0080636

Tri-Party Agreement

**Change Notice for Modifying Approved Documents/ Workplans In Accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records***

| Change Number | Document Submitted Under Tri-Party Agreement Milestone | Date: |
|---|---|---|
| TPA-CN-269 | _____ | March 4, 2009 |

| Document Number and Title: | Date Document Last Issued: |
|---|---|
| WMP-30818, Sample and Analysis Plan for Disposition of Low-Level and Mixed Low-Level Waste from Burial Grounds Except Drums in 218-W-4C | Revision 0, June 2008 |

**Originator:** J. L. Westcott **Phone:** 373-9800

**Description of Change:**

Larry Romine (DOE) and David Einan (Lead Regulatory Agency) agree that the proposed change modifies an approved workplan/document and will be processed in accordance with the Tri-Party Agreement Action Plan, Section 9.0, *Documentation and Records*, and not Chapter 12.0, *Changes to the Agreement.*

The document has been revised incorporating the following changes into the document:

- Add a new Appendix, Appendix H, adding a new waste stream
- Editorial corrections
- Update of companies and team members
- Correct contaminated secondary waste chemical list (Table F-3)

The affected pages: vi, x, 1-1, 1-2, 1-5 through 1-8, 1-10 , 1-11, 2-1, 2-2, 4-12, 4-13, 4-16, 5-4, 7-1, E-3, F-2, F-3, F-4, F-10, F-20, G-13, and all of Appendix H.

**Justification and Impacts of Change:**

The addition of the Appendix H is required to added new waste streams to the SAP. All other changes are corrections of errors identified in the document or updates necessary to incorporate recent contract changes.

RECEIVED
MAR 11 2009
EDMC

**Approvals:**

| | | | | |
|---|---|---|---|---|
| DOE Project Manager | 3-4-09 Date | ✓ Approved | __ Disapproved | |
| Lead Regulatory Project Manager | 3/4/09 Date | ✓ Approved | __ Disapproved | |

Once all the above steps have been completed, the originator sends a copy of the signed change notice to the FH TPAI organization (H8-12), the Administrative Record (H6-08) (refer to TPA Action Plan, Section 9.3), lead regulatory agency, affected Hanford contractor, DOE Project Manager, project/contractor Document Custodian, and others as appropriate. Maintain the original Change Notice per approved Records Management procedures.

## TERMS

| | |
|---|---|
| WAC | waste acceptance criteria |
| WCH | Washington Closure Hanford, LLC |
| WIPP | Waste Isolation Pilot Plant |
| WRAP | Waste Retrieval and Processing |

## DEFINITIONS

**Acceptable knowledge** – Process knowledge information concerning a waste that is collected, evaluated, and documented in accordance with Hanford transuranic program requirements.

**Field measurement** – Testing performed on a container of waste not at a fixed laboratory.

**Field testing** – Testing performed on a sample or container of the waste using portable instruments, strips, etc. not located at a fixed laboratory.

**Laboratory Testing** – Testing performed on a sample of the waste using instruments located at a fixed laboratory.

**Process knowledge** – Historical information about the waste and the waste generation process. It includes past testing, measurements, and observations of waste and related material; the facility generating the waste; and information about the waste generation process.

**Retrievably Stored Waste** – Suspect transuranic waste that was placed in earthen covered storage in the Hanford low-level waste burial grounds in 1970 and thereafter.

# 1.0 INTRODUCTION

An action regarding the treatment and disposal of waste on the Hanford site under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) per 40 CFR 300, "National Oil and Hazardous substance Pollution Contingency Plan," has been initiated. The action is established in the *Amended Record of Decision for the Environmental Restoration Disposal Facility* (EPA et. al. 2007), hereafter called the ERDF ROD Amendment, consisting of treatment, as needed, and disposal of Hanford low-level waste (LLW) and mixed low-level waste (MLLW) at the Environmental Restoration Disposal Facility (ERDF). DOE/RL-2006-40, *Work Plan for the Disposition of Low-Level and Mixed Low-Level Waste from Burial Grounds Except Drums in 218-W-4C* (FH 2008) implements the action and requires that a sampling and analysis plan (SAP) be prepared and approved by the U.S. Environmental Protection Agency (EPA). However, some Hanford waste may be determined by evaluation to have the appropriate documentation that can be substituted for a SAP as specified in Section 5.0 of DOE/RL-2006-40 (FH 2008). Such waste that is approved in accordance with Section 5.0 of DOE/RL-2006-40 is not included in this SAP. This document is the sampling and analysis plan (SAP) required by the work plan (FH 2008) for the disposition of containers of low-level waste (LLW) and mixed low-level waste (MLLW) retrieved from b~~B~~urial ~~G~~grounds located at the 200 West and 200 East Areas at the U.S. Department of Energy (DOE) Hanford Site. Waste is being retrieved from the following Burial Grounds:

- Burial Ground 218-W-4C (trenches 1, 4, 7, 20, 24, and 29)
- Burial Ground 218-W-4B (trenches 7, V-7, and 11)
- Burial Ground 218-E-12B (parts of trenches 17 and 27)
- Burial Ground 218-W-3A (parts of trenches 1, 4, 5, 6, 8, 10, 15, 17, 23, 30, 32, 34, S6, and S9).

Refer to Figures 1-1 and 1-2 for maps of the 200 West and 200 East Areas Low-Level Burial Grounds, respectively.

The Washington State Department of Ecology, the U.S. Environmental Protection Agency (EPA), and the DOE, hereinafter referred to as the Tri-Parties, approved and signed *Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA] Time Critical Removal Action Memorandum for Disposal at the Environmental Disposal Restoration Facility [ERDF] of Non-Transuranic [TRU] Waste Generated During the M-91 Retrieval Operations at Burial Ground 218-W-4C* (EPA et. al. 2004), to accelerate the disposition of wastes stored in drums located in Burial Ground 218-W-4C. The drums of waste from Burial Ground 218-W-4C that are the subject of the time critical removal action (TCRA) (EPA 2004) are excluded from the scope of this document because the waste is covered by an existing time-critical action memorandum and supporting documentation.

The ERDF ROD Amendment (EPA et. al. 2007), authorizes the treatment and disposal to ERDF of many wastes including the retrievably stored waste (RSW) that is the subject of this document. Waste becomes subject to this CERCLA action when it is determined that the waste is compliant or can be treated at the ERDF to be compliant for disposal at the ERDF and it is decided by the project to send the waste to the ERDF for disposal. The ERDF ROD amendment does not mandate that the waste be disposed at the ERDF; rather, it provides a method for

disposal at the ERDF that may be selected. The accumulation, storage, testing, treatment, collection and evaluation of process knowledge (PK), and transportation of waste activities may occur prior to this action and its requirements becoming effective to a waste. Those activities performed prior to the action becoming effective are not governed by this SAP. However, those activities performed prior to the time the action becomes effective to a waste that are necessary to demonstrate compliance with the ERDF waste acceptance criteria must comply with the quality requirements specified herein in order to make decisions concerning waste treatment and disposal at the ERDF. These activities performed prior to the waste being under the authority of the action frequently include waste packaging, characterization, designation, and radioactive waste classification.

RSW and secondary waste that meets the eligibility requirements described in Section 1.0 of DOE/RL-2006-40 may be disposed at the ERDF under the authority of this action. RSW is considered Hanford site waste in the context of the ERDF ROD Amendment. Secondary waste is radioactive waste that is a product of operations and cleanup activities performed on the Hanford Site and therefore also is Hanford site waste. Wastes that are authorized for disposal at the ERDF by the ERDF ROD Amendment (EPA et. al. 2007) and are the scope of this document includes the following:

- LLW fraction of the RSW
- MLLW fraction of the RSW
- Secondary wastes generated by waste retrieval and during treatment and disposal operations performed at the ERDF (e.g., personal protective equipment, wood, plastic, paper, metal, soil).

In this document, the term RSW refers to all containers located at Burial Grounds 218-W-4C (trenches 1, 4, 7, 20, 24, and 29); Burial Ground 218-W-4B (trenches 7, V-7, and 11); Burial Ground 218-E-12B (parts of trenches 17 and 27); and Burial Ground 218-W-3A (parts of trenches 1, 4, 5, 6, 8, 10, 15, 17, 23, 30, 32, 34, S6, and S9) except containers that are drums located in Burial Ground 218-W-4C and waste retrieved before approval of the TCRA.

The action meets the criteria for initiating an action under the CERCLA per 40 CFR 300, "National Oil and Hazardous Substance Pollution Contingency Plan." The recommended action identified in the ERDF ROD Amendment (EPA et. al. 2007) is treatment, as needed, and disposal of the LLW and MLLW at the ERDF. This SAP supports implementation of the ERDF ROD Amendment.

17 and 27); and Burial Ground 218-W-3A (parts of trenches 1, 4, 5, 6, 8, 10, 15, 17, 23, 30, 32, 34, S6, and S9).

The DOE is required to (1) retrieve; (2) designate pursuant to WAC 173-303, "Dangerous Waste Regulations," Sections -070 through -100; and (3) if needed, treat the suspect-TRU RSW in accordance with *Modification of Hanford Federal Facility Agreement and Consent Order (HFFACO) M-91 Series* (EPA et al. 2008). The suspect-TRU RSW will be segregated into three categories: TRU (including mixed TRU) waste, LLW, and MLLW. A list of original waste generating sources for each ~~B~~burial ~~G~~ground is provided in Tables 1-1 through 1-4.

Table 1-1. Burial Ground 218-W-4C Retrievably Stored Waste Original Waste-Generating Sources. (2 sheets)

| Source Facility | Waste-Generating Source |
|---|---|
| 308 | Plutonium Fabrication Pilot Plant (Plutonium Laboratory and Fuels Development Laboratory) |
| 318 | High Temperature Lattice Test Reactor |
| 324 | Chemical Engineering Laboratory |
| 325 | Radiochemistry Building |
| 340 | Retention and Neutralization Complex |
| 3708 | Radiation Measurements Building |
| 105KE | Battelle Northwest Laboratory |
| 105N | Plutonium production reactor, Reactor operation experimentation<br>Domestic power production |
| 1706KEL | Plutonium production reactor, Reactor operation experimentation |
| 200W | Unspecified locations in the 200 West Area |
| 202A /202AL | Plutonium Uranium Extraction Plant |
| 209E | Critical Mass Laboratory |
| 216Z9 | PFP Complex Building and Crib |
| 216Z12/216Z1A | Process Crib and Tile Field |
| 216B5 | Reverse Well |
| 222S | REDOX Control Laboratory |
| 231Z | Isolation Building (Concentration Building)<br>Plutonium metallurgical laboratory |
| 233S | Plutonium Concentration Facility |
| 2345Z | Plutonium Finishing Plant |
| 2WTF | West Tank Farms |
| 303-C | Fresh Metal Storage Building/Special Nuclear Materials Facility |
| 327/327C | Radiometallurgy Building |
| ARGON | Argonne National Laboratory |
| BABCX | ~~Babcox~~Babcock and Wilcox |
| BATCO | Battelle Columbus Laboratory |
| BETTS | Bettis Atomic Power Laboratory |

Table 1-1. Burial Ground 218-W-4C Retrievably Stored Waste Original Waste-Generating Sources. (2 sheets)

| Source Facility | Waste-Generating Source |
|---|---|
| CUPRC | Center for Energy and Environmental Research |
| ESG/ETEC | Rocketdyne Energy Systems Group/Energy Technology Engineering Center |
| EXXON | Exxon Nuclear Systems |
| LBLAB | Lawrence Berkeley Laboratory |
| MCGEE | Kerr-McGee, Cimarron Plutonium Fuel Fabrication Facility |
| VAL | General Electric - Vallecitos Nuclear Center |
| WARD | Westinghouse Advanced Reactor Division |

PFP = Plutonium Finishing Plant.
REDOX = reduction-oxidation.

Table 1-2. Burial Ground 218-E-12B Trenches 17 and 27 Retrievably Stored Waste-Generating Sources.

| Source Facility | Waste-Generating Source |
|---|---|
| 202A/202AL | Plutonium Uranium Extraction Plant |
| 209E | Critical Mass Laboratory |

Table 1-3. Burial Ground 218-W-3A Trenches 1, 4, 5, 6[1], 8, 10, 15, 17, 23, 30, 32, 34, S6, and S9 Retrievably Stored Waste-Generating Sources. (2 sheets)

| Source Facility | Waste-Generating Source |
|---|---|
| 105C | 105-C Reactor Facility |
| 105KE | 105-KE Reactor Facility |
| 105N | 105-N Building |
| 108F | 108-F Building |
| 144F | 144-F Building |
| 200W | 200 West Area |
| 202A/202AL | Plutonium Uranium Extraction Plant |
| 209E | Critical Mass Laboratory |
| 221TS | T Plant |
| 222-S | REDOX Control Laboratory |
| 231-Z | Isolation Building (Concentration Building), Plutonium ~~metallurgical~~ Metallurgical ~~l~~Laboratory |
| 2345Z | Plutonium Finishing Plant |

[1] Due to containers in the trench that do not have identifying marks on them the whole trench is managed as separate individual waste stream.

Table 1-3. Burial Ground 218-W-3A Trenches 1, 4, 5, 6[1], 8, 10, 15, 17, 23, 30, 32, 34, S6, and S9 Retrievably Stored Waste-Generating Sources. (2 sheets)

| Source Facility | Waste-Generating Source |
|---|---|
| 308 | Plutonium Fabrication Pilot Plant (Plutonium Laboratory and Fuels Development Laboratory) |
| 325 | Radiochemistry Building |
| 327C | Radiometallurgy Building |
| BATCO | Battelle Columbus Laboratory |
| LRLAB | Lawrence Livermore Laboratory |
| RF | Rocky Flats |

REDOX = reduction-oxidation.

Table 1-4. Burial Ground 218-W-4B Trenches 7[2], V7[2], and 11[2] Retrievably Stored Waste-Generating Sources. (2 sheets)

| Source Facility | Waste-Generating Source |
|---|---|
| 105C | 105-C Reactor Facility |
| 105KE | 105-KE Reactor Facility |
| 105N | 105-N Building |
| 108F | 108-F Building |
| 144F | 144-F Building |
| 200W | 200 West Area |
| 202A/202AL | Plutonium Uranium Extraction Plant |
| 209E | Critical Mass Laboratory |
| 216Z9 | PFP Complex Building and Crib |
| 216Z12/216Z1A | Process Crib and Tile Field |
| 221TS | T Plant |
| 222-S | REDOX Control Laboratory |
| 231-Z | Isolation Building (Concentration Building), Plutonium Metallurgical Laboratory |
| 233S | Plutonium Concentration Facility |
| 2345Z | Plutonium Finishing Plant |
| 242B | 242B Evaporator |
| 2WTF | 200 West Tank Farms |
| 303-C | Fresh Metal Storage Building/Special Nuclear Materials Facility |
| 308 | Plutonium Fabrication Pilot Plant (Plutonium Laboratory and Fuels Development Laboratory) |
| 325 | Radiochemistry Building |

[2] Due to containers in the trench that do not have identifying marks on them the whole trench is managed as spearate individual waste stream.

Table 1-4. Burial Ground 218-W-4B Trenches 7[2], V7[2], and 11[2] Retrievably Stored Waste-Generating Sources. (2 sheets)

| Source Facility | Waste-Generating Source |
|---|---|
| 327C | Radiometallurgy Building |
| ARGON | Argonne National Laboratory |
| BATCO | Battelle Columbus Laboratory |
| LRLAB | Lawrence Livermore Laboratory |
| RF | Rocky Flats |

PFP = Plutonium Finishing Plant.
REDOX = reduction-oxidation.

Suspect-TRU RSW is suspected to be mixed waste and will be managed as mixed waste unless and until it is designated as not mixed. A simplified process flow diagram for the disposition of RSW from the Burial Grounds is provided in Figure 1-3. The TRU portion of the RSW from the ~~B~~burial ~~G~~grounds will be processed as part of the Waste Isolation Pilot Plant (WIPP) certification activities ~~to~~ that determines that a waste meets the definition of TRU waste ~~to~~ and enables DOE to comply with provisions of the *Waste Isolation Pilot Plant Land Withdrawal Act of 1992*.

The ERDF ROD Amendment (EPA et. al. 2007) authorizes the treatment of the LLW and MLLW fractions of the RSW, as required, and their disposal at the ERDF. The waste must comply with or be treated to comply with the ERDF waste acceptance criteria, which embodies the ERDF applicable or relevant and appropriate requirements (ARARs). The treatment and disposal of LLW and MLLW RSW under the TCRA (EPA 2004) is excluded from the scope of this document. The LLW and MLLW fractions account for about half of the RSW from the ~~B~~burial ~~G~~grounds (i.e., approximately 10,000 containers not including drums from Burial Ground 218-W-4C). It is anticipated that greater than 90 percent of the MLLW will meet the definition of debris waste under WAC 173-303-140, "Land Disposal Restrictions," or are radioactive lead solids.

## 1.2 DATA QUALITY OBJECTIVES

The data quality objectives (DQO) are established in WMP-30817, *Data Quality Objectives Report for Disposition of Low-Level and Mixed Low-Level Waste from Burial Grounds Except Drums from Burial Ground 218-W-4C* (FH 2007) that was written in accordance with the seven-step planning process described in EPA QA/G-4, *Guidance for Data Quality Objectives Process* (EPA 2000). The information pertinent to this SAP is reproduced from the DQO report (FH 2007) in this section of the SAP. For application of the complete DQO process see the DQO report (FH 2007).

The DQO and SAP development team members are listed in Table 1-5. The DQO and SAP decision-makers are listed in Table 1-6.

Table 1-5. Data Quality Objectives Team Members. (2 sheets)

| Name | Company/Organization | Position or Area of Expertise |
|---|---|---|
| ~~Darrin Faulk~~ | ~~FH/Waste Stabilization and Disposal Project~~ | ~~Regulatory Support/Environmental Compliance Officer~~ |
| Mike Conilogue | WCH/Waste Services | ERDF waste acceptance |
| John Trechter | FH/Production Control | Laboratory Representative |
| Naeem Abdurrahman | ~~FH~~CHPRC/Waste ~~Stabilization~~ and ~~Disposal~~Fuel Management Project | Nondestructive Assay |
| Jeff Westcott | ~~FH~~M&EC/ Waste and Fuel Management Project~~Waste Stabilization and Disposal Project~~ | Task Lead and Waste Management |
| John Woodbury | CHPRC~~EnergySolutions Federal Services, Transportation Safety Operations~~/Shipping and Transport | Transportation Engineer |
| Bill Jasen | ~~PEC~~CHPRC/ Waste and Fuel Management Project~~Waste Stabilization and Disposal Project~~ | Nondestructive Assay |
| ~~Mike Hill~~Joe Guyette | ~~FH~~M&EC/Quality Assurance | QA |
| Stephen Smith | ~~FH~~CHPRC/Quality Assurance | Environmental QA |
| Lana Strickling | M&EC/ Waste and Fuel Management Project~~FH/Waste Stabilization and Disposal Project~~ | Task Lead Waste Retrieval Project |
| Roni Swan | M&EC/ Waste and Fuel Management Project~~FH/Waste Stabilization and Disposal Project~~ | Waste Retrieval Project |
| Brett Barnes | CHPRC/ Waste and Fuel Management Project~~FH/Waste Stabilization and Disposal Project~~ | Regulatory Support/Environmental Compliance Officer |

Table 1-5. Data Quality Objectives Team Members. (2 sheets)

| Name | Company/Organization | Position or Area of Expertise |
|---|---|---|
| Paul Fernandez | M&EC/ Waste and Fuel Management Project~~FH/Waste Stabilization and Disposal Project~~ | T plant support |
| Jeff Ahlers | M&EC/ Waste and Fuel Management Project~~FH/Waste Stabilization and Disposal Project~~ | T plant operations |
| Dean Nester | CHPRC/ Waste and Fuel Management Project~~FH/Waste Stabilization and Disposal Project~~ | Lead mixed waste treatment project |
| John Miller | CHPRC/ Waste and Fuel Management Project~~FH/Waste Stabilization and Disposal Project~~ | Radiation Control |
| Wayne Moore | CHPRC/ Waste and Fuel Management Project~~FH/ Waste Stabilization and Disposal Project~~ | Retrieval Operations |

CHPRC = CH2M HILL Plateau Remediation Company
ERDF = Environmental Restoration Disposal Facility.
FH = Fluor Hanford, Inc.
M&EC = East Tennessee Materials and Energy Company
~~PEC = Project Enhancement Corporation.~~
QA = quality assurance.
WCH = Washington Closure Hanford, LLC.

Table 1-6. Key Decision-Makers.

| Name | Organization |
|---|---|
| ~~Greg Sinton~~Larry Romine | U.S. Department of Energy, Richland Operations Office |
| Owen Robertson | U.S. Department of Energy, Richland Operations Office |
| Dave Einan | U.S. Environmental Protection Agency |

### 1.2.1 Statement of Problem

The problem is stated as:

> The low-level and mixed low-level fractions of RSW and secondary waste must be treated (if required), processed (if required), and then disposed at the ERDF. The waste must be characterized, designated, radioactive waste class determined, land disposal restrictions (LDR) status determined, and treated if required to dispose of it at the ERDF.

# 2.0 SAMPLING AND MEASUREMENT RATIONALE AND DESIGN

RSW consists of a large number of containers of waste that exhibit diverse characteristics, waste form, original sources, quality of documentation, and container types; therefore, it is not possible to collect, evaluate, and present in the initial issue of this SAP all the PK information that exists for the waste. Instead, a process is described whereby RSW and secondary waste PK is collected and the waste characterization completed as required to support decision making necessary to treat and dispose of the waste at the ERDF.

As waste streams are identified for inclusion in this SAP in accordance with Section 5.0 of the work plan (DOE 2008) and information is collected and evaluated, a summary of the waste stream specific data is added to this SAP in an appendix. When a waste stream is added as an appendix herein, the appendix shall contain waste stream specific data consisting of the following elements:

- A waste stream title.
- A description of the waste stream including its distinguishing characteristics and burial ground of origination.
- An estimated number of containers constituting the waste stream.
- A list of data sources with a summary describing the contents of the data source.
- A summary of the originating waste generation process.
- A summary of the process determining the COC from an original list of COPC.
- A summary of an assessment of the data to determine if each DR of Table 1-7 can be resolved.
- If a DR can be resolved, then a summary of the resolution including waste codes and radionuclide distribution as applicable to the waste stream.
- If data collection other than verification and nondestructive assay (NDA) are required for RSW or an inventory and radioactive survey for secondary waste, then a data collection plan shall be incorporated into the waste stream specific appendix. The data collection plan shall address all the elements specified in Appendix B.

## 2.1 RETRIEVABLY STORED WASTE

The characterization of RSW activity will first collect information describing the waste and waste generation processes that can be used in decision making, information of this kind is called PK. PK may or may not be adequate to resolve all of the decisions regarding the waste. Commonly, PK is collected, evaluated and documented in accordance with the Hanford TRU Waste program requirements and is called by the TRU ~~p~~Program acceptable knowledge (AK). AK developed in accordance with the TRU ~~P~~program is also PK. Throughout the rest of this document when the term PK is used it also includes AK. The process of evaluating PK about a waste will identify the need to collect additional data, such as the NDA of containers of waste. As new data is collected the quality and the adequacy of the new information to make the necessary decisions is evaluated. The process steps used to characterize RSW are performed in the following order listed:

- All physical, chemical, and radiological PK information associated with RSW containers is collected. PK includes the kind of information that is described in Section 4.4
- Containers of RSW are grouped into waste streams for further evaluation.
- The PK information is evaluated to determine if the containers can be identified at the time of retrieval.
- The PK information is evaluated to determine if it is adequate to resolve DR as described per Section 2.1.1.
- If the containers cannot be identified at the time of retrieval or the PK is not adequate to resolve DR, then the waste will be managed as described for waste without adequate PK per Section 2.1.2.
- If the containers can be identified at the time of retrieval and the PK is adequate to resolve DR, then the waste is managed as described for waste with adequate knowledge.
- The identity of RSW will be verified as described per Section 2.3.
- In some cases where containers of RSW cannot be connected with the original source of generation due to a lack of markings or labels on the container or loss of container integrity, waste streams may be prepared that incorporates information about all the possible generation sources at that location. Such waste streams may extend over a trench or a b~~B~~urial g~~G~~round.

### 2.1.1 Retrievably Stored Waste with Adequate PK

The waste PK information is evaluated to determine if it is adequate to resolve each DR as described in the information requirements presented in Section 2.4 of this SAP. For most waste streams PK exists that is adequate to: (1) designate the waste resolving DR 2 through 4 and elements of DR 5; (2) establish the radioactive distribution necessary to support NDA that will resolve DR 1 and elements of DR 5; and (3) demonstrate compliance with the physical requirements of DR 5. In most cases NDA and visual examination are the only additional information required to resolve all DR, though some waste streams of RSW may be determined to possess adequate PK to establish the radionuclide inventory of the waste without subjecting the waste to NDA. RSW will be subjected to verification to confirm knowledge of the waste as described per Section 2.3 of this SAP.

### 2.1.2 Retrievably Stored Waste without Adequate PK

RSW streams that do not possess adequate PK in accordance with the itemized list for most waste streams shown in Section 2.1.1 will require data collection over and above verification and NDA. The planning to collect data over and above verification and NDA, shall be performed for each RSW stream addressing the elements established in Appendix B of this SAP. The data collection planning shall address the data needed to be collected to resolve each of the DR of Table 1-7 as necessary. The data collection shall be accomplished using the methods presented in this SAP to the extent practicable.

### 4.2.2 Field Testing

Samples of waste will be collected and tested in the field and then the sample returned to the waste container. The data collection plan shall specify the field testing methods selected from Table 4-1, or if not in Table 4-1, then in accordance with test method work documents. The data collectors shall plan their work to comply with the method performance requirements of precision, accuracy, and quantitation limits specified in Table 4-1. However, the actual performance may be different due to sample matrix and/or interferences. If necessary, the data collectors shall determine, with the concurrence of the project, an alternate performance requirement for a test method. If a test method not in Table 4-1 is chosen or alternate performance requirements are specified, it shall be documented in the data collection plan.

## 4.3 MEASUREMENTS

### 4.3.1 Nondestructive Assay

RSW and secondary waste may be subjected to NDA using either mobile or portable NDA units located at the retrieval site or fixed NDA units at the Waste Retrieval and Processing (WRAP) Facility. Multiple contractors provide various NDA equipment and services. At the retrieval site and WRAP Facility, measurements are obtained using gamma energy NDA, passive~~/active~~ neutron, and/or ~~imaging~~ passive/active neutron systems.

The primary purpose of ~~the~~ an NDA system is to accurately and reliably identify and quantify radionuclides with sufficient confidence to distinguish TRU waste from LLW. The NDA system is required to report a minimum detectable concentration (MDC) of TRU radionuclides sufficiently below 100 nCi/g to determine TRU waste from LLW (nominally at 60 nCi/g or lower). The MDC is ~~also referred~~related to ~~as~~ the lower limit of detection (LLD).

The mobile drum NDA system used at the retrieval site consists of four gamma ray measurement stations situated in a mobile transport container. Each station has a separate drum rotator and consists of a far field measurement using a collimated and shielded high purity germanium detector (HPGe) in a support frame connected to a high-resolution gamma ray spectroscopy system. The drum is measured on a rotating turntable to even out heterogeneities in the waste matrix. Control and analysis uses the ORTEC GAMMAVISION[3] and ISOTOPIC[4] software for the identification and quantification of radionuclides.

A second mobile drum NDA system may be installed for use. This system will consist of a field measurement using a collimated and shielded HPGe detector connected to a high-resolution gamma ray spectroscopy system and a passive/active neutron detector. The detector is used on waste streams that the TRU waste/LLW content cannot be determined by gamma NDA. The drum is measured on a rotating turntable to even out heterogeneities in the waste matrix. Control and analysis uses vendor-supplied software compliant with verification and validation requirements for the identification and quantification of radionuclides.

---

[3]GAMMAVISION is a registered trademark of AMETEK, Inc., Paoli, Pennsylvania.

[4] ISOTOPIC is a registered trademark of AMETEK, Inc., Paoli, Pennsylvania.

Containers other than drums from the retrieval site are measured using a portable NDA system. These containers include large boxes and tanks and other configurations. The portable NDA system consists of an in situ object counting system unit and a slab neutron counter. The object counting unit consists of a shielded HPGe detector connected to a high-resolution gamma ray spectroscopy system. The neutron counter unit consists of ~~five~~ an array of pressurized $^{3}$He detector tubes in a high-density polyethylene block. Using the slab neutron counter, individual neutron events are detected and reported and related to the TRU concentration. In this situation, the NDA detector is positioned around the large waste item, multiple measurements may be performed, and the results integrated to report the TRU concentration.

The primary purpose of the WRAP Facility NDA systems is to perform measurements for disposal of TRU waste. The units located at the WRAP Facility are certified to the quality requirements of the TRU Program. The WRAP Facility has two types of drum NDA systems:

- Gamma energy analysis (GEA)
- Imaging passive active/neutron (IPAN).

WRAP is redundant in both system types and separates the units as A and B (GEA-A and GEA-B; IPAN-A and IPAN-B.) The gamma energy analysis units contain ~~four~~ six HPGe detectors four of which are for absolute radionuclide measurements and the remaining two are used for relative isotopic measurements. ~~that,~~The array of four detectors, when coupled with moving the drum through three vertical platform positions, ~~breaks~~ partitions ~~a~~the drum into ~~ten~~ up to twelve assay segments. Four transmission sources are located directly opposite each HPGe detector. These sources are used to directly measure the attenuation of the matrix for that vertical segment. The ~~analysis~~ software used on the system is the Genie 2000/NDA2000.[5] ~~PC-based Gamma Waste Assay Software. Imaging~~ Active/P~~p~~assive~~/active~~ ~~n~~Neutron measurements using the Imaging Passive /Active Neutron (IPAN) complement gamma measurements when gamma measurements are ~~used to assist in the~~inadequate to ~~quantification~~ quantify the~~of~~ TRU radionuclide content.

For boxes, the WRAP Facility also has a super high-efficiency neutron coincidence NDA system for performing assays of metal standard waste boxes. That NDA system consists of a passive neutron system that uses both standard coincidence counting and multiplicity analysis and a HPGe isotopic assay system. The super high-efficiency neutron coincidence assay system is used for nuclear material accountability, for criticality safety compliance, and disposal facility compliance.

Numerous factors affect the MDC reported by the analysis systems, including the following:

- Detector to sample calibration geometry
- Detector resolution
- Detector efficiency
- Sample density
- Sample elemental composition
- Spatial distribution of activity material
- Self attenuation of source materials

[5] Genie is a registered trademark of Canberra Industries, Inc., Meriden, Connecticut.

## 4.4 PROCESS KNOWLEDGE

PK consists of historical information about the waste and tests and/or measurements performed on the waste or waste samples that may be used to resolve the DR. PK consists of following types and forms of information:

- Solid waste storage/disposal records, TRU waste storage records, waste certification summaries, and other applicable waste acceptance documentation
- Published documentation
- Unpublished information or notes
- Interviews (e.g., phone conversation, e-mail, etc.)
- Internal generator procedures including operating and administrative
- Laboratory and/or field analysis data from testing a representative sample of the waste or a material generated by a similar process
- Material safety data sheets of commercial products
- A mass balance, including radioactive material, for the waste generating process, to the extent that such data provide a sufficient understanding of the characteristics of and constituents of the waste stream
- Inventory sheets
- Vendor and procurement information
- Radiation work packages
- Computer modeling that is corroborated with some direct measurement methods.

The PK documents shall be placed in the records. The PK evaluation shall be summarized in the information included in waste stream specific appendices of this SAP.

## 4.5 VERIFICATION

The verification of RSW consists of two components, inspection at the time of retrieval from a burial ground and visual examination. The verification of secondary waste consists of a supervisory inventory sheet review.

### 4.5.1 RSW Container Inspection

During the initial inspection at the time of RSW retrieval, the following information will be confirmed:

- Container number or other unique identifying characteristic (e.g., seal number), if available
- Vent clip installation
- Contamination and surface dose
- Container condition.

**Quality Assurance**

The QA management has the following responsibilities:

- Review and approve project documentation that establishes and/or implements quality assurance requirements
- Perform QA assessments and surveillances
- Manage corrective actions associated with work performed by organization
- Maintain qualifications of personnel performing work in accordance with this SAP.

### 5.1.4 Special Training Requirements and Certification

The activities performed in accordance with this SAP are routine and do not require special training with the exception of NDA and RTR operators. The training of personnel, except TRU program personnel, is performed and maintained in accordance with the ~~Fluor Hanford, Inc.~~CH2M HILL Plateau Remediation Company (~~FH~~CHPRC) training and QA program. Personnel performing activities under the Hanford TRU program shall be trained in accordance with TRU program training and QA program requirements.

The NDA unit personnel shall be trained in accordance with training requirements of ASTM C 1490, *Standard Guide for Selection, Training, and Qualification of Nondestructive Assay (NDA) Personnel ANSI N15.54, Radiometric Calorimeters- Measurement Control Program* (ASTM 2004).

The RTR unit operator shall be trained as a level II operator in accordance with *Recommended Practice No. SNT-TC-1A-1992, Personnel Qualification and Certification for Nondestructive Testing* (ASNT 1992).

### 5.1.5 Quality Assurance Objectives and Criteria for Measurement Data

The objective of this SAP is to obtain data of known and sufficient quality to support RSW and secondary waste disposal at the ERDF as established by the DR presented in Table 1-7.

Data QA objectives (QAO) for the data being collected are expressed as representativeness, comparability, accuracy, precision, and completeness. These parameters are defined as follows:

- **Representativeness** – A measure of how closely data reflect the characteristic of a population, a parameter, variations at a sampling point, or environmental conditions.
- **Comparability** – A measure of the confidence with which one data set can be compared to another.
- **Accuracy** – The degree to which the data agree with an accepted reference or true value.
- **Precision** – A measure of the mutual agreement between comparable data gathered or developed under similar conditions.
- **Completeness** – A measure of the amount of valid data obtained compared to the amount that was expected.

## 7.0 REFERENCES

10 CFR 61, "Licensing Requirements for Land Disposal of Radioactive Waste," *Code of Federal Regulations*, as amended.

10 CFR 835, "Occupational Radiation Protection," *Code of Federal Regulations*, as amended.

29 CFR 1910, "Occupational Safety and Health Standards," *Code of Federal Regulations*, as amended.

40 CFR 268, "Land Disposal Restrictions," *Code of Federal Regulations*, as amended.

40 CFR 300, "National Oil and Hazardous Substance Pollution Contingency Plan," *Code of Federal Regulations*, as amended.

40 CFR 761, "Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions," *Code of Federal Regulations*, as amended.

49 CFR Parts 100-185, "Transportation," *Code of Federal Regulations*, as amended. ASNT, 1992, *Recommended Practice No. SNT-TC-1A-1992, Personnel Qualification and Certification for Nondestructive Testing*, SNT-TC-1A-1992, American Society for Nondestructive Testing, Columbus, Ohio.

ASTM, 2004, *Standard Guide for Selection, Training, and Qualification of Nondestructive Assay (NDA) Personnel ANSI N15.54, Radiometric Calorimeters- Measurement Control Program*, ASTM C 1490, American Society for Testing and Materials, Philadelphia, Pennsylvania.

*Comprehensive Environmental Response, Compensation, and Liability Act.*

DOE, 1999, *Radioactive Waste Management Manual*, DOE M 435.1-1, U.S. Department of Energy, Washington, D.C.

DOE, 2002, *Hanford Sitewide Transportation Safety Document,* DOE/RL-2001-36, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE, 2008, *Work Plan for the Disposition of Low-Level and Mixed Low-Level Waste from Burial Grounds Except Drums in 218-W-4C*, DOE/RL-2006-40, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

EPA, 1997, *Test Methods for Evaluating Solid Waste: Physical/Chemical Methods*, SW-846, Update III, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 2000, *Guidance for the Data Quality Objectives Process*, EPA QA/G-4, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 2004, *Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) Time Critical Removal Action Memorandum for Disposal at the Environmental Restoration Disposal Facility (ERDF) of Non-Transuranic (TRU) Waste Generated During the M-91 Retrieval Operations at Burial Ground 218-W-4C*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

EPA, Ecology, and DOE, 2007, *Amended Record of Decision for the Environmental Restoration Disposal Facility*, U.S. Environmental Protection Agency, Washington State Department of Ecology, and U.S. Department of Energy, Olympia, Washington.

The PUREX Plant used administrative controls such as operating procedures and policies to regulate the physical, chemical, and radionuclide content of the waste. Most of the debris was segregated between combustible and noncombustible waste. Chemicals (e.g., pipettes) were required by procedure to be compatible with the contents of the container. Hood waste did not contain metal, glass, or process materials such as powder, sludge, acid-soaked rags or solutions. Free liquids and absorbed organics were prohibited. Acid-soaked or oxidizer-soaked materials from the Analytical Laboratory were required to be thoroughly rinsed with water several times, dried, and bagged separately.

The waste materials expected to be present that could potentially contain dangerous waste constituents include alkaline batteries, dried paint, and fluorescent light tubes. Retrievably stored waste (RSW) containers that are classified as TRU from this same waste stream have been subjected to Waste Isolation Pilot Plant (WIPP) certification activities. Waste items have been identified that are not eligible for macroencapsulation or that do not meet the Environmental Restoration Disposal Facility (ERDF) waste acceptance criteria (WAC). These types of restricted items include, for example, inner containers of liquid and aerosol cans.

## E1.3 RADIONUCLIDES

This evaluation summarizes the radionuclides and isotopic distributions expected to be in the PUREX mixed waste containers placed in storage in the 218-W-4B, Trenches T7 and TV7 and ~~b~~Burial ~~g~~Ground 218-W-3A, Trench T17 at Hanford from 1972 to 1978. The wastes were generated from PUREX operations and laboratory facilities. The laboratory facilities included the D5 hot cell which received samples from the dissolver feed stream for nuclear accountability. Consequently, many of these containers are high in mixed fission products (MFP) ($^{85}$Kr, $^{90}$Sr, $^{99}$Tc, $^{137}$Cs, $^{147}$Pm, $^{151}$Sm, $^{154}$Eu, and $^{155}$Eu). The MFP contamination will vary from not detectable to remote handled due mainly to $^{137}$Cs or if it was from the D5 hot cell. The radionuclides present in the waste include fuels and weapons-grade plutonium ($^{238}$Pu, $^{239}$Pu, $^{240}$Pu, $^{241}$Pu, and $^{242}$Pu), depleted and slightly enriched uranium ($^{233}$U, $^{234}$U, $^{235}$U, and $^{238}$U), americium ($^{241}$Am), and neptunium ($^{237}$Np).

When the waste was packaged for storage in the ~~B~~burial ~~G~~grounds, the radionuclide content of each waste package was either estimated or measured and recorded on the waste disposal record, nuclear accountability forms, shipping records, or content inventory sheet for each shipment of waste containers.

A review of the waste disposal records and associated documentation was performed to determine the isotopic distributions and ratios in the PUREX waste stream. The PUREX waste stream will have a mixture of MFP. The gamma emitters will be determined by nondestructive assay (NDA) while the significant beta emitters can be determined from ratios (the ratios are based on 32 years of decay [1975] which is the average of 1972 and 1978).

The enriched $^{235}$U component in these containers is less than 1% of the total uranium because PUREX could not process the higher enriched materials. PUREX was not constructed to be "critically safe" for materials over 1% enrichment and therefore did not process highly enriched uranium. PUREX also processed depleted uranium. Consequently, the uranium isotopic ratios will vary from depleted to slightly enriched. Since the burial records did not provide the isotopic ratios of these materials, similar ratios were used.

Table F-1. Existing Documents and Data. (2 sheets)

| Reference | Summary |
|---|---|
| DSI, "Chemicals Associated with the Contaminated Secondary Waste Generated During Retrieval Operations," M. Lakes to L. Strickling et. al. (FH 2008) | The document lists and designates contaminated secondary debris waste from waste retrieval operations in all burial grounds. |

## F1.1 BACKGROUND INFORMATION

A characterization for radioactively contaminated secondary waste generated during waste drum retrieval operations at the 218-W-4C Burial Ground was established in HNF-21786, Revision 0-B, *Sampling and Analysis for the Low-Level Waste Fraction of Retrievably Stored Waste*. This appendix expands the characterization in HNF-21786, Revision 0-B (FH 2007b) to include contaminated secondary MLLW generated during waste retrieval operations at Burial Grounds 218-W-4C, 218-W-4B, 218-W-3A, and 218-E-12B. The scope of this appendix includes Burial Ground 218-W-4C because boxes are removed from the ~~B~~burial ~~G~~ground then disposed within the scope the Environmental Restoration Disposal Facility (ERDF) Record of Decision amendment. The characterization provided herein represents all of the waste streams identified in the b~~B~~urial ~~G~~grounds listed above.

Secondary waste generated during waste retrieval operations at the ~~B~~burial ~~G~~grounds is split into two types, contaminated and suspect-contaminated. At the time of generation secondary waste is sorted into one of these two types by performing radiological surveys of the waste. Secondary waste where detectible surface contamination is identified is managed as contaminated secondary waste.

## F1.2 PHYSICAL WASTE DESCRIPTION

The waste stream consists of radioactively contaminated secondary waste that is debris. The contaminated secondary MLLW debris includes such items as PPE, wood (e.g., plywood, railroad ties, pallets), paper, plastic (e.g., vent pipes, tarps, tent material), rubber, non-regulated metals (e.g., aluminum, steel, copper), and incidental amounts of soil or particulate.

## F2.0 CONTAMINANTS OF CONCERN

The Contaminants of Potential Concern (COPC) for contaminated secondary debris waste are compiled using the process knowledge (PK) documentation, the solid waste information tracking system, and information gathered via the waste through retrieval and Waste Isolation Pilot Plant (WIPP) certification efforts. COPCs for which PK and/or analytical data are sufficient to confirm that they are not present, or are not reasonably expected to be in the waste stream are excluded to obtain the Contaminants of Concern (COC). Radionuclides are excluded when they are naturally occurring and have not been concentrated in the waste or when they are present at concentrations below ERDF waste acceptance criteria reporting limits. The exclusions and rationale are provided in this section.

## F2.1 CONTAMINANTS OF POTENTIAL CONCERN

Table F-2 identifies the contaminated secondary MLLW COPCs. Since the secondary MLLW consists of newly generated debris from retrieval operations potentially contaminated with the retrievably stored waste (RSW), those COPCs present in all RSW were included in the COPC list. The chemical constituents in all RSW are listed in Table F-3.

Table F-2. Contaminants of Potential Concern for Secondary MLLW.

| Type of contamination (general) | Contaminants of potential concern (specific) |
|---|---|
| Chemicals | Polychlorinated biphenyl and the list of chemicals provided in Table F-3 |
| Radionuclides | $^{22}$Na, $^{40}$K, $^{59}$Ni, $^{63}$Ni, $^{90}$Y, $^{94}$Nb, $^{99}$Tc, $^{125}$Sb, $^{134}$Cs, $^{137m}$Ba, $^{147}$Pm, $^{151}$Sm, $^{152}$Eu, , $^{155}$Eu, $^{226}$Ra, $^{228}$Th, $^{232}$U, $^{236}$U, $^{243}$Am, $^{242}$Cm, $^{244}$Cm, $^{247}$Bk, $^{60}$Co, $^{90}$Sr, $^{137}$Cs, $^{154}$Eu, $^{237}$Np, $^{232}$Th, $^{233}$U, $^{234}$U, $^{235}$U, $^{238}$U, $^{238}$Pu, $^{239}$Pu, $^{240}$Pu, $^{241}$Pu, $^{242}$Pu, $^{241}$Am, $^{243}$Cm, $^{249}$Cf |

Table F-3. List of Chemicals in Retrievably Stored Waste. (13 sheets)

| Chemicals | CAS# | Chemicals | CAS# |
|---|---|---|---|
| (3-2-arsonophenylazo)-4,5-dihydroxy-2,7 naphthalenedisulfonic acid, disodium salt (Arsenazo I Reagent) | 3547-38-4 | -- | -- |
| 1,1,1-Trichloroethane | 71-55-6 | Magnesium aluminum silicate | 8031-18-3 |
| 1,1,2,2-Tetrachloroethane | 79-34-5 | Magnesium carbonate | 546-93-0 |
| 1,10-Phananthroline iron II sulfate complex | 14634-91-4 | Magnesium carbonate | 7760-50-1 |
| 1,1-dichloroethylene | 75-35-4 | Magnesium chloride | 7786-30-3 |
| 1,1-dichloroethylene | 75-77-4 | Magnesium hydroxide | 1309-42-8 |
| 1,2,3-Tri (CIS-9-Octadecenoyl) glycerol | 122-32-7 | Magnesium nitrate | 10377-60-3 |
| 1,2,4-Trichlorobenzene | 120-82-1 | Magnesium nitrate hexahydrate | 13446-18-9 |
| 1,2-Dichloroethane | 107-06-2 | Magnesium oxide | 1309-48-4 |
| 1,2-Dihydroxyanthraquinone | 72-48-0 | Magnesium perchlorate | 10034-81-8 |
| 1,3,4-oxadizole,2-(1,1'-biphenyl)-4-YL-5-(4-(1,1-dimethyle)) | 15082-28-7 | Magnesium silicate | 1343-88-0 |
| 1,8-Dihydroxyanthraquinone | 117-10-2 | Magnesium stearate | 557-04-0 |
| 1.2.4-Trimethylbenzene | 95-63-6 | Magnesium sulfate | 7487-88-9 |
| 1-Chloro-1,1-difluoroethane | 75-68-3 | Manganese | 7439-96-5 |
| 1-Hydroxy-2,4-Disulfobenzene | 96-77-5 | Manganese Chloride | 7773-01-5 |
| 1-Methoxy 2-Acetoxypropane | 108-65-6 | Manganese dioxide | 1313-13-9 |
| 2-(2-butoxyethoxy)-ethanol | 112-34-5 | Manganese nitrate | 10377-66-9 |
| -- | -- | Manganese oxide | 1317-35-7 |
| ~~2,4,6 Trichlorophenol~~ -- | ~~88-06-2~~ -- | Manganous sulfate | 7785-87-7 |

Table F-3. List of Chemicals in Retrievably Stored Waste. (13 sheets)

| Chemicals | CAS# | Chemicals | CAS# |
|---|---|---|---|
| 2,4-dinitrotoluene | 121-14-2 | Mannitol (L) | 69-65-8 |
| 2-amino-2-(hydroxymethyl)-1-3-propannediol | 77-86-1 | M-cresol | 108-39-4 |
| 2-Butanol | 78-92-2 | Melamine-Formaldehyde | 9003-08-1 |
| 2-Butanone, Oxime | 96-29-7 | Melamine-Formaldehyde | 9003-08-1 |
| 2-Butoxy Ethanol | 111-76-2 | Mercuric chloride | 7487-94-7 |
| 2-butoxyethyl phosphate | 78-51-3 | Mercuric iodide | 7774-29-0 |
| 2-dimethylaminoethanol | 108-01-0 | Mercuric nitrate | 10045-94-0 |
| 2-Ethyl-1-Hexanol | 104-76-7 | Mercuric oxide | 21908-53-2 |
| 2-Heptanone | 110-43-0 | Mercuric sulfate | 7783-35-9 |
| 2-Methoxy-1-propanol | 1589-47-5 | Mercuric thiocyanate | 592-85-8 |
| 2-Propanol, 1-butoxy | 5131-66-8 | Mercurous sulfate | 7783-36-0 |
| 4,4'-BIS(R-amino-1-naphthylazo)-2,2'-stilbenedisulfonic acid | 5463-64-9 | Mercury | 7439-97-6 |
| Absorbent, Mineral | GCNABSM | Metal (Non Haz) | GCNMETAL |
| Absorbents (non-specified) | GCN049 | Methanol | 67-56-1 |
| Acenaphthene | 83-32-9 | Methyl cellulose | 9004-67-5 |
| Acetic acid | 64-19-7 | Methyl ether | 115-10-6 |
| Acetic acid, (1,2-cyclohexylenedinitrilo)tetra- | 482-54-2 | Methyl ethyl ketone | 78-93-3 |
| Acetone | 67-64-1 | Methyl ethyl methacrylate acid | 80-62-6 |
| Acid chloroplatinic | 16941-12-1 | Methyl iodide | 74-88-4 |
| Acrylate polymer | GCN113 | Methyl Isobutyl ketone (4-Methyl-2-Pentanone) | 108-10-1 |
| Acrylic Acid | 9003-01-4 | Methyl lactic acid (ethylester) | 80-55-7 |
| Acrylic Acid-Isooctyl Acrylate Polymer | 9017-68-9 | Methyl Red Hydrochloride Crystalline | 63451-28-5 |
| Adiponitrile | 111-69-3 | Methylene chloride (Dichloromethane) | 75-09-2 |
| Agar | 9002-18-0 | Methylpolysiloxane | 63148-62-9 |
| Alcohol | 68603-15-6 | Methyltriacetoxysilane | 4253-34-3 |
| Aliphatic amines | GCN009 | MICA | 12001-26-2 |
| Aliphatic hydrocarbon solvent | 64742-88-7 | Micro hollow balls | 68131-74-8 |
| Aliphatic petroleum solvent (kerosene) | 64742-47-8 | Mineral Oil | 8012-95-1 |
| Alizarin complexone | 3952-78-1 | Mineral oil, petroleum distillates | 64741-88-4 |
| Alkyl benzene | 68855-24-3 | Mineral Spirits | 8032-32-4 |
| Alkyl phenyl siloxane | 6904-66-1 | Mineral Water | 7732-18-5 |
| Alumina Silicate (mullite, calcined kyanite) | 1302-93-8 | Molybdenum | 7439-98-7 |
| -- | -- | Molybdate Orange | 12656-85-8 |

Table F-3. List of Chemicals in Retrievably Stored Waste. (13 sheets)

| Chemicals | CAS# | Chemicals | CAS# |
|---|---|---|---|
| Cobalt chloride | 7646-79-9 | Silica, crystalline - tripoli | 1317-95-9 |
| Cobalt oxide | 1307-96-6 | Silica, Crystalline Quartz | 14808-60-7 |
| Conweb Pads | GCN014 | Silica, crystalline-cristobalite | 14464-46-1 |
| Copolymer of Styrene | 60177-39-1 | Silicate | GCN134 |
| Copolymer of Styrene | 9052-95-3 | Silicon | 7440-21-3 |
| Copper | 7440-50-8 | Silicon carbide | 409-21-2 |
| Copper (II) nitrate | 19004-19-4 | Silicon dioxide | 7631-86-9 |
| Copper (II) sulfide | 1317-40-4 | Silicon dioxide (crystalline silica) | 60676-86-0 |
| Copper naphthenate | 1338-02-9 | Silicon oxide | 10097-28-6 |
| Copper Oxide | 1317-39-1 | Silicone | GCN118 |
| Cordierite | 1302-88-1 | Silicone grease | GCN-040 |
| Corn Oil | 8001-30-7 | Silicone Oil | 63148-58-3 |
| Corn syrup (solids) | 68131-37-3 | Silver | 7440-22-4 |
| Cottonseed Oil | 68334-00-9 | Silver (1+) oxide | 20667-12-3 |
| Cresol | 1319-77-3 | Silver chloride | 7783-90-6 |
| Cresol Red, water soluble | 62625-29-0 | Silver cyanide | 506-64-9 |
| -- | -- | Silver Iodide | 7783-96-2 |
| Cumene hydroperoxide | 80-15-9 | Silver nitrate | 7761-88-8 |
| Cupferron | 135-20-6 | Silver oxide | 1301-96-8 |
| Cupric chloride | 7447-39-4 | Silver sulfate | 10294-26-5 |
| Cupric oxide | 1317-38-0 | Soda lime | 8006-28-8 |
| Cuprous chloride | 7758-89-6 | Sodium | 7440-23-5 |
| Cyanide | 57-12-5 | Sodium acetate | 6131-90-4 |
| Cyclohexane | 110-82-7 | Sodium aluminate | 11138-49-1 |
| Cyclohexanone | 108-94-1 | Sodium arsenate | 7631-89-2 |
| De-asphalted hydrotreated petroleum distillates | 64742-57-0 | Sodium arsenite | 7784-46-5 |
| Decane | 124-18-5 | Sodium bicarbonate | 144-55-8 |
| Diammonium phosphate Dimethyl adipate | 627-93-0 | Sodium Bismuthate | 12232-99-4 |
| Diatomaceous earth | 61790-53-2 | Sodium Bisulfate | 7681-38-1 |
| Diatomaceous Earth Flux Calcined | 68855-54-9 | Sodium bisulfite | 7631-90-5 |
| Dibutyl butyl phosphonate (DBBP) | 78-46-6 | Sodium borate | 1303-96-4 |
| Dibutyl phosphate | 107-66-4 | Sodium bromate | 7789-38-0 |
| Dibutyl phthalate | 84-74-2 | Sodium bromide | 7647-15-6 |
| Dichlorodifluoromethane | 75-71-8 | Sodium carbonate | 497-19-8 |
| Dichloroethyl ether | 111-44-4 | Sodium chloride | 7647-14-5 |
| Diethyl ether (ethyl ether) | 60-29-7 | Sodium chromate | 7775-11-3 |

Table F-7. Contaminated Secondary Debris Waste Stream Hazardous Waste Characterization Summary. (2 sheets)

| Chemical Constituents | Codes |
|---|---|
| (3-2-arsonophenylazo)-4,5-dihydroxy-2,7 naphthalenedisulfonic acid, disodium salt (Arsenazo I Reagent), Arsenic, Arsenic trioxide, Arsenious acid-trisodium salt, Arsenic (V) oxide; hydrate, Arsenic pentoxide, Asenazo III, Sodium arsenate, and Sodium arsenite | D004 |
| Barium, Barium acetate, Barium carboate, Barium chloranilate, Barium chloride, Barium chloride dihydrate, Barium hydroxide, Barium oxide, and Barium nitrate | D005 |
| Cadmium, Cadmium hydroxide, Cadmium nitrate, Cadmium nitrate tetrahydrate, Cadmium oxide, Cadmium sulfate-octahydrate | D006 |
| Ammonium chromate, Chromic (VI) acid, Chromic chloride, Chromic sulfate, Chromium, Chromium oxide, Chromium (VI), Chromium III, Chromium nitrate, Chromium trihydroxide, Chromium trioxide, Dipotassium dichromate, Potassium chromate, Sodium chromate, and Sodium dichromate | D007 |
| Lead chromate, Lead chromate molybdate, and Lead chromate oxide/Molybdate orange | D007, D008 |
| Lead, Lead acetate, Lead dioxide, Lead floroborate, Lead nitrate, Lead hydroxide, Lead monoxide, Lead chloride, and Lead sulfate | D008 |
| Mercuric chloride, Mercuric iodide, Mercuric nitrate, Mercuric oxide, Mercuric sulfate, Mercuric thiocyanate, Mercurous sulfate, Mercury, and Phenyl mercury acetate | D009 |
| Selenious acid, Selenium, and Sodium selenate | D010 |
| Silver, Silver (1+) oxide, Silver chloride, Silver cyanide, Silver nitrate, Silver oxide, ~~and~~ Silver sulfate, and Silver iodide | D011 |
| Benzene | D018, F005 |
| Carbon tetrachloride | D019, F001 |
| ~~Chlordane~~ | ~~D020~~ |
| Chloroform | D022 |
| P-Dichlorebenzene | D027 |
| 1,2-Dichloroethane | D028 |
| 1,1-dichloroethylene | D029 |
| 2,4-dinitrotoluene | D030 |
| ~~Heptachlor~~ | ~~D031~~ |
| ~~Hexachlorobenzene~~ | ~~D032~~ |
| ~~Hexachlorobutadiene~~ | ~~D033~~ |
| Hexachloroethane | D034 |
| Methyl ethyl ketone | D035, F005 |
| Pentachlorophenol | D037 |
| Pyridine | D038, F005 |
| ~~2,4,6 Trichlorophenol~~ | ~~D042~~ |
| Vinyl chloride (chloroethylene) | D043 |
| Dichlorodifluoromethane and Chlorodifluoromethane | F001 |
| 1,1,1-Trichloroethane, Methylene chloride (Dichloromethane), Tetrachloroethylene, Trichloroethylene, Trichlorofluoromethane, and Trichlorotrifluoroethane(Freon) | F001, F002 |

Historical PK data was used to develop scaling factors to $^{137}Cs$ for radionuclides difficult to measure directly by NDA, such as $^{90}Sr$ (FH 2008) because to $^{137}Cs$ is an easy to measure nuclide.

$$^{90}Sr/^{137}Cs = 1.1$$

Historical PK data was used to develop a distribution for uranium isotopes some of which are difficult to measure or are not detected due to low uranium concentration or interferences (FH 2008). The uranium distribution applicable to PFP waste is provided in Table G-8. The uranium isotopes that are not detected, usually $^{234}U$ and $^{236}U$, shall be calculated using the distribution provided in Table G-8.

Table G-8. Estimated Uranium Isotopic Distributions.

| Isotope | Wt % Distribution |
|---|---|
| $^{233}U$ | Trace |
| $^{234}U$ | 0.006 – 0.008 |
| $^{235}U$ | 0.57 – 0.97 |
| $^{236}U$ | 0.08 – 0.07 |
| $^{238}U$ | 99.35 – 98.95 |

Plutonium isotopic distributions are based on one of two distributions, Hanford's PFP Complex solid wastes or U.S. Department of Military Application (DMA) waste as shown in Table G-9. The PFP Complex distribution applies to all PFP debris except DMA debris in these ~~B~~burial ~~G~~grounds. The DMA waste was generated from the clean up of a specific activity performed at PFP and therefore has a specific Pu distribution. The values calculated using the Pu distributions are based on directly measured values for $^{239}Pu$, with two conditional exceptions: $^{238}Pu$ and $^{241}Am$. Both $^{238}Pu$ and $^{241}Am$ may be measured directly, however, for conservatism those measured values are compared to the ratio values from measured $^{239}Pu$ and whichever value is greater is reported. The plutonium distributions provided in Table G-9 have been compared with PFP information (FH 2008), Table G-9 was found to represent the range of plutonium distributions applicable to PFP received in the 218-W-3A and the 218-W-4B Burial Grounds from 1972 through 1978.

Table G-9. Plutonium and Associated Mass Distributions

| Isotope | PFP Complex Debris Wt % Distribution | DMA Debris Wt % Distribution |
|---|---|---|
| $^{238}Pu$ | 0.007 – 0.05 | 0.01 – 0.03 |
| $^{239}Pu$ | 97.77 – 74.78 | 95.21 – 91.80 |
| $^{240}Pu$ | 2.13 – 20.72 | 4.36 – 7.08 |
| $^{241}Pu$ | 0.02 – 0.81 | 0.05 – 0.14 |
| $^{242}Pu$ | 0.001 – 0.66 | 0.01 – 0.05 |
| $^{241}Am$ | 0.07 – 2.88 | 0.34 – 0.87 |
| $^{237}Np$ | 0.00 – 0.92 | 0.02 – 0.04 |

# APPENDIX H
# SUMMARY OF TRENCH AND OTHER DEBRIS WASTE STREAM

# APPENDIX H

# SUMMARY OF TRENCH AND OTHER DEBRIS WASTE STREAM

## H1.0 TRENCH AND OTHER DEBRIS WASTE STREAM

This waste stream consists of debris type waste that is retrieved from earthen covered storage from Burial Grounds 218-W-3A, 218-W-4B, and 218-E-12B. Each of these burial grounds contains waste from multiple original waste source facilities (e.g., PFP). This waste stream includes all the original waste sources listed in Table H-1 except as follows[10]:

- The waste sources Plutonium Finishing Plant (PFP), Plutonium Uranium Extraction Plant (PUREX), Sandia laboratory, Savannah River Site, Argonne Laboratory, 100 Area reactors are not included and
- Energy Technology Engineering Center (ETEC), 1706-KEL facility, and P-11 Critical Mass Laboratory (P-11) are included.

For most waste, the characterization applied is that which is determined for each original waste source facility. However, when a waste cannot be identified with an originating source facility, a trench characterization is applied to the waste. Each of the trench characterizations are identified in Table H-1. Each trench characterization is built by considering the chemical and radioactive characteristics of each of the source facilities that have waste stored in the trench. An 'X' shown in a box in Table H-1 means that the source facility identified for that row is included in that trench characterization. A blank in a box in Table H-1 means that source facility identified for that row is not included in that trench characterization.

A listing of documents that establishes the characterization and designation of each waste by both original source facility and trench is shown in Table H-2. Each of the documents listed in Table H-2 contains either a description of the source facility history, processing, and designation or a description of the trench characterization and designation. The documents identified for each source facility includes the specific locations where waste was originally generated and chemicals used in the facility, and documents a designation of the waste.

[10]The six original waste sources that are identified in the first bullet of the first paragraph of this section are not shown individually in Table 2 but are incorporated into one or more of the trench characterizations.

Table H-1. List of Waste Source Facilities Per Trench. (2 sheets)

| Hanford Facilities (Location) | Generator (Facility Source) | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-W-3A, Trench 6 | 218-E-12B, Trenches 17 and 27 |
|---|---|---|---|---|---|---|
| *Hanford Production Facilities* | | | | | | |
| 100 Area Reactors: KE Reactor (100 Area) | 105-KE, 105-C, 105-F [108-F (Biology Lab), 144-R(Dog Kennel)], 105N | X | | X | X | |
| 200 West Tank Farms (200 West Area) | 242-T Evaporator (2WTF) | X | | | | |
| 233-S Plutonium Concentration Facility/REDOX (200 West Area) | 233-S (and 233-SA) | X | | | | |
| | 202-S (REDOX) | X | | | | |
| PUREX Plant (200 East Area) | 202-A Building (and 202-AL) | X | X | X | | X |
| Plutonium Finishing Plant [PFP, Z-Plant] (200 West Area) | 234-5Z (Primary Process facility), PFP Complex | X | X | X | X | |
| | PFP Effluents, 216 Z-9 crib | X | | | X | |
| B Plant (200 East Area) | 242-B Building | X | | | | |
| T-Plant (200 West Area) | T-Plant/224-T (221-T Building, 224-T Building) | X | X | X | X | |
| *Production - Non-Hanford Facilities* | | | | | | |
| Babcock & Wilcox (B&W) | Fuels Production | X | | | | |
| Kerr McGee | Fuels Production | X | | | | |
| Sandia National Laboratory | Weapons Production | X | | | | |
| Savannah River Site | Fuels and Weapons Production | X | | | | |
| *Hanford Laboratory Facilities* | | | | | | |
| 209-E (200 East Area) and P-11 (600 Area) | Critical Mass Laboratories | X | X | | | X |
| 222-S (200 West Area) | Research, Development, Analytical | X | X | X | X | |
| 231-Z (200 West Area) | Plutonium Metallurgical Laboratory | X | X | X | X | |
| 300 Area | 308 Building | X | | | X | |

Table H-1. List of Waste Source Facilities Per Trench. (2 sheets)

| Hanford Facilities (Location) | Generator (Facility Source) | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-W-3A, Trench 6 | 218-E-12B, Trenches 17 and 27 |
|---|---|---|---|---|---|---|
| | 325 Building, 327 Laboratory | X | X | X | X | |
| | 3706 Building, 3708 Building | | | | X | |
| *Laboratory - Non-Hanford Facilities* | | | | | | |
| Argonne National Laboratory | Research, Development | X | | X | | |
| Battelle Columbus Laboratories (BATCO) | Research, Development | X | | | | |
| Vallecitos Nuclear Center | Research, Development, small-scale commercial nuclear power, Analytical | X | | | | |

Table H-2. Existing Documents and Data Sources for Trench and Other Debris Waste. (2 sheets)

| Facility | Document Number/Title |
|---|---|
| 218-W-3A, Trench 06 | WMP-35544, Acceptable Knowledge Summary Report for Mixed Transuranic Waste, 218-W-3A, Trench 06 (FH 2008a) |
| 218-W-4B, Trench 07 | WMP-35430, Acceptable Knowledge Summary Report for Mixed Transuranic Waste 218-W-4B, Trench 7 (FH 2008b) |
| 218-W-4B, Trench V7 | WMP-38019, Acceptable Knowledge Summary Report for Mixed Transuranic Waste 218-W-4B, Trench V7 (FH 2008c) |
| 218-W-4B, Trench 11 | WMP-34251, Acceptable Knowledge Summary Report for Mixed Transuranic Waste, 218-W-4B, Trench 11 FH 2007a) |
| 218-E-12B, Trenches 17 & 27 | WMP-31661, *Acceptable Knowledge Evaluation and Summary Report for TRU Mixed-Debris Waste 218-E-12B, Trenches 17 and 27* (FH 2007b) |
| 1706-KEL | WMP-37957, *Acceptable Knowledge Summary Report for 1706-KEL Facility Debris Waste Stream* (FH 2008d) |
| 209-E | WMP-32037, *Acceptable Knowledge Summary Report for 209-E Critical Mass Laboratory Mixed Transuranic Debris* (FH 2007c) |
| 216-Z-9 (PFP) | WMP-38831, *Acceptable Knowledge Summary Report for 216 Z-9 Crib Soil and Debris Waste* (FH 2008e) |
| 222-S Complex | *WMP-36321, Acceptable Knowledge Summary Report for 222-S Laboratory Mixed Transuranic Debris* (FH 2008f) |
| 231-Z | WMP-32345, *Acceptable Knowledge Summary Report for 231-Z Facility Mixed Transuranic Waste Stream* |
| 233-S | HNF-30266, *Acceptable Knowledge Document for 233-S Plutonium Concentration Facility Decontamination and Decommissioning Mixed Debris Waste Stream* (FH 2007e)<br>233S-AK-01-00, *Acceptable Knowledge Summary Report for 233-S Plutonium Concentration Facility Mixed Transuranic Debris* and 233-DES-01-00, *Designation for 233-DES-01-00* - Not Released (FH 2005) |
| 2WTF | 2WTF-AK-01-00, *Acceptable Knowledge Summary Report For 200 West Tank Farm 242-T Evaporator Mixed Transuranic Waste Stream* - Not Released (FH 2006a) |
| 300 Area (includes 303-C Building, 308 Building, and 325 Radiochemistry Building) | WMP-31733, *Acceptable Knowledge Summary Report 300 Area Facilities Mixed Transuranic Solids* (FH 2007f)<br>WMP-31393, *Acceptable Knowledge Summary Report for Building 303-C Mixed Debris from Burial Ground 218-W-4B* (FH 2006b)<br>HNF-29953, *Acceptable Knowledge Document for Debris Waste from Operations and Decontamination and Decommissioning of Building 308* (supplemented by *308-DESDSI, 308-DES-01-00, and 308-DES-02-00*) (FH 2006c)<br>HNF-30810, *Acceptable Knowledge Document for the 325 Building Radiochemistry Laboratory Mixed Debris Waste Stream* (supplemented by 325-DES-01-01) (FH 2007g) |
| Babcock & Wilcox (B&W) | HNF-28620, *Acceptable Knowledge Document for Babcock and Wilcox Parks Township Site Plutonium Facility Debris Waste Stream* (supplemented by BW-DESDSI-01-01 and BW-DES-01-01) (FH 2006d) |
| BATCO | WMP-34040, *Acceptable Knowledge Summary Report For Battelle Columbus Laboratory Mixed Transuranic Debris* (FH 2007h) |

Table H-2. Existing Documents and Data Sources for Trench and Other Debris Waste. (2 sheets)

| Facility | Document Number/Title |
|---|---|
| ETEC | *WMP-32570, Acceptable Knowledge Summary Report for Energy Technology Engineering Center Transuranic Mixed Debris, Transuranic Mixed Solidified Liquids, and Low-Level Mixed Organic Liquids Waste Streams* (FH 2007i) |
| Kerr-McGee | *HNF-30020, Acceptable Knowledge Document for Consolidated Fuel Fabrication Debris Waste Stream([Kerr-McGee Nuclear Corporation]*, supplemented by KMG-DES-01-01) (FH 2008g) |
| PFP (234-5Z) | *WMP-33208, Acceptable Knowledge Summary Report for Plutonium Finishing Plant Complex Mixed Debris Waste from the Hanford Site Burial Grounds* (FH 2008h)<br>WMP-38984 *Acceptable Knowledge Summary Report for Mixed Transuranic Ash Waste* (CHPRC 2008a)<br>WMP-33204, *Acceptable Knowledge Summary Report for PFP Complex Effluent Waste* (FH 2007j)<br>WMP-31576, *Acceptable Knowledge Summary Report for Miscellaneous Radioactive Sources Waste Stream* (FH 2008i) |
| PUREX | WMP-34111, *Acceptable Knowledge Evaluation and Summary Report for Plutonium Uranium Extraction Plant Mixed Debris* (FH 2007k) |
| 216-B-5 (224-B) | WMP-31915, *Acceptable Knowledge Summary Report for 216-B-5 Reverse Well Mixed Transuranic Debris* (FH 2007l) |
| P-11 | WMP-38806, *Acceptable Knowledge Summary Report for P-11 Critical Mass Laboratory Debris Waste Stream* (CHPRC 2008b) |
| T-Plant | WMP-36882, *Acceptable Knowledge Summary Report for T-Plant Facilities Mixed Transuranic Waste* (FH 2008j) |
| Vallecitos Nuclear Center (Vallecitos) | WMP-32180, *Acceptable Knowledge Summary Report for Vallecitos Mixed Transuranic Debris* (FH 2007m) |
| WARD | HNF-30025, *Acceptable Knowledge Document or Westinghouse Advanced Reactors Division Mixed Debris Waste* and WMP-33659, *Acceptable Knowledge Evaluation Report for Westinghouse Advanced Reactor Division, 218-W-4C-T07 and 218-W-3A-T17* (FH 2007n) |
| Not applicable | Memo M4S20-JDA-04-018 from J. Ahlers to C. D. Cornelison and J. R. Durfee, September 16, "Update of TRU Retrieval Isotopic Data from 1999-2002 Retrieval Campaigns, Revision 1." |
| Not applicable | Memo M4 S20-JDA-05-001 from J. Ahlers to D. E. Nester, April 14, *Update of Waste Retrieval Project Isotopic Data for Including Americium-241 When Not Previously Reported in Backlog Drums.* |

## H1.2 PHYSICAL WASTE DESCRIPTION

Contaminated debris waste consists of waste materials generated in numerous locations on and off of the Hanford Site A list of the debris waste source facilities and a general description of the activities generating the waste is provided in Table H-1.

All of the waste is dry solid material that generally meets the definition of debris in accordance with WAC 173-303-040 but may also include other debris-like material such as intact containers and crushed glass. The container contents are primarily debris (including empty containers) but

may also contain a fraction of non-debris material such as soil, gravel, or other particulates. The waste does not contain liquids and compressed gases or chemicals that would cause the waste to be regulated as dangerous waste or for polychlorinated biphenyl (PCB) content. The waste may contain asbestos.

## H1.3 RADIONUCLIDES

The radionuclides expected to be in the waste received at the burial grounds are identified in each of the AK documents prepared for each original source of waste placed in the burial ground or trench, as listed in Table H-2. Plutonium ($^{238}$Pu, $^{239}$Pu, $^{240}$Pu, $^{241}$Pu, and $^{242}$Pu) is usually the main activity present in these wastes, but there also would have been trace amounts of uranium ($^{234}$U, $^{235}$U, $^{236}$U and $^{238}$U), americium ($^{241}$Am), neptunium ($^{237}$Np), and their decay daughters. Mixed fission and activation products would generally only be present as contamination or as a trace material.

Hanford initially produced weapons-grade plutonium with a $^{240}$Pu weight percentage of 6.0% (between approximately 0.9% and 7%). Weapons-grade plutonium metals and oxides were in high demand up to the mid 1960s, but in 1964 the need for fuels-grade plutonium began to increase. The Hanford mission then began turning toward fuels-grade plutonium production to support the reactor research industry. Hanford processed fuels-grade material with $^{240}$Pu concentrations varying from approximately 8% to 27% for experimental reactor technology (e.g., Fast Flux Test Reactor) and other reactors, but most of the fuels-grade plutonium was approximately 12%.

The $^{241}$Am that is present in the wastes is usually from the decay of the $^{241}$Pu. It should be noted that $^{241}$Am is the daughter of $^{241}$Pu and over a relatively short period of time the $^{241}$Pu will decay away since it has a half life of 14.4 years. Consequently the $^{241}$Am (with a half life of 432 years) will increase. In addition, the $^{241}$Am alpha decays to $^{237}$Np, which has a half life (2.14 E+6 years) longer than $^{239}$Pu. As a result there may be trace quantities of $^{237}$Np present, but its activity is orders of magnitude lower than $^{241}$Am. The peak buildup in activity of $^{241}$Am from $^{241}$Pu is approximately 2.9% of the initial $^{241}$Pu content.

## H1.4 CONTAMINANTS OF POTENTIAL CONCERN

The contaminants of potential concern (COPC) are identified in each characterization documents listed in Table H-2. A summary of the COPCs for this debris waste stream listed in Table H-3 was compiled from each of the characterization documents. A list of all the chemicals that may be in the waste is shown in Table H-4. In Table H-4, an 'X' in the column means the chemical in that row exists in the waste source listed for the column.

Table H-3. Contaminants of Potential Concern.

| Waste source | Type of contamination (general) | Contaminants of potential concern (specific) |
|---|---|---|
| debris | Chemicals in debris waste | See list of chemicals shown in Table H-4 |
| | Radionuclides | $^{60}Co$, $^{40}K$, $^{59}Ni$, $^{63}Ni$, $^{90}Sr$, $^{90}Y$, $^{137}Cs$, $^{137m}Ba$, $^{154}Eu$, $^{231}Th$, $^{233}Pa$, $^{233}U$, $^{234m}Pa$, $^{234}U$, $^{235}U$, $^{235m}U$, $^{236}U$, $^{237}Np$, $^{238}U$, $^{238}Pu$, $^{239}Pu$, $^{240}Pu$, $^{241}Pu$, $^{242}Pu$, $^{241}Am$, $^{243}Cm$ |

This page intentionally left blank.

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2466-09-3 | diphosphoric acid | 100 | X | X | | X | | | X | | | | | X | | | | | | | | | | | | |
| 3811-04-9 | chloric acid, potassium salt | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 5470-11-1 | hydroxylamine hydrochloride | 100 | X | X | X | X | X | | X | X | | | | X | X | | | | | | | | X | | | |
| 7440-03-1 | niobium | 100 | X | X | X | X | | | | | | | | | | | | | X | | | | | | | |
| 7440-05-3 | palladium | 100 | | X | | X | | | | | | | | | | | | | | | | | | | | |
| 7440-06-4 | platinum | 100 | X | X | X | X | | | | | | | | X | | | | | X | | | | | | | |
| 7440-07-5 | plutonium | 4116 | X | X | | | | | | | | | | X | | | | | | | | | | | X | |
| 7440-09-7 | potassium | 100 | X | X | X | X | X | | | | | | | | | | | | | X | X | | | | X | |
| 7446-09-5 | sulfur dioxide | 100 | | | X | X | | | | | | | | | | | X | | | | | | | | | |
| 7632-05-5 | sodium orthophosphate | 100 | | X | | X | X | | | | | | | | | | | | | | | | | | | |
| 7637-07-2 | boron trifluoride | 100 | X | X | X | X | X | | X | X | | | | | | | | | | | | | X | | | |
| 7705-07-9 | titanium trichloride | 100 | X | X | X | X | X | | X | X | | | | X | | | | | | | | | | | | |
| 7758-01-2 | bromic acid, potassium salt | 100 | | | | X | | X | | | | | | | | | | | | | | | | | | |
| 7758-02-3 | potassium bromide | 100 | X | X | X | X | | | | X | | | | X | | | | | | | | | | | | |
| 7758-05-6 | potassium iodate | 100 | X | X | X | X | | | | | | | | X | X | | | | | | | | | | | |
| 7773-01-5 | manganese chloride | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7775-09-9 | sodium chlorate | 100 | | | | | | X | | | | | | | | | | | | | | | | | | |
| 7775-11-3 | sodium chromate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 7789-09-5 | ammonium bichromate | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 9003-01-4 | acrylic acid, polymers (resin) | 100 | X | X | | | | | | | | | | X | | | | | | | | | | | | |
| 9003-08-1 | formaldehyde-melamine polymer | 16.40% | | | | | | | | | | | | | | | X | | | | | | | | | |
| 9005-09-8 | vinyl chloride resin | 100 | | | | | X | | X | | | X | | | | | | | | | | | | | | |
| 100-10-7 | p-(dimethylamino)benzaldehyde | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 100-21-0 | terephthalic acid | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 10022-31-8 | barium nitrate | 100 | X | X | X | X | | | | X | | | | X | | | | | | | | | | | | |
| 10022-68-1 | cadmium (II) nitrate tetrahydrate | 100 | X | X | X | X | | | | | | | | | | | | | X | | | | | | | |
| 10025-69-1 | tin(II) chloride dihydrate | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 10025-73-7 | chromic chloride | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 10028-22-5 | ferric sulfate | 100 | X | X | X | X | | | | | | | | X | | | | | X | X | | | | | | |
| 10031-31-9 | calcium iodide | 100 | X | | X | X | | | | | | | | X | | | | | X | | | | | | | |
| 10034-81-8 | magnesium perchlorate | 100 | X | X | X | X | | | | | | | | X | X | | | | | | | | | | | |
| 10034-85-2 | hydriodic acid | 100 | | X | X | X | | | | | | | | | X | | | | | | | | | | | |
| 10034-93-2 | hydrazine sulfate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 10035-10-6 | hydrobromic acid | 100 | X | X | X | X | X | | | X | | | | | | | | | | | X | | | | | |
| 100-41-4 | ethylbenzene | 100 | | X | | | | | | | | X | | | | X | | | | X | | | | | X | |
| 100-42-5 | styrene | 100 | X | X | | | | | | | | | | X | | | | | | | | | | | | |
| 10042-76-9 | strontium nitrate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 10043-01-3 | aluminum sulfate | 100 | X | X | X | X | | | | | | | | X | | | | | X | X | | | | | | |
| 10043-11-5 | boron nitride | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 10043-35-3 | boric acid | 100 | X | X | X | X | | X | | | | | | X | X | | | | X | | | | | | | |
| 10043-52-4 | calcium chloride | 100 | X | X | X | X | | | | | | | | X | | | | | X | | | | | | | |
| 10043-67-1 | aluminum potassium salt (2:1:1) sulfuric acid | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 10045-89-3 | ferrous ammonium sulfate | 100 | X | X | X | X | | | | | | | | X | | | | | | X | | | | X | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10045-94-0 | mercuric nitrate | 100 | X | X | X | X | X | | | | | | | X | | | | | X | | X | | | | | |
| 10045-95-1 | neodymium nitrate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 10049-01-1 | bismuth phosphate | 100 | X | X | X | X | | | | | | | | | | | | | | | | | X | X | | |
| 10049-06-6 | titanium dichloride | 100 | | | X | | | | | | | | | | | | | | | | | | X | | | |
| 10049-08-8 | ruthenium chloride (trichloride) | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 100-97-0 | hexamethylenetetramine | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 10097-28-6 | silicon oxide | 100 | X | X | X | | | | | | | | | | | | | | X | | | | | | | |
| 10099-59-9 | lanathanum nitrate | 100 | X | X | X | X | X | | | | | | | X | | | | | X | X | X | | | | | |
| 10099-74-8 | lead nitrate | 100 | X | X | X | X | X | | | | | | | X | | | | | X | X | X | | | | | |
| 10101-41-4 | calcium sulfate (plastic of paris) | 100 | X | X | X | X | | | | | | | | X | X | | | | X | X | | | | | | |
| 10101-53-8 | chromium sulfate | 100 | | X | | | X | | X | | | | | | | | | | | | | | | | | |
| 10101-89-0 | sodium phosphate tribasic dodecahydrate | 100 | X | X | X | X | | | | | X | X | | | | X | | | | | | | | | | |
| 10102-06-4 | uranyl nitrate | 100 | X | X | | X | | | | | X | | | X | | | | | | | | | | | | |
| 10102-44-0 | nitrogen dioxide | 100 | X | X | X | X | | | | X | | | | | X | | | | | | | | | | | |
| 10102-68-8 | calcium iodide | 100 | | X | | | | | | | | | | | | | | | | X | | | | | | |
| 10103-47-6 | chromium nitrate | 100 | X | X | X | | | | | | | | | | | | | | X | X | | | | | | |
| 10108-73-3 | cerous nitrate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 10124-37-5 | calcium nitrate | 1250 | X | X | X | X | | | | | | | X | X | | | | | X | X | | | | | | |
| 10124-56-8 | metaphosphoric acid, hexasodium salt | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 10138-04-2 | ferric ammonium sulfate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 101-68-8 | 4,4'-diphenylmethane-diisocyanate | 100 | | X | | | | | | | | | | | | | | | | | | | | | X | |
| 10192-30-0 | ammonium bisulfite, solid | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 102-06-7 | diphenylguanidine | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 10213-10-2 | sodium tungstate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 10257-55-3 | calcium sulfite, dihydrate | 100 | X | X | X | X | | | | | | | | | | | | | X | X | | | | | | |
| 102-71-6 | 2,2',2"-nitrilotriethanol | 100 | | X | | | | | | | | | | | X | X | | | | | | | | | | |
| 102-87-4 | tridodecylamine | 100 | | X | X | X | X | | | | | | | | | | | | | | X | | | | | |
| 10294-26-5 | silver sulfate | 100 | X | X | X | X | | | | | | | | X | X | | | | | | | | | | | |
| 10294-41-4 | cerium nitrate | 100 | | X | | | | | | | | | | X | | | | | | | | | | | | |
| 10325-94-7 | cadmium nitrate | 100 | X | X | X | X | X | | | | | | | X | | | | | | X | X | | | | | |
| 10326-27-9 | barium chloride, dihydrate | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 10361-03-2 | sodium metaphosphate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 10361-37-2 | barium chloride | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 10361-44-1 | bismuth nitrate | 100 | X | X | X | X | X | | X | | | | | | | | | | X | | | | X | X | | |
| 10361-93-0 | yttrium nitrate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 10377-48-7 | lithium sulfate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 10377-60-3 | magnesium nitrate | 1710 | X | X | X | | | | | | | | X | | | | | | X | X | | | | | | |
| 10377-66-9 | magnesium nitrate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 10378-23-1 | EDTA acid tetrasodium | 100 | X | | X | X | | | | | | | | | | | | | X | | | | | | | |
| 10378-47-9 | ceric ammonium sulfate dihydrate | 100 | | | | | | | | | | | | | | | | | | | | | X | | | |
| 10421-48-4 | ferric nitrate (tox per CAS 7782-61-8) | 270 | X | X | X | X | X | | | | | | X | X | | | | | X | X | X | | | | | |
| 104389-31-3 | polyisoprene | 100 | | X | | | X | | X | | | | | | | | X | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10450-60-9 | periodic acid | 100 | X | X | X | X | X | | | | | | | X | | | | | | | X | | | | | |
| 104-51-8 | n-butylbenzene | 100 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 104-76-7 | 2-ethyl-1-hexanol | 100 | | | | | | | | | | | | | | | X | | | | | | | | | |
| 10588-01-9 | sodium dichromate | 100 | X | X | X | X | X | | | | | | | X | | | | | | | X | | | X | | |
| 106-44-5 | p-cresol | 200 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 106-46-7 | p-dichlorobenzene | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 106-65-0 | dimethylsuccinate | 100 | | X | | | | | | | | | | | | | | | | | | | | | X | |
| 106-87-6 | vinyl cyclohexene dioxide | 100 | X | X | | | | | | | | | | X | | | | | | | | | | | | |
| 106-97-8 | butane | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 107-06-2 | 1,2-dichloroethane | 100 | X | X | X | X | | | | | | | | X | | | | | | X | | | | | | |
| 107-15-3 | ethylenediamine | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 107-21-1 | ethylene glycol | 100 | X | X | | X | | | | | | X | | X | | X | X | | | | | | | | X | |
| 107-66-4 | dibutyl phosphate | 100 | x | x | x | x | | | | x | | | | X | | | | | x | x | | | | | | |
| 107-98-2 | propylene glycol monomethyl ether | 100 | X | X | X | X | | | | | X | | | X | | | X | | | | | | | | | |
| 108-01-0 | 2-dimethylaminoethanol | 100 | X | X | | | | | | | | | | X | | | | X | | | | | | | | X |
| 108-05-4 | vinyl acetate | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 108-10-1 | 4-methyl-2-pentanone | 100 | X | X | X | X | X | | X | | | X | X | X | | | | | | X | | | | | X | |
| 108-39-4 | m-cresol | 200 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 108-46-3 | resorcinol | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 108-65-6 | 2-methoxy-1-methylethyl ester acetic acid | 100 | | X | | | | | | | | X | | | | | | X | | | | | | | X | X |
| 108-83-8 | 2,6-dimethyl-4-heptanone | 100 | | X | | | | | | | | | | | | | | | | | | | | | X | |
| 108-86-1 | bromobenzene | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 108-88-3 | toluene | 100 | X | X | X | X | X | X | X | | | X | | X | X | X | X | X | | X | X | | | | X | X |
| 108-90-7 | chlorobenzene | 0.000015 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 108-94-1 | cyclohexanone | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 108-95-2 | phenol | 100 | X | X | X | X | | | | X | | | | X | | | | | | X | | | | | | |
| 109-66-0 | pentane | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 109-86-4 | methoxyethanol,2- | 100 | | | | | | | | | | | | | | | | X | | | | | | | | X |
| 110-15-6 | succinic acid | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | X |
| 110-43-0 | 2-heptanone | 100 | X | X | X | X | | | | | X | | | | | | | | | | X | | | | | |
| 110-54-3 | n-hexane | 100 | X | X | X | X | | | | | | | | X | | X | | | | | | | | | | |
| 110-82-7 | cyclohexane | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 110-86-1 | pyridine | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 110-91-8 | morpholine | 100 | | X | | | | | | | | X | | | | X | | | | | | | | | | |
| 11096-82-5 | polychlorinated biphenyl (aroclor 1260) | 100 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 11097-69-1 | polychlorinated biphenyl (aroclor 1254) | 100 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 11098-84-3 | molibdic acid, ammonium salt | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 11099-06-2 | ethyl polysilicate | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 11100-14-4 | polychlorinated biphenyl (aroclor 1268) | 100 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 11104-28-2 | polychlorinated biphenyl (aroclor 1221) | 100 | | | | | | | | | | | | | | | | | | X | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 11105-11-6 | tungstic acid | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 11116-03-3 | plutonium oxide | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 11128-96-4 | amberlite la-2 | 100 | | | | X | | | | | | | | | | X | | | | | | | | | | |
| 11135-81-2 | sodium potassium alloy | 100 | | X | | | | | | | | | | X | | | | | X | | | X | | | | |
| 11138-49-1 | sodium aluminate | 100 | X | X | X | X | | | | | | | | | | | | | | X | | | | | | |
| 11141-16-5 | polychlorinated biphenyl (aroclor 1232) | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| 111-44-4 | bis(2-chloroethyl)ether | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 1116-76-3 | trioctylamineine | 100 | X | X | X | X | | | | | | | | X | X | | | | | | | | | | | |
| 111-69-3 | adiponitrile | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 111-76-2 | 2-butoxyethanol | 100 | | X | | X | | | | | | X | | | | X | X | X | | | | | | | | X |
| 111-90-0 | ethanol,2-(2-ethoxyethoxy-) | 100 | | X | | | | | | | | X | | | | X | | | | | | | | | | |
| 1119-40-0 | mixture of dimethyl esters | 100 | | X | | | | | | | | | | | | | | | | | | | | | X | |
| 1120-21-4 | undecane | 100 | X | | X | | | | | X | | | | | | | | | | | | | | | | |
| 112-07-2 | 2-butoxyethylacetate | 100 | | | | | | | | | | | | | | | | | | | | | | | | X |
| 112-34-5 | 2- (2-butoxyethoxy)-ethanol | 100 | | X | | | | X | | | | X | | | | X | | | | | | | | | X | |
| 112-40-3 | dodecane | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 112-80-1 | oleic acid | 100 | X | X | X | X | | | | | | X | | X | | | | | | | | | | | | |
| 112926-00-8 | amorphous silica, precipatated and gel | 100 | | X | | | | | | | | X | | | | | | | | | | | | | | |
| 112945-52-5 | amorphous silica | 100 | X | X | | | X | | X | | | X | | X | | | | X | | | | | | | | X |
| 115-10-6 | methyl ether | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 115-39-9 | bromophenol blue | 100 | | | | | | | | | | | | | | | | | | | | | X | | | |
| 115-40-2 | bromocresol purple | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 116-85-8 | 1-amino-4-hydroxyanthraquinone | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 117-10-2 | 1,8-dihydroxyanthraquinone | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 117-81-7 | bis(2-ethylhexyl)phthalate(dop) | 100 | X | X | X | X | X | | | | X | | | | | X | | | | X | X | | | | | |
| 117-84-0 | di-n-octylphthalate | 100 | | | | | | | | | | X | | | | | | | | | | | | | | |
| 12001-26-2 | mica silicate | 100 | | X | | | X | | X | | | X | | | | | | | | | | | | | | |
| 12001-29-5 | asbestos | 100 | | X | X | | | | | X | X | | | | | | X | | | | | | X | | | |
| 12002-48-1 | trichlorobenzene, mixed isomers | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 120-12-7 | anthracene | 100 | | | | | | | | | | | | | | | | | | | | | X | | | |
| 12018-01-8 | chromium oxide | 100 | | X | | X | | | | | | X | | | | | | | | | | | | | | |
| 12024-21-4 | gallium oxide | 100 | X | X | X | X | | | | X | | | | X | | | | | | | | | | | | |
| 12026-66-3 | ammonium phosphomolybdate trihydrate | 100 | | X | | | X | | X | | | | | | | | | | | | | | | | | |
| 12027-06-4 | ammonium iodide | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 12027-67-7 | molybdic acid, hexaammonium salt | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 12035-83-5 | plutonium II oxide | 100 | X | X | | | | | | | | | | X | | | | | | | | | | | | |
| 12044-50-7 | arsenic (V) oxide, hydrate | 100 | | | | | | | | | | | | X | | | | | | | | | | | | |
| 12054-48-7 | nickel hydroxide | 100 | X | X | X | X | | | | | | | | X | X | | | | X | X | | | | | | |
| 12055-23-1 | hafnium oxide | 100 | | X | | | | | | | | | | X | | | | | | | | | | | | |
| 12059-95-9 | plutonium dioxide | 150 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 12069-32-8 | boron carbide | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | X | | | |
| 120-82-1 | 1,2,4-trichlorobenzene | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 121-14-2 | 2,4-dinitrototoluene | 100 | X | X | X | X | | | | | | | | X | | | | | X | | | | | | | | |
| 12124-97-9 | ammonium bromide | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 12125-01-8 | ammonium fluoride | 100 | X | X | X | X | X | | | | | | | X | | | | | | | X | | | | | |
| 12125-02-9 | ammonium chloride | 100 | X | X | X | X | | | | | | | | X | X | | | | | | | | | | | |
| 12141-46-7 | aluminum silicate | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 121-44-8 | triethylamine | 100 | X | X | | | | | | | | | | X | | | | | | | | | | | | |
| 121-54-0 | diisobutylphenoxyethoxyethyl dimethyl benzyl ammonium choride | 100 | | X | | | | | | | | X | | | | | X | | | | | | | | | |
| 12174-11-7 | magnesium aluminum silicate | 100 | | | | | | | | | | | | | | | | X | | | | | | | | |
| 12179-04-3 | boric acid, disodium salt, pentahydrate | 100 | X | | | X | | | | | | | | X | | | | | | | | | | | | |
| 122-32-7 | 1,2,3-tri(cis-9-octadecenoyl)glycerol | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 12232-99-4 | sodium bismuthate | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | X | | |
| 12254-64-7 | americium(III) oxide (radioactive) | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 123-31-9 | hydroquinone | 100 | X | X | X | X | | | | | | | | X | | | | | X | | | | | | | |
| 123-51-3 | 1-butanol, 3-methyl- | 100 | | X | X | X | X | | | | | | | | | | | | | | X | | | | | |
| 123-86-4 | acetic acid, butyl ester | 100 | | X | | | | | | | | | | | | | | | | | | | | | X | |
| 123-91-1 | dioxane (1,4-diethylene dioxide) | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |
| 123-95-5 | butyl stearate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 12401-86-4 | sodium monoxide | 200 | | | | | | | | | | | | | | | X | | | | | | | | | |
| 124-18-5 | decane | 100 | X | X | | X | | | | | | | | | | | | | | X | | | | | | |
| 12425-68-2 | andalusite | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |
| 12428-46-5 | aluminum hydroxide silicate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 124-38-9 | carbon dioxide | 100 | | X | | X | X | | X | | | | | | | | | | | | | | | | | |
| 125-20-2 | thymolphthalein | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 12595-89-0 | chloride (salt) | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 12597-71-6 | brass | 100 | | X | | X | | | | | | | | | | | | | | | | | | | | |
| 12612-50-9 | molybdenum sulfide | 100 | | X | | X | | | | | | | | | | | | | | | | | | | | X |
| 12624-35-0 | polyamide resin | 100 | | | | | | | | | | | | | | | | | | | | | | | X | |
| 12656-85-8 | molybdate orange | 100 | | X | | | | | | | | | | | | | | | | X | | | | | | |
| 12672-29-6 | polychlorinated biphenyls (aroclor 1248) | 100 | | | | | | | | X | | | | X | | | | | X | X | X | | | | | |
| 126-73-8 | tributyl phosphate (TBP) | 100 | X | X | X | X | X | | | | | | | | | | | | | X | | | | | | |
| 12674-11-2 | polychlorinated biphenyls (aroclor 1016) | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| 127-08-2 | acetic acid, potassium salt (potassium acetate) | 100 | X | X | X | X | | | | | | | | X | X | | | | | | | | | | | |
| 127-09-3 | sodium salt acetic acid | 100 | X | X | X | | | | | X | | | | | X | | | | | | | | | | | |
| 127-18-4 | tetrachloroethylene | 100 | X | X | X | X | | | | X | | | | X | | | | | | X | | | | | | |
| 1300-72-7 | sodium xylene sulfonate | 100 | | X | | | | X | | | | | | | | X | | | | | | | | | | |
| 1301-96-8 | silver (II) oxide | 100 | | X | X | | | | | | | | | | | | | | | | | | | | | |
| 1302-74-5 | corundum or emery | 100 | X | | X | | | | | | | | | | | | | | X | X | | | | | | |
| 1302-78-9 | bentonite | 100 | X | X | X | X | | | | | | X | | | | | X | | X | | | | | | | |
| 1302-88-1 | cordierite | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |
| 1302-93-8 | alumina silicate (mullite, calcined | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | kyanite) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1303-28-2 | arsenic pentoxide | 100 | | | | X | | | | | | | | X | | | | | X | | | | | | | |
| 1303-96-4 | sodium borate, decahydrate | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |
| 1304-28-5 | barium oxide | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 1304-56-9 | beryllium oxide | 100 | X | X | | X | | | | | | | | X | | | | | X | X | | | | | | |
| 1305-62-0 | calcium hydroxide | 100 | X | X | X | X | | | | | | | | X | X | | X | | | | | | | | X | |
| 1305-78-8 | calcium oxide | 100 | X | X | | X | X | | X | X | | | | | | | | | | | | | | | | |
| 1306-19-0 | cadmium oxide | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 1306-38-3 | ceric oxide | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 1307-96-6 | cobalt (2+) oxide | 100 | X | X | X | X | X | | | | | | | | | | | | X | X | X | | | | | |
| 1308-14-1 | chromic (III) hydroxide [DOT chromic acid] | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |
| 1308-38-9 | chromic oxide | 100 | | | | X | | | | | | | | | | | | | X | X | | | | | | |
| 1309-33-7 | ferric hydroxide | 100 | X | X | X | X | | | | | | | | X | X | | X | X | | | | | X | | X | X |
| 1309-37-1 | ferric oxide | 100 | X | X | X | X | X | | X | | | | | | | | | | | | X | | | | | X |
| 1309-38-2 | iron oxide | 100 | X | X | X | X | X | | | | X | | | | | | | | | | | | | | | |
| 1309-42-8 | magnesium hydroxide | 100 | X | X | X | X | | | | | | | | | | | | | X | X | | | | | | |
| 1309-48-4 | magnesium oxide | 100 | X | X | X | X | X | | X | | X | | | X | X | | X | X | X | X | | | X | | X | |
| 1309-60-0 | lead oxide | 100 | X | X | X | X | | | | | | | | X | | | | | X | | | | | | | |
| 1310-58-3 | potassium hydroxide | 100 | X | X | X | X | X | | | X | | | | X | X | | X | | X | | X | | | X | | |
| 1310-65-2 | lithium hydroxide | 100 | X | X | | X | | | | | | | | X | X | | | | | | | | | | | |
| 13106-76-8 | ammonium molybdate | 100 | X | | X | X | | | | | | | | X | | | | | | | | | | | | |
| 1310-73-2 | sodium hydroxide | 100 | X | X | X | X | X | X | X | X | X | | | X | X | | X | | X | X | X | X | X | X | | X |
| 1310-82-3 | rubidium hydroxide | 100 | X | X | X | X | | | | | | | | | | | | | X | X | | | | | | |
| 1311-11-1 | lead hydroxide | 100 | X | X | X | X | | | | | | | | | | | | | X | X | | | | | | |
| 13126-12-0 | rubidium nitrate | 100 | X | X | X | X | | | | | | | | | | | | | X | X | | | | | | |
| 1312-81-8 | lanthanum oxide | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 1313-13-9 | manganese dioxide | 100 | X | X | X | X | X | | X | | | | | X | X | | | | X | | X | | X | | | |
| 1313-27-5 | molydenum trioxide | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 13138-45-9 | nickel (II) nitrate (1:2) | 100 | X | X | X | X | X | | | | | | | X | | | | | X | X | X | | | | | |
| 1313-97-9 | neodymium oxide | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 1313-99-1 | nickel monoxide | 300 | | | | | | | | | | | | | | | | | X | | | | | | | |
| 1314-13-2 | zinc oxide | 100 | X | X | X | X | X | | | | | | | X | | | | X | X | | X | | | | | X |
| 1314-20-1 | thorium oxide | 840 | X | X | | X | X | | | | | | | | | | X | | | | X | | | | X | |
| 1314-23-4 | zirconium oxide | 840 | X | X | X | X | X | | | | | | | | | | X | | X | | X | | | | X | |
| 1314-35-8 | tungsten trioxide | 100 | X | X | X | X | | | | | | | | X | X | | | | | | | | | | | |
| 1314-36-9 | yttrium oxide | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 1314-56-3 | phosphorus pentoxide | 100 | X | X | X | X | X | | | | | | | X | | | X | | X | | X | | | | | |
| 1314-62-1 | vanadium pentoxide (dust) fume not toxic | 100 | X | X | X | X | | | | X | | | | X | | | | | | | | | | | | |
| 1314-64-3 | uranyl sulfate | 100 | X | X | | X | | | | | | | | | | | | | | | | | | X | | |
| 131-70-4 | monobutyl phthalate | 100 | X | X | | | | | | | | | | | | | | | | | X | | | | | |
| 1317-35-7 | manganese oxide | 100 | X | X | X | X | X | | | | | | | | | | | | | | | | | | | |
| 1317-36-8 | lead monoxide | 100 | | | X | X | | | | | | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1317-38-0 | copper oxide | 100 | X | | X | X | | | | | | | | X | | | | | | | | | | | | |
| 1317-39-1 | cuprous oxide | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 1317-40-4 | copper (II) sulfide | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 1317-65-3 | calcium carbonate | 100 | X | X | X | X | X | | X | X | | | | X | X | | X | | X | | | | | | X | |
| 1317-95-9 | silica, crystalline - tripoli | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 1317-99-3 | uranium oxtaoxide | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 1318-00-9 | vermiculite, exfoliated | 100 | X | X | | X | X | | X | | | | | X | X | | X | | | X | | | | | | |
| 1319-77-3 | cresol | 200 | | X | X | | | | | | | | X | | | | | | | | | | | X | | |
| 1327-36-2 | aluminum silicate | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 1327-53-3 | arsenic trioxide | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 13291-61-7 | trans-1,2-diaminocyclohexane-n,n,n',n'-tetraacetic acid | 100 | | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 1330-20-7 | xylene (mixed isomers) | 100 | X | X | X | X | X | X | | X | X | X | | X | X | X | X | X | X | X | X | | | | X | X |
| 1331-17-5 | propylene glycol | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 1332-21-4 | asbestos | 100 | X | X | | X | | | | | | X | | X | | | | | X | | | | | | | X |
| 1332-58-7 | kaolin clay | 100 | | X | | | | | | | | X | | | | | | | | | | | | | | |
| 1332-69-0 | lime | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 1333-74-0 | hydrogen | 100 | X | X | | X | X | | | | | | | | | | | | | | X | | | | | |
| 1333-82-0 | chromium trioxide | 100 | X | X | X | X | | | | | | | | X | | | | | | | | X | | | | |
| 1333-86-4 | carbon black | 100 | X | X | | X | | | | | | X | | | | | X | | | | | | | | | |
| 1335-30-4 | aluminum silicate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 1336-21-6 | ammonium hydroxide | 100 | X | X | X | X | X | | | | X | X | | X | X | | | | | | X | | | | X | |
| 1336-36-3 | polychlorinated binphenyls | 100 | | | | | | | | | | | | | | | X | | | | | | | | | |
| 1338-02-9 | copper naphthenate | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |
| 13410-01-0 | sodium selenate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 1341-49-7 | ammonium bifluoride | 100 | | X | X | X | X | X | | | | | | | | | | | | | X | | | | | |
| 134-32-7 | naphthylamine,1-e(toxic per SAX) | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 13435-46-6 | barium chloranilate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 1343-88-0 | magnesium silicate | 100 | | X | | | | | | | | | | | | | | X | | | | | | | | X |
| 1344-28-1 | aluminum oxide | 100 | X | X | X | X | | | | | | X | | X | | | X | X | X | X | | | | | | |
| 1344-37-2 | lead chromate | 100 | | X | X | X | X | | | | | | | | | | | | | | X | | | | | |
| 1344-57-6 | uranium dioxide | 100 | X | X | | X | | | | | | | | X | | | X | | | | | | | | | |
| 13446-18-9 | magnesium nitrate, hexahydrate | 885 | X | X | | X | | | | X | | | | | | | | | | | | | | | | |
| 1344-64-5 | vanadyl sulfate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 13462-88-9 | nickel (II) bromide trihydrate | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 13463-67-7 | titanium oxide | 100 | X | X | X | X | X | | X | | | X | | X | | | X | X | X | | | | | | X | X |
| 13464-37-4 | arsenous acid, trisodium salt | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 13465-08-2 | hydroxylamine nitrate | 100 | X | X | X | X | X | | | X | | | | X | | | | | X | | X | | | | | |
| 13472-30-5 | sodium metasilicate | 100 | X | X | X | X | | | | | | | | | | X | X | | X | | | | | | | |
| 13473-90-0 | aluminum (111) nitrate (1:3) | 100 | | X | X | X | X | | | X | | | | | | | | | | X | X | | | | | |
| 13477-34-4 | calcium nitrate tetrahydrate | 100 | X | | | X | | | | X | | | | | | | | | | | | | | | | |
| 13478-00-7 | nickel nitrate hexahydrate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 13478-10-9 | ferrous chloride | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 13494-80-9 | tellurium | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 135-20-6 | cupferron | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 13520-68-8 | iron(II) nitrate hexahydrate (1:2:6) | 100 | X | X | X | X | | | | X | | | | | | | | | | | X | | | | | |
| 13520-83-7 | uranyl nitrate hexahydrate | 100 | | X | | X | X | | | | | | | | | | | | | | | | | | | |
| 13548-38-4 | chromium(III) nitrate | 100 | X | X | X | X | | | | X | | | | | | | | | | | X | | | | | |
| 13590-82-4 | cerium sulfate | 100 | X | X | X | X | X | | X | | | | | X | | | | | | | X | | | | | |
| 13601-19-9 | ferrate(4-), hexacyano-, tetrasodium | 100 | | X | X | X | X | | | | | | | | | | | | | | | | | | | |
| 13708-85-5 | sodium phosphite | 100 | X | X | X | X | | | | | | | | X | | | | | | | X | | X | X | | |
| 13709-38-1 | lanthanum fluoride | 100 | X | X | X | X | X | | | | | | | | | | | | | | | | | | | |
| 13709-56-3 | plutonium tetrafluoride | 100 | | X | | X | | | | | | | | | | | | | | | | | | | | |
| 13746-66-2 | potassium ferrocyanide | 6600 | X | X | X | | X | | | | | | | X | | | | | | | | | X | | | |
| 13755-29-8 | sodium fluoborate | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| 13775-53-6 | sodium hexafluoroaluminate, 98% | 100 | | | | | | | | | X | | | | | | | | X | | | | | | | |
| 13778-30-8 | zinc nitrate | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |
| 13814-96-5 | lead fluoborate | 100 | | X | | X | | | | | | | | | | | | | | | | | | | | |
| 13823-29-5 | thorium nitrate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 13825-74-6 | titanium sulfate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 13826-66-9 | zirconyl nitrate | 100 | X | X | X | X | | | | X | | | | X | | | | | | | X | | | | | |
| 13840-04-5 | ammonium ceric sulfate | 100 | | X | X | X | X | | | | | | | | | | | | | | | | | | | |
| 13870-30-9 | sodium silicate | 100 | X | X | X | X | | | | | | | | X | | | | | X | | | | | | | |
| 13907-45-4 | chromate | 100 | | | | | | | | | | | | | | | | | | | | | X | | | |
| 139-13-9 | nitrilotriacetic acid | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 13943-58-3 | potassium ferrocyanide, trihydrate | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |
| 139-89-9 | glycine, n-(carboxymethyl)-n'-(2-hydroxyethyl)-n,n'-ethylene | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 140-01-2 | pentasodium pentetate (DTPA) | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 14017-39-1 | iron (II) sulfamate | 100 | X | X | X | X | | | | X | | | | | X | | | | | | | | | | | |
| 141-32-2 | n-butylacrylate | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 141-43-5 | ethanolamine | 100 | X | X | X | X | | | | X | | | | | | | X | | | | | | | | | |
| 141-78-6 | ethylacetate | 100 | | X | | X | | | | | | | | | | | | X | | | | | | | X | X |
| 14258-49-2 | ammonium oxalate | 100 | X | X | X | X | | | | | | | | X | | | | | X | | | | | | | |
| 14265-44-2 | ortho-phosphate | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 142-82-5 | heptane | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |
| 143-18-0 | potassium oleate (oleic acid potassium salt) | 100 | | X | | | X | | X | | | X | | | | | | | | | | | X | | | |
| 143-19-1 | sodium oleate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 14332-21-9 | hypoiodous acid | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 143-33-9 | sodium cyanide | 100 | X | X | X | X | | | | X | | | | | X | | | | | | | | | | | |
| 143-66-8 | sodium tetraphenyl boron powder | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 143-74-8 | phenol, 4,4'-(3h-2,1-benzoxathiol-3-ylidene)di-,s,s-dioxide | 100 | | X | | | X | | X | | | | | | | | | | | | | | | | | |
| 144-33-2 | sodium citrate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 144-55-8 | sodium bicarbonate | 100 | X | X | X | X | | | | | | X | | X | | | | | X | | | | | | | |
| 14459-95-1 | potassium ferrocyanide trihydrate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 144-62-7 | oxalic acid | 100 | X | X | X | X | X | X | | X | | | | X | | | X | | X | X | X | X | | X | | X |
| 14464-46-1 | silica, crystalline, cristobalite | 309600 | X | X | X | X | X | | X | | X | X | | X | | | X | X | | | | | | | X | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14507-19-8 | lanthanum hydroxide | 100 | | X | X | X | X | | | | | | | | | | | | | | X | | | X | | |
| 14634-91-4 | 1,10-phenanthroline iron(II) sulfate complex | 100 | | | | X | | | | | | | | | | | | | | X | | X | | | | |
| 14797-55-8 | nitrate | 100 | X | X | | X | | | | | | | | | | | | | | X | | | | | | |
| 14797-65-0 | nitrite | 100 | X | X | | X | | | | | | | | | | | | | | X | | | | | | |
| 14798-03-9 | ammonium ion | 100 | | | | | | | | | X | X | | | | | | | | X | X | | | | | |
| 14807-96-6 | talc | 100 | X | X | X | X | X | | | | X | X | | X | X | | X | X | | | | | | | X | X |
| 14808-60-7 | crystalline quartz silica | 12900 | X | X | X | X | X | | X | | X | X | | | | | | | | X | | X | X | | | |
| 14808-79-8 | sulfate | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 148-18-5 | sodium diethyldithiocarbamate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 148-24-3 | 8-hydroxyquinoline | 100 | | | | | | X | | | | | | | | | | | | | | | | | | |
| 148-97-0 | n-nitroso-n-phenylhydroxylamine | 100 | X | X | X | X | | | | X | | | | | | | | | | | X | | X | | | |
| 14913-29-2 | plutonium nitrate (solution) | 100 | X | X | | X | X | | X | | | | | | | | | | | | | | | | | |
| 149-44-0 | sodium formaldehyde sulfoxylate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 149-57-5 | ethyl hexanoic acid | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 14985-18-3 | zirconium dinitrate oxide (see 13826-66-9, zirconyl nitrate) | 100 | | X | X | | | | | X | | | | | | | | | | | | | | | | |
| 150-39-0 | hydroxyethylethylenediaminetriacetic acid, 2,n- | 100 | X | X | X | X | | | | X | | | | X | | | | | | | | | | | | |
| 15082-28-7 | 1,3,4-oxadiazole,2-(1,1'-diphenyl)-4-yl-5-(4-(1,1-dimethyle | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 15096-52-3 | sodium fluoaluminate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | X | | | |
| 151-13-3 | butyl ricinoleate | 100 | | X | | | X | | X | | | X | | | | | | | | | X | | | | | |
| 151-21-3 | sodium lauryl sulfate | 100 | X | X | X | X | X | | | | X | X | | | | | | | | | | | | | | |
| 151-50-8 | potassium cyanide | 100 | X | X | X | X | | | | X | | | | | | | | | | X | | | | | | |
| 156-59-2 | cis-1,2-dichloroethylene | 100 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 156-60-5 | trans-1,2-dichloroethylene | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| 15710-66-4 | manganese(II)nitrate hydrate | 100 | | | X | | | | | | | | | | | | X | | | | | | | | | |
| 1589-47-5 | 2-methoxy-1-propanol | 100 | | | | | X | | X | | | | | | | | | | | | | | | | | |
| 15905-86-9 | uranium nitrate | 100 | | X | | | | | | | | | | | | | | | X | | | | | | | |
| 16065-83-1 | chromium III | 100 | | | | | | | | | | | | | | | | | X | X | | | | | | |
| 1623-15-0 | monobutyl phosphate | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |
| 16456-56-7 | monobutyl phosphite | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 1662-01-7 | diphenol-1,10-phenanthroline,4,7- | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 1668-00-4 | arsenazo III | 100 | | | | X | | | | | | | | | | | | | X | | | | | | | |
| 16774-21-3 | ammonium ceric nitrate | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |
| 16788-57-1 | potassium phosphate, dibasic trihydrate | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 16872-11-0 | fluoboric acid | 100 | | | | X | | | | | | | | | | | | | | X | | | | | | |
| 16887-00-6 | chloride (ion) | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 16919-31-6 | ammonium hexafluorozirconate | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 16921-30-5 | potassium chloroplatinate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 16941-12-1 | acid chloroplatinic | 100 | | | | X | | | | | | | | X | | | | | | | | | | | | |
| 16961-83-4 | hydrofluosilicic acid | 100 | X | X | | X | | | | | | | X | | | | | | | X | | | | | | |
| 16984-48-8 | fluoride | 2790 | X | X | | X | | | | | | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 17194-00-2 | barium hydroxide | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 1762-95-4 | ammonium thiocyanate | 100 | X | X | X | X | | | | | | | | X | | | | | X | | | | | | | |
| 17689-77-9 | ethyltriacetoxysilane | 100 | | X | | | | | | | | | | | | | | X | | | | | | | | |
| 1787-61-7 | eriochrome ® black t | 100 | | | | X | | | | | | | | | | | | | | | | | | | X | |
| 18454-12-1 | lead chromate oxide | 100 | | X | | X | | | | | | | | | | | | | | | | | | | X | |
| 18540-29-9 | chromium (VI) | 100 | X | X | X | X | X | | X | | | | | X | | | X | | | X | | | | X | X | |
| 18868-43-4 | molybdenum (IV) oxide | 100 | | | | | | | | | | | | | | | X | | | | | | | | | |
| 19004-19-4 | copper (II) nitrate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | X |
| 19210-06-1 | zinc dithiophosphate (phosphorodithioc acid, zinc salt) | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| 1945-73-9 | diphenyldithiocarbamic acid 2-(diethylamino)ethyl ester phosphate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 20667-12-3 | silver (1+) oxide | 100 | X | X | | X | X | | | | | | | X | | | | | X | | X | | | | | |
| 21041-95-2 | cadmium hydroxide | 100 | X | X | X | X | | | | | | | | X | X | | | | X | X | | | | | | |
| 21351-79-1 | cesium hydroxide | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 21645-51-2 | aluminum hydroxide | 100 | X | X | X | X | X | | X | | | X | | | | | | | X | X | | | | | | |
| 21908-53-2 | mercuric oxide | 100 | X | X | X | X | X | | | X | | | | X | X | | | | X | | X | | | | | |
| 2243-76-7 | mordant orange 1 | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 22984-54-9 | methyltri(ethylmethylketoxome)silane | 100 | | | | | | | | | | X | | | | | | | | | | | | | | |
| 2439-89-6 | steel (iron) | 100 | | X | X | | | | | | | | | | | | | | | | | | | | | |
| 24959-67-9 | bromide | 100 | X | X | | X | | | | | | | | | | | | X | | | | | | | | X |
| 25036-25-3 | reaction products of epichlorohydrin and bisphenol A | 100 | | | | | | | | | | | | | | | | X | | | | | | | | X |
| 25068-38-6 | bisphenol A/epichlorohydrin resin | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| 25103-12-2 | triisooctyl phosphite | 100 | | | | X | | | | | | | | X | | X | | | | | | | | | | |
| 25155-30-0 | sodium dodecylbenzenesulfonate | 100 | X | X | X | X | | | | | | X | | | | | | | | | | | | | | |
| 25265-77-4 | 2,2,4-trimethyl-1,3pentanediolmonoisobutyrate | 100 | | X | | | | | | | | | | X | | X | X | | | | | | | | X | |
| 25322-68-3 | polyethylene glycol | 150 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 2551-62-4 | sulfur hexafluoride | 100 | | X | | X | | | | | | | | | | | | | | | | | | | | |
| 25549-16-0 | triisooctylamine | 100 | X | X | X | | | | | | | | | | | | | | X | | | | | | | |
| 25551-13-7 | trimethyl benzene (mixed isomers) | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |
| 25767-47-9 | polymer resin | 100 | | | | | | | | | | X | | | | | | | | | | | | | | |
| 25933-53-3 | americium trinitrate (radioactive) | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 26172-55-4 | 4-isothiazolin-3-one, 5-chloro-2-methyl- | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 26419-73-8 | tirpate | 100 | | | X | | | | | | | | | | | | X | | | | | | | | | |
| 26499-65-0 | plaster of paris | 6.52% | | | | | | | | | | | | | | | | | | | | | | | | |
| 26952-21-6 | isooctyl alcohol | 100 | | X | | | | | | | | X | | | | X | | | | | | | | | | |
| 27176-87-0 | dodecylbenzene sulfonic acid | 100 | | | | | | | | | | | | | | X | | | | | | | | | | |
| 27177-77-1 | potassium dodecylbenzenesulfonate | 100 | | X | | | | | | | | | | | | | | | | | | | | | | X |
| 27321-96-6 | chloeth-24(or polyethylene, monocholeseryl ether) | 100 | | | | | | | | | | | | | | | | | | | | | X | | | |
| 27360-07-2 | polyvinyl butyral - polymer | 100 | | X | | | X | | X | | | X | | | | | | | | | | | | | | |
| 2757-28-0 | triheptylamine, 6,6',6"-trimethyl- | 100 | X | | | X | | | | X | | | | X | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 27774-13-6 | vanadyl sulfate | 100 | | X | X | | | | | | | | | | X | | | | | | X | | | | | |
| 28132-50-5 | zirconium phosphate | 100 | | X | X | X | X | | | | | | | | | | | | | | X | | | | | |
| 2836-32-0 | hydroxyacetic acid, sodium salt | 100 | | X | X | X | X | | | | | | | | | | | | | | | | | | | |
| 28928-97-4 | nonenylsuccinic anhydride | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 297-97-2 | phosphorothioic acid, o,o-diethyl o-pyrazinyl ester | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 298-00-0 | o,o-dimethyl o-p-nitrophenyl phosphorothioate | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 298-02-2 | phorate | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 298-04-4 | disulfoton | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 298-07-7 | bis(2 ethyl hexyl) hydrogen phosphate | 100 | X | | | X | | | | | | | | X | | | | | | | | | | | | |
| 298-14-6 | potassium bicarbonate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 301-04-2 | lead acetate | 100 | X | X | X | X | | | | | | | | | | | | | X | | X | | | | | |
| 302-01-2 | hydrazine | 100 | X | X | X | X | X | X | | X | | | | | | | | | | | X | | | | | |
| 304-59-6 | potassium sodium tartrate | 100 | X | X | X | X | X | | | | | | | X | | | | | | | | | | | | |
| 3164-34-9 | calcium tartrate dihydrate | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 3194-55-6 | hexabromocyclododecane | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |
| 3251-23-8 | nitric acid, copper(2+)salt | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 32607-23-1 | chloronilic acid lanthanum salt hydrate | 100 | X | | | | | | | | | | | | | | | | | | | | | | | |
| 326-91-0 | thenoyltrifluoroacetone | 100 | X | X | X | X | X | | | X | | | | X | X | | | X | | | X | | | | | |
| 333-20-0 | potassium thiocyanate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 3547-38-4 | 2-(2-arsonophenylazo)-1,8-dihydroxy-3,6-naphthalenedisulfonic acid, di | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 3658-48-8 | bis(2-ethylhexyl) hydrogen phosphite | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 37324-23-5 | polychlorinated biphenyl (aroclor 1262) | 100 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 3812-32-6 | carbon trioxide ion(2-) | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 39423-51-3 | alpha-hydro-omega-(2-aminomethylethoxy)poly[oxy(method-1,2-ethaned | 100 | | | | | | | | | | X | | | | | | | | | | | | | | |
| 3952-78-1 | alizarin complexion | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 3982-82-9 | 1,1,5,5-tetraphenyltetramethyltrisiloxane | 100 | | | | | | | | | | | | | | | X | | | | | | | | X | |
| 409-21-2 | silicon carbide | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 4098-71-9 | isophorone diisocyanate | 100 | | X | | | | | | | | X | | | | | | | | | | | | | | |
| 41638-13-5 | epoxy resin | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 4253-34-3 | methyltriacetoxysilane | 100 | | X | | | | | | | | | | | | | | X | | | | | | | | X |
| 4571-30-6 | carboxymethylammonium-4-methylbenzenesulfonite | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 482-54-2 | acetic acid, (1,2-cyclohexylenedinitrilo) tetra- | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 493-52-7 | methyl red | 100 | | | | | | | | | | | | | | | | | | | | | X | | | |
| 496-74-2 | toluene-3,4-dithiol | 100 | | X | X | X | | | | | | | | | X | | | | | | | | | | | |
| 497-19-8 | sodium carbonate | 100 | X | X | X | X | X | X | | X | | | | X | | X | X | | X | X | X | X | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 50-00-0 | formaldehyde | 100 | X | X | X | X | X | X | | X | | | | X | | | | | | | X | | | | | |
| 501-30-4 | kojic acid | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 50-21-5 | lactic acid | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 50454-43-8 | neptunium nitrate | 100 | | | | X | X | | | | | | | | | | | | | | | | | | | |
| 5064-31-3 | glycine, n-n-bis(carboxymethyl)-, trisodium salt | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 506-64-9 | silver cyanide | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 506-87-6 | ammonium carbonate | 100 | | | | X | | X | | | | | | | | | | | | | | | | | X | |
| 50-70-4 | glucitol | 100 | | X | X | | | | | | | | | | | | | | | | | | | | | |
| 50-81-7 | ascorbic acid | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 51-28-5 | dinitrophenol, 2,4- | 100 | X | X | X | X | | | | | | | | X | | | X | | | | | | | | | |
| 5131-66-8 | 2-propanol, 1-butoxy | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 513-77-9 | barium carbonate | 100 | X | X | X | X | | | | | | | | | X | | | | | | | | | | | |
| 51429-74-4 | phosphomolybdic acid | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 52-51-7 | 1,3-propaediol, 2-bromo-2-nitro | 100 | | | | X | | | | | | | | X | | | | | | | | | | | | |
| 526-95-4 | gluconicacid 50% in water | 100 | X | X | | X | | | | | | | | | | | | | X | | | | | | | |
| 527-07-1 | sodium gluconate | 100 | X | X | X | X | | | | | X | X | | X | X | X | | | X | X | X | | | | | |
| 5329-14-6 | sulfamic acid | 100 | X | X | X | X | X | X | | | | X | | | | | | | | X | | | | | | |
| 53469-21-9 | polychlorinated biphenyl (aroclor 1242) | 100 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 541-02-6 | decamethylcyclopentasiloxane | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 543-80-6 | barium acetate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 5463-64-9 | 4,4'-bis(r-amino-1-naphthylazo)-2,2'-stilbenedisulfonic acid | 100 | | | | | | | | | | | | | | | | | X | X | | | | | | |
| 546-93-0 | magnesium carbonate | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |
| 547-58-0 | c. i. acid orange 52 | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 547-64-8 | methyl lactate | 100 | | | X | | | | | | | | | | | | | | | X | | | | | | |
| 554-12-1 | methyl propionate | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| 554-13-2 | lithium carbonate | 100 | | X | | X | | | | | | | | | | | | | | | | | | | | |
| 555-43-1 | tristearin | 840 | X | | | | | | | | | | | X | | | | | | | | | | | | |
| 55-55-0 | p-methylaminophenol sulfate | 100 | X | X | | X | | | | | | | | | | | X | | | | | | | | X | |
| 557-04-0 | magnesium stearate | 100 | | X | | | | | | | | | | | | | X | | | | | | | | | |
| 557-05-1 | zinc stearate | 100 | X | X | | X | | | | | | | | X | | | X | | | | | | | | | |
| 56-23-5 | carbon tetrachloride | 100 | X | X | X | X | X | X | X | X | X | X | | X | | | X | | X | X | X | | | | | |
| 563-41-7 | semicarbazide hydrochloride | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 56-38-2 | parathion | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 56-40-6 | glycine | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 56-81-5 | glycerol or 1,2,3-propanetriol | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 57-11-4 | stearic acid | 100 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 57-12-5 | cyanide | 100 | X | X | | X | | | | | | | X | | | | | | | | | | | | | |
| 57-13-6 | urea | 100 | X | X | X | X | | | | | | | | X | | | | | X | | | | | | | |
| 57-50-1 | sucrose | 100 | X | X | X | X | X | | | | X | | | X | | | | | | | X | | | | | |
| 57-55-6 | 1,2-propanediol | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 5794-28-5 | calcium oxalate monhydrate | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 58-08-2 | caffeine | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 584-08-7 | potassium carbonate | 100 | X | X | X | X | | | | | | | | X | | | | | X | | | | | | | | |
| 584-42-9 | alazarin yellow gg | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 592-85-8 | mercuric thiocyanate | 100 | X | X | X | X | | | | | | | | X | X | | | | X | | | | | | | |
| 5989-27-5 | d-limonene | 200 | | | | | | | | | | | | | | | X | | | | | | | | | |
| 60-00-4 | EDTA (ethylenediaminetetraacetic acid) | 100 | X | X | X | X | | X | | X | | | | X | | | | | | | | | | | | |
| 60177-39-1 | copolymer of styrene | 100 | | X | X | X | X | | | | | | | | | | | | | | X | | | | | |
| 60-29-7 | diethyl ether | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 60-51-5 | dimethoate | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 60676-86-0 | crystalline-fused silica | 100 | X | X | X | X | | | | | | | | | X | | | | X | X | | | | | | |
| 6131-90-4 | sodium acetate | 100 | X | X | | X | | | | | | | | X | | | | | X | | | | | | | |
| 6153-56-6 | oxalic acid | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 61788-76-9 | chlorinated paraffin | 100 | | X | | | X | | X | | | X | | | | | | | | | | | | | | X |
| 61790-53-2 | diatomaceous earth | 100 | X | X | X | X | | | | | | | | X | | | | X | X | | | | | | | |
| 623-42-7 | methyl butyrate | 100 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 62-38-4 | mercury, (acetato)phenyl- | 100 | | X | | | | | | | | X | | | | | | | | | | | | | | |
| 62625-29-0 | cresol red, water soluble, indicator grade | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 62-76-0 | ethanedioic acid, disodium salt (sodium oxalate) | 100 | X | X | X | X | | | | | | | | | | | | | X | | | | | | X | |
| 627-93-0 | dimethyl adipate | 100 | | X | | | | | | | | | | | | | | | | | | | | | X | |
| 628-63-7 | amyl acetate | 100 | | X | | X | | | | | | | | | X | | | | | | | | | | | |
| 629-50-5 | tridecane | 100 | X | | X | X | | | | X | | | | | | | | | | | | | | | | |
| 629-59-4 | tetradecane | 100 | X | | X | X | | | | X | | | | | | | | | | | | | | | | |
| 629-62-9 | pentadecane, n- | 100 | X | | X | X | | | | | | | | | | | | | | | | | | | | |
| 63148-58-3 | trimethyl phenylmethylpolysiloxane | 100 | | X | | | | | | | | X | | | | | X | | | | X | | | | | |
| 63148-62-9 | methylpolysiloxane | 100 | | X | X | X | X | | | | | | | | | | X | X | | | | | | | | |
| 63148-65-2 | polyvinylbutyral resin | 100 | | X | | | X | | X | | | X | | | | | | | | | | | | | | |
| 631-61-8 | ammonium acetate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 63231-67-4 | silica gel | 100 | X | X | X | X | | | | | | | | X | | | X | | | | | | | | | |
| 63-42-3 | D-(+)-lactose | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 63449-39-8 | paraffin waxes and hydrocarbon waxes, chlorinated | 100 | | X | | | X | | X | | | X | | | | | | | | | | | | | | |
| 63450-15-7 | polyvinyl alcohol polymer w/polyvinyl acetate copolymer | 100 | | X | | | | | | | | X | | | | | | | | | | | | | | |
| 63451-28-5 | methyl red hydrochloride crystalline | 100 | | X | | | X | | X | | | | | | | | | | | | | | | | | |
| 6358-31-2 | c.i. pigment yellow 74 | 100 | | X | | | X | | X | | | | | | | | X | | | | | | | | | |
| 63800-37-3 | sepiolite (clay) | 2500 | | | | | | | | | | | | | | | X | | | | | | | | | |
| 64-02-8 | tetrasodium n,n'-ethylenediaminediacetate | 100 | X | X | X | X | | | | | | X | | X | X | | X | | | | | | | | | |
| 64-17-5 | ethanol | 100 | X | X | X | X | | | | X | X | | | X | X | X | X | X | | | | | | | X | |
| 64-18-6 | formic acid | 100 | X | X | X | X | X | | X | X | | | | X | | X | | | X | | X | | | | | |
| 64-19-7 | acetic acid | 100 | X | X | X | X | X | | | | | | | | X | X | | | | | X | | | | | |
| 64475-85-0 | petroleum spirits | 100 | | X | X | X | X | | | | | | | | | X | | | | | | | | | | |
| 64741-56-6 | mineral oil (no information available) | 100 | | | | | | | | | | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 64741-88-4 | mineral oil, petroleum distillates (mild and severe) | 100 | X | X | | X | | | | | | | | X | | | X | | | | | | | | | |
| 64742-38-7 | normal paraffins | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 64742-41-2 | clay-treated residual oils (petroleum) | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 64742-46-7 | mineral seal oil | 100 | | X | | | | | | | | | | | | X | | | | | | | | | | |
| 64742-47-8 | hydrotreated kerosene (petroleum) | 100 | | X | | | | X | | | | X | | | | X | | | | | | | | | X | |
| 64742-53-6 | vacuum residuum | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 64742-54-7 | hydrotreated (mild & severe) heavy paraffinic distillate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 64742-57-0 | de-asphalted hydrotreated petroleum distillates | 100 | | X | | X | | | | | | | | | | | | | | | | | | | | |
| 64742-65-0 | solvent-dewaxed (mild & severe) heavy paraffinic distillate | 100 | X | X | X | X | X | | X | | X | | | | | | X | | | | | | | | | |
| 64742-70-7 | catalytic-dewaxed (mild & severe) heavy parafinnic distillate | 100 | | X | | | | | | | | | | | X | | | | | | | | | | X | |
| 64742-81-0 | hydrodesulfurized kerosene (petroleum) | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 64742-88-7 | medium aliphatic solvent naphtha | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | X | |
| 64742-89-8 | naphtha | 100 | | X | | | | | | | | X | | | | | | | | | | | | | | |
| 64742-94-5 | solvent naphtha | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |
| 64771-72-8 | normal parrifins C5-20 (NPH) | 100 | | X | | X | X | | | | | | | | | | | | | | | | | | | |
| 6484-52-2 | ammonium nitrate | 100 | X | X | X | X | X | | | X | | | | | | | | | | | X | | | | | |
| 6487-48-5 | potassium oxalate | 100 | | X | X | X | X | | | | | | | | | | | | | | | | | | | |
| 65794-96-9 | 3/4-methylphenol or 3/4-cresol mix | 100 | | | X | | | | | | | | | | | | | | | | | | | | X | |
| 65-85-0 | benzoic acid | 100 | | X | | X | | | | | | | | | | | | | | | | | | | | |
| 65996-67-0 | iron | 100 | X | X | X | X | X | | X | X | | | | X | X | | | | X | X | X | | X | X | X | |
| 65996-93-2 | coal tar pitch | 100 | | | | | X | | | | | | | | | | | X | | | | | | | | X |
| 65997-15-1 | portland cement | 100 | X | X | X | X | X | | X | | X | | | X | X | | X | | | | | | | | X | |
| 66-71-7 | phenanthroline, 1,10- | 100 | | X | | | X | | X | | | | | | | | | | | | | | | | | |
| 67-43-6 | glycine, n,n-bis(2-(bis(carboxymethyl)amine)ethyl- | 100 | X | X | | X | | | | | | | | X | | | X | | | | | | | | | X |
| 67-56-1 | methanol | 100 | X | X | X | X | X | | X | | | X | | X | X | X | | X | | | | | | | X | X |
| 67-63-0 | isopropyl alcohol | 100 | X | X | X | X | X | | X | | | X | | X | X | | X | X | | | | | | | X | X |
| 67-64-1 | acetone | 100 | X | X | X | X | X | | X | X | X | X | X | X | X | X | X | X | X | X | X | | | X | X | X |
| 67-66-3 | chloroform | 100 | X | X | X | X | | | | X | | | | X | | | | | X | X | | | | | | |
| 67-68-5 | dimethyl sulfoxide | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 67-72-1 | hexachloroethane | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 68131-37-3 | corn syrup solids | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 68131-40-8 | ethoxylated secondary alcohols | 100 | | | | | | | | | | | | | | | X | | | | | | | | | |
| 68131-74-8 | micro hollow balls | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | X | |
| 68186-90-3 | chrome (III) antimony (V) titanium oxide | 100 | | X | | | | | | | | | | | | | | | | | X | | | | | |
| 68308-54-3 | mono-,di-, tri-, tallow glycerides, hydrogenated | 100 | | X | X | X | X | | | | | | | | | | | | | | | | | | X | X |
| 68334-00-9 | cottonseed oil, hydrogentated | 100 | X | X | | X | | | | | | | | X | X | | | | | | | | | | | X |
| 68334-76-9 | bisphenol-a based epoxy | 100 | | | | | | | | | | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 68410-21-1 | organic oil (no info) | 100 | | | | | | | | | | | | | | | | X | | | | | | | | X |
| 68412-54-4 | nonylphenoxypolyethoxyethanol | 100 | | X | | | | | | | | | | | | X | | | | | | | | | | |
| 68476-85-7 | liquefied petroleum gas (lpg) | 100 | | X | | | | | X | | | | | | X | | X | | | | | | | | X | |
| 6850-28-8 | tris(hydroxymethyl)aminomethane acetate salt | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 68603-15-6 | alcohols, C6-12 | 100 | | X | | X | | | | | | | | | | | | | | | | | | | | |
| 68608-26-4 | sulfonic acids, petroleum, sodium salts | 100 | | X | | | | | | | | | | | | X | | | | | | | | | | |
| 68649-42-3 | zinc salts of dialkylphosphorodithioic acid (additive ingrd) | 100 | X | X | | X | | | | | X | | | X | X | | | X | | | | | | | X | X |
| 68855-24-3 | alkyl benzene | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |
| 68855-54-9 | diatomaceous earth flux calcined | 100 | | X | | | X | | X | | | | | | | | | | | | | | | | | |
| 69011-15-0 | chloromethylated copolymer | 100 | X | X | | X | | | | | | | | | X | | | | | | | | | | | |
| 69011-18-3 | sulfonated chloromethylated copolymer of styrene DVB in H2 | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 69011-19-4 | styrene/DVB ion exchange resin | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 69011-20-7 | benzene, diethenyl-, polymer; ethenylbenzene & etenylethylbenzene su | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 69011-22-9 | sulfonated copolymer of styrene and divinylbenzene in sodium | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 6904-66-1 | alkyl phenyl siloxane | 100 | | | | | | | | | | | | | | | X | | | | | | | | | |
| 69-65-8 | d-mannitol | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 69-72-7 | salicylic acid | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 69772-06-1 | dowex 1X8-50 ion exchange resin | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 70131-67-8 | hydroxypolydimethylsiloxane | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 70677-00-8 | butylacrylate, methyl methacrylate, styrene, methacrylic acid 2-hydroxy ethyl acrylate polymer | 100 | X | | | | | | | | | | | | | | | | | | | | | | | |
| 71-36-3 | butyl alcohol | 100 | X | X | X | X | | | | X | | X | | X | X | X | | X | X | X | | | | X | | X |
| 71-43-2 | benzene | 100 | X | X | X | X | X | | X | | X | X | | X | | X | | | X | X | | | | | | |
| 71-55-6 | 1,1,1-trichloroethane | 100 | X | X | X | X | X | | X | | X | X | X | X | | | X | X | | X | X | | | X | | |
| 72-48-0 | 1,2-dihydroxyanthraquinone | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 7369-66-6 | dihexyl-n,n-diethylcarbamoyl methyl phosphonate | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 7429-90-5 | aluminum | 1715 | X | X | X | X | X | | X | X | | | | X | | | X | | X | X | X | X | X | X | X | |
| 7429-91-6 | dyprosium | 100 | X | X | X | X | X | | | | | | | | X | | | | | | X | | | | X | |
| 7439-88-5 | iridium powder | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 7439-89-6 | iron | 10% | X | X | X | X | X | | X | X | | | | | | X | | X | | X | | | | X | | |
| 7439-91-0 | lanthanum | 3.20% | | | | | | | | | | | | | | | | | | | | | | | | |
| 7439-92-1 | lead | 250 | X | X | X | X | X | | X | X | X | X | X | X | X | X | X | X | X | X | X | | X | X | X | X |
| 7439-93-2 | lithium | 100 | X | X | | X | X | | X | X | | | | X | | X | | | X | X | X | | X | | X | |
| 7439-95-4 | magnesium | 100 | X | X | X | X | X | | | | | | | X | | | | | X | X | X | X | X | X | X | |
| 7439-96-5 | manganese | 100 | X | X | X | X | X | | X | | | | | X | | | | | X | X | X | | | | | X |
| 7439-97-6 | mercury | 100 | X | X | X | X | X | | | | X | X | X | X | X | X | X | X | X | | X | | | | X | |
| 7439-98-7 | molybdenum | 925 | X | X | X | X | X | | | | X | | | X | | | | | X | | X | | | | X | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-02-0 | nickel | 1770 | X | X | X | X | X | | X | X | | | X | X | X | | X | | X | X | X | X | | X | X | |
| 7440-14-4 | radium | 100 | X | X | | | | | | | | | | | | | | | X | | | | | | | |
| 7440-16-6 | rhodium | 100 | X | X | X | X | | | | | | | | | X | | | | | | X | | | | X | |
| 7440-19-9 | samarium | 100 | X | X | X | X | X | | | | | | | X | | | | | | | X | | | X | X | |
| 7440-21-3 | silicon | 100 | X | X | X | X | X | | | X | | X | X | X | | X | | | X | X | X | | | X | X | |
| 7440-22-4 | silver | 100 | X | X | X | X | X | | | X | | | | X | | X | | | | X | X | | | | X | |
| 7440-23-5 | sodium | 112 | X | X | X | X | X | | | | | | | | | | | | | | | | | X | | |
| 7440-24-6 | strontrium | 100 | X | X | | X | | | | | | | | | | | | | X | | X | | | | X | |
| 7440-25-7 | tantalum | 112 | X | X | X | X | X | | | X | X | | | | | | | | | | | | | | | |
| 7440-28-0 | thallium | 100 | | X | | | | | | | | | X | | | | | | | | | | | | | |
| 7440-29-1 | thorium | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 7440-31-5 | tin | 17000 | X | X | X | X | X | | | | | | | X | X | | | | X | | X | | | | X | |
| 7440-32-6 | titanium | 140 | X | X | X | X | X | | | X | | | | | | | | | X | X | X | | | | X | |
| 7440-33-7 | tungsten | 100 | X | X | X | X | X | | X | | X | | | | X | | X | | X | | X | | X | | X | |
| 7440-36-0 | antimony | 100 | | X | | | | | | | | | X | | | | | | | X | | | | | | |
| 7440-38-2 | arsenic | 100 | X | X | X | X | | | | | | X | X | X | | | | | X | X | | | | | | |
| 7440-39-3 | barium | 208 | X | X | X | X | X | | | | | X | X | X | | X | | | X | X | X | | X | X | | |
| 7440-41-7 | beryllium | 100 | X | X | X | X | X | | | | X | | X | X | | | | | X | X | X | | X | | X | |
| 7440-42-8 | boron | 100 | X | X | X | X | X | | X | | | | | | | | | | X | | X | | X | | X | |
| 7440-43-9 | cadmium | 100 | X | X | X | X | X | X | X | | X | X | X | X | X | X | X | | X | X | X | | X | X | X | |
| 7440-44-0 | carbon | 875 | X | X | X | X | X | | | | | | | X | X | | X | | X | X | X | | | | X | |
| 7440-45-1 | cerium | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |
| 7440-47-3 | chromium | 2460 | X | X | X | X | X | X | X | | X | X | X | X | | X | X | X | X | X | X | | | | X | |
| 7440-48-4 | cobalt | 100 | X | X | X | X | X | | | X | | | | | | | | | | X | X | | | | X | |
| 7440-50-8 | copper | 100 | X | X | X | X | X | | X | X | X | | | X | X | | | | X | X | X | | | | X | |
| 7440-53-1 | europium | 100 | X | X | X | X | X | | | | | | | | X | | | | | | X | | | | X | |
| 7440-54-2 | gadolinium | 100 | X | X | X | X | X | | X | | | | | X | X | | | | | X | | | | | | |
| 7440-55-3 | gallium | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |
| 7440-57-5 | gold | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7440-58-6 | hafnium | 200 | X | X | X | X | X | | | | | | | | | | | | | | X | | | | | |
| 7440-61-1 | uranium | 123312 | X | X | | X | X | | | | | | | | | | | | | | X | | | | | |
| 7440-62-2 | vanadium | 100 | X | X | X | X | X | | | | | | X | X | | | | | | X | X | | | | X | |
| 7440-65-5 | yttrium | 100 | | X | | X | | | | | | | | | X | | | | | | | | | | | |
| 7440-66-6 | zinc | 100 | X | X | X | X | X | | | X | X | | X | X | X | | | X | X | X | X | | | X | X | X |
| 7440-67-7 | zirconium | 10% | X | X | X | X | X | | | X | | | | X | | | | | X | | X | | | | X | |
| 7440-69-9 | bismuth | 100 | X | X | | X | X | | X | | | | | X | | | | | | X | | X | X | | | |
| 7440-70-2 | calcium | 105 | X | X | X | X | X | | | | | | | X | | | | | X | X | X | | | | X | |
| 7446-14-2 | lead sulfate | 100 | X | X | X | X | | | | | | | | | | | | | X | | | | | | | |
| 7446-70-0 | aluminum chloride | 100 | X | X | X | X | | | | | | | | X | | | | | | X | | | | | | |
| 7447-39-4 | cupric chloride | 100 | | | | X | | | | | | | | | | | | | X | | | | | | | |
| 7447-40-7 | potassium chloride | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7447-41-8 | lithium chloride | 100 | | | | X | | | | | | | | | | | | | | X | | | | | | |
| 74-87-3 | chloromethane | 100 | | | | | | | | | | | | | | | | | X | X | | | | | | |
| 7487-88-9 | magnesium sulfate (epsom salts) | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7487-94-7 | mercuric chloride | 100 | X | X | X | X | | | | X | | | | | X | | | | | | | | | | | |
| 74-88-4 | iodomethane | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 7491-65-8 | phosphorodithioic acid, 0,0-bis(1,2,2-trimethulpropyl)ester, | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 74-98-6 | propane | 100 | X | X | X | X | | | | | | X | | X | X | | | X | X | | | | | | | |
| 75-00-3 | chloroethane | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 75-01-4 | vinyl chloride (chloroethylene) | 100 | X | X | X | X | X | | X | | | X | | X | | | | | | | | | | | | |
| 75-09-2 | dichloromethane | 100 | X | X | X | X | | | | X | X | X | X | X | X | X | | X | X | X | | | | X | | X |
| 75-20-7 | calcium carbide | 2500 | | | | | | | | | | | | | | | X | | | | | | | | | |
| 75-21-8 | ethylene oxide | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 75-28-5 | isobutane | 100 | X | X | | X | | | | | | X | | X | X | | | | | | | | | | | |
| 75-34-3 | 1,1-dichloroethane | 100 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 75-35-4 | 1,1-dichloroethylene | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 75-45-6 | chlorodifluoromethane | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |
| 7550-45-0 | titanium tetrachloride | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 75-52-5 | nitromethane | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 7553-56-2 | iodine | 100 | X | X | X | X | | | | | | | | X | | | | | X | | | | | | | |
| 7558-79-4 | sodium phosphate dibasic | 100 | X | X | | | | | | | | | | X | | | | | | | | | | | | |
| 75-68-3 | 1-chloro-1,1-difluoroethane | 100 | X | X | X | X | | | | | X | | | | | | | | | X | | | | | X | |
| 75-69-4 | trichlorofluoromethane | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 75-71-8 | dichlorodifluoromethane | 100 | X | X | X | X | | | | | X | X | | | | | | | | | | | | | | |
| 75-77-4 | trimethyl chlorosilane | 100 | X | X | X | X | | | | X | | | | X | | | | | | | | | | | | |
| 75-78-5 | dichlorodimethylsilane | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 7601-54-9 | sodium phosphate, tribasic | 100 | | X | | | | X | | | | | | | | | | | | | | X | | | | |
| 76-01-7 | pentachloroethane | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 7601-90-3 | perchloric acid | 100 | X | X | X | X | | | | | | | | X | X | | X | | | | | | | | | |
| 76-03-9 | trichloroacetic acid | 200 | | | | | | | | | | | | | | | X | | | | | | | | | |
| 76-13-1 | 1,1,2-trichloro-1,2,2-trifluoroethane | 100 | X | X | X | X | | | | | X | | | X | | | X | | | | | | | | | |
| 7631-86-9 | silicon dioxide | 100 | X | X | | X | | | | | X | | | X | | | X | | | | | | | | | |
| 7631-89-2 | sodium arsenate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 7631-90-5 | sodium bisulfite (pH = 4.56 per T. Hughes) | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7631-99-4 | sodium nitrate | 870 | X | X | X | X | X | | | X | | | X | X | | | | X | X | X | X | X | | X | | |
| 7632-00-0 | sodium nitrite | 100 | X | X | X | X | X | | | X | | X | | X | X | | | | | X | | | | | | |
| 7632-50-0 | ammonium citrate | 100 | X | X | X | X | | X | | | | | | | | | | | | | | | | | | |
| 7646-78-8 | stannic chloride | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7646-79-9 | cobalt chloride | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 7646-85-7 | zinc chloride (reference merck index)(pH = 2.5 of 1:1 soln) | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7646-93-7 | potassium bisulfate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 7647-01-0 | hydrochloric acid | 100 | X | X | X | X | X | X | | X | X | X | | X | X | X | X | | X | X | X | | | | | |
| 7647-14-5 | sodium chloride | 100 | X | X | X | X | X | | X | | | | | X | X | | X | | X | | | | | | X | |
| 7647-15-6 | sodium bromide | 100 | X | X | X | X | | | | X | | | | X | | | | | | | | | | | | |
| 7647-17-8 | cesium chloride | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 76-59-5 | bromthymol blue | 100 | | X | | | X | | X | | | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 76-60-8 | bromocresol green | 100 | | | | X | | | | | | | | | X | | | | | | | | | | | |
| 76-61-9 | thymol blue | 100 | | X | | | | | | | X | X | | | X | X | X | | | | X | | X | X | X | |
| 7664-38-2 | phosphoric acid | 100 | X | X | X | X | X | X | | | | | | X | X | X | X | | X | X | X | | | X | X | |
| 7664-39-3 | hydrofluoric acid | 100 | X | X | X | X | X | | | X | | | | X | | | X | | | X | | X | | | | |
| 7664-41-7 | ammonia | 100 | X | X | X | X | X | | X | X | | | | X | X | X | X | | X | | X | | X | X | | |
| 7664-93-9 | sulfuric acid | 100 | X | X | X | X | X | X | X | X | | | | X | X | | | | | | | | | | | |
| 7681-11-0 | potassium iodide | 100 | X | X | X | X | | | | | | X | | X | X | X | | | X | | X | | | X | | |
| 7681-38-1 | sodium bisulfate | 100 | X | X | X | X | X | X | | | | | | X | X | | | | X | X | X | | | | | |
| 7681-49-4 | sodium fluoride | 100 | X | X | X | X | X | | | X | | | | X | | | | | | | | | | | | |
| 7681-52-9 | sodium hypochlorite | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |
| 7681-57-4 | disodium salt pyrosulfurous acid | 100 | | | | X | | | | | | | | X | | | | | | | | | | | | |
| 7681-82-5 | sodium iodide | 100 | X | X | X | X | | | | | | | | X | X | X | X | | X | X | X | | X | X | X | X |
| 7697-37-2 | nitric acid | 2290 | X | X | X | X | X | X | X | X | X | X | X | X | X | | X | | X | | X | | | | X | |
| 7704-34-9 | sulfur | 100 | X | X | X | X | X | | | | | | | X | X | | X | | X | | | | | | | |
| 7704-99-6 | zirconium hydride | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 7705-08-0 | ferric chloride | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 77-09-8 | phenolphthalein | 100 | | X | | X | | | | | | | | | X | | | | | | | | | | | |
| 7718-54-9 | nickel (II) chloride (1:2) | 100 | X | X | X | X | | | | | | | | X | X | | | | | | X | | | | | |
| 7720-78-7 | ferrous sulfate | 100 | X | X | X | X | X | | | | | | | X | | | | | X | X | X | | X | X | | |
| 7722-64-7 | potassium permanganate | 100 | X | X | X | X | X | X | X | X | | | | | | | | | | | | | | | | |
| 7722-76-1 | ammonium dihydrogen phosphate | 100 | | | | X | | | | | | | | | | | | | X | X | X | | | | | |
| 7722-84-1 | hydrogen peroxide | 100 | X | X | X | X | X | | | X | X | | | X | | | | | | | | | | | | |
| 7722-88-5 | tetradosium pyrophosphate (TSPP) | 100 | | | X | X | | | | | | | | | | | | | | | | | | | | |
| 7723-14-0 | phosphorus (red, white/yellow, black/violet) | 100 | X | X | X | X | X | | | X | | | | | X | | | | | X | X | | | | X | |
| 7726-95-6 | bromine | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 7727-21-1 | potassium persulfate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 7727-37-9 | nitrogen | 100 | X | X | | X | X | | | | | | | | | | | | | | X | | | | X | |
| 7727-43-7 | barium sulfate | 100 | X | X | X | X | X | | X | | | | | X | | | | X | X | | | | | | | |
| 7727-54-0 | peroxydisulfuric acid, diammonium salt | 100 | | | | X | | X | | | | | | | | | | | | | | | | | | |
| 7732-18-5 | water | 125 | X | X | X | X | X | X | X | X | X | X | | X | X | X | X | X | | | | | | | X | |
| 7738-94-5 | chromic (VI) acid | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7757-79-1 | potassium nitrate | 520 | X | X | X | X | | | | X | | | X | | | | | | X | X | | | | | | |
| 7757-82-6 | sodium sulfate | 170 | X | X | X | X | X | | | X | | | X | X | | | | | X | | X | X | | | | |
| 7757-83-7 | sodium sulfite | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 7758-09-0 | potassium nitrite | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 7758-16-9 | pyrophosphoric acid, disodium salt | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 7758-89-6 | cuprous chloride | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 7758-95-4 | lead chloride (PB = 74.5% wt.) | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7758-97-6 | lead chromate | 100 | X | X | | X | | | | | | | | | | | | | X | | | | | | | X |
| 7761-88-8 | silver nitrate | 100 | X | X | X | X | X | | | X | | | | X | | | | | | | X | | | | | |
| 7772-98-7 | disodium salt thiosulfuric acid | 100 | X | X | X | X | X | | | | | | | X | | | | | X | | X | | | | | |
| 7772-99-8 | stannous chloride | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7774-29-0 | mercuric iodide | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7775-14-6 | dithionous acid, disodium salt | 100 | | | | X | | | | | | | | | | | | | | | | | | | X | |
| 7778-18-9 | calcium salt sulfuric acid | 100 | X | X | | X | X | | X | | | | | X | | | X | | | | | | | | | |
| 7778-50-9 | dipotassium dichromate | 100 | X | X | X | X | | X | | | | | | X | X | | | | | | | | | | | |
| 7778-53-2 | potassium phosphate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 7779-88-6 | zinc nitrate | 100 | X | X | | X | | | | | | | | | | | | | X | | X | X | | | X | |
| 7782-41-4 | fluorine | 100 | X | X | X | X | X | | | | X | | | X | | | X | | X | | | | | | | |
| 7782-42-5 | graphite | 100 | X | X | X | X | | | | | | | | | | | | | | | X | | | | | |
| 7782-44-7 | oxygen | 1400 | X | X | | X | X | | | | | X | X | X | | | | | X | X | | | | X | | |
| 7782-49-2 | selenium | 100 | X | X | X | X | | | | | | | | | | | | | | | X | | | | X | |
| 7782-50-5 | chlorine | 100 | X | X | X | X | X | | | X | | | | | | | | | X | | | | | | | |
| 7782-61-8 | ferric nitrate, nonahydrate | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 7782-68-5 | iodic acid | 100 | | | | X | | | | | | | | X | | | | | | | | | | | | |
| 7782-77-6 | nitrous acid | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7782-91-4 | molybdic acid (no RTECS info) | 100 | X | X | | X | | | | X | | | | | | | | | | | | | | | | |
| 7783-00-8 | selenious acid | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7783-18-8 | ammonium thiosulfate | 100 | X | X | | X | | | | | | | | | | | | | X | | | | | | | |
| 7783-20-2 | ammonium sulfate | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | X | |
| 7783-22-4 | ammonium diuranate | 150 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 7783-28-0 | ammonium phosphate dibasic | 100 | X | X | X | X | | | | | | | | | | | | | X | | | | | | | |
| 7783-35-9 | mercuric sulfate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7783-36-0 | mercurous sulfate | 100 | X | X | X | X | | | | | | | | | | | | | X | X | | | | | | |
| 7783-50-8 | ferric fluoride | 100 | X | X | X | X | | | | | | | | | X | | | | | | | | | | | |
| 7783-85-9 | ammonium ferrous sulfate | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 7783-90-6 | silver chloride | 100 | | X | X | X | | | | | | | | | | | | | | | | | | | | |
| 7783-96-2 | silver iodide | 100 | X | | | | | | | | | | | | | | | | | | | | | | | |
| 7784-18-1 | aluminum fluoride hydrate | 100 | X | X | | X | | | | | | | X | X | | | | | X | | X | | | | | |
| 7784-27-2 | aluminum nitrate | 15920 | X | X | X | X | X | | | | | | | X | | | | | | | | | | | | |
| 7784-46-5 | sodium arsenite | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 7785-87-7 | manganous sulfate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 77-86-1 | 2-amino-2-(hydroxymethyl)-1-3-propanediol | 100 | X | X | | X | | | | | | | | | | | | | X | X | | | | | | |
| 7786-30-3 | magnesium chloride | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |
| 7786-81-4 | nickel (II) sulfate (1:1) | 100 | X | X | X | X | | | | | | | | | | | | | | | | | X | | | |
| 7787-49-7 | beryllium fluoride | 100 | | | | | | | | | | | | X | | | | | | | | | | | | |
| 7788-98-9 | ammonium chromate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 7789-00-6 | potassium chromate | 100 | X | X | X | X | | | | | | | | X | | | | | | | X | | | | | |
| 7789-23-3 | potassium fluoride | 100 | X | X | X | X | X | | | | | | | | | | | | X | | | | | | | |
| 7789-24-4 | lithium fluoride | 100 | X | X | X | X | | | | | | | | | | | | | | | X | | | | | |
| 7789-38-0 | bromic acid, sodium salt | 100 | | X | X | X | X | | | | | | | X | | | | | X | X | | | | | | |
| 7789-75-5 | calcium fluoride | 100 | X | X | X | X | | | | | | | | | | | | | | | | | | | | |
| 7790-21-8 | potassium periodate | 100 | | | | X | | | | | | | | X | X | | | | | | | | | | | |
| 7790-62-7 | potassium pyrosulfate | 100 | X | X | X | X | | | | | | | | | | | | | | | | | X | | | |
| 7790-69-4 | lithium nitrate | 100 | | X | | | X | | X | | | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7790-84-3 | cadmium sulfate, octahydrate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 77-92-9 | citric acid | 100 | X | X | X | X | X | X | | | | X | | X | X | X | X | X | X | | X | | | | X | X |
| 7803-49-8 | hydroxylamine | 100 | X | X | X | X | | | | X | | | | X | X | | | | | | | | | | | |
| 7803-55-6 | ammonium vanadate | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 78-10-4 | ethyl silicate | 100 | | X | | | | | | | | | | | | | | | | | | | | | X | |
| 78-38-6 | diethyl ethylphosphonate | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 78-46-6 | dibutyl butylphosphonate | 100 | X | | X | X | X | | | X | | | | | | | | | X | X | X | | | | | |
| 78-50-2 | trioctyl phospine oxide | 100 | X | X | X | X | | | | | | | | | | | | | X | | | | | | | |
| 78-51-3 | 2-butoxyethanol, phosphate | 100 | X | X | | X | | | | | | | | X | | | X | | | | | | | | | |
| 78-92-2 | sec-butyl alcohol (butanol) | 100 | | | | | | | | | | X | X | X | X | X | | X | | X | | | | X | X | X |
| 78-93-3 | methyl ethyl ketone | 200 | X | X | X | X | X | X | X | X | | | | X | | X | X | | | X | | | | | | |
| 79-01-6 | trichloroethylene | 100 | X | X | X | X | | X | | | X | | | X | | | | | | | | | | | | |
| 79-09-4 | propionic acid | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 79-11-8 | chloroacetic acid | 100 | X | X | X | X | | | | | | | | X | | | | | | X | | | | | | |
| 79-20-9 | methyl acetate | 100 | | | | | | | | | | | | | | | | | | X | | | | | | |
| 79-27-6 | tetrabromoethane, 1,1,2,2- | 100 | X | X | | X | | | | | | X | | | | | | | | X | | | | | | |
| 79-34-5 | 1,1,2,2-tetrachloroethane | 100 | | | | | | | | | | | | | | | X | | | | | | | | | |
| 8001-30-7 | corn oil | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 8001-79-4 | castor oil | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 8002-43-5 | soya lecithin | 100 | | X | | | | | | | | X | | | | | | | | | | | X | | | |
| 8002-74-2 | paraffin | 100 | | | | | | | | | | | | | | | | | | | | | | | | |
| 8006-28-8 | soda lime | 100 | | | | X | | | | | | | | | | | | | | | | | | | X | |
| 8007-18-9 | nickel antimony titanate | 100 | | X | | | | | | | | X | | | | | | | | | X | | | | | |
| 8007-45-2 | coal tar | 100 | X | X | X | X | X | | | | X | | | X | | | X | | X | | | | | | | |
| 8008-20-6 | kerosene | 100 | X | X | X | X | | X | | | | | | | | | | | | | | | | | | |
| 8012-75-7 | chromic acid, calcium salt (1:1), dihydrate | 100 | | | | | | X | | | | | | | | | | | | | | | | | | |
| 8012-95-1 | mineral oil | 100 | | X | X | X | X | | | | | X | | | | | X | | | | X | | | | | |
| 80-15-9 | cumene hydroperoxide | 100 | X | X | X | X | | | | X | | | | | | | | | | X | | | | | | |
| 8016-28-2 | animal fatty oil | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | X | |
| 8031-18-3 | atlapulgite clay | 100 | | X | | | X | | X | | | X | | | | | X | X | | | | | | | | X |
| 8032-32-4 | ligroine | 100 | X | X | X | X | | | | | X | X | | | | | | | | | | | | | | |
| 8042-47-5 | white mineral oil | 100 | X | X | X | X | | | | | X | X | | | | | | | | | | | | | | |
| 804-63-7 | quinine sulfate | 100 | | | | X | | | | | | | | | | | X | X | | | X | | | | | |
| 8052-41-3 | stoddard solvent | 100 | X | X | X | X | X | | X | | X | X | | | | | X | | | | | | | | | |
| 8052-42-4 | asphalt | 100 | | X | | | | | | | | | | X | | | | | | | | | | | | |
| 80-55-7 | methyl lactic acid (ethylester) | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 80-62-6 | methyl ester methacrylic acid | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 81133-20-2 | ascarite | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 814-91-5 | cupric oxalate | 100 | X | | | | | | | | | | | | | | | | | | | | | | | |
| 81-88-9 | basic violet 10 | 100 | | | | X | | | | | | | | X | | | | | | | | | | | | |
| 83-32-9 | acenaphthene | 100 | X | X | | X | | | | | | X | | | | | | | | | | | | | | |
| 83817-72-5 | di(ethylmethylkeotoxime)methoxy methylsilane | 100 | | | | | | | | | | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 845-10-3 | dimethylaminepheylazobenzoic acid, sodium salt | 100 | | | | X | | | | | | | | | | | X | | | X | | | | | | |
| 84-74-2 | dibutyl phthalate | 100 | | | | | | | | | | | | | X | | | X | | | | | | | X | |
| 85-68-7 | benzyl butyl ester phthalic acid | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 868-14-4 | potassium tartrate | 100 | | | | X | | | | | | | | X | | | | | | | X | | | | | |
| 868-18-8 | sodium tartrate | 100 | X | X | X | X | X | | | | | | | X | | | | | | | X | | X | | | |
| 87-69-4 | tartaric acid | 100 | X | X | X | X | X | X | X | | | | | X | | | | | | | | | | | | |
| 877-24-7 | potassium biphthalate | 100 | | | | X | | | | | | | | | | | | | | | | | | | | |
| 87-78-5 | mannitol | 100 | | | X | | | | | | | | | | | | | | | | | | | | | |
| 87-86-5 | pentachlorophenol | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | X | |
| 87-90-1 | trichloroisocyanuric acid | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 89-83-8 | thymol | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 9000-70-8 | gelatin | 100 | | X | | | | | | | | | | | X | | | | | | | | | | | |
| 9002-18-0 | agar | 100 | | | | X | | | | | | | | | | | | | | | X | | X | | | |
| 9002-84-0 | teflon | 100 | | X | X | X | X | | X | | | | | | | | | | | | | | | | | |
| 9002-88-4 | poly(ethylene) | 100 | | x | | | X | | x | | | | | | | | | | | | X | | | | X | |
| 9002-89-5 | poly vinyl alcohol | 150 | X | X | X | X | X | | | | | | | | X | | | | | | | | | | | X |
| 9002-93-1 | triton X-100 | 100 | X | X | | X | | | | | | | | X | | X | | X | | | | | | | | |
| 9003-07-0 | propene polymers | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 9003-22-9 | vinyl acetate-vinyl chloride copolymer | 100 | | X | | | X | | X | | | X | | | | | | | | | | | | | | |
| 9003-27-4 | propene, 2-methyl-, polymers | 100 | | X | | | X | | X | | | | | | | | X | | | | | | | | | |
| 9003-39-8 | povidone | 100 | X | | | X | | | | | | | | | | | | | | | | | X | | | |
| 9003-53-6 | polystyrene | 100 | X | X | X | X | | | | | X | | | | | | | | | | | | | | | |
| 9004-35-7 | cellulose acetate | 100 | X | X | X | X | | | | X | X | | | | | | | | | | | | | | | |
| 9004-36-8 | cellulose ester | 100 | | X | | X | | | | | | | | | | | | | | | | | | | | |
| 9004-53-9 | dextrin | 100 | | | | | | X | | | | | | | | | | | | | X | | | | | |
| 9004-62-0 | hydroxy ethyl cellulose | 100 | | X | X | X | X | | | | | | | | | | | | | | X | | | | X | |
| 9004-67-5 | methyl ether cellulose | 150 | X | X | X | X | X | | | | | | | | | | | | | | | | | | | |
| 9004-70-0 | nitrocellulose | 100 | X | X | X | X | | | | X | | | | | | | | | | | | | | | | |
| 9004-87-9 | OP-7 (detergent) | 100 | | X | | | | | | | | | | | | X | | | | | | | | | | |
| 9005-25-8 | corn starch | 100 | | X | | X | | | | | | | | | | | X | | | | | | | | X | |
| 9010-76-8 | copolymer resin | 100 | | X | | | | | | | | | | | | | X | X | | | | | | | | X |
| 9016-45-9 | nonylphenoxypoly (ethyleneoxy) ethanol | 100 | | X | | | | | | | | X | | | | | | | | | | | | | X | |
| 9016-87-9 | polymethylenepolyphenyl-isocyanate | 100 | | X | | | | | | | | | | | | | | | | | | | | | | |
| 9017-68-9 | acrylic acid-isooctyl acrylate polymer | 100 | | X | | | X | | X | | | | | | | | | | | | | | | | | |
| 9036-19-5 | polyoxyethylene monooctylphenl ether | 100 | X | X | | X | | | | | | X | | X | | | X | | | | | | | | | |
| 9038-95-3 | glycols, polyethylenepolypropylene, monobutyl ether | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 9052-95-3 | copolymer of styrene and divinylbenzene | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 90-80-2 | gluconic acid, delta-lactone, d- | 100 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 91-20-3 | naphthalene | 100 | X | X | X | X | X | X | | | X | | | X | | | X | | | | X | | | | | |
| 92-31-9 | tolonium chloride | 100 | X | X | | X | | | | | | | | | | | | | | | | | | | | |
| 94-13-3 | benzoic acid, p-hydroxy-, propyl ester | 100 | | X | | | X | | X | | | | | | | | | | | | | | | | | |
| 95-14-7 | h-benzotriazole | 100 | | X | | | | | | | | | | | | | | X | | | | | | | | X |
| 95-45-4 | dimethylglyoxime | 100 | X | X | X | X | | | | | | | | X | | | | | | | | | | | | |
| 95-48-7 | o-cresol | 200 | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| 95-63-6 | 1,2,4-trimethylbenzene | 100 | | | | | | X | | | | | | | | | X | | | | | | | | | |
| 96-29-7 | 2-butanone, oxime | 100 | | X | | | | | | | | X | | | | | | | | | | | | | | |
| 96-77-5 | 1-hydroxy-2,4-disulfobenzene | 100 | | | | X | | | | | | | | X | | | | | | | | | | | | |
| 98-95-3 | nitrobenzene | 100 | X | X | | X | | | | | | | | | | | | X | | | | | | | | X |
| GCN000 | no constituents given (designation based - msds information) | 1.00% | | X | | | | | | | | X | | | | | | | | | | | | | | |
| GCN001 | remainder non-hazardous per the manufacturer | 15% | X | X | X | | | X | X | | X | X | | | | | X | X | | | | | | | X | |
| GCN002 | polyalkylene glycol plus | 1% | X | X | X | X | | | | | X | | | | | | | | | | | | | | X | |
| GCN005 | resins (phenolic) | 1% | | | | | | | | | | | | | | | | X | | | | | | | | |
| GCN009 | aliphatic amines | 1% | | X | | | | | | | | | | | | | | | | | | | | | | |
| GCN014 | conweb pads | 20% | X | X | | X | | | | | | | | X | | | | | | | | | | | X | X |
| GCN016 | petroleum hydrocarbons (non-specified) | 30% | X | X | X | X | | | | | X | | | X | | | | X | | | | | | | | |
| GCN018 | paraffinic hydrocarbons | 2% | X | X | | X | X | | | | | | | | | | | | X | | X | | | | | |
| GCN020 | surfactants | 1% | | | | X | | | | | | | | | | X | X | | | | | | | | | |
| GCN023 | corrosion inhibitors | 1% | | X | | | | | | | | X | | | | | | | | | | | | | | |
| GCN024 | petroleum distillates | 1% | X | X | X | X | | | | | | | | | | | | | | | | | | | | |
| GCN025 | dye | 1% | | X | | | | | | | | X | | | | | | | | | | | | | | |
| GCN026 | soap/detergent | 1% | X | X | X | X | | X | | | | | | | | | | | X | | | | | | | |
| GCN035 | waxes (non-specified) | 1% | X | X | X | X | X | | | | X | | | | | | | | | | | | | | X | |
| GCN036 | pigments | 1% | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| GCN038 | epoxy resins | 5% | X | X | X | X | X | | | | X | | | | | | X | | | | | | | | | |
| GCN040 | grease (non-specified) | 1% | | X | | | | | | | | | | | | | | | | | | | | | | |
| GCN042 | polyurethane (non-specified) | 10% | | X | | | | | | | | X | | | | | | | | | | | | | | |
| GCN049 | absorbents (non-specified) | 49% | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| GCN050 | attapulgite clay (tox per CAS 12174-11-7) | 15% | | X | X | | | | | | | | | | | | | | | | | | | | | |
| GCN055 | inert material (paper, wood, plastic, etc.) | 100% | X | X | X | X | X | X | | X | | | X | X | | X | | | X | | X | | | | | |
| GCN056 | inert non-hazardous material | 100% | X | X | X | | | | X | | X | | | | X | | X | X | | | | | | | X | X |
| GCN060 | anion/cation exchange resin | 1% | X | X | X | X | X | | | | | | | | | | | | X | | X | | | | | |
| GCN061 | asphalt based material | 1% | | X | | | | | | | | X | | | | | | | | | | | | | | |
| GCN062 | polymers (non-specified) | 1% | | X | | | | | | | | X | | | | | | | | | | | | | | |
| GCN065 | polyester resin | 1% | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| GCN069 | naphthenic oil (non-specified) | 1% | X | X | X | X | X | | | | | | | | | | | | | | X | | | | | |
| GCN078 | quaternary ammonium compound (CAS# NA) | 1% | | X | | | | | | | | X | | | | | X | | | | | | | | | |
| GCN098 | amines (non-specified) | 1% | | X | | X | | | | | | | | | | | | | | | | | | | | |

Table H-4. Chemical List for Waste Sources and Trenches. (22 sheets)

| CAS # | Comp Name | PPM / WT % | 218-W-3A, Trench 6 | 218-W-4B, Trench 7 | 218-W-4B, Trench V7 | 218-W-4B, Trench 11 | 218-E-12B, Trenches 17 and 27 | 1706-KEL | 209-E | 222-S | 231-Z | 233-S | 2WTF | 300 Area | B&W | BATCO | ETEC | Kerr McGee | PFP (234-5Z) | 216-Z-9 | PUREX | 216-B-5 | P-11 | T-Plant | Vallecitos | Ward |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GCN099 | ferrous sulfamate | 1% | | X | | X | X | | | | | X | | X | | | | X | | | X | | | | | X |
| GCN113 | acrylic emulsion/polymer | 25% | X | X | | X | | | | | | | | | | | | | X | | X | | | | X | |
| GCN115 | metal compound, non-regulated (non-specified) | 1% | X | X | X | | X | | | | | | | | | | | | | | | | | | | |
| GCN118 | silicones (emulsified) | 1% | X | X | | X | | | | | | | | X | | | | | | | | | | | | |
| GCN126 | ethers (non-specified) | 1% | X | X | | X | | | | | | | | X | | | | | | | | X | | X | | |
| GCN133 | phosphate (non-specified) | 2.50% | | | X | | | | | | | | | | | | | | | | | X | | | | |
| GCN134 | silicates (non-specified) | 100 | | | | | | | | | | | | | | | X | | | | | | | | | |
| GCNABSM | absorbent, mineral | 1.00% | | | | | | | | | | | | | | | | | | | | | | | | |
| GCNABSOIL | absorbed oil | 10% | | X | | | | | | | | | | | | | | | | | | | | | | |
| GCNANIMAL | animal carcasess | 10% | X | | | | | | | X | | | | | | X | | | | | | | | | | |
| GCNASBESTOS | asbestos | 5% | | | | | | | | | | | | | | | | | | | | | | | | |
| GCNASH | ash | 1% | | X | | X | | | | | | | | | | | | X | | | | | | | | |
| GCNCLOTH | cloth | 10% | | | | | | | | | | | | | | | | | | | | | X | | | |
| GCNCONCRETE | concrete/rubble | 40% | | | | | | | | | | | | | X | | | | | | | | | | | |
| GCNDEBRIS | misc. compactible debris (paper, plastic, metal, wood, etc.) | 100% | | X | | | | | | | | | | | | | | | | | | | X | | | |
| GCNDEMODEBR | demolition debris (wood, concrete, metal, asphalt) | 100% | | | | | | | | | | | | | | | | | | | | | | | | |
| GCNFGLASS | fiberglass | 10% | X | | | | | | | | | | | | | | | X | | | | | | | | |
| GCNGLASS | glass | 10% | | X | | | | | | | | | | | | | | | | | | | | | | |
| GCNHEPA | hepafilters | 1% | | | | | X | | | | | | | | | | | | | X | | | | | | |
| GCNINORGDEBR | inorganic debris (mixed inorganic/metal, concrete, glass) | 100% | | | | | | | | | | | | | | | | X | | | | | | | | |
| GCNMETAL | metal (nonhazardous) | 100% | X | X | | X | | | | | | | | | | | X | | X | | | | | | | |
| GCNOIL | oil (non-specified, no CAS#) | 49% | | | X | | | | | | | | | | | | | | | X | | | | X | | |
| GCNORGDEBRIS | organic debris (mixed organic/incidental inorg) | 100% | | | X | | | | | | | | | | | | | X | | | | | | | | |
| GCNPAPER | paper/cardboard | 40% | | | | | | | | | | | | | | | | X | | | | | | | | |
| GCNPLASTIC | plastic | 40% | | | | | | | | | | | | | | | | X | | | | | | | | |
| GCNRUBBER | rubber | 20% | | X | | | | | | | | | | | X | | | | | | | | | | | |
| GCNSAND | sand | 5% | | X | | | | | | | | | | | | | | | | X | | | X | | | |
| GCNSOIL | soil/rock/gravel | 49% | | | X | | | | | | | | | | | | | X | | | | | | | | |
| GCNWOOD | wood. | 43% | X | | | | | | | | | | | | | | | | | | | | | | | |

## H1.5 COPC EXCLUSIONS

Table H-5 lists the excluded COPC. The rationale for these exclusions is typically based on process knowledge, physical characteristics, and regulatory limits.

Table H-5. Excluded Contaminants of Potential Concern.

| Waste source | Contaminants of potential concern | Rationale for exclusion |
|---|---|---|
| debris | All chemicals listed in Table H-4 that did not have a dangerous waste code identified for it and are not chelating agents. | Chemicals that are found as contaminants or residue on debris that are not chelating agents and do not cause the waste to be designated with a waste code in accordance with WAC 173-303-070 by regulation, form, or concentration, are documented in documents listed in Table H-2. |
| | Radionuclides: $^{40}K$, $^{137m}Ba$, $^{90}Y$, $^{235m}U$, $^{233}Pa$, $^{234m}Pa$, $^{231}Th$ | Potassium ($^{40}K$) is found in soil, cement, limestone, and wood and should be expected to be naturally occurring within the waste stream. No processes are expected to have concentrated the potassium. Both $^{137m}Ba$ and $^{90}Y$ are daughters in secular equilibrium. The nuclides $^{235m}U$, $^{233}Pa$, $^{234m}Pa$, $^{231}Th$ all have half lives less than the reporting criteria of 2 years. |

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

## H1.6 FINAL LIST OF CONTAMINANTS OF CONCERN

Table H-6 provides the Contaminants of Concern (COC) for the debris waste stream.

Table H-6. Final List of Contaminants of Concern.

| Waste source | Contaminants of concern |
|---|---|
| debris | $^{60}Co$, $^{59}Ni$, $^{63}Ni$, $^{90}Sr$, $^{137}Cs$, $^{154}Eu$, $^{233}U$, $^{234}U$, $^{235}U$, $^{236}U$, $^{237}Np$, $^{238}U$, $^{238}Pu$, $^{239}Pu$, $^{240}Pu$, $^{241}Pu$, $^{242}Pu$, $^{241}Am$, $^{243}Cm$ [1] |
| | Toxic Chemicals: All chemicals listed in Table H-4 that did have a dangerous waste code identified for it. |
| | Chelating agents: Tetrasodium EDTA, Ammonium oxalate, Oxalic acid, Sodium acetate, Sodium oxalate (disodium oxalate), Acetic acid |

[1]Other radionuclides may be identified during nondestructive analysis. These radionuclides will be evaluated to determine whether they are daughter products, fission products, or other reaction products from radionuclides in the debris waste stream inventory. Radionuclides associated with the debris waste stream may be added to the waste profile for the Environmental Restoration Disposal Facility.

# H2.0 DATA ASSESSMENT

Information on the debris original waste sources consists of not only historical documentation but also information from visual observation performed at a commercial treatment facility. As visual observation information was obtained on these waste containers, the solid waste information tracking system database was updated to include new information as necessary. The information of each generator source and trench that are part of this waste stream listed in Table H-2 were evaluated against the decision rule data requirements described in Section 2.4 to

information of each generator source and trench that are part of this waste stream listed in Table H-2 were evaluated against the decision rule data requirements described in Section 2.4 to determine if the information is adequate to support decision making. The results of the evaluation are provided in Table H-7. The process knowledge information identified in Table H-7 was determined to be of the form and type that is of sufficient quality to be process knowledge (PK) in accordance with Section 4.4.

Table H-7. Data Assessment. (2 sheets)

| PSQ # | Required data | Data collection methods | Does data exist? (Y/N) | Available source reference | Are the data of sufficient quality? (Y/N) | Additional information required? (Y/N) |
|---|---|---|---|---|---|---|
| 1 and 5 | Data to calculate the radionuclide quantities to determine if the RSW is low-level and otherwise meets the ERDF waste acceptance criteria for radioactivity. | Process Knowledge, NDA | Y | Documents listed in Table H-2<br>M4S20-JDA-05-001 (FH 2005b) | Y | Y[b] |
| 2 | Data to determine if the RSW is regulated as a listed dangerous waste in accordance with WAC 173-303-080, -081, and -082. Data to determine if the RSW meets the definition of a characteristic waste in accordance with 40 CFR 261.24, 40 CFR 268.40, and WAC 173-303-090[2]-[8]; if the RSW meets the definition of a toxic dangerous waste in accordance with WAC 173-303-100 and WAC 173-303-100[5]; and if the RSW meets the definition of a persistent waste, in accordance with WAC 173-303-100. | Process Knowledge | Y | Documents listed in Table H-2 | Y | N[a] |
| 3 | Data to determine if the RSW is land-disposal restricted and meets the definition of debris, in accordance with WAC 173-303-140 and 40 CFR 268. | Process Knowledge | Y | Documents listed in Table H-2 | Y | N[a] |
| 4 | Data to determine if the RSW is regulated for polychlorinated biphenyl concentrations in accordance with the *Toxic Substances Control Act of 1976* and/or WAC 173-303-9904. | Process Knowledge | Y | Documents listed in Table H-2 | Y | N |
| 5 | Data to determine that ERDF restricted constituents or characteristics are not present. | Process Knowledge | Y | Documents listed in Table H-2 | Y | N[a] |

Table H-7. Data Assessment. (2 sheets)

| PSQ # | Required data | Data collection methods | Does data exist? (Y/N) | Available source reference | Are the data of sufficient quality? (Y/N) | Additional information required? (Y/N) |
|---|---|---|---|---|---|---|

[a]Additional verification to determine the presence of prohibited articles and confirm the debris determination may be completed prior to treatment and disposal.

[b]NDA or dose rate survey will be completed to quantify radionuclides and confirm radionuclides listed on waste records. Scaling will be done to quantify radionuclides not detected by NDA.

40 CFR 261, "Identification and Listing of Hazardous Waste," 261.24, "Toxicity characteristic," *Code of Federal Regulations*, as amended.

40 CFR 268, "Land Disposal Restrictions," 268.40, "Applicability of treatment standards," *Code of Federal Regulations*, as amended.

FH 2005b, *Update of Waste Retrieval Project Isotopic Data for Including Americium-241 When Not Previously Reported in Backlog Drums* (Memo M4 S20-JDA-05-001 from J. Ahlers to D. E. Nester, April 14) Fluor Hanford, Inc., Richland, Washington.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.

*Toxic Substances Control Act of 1976*, 15 USC 2601, et seq.

ERDF = Environmental Restoration Disposal Facility.
N = No.
NDA = nondestructive assay.
PSQ = principal study question.
RSW = retrievably stored waste.
Y = Yes.

## H2.1 LISTED DANGEROUS WASTE

This waste was evaluated to identify listed waste codes (P, U, K, and F codes) per WAC 173-303-080, -081, and -082 and 40 CFR 261, "Identification and Listing of Hazardous Waste"; 261.31, "Hazardous wastes from non-specific sources"; 261.32, "Hazardous wastes from specific sources"; and 261.33, "Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof." Several constituents were identified as dangerous waste sources in the characterization documents listed in Table H-2. A summary of the listed waste chemicals and their designation is shown in Table H-8. The waste codes are assigned to each container of RSW debris by applying the original waste source or if necessary, the trench designation contained in the applicable characterization document.

Table H-8. RSW Dangerous Waste Constituents and Waste Codes. (2 sheets)

| Chemical Constituents | Codes |
|---|---|
| (3-2-arsonophenylazo)-4,5-dihydroxy-2,7 naphthalenedisulfonic acid, disodium salt (Arsenazo I Reagent), Arsenic, Arsenic trioxide, Arsenious acid-trisodium salt, Arsenic (V) oxide; hydrate, Arsenic pentoxide, Asenazo III, Sodium arsenite, and sodium arsenate | D004 |
| Barium, Barium acetate, Barium carboate, Barium chloranilate, Barium chloride, Barium chloride dihydrate, Barium hydroxide, Barium oxide, and Barium nitrate | D005 |
| Cadmium, Cadmium hydroxide, Cadmium nitrate, Cadmium nitrate tetrahydrate, Cadmium oxide, Cadmium sulfate-octahydrate | D006 |
| Ammonium chromate, Chromic (VI) acid, Chromic chloride, Chromic sulfate, Chromium, Chromium oxide, Chromium (VI), Chromium III, Chromium nitrate, Chromium trihydroxide, Chromium trioxide, Dipotassium dichromate, Potassium chromate, Sodium chromate, and Sodium dichromate | D007 |
| Lead chromate, Lead chromate molybdate (molybdate orange), and Lead chromate oxide | D007, D008 |
| Lead, Lead acetate, Lead dioxide, Lead floroborate, Lead nitrate, Lead hydroxide, Lead monoxide, Lead chloride, and Lead sulfate | D008 |
| Mercuric chloride, Mercuric iodide, Mercuric nitrate, Mercuric oxide, Mercuric sulfate, Mercuric thiocyanate, Mercurous sulfate, Mercury, and Phenyl mercury acetate | D009 |
| Selenious acid, Selenium, and Sodium selenate | D010 |
| Silver, Silver (1+) oxide, Silver chloride, Silver cyanide, Silver nitrate, Silver oxide, Silver Iodide, and Silver sulfate | D011 |
| Benzene | D018, F005 |
| Carbon tetrachloride | D019, F001 |
| Chloroform | D022 |
| P-Dichlorebenzene | D027 |
| 1,2-Dichloroethane | D028 |

Table H-8. RSW Dangerous Waste Constituents and Waste Codes. (2 sheets)

| Chemical Constituents | Codes |
|---|---|
| 1,1-dichloroethylene | D029 |
| 2,4-dinitrotoluene | D030 |
| Hexachloroethane | D034 |
| Methyl ethyl ketone | D035, F005 |
| Pentachlorophenol | D037 |
| Pyridine | D038, F005 |
| Vinyl chloride (chloroethylene) | D043 |
| Dichlorodifluoromethane and Chlorodifluoromethane | F001 |
| 1,1,1-Trichloroethane, Methylene chloride (Dichloromethane), Tetrachloroethylene, Trichloroethylene, Trichlorofluoromethane, and Trichlorotrifluoroethane(Freon) | F001, F002 |
| Acetone, Butyl alcohol, Cyclohexanone, diethyl ether (ethyl ether), Ethyl acetate, Ethyl benzene, Methanol, Methyl Isobutyl ketone (4-Methyl-2-Pentanone), and Xylene | F003 |
| Cresol, o-cresol, m-cresol, p-cresol, and Nitrobenzene | F004 |
| Toluene | F005 |

## H2.2 CHARACTERISTIC, TOXIC, AND PERSISTENT DANGEROUS WASTE

This mixed debris waste stream does not exhibit the characteristics of ignitability, corrosivity or reactivity as defined by the 40 CFR 261.21, "Characteristic of ignitability"; 40 CFR 261.22, "Characteristic of corrosivity"; and 261.23, "Characteristic of reactivity," respectively. Washington State solid corrosive WSC2 was not be assigned because federal listed waste codes take precedence. A summary of the characteristic, toxic, and persistent waste chemicals and their designation is shown in Table H-8. The waste codes are assigned to each container of debris waste retrieved by applying the original waste source or if necessary the trench designation contained in the applicable characterization document.

In accordance with WAC 173-303-070 state criteria do not apply because Federal waste codes are applied. The state criteria were evaluated for land disposal restriction purposes, the waste was determined to be dangerous waste, not extremely hazardous waste, because of toxic and persistence criteria.

## H2.3 POLYCHLORINATED BIPHENYLS

A small portion of the debris waste stream may be contaminated with PCBs regulated under TSCA, the debris will be treated in accordance with TSCA, as required, in preparation for disposal at ERDF. The PCB-contaminated debris waste will be disposed at ERDF when it shown to be compliant with the ERDF waste acceptance requirements.

## H2.4 DEBRIS DETERMINATION

Debris is defined as natural or man-made materials that exceed 60 mm in particle size that make up greater-than-or-equal-to 50 volumetric percent of a container. Even though debris must be a solid material, it may contain or be mixed with free liquids entrapped in the debris, provided the liquid is not in a container. If liquids separate from hazardous debris prior to treatment of the debris, they must be managed as hazardous waste. A debris determination is made on each individual waste container based on the waste record and is confirmed by visual examination of the waste prior to treatment or disposal.

## H2.5 RADIONUCLIDE CONTENT

Isotopic quantities will be determined through direct and indirect NDA measurements. NDA measurement data generation and acquisition methodology shall be conducted as provided in Sections 4.3 and 5.2 of this SAP. The radionuclides measured by direct NDA and indirect methods are summarized in Table H-9 (FH 2004 and FH 2005b).

Table H-9. Radionuclide Characterization Methods. (2 sheets)

| | **Determination Method** |
|---|---|
| $^{60}Co$ | Measured[2] |
| $^{59}Ni$ | Calculate using $^{60}Co/^{59}Ni$ ratio |
| $^{63}Ni$ | Calculate using $^{60}Co/^{63}Ni$ ratio |
| $^{90}Sr$ | Calculate using $^{137}Cs/^{90}Sr$ ratio |
| $^{137}Cs$ | Measured |
| $^{154}Eu$ | Measured[2] |
| $^{232}Th$ | Measured[2] |
| $^{233}U$ | Measured[2] |
| $^{234}U$ | Calculate using $^{234}U/^{235}U$ or $^{234}U/^{238}U$ |
| $^{235}U$ | Measured or calculate using $^{235}U/^{238}U$ ratio |
| $^{236}U$ | Measured or calculate using nuclide ratio established for the waste stream[3] |
| $^{237}Np$ | Measured or calculate using nuclide ratio established for the waste stream[3] |
| $^{238}U$ | Measured or calculate using $^{238}U/^{235}U$ ratio |
| $^{238}Pu$ | Measured or calculate using $^{238}Pu/^{239}Pu$ - or $^{238}Pu/^{240}Pu$ ratios |
| $^{239}Pu$ | Measured or calculate using $^{239}Pu/^{240}Pu$ ratio |
| $^{240}Pu$ | Measured or calculate using $^{240}Pu/^{239}Pu$ ratio |
| $^{241}Pu$ | Calculate using $^{241}Pu/^{239}Pu$ or $^{241}Pu/^{240}Pu$ ratios |
| $^{242}Pu$ | Calculate using $^{242}Pu/^{239}Pu$ or $^{242}Pu/^{240}Pu$ ratios |

Table H-9. Radionuclide Characterization Methods. (2 sheets)

| | Determination Method |
|---|---|
| $^{241}Am$ | Measured or calculate using $^{241}Am/^{239}Pu$ or $^{241}Am/^{240}Pu$ ratios[1] |
| $^{243}Am$ | Measured[2] |
| $^{243}Cm$ | Measured[2] |
| $^{245}Cm$ | Measured[2] |

1. The calculation method, protocol, and ratios used are detailed in memorandum FH 2005b.
2. Nuclide is not reported if not detected by assay measurement.
3. The nuclide is reported when measured or calculated when the Acceptable Knowledge documentation establishes a ratio to another measured nuclide.

FH 2005b, "Update of Waste Retrieval Project Isotopic Data for Including Americium-241 When Not Previously Reported in Backlog Drums," (Memo M4 S20-JDA-05-001 from J. Ahlers to D. E. Nester, April 14) Fluor Hanford, Inc., Richland, Washington.

Historical PK data was used to develop scaling factors for radionuclides difficult to measure directly by NDA, such as $^{90}Sr$ and $^{234}U$. A default scaling factor of 1.1 $^{137}Cs$ to $^{90}Sr$ was developed to quantify $^{90}Sr$ based on directly measured $^{137}Cs$ values. This scaling factor is based on the ratio of cesium to strontium generated from the $^{235}U$ fission process.

Historical PK data was used to develop scaling factors to $^{60}Co$ for some activation products that may exist in reportable quantities if $^{60}Co$ is detected by measurement (FH 1999). If $^{60}Co$ is detected by NDA then the following isotopes of nickel shall be calculated using the following ratios (Table 3.5 values decayed to July 1, 2008).

$$^{59}Ni/^{60}Co = 0.039$$

$$^{63}Ni/^{60}Co = 4.0$$

Hanford typical fuels-grade and weapons-grade uranium isotopic distributions were used to develop scaling factors for $^{234}U$ based on directly measured values for $^{235}U$ or $^{238}U$, whichever radionuclide is detected in greater abundance. For example, if both $^{235}U$ and $^{238}U$ are detected by NDA and $^{238}U$ is present in greater mass quantities, then the Hanford fuels grade uranium isotopic distributions in Table H-10 will be used in conjunction with specific activities to establish an activity scaling factor of 2:1 $^{234}U$ to $^{238}U$, as shown in the following equation:

$$^{234}U\ Activity(Ci) = \left(^{238}U\ Activity(Ci)\right)\left(\frac{Spec.\ Activity\ ^{234}U\ (Ci/g)}{Spec.\ Activity\ ^{238}U\ (Ci/g)}\right)\left(\frac{0.0106\ wt\%\ ^{234}U}{98.9651\ wt\%\ ^{238}U}\right)$$

However, if $^{235}U$ is the only uranium isotope detected or the one determined to be in greater abundance, then the Hanford weapons grade uranium isotopic distributions in Table H-10 will be applied and an activity scaling factor of 30:1 $^{234}U$ to $^{235}U$ will be used.

Table H-10. Uranium Isotopic Distributions.

| Isotope | Hanford Weapons Grade (wt%) | Hanford Fuels Grade (wt%) |
|---|---|---|
| $^{234}U$ | 0.8710 | 0.0106 |
| $^{235}U$ | 92.5021 | 1.0243 |
| $^{238}U$ | 6.3038 | 98.9651 |

In summary, the scaling factors for the following activity relationships are as follows:

$^{137}Cs/^{90}Sr \sim 1.1$
$^{234}U/^{235}U \sim 30$ (use this $^{234}U$ scaling factor for weapons grade)
$^{234}U/^{238}U \sim 2$ (use this $^{234}U$ scaling factor for fuels grade).

Plutonium isotopic distributions are also based on accepted Hanford plutonium distributions as provided in Table H-11. The accepted Hanford fuels grade (nominally 12% $^{240}Pu$) isotopic distribution will typically be used as the default ratio for determining indirectly measured plutonium isotopes (including $^{241}Am$). If other radiological characterization information is available supporting the use of a different ratio as provided in Table H-11, then the most appropriate ratio will be used.

The values calculated from ratio are based on directly measured values for $^{239}Pu$, with two conditional exceptions: $^{238}Pu$ and $^{241}Am$. Both $^{238}Pu$ and $^{241}Am$ are measured directly, however, those measured values are compared to the ratio values from measured $^{239}Pu$ and which ever value is greater is reported.

Table H-11. Plutonium Isotopic Distributions.

| Isotope | Weapons Grade (6% $^{240}Pu$) | Fuels Grade (12% $^{240}Pu$)[a] | Worst Case (23% $^{240}Pu$) |
|---|---|---|---|
| 238Pu | 0.03% | 0.08% | 0.09% |
| 239Pu | 93.21% | 83.95% | 70.60% |
| 240Pu | 6.02% | 12.97% | 23.86% |
| 241Pu | 0.22% | 1.10% | 1.60% |
| 242Pu | 0.02% | 0.03% | 1.30% |
| 241Am | 0.50% | 1.75% | 2.55% |

[a]Hanford fuels grade isotopic distribution (nominal 12% $^{240}Pu$) will be used as the default.

## H2.6 RESTRICTED WASTE

Debris RSW has been visually examined in accordance with the Hanford TRU Waste Program. As of the writing of this document, thousands of drums of debris RSW have been examined. A small number of free liquids and aerosol cans were identified.

All containers of waste will be visually examined prior to treatment or disposal to identify items that are restricted for disposal at ERDF. Restricted waste items, such as bottles and aerosol cans containing liquid, will continue to be removed and treated as necessary to ensure compliance with the ERDF waste acceptance criteria.

Waste is prohibited from containing 1.0% or more of chelating agents. The chelating agents that have been identified in the waste are listed on Table H-6. Adding all of these chelating agents together results in a total percent of less than 0.1% in the waste.

## H3.0 REFERENCES

40 CFR 261, "Identification and Listing of Hazardous Waste"; 261.21, "Characteristic of ignitability"; 261.22, "Characteristic of corrosivity"; 261.23, "Characteristic of reactivity"; 261.24, "Toxicity characteristic"; 261.31, "Hazardous wastes from non-specific sources"; 261.32, "Hazardous wastes from specific sources"; and 261.33, "Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof," *Code of Federal Regulations*, as amended.

40 CFR 268, "Land Disposal Restrictions," 268.40, "Applicability of treatment standards," *Code of Federal Regulations*, as amended.

CHPRC 2008a, *Acceptable Knowledge Summary Report for Mixed Transuranic Ash Waste*, WMP-38984, Rev. 1, CH2M HILL Plateau Remediation Company, Inc., Richland, Washington.

CHPRC 2008b, *Acceptable Knowledge Summary Report for P-11 Critical Mass Laboratory Debris Waste Stream*, WMP-38806, Rev. 0, CH2M HILL Plateau Remediation Company, Inc., Richland, Washington.

FH 1999, *105-K Basin Material Design Basin Feed Descriptions for Spent Nuclear Fuel Project Facilities,* HNF-SD-SNF-TI-009, Vol. 1, Fuel, Rev. 3, Fluor Hanford, Inc., Richland, Washington.

FH 2005, *Acceptable Knowledge Summary Report for 233-S Plutonium Concentration Facility Mixed Transuranic Debris* and 233-DES-01-00, *Designation for 233-DES-01-00*, 233S-AK-01-00, Not Released, Fluor Hanford, Inc., Richland, Washington.

FH 2006a, *Acceptable Knowledge Summary Report For 200 West Tank Farm 242-T Evaporator Mixed Transuranic Waste Stream,* 2WTF-AK-01-00, Not Released, Fluor Hanford, Inc., Richland, Washington.

FH 2006b, *Acceptable Knowledge Summary Report for Building 303-C Mixed Debris from Burial Ground 218-W-4B*, WMP-31393, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

FH 2006c, *Acceptable Knowledge Document for Debris Waste from Operations and Decontamination and Decommissioning of Building 308 (*supplemented by *308-DESDSI, 308-DES-01-00, and 308-DES-02-00*), HNF-29953, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

FH 2006d, *Acceptable Knowledge Document for Babcock and Wilcox Parks Township Site Plutonium Facility Debris Waste Stream (*supplemented by BW-DESDSI-01-01 and BW-DES-01-01), HNF-28620, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

FH 2007a, Acceptable Knowledge Summary Report for Mixed Transuranic Waste, 218-W-4B, Trench 11, WMP-34251, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

FH 2007b, *Acceptable Knowledge Evaluation and Summary Report for TRU Mixed-Debris Waste 218-E-12B, Trenches 17 and 27*, WMP-31661, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

FH 2007c, *Acceptable Knowledge Summary Report for 209-E Critical Mass Laboratory Mixed Transuranic Debris*, WMP-32037, 0, Fluor Hanford, Inc., Richland, Washington.

FH 2007d, *Acceptable Knowledge Summary Report for 231-Z Facility Mixed Transuranic Waste Stream*, WMP-32345, Rev. 2, Fluor Hanford, Inc., Richland, Washington.

FH 2007e, *Acceptable Knowledge Document for 233-S Plutonium Concentration Facility Decontamination and Decommissioning Mixed Debris Waste Stream*, HNF-30266, Rev. 2, Fluor Hanford, Inc., Richland, Washington.

FH 2007f, *Acceptable Knowledge Summary Report 300 Area Facilities Mixed Transuranic Solids*, WMP-31733, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

FH 2007g, *Acceptable Knowledge Document for the 325 Building Radiochemistry Laboratory Mixed Debris Waste Stream (*supplemented by 325-DES-01-01), HNF-30810, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

FH 2007h, *Acceptable Knowledge Summary Report For Battelle Columbus Laboratory Mixed Transuranic Debris*, WMP-34040, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

FH 2007i, *Acceptable Knowledge Summary Report for Energy Technology Engineering Center Transuranic Mixed Debris, Transuranic Mixed Solidified Liquids, and Low-Level Mixed Organic Liquids Waste Streams*, WMP-32570, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

FH 2007j, *Acceptable Knowledge Summary Report for PFP Complex Effluent Waste*, WMP-33204, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

FH 2007k, *Acceptable Knowledge Evaluation and Summary Report for Plutonium Uranium Extraction Plant Mixed Debris*, WMP-34111, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

FH 2007l, *Acceptable Knowledge Summary Report for 216-B-5 Reverse Well Mixed Transuranic Debris*, WMP-31915, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

FH 2007m, *Acceptable Knowledge Summary Report for Vallecitos Mixed Transuranic Debris,* WMP-32180, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

FH 2007n, *Acceptable Knowledge Document or Westinghouse Advanced Reactors Division Mixed Debris Waste* and WMP-33659, *Acceptable Knowledge Evaluation Report for Westinghouse Advanced Reactor Division, 218-W-4C-T07 and 218-W-3A-T17*, HNF-30025, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

FH 2008a, *Acceptable Knowledge Summary Report for Mixed Transuranic Waste, 218-W-3A, Trench 06,* WMP-35544, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

FH 2008b, *Acceptable Knowledge Summary Report for Mixed Transuranic Waste 218-W-4B, Trench 7*, WMP-35430, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

FH 2008c, Acceptable Knowledge Summary Report for Mixed Transuranic Waste 218-W-4B, Trench V7, WMP-38019, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

FH 2008d, *Acceptable Knowledge Summary Report for 1706-KEL Facility Debris Waste Stream*, WMP-37957, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

FH 2008e, *Acceptable Knowledge Summary Report for 216 Z-9 Crib Soil and Debris Waste*, WMP-38831, Rev. 0, Fluor Hanford, Inc., Richland, Washington.

FH 2008f, *Acceptable Knowledge Summary Report for 222-S Laboratory Mixed Transuranic Debris*, WMP-36321, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

FH 2008g, *Acceptable Knowledge Document for Consolidated Fuel Fabrication Debris Waste Stream ([Kerr-McGee Nuclear Corporation],* supplemented by KMG-DES-01-01) , HNF-30020, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

FH 2008h, *Acceptable Knowledge Summary Report for the Plutonium Finishing Plant Complex Mixed Debris Waste From the Hanford Site Burial Grounds*, WMP-33208, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

FH 2008i, *Acceptable Knowledge Summary Report for Miscellaneous Radioactive Sources Waste Stream*, WMP-31576, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

FH 2008j, *Acceptable Knowledge Summary Report for T-Plant Facilities Mixed Transuranic Waste*, WMP-36882, Rev. 1, Fluor Hanford, Inc., Richland, Washington.

Memo M4S20-JDA-04-018 from J. Ahlers to C. D. Cornelison and J. R. Durfee, September 16, "Update of TRU Retrieval Isotopic Data from 1999-2002 Retrieval Campaigns, Revision 1."

Memo M4 S20-JDA-05-001 from J. Ahlers to D. E. Nester, April 14, Update of Waste Retrieval Project Isotopic Data for Including Americium-241 When Not Previously Reported in Backlog Drums.

*Toxic Substances Control Act of 1976*, 15 USC 2601, et seq.

WAC-173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, as amended.