0050046

DOE/RL-98-62
Revision 0

Request for Modification of 200 Area Effluent Treatment Facility Final Delisting

DEC 1998
RECEIVED
EDMC

United States
Department of Energy
Richland, Washington

Approved for Public Release

THIS PAGE INTENTIONALLY
LEFT BLANK

DOE/RL-98-62
Revision 0
UC-630

Request for Modification of 200 Area Effluent Treatment Facility Final Delisting

Date Published
November 1998

United States
Department of Energy
P.O. Box 550
Richland, Washington 99352

Approved for Public Release

RELEASE AUTHORIZATION

Document Number: DOE/RL-98-62, Rev. 0

Document Title: Request for Modification of 200 Area Effluent Treatment Facility Final Delisting

This document, reviewed in accordance with DOE Order 241.1, "Scientific and Technical Information Management,"and 241.1-1, "Guide to the Management of Scientific and Technical Information," does not contain classified or sensitive unclassified information and is:

APPROVED FOR PUBLIC RELEASE

V. L. Birkland 11/18/98

V. L. Birkland
Lockheed Martin Services, Inc.
Document Control/Information Clearance

Reviewed for Applied Technology, Business Sensitive, Classified, Copyrighted, Export Controlled, Patent, Personal/Private, Proprietary, Protected CRADA, Trademark, Unclassified Controlled Nuclear Information.

Trademark Disclaimer. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof. This report has been reproduced from the best available copy.

Printed in the United States of America.

Available to the U.S. Department of Energy and its contractors from the U.S. Department of Energy Office of Scientific and Technical Information, P.O. Box 62, Oak Ridge, TN 37831; Telephone: 423/576-8401.

Available to the public from the U.S. Department of Commerce National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161; Telephone: 703/487-4650.

SUMMARY

A Delisting Petition submitted to the U.S. Environmental Protection Agency in August 1993 addressed effluent to be generated at the 200 Area Effluent Treatment Facility from treating Hanford Facility waste streams. This Delisting Petition requested that 71.9 million liters per year of treated effluent, bearing the designation 'F001' through 'F005', and/or 'F039' that is derived from 'F001' through 'F005' waste, be delisted. On June 13, 1995, the U.S. Environmental Protection Agency published the final rule (Final Delisting), which formally excluded 71.9 million liters per year of 200 Area Effluent Treatment Facility effluent from "being listed as hazardous wastes" (60 FR 31115 now promulgated in 40 CFR 261). Given the limited scope, it is necessary to request a modification of the Final Delisting to address the management of a more diverse multi-source leachate (F039) at the 200 Area Effluent Treatment Facility.

From past operations and current cleanup activities on the Hanford Facility, a considerable amount of both liquid and solid *Resource Conservation and Recovery Act of 1976*- regulated mixed waste has been and continues to be generated. Ultimately this waste will be treated as necessary to meet the *Resource Conservation and Recovery Act* Land Disposal Restrictions. The disposal of this waste will be in *Resource Conservation and Recovery Act*-compliant permitted lined trenches equipped with leachate collection systems. These operations will result in the generation of what is referred to as multi-source leachate. This newly generated waste will receive the listed waste designation of F039. This waste also must be managed in compliance with the provisions of the *Resource Conservation and Recovery Act*.

Given the nature of past operations and current waste management activities, leachate resulting from Hanford Facility mixed waste disposal operations is anticipated to represent the broadest spectrum of constituents destined for disposal of a multi-source leachate waste stream to be managed at the 200 Area Effluent Treatment Facility. The Liquid Effluent Retention Facility and the 200 Area Effluent Treatment Facility are *Resource Conservation and Recovery Act*-compliant permitted waste management units that will be used to manage this waste stream. Following treatment at the 200 Area Effluent Treatment Facility, the treated leachate will be discharged to the State-Approved Land Disposal Site north of the 200 West Area in compliance with the Washington State Waste Discharge Permit (ST 4500).

Because the treated leachate also will be considered a hazardous waste under the derived-from rule, and the *Resource Conservation and Recovery Act* regulations prohibit the placement of liquid hazardous waste on land (40 CFR 264.314), this effluent must be delisted before being discharged to the State-Approved Land Disposal Site. The effluent also must meet the discharge criteria of the State Waste Discharge Permit (ST 4500) and the existing Final Delisting (40 CFR 261, Appendix IX, Table 2).

In accordance with the requirements of Washington Administrative Code 173-303-072 (1) and (4) and -910(3), and 40 CFR 260.20 and .22, this delisting modification document presents sufficient information to justify that treated multi-source leachate "is not capable of posing a substantial present or potential threat to public health or the environment. . .". This delisting modification document applies an upfront delisting approach depends on the ability of the treated effluent to meet concentration levels specified in the Final Delisting. The management of this waste from the point of generation through disposal is explained. A demonstration is made showing how the constituents will be effectively treated so that 200 Area Effluent Treatment Facility effluent will no longer require management as a regulated dangerous waste or hazardous waste. The demonstration is based on treatment knowledge gained from 200 Area Effluent Treatment Facility operations, surrogate testing performed in support of the original delisting effort, and information available from the manufacturer for equipment used in the 200 Area Effluent Treatment Facility. In

addition, details are provided showing how constituents included in the treated waste stream will be monitored to confirm applicable constituent concentration requirements are met.

It is believed that the waste management process described in this document represents the best management system available for multi-source leachate. Given the cradle-to-grave control of multi-source leachate, the treatment capabilities of the 200 Area Effluent Treatment Facility, and the regulatory control over this process, the treated multi-source leachate "is not capable of posing a substantial present or potential threat to public health or the environment. . ." [WAC 173-303-072(4)].

CONTENTS

SUMMARY iii

GLOSSARY vii

METRIC CONVERSION CHART viii

1.0 ADMINISTRATIVE INFORMATION 1-1
1.1 NAME OF PETITIONER 1-1
1.2 CONTACTS 1-1
1.3 FACILITY NAME AND LOCATION 1-1
1.4 DESCRIPTION OF PROPOSED DELISTING ACTION 1-1
1.5 STATEMENT OF NEED/JUSTIFICATION 1-2
1.6 CERTIFICATION STATEMENT 1-3

2.0 LEACHATE GENERATION AND MANAGEMENT 2-1
2.1 LEACHATE GENERATION 2-1
2.1.1 Leachate Sources 2-1
2.1.2 Mixed Waste Disposal 2-2
2.1.2.1 Mixed Waste Volumes 2-2
2.1.2.2 Mixed Waste Disposal Acceptance Criteria 2-2
2.1.3 Leachate Collection 2-3
2.1.4 Expected Leachate Volumes and System Capacities 2-4
2.2 LEACHATE MANAGEMENT 2-4
2.2.1 Leachate Baseline Data 2-5
2.2.2 Leachate Constituents 2-5
2.2.3 Generator Sample and Analysis Plans 2-6

3.0 200 AREA EFFLUENT TREATMENT FACILITY AND LIQUID EFFLUENT RETENTION FACILITY PROCESS 3-1
3.1 LIQUID EFFLUENT RETENTION FACILITY PROCESS DESCRIPTION 3-1
3.2 EFFLUENT TREATMENT FACILITY PROCESS DESCRIPTION 3-2
3.2.1 Effluent Treatment Facility Operating Configuration 3-2
3.2.2 Primary Treatment Train 3-3
3.2.3 Secondary Treatment Train 3-5

4.0 TREATABILITY INFORMATION 4-1
4.1 CURRENT DELISTING LEVELS 4-1
4.2 TREATABILITY GROUPS 4-1
4.3 CONSTITUENT TREATMENT EFFICIENCY 4-2
4.3.1 Inorganic Constituent Treatability Efficiency 4-2
4.3.2 Organic Constituent Treatability Efficiency 4-3
4.4 STANDARDS TREATED WASTE MUST MEET 4-4
4.5 TREATABILITY CONCLUSION 4-5

5.0 SAMPLING AND ANALYSIS 5-1

6.0 F039 LEACHATE DELISTING CONCLUSION 6-1

7.0 REFERENCES 7-1

APPENDIX

A EFFLUENT TREATMENT FACILITY ACTUAL TREATMENT EFFICIENCIES ..... APP A-i

B BACKGROUND INFORMATION USED TO DETERMINE THE TREATABILITY ENVELOPE FOR ORGANICS ..... APP B-i

FIGURES

Figure 1-1. Hanford Facility. 1-4
Figure 1-2. F039 Leachate Generation and Disposition. 1-5
Figure 2-1. Determination of Potential Leachate Constituents. 2-8
Figure 3-1. Liquid Effluent Retention Facility Layout. 3-8
Figure 3-2. Plan View of the 200 Area Effluent Treatment Facility. 3-9
Figure 3-3. 200 Area Effluent Treatment Facility Layout. 3-10
Figure 3-4. 200 Area Effluent Treatment Facility. 3-11
Figure 3-5. Example - 200 Area Effluent Treatment Facility Configuration 1. 3-12
Figure 3-6. Example - 200 Area Effluent Treatment Facility Configuration 2. 3-13
Figure 3-7. Surge Tank. 3-14
Figure 3-8. Ultraviolet Light/Oxidation Unit. 3-15
Figure 3-9. Reverse Osmosis Unit. 3-16
Figure 3-10. Ion Exchange Unit. 3-17
Figure 3-11. Verification Tanks. 3-18
Figure 3-12. Effluent Treatment Facility Evaporator. 3-19
Figure 3-13. Thin Film Dryer. 3-20

TABLES

Table 2-1. Waste Volume 2-9
Table 2-2. Baseline Constituents Above Method Detection Limits. 2-12
Table 2-3. Identification of Potential Leachate Constituents. 2-13
Table 4-1. Constituents Delisted and Considered in Delisting Modification. 4-7
Table 4-2. Treatability Groups. 4-18
Table 4-3. Organic Constituent Modified Treatability Envelope. 4-19
Table 4-4. Standards Treated Waste Must Meet. 4-28

GLOSSARY

ARAR	applicable or relevant and appropriate requirements
ASTM	American Society for Testing and Materials
BDAT	best demonstrated available technology
CAS	Chemical Abstract Service
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
CFR	Code of Federal Regulations
DOE-RL	U.S. Department of Energy, Richland Operations Office
Ecology	Washington State Department of Ecology
EE/O	Electrical Energy per Order
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ETF	200 Area Effluent Treatment Facility
FR	Federal Register
HBL	health-based level
HDPE	high-density polyethylene
ICP	inductively coupled plasma
IX	ion exchange
LDR	land disposal restriction
LERF	Liquid Effluent Retention Facility
LLBG	Low-Level Burial Grounds
PC	process condensate
PCB	polychlorinated biphenyl
PUREX	plutonium-uranium extraction (Facility)
RCRA	*Resource Conservation and Recovery Act of 1976*
RO	reverse osmosis
TSCA	*Toxic Substances Control Act of 1976*
UV/OX	ultraviolet oxidation
WAC	Washington Administrative Code
°C	degrees Celsius
pCi/L	picocuries per liter
pH	negative logarithm of the hydrogen-ion concentration
ppm	parts per million

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	Millimeters	millimeters	0.0393	inches
inches	2.54	Centimeters	centimeters	0.393	inches
feet	0.3048	Meters	meters	3.2808	feet
yards	0.914	Meters	meters	1.09	yards
miles	1.609	Kilometers	kilometers	0.62	miles
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	Hectares	hectares	2.471	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	Grams	grams	0.0352	ounces
pounds	0.453	Kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			**Volume**		
fluid ounces	29.57	Milliliters	milliliters	0.03	fluid ounces
quarts	0.95	Liters	liters	1.057	quarts
gallons	3.79	Liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.948	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force			**Force**		
pounds per square inch	6.895	Kilopascals	kilopascals	1.4504×10^{-4}	pounds per square inch

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Second Ed., 1990, Professional Publications, Inc., Belmont, California.

1.0 ADMINISTRATIVE INFORMATION

This chapter provides administrative information, a description of the proposed delisting action, and a statement of need/justification.

1.1 NAME OF PETITIONER

United States Department of Energy,
Richland Operations Office
Richland, Washington

1.2 CONTACTS

For additional information, contact:

Name	Title	Telephone Number
J. E. Rasmussen	Director Office of Environmental Assurance, Permits, and Policy	(509) 376-5441

Mailing address for contact:

U.S. Department of Energy,
Richland Operations Office (DOE-RL)
P. O. Box 550
Richland, Washington 99352.

1.3 FACILITY NAME AND LOCATION

200 Area Effluent Treatment Facility (ETF)
200 East Area
Hanford Facility, Richland, Washington.

The single identification number issued to the Hanford Facility by the U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) is EPA/State Identification Number WA7890008967.

1.4 DESCRIPTION OF PROPOSED DELISTING ACTION

The proposed delisting action requests modification of the existing ETF Final Delisting to expand the universe of multi-source leachate (F039) that can be treated at ETF and ultimately land disposed. Multi-source leachate is expected to be generated as a result of mixed waste land disposal operations conducted in support of cleanup activities on the Hanford Facility. The original ETF Delisting Petition requested that 71.9 million liters per year of treated effluent bearing the designation 'F001' through 'F005', and/or 'F039' that is derived from 'F001' through 'F005' waste, be delisted. At the beginning of the delisting process, only 242-A Evaporator process condensate (PC) and two aqueous waste streams from the Plutonium-Uranium Extraction (PUREX) Facility were identified for treatment at ETF. On June 13, 1995, EPA published the

final rule (Final Delisting) that excluded 71.9 million liters per year of ETF effluent from "being listed as hazardous wastes" [60 Federal Register (FR) 31115 now promulgated in 40 Code of Federal Regulations (CFR 261)].

The ETF, which is located in the 200 East Area of the Hanford Facility (Figure 1-1), began waste management operations in November of 1995. The ETF is a *Resource Conservation and Recovery Act* (RCRA) *of 1976* permitted treatment and storage unit that will be used to manage multi-source leachate generated from future mixed waste land disposal operations. This delisting modification document, therefore, is a request to remove language from the Final Delisting that restricts the multi-source leachate that can be managed at ETF to 'F039' that is derived from 'F001' through 'F005' waste. The basis for this modification request is treatment knowledge gained from ETF operations, surrogate testing performed in support of the original delisting effort (DOE/RL-92-72), and information available from manufacturers for equipment used in the ETF.

The scope of the ETF delisting modification is limited to the addition of constituents associated with multi-source leachate generated from land disposal operations. The multi-source leachate waste streams to be managed at the ETF will result from RCRA-compliant/permitted land disposal operations. This leachate will be transferred to the Liquid Effluent Retention Facility (LERF) or ETF, which are both RCRA-compliant waste management units. Following treatment at ETF, the effluent will be subject to the conditions of the Washington State Waste Discharge Permit (ST 4500) as well as the conditions of the Final Delisting. This delisting modification document, therefore, applies the upfront delisting process that depends on the ability of the resulting treated effluent to meet the concentration levels specified in the Final Delisting.

This delisting modification document demonstrates that multi-source leachate will be treated adequately so that the resulting effluent from the ETF will no longer require management under RCRA Subtitle C or the State of Washington Hazardous Waste Management Act (HWMA). This determination will apply to hazardous waste and dangerous waste. Dangerous waste is waste regulated under the HWMA. This demonstration will be accomplished by grouping the multi-source leachate constituents, as well as a very broad list of hazardous and dangerous constituents into treatability groups of like chemistry. Consistent with the approach taken in the original petition, the approach detailed in this document shows that effective treatment of these groups can be achieved. In addition, the sampling/analysis approach to be employed is detailed. The demonstration shows how the broad list of constituents, other than F001 through F005 constituents, will be below delisting levels following treatment. Given this strategy, no bench-scale, surrogate, or other testing is proposed.

In summary, all aspects of waste management before and following generation of multi-source leachate (Figure 1-2) will be governed by associated regulations and permits. The control imposed by these regulations and permits on the management of land disposed waste and the generation and subsequent management of multi-source leachate further justifies delisting.

1.5 STATEMENT OF NEED/JUSTIFICATION

To support the current Hanford Facility mission, disposal capacity for mixed waste generated during cleanup is required. In addition, if proper public comment and stakeholder participation determines offsite multi-source leachate can be treated at the ETF, this delisting petition modification will support treatment of offsite generated multi-source leachate. When disposed, landfilled mixed waste will meet the RCRA and HWMA land disposal restriction (LDR) standards. RCRA-compliant trenches currently exist for mixed waste disposal. Disposal of waste in these trenches will result in the generation of multi-source leachate. This newly generated waste will receive the designation F039. Following treatment at LERF and ETF, the

resulting effluent will be discharged to the State-Approved Land Disposal Site (SALDS) north of the 200 West Area. However, because the treated effluent also will be considered a hazardous waste and dangerous waste under the derived-from rule, and the RCRA and HWMA regulations prohibit the placement of liquid hazardous waste (40 CFR 264.314) and liquid dangerous waste [Washington Administrative Code (WAC) 173-140(4)(b)] on land, this effluent must be delisted before being discharged to the SALDS. The effluent also must meet the discharge criteria of ST 4500 and the Final Delisting (40 CFR 261, Appendix IX, Table 2).

The current delisting for the ETF addresses waste streams bearing the designation 'F001' through 'F005', and/or 'F039' that is derived from 'F001' through 'F005' waste. However, current mixed waste inventories on the Hanford Facility, when disposed, will generate multi-source leachate having a much broader spectrum of constituents than the F001 through F005 covered by the current delisting. Broad spectrum constituent mixed waste disposal operations are budgeted to begin in fiscal year 2000. To support this activity, effluent generated from treating leachate must be delisted in accordance with the EPA regulations promulgated under the authority of RCRA found in 40 CFR 260.20 and 260.22, as well as the HWMA found in WAC 173-303-072(1) and -072(4).

1.6 CERTIFICATION STATEMENT

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this demonstration and all attached documents, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.

John D. Wagoner — 12/23/98

Owner/Operator
John D. Wagoner, Manager
U.S. Department of Energy,
Richland Operations Office

Date

/FOR — 11/30/98

Co-operator
R. D. Hanson, President and Chief Executive Officer
Fluor Daniel Hanford, Inc.

Date

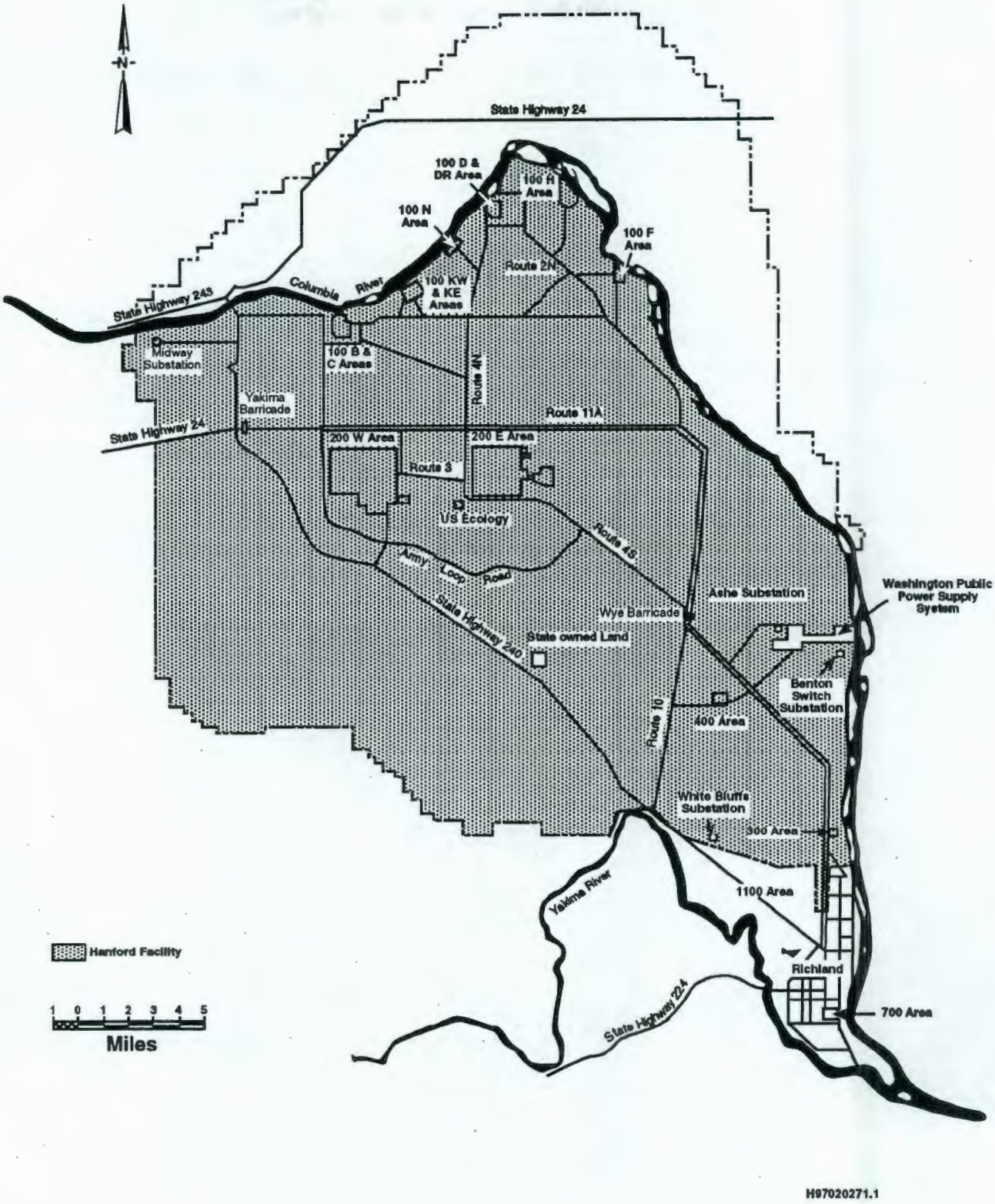


Figure 1-1. Hanford Facility.

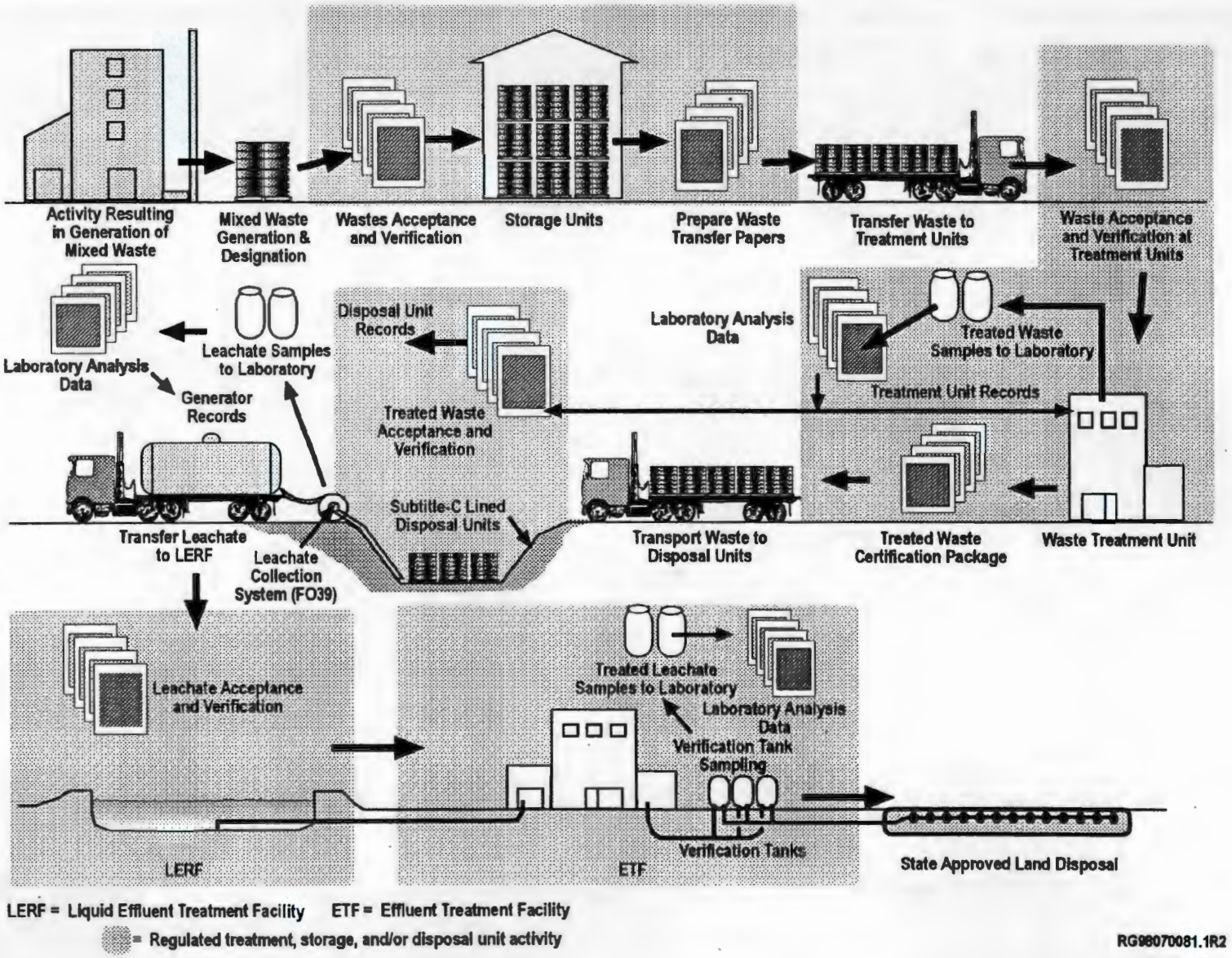


Figure 1-2. F039 Leachate Generation and Disposition.

This page intentionally left blank.

2.0 LEACHATE GENERATION AND MANAGEMENT

Leachate (liquids that have percolated through land disposed waste) resulting from the disposal of more than one restricted waste classified as hazardous (RCRA Subpart D) and/or dangerous (WAC 173-303) are said to be *multi-source*. Multi-source leachates are newly generated waste designated with the F039 waste number per WAC 173-303-082 (40 CFR 261.31). By regulation, only the F039 listed waste number can be applied to the newly generated multi-source leachate. Waste numbers associated with the disposed waste in a landfill from which the leachate is generated are not carried forward.

2.1 LEACHATE GENERATION

As of this submittal, multi-source leachate has not been generated on the Hanford Facility. However, the Environmental Restoration Disposal Facility (ERDF) located in the 600 Area has generated leachate under *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) *of 1980* authority. The ERDF adopted the RCRA/HWMA waste designation and LDR regulations as part of their applicable or relevant and appropriate requirements (ARARs). The single-source leachate generated from ERDF operations currently is being sent to ETF for treatment under CERCLA authority; therefore, ETF has operational history at treating leachates. The ERDF leachate is expected to become multi-source in the future and will be delisted under CERCLA authority.

Beginning in fiscal year 1999, disposal operations are to begin in lined RCRA-compliant disposal units (Section 2.1.1). Initial disposal operations will be limited to waste that meets treatment standards for characteristic waste, F001 through F005 listed constituents (nonspecific source waste), and state-only requirements (WAC 173-303). The leachate generated from these disposal operations is acceptable for treatment at ETF under the Final Delisting. However, beginning in fiscal year 2000, disposal operations will be expanded to include waste that meets treatment standards for other listed constituents managed on the Hanford Facility (e.g., other F, P, and U designated waste). The multi-source leachate generated from these operations also will be treated at the ETF.

2.1.1 Leachate Sources

Currently there are only two lined RCRA-compliant disposal trenches where multi-source leachate will be generated, trenches 31 and 34 of the 218-W-5 Low-Level Burial Grounds (DOE/RL-88-20). Additional lined RCRA-compliant disposal trenches will be constructed on an as-needed basis to accommodate mixed waste disposal volumes.

Construction of trenches 31 and 34 was completed in 1995. Each trench can hold between 22,800 to 52,760 cubic meters of LDR-compliant mixed waste (based on 'containerized' and 'bulk' waste respectively). The trenches meet minimum technological requirements for landfills. The liners in the trenches are made from high-density polyethylene (HDPE), a standard commercially available liner material that provides a high resistance to chemical degradation. Precipitation will percolate through the disposed waste and form the leachate. This leachate will be collected in sumps embedded in the trench bottom and will be pumped periodically into accumulation tanks. Samples of the leachate will be taken for analysis according to a schedule based on meeting generator requirements and requirements imposed through the waste analysis plan of the treatment unit receiving the waste.

Other sources of F039 designated waste could include, but are not limited to, offsite generators, additional disposal sites outside the 200 West and 200 East Areas, and waste generated from application of the derived from rule and/or mixture rule.

2.1.2 Mixed Waste Disposal

Important factors to this delisting modification include the amount of mixed waste in storage and the acceptance criteria for the disposal units on the Hanford Facility.

2.1.2.1 Mixed Waste Volumes

Mixed waste currently in storage on the Hanford Facility consists of debris, solar evaporation basin solids [from 183-H Solar Evaporation Basins (183-H Solar Evaporation Basins Closure/Post-Closure Plan, Hanford Facility RCRA Permit, Dangerous Waste Portion, Attachment 11)] and miscellaneous waste (e.g., labpacks, soils, wastewater treatment secondary solids). Currently, there are approximately 8,600 cubic meters of solid mixed waste residing in storage (DOE/RL-98-09).

- Debris consists of various debris constituents including metals (e.g., pipe, pumps, sheet metal), building rubble (e.g., concrete, brick, roofing), and organic/carbonaceous materials (e.g., wood, plastic, paper, asphalt). Currently 3,100 cubic meters of debris are stored at Central Waste Complex (CWC) (DOE/RL-91-17). The waste is packaged in 208-liter containers or various sized boxes. The primary generating units for these waste types are the Single-Shell and Double-Shell Tank Systems (DOE/RL-88-21). The waste is designated with listed waste numbers F001 through F005. Debris from other generating units have various other waste numbers (both characteristic and listed).

- The 183-H Solar Evaporation Basins solids consist of solidified basin liquids, crystalline solids, sludges, and particulates (sandblast grit) from closure activities. Currently, there are 3,500 cubic meters of this waste type stored at CWC. The waste is designated with listed waste constituents P029, P030, P098, P106, P120, and U123. The concentrations of these constituents in the waste is very low (i.e., below LDR concentration limits) or nondetectable.

- The CWC stores several smaller volume, unique mixed waste streams (e.g., inorganic and organic labpacks, elemental lead and mercury, inorganic and organic solids/particulates, and batteries). There are approximately 105 different waste numbers associated with these waste streams. Additional listed and characteristic waste numbers are expected to be received from the receipt of forecasted waste. The CWC Part A, Form 3, Permit Application (DOE/RL-88-21) reflects this broad range of waste numbers by including all D, P, and U numbers, and applicable F numbers.

The volume of waste associated with each waste number currently being managed at CWC is provided in Table 2-1. Federal waste numbers F001 through F005, P029, P030, P098, P106, P120, U123, D001, D007, D008; and state-only waste numbers WT02, WP02, and WT01 are the most significant on a waste volume basis.

An additional 63,750 cubic meters of solid mixed waste has been forecasted to be generated through fiscal year 2032 (DOE/RL-98-09). The significant waste numbers applicable to the forecasted waste are anticipated to be D001 through D043 and F001 through F005.

2.1.2.2 Mixed Waste Disposal Acceptance Criteria

All waste accepted at lined RCRA-compliant disposal trenches must meet LDR treatment standards (40 CFR 268 and WAC 173-303-140). In addition to these requirements, there also are safety-based and environmentally-based limits on the radionuclide concentrations of the disposed waste.

The federal LDR treatment standards take three basic forms: "total waste standards" [40 CFR 268.40(a)(1)], "waste extract standards" [40 CFR 268.40(a)(2)], or the "technology standard" [40 CFR 268.40(a)(3)]. In addition to these standards, much of the debris waste is, and will be, treated using one or more of the "Alternative Treatment Standards for Hazardous Debris" (40 CFR 268.45). Mixed waste containing polychlorinated biphenyls (PCBs) under the *Toxic Substances Control Act* (TSCA) *of 1976* jurisdiction will be treated meeting the standards specified in 40 CFR 761. The state-only LDR treatment standards are nonspecific with respect to treatment levels or specified treatment technologies. The treated waste however must be treated, detoxified, or otherwise processed to remove or reduce the harmful properties or characteristics. For waste that has "concentration-based" treatment standards for specific hazardous constituents under 40 CFR 268, the waste must be tested in accordance with 40 CFR 268. For waste treated to "technology standards", process knowledge must demonstrate the treatment was done in a "well designed and well operated" manner.

For waste requiring treatment before disposal, the following treatment paths have been developed to disposition the waste.

- **Non-thermal Treatment**--Uses treatment technologies that do not depend on elevated temperatures to obtain compliant and successful treatment. Treatment technologies include, but are not limited to, stabilization, chemical reduction, deactivation, macroencapsulation (elemental lead and hazardous debris), neutralization, and mercury amalgamation. Inorganic hazardous constituents normally are treated by non-thermal means. This includes, but is not limited to, metals, corrosives, some ignitables and reactives, and certain hazardous debris.

Currently, non-thermal treatment is being pursued onsite. These treatment units are either under interim status or are in the process of obtaining RCRA final status permits.

- **Thermal Treatment**--Uses treatment technologies that depend on elevated temperatures to obtain successful treatment. Treatment technologies include, but are not limited to, combustion, incineration, vitrification, gasification, steam reforming, and roasting/retorting. Organic hazardous constituents normally are treated by thermal means. This includes, but is not limited to, organics (D012 through D043), some ignitables and reactives, listed organic constituents, and hazardous debris containing organic/carbonaceous waste.

Treatment technologies are and will be matched with the specific hazardous waste constituents required (i.e., technology standard) or recommended [best demonstrated available technology (BDAT)]. Based on current regulations, approximately 60 percent of the disposed mixed waste will be treated by non-thermal treatment technologies, 30 percent by thermal treatment technologies, and 10 percent not treated because the waste either meets LDRs as-generated or administrative processes have authorized the disposal of specific waste streams. The major treated waste form to be disposed is macroencapsulated inorganic hazardous debris (mostly stainless steel) originating from Single-Shell and Double-Shell Tank System activities.

2.1.3 Leachate Collection

Infiltration of precipitation (e.g., rain, snowmelt) through the disposed waste will be the primary contributor to the leachate generation rate in the disposal areas. Precipitation will enter the disposal areas through the exposed surface area, slowly migrate downward through the waste to the primary lining, and flow along the sloped lining to one or more leachate collection sumps designed into the low points of each disposal trench. At a set operational level, these sumps will be pumped into an accumulation tank. When enough leachate has accumulated in a tank, the leachate will be transported by tanker truck to LERF or ETF.

Current planning assumes that the majority of the waste to be disposed in lined RCRA-compliant disposal trenches will be containerized (e.g., steel drums and boxes, HDPE macroencapsulated forms). During initial operations, infiltration of precipitation will not come into contact with the containerized treated waste. Contact with the treated waste would not occur until some of the corrodible containers are breached (10 years is assumed based on a 0.13 millimeter per year corrosion rate). However, bulk waste disposal will be an option at the disposal trenches; therefore, precipitation would readily come into contact with this portion of the disposed waste.

2.1.4 Expected Leachate Volumes and System Capacities

The quantity of leachate generated from a given disposal trench is expected to vary over the life of the trench depending on the exposed surface area, amount of waste disposed, solar evaporation rates, and yearly precipitation amounts. The leachate flow would be greatest at inception of disposal operations and progressively decrease as filling occurs until the burial ground is capped and closed, at which time leachate production would become fairly steady state. However, leachate generation can increase significantly during the winter months and/or during a heavy precipitation event. Based on data compiled from pumping accumulated precipitation from the existing lined disposal areas, approximately 120 liters of leachate per square meter of open disposal surface area initially can be expected each year. It is assumed that the maximum effective open disposal surface area would not exceed 90,000 square meters in a given year; therefore, the maximum yearly leachate generation rate would be approximately 10,800,000 liters.

The current leachate accumulation tanks associated with trenches 31 and 34 are 37,850 liters each (this capacity is not indicative of all future leachate storage tanks anticipated for use). This volume is effective for an average leachate production rate of approximately 4,100 liters per day (1,500,000 liters per year). However, peak precipitation events significantly could elevate the daily generation rate. The theoretical maximum daily rate is 416,400 liters based on the 25-year 24-hour precipitation event. At this generation rate, the accumulation tanks would need to be emptied every 2 hours and the leachate shipped in 18,900- to 28,400-liter tankers to LERF.

2.2 LEACHATE MANAGEMENT

As stated previously, multi-source leachates are newly generated waste designated with the F039 listed waste number per WAC 173-303-082 (40 CFR 261.31). Waste numbers associated with the disposed waste in a landfill from which the leachate is generated do not carry forward unless the waste exhibits a hazardous characteristic that is not specifically addressed by the F039 listed waste number (i.e., ignitable, corrosive, or reactive). The F039 LDR treatment standard consists of approximately 200 hazardous constituents. The regulations do not require that all hazardous constituents specified on the list need to be monitored; instead, the generator is required to identify only those F039 hazardous constituents that are reasonably expected to be present in the leachate at the point of generation above the concentration levels identified in 40 CFR 268.40.

Leachate generated from lined RCRA-compliant disposal trenches on the Hanford Facility initially will reside in accumulation tanks managed per the generator provisions (40 CFR 262.34 and WAC 173-303-200). The leachate will be designated with waste number F039 and applicable F039 hazardous constituents reasonably expected to be present in the waste at the point of generation will be determined. Generator sample analysis plans will be used where applicable to determine the appropriate hazardous constituents to be monitored. The frequency of sampling the accumulated multi-source leachate will be based primarily on three factors to meet generator acceptable knowledge requirements. The three factors are: the amount of precipitation that percolates through land disposed waste, the likeliness of the

precipitation to contact land disposed waste, and the volume of waste disposed for any given waste number.

Further waste characterization may be required by LERF/ETF to meet waste acceptance requirements specified in their waste analysis plan (DOE/RL-97-03)

2.2.1 Leachate Baseline Data

To provide a baseline for determining which leachate constituents are inherent to the disposal trench as opposed to those associated with the disposed waste, samples of liquids from the two unused lined RCRA Subtitle-C disposal units were obtained during September 1996. The liquids originated from precipitation run-off and were removed using the leachate removal systems.

Analysis performed on the samples included the following parameters: inductively coupled plasma (ICP) metals, anions, volatile organics and aromatics, semivolatile organics and aromatics, pesticides, polychlorinated biphenyls (PCBs), and radiological screening. From the analysis, all detectable constituents were significantly below (by several orders of magnitude) LDR regulatory levels, and no organic constituents were detected. Table 2-2 identifies the hazardous constituents that showed concentrations in the baseline samples above the minimum detection levels (MDL).

2.2.2 Leachate Constituents

For the purpose of identifying the constituents to be addressed by this delisting modification document, an exhaustive evaluation of several hazardous constituent lists was performed. The lists considered are as follows:

- 40 CFR 261 Subpart C – Characteristics of Hazardous Waste
- 40 CFR 261 Subpart D – Lists of Hazardous Wastes
  - Hazardous wastes from non-specific sources (as applicable)
  - Discarded commercial chemical products, off-specification species, container residues, and spill residues thereof
- 40 CFR 261 Appendix VIII, Hazardous Constituents
- 40 CFR 268.40, F039
- 40 CFR 268.48, Universal Treatment Standards
- Constituents specified in the document *Petitions to Delist Hazardous Wastes, A Guidance Manual* (EPA 530/R-93/007)
  - Oil and Grease
  - Cyanide, total
  - Cyanide, reactive
  - Nickel
  - Sulfide, total
  - Sulfide, reactive
  - Acetone
  - Ethylbenzene
  - Isophorone
  - 4-methyl-2-pentanone
  - Styrene
  - Xylenes
- *Docket Report on Health-Based Levels and Solubilities Used in the Evaluation of Delisting Petitions, Submitted Under 40 CFR 260.20 and 260.22* (EPA 1994)

Upon defining the constituent lists to be considered in support of this delisting modification effort, it

became obvious that not all of the identified constituents would be present in the multi-source leachate waste streams to be treated. Figure 2-1 details the logic used to evaluate each constituent from the lists identified previously. The following is a description of each decision point:

A1: This activity combines the various constituent source lists together into one list. Equivalent constituents from each list were combined and presented once in the list. An attempt was made to identify Chemical Abstract Service (CAS) numbers for those constituents that were not represented by one from the source lists.

A2: This activity removes all the "Not Otherwise Specified" (NOS) general constituent classes from the consolidated constituent list (A1), and sends these to activity (A3) for re-assignment.

A3: To allow evaluation of the NOS generic constituent classes, a specific representative constituent is assigned to the generic class. This representative constituent is chosen from the consolidated constituent list (A1). If the A1 list does not have a representative constituent for a generic class, a representative constituent is chosen from other sources and the source is referenced.

A4: This activity identifies compounds that have the same regulated hazardous constituents, and assigns the regulated constituent CAS number to the compound. This activity is similar to the A3 activity, but instead focuses on the various salts of the primary constituent.

A5: This activity identifies those constituents that can be eliminated from consideration based on professional judgment. Many of the constituents residing in the consolidated constituent list are unlikely to be associated with waste generating activities on the Hanford Site or other DOE sites that are considering disposing mixed waste on the Hanford Site (e.g., pesticides, fungicides, pharmaceuticals). Furthermore, because this petition applies to multi-source leachate, organic compounds insoluble in water should not be considered for analysis. The ERDF leachate delisting petition (DOE/RL-98-47) was consulted with regard to this analysis. In the subject document, Table A9 was reviewed and determined to be applicable to this petition. The professional judgment decisions detailed here were based on searches of various hazardous substance databases (including applicable material safety data sheets), and by using 40 CFR 264 Appendix IX, *Ground Water Monitoring List,* in the decisionmaking.

A6: This activity identifies those hazardous constituents that reasonably are not likely to be present in the waste being disposed because of the regulatory specified treatment method(s) performed on the waste before disposal. Many of the constituents residing in the consolidated constituent list are identified by a specific listed waste number that are treated by the specified technology-based standard of *CMBST* (combustion) or *ADGAS* (venting of compressed gas). These technologies destroy or remove the constituent(s) from the waste before disposal; therefore, it is reasonable to state that the constituents would not be present in the disposed waste. The constituents on the consolidated constituent list identified with the *CMBST* and *ADGAS* technology-based standard are removed from further consideration.

A7: This activity denotes those constituents that have a potential to be found in the multi-source leachate waste streams. These constituents will be evaluated for treatment effectiveness at ETF.

The results of the evaluation performed are detailed in Table 2-3. This table identifies the constituents that are addressed by this delisting modification document.

2.2.3 Generator Sample and Analysis Plans

For multi-source leachate managed pursuant to this delisting modification, the approach to identifying and managing the constituents that have a potential to be found in the multi-source leachate waste stream will

be through the use of sample and analysis plans (SAPs). These SAPs generally will be based on the following:

- Establish baseline knowledge of the natural occurring constituents in the disposal unit that migrate to the leachate
- Periodically assess the type and quantity of constituents being disposed that have a potential to be found in the multi-source leachate waste stream and apply this knowledge to the list of constituents being analyzed
- Assess the physical form and packaging of the waste being disposed
- Assess the receiving treatment, storage, and disposal (TSD) unit's waste acceptance criteria requirements and incorporate those applicable requirements into the SAPs
- Periodic assessments to determine if changes to the leachate sampling and analysis requirements are needed as the disposal unit matures. The assessment will include evaluating multi-source leachate analytical result trends and accounting for reduction in leachate generation as the disposal units are filled and monitored during post-closure operations.

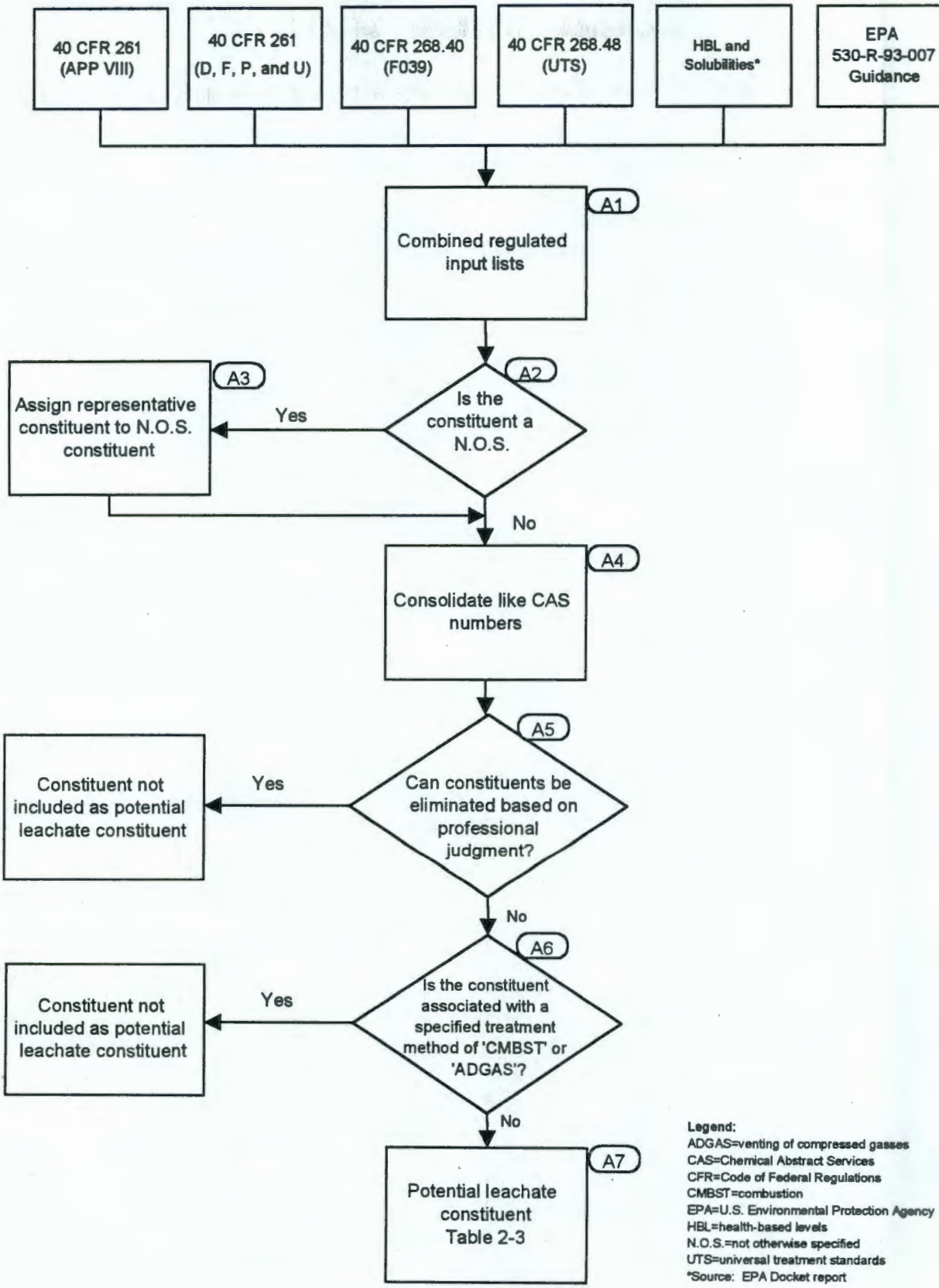


Figure 2-1. Determination of Potential Leachate Constituents.

Table 2-1. Waste Volume[1]

Waste number	Waste number description	Waste volume containing subject waste number (m^3)	Package count containing subject waste number	Waste volume percent of each waste number
F003	Organic solvents	3,336.90	5,066	38.8
D001	Ignitable	3,189.40	11,262	37.1
F005	Organic solvents	3,121.10	4,178	36.3
F001	Organic solvents	3,078.40	3,966	35.8
F002	Organic solvents	3,073.00	3,975	35.7
F004	Organic solvents	2,913.00	3,383	33.9
WT02	Toxic dangerous wastes DW	2,896.00	9,215	33.7
P098	Potassium cyanide	2,885.40	9,059	33.6
U123	Formic acid	2,885.20	9,058	33.5
P029	Copper cyanide	2,885.00	9,057	33.5
P030	Cyanide total	2,885.00	9,057	33.5
P106	Sodium cyanide	2,885.00	9,057	33.5
P120	Vanadium pentoxide	2,885.00	9,057	33.5
WP02	Persistent dangerous wastes halogenated organic compounds DW	2,232.00	2,202	26.0
WT01	Toxic dangerous wastes EHW	1,701.50	6,418	19.8
D008	Lead	1,617.60	2,627	18.8
D007	Chromium	1,335.70	3,627	15.5
D009	Mercury	330.0	699	3.8
D006	Cadmium	256.9	599	3.0
D002	Corrosive	231.6	654	2.7
WP01	Persistent dangerous wastes halogenated organic compounds EHW	133.5	496	1.6
D005	Barium	90.2	338	1.0
D010	Selenium	89.9	334	1.0
D011	Silver	72.2	240	0.8
U031	n-Butyl alcohol	69.8	333	0.8
U108	1,4-Dioxane	69.4	331	0.8
P022	Carbon disulfide	68.5	327	0.8
P023	Chloroacetaldehyde	68.5	327	0.8
U001	Acetaldehyde	68.5	327	0.8
U025	Bis(2-Chloroethyl)ether	68.5	327	0.8
U117	Ethyl ether	68.5	327	0.8
U160	Methyl ethyl ketone peroxide	68.5	327	0.8
U213	Tetrahydrofuran	68.5	327	0.8
U359	2-Ethoxyethanol	56.9	271	0.7
D040	Trichloroethylene	56.1	270	0.7
D039	Tetrachloroethylene	54.3	262	0.6
WSC2	Corrosivity	48.3	227	0.6
D019	Carbon tetrachloride	48.2	221	0.6

Table 2-1. Waste Volume[1]

Waste number	Waste number description	Waste volume containing subject waste number (m^3)	Package count containing subject waste number	Waste volume percent of each waste number
W001	PCBs	47.0	157	0.5
D004	Arsenic	45.8	137	0.5
D035	Methyl ethyl ketone	41.8	125	0.5
D018	Benzene	39.6	168	0.5
D029	1,1-Dichloroethylene	38.3	165	0.4
D043	Vinyl chloride	31.7	153	0.4
D003	Reactive	26.3	65	0.3
D028	1,2-Dichloroethane	23.5	93	0.3
D037	Pentachlorophenol	17.6	3	0.2
D022	Chloroform	17.0	63	0.2
D026	Cresols Total	15.2	14	0.2
D036	Nitrobenzene	14.4	50	0.2
D033	Hexachlorobutadiene	6.5	12	0.1
D038	Pyridine	5.0	24	0.1
D027	1,4-Dichlorobenzene	4.6	3	0.1
D034	Hexachloroethane	4.4	2	0.1
D030	2,4-Dinitrotoluene	4.4	20	0.1
U002	Acetone	2.9	14	< 0.1
U151	Mercury	2.9	14	< 0.1
U133	Hydrazine	2.9	11	< 0.1
U239	Xylene total	2.3	11	< 0.1
U226	1,1,1-Trichloroethane	2.1	10	< 0.1
D012	Endrin	2.0	6	< 0.1
D031	Heptachlor	1.8	7	< 0.1
WP03	Polycyclic aromatic hydrocarbons EHW	1.7	8	< 0.1
U161	Methyl isobutyl ketone	1.5	7	< 0.1
U154	Methanol	1.5	7	< 0.1
U159	Methyl ethyl ketone	1.4	7	< 0.1
U080	Methylene chloride	1.2	6	< 0.1
U006	Acetyl chloride	1.1	4	< 0.1
D023	o-Cresol	1.0	5	< 0.1
U220	Toluene	1.0	5	< 0.1
U019	Benzene	0.9	4	< 0.1
U189	Phosphorus sulfide	0.9	3	< 0.1
U162	Methyl methacrylate	0.8	4	< 0.1
U188	Phenol	0.8	4	< 0.1
P012	Arsenic trioxide	0.6	3	< 0.1
U112	Ethyl acetate	0.6	3	< 0.1
D016	2,4,Dichlorophenoxyacetic acid	0.4	2	< 0.1
U044	Chloroform	0.4	2	< 0.1
U056	Cyclohexane	0.4	2	< 0.1

Table 2-1. Waste Volume[1]

Waste number	Waste number description	Waste volume containing subject waste number (m^3)	Package count containing subject waste number	Waste volume percent of each waste number
U121	Trichlorofluoromethane	0.4	2	< 0.1
U134	Hydrogen fluoride	0.4	2	< 0.1
U165	Naphthalene	0.4	2	< 0.1
U196	Pyridine	0.4	2	< 0.1
U218	Thioacetamide	0.4	2	< 0.1
U169	Nitrobenzene	0.4	2	< 0.1
U228	Trichloroethylene	0.4	2	< 0.1
U144	Lead acetate	0.4	2	< 0.1
U003	Acetonitrile	0.2	1	< 0.1
D020	Chlordane	0.2	1	< 0.1
D021	Chlorobenzene	0.2	1	< 0.1
F022	Dioxins and furans	0.2	1	< 0.1
P102	Propargyl alcohol	0.2	1	< 0.1
U004	Acetophenone	0.2	1	< 0.1
U057	Cyclohexanone	0.2	1	< 0.1
U103	Dimethyl sulfate	0.2	1	< 0.1
U170	p-Nitrophenol	0.2	1	< 0.1
U187	Phenacetin	0.2	1	< 0.1
U203	Safrole	0.2	1	< 0.1
U210	Tetrachloroethylene	0.2	1	< 0.1
U211	Carbon tetrachloride	0.2	1	< 0.1

[1] Waste volumes represent what is currently in storage at the Central Waste Complex (current as of 9/98) and represent a subset of the waste numbers allowed for storage based on the Central Waste Complex Part A, Form 3, permit application.

DW = dangerous waste.
EHW = extremely hazardous waste.
m^3 = cubic meters.

Table 2-2. Baseline Constituents Above Method Detection Limits.

F039 Constituent	Measured Concentration	MDL	LDR Concentration Limit
Metals			
Antimony	1.0 ug/L	0.30 ug/L	1,900 ug/L
Arsenic	20.1 ug/L	0.40 ug/L	1,400 ug/L
Barium	32.5 ug/L	0.20 ug/L	1,200 ug/L
Chromium	8.7 ug/L	1.10 ug/L	2,770 ug/L
Copper	9.5 ug/L	0.40 ug/L	Non specified
Lead	1.9 ug/L	0.20 ug/L	690 ug/L
Manganese	25.0 ug/L	0.20 ug/L	Non specified
Mercury	0.3 ug/L	0.10 ug/L	150 ug/L
Nickel	1.3 ug/L	0.50 ug/L	3,980 ug/L
Selenium	2.3 ug/L	1.10 ug/L	820 ug/L
Uranium	9.1 ug/L	0.30 ug/L	Non specified
Vanadium	26.8 mg/L	0.40 ug/L	4,300 ug/L
Zinc	32.1 mg/L	0.30 ug/L	2,610 ug/L
General Chemistry			
Fluoride	0.9 mg/L	0.01 mg/L	35 mg/L
Chloride	6.5 mg/L	0.64 mg/L	Non specified
Nitrate	4.0 mg/L	0.28 mg/L	Non specified
Phosphate	0.3 mg/L	0.06 mg/L	Non specified
Sulfate	280 mg/L	3.57 mg/L	Non specified
Cyanides	Not Analyzed	----	1,200 ug/L (Total) 860 ug/L (Amenable)
Sulfide	Not Analyzed	----	14 mg/L

LDR = land disposal restriction.
MDL = method detection limits.
mg/L = milligrams per liter.
ug/L = micrograms per liter.

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
100-01-6	p-Nitroaniline	X	P077	X	X				100-01-6		Conc	Y
100-02-7	p-Nitrophenol	X	U170	X					100-02-7		Conc	Y
100-41-4	Ethylbenzene		F001-5	X	X	X	X		100-41-4		Conc	Y
100-42-5	Styrene					X	X		100-42-5		not specified	Y
100-51-6	Benzyl alcohol	X				X			100-51-6		not specified	Y
10061-01-5	cis-1,3-Dichloropropylene		F024	X	X				10061-01-5		CMBST or Conc	Y
10061-02-6	trans-1,3-Dichloropropylene		F024	X	X				10061-02-6		CMBST or Conc	Y
100-75-4	N-Nitrosopiperidine	X	U179	X	X	X			100-75-4		Conc	Y
10102-45-1	Thallium(I) nitrate (Thallium)	X	U217						10102-45-1		STABL	Y
101-14-4	4,4'-Methylenebis(2-chloroaniline)	X	U158	X	X				101-14-4		Conc	Y
101-27-9	Barban	X	U280		X				101-27-9		Conc	Y
101-55-3	4-Bromophenyl phenyl ether	X	U030	X	X				101-55-3		Conc	Y
1024-57-3	Heptachlor epoxide	X	D031	X	X	X			1024-57-3		Conc	Y
none	Heptachlor epoxide (alpha, beta, and gamma isomers)	X							1024-57-3		not specified	Y
1031-07-8	Endosulfan sulfate			X	X				1031-07-8		Conc	Y
105-67-9	2,4-Dimethylphenol	X	U101	X	X	X			105-67-9		Conc	Y
10595-95-6	N-Nitrosomethylethylamine	X		X	X	X			10595-95-6		Conc	Y
10605-21-7	Carbendazim	X	U372		X				10605-21-7		Conc	Y
106-44-5	p-Cresol		D026, F001-5	X	X				106-44-5		Conc	Y
106-46-7	p-Dichlorobenzene [1,4-Dichorobenzene]	X	D027, U072	X	X	X			106-46-7		Conc	Y
25321-22-6	Dichlorobenzene, N.O.S.	X						X	106-46-7		not specified	Y
106-47-8	p-Chloroaniline	X	P024	X	X	X			106-47-8		Conc	Y
106-50-3	p-Phenylenediamine					X			106-50-3		not specified	Y
106-93-4	Ethylene dibromide	X	U067	X	X	X			106-93-4		Conc	Y
107-05-1	3-Chloropropylene [Allyl chloride]		F024	X	X	X			107-05-1		CMBST or Conc	Y
107-06-2	Ethylene dichloride [1,2-Dichloroethane]	X	D028, F024-25, U077	X	X	X			107-06-2		CMBST or Conc	Y
107-13-1	Acrylonitrile	X	U009	X	X	X			107-13-1		Conc	Y
108-05-4	Vinyl acetate					X			108-05-4		not specified	Y

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
108-10-1	Methyl isobutyl ketone [4-Methy-2-pentanone]		F001-5, U161	X	X	X			108-10-1		Conc	Y
108-39-4	m-Cresol		D024, F001-5	X	X				108-39-4		Conc	Y
108-60-1	Dichloroisopropyl ether	X	U027			X			108-60-1		Conc	Y
108-88-3	Toluene	X	F001-5, U052, U220	X	X	X			108-88-3		Conc	Y
108-90-7	Chlorobenzene	X	D021, F001-5, U037	X	X	X			108-90-7		Conc	Y
none	Chlorinated benzenes, N.O.S.	X						X	108-90-7		not specified	Y
108-94-1	Cyclohexanone		F001-5, U057	X	X				108-94-1		CMBST, Conc or TCLP	Y
108-95-2	Phenol	X	U188	X	X	X			108-95-2		Conc	Y
none	HxCDFs [Hexachlorodibenzofurans]	X	F022, F026-28	X	X				109-99-9		Conc	Y
none	PeCDFs [Pentachlorodibenzofurans]	X	F022, F026-28	X	X				109-99-9		Conc	Y
none	TCDFs [Tetrachlorodibenzofurans]	X	F022, F026-28	X	X				109-99-9		Conc	Y
none	HeCDFs [Heptachlorodibenzofurans]	X							109-99-9		Conc	Y
110-86-1	Pyridine	X	D038, F001-5, U196	X	X	X			110-86-1		Conc	Y
111-44-4	bis(2-Chloroethyl)ether [Dichloroethyl ether]	X	U025	X	X	X			111-44-4		Conc	Y
none	Chloroalkyl ethers, N.O.S.	X						X	111-44-4		Conc	Y
1114-71-2	Pebulate	X			X				1114-71-2		Conc	Y
111-91-1	bis(2-Chloroethoxy)methane [Dichloromethoxy ethane]	X	U024	X	X				111-91-1		Conc	Y
114-26-1	Propoxur	X	U411		X				114-26-1		Conc	Y
115-29-7	Endosulfan	X	P050			X			115-29-7		Conc	Y
117-81-7	Bis(2-Ethylhexyl) phthalate	X	F024, U028	X	X	X			117-81-7		CMBST or Conc	Y
117-84-0	Di-n-octylphthalate	X	U107	X	X	X			117-84-0		Conc	Y
118-79-6	2,4,6-Tribromophenol	X	U408						118-79-6		Conc	Y
120-12-7	Anthracene			X	X	X			120-12-7		Conc	Y
12039-52-0	Thallium selenite (Selenium)	X	P114						12039-52-0		TCLP	Y

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
120-58-1	Isosafrole	X	U141	X	X				120-58-1		Conc	Y
120-82-1	1,2,4-Trichlorobenzene	X		X	X	X			120-82-1		Conc	Y
120-83-2	2,4-Dichlorophenol	X	U081	X	X	X			120-83-2		Conc	Y
121-14-2	2,4-Dinitrotoluene	X	D030, U105	X	X	X			121-14-2		Conc	Y
122-39-4	Diphenylamine	X		X	X	X			122-39-4		Conc	Y
122-42-9	Propham	X	U373		X				122-42-9		Conc	Y
123-91-1	1,4-Diethyleneoxide	X	U108	X	X	X			123-91-1		CMBST or Conc	Y
124-48-1	Chlorodibromomethane			X	X	X			124-48-1		Conc	Y
126-68-1	O,O,O-Triethyl phosphorothioate	X							126-68-1		not specified	Y
126-72-7	Tris(2,3-dibromopropyl) phosphate	X	U235	X	X	X			126-72-7		Conc	Y
126-73-8	Tributyl phosphate								126-73-8		not specified	Y
126-98-7	Methacrylonitrile	X	U152	X	X	X			126-98-7		TCLP	Y
126-99-8	Chloroprene [2-Chloro-1,3-butadiene]	X		X	X	X			126-99-8		Conc	Y
127-18-4	Tetrachloroethylene	X	D039, F001-5, U210	X	X	X			127-18-4		Conc	Y
128-03-0	Potassium dimethyldithio-carbamate	X							128-03-0		not specified	Y
128-04-1	Sodium dimethyldithio-carbamate	X							128-04-1		not specified	Y
129-00-0	Pyrene			X	X	X			129-00-0		Conc	Y
1303-28-2	Arsenic pentoxide Arsenic)	X	P011						1303-28-2		TCLP	Y
131-11-3	Dimethyl phthalate	X	U102	X	X	X			131-11-3		Conc	Y
1314-32-5	Thallic oxide (Thallium)	X	P113						1314-32-5		STABL	Y
1314-62-1	Vanadium pentoxide (Vanadium)	X	P120						1314-62-1		STABL	Y
1319-77-3	Cresol [Cresylic acid]	X	D026, F001-5, U052			X			1319-77-3		Conc	Y
1327-53-3	Arsenic trioxide (Arsenic)	X	P012						1327-53-3		TCLP	Y
1330-20-7	Xylenes		F001-5, U051, U239	X	X	X			1330-20-7		Conc	Y
1335-32-6	Lead subacetate (Lead)	X	U146						1335-32-6		TCLP	Y
none	Polychlorinated biphenyls, N.O.S.	X						X	1336-36-3		not specified	Y
1336-36-3	Total PCBs			X	X	X			1336-36-3		Conc	Y
13463-39-3	Nickel carbonyl (Nickel)	X	P073						13463-39-3		TCLP	Y
136-30-1	Sodium dibutyldithiocarbamate	X							136-30-1		not specified	Y

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
137-29-1	Copper dimethyldithiocarbamate	X							137-29-1		not specified	Y
137-30-4	Ziram	X	P205		X				137-30-4		Conc	Y
137-41-7	Potassium n-methyldithio-carbamate	X							137-41-7		not specified	Y
137-42-8	Metam Sodium	X							137-42-8		not specified	Y
13765-19-0	Calcium chromate (Chromium)	X	U032						13765-19-0		TCLP	Y
140-57-8	Aramite	X		X	X				140-57-8		Conc	Y
141-78-6	Ethyl acetate		F001-5, U112	X	X	X			141-78-6		Conc	Y
14324-55-1	Ethyl Ziram	X							14324-55-1		not specified	Y
143-33-9	Sodium cyanide (Cyanides)	X	P106						143-33-9		Conc	Y
143-50-0	Kepone	X	U142	X	X	X			143-50-0		Conc	Y
144-34-3	Selenium, tetrakis (dimethyl-dithiocarbamate)	X							144-34-3		TCLP	Y
14484-64-1	Ferbam	X							14484-64-1		not specified	Y
148-18-5	Sodium diethyldithiocarbamate	X							148-18-5		not specified	Y
151-50-8	Potassium cyanide (Cyanides)	X	P098						151-50-8		Conc	Y
15339-36-3	Manganese dimethyldithio-carbamate	X	P196						15339-36-3		Conc	Y
1563-38-8	Carbofuran phenol	X	U367		X				1563-38-8		Conc	Y
1563-66-2	Carbofuran	X	P127		X				1563-66-2		Conc	Y
156-59-2	cis-1,2-Dichloroethylene					X			156-59-2		not specified	Y
156-60-5	trans-1,2-Dichloroethylene	X	U079	X	X	X			156-60-5		Conc	Y
1634-02-2	Tetrabutylthiuram disulfide	X							1634-02-2		not specified	Y
1646-88-4	Aldicarb sulfone	X	P203		X				1646-88-4		Conc	Y
16984-48-8	Fluoride			X	X	X			16984-48-8		Conc	Y
17804-35-2	Benomyl	X	U271		X				17804-35-2		Conc	Y
18496-25-8	Sulfide			X	X		X		18496-25-8		Conc	Y
1888-71-7	Hexachloropropene	X	U243	X	X				1888-71-7		Conc	Y
189-64-0	Dibenzo[a,h]pyrene	X							189-64-0		not specified	Y
191-24-2	Benzo[g,h,i]perylene			X	X				191-24-2		Conc	Y
192-65-4	Dibenzo[a,e]pyrene	X		X	X				192-65-4		Conc	Y
1929-77-7	Vernolate	X			X				1929-77-7		Conc	Y
193-39-5	Indeno[1,2,3-cd]pyrene	X	U137	X	X	X			193-39-5		Conc	Y
2008-41-5	Butylate	X			X				2008-41-5		Conc	Y

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
2032-65-7	Methiocarb	X	P199		X				2032-65-7		Conc	Y
205-82-3	Benzo[j]fluoranthene	X							205-82-3		not specified	Y
205-99-2	Benzo[b]fluoranthene	X		X	X	X			205-99-2		Conc	Y
206-44-0	Fluoranthene	X	U120	X	X	X			206-44-0		Conc	Y
207-08-9	Benzo(k)fluoranthene	X		X	X				207-08-9		Conc	Y
20816-12-0	Osmium tetroxide	X	P087						20816-12-0		RTHRM (alt. STABL)	Y
208-96-8	Acenaphthylene			X	X				208-96-8		Conc	Y
218-01-9	Chrysene	X	U050	X	X	X			218-01-9		Conc	Y
2212-67-1	Molinate	X			X				2212-67-1		Conc	Y
224-42-0	Dibenz[a,j]acridine	X							224-42-0		not specified	Y
226-36-8	Dibenz[a,h]acridine	X							226-36-8		not specified	Y
22781-23-3	Bendiocarb	X	U278		X				22781-23-3		Conc	Y
2303-17-5	Triallate	X	U389		X				2303-17-5		Conc	Y
23135-22-0	Oxamyl	X	P194		X				23135-22-0		Conc	Y
23564-05-8	Thiophanate-methyl	X	U409		X				23564-05-8		Conc	Y
23950-58-5	Pronamide	X	U192	X	X	X			23950-58-5		Conc	Y
2631-37-0	Promecarb	X	P201		X				2631-37-0		Conc	Y
26545-73-3	Dichloropropanol, N.O.S.	X						X	26545-73-3		not specified	Y
298-00-0	Methyl parathion	X	P071	X	X	X			298-00-0		Conc	Y
298-02-2	Phorate	X	P094	X	X	X			298-02-2		Conc	Y
298-04-4	Disulfoton	X	P039	X	X	X			298-04-4		Conc	Y
301-04-2	Lead acetate (Lead)	X	U144						301-04-2		TCLP	Y
30558-43-1	A2213	X	U394		X				30558-43-1		Conc	Y
309-00-2	Aldrin	X	P004	X	X	X			309-00-2		Conc	Y
315-18-4	Mexacarbate	X	P128		X				315-18-4		Conc	Y
319-84-6	alpha-BHC		D013, U129	X	X	X			319-84-6		Conc	Y
319-85-7	beta-BHC		D013, U129	X	X	X			319-85-7		Conc	Y
319-86-8	delta-BHC		D013, U129	X	X				319-86-8		Conc	Y
33213-65-9	Endosulfan II			X	X				33213-6-5		Conc	Y
3424-82-6	o,p'-DDE			X	X				3424-82-6		Conc	Y
39638-32-9	bis(Chloroisopropyl)ether			X	X				39638-32-9		Conc	Y

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
465-73-6	Isodrin	X	P060	X	X				465-73-6		Conc	Y
50-29-3	DDT [p,p'-DDT]	X	U061	X	X	X			50-29-3		Conc	Y
50-32-8	Benzo[a]pyrene	X	U022	X	X	X			50-32-8		Conc	Y
506-61-6	Potassium silver cyanide	X	P099						506-61-6		Conc & TCLP	Y
506-64-9	Silver cyanide	X	P104						506-64-9		Conc & TCLP	Y
51026-28-9	Potassium n-hydroxymethyl-n-methyl-dithiocarbamate	X							51026-28-9		not specified	Y
51-28-5	2,4-Dinitrophenol	X	P048	X	X	X			51-28-5		Conc	Y
52-85-7	Famphur	X	P097	X	X	X			52-85-7		Conc	Y
53-19-0	o,p'-DDD			X	X				53-19-0		Conc	Y
534-52-1	4,6-Dinitro-o-cresol	X	P047	X	X				534-52-1		Conc	Y
53-70-3	Dibenz[a,h]anthracene	X	U063	X	X	X			53-70-3		Conc	Y
53-96-3	2-Acetylaminofluorene	X	U005	X	X				53-96-3		Conc	Y
541-73-1	m-Dichlorobenzene	X	U071	X	X				541-73-1		Conc	Y
542-62-1	Barium cyanide	X	P013						542-62-1		TCLP	Y
542-75-6	1,3-Dichloropropene	X	U084			X			542-75-6		Conc	Y
26952-23-8	Dichloropropene, N.O.S.	X						X	542-75-6		not specified	Y
544-92-3	Copper cyanide (Cyanides)	X	P029						544-92-3		Conc	Y
55-18-5	N-Nitrosodiethylamine	X	U174	X	X	X			55-18-5		Conc	Y
557-19-7	Nickel cyanide	X	P074						557-19-7		Conc & TCLP	Y
557-21-1	Zinc cyanide (Cyanides)	X	P121						557-21-1		Conc	Y
56-23-5	Carbon tetrachloride	X	D019, F001-5, F025, U211	X	X	X			56-23-5		Conc	Y
563-68-8	Thallium(I) acetate (Thallium)	X	U214						563-68-8		STABL	Y
56-38-2	Parathion	X	P089	X	X	X			56-38-2		Conc	Y
56-49-5	3-Methylcholanthrene	X	U157	X	X	X			56-49-5		Conc	Y
56-55-3	Benz[a]anthracene	X	U018	X	X	X			56-55-3		Conc	Y
none	Cyanides (soluble salts and complexes) N.O.S.	X	P030					X	57-12-5		Conc	Y
57-12-5	Cyanides		F006-12, F019	X	X	X	X		57-12-5		Conc	Y
57-47-6	Physostigmine	X	P204		X				57-47-6		Conc	Y
57-64-7	Physostigmine salicylate	X	P188		X				57-64-7		Conc	Y

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
57-74-9	Chlordane	X	D020, U036	X	X	X			57-74-9		Conc	Y
57-74-9, 39400-80-1, 53637-13-1	Chlordane (alpha and gamma isomers)	X	U036			X			57-74-9		Conc	Y
58-89-9	Lindane (gamma-BHC)	X	D013, U129	X	X	X			58-89-9		Conc	Y
58-90-2	2,3,4,6-Tetrachlorophenol	X	F020, F023, F027-28	X	X				58-90-2		Conc	Y
53535276	2,3,4,6-tetrachlorophenol, potassium salt (2,3,4,6-tetrachlorophenol salt)	X	F027			X			58-90-2		not specified	Y
25567559	2,3,4,6-tetrachlorophenol, sodium salt (2,3,4,6-tetrachlorophenol, salt)	X	F020, F023, F027-28						58-90-2		not specified	Y
592-01-8	Calcium cyanide (Cyanides)	X	P021						592-01-8		Conc	Y
59-50-7	p-Chloro-m-cresol	X	U039	X	X				59-50-7		Conc	Y
59669-26-0	Thiodicarb	X	U410		X				59669-26-0		Conc	Y
59-89-2	N-Nitrosomorpholine	X		X	X				59-89-2		Conc	Y
60-29-7	Ethyl ether		F001-5, U117	X	X	X			60-29-7		Conc	Y
60-57-1	Dieldrin	X	P037	X	X	X			60-57-1		Conc	Y
606-20-2	2,6-Dinitrotoluene	X	U106	X	X				606-20-2		Conc	Y
608-93-5	Pentachlorobenzene	X	U183	X	X	X			608-93-5		Conc	Y
621-64-7	N-Nitroso-di-n-dipropylamine	X	U111	X	X	X			621-64-7		Conc	Y
62-38-4	Phenylmercury acetate (Mercury)	X	P092						62-38-4		IMERC, RMERC, TCLP	Y
62-44-2	Phenacetin	X	U187	X	X				62-44-2		Conc	Y
62-53-3	Aniline	X	U012	X	X	X			62-53-3		Conc	Y
62-75-9	N-Nitrosodimethylamine	X	P082	X	X	X			62-75-9		Conc	Y
628-86-4	Mercury fulminate (Mercury)	X	P065						628-86-4		IMERC, RMERC, TCLP	Y
630-10-4	Selenourea (Selenium)	X	P103						630-10-4		TCLP	Y
630-20-6	1,1,1,2-Tetrachloroethane	X	U208	X	X	X			630-20-6		Conc	Y
63-25-2	Carbaryl	X	U279		X				63-25-2		Conc	Y
6533-73-9	Thallium(I) carbonate (Thallium)	X	U215						6533-73-9		STABL	Y
66-27-3	Methyl methanesulfonate	X		X	X				66-27-3		Conc	Y

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
67-56-1	Methanol		F001-5, U154	X	X	X			67-56-1		CMBST or TCLP	Y
67-64-1	Acetone		F001-5, U002	X	X	X	X		67-64-1		Conc	Y
67-66-3	Chloroform	X	D022, F025, U044	X	X	X			67-66-3		Conc	Y
67-72-1	Hexachloroethane	X	D034, F024-25, U131	X	X	X			67-72-1		CMBST or Conc	Y
696-28-6	Dichlorophenylarsine (Arsenic)	X	P036						696-28-6		TCLP	Y
71-36-3	n-Butyl alcohol [1-Butyl alcohol]		F001-5, U031	X	X	X			71-36-3		Conc	Y
71-43-2	Benzene	X	D018, F001-5, U019	X	X	X			71-43-2		Conc	Y
71-55-6	1,1,1-Trichloroethane (Methyl chloroform)	X	F001-5, U226	X	X	X			71-55-6		Conc	Y
none	Chlorinated ethane, N.O.S.	X						X	71-55-6		not specified	Y
72-20-8	Endrin & Endrin metabolites	X	D012, P051	X	X	X			72-20-8		Conc	Y
72-43-5	Methoxychlor	X	D014, U247	X	X	X			72-43-5		Conc	Y
72-54-8	DDD (p,p'-DDD)	X	U060	X	X	X			72-54-8		Conc	Y
72-55-9	DDE (p,p'-DDE)	X		X	X	X			72-55-9		Conc	Y
7421-93-4	Endrin aldehyde		D012	X	X				7421-93-4		Conc	Y
7439-92-1	Lead	X	D008, F006-9, F011-12	X	X	X			7439-92-1		MACRO or TCLP	Y
none	Lead compounds, N.O.S. (Lead)	X						X	7439-92-1		TCLP	Y
7439-97-6	Mercury	X	D009, U151	X	X	X			7439-97-6		AMLGM or TCLP	Y
none	Mercury compounds, N.O.S. (Mercury)	X						X	7439-97-6		TCLP	Y
7440-02-0	Nickel	X	F006-9, F011-12	X	X	X	X		7440-02-0		Conc	Y
none	Nickel compounds, N.O.S. (Nickel)	X						X	7440-02-0		TCLP	Y
7440-22-4	Silver	X	D011, F006-9, F001-12	X	X	X			7440-22-4		TCLP	Y
none	Silver compounds, N.O.S. (Silver)	X						X	7440-22-4		TCLP	Y
7440-28-0	Thallium	X		X	X	X			7440-28-0		Conc	Y
none	Thallium compounds, N.O.S. (Thallium)	X						X	7440-28-0		TCLP	Y

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
7440-36-0	Antimony	X		X	X	X			7440-36-0		TCLP	Y
none	Antimony compounds, N.O.S. (Antimony)	X		X				X	7440-36-0		TCLP	Y
7440-38-2	Arsenic	X	D004	X	X	X			7440-38-2		TCLP	Y
generic	Arsenic compounds, N.O.S. (Arsenic)	X						X	7440-38-2		TCLP	Y
7440-39-3	Barium	X	D005	X	X	X			7440-39-3		TCLP	Y
generic	Barium compounds, N.O.S. (Barium)	X						X	7440-39-3		TCLP	Y
7440-41-7	Beryllium powder	X	P015	X	X	X			7440-41-7		RTHRM (alt. STABL)	Y
generic	Beryllium compounds, N.O.S. (Beryllium)	X						X	7440-41-7		TCLP	Y
7440-43-9	Cadmium	X	D006, F006-9, F011-12	X	X	X			7440-43-9		TCLP	Y
generic	Cadmium compounds, N.O.S. (Cadmium)	X						X	7440-43-9		TCLP	Y
7440-47-3	Chromium	X	D007, F006-10, F011-12, F019	X	X	X			7440-47-3		TCLP	Y
generic	Chromium compounds, N.O.S. (Chromium)	X						X	7440-47-3		TCLP	Y
7440-62-2	Vanadium			X	X	X			7440-62-2		Conc	Y
7440-66-6	Zinc				X	X			7440-66-6		Conc	Y
7446-18-6	Thallium(I) sulfate (Thallium)	X	P115						7446-18-6		STABL	Y
7446-27-7	Lead phosphate (Lead)	X	U145						7446-27-7		TCLP	Y
74-83-9	Methyl bromide	X	U029	X	X	X			74-83-9		Conc	Y
74-87-3	Methyl chloride	X	U045	X	X	X			74-87-3		Conc	Y
74-88-4	Methyl iodide (Iodomethane)	X	U138	X	X				74-88-4		Conc	Y
7488-56-4	Selenium sulfide (Selenium)	X	U205						7488-56-4		TCLP	Y
74-90-8	Hydrogen cyanide (Cyanides)	X	P063						74-90-8		Conc	Y
74-95-3	Methylene bromide	X	U068	X	X	X			74-95-3		Conc	Y
75-00-3	Chloroethane			X	X				75-00-3		Conc	Y
75-01-4	Vinyl chloride	X	D043, F025, U043	X	X	X			75-01-4		Conc	Y
75-05-8	Acetonitrile	X	U003	X	X	X			75-05-8		CMBST or Conc	Y
75-09-2	Methylene chloride	X	F001-5, F025, U080	X	X	X			75-09-2		Conc	Y
none	Halomethanes, N.O.S.	X						X	75-09-2		Conc	Y

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
75-15-0	Carbon disulfide	X	F001-5, P022	X	X	X			75-15-0		CMBST, Conc or TCLP	Y
75-25-2	Bromoform	X	U225	X	X	X			75-25-2		Conc	Y
75-27-4	Bromodichloromethane			X	X	X			75-27-4		Conc	Y
75-34-3	Ethylidene dichloride (1,1-Dichloroethane)	X	F024, U076	X	X	X			75-34-3		CMBST or Conc	Y
75-35-4	1,1-Dichloroethylene	X	D029, F025, U078	X	X	X			75-35-4		Conc	Y
25323-30-2	Dichloroethylene, N.O.S.	X						X	75-35-4		not specified	Y
75-69-4	Trichloromonofluoromethane	X	F001-5, U121	X	X	X			75-69-4		Conc	Y
none	Chlorinated fluorocarbons, N.O.S.	X						X	75-69-4		Conc	Y
75-71-8	Dichlorodifluoromethane	X	U075	X	X	X			75-71-8		Conc	Y
759-94-4	EPTC	X			X				759-94-4		Conc	Y
76-13-1	1,1,2-Trichloro-1,2,2-trifluoroethane		F001-5	X	X	X			76-13-1		Conc	Y
76-44-8	Heptachlor	X	D031, P059	X	X	X			76-44-8		Conc	Y
7664-39-3	Hydrogen fluoride	X	U134						7664-39-3		NEUTR	Y
7664-41-7	Ammonia								7664-41-7		not specified	Y
7778-39-4	Arsenic acid (Arsenic)	X	P010						7778-39-4		TCLP	Y
7782-49-2	Selenium	X	D010	X	X	X			7782-49-2		TCLP	Y
none	Selenium compounds, N.O.S. (Selenium)	X						X	7782-49-2		TCLP	Y
7783-00-8	Selenium dioxide (Selenium)	X	U204						7783-00-8		TCLP	Y
7791-12-0	Thallium(I) chloride (Thallium)	X	U216						7791-12-0		STABL	Y
78-00-2	Tetraethyl lead (Lead)	X	P110						78-00-2		TCLP	Y
7803-55-6	Ammonium vanadate (Vanadium)	X	P119						7803-55-6		STABL	Y
78-59-1	Isophorone					X	X		78-59-1		not specified	Y
78-83-1	Isobutyl alcohol	X	F001-5, U140	X	X	X			78-83-1		Conc	Y
78-87-5	Propylene dichloride [1,2-Dichloropropane]	X	F024, U083	X	X	X			78-87-5		CMBST or Conc	Y
26638-19-7	Dichloropropane, N.O.S.	X						X	78-87-5		not specified	Y
789-02-6	o.p'-DDT			X	X				789-02-6		Conc	Y
78-93-3	Methyl ethyl ketone (MEK)	X	D035, F001-5, U159	X	X	X			78-93-3		Conc	Y

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
79-00-5	1,1,2-Trichloroethane	X	F001-5, F025, U227	X	X	X			79-00-5		Conc	Y
79-01-6	Trichloroethylene	X	D040, F001-5, F025, U228	X	X	X			79-01-6		Conc	Y
79-34-5	1,1,2,2-Tetrachloroethane	X	U209	X	X	X			79-34-5		Conc	Y
25322-20-7	Tetrachloroethane, N.O.S.	X						X	79-34-5		not specified	Y
8001-35-2	Toxaphene	X	D015, P123	X	X	X			8001-35-2		Conc	Y
8001-58-9	Creosote	X	U051						8001-58-9		Conc	Y
8007-45-2	Coal tar creosote	X							8007-45-2		not specified	Y
80-62-6	Methyl methacrylate	X	U162	X	X	X			80-62-6		Conc	Y
82-68-8	Pentachloronitrobenzene (PCNB)	X	U185	X	X	X			82-68-8		Conc	Y
83-32-9	Acenaphthene		F034, F037	X	X	X			83-32-9		Conc	Y
84-66-2	Diethyl phthalate	X	U088	X	X	X			84-66-2		Conc	Y
none	Phthalic acid esters, N.O.S.	X						X	84-66-2		Conc	Y
84-74-2	Di-n-butylphthalate	X	U069	X	X	X			84-74-2		Conc	Y
85-01-8	Phenanthrene			X	X				85-01-8		Conc	Y
85-44-9	Phthalic anhydride	X	U190	X					85-44-9		Conc	Y
85-68-7	Butyl benzyl phthalate	X		X	X	X			85-68-7		Conc	Y
35576-91-1	Nitrosamines, N.O.S.	X						X	86-30-6		not specified	Y
86-30-6	Diphenylnitrosamine			X	X				86-30-6		Conc	Y
86-30-6	N-Nitrosodiphenylamine					X			86-30-6		not specified	Y
86-73-7	Fluorene			X	X	X			86-73-7		Conc	Y
87-65-0	2,6-Dichlorophenol	X	U082	X	X				87-65-0		Conc	Y
87-68-3	Hexachlorobutadiene	X	D033, F025, U128	X	X	X			87-68-3		Conc	Y
87-86-5	Pentachlorophenol	X	D037, F021, F027-28	X	X				87-86-5		Conc	Y
131522	Sodium pentachlorophenate (Pentachlorophenol salt)	X				X			87-86-5		not specified	Y
7778736	Potassium pentachlorophenate (Pentachlorophenol salt)	X				X			87-86-5		not specified	Y
88-06-2	2,4,6-Trichlorophenol	X	D042, F020, F023, F027-28	X	X	X			88-06-2		Conc	Y

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
88-74-4	o-Nitroaniline				X				88-74-4		Conc	Y
88-85-7	Dinoseb	X	P020	X	X	X			88-85-7		Conc	Y
91-20-3	Naphthalene	X	U165	X	X	X			91-20-3		Conc	Y
91-58-7	beta-Chloronaphthalene	X	U047	X	X	X			91-58-7		Conc	Y
none	Chlorinated naphthalene, N.O.S.	X						X	91-58-7		not specified	Y
91-80-5	Methapyrilene	X	U155	X	X				91-80-5		Conc	Y
924-16-3	N-Nitroso-di-n-butylamine	X	U172	X	X	X			924-16-3		Conc	Y
92-67-1	4-Aminobiphenyl	X		X	X				92-67-1		Conc	Y
930-55-2	N-Nitrosopyrrolidine	X	U180	X	X	X			930-55-2		Conc	Y
93-72-1	Silvex (2,4,5-TP)	X	D017, F027	X	X	X			93-72-1		Conc	Y
93-76-5	2,4,5-T	X	F027	X	X	X			93-76-5		Conc	Y
94-59-7	Safrole	X	U203	X	X	X			94-59-7		Conc	Y
94-75-7	2,4-D	X	D016, U240	X	X	X			94-75-7		Conc	Y
95-48-7	o-Cresol		D023, F001-5	X	X				95-48-7		Conc	Y
95-50-1	o-Dichlorobenzene	X	F001-5, U070	X	X	X			95-50-1		Conc	Y
95-54-5	o-Phenylenediamine				X				95-54-5		Conc	Y
95-57-8	o-Chlorophenol	X	U048	X	X	X			95-57-8		Conc	Y
none	Chlorinated phenol, N.O.S.	X						X	95-57-8		Conc	Y
95-80-7	Toluene-2,4-diamine	X				X			95-80-7		not specified	Y
95-94-3	1,2,4,5-Tetrachlorobenzene	X	U207	X	X	X			95-94-3		Conc	Y
95-95-4	2,4,5-Trichlorophenol	X	D041, F020, F023, F027-28	X	X	X			95-95-4		Conc	Y
none	TCDDs [Tetrachlorodibenzo-p-dioxins]	X	F022, F026-28	X	X				95-95-4		Conc	Y
none	HxCDDs [Hexachlorodibenzo-p-dioxins]	X	F022, F026-28	X	X				95-95-4		Conc	Y
none	PeCDDs [Pentachlorodibenzo-p-dioxins]	X	F022, F026-28	X	X				95-95-4		Conc	Y
none	HeCDDs [Heptachlorodibenzo-p-dioxins]	X							95-95-4		not specified	Y
959-98-8	Endosulfan I			X	X				959-98-8		Conc	Y
96-12-8	1,2-Dibromo-3-chloropropane	X	U066	X	X	X			96-12-8		Conc	Y

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
96-18-4	1,2,3-Trichloropropane	X		X	X	X			96-18-4		Conc	Y
25735-29-9	Trichloropropane, N.O.S.	X						X	96-18-4		not specified	Y
97-63-2	Ethyl methacrylate	X	U118	X	X	X			97-63-2		Conc	Y
97-77-8	Disulfiram	X							97-77-8		not specified	Y
98-05-5	Benzenearsonic acid	X							98-05-5		not specified	Y
98-86-2	Acetophenone	X	U004	X	X	X			98-86-2		Conc	Y
98-95-3	Nitrobenzene	X	D036, F001-5, U169	X		X			98-95-3		Conc	Y
99-55-8	5-Nitro-o-toluidine	X	U181	X					99-55-8		Conc	Y
99-65-0	1,3-Dinitrobenzene					X			99-65-0		not specified	Y
none	Oil & Grease						X		none		not specified	Y
100-25-4	1,4-Dinitrobenzene			X	X	X			100-25-4	Dyestuff	Conc	N
100-44-7	Benzyl chloride	X	P028			X			100-44-7		CMBST	N
10102-43-9	Nitric oxide	X	P076						10102-43-9		ADGAS	N
10102-44-0	Nitrogen dioxide	X	P078						10102-44-0		ADGAS	N
103-85-5	Phenylthiourea	X	P093						103-85-5	Pesticide	CMBST	N
106-49-0	p-Toluidine	X	U353			X			106-49-0		CMBST	N
106-51-4	p-Benzoquinone	X	U197						106-51-4		CMBST	N
106-89-8	Epichlorohydrin	X	U041			X			106-89-8		CMBST	N
107-02-8	Acrolein	X	P003	X	X	X			107-02-8		CMBST	N
107-10-8	n-Propylamine	X	U194						107-10-8	Pesticide, Dyestuff, Pharmaceutical, Polymer	CMBST	N
107-12-0	Ethyl cyanide	X	P101	X	X				107-12-0	Solvent	Conc	N
107-18-6	Allyl alcohol	X	P005						107-18-6	Fungicide	CMBST	N
107-19-7	Propargyl alcohol	X	P102						107-19-7		CMBST	N
107-20-0	Chloroacetaldehyde	X	P023						107-20-0		CMBST	N
107-30-2	Chloromethyl methyl ether	X	U046						107-30-2		CMBST	N
107-49-3	Tetraethyl pyrophosphate	X	P111						107-49-3		CMBST	N
108-31-6	Maleic anhydride	X	U147						108-31-6		CMBST	N
108-46-3	Resorcinol	X	U201						108-46-3		CMBST	N
108-98-5	Thiophenol	X	P014						108-98-5		CMBST	N

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
109-06-8	2-Picoline	X	U191						109-06-8	Solvent	CMBST	N
109-77-3	Malononitrile	X	U149						109-77-3	Pharmaceutical, R&D	CMBST	N
109-99-9	Tetrahydrofuran		U213						109-99-9		CMBST	N
110-00-9	Furan		U124			X			110-00-9		CMBST	N
110-75-8	2-Chloroethyl vinyl ether	X	U042		X				110-75-8		CMBST	N
110-80-5	2-Ethoxyethanol [Ethylene glycol monoethyl ether]	X	F005, U359			X			110-80-5		CMBST	N
110-82-7	Cyclohexane		U056						110-82-7		CMBST	N
111-54-6	Ethylenebisdithiocarbamic acid	X	U114						111-54-6	Fungicide	CMBST	N
generic	Ethylenebisdithiocarbamic acid, salts and esters	X	U114						111-54-6		CMBST	N
1116-54-7	N-Nitrosodiethanolamine	X	U173						1116-54-7	R&D	CMBST	N
1120-71-4	1,3-Propane sultone	X	U193						1120-71-4		CMBST	N
1129-41-5	Metolcarb	X	P190		X				1129-41-5	Pesticide	Conc	N
1134-23-2	Cycloate	X							1134-23-2	Pesticide	not specified	N
115-02-6	Azaserine	X	U015						115-02-6	Pharmaceutical	CMBST	N
116-06-3	Aldicarb	X	P070						116-06-3	Pesticide	CMBST	N
118-74-1	Hexachlorobenzene	X	D032, F025, U127	X	X	X			118-74-1	Pesticide, Fungicide	Conc	N
119-38-0	Isolan	X	P192		X				119-38-0	Miscellaneous	Conc	N
119-90-4	3,3'-Dimethoxybenzidine	X	U091			X			119-90-4		CMBST	N
119-93-7	3,3'-Dimethylbenzidine	X	U095			X			119-93-7		CMBST	N
120-54-7	Bis(pentamethylene)-thiuram tetrasulfide	X							120-54-7	Consumer	not specified	N
121-44-8	Triethylamine	X	U404		X				121-44-8	Dyestuff	Conc	N
122-09-8	alpha,alpha-Dimethylphenethylamine	X	P046						122-09-8	Consumer	CMBST	N
122-66-7	1,2-Diphenylhydrazine	X	U109	X	X	X			122-66-7		CMBST	N
123-33-1	Maleic hydrazide	X	U148						123-33-1	Pesticide	CMBST	N
123-63-7	Paraldehyde	X	U182						123-63-7	Pharmaceutical, Polymer, Solvent	CMBST	N
124-40-3	Dimethylamine		U092						124-40-3		CMBST	N
126-85-2	Nitrogen mustard N-oxide	X							126-85-2	Not Commercially Produced	not specified	N

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
130-15-4	1,4-Naphthoquinone	X	U166						130-15-4	Polymer	CMBST	N
1314-80-3	Phosphorus sulfide		U189						1314-80-3		CMBST	N
1314-84-7	Zinc phosphide	X	P122, U249						1314-84-7		CMBST	N
131-74-8	Ammonium picrate		P009						131-74-8		CMBST	N
131-89-5	2-Cyclohexyl-4,6-dinitrophenol	X	P034						131-89-5		CMBST	N
13256-22-9	N-Nitrososarcosine	X							13256-22-9	Non-Commercially Produced	not specified	N
1338-23-4	Methyl ethyl ketone peroxide	X	U160						1338-23-4	Polymer	CMBST	N
134-32-7	alpha-Naphthylamine	X	U167						134-32-7		CMBST	N
137-26-8	Thiram	X	U244						137-26-8		CMBST	N
1402-68-2	Aflatoxins	X							1402-68-2	R&D	not specified	N
140-88-5	Ethyl acrylate		U113						140-88-5		CMBST	N
142-84-7	Dipropylamine		U110						142-84-7		CMBST	N
145-73-3	Endothall	X	P088			X			145-73-3	Pesticide	CMBST	N
1464-53-5	1,2:3,4-Diepoxybutane	X	U085						1464-53-5	R&D, Polymer	CMBST	N
148-82-3	Melphalan [alanine nitrogen mustard]	X	U150						148-82-3	Pharmaceutical	CMBST	N
14901-08-7	Cycasin	X							14901-08-7	Pharmaceutical, Not Commercially Produced	not specified	N
151-56-4	Ethyleneimine	X	P054						151-56-4		CMBST	N
152-16-9	Octamethylpyrophosphoramide	X	P085			X			152-16-9	Pesticide	CMBST	N
1615-80-1	N,N'-Diethylhydrazine	X	U086						1615-80-1		CMBST	N
16543-55-8	N-Nitrosonornicotine	X							16543-55-8	Consumer	not specified	N
16752-77-5	Methomyl	X	P066		X				16752-77-5		CMBST	N
17702-57-7	Formparanate	X	P197		X				17702-57-7	Pesticide	Conc	N
18883-66-4	Streptozotocin	X	U206						18883-66-4	Pharmceutical	CMBST	N
189-55-9	Dibenzo[a,i]pyrene	X	U064						189-55-9		CMBST	N
194-59-2	7H-Dibenzo[c,g]carbazole	X							194-59-2	Not Commercially Produced	not specified	N
20830-81-3	Daunomycin	X	U059						20830-81-3	Pharmaceutical	CMBST	N

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
20859-73-8	Aluminum phosphide	X	P006						20859-73-8		CMBST	N
225-51-4	Benz[c]acridine	X	U016						225-51-4	Not Commercially Produced	CMBST	N
22961-82-6	Bendiocarb phenol	X	U364		X				22961-82-6	Pesticide	Conc	N
2303-16-4	Diallate	X	U062			X			2303-16-4	Pesticide	CMBST	N
2312-76-7	4,6-Dinitro-o-cresol salts	X	P047						2312-76-7		CMBST	N
23422-53-9	Formetanate hydrochloride	X	P198		X				23422-53-9	Pesticide	Conc	N
25154-54-5	Dinitrobenzene, N.O.S.	X						X	25154-54-5	Dyestuff	not specified	N
25265-76-3	Phenylenediamine	X							25265-76-3	Polymer	not specified	N
25376-45-8	Toluenediamine	X	U221						25376-45-8	Dyestuff	CMBST	N
26419-73-8	Tirpate	X	P185		X				26419-73-8	Agriculture	Conc	N
26471-62-5	Toluene diisocyanate	X	U223						26471-62-5	Stability	CMBST	N
26628-22-8	Sodium azide		P105						26628-22-8		CMBST	N
2763-96-4	5-(Aminomethyl)-3-isoxazolol	X	P007						2763-96-4	Pharmaceutical	CMBST	N
297-97-2	O,O-Diethyl O-pyrazinyl phosphorothioate	X	P040						297-97-2	Pesticide	CMBST	N
302-01-2	Hydrazine	X	U133						302-01-2	Stability	CMBST	N
302-70-5	Nitrogen mustard, N-oxide, hydrochloride salt	X							302-70-5	Pharmaceutical, Agriculture	not specified	N
303-34-4	Lasiocarpine	X	U143						303-34-1		CMBST	N
305-03-3	Chlorambucil	X	U035						305-03-3	Pharmaceutical	CMBST	N
311-45-5	Diethyl-p-nitrophenyl phosphate	X	P041						311-45-5	Pharmaceutical	CMBST	N
3165-93-3	4-Chloro-o-toluidine hydrochloride		U049						3165-93-3		CMBST	N
3288-58-2	O,O-Diethyl S-methyl dithiophosphate	X	U087						3288-58-2	Agriculture	CMBST	N
353-50-4	Carbon oxyfluoride	X	U033						353-50-4		CMBST	N
357-57-3	Brucine	X	P018						357-57-3	Pesticide	CMBST	N
3689-24-5	Tetraethyldithiopyrophosphate	X	P109			X			3689-24-5		CMBST	N
39196-18-4	Thiofanox	X	P045						39196-18-4	Pesticide	CMBST	N
4170-30-3	Crotonaldehyde [2-Butenaldehyde]	X	U053						4170-30-3	Pesticide, Pharmaceutical, Solvent	CMBST	N
4549-40-0	N-Nitrosomethylvinylamine	X	P084						4549-40-0	R&D	CMBST	N
460-19-5	Cyanogen	X	P031						460-19-5		CMBST	N

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
492-80-8	Auramine	X	U014						492-80-8	Dyestuff	CMBST	N
494-03-1	Chlornaphazin	X	U026						494-03-1	Pharmaceutical	CMBST	N
496-72-0	Toluene-3,4-diamine	X							496-72-0	Dyestuff, Consumer, Misc.	not specified	N
50-00-0	Formaldehyde	X	U122						50-00-0		CMBST	N
50-07-7	Mitomycin C	X	U010						50-07-7	Pharmaceutical	CMBST	N
50-18-0	Cyclophosphamide	X	U058						50-18-0	Pharmaceutical	CMBST	N
504-24-5	4-Aminopyridine	X	P008						504-24-5	Pharmaceutical	CMBST	N
504-60-9	1,3-Pentadiene		U186						504-60-9		CMBST	N
50-55-5	Reserpine	X	U200						50-55-5	Pharmaceutical	CMBST	N
505-60-2	Mustard gas	X							505-60-2	Military	not specified	N
506-68-3	Cyanogen bromide	X	U246						506-68-3		CMBST	N
506-77-4	Cyanogen chloride	X	P033			X			506-77-4		CMBST	N
509-14-8	Tetranitromethane	X	P112						509-14-8		CMBST	N
510-15-6	Chlorobenzilate	X	U038	X	X	X			510-15-6		CMBST	N
51-43-4	Epinephrine	X	P042						51-43-4	Pharmaceutical	CMBST	N
51-52-5	Propylthiouracil	X							51-52-5	Pharmaceutical	not specified	N
51-75-2	Nitrogen mustard	X							51-75-2	Military	not specified	N
51-79-6	Ethyl carbamate (urethane)	X	U238						51-79-6		CMBST	N
52-24-4	Tris(1-aziridinyl)phosphine sulfide	X							52-24-4	Pharmaceutical	not specified	N
52888-80-9	Prosulfocarb	X	U387		X				52888-80-9	Agriculture	Conc	N
533-74-4	Dazomet	X							533-74-4	Pesticide, Agriculture	not specified	N
5344-82-1	1-(o-Chlorophenyl)thiourea	X	P026						5344-82-1	Pesticide	CMBST	N
540-73-8	1,2-Dimethylhydrazine	X	U099						540-73-8		CMBST	N
54-11-5	Nicotine	X	P075						54-11-5		CMBST	N
generic	Nicotine salts	X	P075						54-11-5		CMBST	N
541-53-7	Dithiobiuret	X	P049						541-53-7	Pesticide	CMBST	N
542-76-7	3-Chloropropionitrile	X	P027						542-76-7	Pharmaceutical, Polymer	CMBST	N
542-88-1	Dichloromethyl ether	X	P016						542-88-1		CMBST	N
55285-14-8	Carbosulfan	X	P189		X				55285-14-8	Agriculture	Conc	N

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
55406-53-6	3-Iodo-2-propynyl n-butylcarbamate	X							55406-53-6	Fungicide	not specified	N
55-63-0	Nitroglycerin	X	P081						55-63-0		CMBST	N
55-86-7	Nitrogen mustard hydrochloride (salt)	X							55-86-7	Military	not specified	N
55-91-4	Diisopropylfluorophosphate (DFP)	X	P043						55-91-4	Pharmaceutical	CMBST	N
56-04-2	Methylthiouracil	X	U164						56-04-2	Pharmaceutical	CMBST	N
56-53-1	Diethylstilbesterol	X	U089			X			56-53-1	Pharmaceutical	CMBST	N
57-14-7	1,1-Dimethylhydrazine	X	U098						57-14-7	Stability	CMBST	N
57-24-9	Strychnine	X	P108			X			57-24-9		CMBST	N
none	Strychnine salts	X	P108						57-24-9		CMBST	N
57-97-6	7,12-Dimethylbenz[a]anthracene	X	U094			X			57-97-6		CMBST	N
591-08-2	1-Acetyl-2-thiourea	X	P002						591-08-2		CMBST	N
5952-26-1	Diethylene glycol, dicarbamate	X	U395		X				5952-26-1	Pharmaceutical	Conc	N
598-31-2	Bromoacetone	X	P017						598-31-2	Military	CMBST	N
60-11-7	p-Dimethylaminoazobenzene	X	U093		X				60-11-7		CMBST	N
60-34-4	Methylhydrazine		P068						60-34-4	Military	CMBST	N
60-51-5	Dimethoate	X	P044			X			60-51-5	Pesticide	CMBST	N
615-53-2	N-Nitroso-N-methylurethane	X	U178						615-53-2		CMBST	N
61-82-5	Amitrole	X	U011						61-82-5		CMBST	N
624-83-9	Methyl isocyanate	X	P064						624-83-9	Pesticide, Stability, Polymer	CMBST	N
62-50-0	Ethyl methanesulfonate	X	U119			X			62-50-0		CMBST	N
62-55-5	Thioacetamide	X	U218						62-55-5	Solvent	CMBST	N
62-56-6	Thiourea	X	U219						62-56-6	Consumer, Stability	CMBST	N
62-74-8	Fluoroacetic acid, sodium salt	X	P058						62-74-8		CMBST	N
6358-53-8	Citrus red No. 2	X							6358-53-8	Dyestuff	not specified	N
636-21-5	o-Toluidine hydrochloride	X	U222						636-21-5		CMBST	N
64-00-6	m-Cumenyl methylcarbamate	X	P202		X				64-00-6	Pesticide	Conc	N
640-19-7	Fluoroacetamide	X	P057						640-19-7	Pesticide	CMBST	N
64-18-6	Formic acid	X	U123			X			64-18-6		CMBST	N
644-64-4	Dimetilan	X	P191		X				644-64-4	Pesticide	Conc	N

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
66-75-1	Uracil mustard	X	U237						66-75-1	Pharmaceutical	CMBST	N
684-93-5	N-Nitroso-N-methylurea	X	U177						684-93-5		CMBST	N
692-42-2	Diethylarsine (Arsenic)	X	P038						692-42-2	Pharmaceutical	TCLP	N
70-25-7	MNNG	X	U163						70-25-7	Pharmaceutical, R&D	CMBST	N
70-30-4	Hexachlorophene	X	U132			X			70-30-4		CMBST	N
72-57-1	Trypan blue	X	U236						72-57-1	Dyestuff	CMBST	N
74-93-1	Thiomethanol (Methanethiol)	X	U153						74-93-1		CMBST	N
75-07-0	Acetaldehyde		U001						75-07-0		CMBST	N
75-21-8	Ethylene oxide [Oxirane]	X	U115	X	X				75-21-8	Fungicide	CMBST	N
75-36-5	Acetyl chloride	X	U006						75-36-5	Dyestuff, Pharmaceutical	CMBST	N
75-44-5	Phosgene	X	P095						75-44-5		CMBST	N
75-55-8	2-Methylaziridine	X	P067						75-55-8	Pharmaceutical	CMBST	N
75-60-5	Cacodylic acid (Arsenic)	X	U136						75-60-5	Pesticide	TCLP	N
75-70-7	Trichloromethanethiol	X	P118						75-70-7		CMBST	N
757-58-4	Hexaethyl tetraphosphate	X	P062						757-58-4	Pesticide	CMBST	N
75-86-5	2-Methyllactonitrile	X	P069						75-86-5	R&D	CMBST	N
75-87-6	Chloral	X	U034						75-87-6	Pesticide	CMBST	N
759-73-9	N-Nitroso-N-ethylurea	X	U176						759-73-9		CMBST	N
76-01-7	Pentachloroethane	X	U184		X				76-01-7		CMBST	N
764-41-0	1,4-Dichloro-2-butene	X	U074						764-41-0		CMBST	N
765-34-4	Glycidylaldehyde	X	U126						765-34-4		CMBST	N
77-47-4	Hexachlorocyclopentadiene	X	U130	X	X	X			77-47-4	Pesticide	Conc	N
77-78-1	Dimethyl sulfate	X	U103						77-78-1		CMBST	N
7782-41-4	Fluorine	X	P056						7782-41-4		ADGAS fb NEUTR	N
7783-06-4	Hydrogen sulfide	X	U135						7783-06-4		CMBST	N
7803-51-2	Phosphine	X	P096						7803-51-2		CMBST	N
79-06-1	Acrylamide	X	U007		X	X			79-06-1		CMBST	N
79-10-7	Acrylic Acid		U008						79-10-7		CMBST	N
79-19-6	Thiosemicarbazide	X	P116						79-19-6	Pesticide	CMBST	N

Table 2-3. Identification of Potential Leachate Constituents.

CAS #	Common name	Constituents							Consolidated CAS# list	Not applicable by professional judgment	Treatment standard	Potential leachate constituent
		APP VIII	Toxic characteristic and/or listed waste	F039	UTS	Docket list	Delisting guidance	N.O.S.				
79-22-1	Methyl chlorocarbonate	X	U156						79-22-1	Pesticide, Military	CMBST	N
79-44-7	Dimethylcarbamoyl chloride	X	U097						79-44-7		CMBST	N
79-46-9	2-Nitropropane	X	F005, U171			X			79-46-9		CMBST	N
80-15-9	alpha, alpha-Dimethyl benzyl hydroperoxide		U096						80-15-9		CMBST	N
81-07-2	Saccharin and Saccharin salts	X	U202						81-07-2	Consumer	CMBST	N
81-81-2	Warfarin salts	X	P001, U248						81-81-2		CMBST	N
823-40-5	Toluene-2,6-diamine	X				X			823-40-5	Dyestuff, Polymer	not specified	N
86-74-8	Carbazole					X			86-74-8	Dyestuff	not specified	N
86-88-4	alpha-Naphthylthiourea	X	P072						86-88-4		CMBST	N
91-59-8	beta-Naphthylamine	X	U168	X	X	X			91-59-8		CMBST	N
91-94-1	3,3'-Dichlorobenzidine	X	U073			X			91-94-1		CMBST	N
92-87-5	Benzidine	X	U021			X			92-87-5		CMBST	N
94-11-1	2,4-D salts & esters	X	D016, U240						94-11-1		CMBST	N
94-58-6	Dihydrosafrole	X	U090						94-58-6	Consumer	CMBST	N
95-06-7	Sulfallate	X							95-06-7	Pesticide	not specified	N
95-53-4	o-Toluidine	X	U328			X			95-53-4		CMBST	N
96-45-7	Ethylenethiourea	X	U116						96-45-7		CMBST	N
97-74-5	Tetramethylthiuram monosulfide	X							97-74-5	Polymer	not specified	N
98-01-1	Furfural		U125						98-01-1		CMBST	N
98-07-7	Benzotrichloride	X	U023						98-07-7		CMBST	N
98-09-9	Benzenesulfonyl chloride		U020						98-09-9		CMBST	N
98-82-8	Cumene		U055			X			98-82-8		CMBST	N
98-87-3	Benzal chloride	X	U017		X				98-87-3		CMBST	N
99-35-4	1,3,5-Trinitrobenzene	X	U234			X			99-35-4	Military	CMBST	N

3.0 200 AREA EFFLUENT TREATMENT FACILITY AND LIQUID EFFLUENT RETENTION FACILITY PROCESS

The primary purpose of this delisting petition modification is to enable the discharge of treated effluent from the ETF to a SALDS. This chapter describes the LERF and ETF processes. The controls that are built into the ETF to ensure that the effluent meets the Washington State Waste Discharge Permit ST 4500 and the limits contained in the Final Delisting also are described.

3.1 LIQUID EFFLUENT RETENTION FACILITY PROCESS DESCRIPTION

LERF is a RCRA final status waste management unit. This waste management unit is a RCRA compliant surface impoundment operating pursuant to the Treatment Surface Impoundment Exemption provisions of 40 CFR 268.4. Each of the three LERF basins has an operating capacity of 29.5-million liters. The LERF receives aqueous waste through several inlets including the following:

- A pipeline that connects LERF with the 242-A Evaporator (another RCRA final status waste management unit)
- A pipeline from the 200 West Area
- A pipeline that connects LERF to the Load-In Station at ETF
- A series of sample ports located at each basin.

Figure 3-1 presents a general layout of LERF and associated pipelines.

Aqueous waste from LERF is pumped to the ETF through one of two double-walled fiberglass transfer pipelines. Effluent from the ETF also can be transferred back to the LERF through one of these transfer pipelines. These pipelines are equipped with leak detection located in the annulus between the inner and outer pipes. In the event that these leak detectors are not in service, the pipelines visually are inspected during transfers for leakage by opening the secondary containment drain lines at the ETF end of the transfer pipelines.

Each basin is equipped with six available sample risers constructed of 6-inch perforated pipe. A seventh sample riser in each basin is dedicated to influent aqueous waste receipt piping (except for aqueous waste received from the 242-A Evaporator), and an eighth riser in each basin contains liquid level instrumentation. Each riser extends along the sides of each basin from the top to the bottom of the basin and allow samples to be collected from any depth. Personnel access to these sample ports is from the perimeter area of the basins.

A catch basin is provided at the northwest corner of each LERF basin for aboveground piping and manifolds for transfer pumps. Aqueous waste from the 242-A Evaporator is transferred through piping that ties into piping at the catch basins. Under routine operations, a submersible pump is used to transfer aqueous waste from a LERF basin to the ETF for processing or for basin-to-basin transfers. This pump is connected to a fixed manifold on one of four available risers.

Each basin consists of a multilayer liner system supported by a concrete anchor wall around the basin perimeter and a soil-bentonite clay underlayment. The multilayer liner system consists of a primary liner in contact with the aqueous waste, a layer of bentonite carpet, a geonet, a geotextile, a gravel layer, and a secondary liner that rests on the bentonite underlayment. Any aqueous waste leakage through the primary liner flows through the geonet to a leachate collection system. The leachate flows to a sump at the northwest corner of each basin, where the leachate is pumped up the sideslope and back into the basin

above the primary liner. Each liner is constructed of high-density polyethylene. A floating cover made of very low-density polyethylene is stretched over each basin above the primary liner. These covers serve to keep unwanted material from entering the basins, and to minimize evaporation of the liquid contents.

3.2 EFFLUENT TREATMENT FACILITY PROCESS DESCRIPTION

ETF is a RCRA final status waste management unit. This waste management unit is a RCRA compliant tank system with container storage capabilities. The ETF is designed as a flexible treatment system that provides treatment for contaminants anticipated in process condensate and other aqueous waste. The design influent flow rate into the ETF is approximately 570 liters per minute with planned outages for activities such as maintenance on the ETF systems. Maintenance outages typically are scheduled between treating a batch of aqueous waste, referred to as treatment campaigns. The effluent flow (or volume) is equivalent to the influent flow (or volume).

The ETF generally receives aqueous waste directly from the LERF. However, aqueous waste also can be transferred from the Load-In Station to the ETF. Aqueous waste is treated and stored in the ETF process area in a series of process units. Within the ETF, waste also is stored in containers. Figure 3-2 provides the relative locations of the process area and container storage areas within the ETF.

The process units are grouped in either the primary or the secondary treatment train. The primary treatment train provides for the removal or destruction of contaminants. Typically, the secondary treatment train processes the waste by-products from the primary treatment train by reducing the volume of waste. In the secondary treatment train, contaminants are concentrated and dried to a powder. The liquid fraction is routed back to the primary treatment train. Figure 3-3 presents the ETF floor plan, the relative locations of the individual process units and associated tanks within the ETF, and the location of the Load-In Station.

The dry powder waste and maintenance and operations waste are containerized and stored in the container storage area or in collection areas. Secondary containment is provided for all ETF container and tank systems (including ancillary equipment).

In the following sections, several figures are provided that present general illustrations of the treatment units and the relation to the process.

The ETF receives aqueous waste from LERF or the Load-In Station. The ETF Load-In Station, located due east of the surge tank and outside of the perimeter fence (Figure 3-3), was designed and constructed to provide the capability to unload, store, and transfer aqueous waste to the ETF or LERF from tanker trucks, and potentially other containers (such as drums). Currently, tanker trucks are used to unload aqueous waste at the Load-In Station.

3.2.1 Effluent Treatment Facility Operating Configuration

Because the operating configuration of the ETF can be adjusted or modified, aqueous waste streams can be effectively treated to below Final Delisting and Discharge Permit limits. The operating configuration of the ETF depends on the unique chemistry of an aqueous waste stream(s). Before an aqueous waste stream is accepted for treatment, the waste is characterized and evaluated. Information from the characterization is used to adjust the treatment process or change the configuration of the ETF process units, as necessary, to optimize the treatment process for a particular aqueous waste stream.

Typically, an aqueous waste is processed first in the primary treatment train, where the ETF is configured to process an aqueous waste through the ultraviolet oxidation (UV/OX) unit first, followed by the reverse

osmosis (RO) unit. However, under an alternate configuration, an aqueous waste could be processed in the RO unit first. For example, high concentrations of nitrates in an aqueous waste might interfere with the performance of the UV/OX. In this case, the ETF could be configured to process the waste in the RO unit before the UV/OX unit.

The flexibility of the ETF also allows for some aqueous waste to be processed in the secondary treatment train first. For example, for small volume aqueous waste with high concentrations of some anions and metals, the approach could be to first process the waste stream in the secondary treatment train. This approach would prevent premature fouling or scaling of the RO unit. The liquid portion (i.e., untreated overheads from the ETF evaporator and thin film dryer) would be sent to the primary treatment train.

Figures 3-4 and 3-5 provide example process flow diagrams for two different operating configurations.

3.2.2 Primary Treatment Train

The primary treatment train consists of the following units:

- Surge tank - inlet, surge capacity
- Filtration - for suspended solids removal
- UV/OX - organic destruction
- pH adjustment - waste neutralization
- Hydrogen peroxide decomposition - removal of excess hydrogen peroxide
- Degasification - removal of carbon dioxide
- RO - removal of dissolved solids and radionuclides
- Ion exchange (IX) - removal of dissolved solids and radionuclides
- Verification - holding tanks during verification.

Each of the primary treatment train process units and ancillary systems provides treatment for removal or destruction of various constituents. The primary treatment train units are operated as needed in different configurations, as determined by the characteristics of an aqueous waste stream, to protect ETF equipment and to meet discharge requirements.

Influent Receipt/Surge Tank. Depending on the configuration of the ETF, the surge tank is one inlet used to feed an aqueous waste into the ETF for treatment. In Configuration 1 (Figure 3-4), the surge tank is the first component downstream of the LERF. The surge tank provides a storage/surge volume for chemical pretreatment and controls feed flow rates from the Load-In Station or LERF to the ETF. However, in Configuration 2 (Figure 3-5), aqueous waste from LERF is fed directly into the treatment units. In this configuration, the surge tank receives aqueous waste that has been processed in the RO units and provides the feed stream to the remaining downstream process units. In yet another configuration, some small volume aqueous waste could be received into the secondary treatment train first for processing. In this case, the aqueous waste would be received directly into the secondary waste receiving tanks. Finally, the surge tank also receives waste extracted from various systems within the primary and secondary treatment train while in operation.

The surge tank is located outside the ETF on the south side. In the surge tank (Figure 3-6), the pH of an aqueous waste is adjusted using the metered addition of sulfuric acid and sodium hydroxide, as necessary, to prepare the waste for treatment in downstream processes. In addition, hydrogen peroxide or biocides could be added to control biological growth in the surge tank. A pump recirculates the contents in the surge tank, mixing the chemical reagents with the waste to a uniform pH.

Filtration. Two primary filter systems remove suspended particles in an aqueous waste: a rough filter removes the larger particulates, while a fine filter removes the smaller particulates. The location of these filters depends on the configuration of the primary treatment train. However, the filters normally are located upstream of the RO units.

The solids accumulating on these filter elements are backwashed to the secondary waste receiving tanks with pulses of compressed air and water, forcing water back through the filter. The filters are cleaned chemically when the backwashing process does not facilitate acceptable filter performance.

Auxiliary fine and rough filters (e.g., disposable filters) have been installed to provide additional filtration capabilities. Depending on the configuration of the ETF, the auxiliary filters are operated either in series with the primary filters to provide additional filtration or in parallel, instead of the primary fine and rough filters, to allow cleaning of the primary fine and rough filters while the primary treatment train is in operation.

Ultraviolet Light/Oxidation. Organic compounds contained in an aqueous waste stream are destroyed in the UV/OX system (Figure 3-7). Hydrogen peroxide is mixed with the waste. The UV/OX system uses the photochemical reaction of UV light on hydrogen peroxide to form hydroxyl radicals and other reactive species that oxidize the organic compounds. The final products of the complete reaction are carbon dioxide, water, and inorganic ions.

Organic destruction is accomplished in two UV/OX units operating in parallel. During the UV/OX process, the aqueous waste passes through reaction chambers where hydrogen peroxide is added. While in the UV/OX system, the temperature of an aqueous waste is monitored. Should the temperature of the waste exceed the upper limits for the UV/OX or RO systems, heat exchangers are used to reduce the temperature of the waste.

pH Adjustment. The pH of a waste stream is monitored and controlled at different points throughout the treatment process. Within the primary treatment train, the pH of a waste can be adjusted with sulfuric acid or sodium hydroxide to optimize operation of downstream treatment processes or adjusted before final discharge. For example, the pH of an aqueous waste would be adjusted in the pH adjustment tank after the UV/OX process and before the RO process. In this example, pH is adjusted to cause certain chemical species such as ammonia to form ammonium sulfate, thereby increasing the rejection rate of the RO.

Hydrogen Peroxide Decomposition. Typically, hydrogen peroxide added into the UV/OX system is not consumed completely by the system. Because hydrogen peroxide is an oxidizer that can damage ETF equipment, the residual hydrogen peroxide from the UV/OX system is removed to protect downstream equipment. The hydrogen peroxide decomposer uses activated carbon to break down the hydrogen peroxide that is not consumed completely in the process of organic destruction. The aqueous waste is sent through a column of fluidized activated carbon that breaks down the hydrogen peroxide into water and oxygen. The gas generated by the decomposition of the hydrogen peroxide is vented to the vessel offgas system.

Degasification. The degasification column is used to purge dissolved carbon dioxide from the aqueous waste to reduce the carbonate loading to downstream dissolved solids removal processes within the ETF primary treatment train. The purged carbon dioxide is vented to the vessel offgas system.

Reverse Osmosis. The RO system (Figure 3-8) uses pressure to force clean water molecules through semi-permeable membranes while keeping the larger molecule contaminants, such as dissolved solids, radionuclides, and large molecular weight organic materials, in the membrane. The RO process uses a staged configuration to maximize water recovery. The process produces two separate streams, including a

clean 'permeate' and a concentrate (or retentate), which are concentrated as much as possible to minimize the amount of secondary waste produced.

The RO process is divided into first and second stages. Aqueous waste is fed to the first RO stage from the RO feed tank. The secondary waste receiving tanks of the secondary treatment train receive the retentate removed from the first RO stage, while the second RO stage receives the permeate (i.e., 'treated' aqueous waste from the first RO stage). In the second RO stage, the retentate is sent to the first stage RO feed tank while the permeate is sent to the IX system or to the surge tank, depending on the configuration of the ETF.

Two support systems facilitate this process. An anti-scale system injects scale inhibitors as needed into the feed waste to prevent scale from forming on the membrane surface. A clean-in-place system using cleaning agents, such as descalants and surfactants, cleans the membrane pores of surface and subsurface deposits that have fouled the membranes.

Ion Exchange. Because the RO process removes most of the dissolved solids in an aqueous waste, the IX process (Figure 3-9) act as a polishing unit. The IX system consist of three columns containing beds of cation and/or anion resins. This system is designed to allow for regeneration of resins and maintenance of one column while the other two are in operation. Though the two columns generally are operated in series, the two columns also can be operated in parallel or individually.

Typically, the two columns in operation are arranged in a primary/secondary (lead/lag) configuration, and the third (regenerated) column is maintained in standby. When dissolved solids breakthrough the first IX column and are detected by a conductivity sensor, this column is removed from service for regeneration, and the second column replaces the first column and the third column is placed into service. The column normally is regenerated using sulfuric acid and sodium hydroxide. The resulting regeneration waste is collected in the secondary waste receiving tanks.

Should regeneration of the IX resins become inefficient, spent resins are transferred into a disposal container. The container is designed to provide dewatering with remote monitoring of the resin and water levels within the container. Displaced air from the vessels is exhausted through an entrainment separator (to remove water drops) and a high-efficiency particulate air filter and into the vessel offgas system. Water is removed from the container to the degree possible and returned to the surge tank. Dewatered resins are transferred to a final storage/disposal point.

Verification. The three verification tanks (Figure 5-10) are used to hold the treated effluent while a determination is made that the effluent meets discharge limits. Should a treated effluent not meet Washington State Waste Discharge Permit or Final Delisting requirements, the effluent can be returned to the primary treatment train for additional treatment or to the LERF.

The three verification tanks alternate between three operating modes: receiving treated effluent, holding treated effluent during laboratory analysis and verification, or discharging verified effluent. Treated effluent also can be returned to the ETF to provide 'clean' service water for operational and maintenance functions, e.g., for boiler water and for backwashing the filters. This recycling keeps the quantity of fresh water used to a minimum.

3.2.3 Secondary Treatment Train

The secondary treatment system typically receives and processes the following by-products generated from the primary treatment train: concentrate from the first RO stage, filter backwash, regeneration waste from the IX system, and spillage or overflow received into the process sumps. Depending on the operating

configuration, however, some aqueous waste could be processed in the secondary treatment train before the primary treatment train (refer to Figures 3-4 and 3-5 for example operating configurations).

The secondary treatment train provides the following processes:

- Secondary waste receiving - tank receiving
- Evaporation - concentrates secondary waste streams
- Concentrate staging - concentrate receipt and pH adjustment in concentrate tanks
- Thin film drying - dewatering of secondary waste streams
- Container handling - packaging of dewatered secondary waste.

Secondary Waste Receiving. Waste to be processed in the secondary treatment train is received into two secondary waste receiving tanks, where the pH can be adjusted with sulfuric acid or sodium hydroxide for optimum evaporator performance.

Evaporation. The ETF evaporator is the first step in the secondary treatment train to reduce the volume of secondary waste. The ETF evaporator is fed alternately by the two secondary waste receiving tanks. One tank serves as a waste receiver while the other tank is operated as the feed tank. The ETF evaporator vessel (also referred to as the vapor body) is the principal component of the evaporation process (Figure 3-11).

Feed from the secondary waste receiving tanks is pumped through a heater to the recirculation loop of the ETF evaporator. In this loop, concentrated waste is recirculated from the ETF evaporator, to a heater, and back into the evaporator where vaporization occurs. As water leaves the evaporator system in the vapor phase, the concentration of the waste in the evaporator increases. When the concentration of the waste reaches the appropriate density, a portion of the concentrate is pumped to one of the concentrate tanks.

The vapor that is released from the ETF evaporator is routed to the entrainment separator, where water droplets and/or particulates are separated from the vapor. The 'cleaned' vapor is routed to the vapor compressor and heater. The steam from the vapor compressor/heater is used to heat the recirculating concentrate in the ETF evaporator. From the vapor compressor/heater, the steam is condensed and fed to the distillate flash tank, where the saturated condensate received from the heater drops to atmospheric pressure and cools to the normal boiling point through partial flashing (rapid vaporization caused by a pressure reduction). The resulting distillate is routed to the surge tank. Noncondensible vapors, such as air, are exhausted by a vacuum blower to the vessel offgas system.

Concentrate Staging. The concentrate tanks make up the head end of the thin film drying process. From the ETF evaporator, concentrate is pumped into two concentrate tanks and pH adjusted. The concentrate tanks function alternately between concentrate receiver and feed tank for the thin film dryer.

Thin Film Drying. The thin film dryer provides the second step in reducing the volume of secondary waste generated by the ETF treatment process. From the concentrate tanks, feed is pumped through a preheater to the thin film dryer (Figure 3-12) that is heated by steam. As the concentrated waste flows down the length of the dryer, the waste is dried. The dried film, or powder, is scraped off the dryer cylinder by blades attached to a rotating shaft. The powder is funneled through a cone-shaped powder hopper at the bottom of the dryer and into the Container Handling System.

Overhead vapor released by the drying of the concentrate is condensed in the distillate condenser. Excess heat is removed from the distillate by a water-cooled heat exchanger. Part of the distillate is circulated

back to the condenser spray nozzles. The remaining distillate is pumped to the surge tank. Any noncondensible vapors and particulates from the spray condenser are exhausted to the vessel offgas system.

Container Handling. Before an empty container is moved into the Container Handling System (Figure 3-13), the lids are loosely placed on the containers and the container is placed on a conveyor. After the lid is removed, the containers are moved into the container filling area after passing through an air lock. The empty container is located under the thin film dryer, and raised into position. The container is sealed to the thin film dryer and a rotary valve begins the transfer of powder to the empty container. Air displaced from the container is vented to the entrainment separator attached to the ETF evaporator that exhausts to the vessel offgas system.

The container is filled to a predetermined level, recapped, and moved along the conveyor to the smear station airlock. At the smear station airlock, the container is moved onto the conveyor by remote control. The airlock is opened and the smear sample (surface wipe) is taken and the radionuclide contamination level counted. If the container has contaminated material on the outside, the container is moved to the washdown station and washed. The container wash water drains to sump tank 1. The washed container is air-dried and retested. Filled containers that pass the smear test are labeled, placed on pallets, and moved by forklift to the filled container storage area.

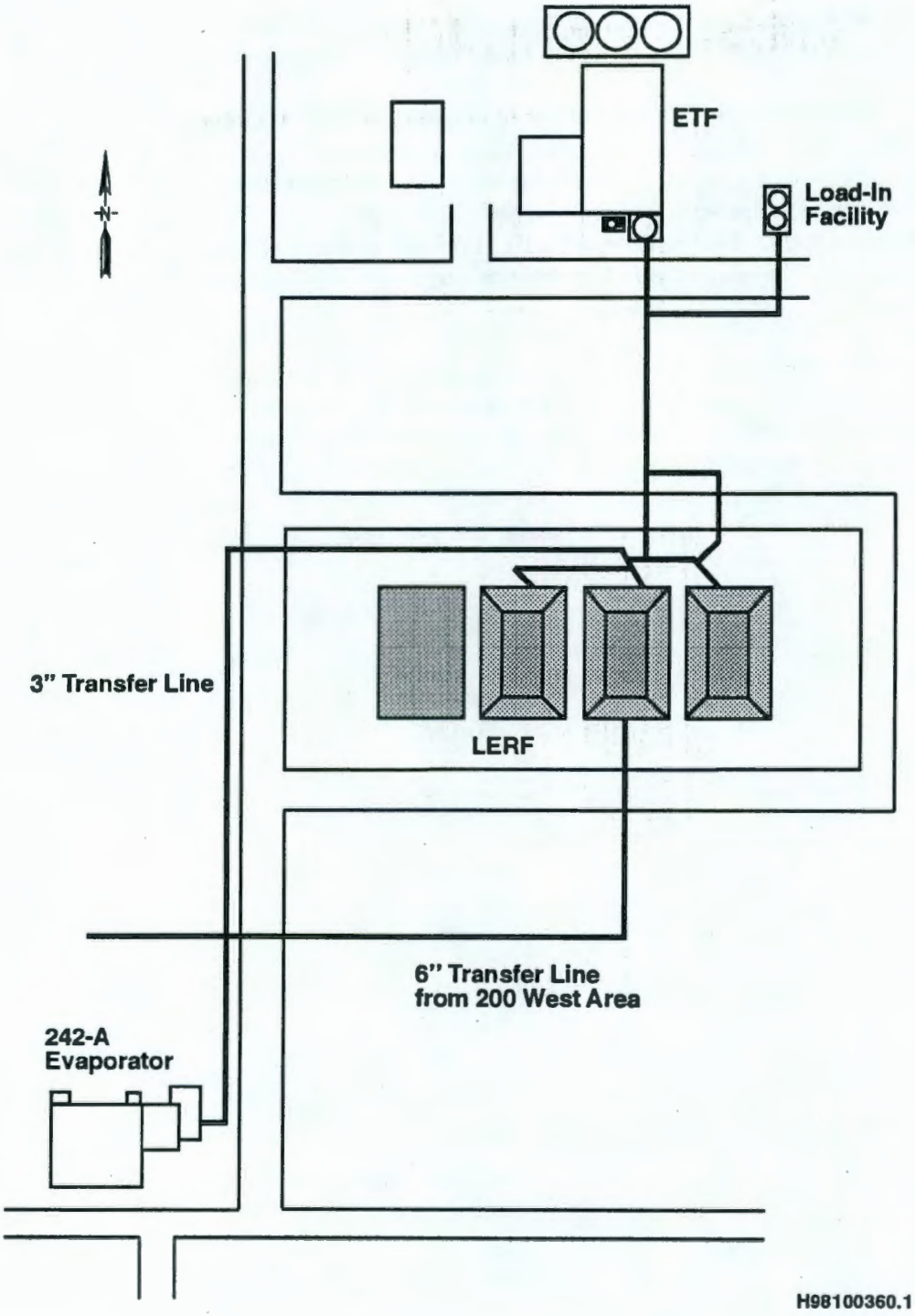
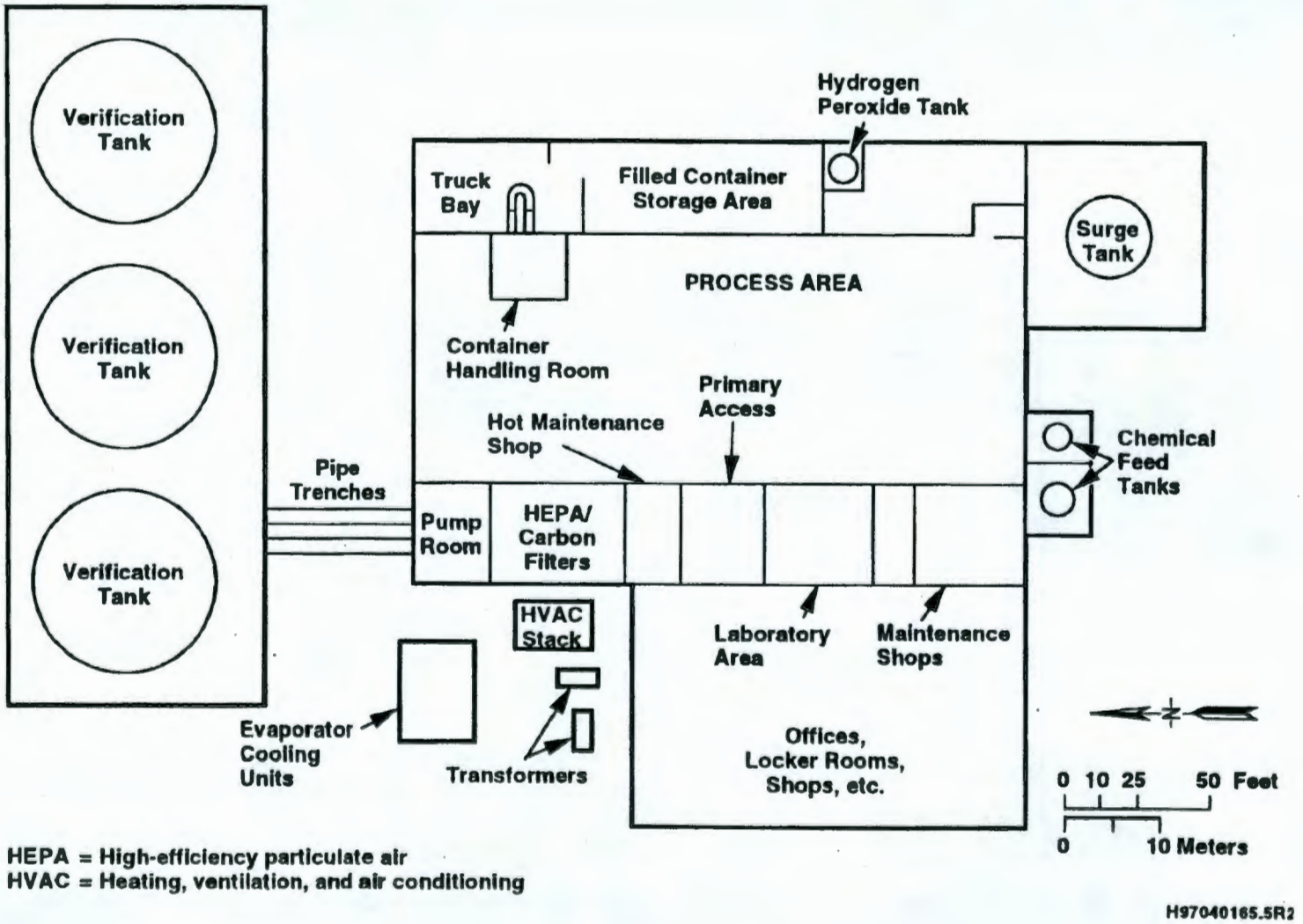


Figure 3-1. Liquid Effluent Retention Facility Layout.



HEPA = High-efficiency particulate air
HVAC = Heating, ventilation, and air conditioning

Figure 3-2. Plan View of the 200 Area Effluent Treatment Facility.

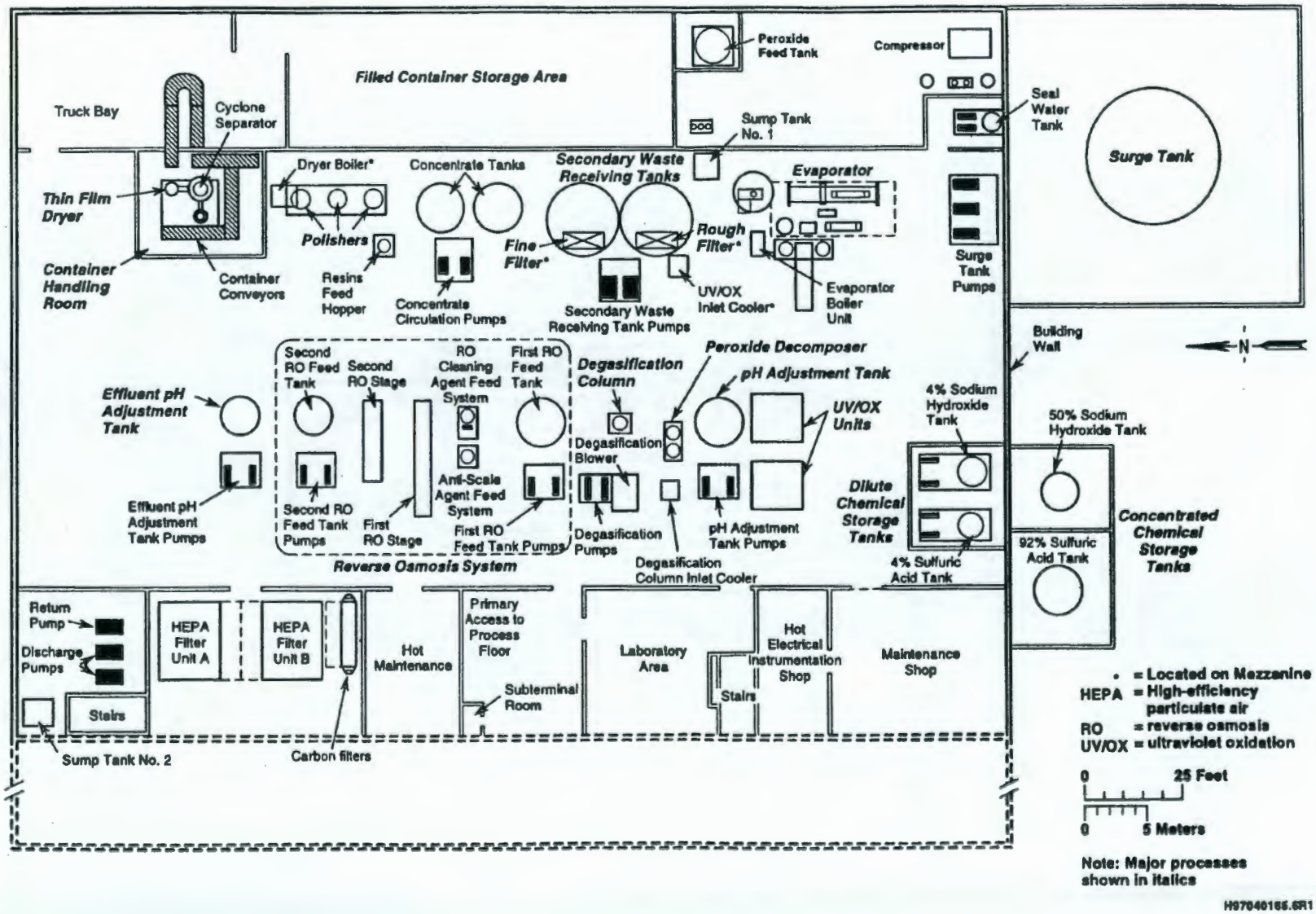


Figure 3-3. 200 Area Effluent Treatment Facility Layout.

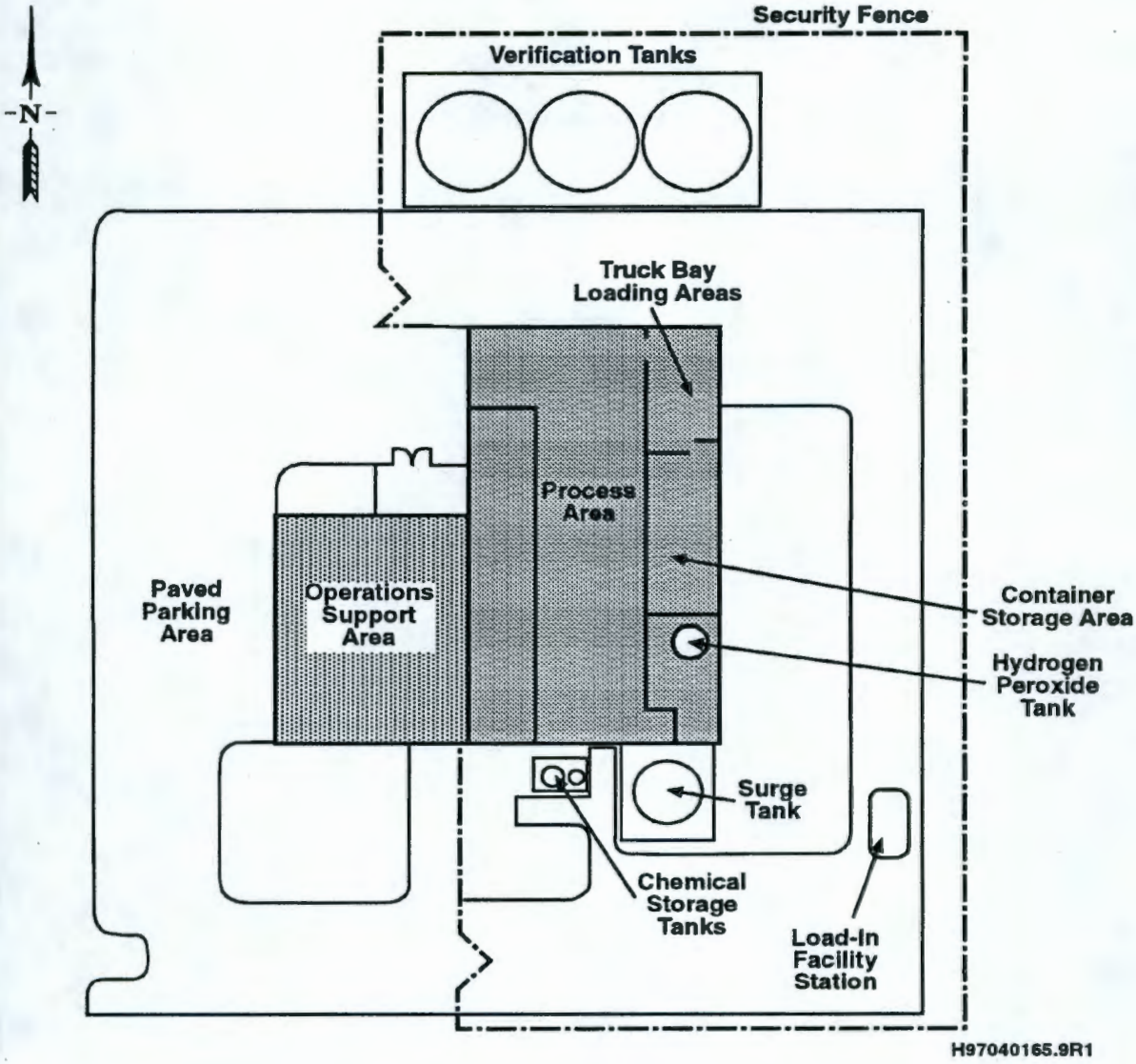


Figure 3-4. 200 Area Effluent Treatment Facility.

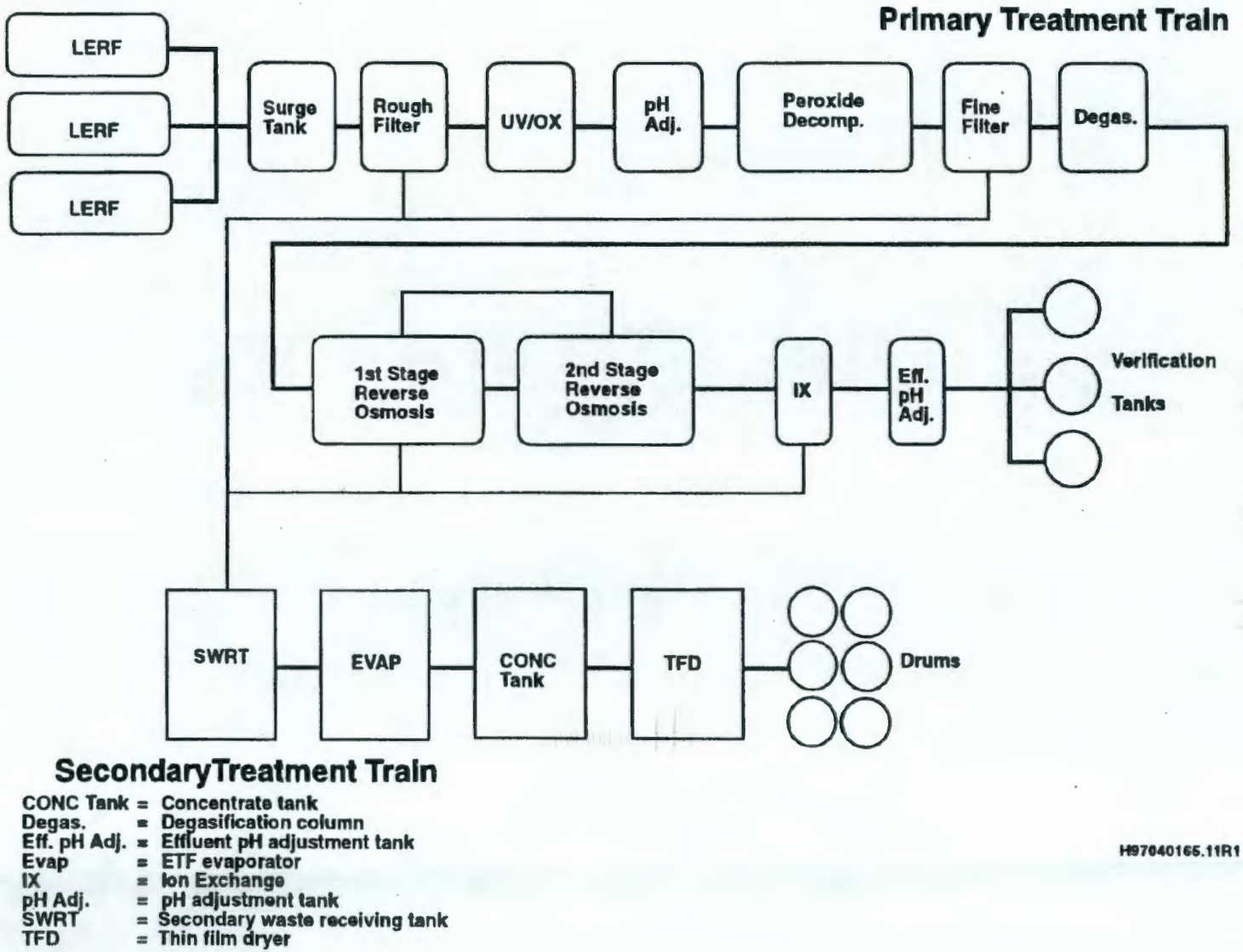
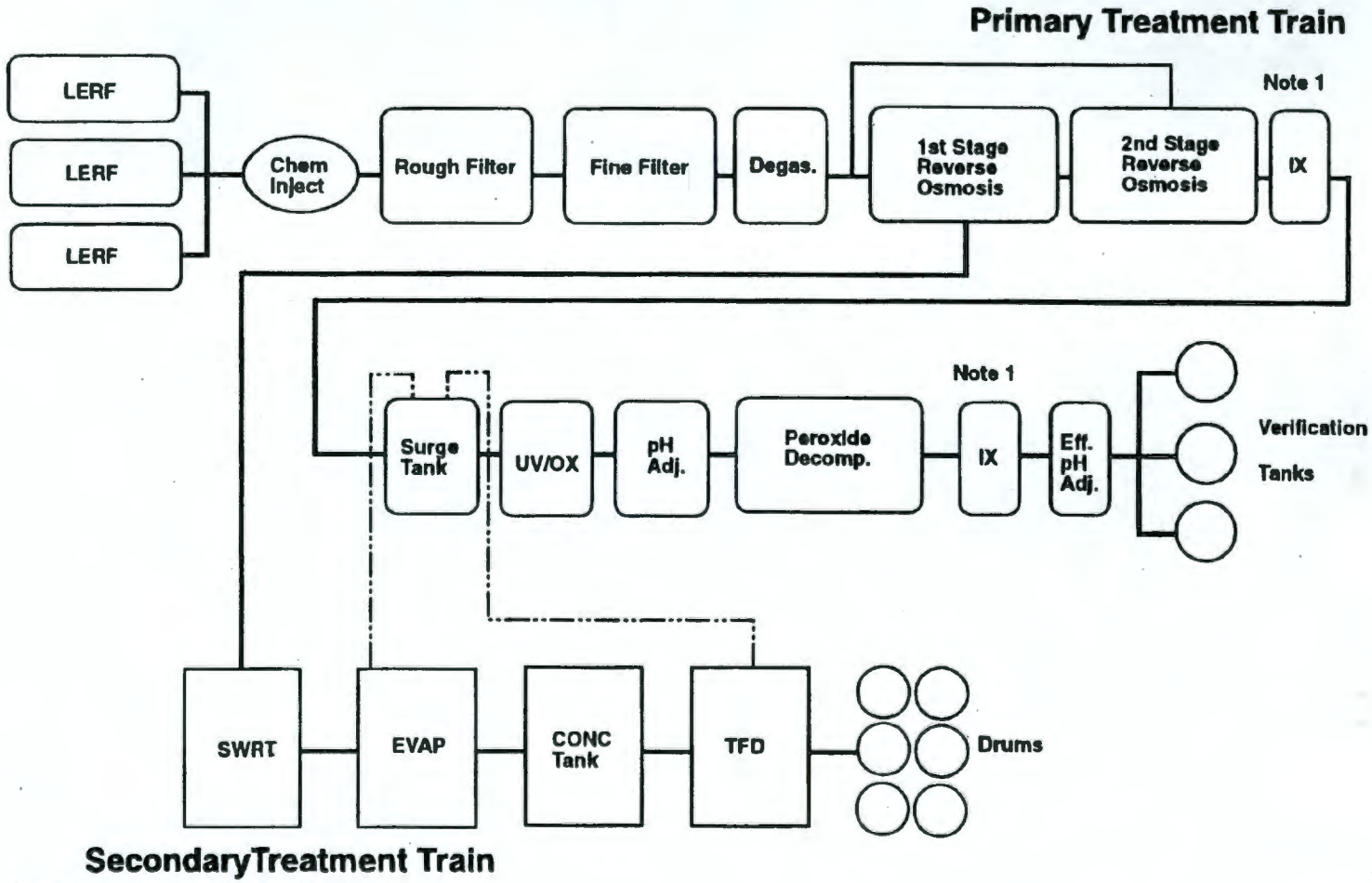


Figure 3-5. Example - 200 Area Effluent Treatment Facility Configuration 1.



Note1: IX can be in either location
CONC Tank = Concentrate tank
Degas. = Degasification column
Eff. pH Adj. = Effluent pH adjustment tank
Evap = ETF evaporator
IX = Ion exchange
pH Adj. = pH adjustment tank
SWRT = Secondary waste receiving tank
TFD = Thin film dryer

H97040165.12R1

Figure 3-6. Example - 200 Area Effluent Treatment Facility Configuration 2.

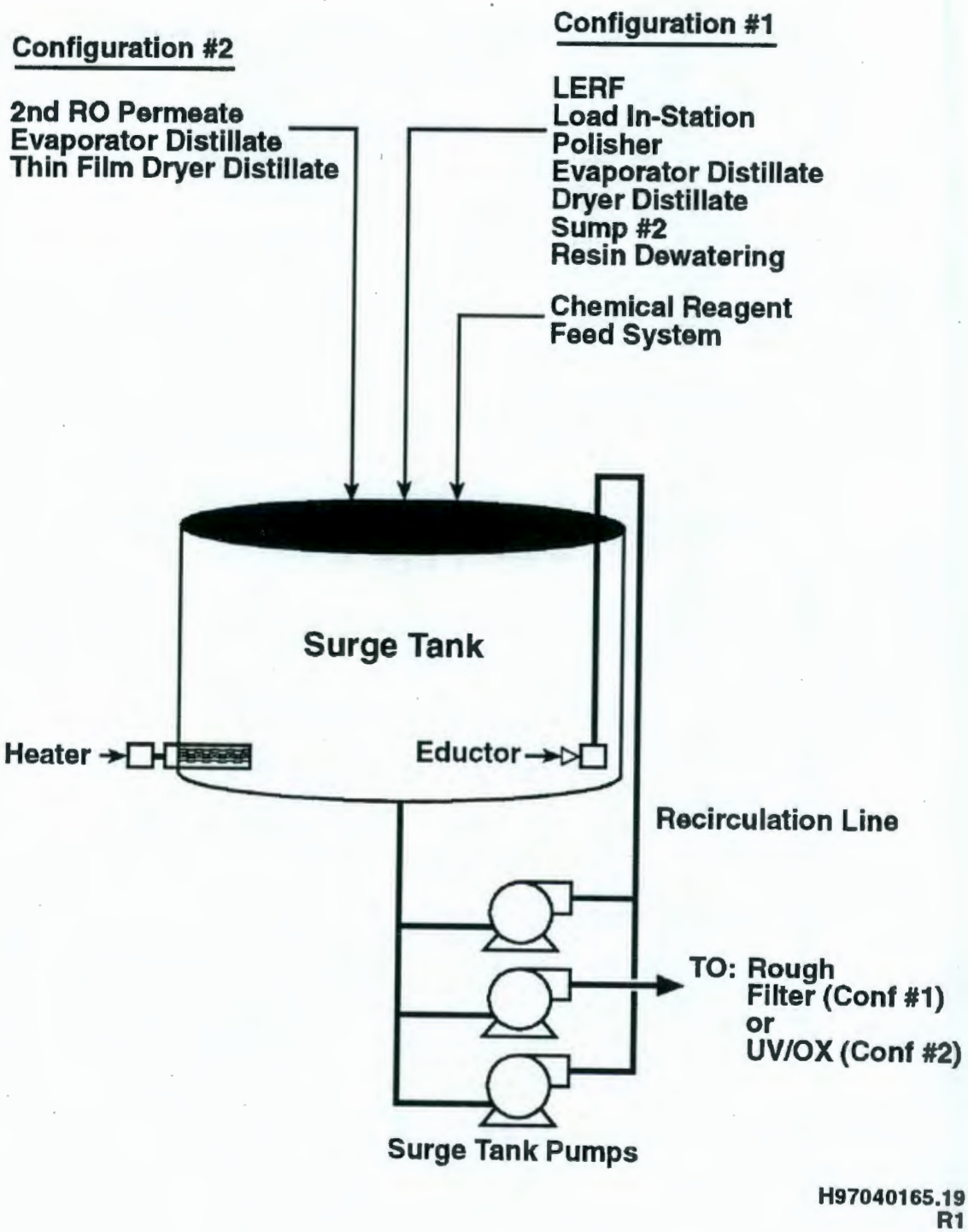


Figure 3-7. Surge Tank.

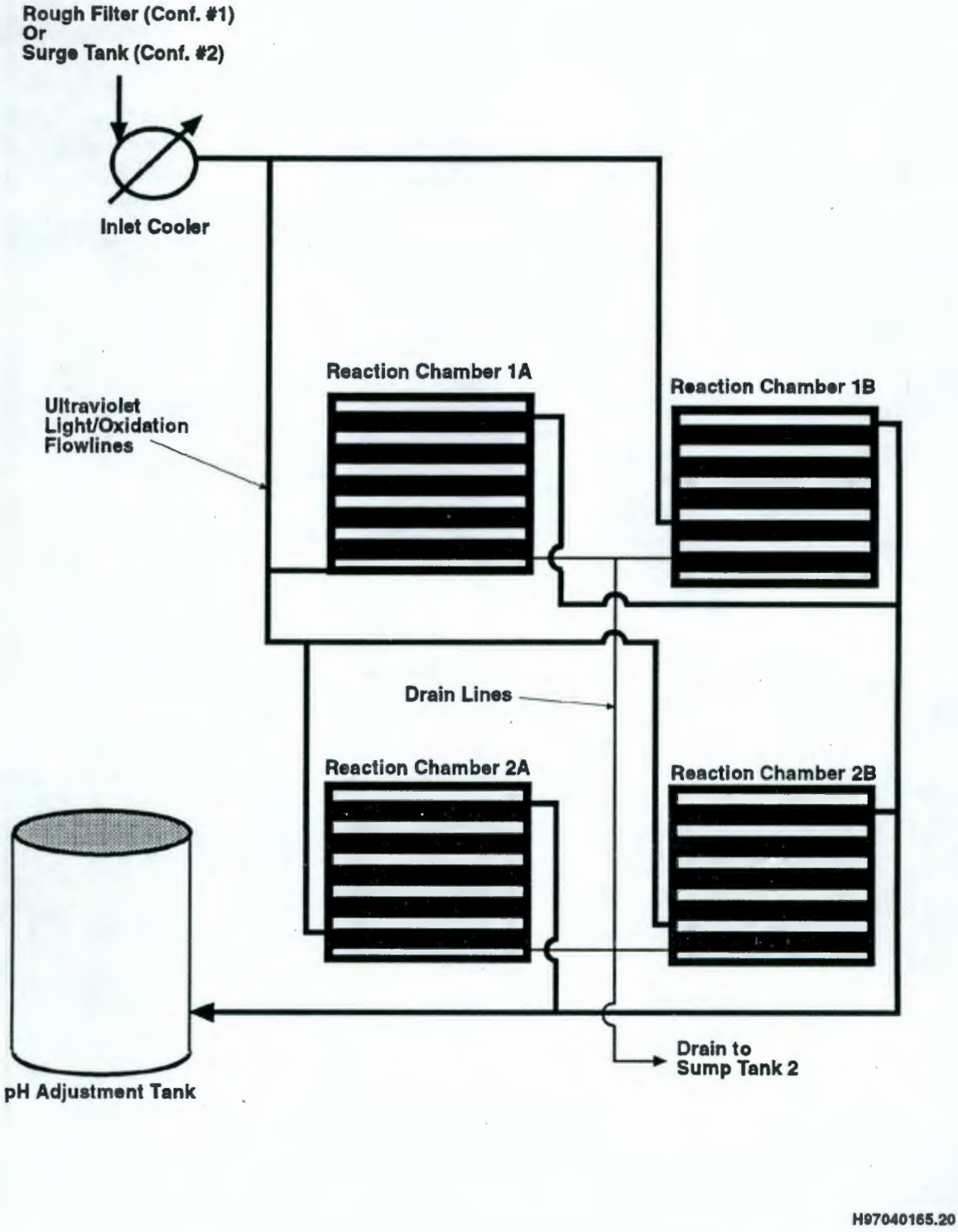


Figure 3-8. Ultraviolet Light/Oxidation Unit.

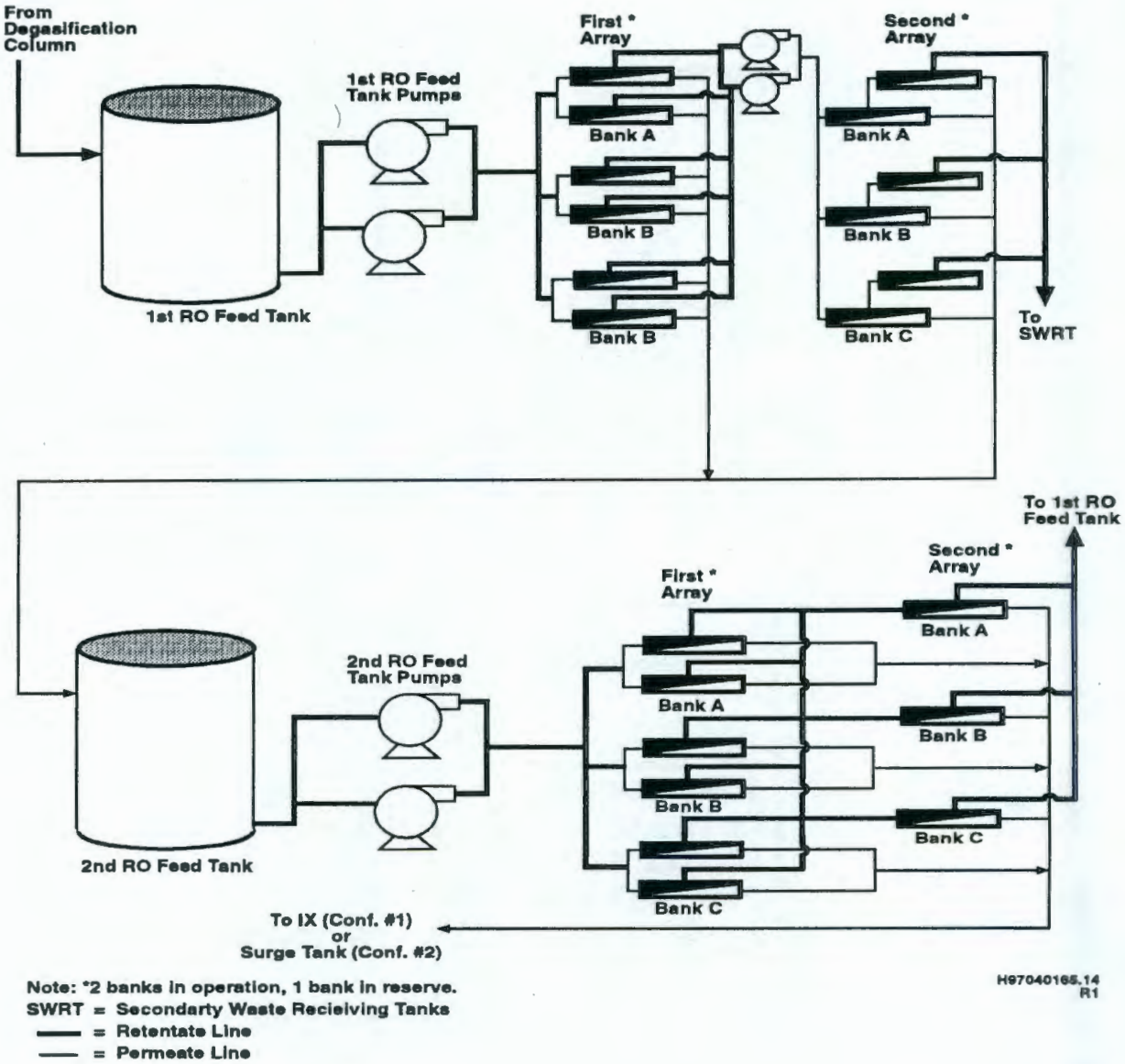
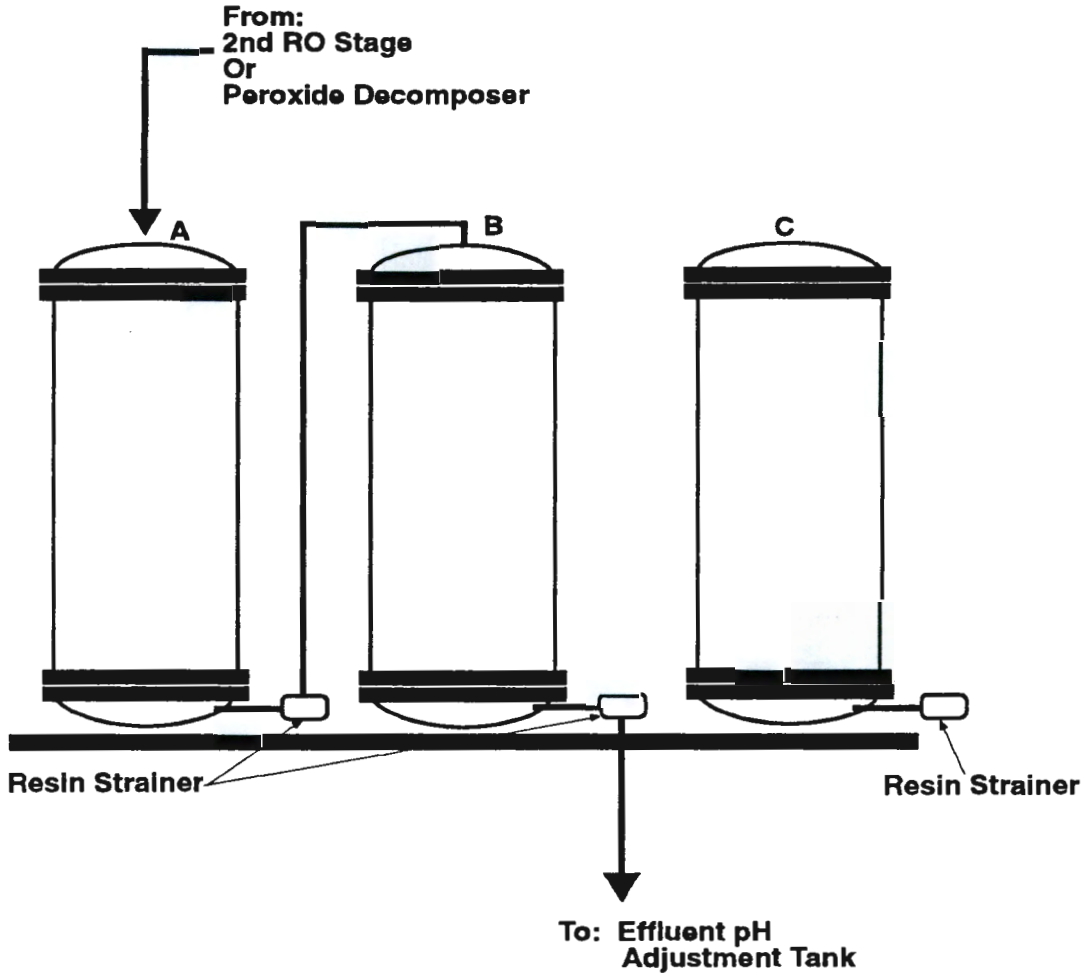


Figure 3-9. Reverse Osmosis Unit.



NOTE: Example Configuration- Column A and B in Operation, Column C in Standby Mode

H97040165.18

Figure 3-10. Ion Exchange Unit.

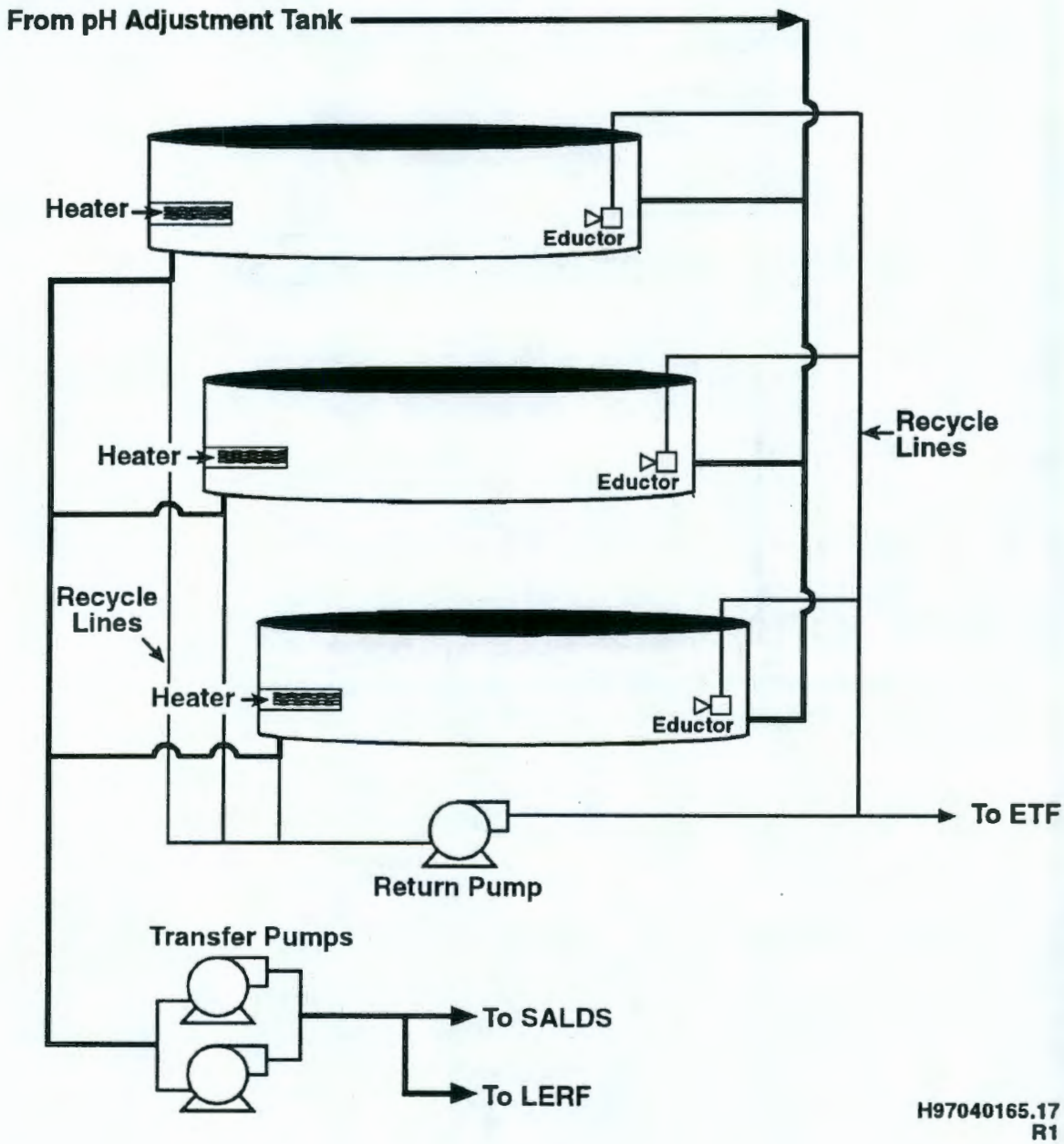


Figure 3-11. Verification Tanks.

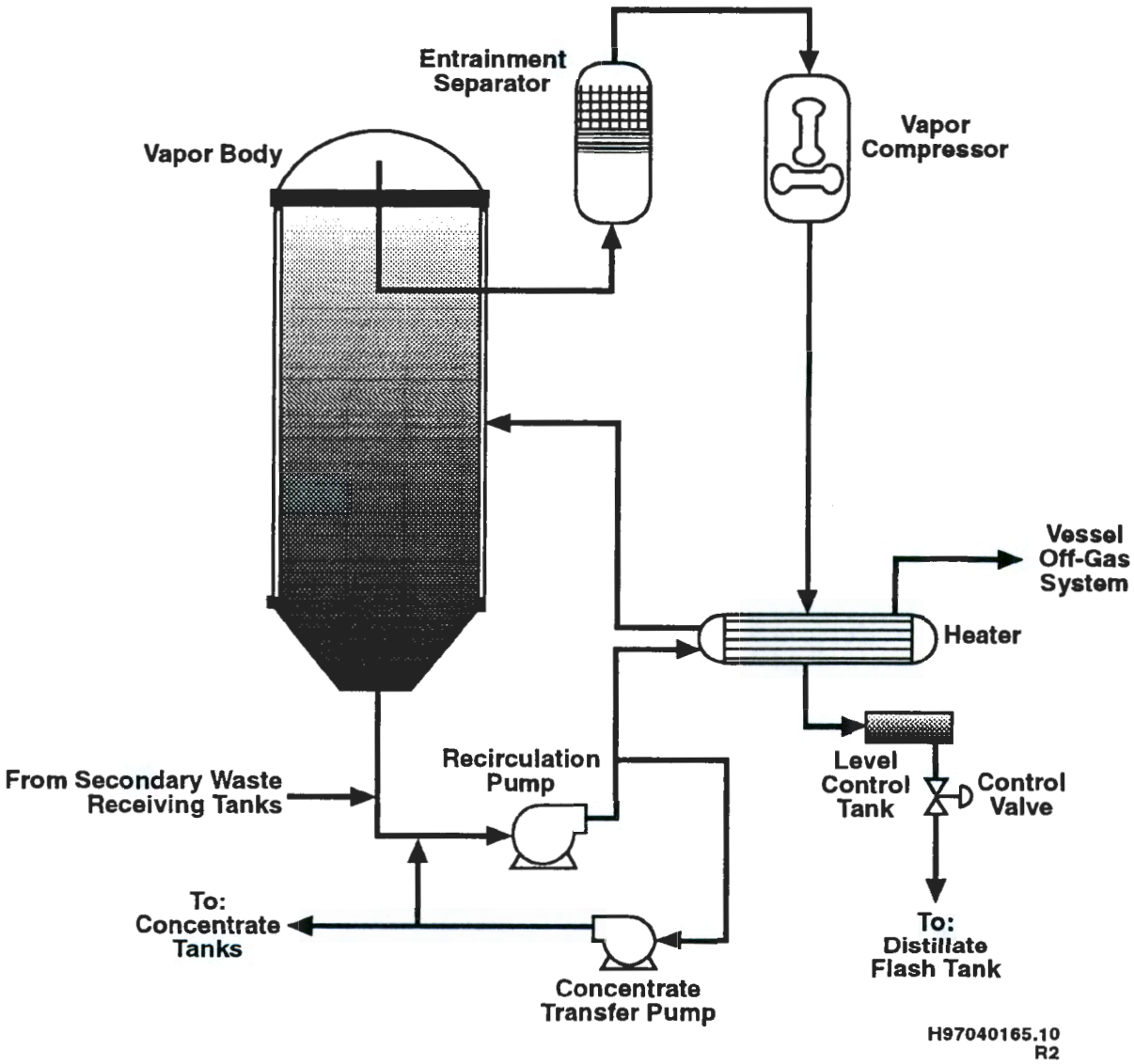


Figure 3-12. Effluent Treatment Facility Evaporator.

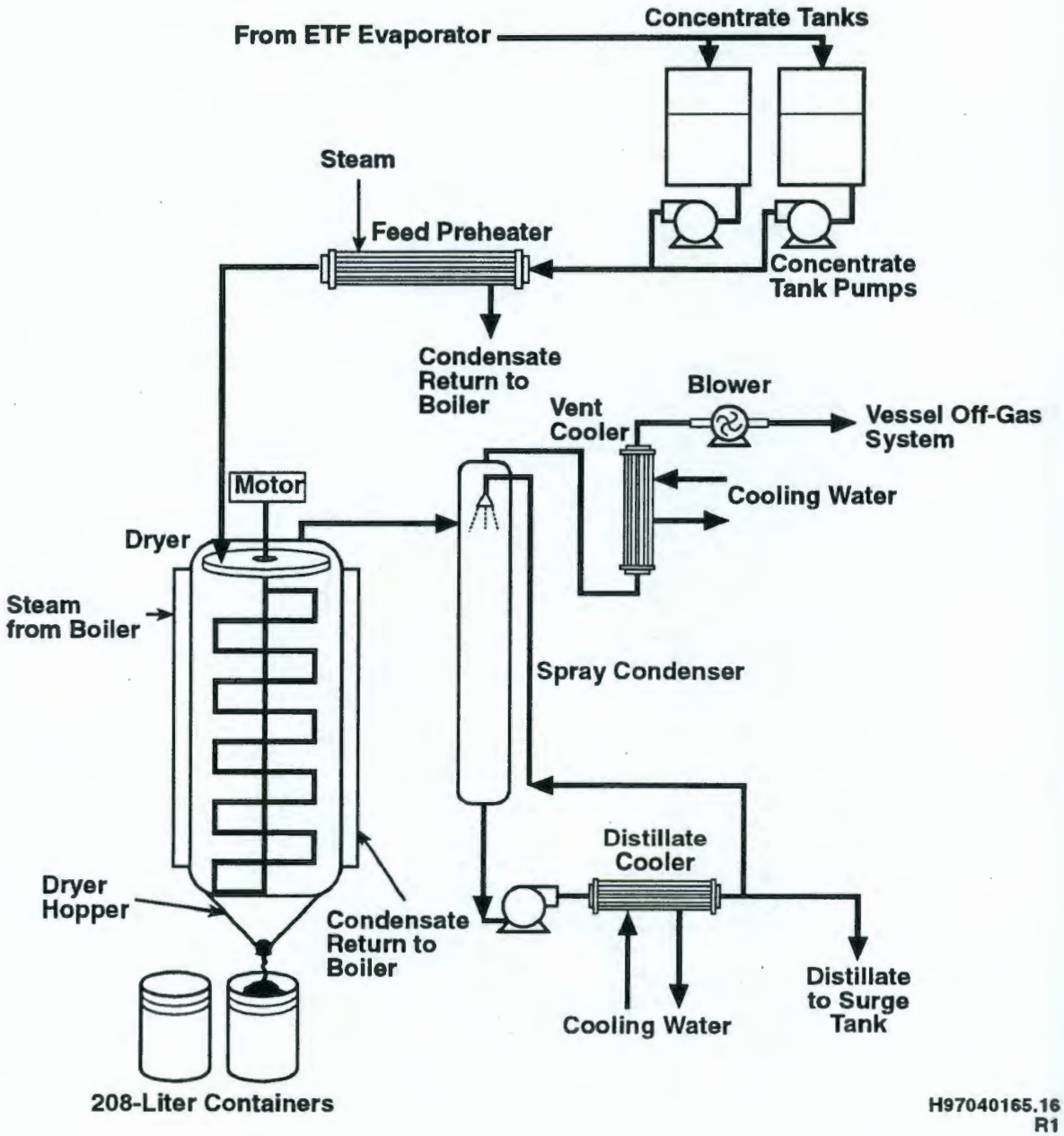


Figure 3-13. Thin Film Dryer.

4.0 TREATABILITY INFORMATION

The treatability information presented in this delisting modification document follows a similar approach as the initial delisting petition and is based on previous laboratory and treatability testing, waste processing experience at the ETF, and vendor information. As in the initial delisting petition, the treatment efficiency is used to calculate a concentration envelope. When the characterization of a waste or batch of compatible waste, fall within the concentration envelope, treatment at the ETF will produce a nonhazardous, nondangerous waste that can be disposed pursuant to Washington State Waste Discharge Permit (ST4500) and the Final Delisting.

The difference between the initial up-front delisting petition and this modification is the track record and operating experience of the ETF. The ETF has treated over 174,000,000 liters of hazardous listed waste. This treated waste was disposed of at the SALDS in compliance with the Washington State Waste Discharge Permit ST 4500 and the Final Delisting.

To determine the treatability of the numerous potential leachate constituents (as determined in Section 2.2.2), the constituents were placed into groups having similar chemical properties. When actual operating or test data were not available for constituents to determine treatment efficiency, one or more constituents were selected to represent the treatability group. This treatability group concept was successfully used in the initial delisting petition (DOE/RL-92-72) and has been demonstrated through ETF operation.

This section identifies those potential leachate constituents that were not addressed in the Final Delisting; categorizes the constituents into the treatability groups; defines the waste concentration level where, following treatment the waste is no longer hazardous; and defines the treatment objectives for these constituents.

4.1 CURRENT DELISTING LEVELS

The current delisting levels (40 CFR 261, Appendix IX, Table 2) are included in Table 4-1. This table also lists other constituents examined in the initial delisting petition (DOE/RL-92-72) and the potential leachate constituents considered in this delisting modification. The assigned treatability group for each constituent also is included in Table 4-1.

The initial petition determined a constituent concentration envelope for which a waste could be treated at the ETF, based on one pass through the ETF, and meet health-based levels (HBLs). The current delisting levels are 10 times the HBLs. The factor of 10 is attributed to the applied groundwater attenuation factor.

4.2 TREATABILITY GROUPS

The initial delisting petition defined numerous chemical or treatability groups that were based on similar chemical structure and or physical properties. These same treatability groups are used in this delisting modification. The treatability groups are particularly important when determining the treatment efficiency of the many organic compounds included as potential leachate constituents. The organic constituents that have similar chemical structures exhibit comparable UV/OX destruction efficiencies. As an example, the volatile halogenated hydrocarbon group includes methyl chloride, methylene chloride, chloroform, and carbon tetrachloride. This example list of compounds is ordered with an increasing number of chloride atoms on the methane molecule and these all have similar treatment efficiencies in the ETF UV/OX treatment unit.

These groups were devised to evaluate constituents based on testing performed using one or more constituents representing the group. This is a viable method to estimate the organic removal efficiency, without testing all constituents, because of the chemical similarities. The list of treatability groups is included in Table 4-2.

4.3 CONSTITUENT TREATMENT EFFICIENCY

The constituent treatment efficiency of the ETF is determined from actual waste processing at the ETF (Appendix A), previous treatability testing, and vendor information. The constituent treatment efficiency is used to back-calculate an ETF influent leachate constituent concentration that effectively can be treated during a single pass through ETF to meet required effluent concentration limits. These concentration limits are based on the HBL, as set forth by the EPA (EPA 1994), with a groundwater attenuation factor of 10 being applied. This approach is consistent with the requirements of the Final Delisting (40 CFR 261 Appendix IX, Table 2). This calculated influent leachate constituent concentration is defined as the concentration envelope, which is used to evaluate the treatability of an identified waste stream. However, because of the flexible design of the ETF, treated aqueous waste can be processed multiple times to ensure the treated waste is at or below the delisting level. It should be noted that some of the potential leachate constituents do not have a health-based level (HBL) established in the docket report. This situation is addressed in Sections 4.3.1 and 4.3.2.

Extensive treatability testing was performed as part of the initial delisting petition. This testing provided sufficient information to provide an up-front delisting before RCRA waste treatment at the ETF. An integrated pilot test was performed using UV/OX, RO, and IX. This testing was included in the initial delisting petition (DOE/RL-92-72).

The concentration envelope for the inorganic constituents is based on the treatability testing performed for the initial delisting petition (DOE/RL-92-72). The inorganic leachate constituents addressed by this delisting modification are sulfide, thallium, osmium, cobalt and tin. The inorganics are removed primarily by the RO and IX treatment operations in the ETF.

The concentration envelope for the organic constituents is based on ETF processing, prior treatability testing, and vendor information. With over 200 organic compounds included as potential leachate constituents in this delisting modification, a representative organic compound or compounds are used to represent the treatment efficiency for each organic treatability group. The organic compounds are removed primarily using the UV/OX treatment operation to destroy the organic compounds. The RO treatment step can remove, to some degree, organic compounds that have a molecular weight greater than 100. However, for determining this concentration envelope, credit for removing organic compounds is given to the UV/OX unit.

4.3.1 Inorganic Constituent Treatability Efficiency

The inorganic constituents considered here are sulfide, thallium, osmium, cobalt and tin. Determining the maximum influent concentration envelope is straight forward for thallium, because thallium is the only one that has an established HBL. For the other inorganic constituents, a HBL of 1 milligram per liter was assumed so an example influent concentration envelope can be calculated. When a HBL is established for these inorganic constituents, the maximum influent concentration envelope to meet 10 times the HBL is determined by multiplying the newly determined HBL by the maximum influent concentration envelope as stated below.

Sulfide was not considered in laboratory or treatability testing. However, sulfide is removed at the ETF by the strong oxidizing conditions resulting from hydrogen peroxide. Hydrogen peroxide is used primarily in the UV/OX system where extreme oxidizing conditions are present and also in the surge tank for biological control. The sulfide is readily converted to the sulfate ion. The sulfide removal efficiency is expected to be greater than 99.9 percent. Using the assumed HBL of 1 milligram per liter the maximum influent concentration envelope for sulfide to meet a treatment target of 10 times the HBL is 10,000 milligrams per liter.

Thallium, osmium, cobalt, and tin were not included in laboratory or treatability testing; however, based on pilot testing of other metals with similar valance states. The removal efficiency by the RO unit for thallium, osmium, cobalt, and tin is greater than 93.4 percent, greater than 97.5 percent, greater than 98.1 percent, and greater than 97.5 percent, respectively. Including a removal efficiency of 99 percent for IX treatment, the overall ETF treatment efficiency for these metals is greater than 99.9 percent. The HBL for thallium is 0.002 milligram per liter. The maximum influent concentration envelope for thallium to meet 10 times the HBL is 20 milligrams per liter. Using the assumed HBL of 1 milligram per liter for osmium, cobalt, and tin, the maximum influent concentration envelope to meet 10 times the HBL is 10,000 milligrams per liter.

4.3.2 Organic Constituent Treatability Efficiency

In the unlikely event that hazardous organic compounds are found in the leachate from F039 listed waste, the ETF must be able to treat these organics below the level where these threaten public health or the environment. This evaluation considers each potential leachate constituent. This organic constituent treatability analysis incorporates data from ETF aqueous waste processing, treatability testing, and vendor information. The Final Delisting specifies delisting levels for 23 organic potential leachate constituents. The initial delisting petition includes treatability results for an additional 18 organic potential leachate constituents. To finish out the list of organic potential leachate constituents, vendor information, treatability information and experience are used to determine the concentration envelope that can be treated at the ETF.

The ETF successfully has treated over 174,000,000 liters of hazardous listed waste. The major organic compounds treated include acetone, 1-butanol, 2-butanone (also called methyl ethyl ketone), 2-butoxyethanol, carbon tetrachloride, tetrahydrofuran, and tributyl phosphate. Appendix A includes treatment efficiencies of constituents treated at the ETF and disposed at the SALDS.

A slight terminology difference is used here to express the treatment efficiency from that used in the initial delisting petition. In the initial delisting petition, the oxidation rate constant was calculated from observed test results based on the test configuration. The observed decrease in the organic compound concentration over time followed first order reaction kinetics. The test results were scaled up to the ETF UV/OX system. The scale-up parameters included the total ultraviolet energy, the hydrogen peroxide concentration, and ultraviolet energy per UV/OX reactor volume. New information provided from the vendor directly incorporates the scale-up parameters of volume and energy input with a first order reaction kinetics curve into a factor specific to the organic compound. This factor is based on an organic constituent concentration decrease of 10 times, 1 order of magnitude. The vendor calls the scale-up factor Electrical Energy per Order (EE/O). The EE/O is different for each organic compound; however, groups of compounds will tend to have similar EE/Os.

The UV/OX key design factor EE/O is defined as the UV light energy in terms of kilowatt hours of electricity required to reduce the concentration of a compound in 1,000 gallons by 1 order of magnitude (or 90 percent). The unit for EE/O is kilowatt hour per 1,000 gallons/order. For example, if it takes 10 kilowatt hours of electricity to reduce the concentration of a target compound from 10 parts per million

to 1 part per million (1 order of magnitude or 90 percent) in 1,000 gallons of aqueous waste, the EE/O is 10 kilowatt hours per 1,000 gallons per order for that compound. It would take another 10 kilowatt hours to reduce the compound from 1 part per million to 0.1 part per million.

The EE/O is determined through laboratory testing in the same way as the oxidation rate constant. The UV/OX vendor has supplied the EE/O for the organic constituents. The treatability group concept was used by the vendor for the EE/O of constituents not included in their extensive database. The lower the EE/O, the greater the treatment efficiency. The formula for EE/O is as follows:

$$EE/O = UV\ Dose / \log(C_{(i)}/C_{(f)}) \quad (1)$$

Where:

The UV dose is kWh/1,000 gallons, the UV energy going into the water
$C_{(f)}$ is the final constituent concentration after treatment assumed to be the HBL x 10. The groundwater attenuation factor is included.
$C_{(i)}$ is the initial constituent concentration before treatment.

The design constraints of the ETF UV/OX system are 720 kilowatt electric (662.4 kilowatt UV energy, using a 92 percent conversion factor), 172 gallons per minute flow rate through the UV/OX equipment, and 2.08 minutes residence time in the UV/OX treatment unit. The design UV dose for the ETF UV/OX unit is 64.19 kilowatt hour per 1,000 gallons. The influent organic constituent concentration that can be treated in one pass through the UV/OX unit and reach the HBL times 10 limit is calculated as follows:

$$C_{(i)} = 10^{(UV\ Dose/EE/O)} * C_{(f)}. \quad (2)$$

The influent organic constituent concentration that can be treated at the ETF is calculated according to equation (2). Several other considerations, as discussed in the following, were used to determine the envelope concentration. Table 4-3 presents the envelope concentrations. Appendix B includes the HBL and the solubility limits for each of the organic compounds.

Additional considerations were used to finalize the influent organic constituent concentration. These considerations include the LERF liner compatibility and the solubility limit of the organic compound. The primary LERF liner is a high-density polyethylene material, the same material as the liner used in the LLBG. Because some of the organic compounds are so effectively treated by UV/OX, the calculated influent concentration, using equation (2), is greater than the liner compatibility limits and/or greater than the solubility limit. When this situation is encountered, the lower of the liner compatibility limit or the solubility limit is used for the influent concentration. In some cases, there was no EPA established HBL for an organic compound. When this occurred, an HBL of 1 milligram per liter was assumed to complete the evaluation. When an HBL is established for the constituent, the maximum influent concentration envelope is determined by multiplying the newly determined HBL by the maximum influent concentration envelope value established for that constituent in Table 4-3. Appendix B includes the determination of the envelope along with the solubility and LERF liner compatibility considerations.

4.4 STANDARDS TREATED WASTE MUST MEET

The aqueous hazardous waste treated at ETF must meet discharge restrictions delineated in Washington State Waste Discharge Permit ST 4500 and the Final Delisting. The Washington State Waste Discharge Permit ST 4500 imposes daily maximum enforcement limits, average monthly enforcement limits, and

average monthly early warning values. The Final Delisting imposes delisting limits. The limits for each parameter are listed in Table 4-4.

4.5 TREATABILITY CONCLUSION

This treatability analysis confirms the conclusions from the initial delisting petition. The treatability groups that are most difficult to treat include halogenated organics, such as the volatile halogenated alkanes and chlorinated aliphatic hydrocarbons. Constituents having an EE/O above 40 are considered difficult to treat.

There are only 10 constituents identified in the waste designations of waste currently waiting disposal at the LLBG, refer to Chapter 2.0, Table 2-1, that fall into the category of difficult to treat in the ETF UV/OX unit. Of these 10 constituents, only 1,2-dichloroethane, carbon tetrachloride, and chloroform are listed as part of the waste designation in greater than one-tenth of one percent of the total waste volume. These three organic compounds have the highest probability of being in the leachate. All of the other organic compounds listed in Table 2-1 are associated with waste that individually would make up less than one-tenth of one percent of the total waste volume. With Table 2-1 being a 'typical' distribution of waste to be disposed of in the LLBG, the total quantity of hard to treat organics that potentially would be in the leachate is very small and within the treatability envelope.

The influent concentration envelope, shown in Table 4-3, indicates the concentrations of hazardous waste that can be treated at the ETF in a once-through treatment process. The ETF design includes the capability of retreating (recycling) aqueous waste that does not meet the treatment limits. Recycling the contents of a verification tank for further treatment before disposal, shown in Figure 3-11, allows for a flexible influent concentration envelope. This flexibility provides the ETF with the ability to treat a wide variety of aqueous wastes containing a broad spectrum of hazardous constituents and still meet the treatment limits before disposal.

This page intentionally left blank.

Table 4-1. Constituents Delisted and Considered in Delisting Modification.

Treatability Group	Constituent	CAS no.	Waste Number	Delisting Level (ppm)	Considered in Initial Delisting Petition*	Considered in Modified Delisting**
1	2,4-Dimethylphenol	105-67-9	U101			x
1	Coal tar creosote	8007-45-2				x
1	Creosote	8001-58-9				x
1	Cresol [Cresylic acid]	1319-77-3	F001-5, U052	20	t	
1	m-Cresol [3-Methylphenol]	108-39-4	F001-5, U052			x
1	o-Cresol [2-Methylphenol]	95-48-7	F001-5, U052			x
1	p-Cresol [4-Methylphenol]	106-44-5	F001-5, U052			x
1	Phenol	108-95-2	U188		t	
2	2,3,4,6-Tetrachlorophenol	58-90-2	F020-23, F026-28			x
2	2,3,4,6-tetrachlorophenol, potassium salt [2,3,4,6-tetrachlorophenol salt]	53535-27-6				x
2	2,3,4,6-tetrachlorophenol, sodium salt [2,3,4,6-tetrachlorophenol, salt]	25567-55-9				x
2	2,4,5-Trichlorophenol	95-95-4	F020-23, F026-28			x
2	2,4,6-Tribromophenol	118-79-6				x
2	2,4,6-Trichlorophenol	88-06-2	F020-23, F026-28			x
2	2,4-Dichlorophenol	120-83-2	U081			x
2	2,6-Dichlorophenol	87-65-0	U082			x
2	m-Chloro-3-methylphenol	59-50-7	U039			x
2	o-Chlorophenol	95-57-8	U048			x
2	Pentachlorophenol	87-86-5	F020-23, F026-28		t	
2	Potassium pentachlorophenate [Pentachlorophenol salt]	7778-73-6				x
2	Sodium pentachlorophenate [Pentachlorophenol salt]	131-52-2				x
3	Acenaphthene	83-32-9	F039			x
3	Acenaphthylene	208-96-8	F039			x
3	Anthracene	120-12-7	F039			x
3	Benzene	71-43-2	F001-5, U019	0.05	t	
3	Benzenearsonic acid (Arsenic)	98-05-5				x

Table 4-1. Constituents Delisted and Considered in Delisting Modification.

Treatability Group		Constituent	CAS no.	Waste Number	Delisting Level (ppm)	Considered in Initial Delisting Petition*	Considered in Modified Delisting**
3		Fluorene	86-73-7	F039			x
3		Naphthalene	91-20-3	U051, U165	10	t	
3		Phenanthrene	85-01-8	U051			x
3		Styrene	100-42-5				x
4		3-Methylcholanthrene	56-49-5	U157			x
4		Benzo(a)anthracene	56-55-3	U018			x
4		Benzo(a)pyrene	50-32-8	U022			x
4		Benzo(b)fluoranthene	205-99-2	F039			x
4		Benzo(ghi)perylene	191-24-2	F039			x
4		Benzo(k)fluoranthene	207-08-9	F039			x
4		Chrysene	218-01-9	U050			x
4		Dibenzo[a,e]pyrene	192-65-4	F039			x
4		Dibenzo[a,h]anthracene	53-70-3	U063			x
4		Dibenzo[a,h]pyrene	189-64-0				x
4		Fluoranthrene	206-44-0	U120			x
4		Indeno(1,2,3,cd)pyrene	193-39-5	F039			x
4		Pyrene	129-00-0	U051		t	
5	a	1,2,4,5-Tetrachlorobenzene	95-94-3	U207			x
5	a	1,2,4-Trichlorobenzene	120-82-1	F039			x
5	a	m-Dichlorobenzene	541-73-1	F001-5, U071			x
5	a	o-Dichlorobenzene	95-50-1	U070			x
5	a	p-Dichlorobenzene	106-46-7	U072	0.75	t	
5	a	Pentachlorobenzene	608-93-5	U183			x
5		2-Chloronaphthalene [beta-Chloronaphthalene]	91-58-7	U047			x
5		Heptachlorodibenzofuran	38998-75-3				x
5		Heptachlorodibenzo-p-dioxins	35822-46-9				x
6	a	Hexachloroethane	67-72-1	U131	0.06	t	
6	b	1,3-Dichloropropene	542-75-6	U084			x
6	b	Chloroprene [2-Chloro-1,3-butadiene]	126-99-8	F039			x

Table 4-1. Constituents Delisted and Considered in Delisting Modification.

Treatability Group		Constituent	CAS no.	Waste Number	Delisting Level (ppm)	Considered in Initial Delisting Petition*	Considered in Modified Delisting**
6	b	cis-1,3-Dichloropropene	10061-01-5	U084			x
6	b	Hexachlorobutadiene	87-68-3	U128			x
6	b	Hexachloropropene	1888-71-7	U243			x
7	a	bis(2-Chloroethoxy) methane	111-91-1	U024			x
7	a	Bis(2-Chloroethyl) ether	111-44-4	U025		t	
7	a	Bis(2-Chloroisopropyl) ether	39638-32-9	U027			x
7	a	Dichloroisopropyl ether	108-60-1	U027			x
7	b	4-Bromophenylphenyl ether	101-55-3	U030			x
7	b	4-Chlorophenyl phenyl ether	7005-72-3			t	
8		Bis(2-Ethylhexyl) phthalate	117-81-7	U028		t	
8		Butylbenzylphthalate	85-68-7	F039			x
8		Diethylphthalate	84-66-2	U088			x
8		Dimethyl phthalate	131-11-3	U102			x
8		Di-n-butylphthalate	84-74-2	U069			x
8		Di-n-octylphthalate	117-84-0	U107	7		
9	a	1-Butanol	71-36-3	F001-5, U031	40	t	
9	a	Benzyl alcohol	100-51-6		100	t	
9	a	Isobutyl alcohol	78-83-1	F001-5, U140			x
9	a	Methanol	67-56-1	F001-5, U154			x
9		1,4-Dioxane [1,4-Diethyleneoxide]	123-91-1	U108			x
9		2,4,5-T	93-76-5	F039			x
9		2,4,5-TP [Silvex]	93-72-1	[D017]			x
9		2,4-D [2,4-Dichlorophenoxyacetic acid]	94-75-7	U240			x
9		Carbofuran phenol	1563-38-8	U367			x
9		Ethyl Acetate	141-78-6	F039			x
9		Kepone	143-50-0	U142			x
9		Lead subacetate (Lead)	1335-32-6				x
9		Methyl methacrylate	80-62-6	U162			x
9		Methyl methanesulfonate	66-27-3	F039			x

Table 4-1. Constituents Delisted and Considered in Delisting Modification.

Treatability Group		Constituent	CAS no.	Waste Number	Delisting Level (ppm)	Considered in Initial Delisting Petition*	Considered in Modified Delisting**
9		Phenyl mercuric acetate	62-38-4	P092			x
9		Phthalic anhydride	85-44-9	U190			x
9		Safrole	94-59-7	U203			x
9		TCDD	1746-01-6				x
9		Vinyl acetate	108-05-4				x
10	a	2-Acethylaminofluorene	53-96-3	U005			x
10	a	4-Aminobiphenyl	92-67-1	F039			x
10	a	Diphenylamine	122-39-4	F039			x
10	a	o-Phenylenediamine	95-54-5				x
10	a	Phenacetin [p-Acetophenetidide]	62-44-2	U187			x
10	a	p-Phenylenediamine	106-50-3				x
10	a	Pronamide	23950-58-5	U192			x
10	a	Selenourea (Selenium)	630-10-4				x
10	a	Toluene-2,4-diamine	95-80-7				x
10	b	4,4'-Methylenebis(2-chloroaniline)	101-14-4	U158			x
10	b	Aniline	62-53-3	U012		t	
10	b	o-Nitroaniline	88-74-4				x
10	b	p-Chloroaniline	106-47-8	P024			x
10	b	p-Nitroaniline	100-01-6				x
10	c	Acetonitrile	75-05-8	U003		t	
10	c	Acrylonitrile	107-13-1	U009			x
10	c	Methacrylonitrile	126-98-7	U152			x
10	d	1,3-Dinitrobenzene	99-65-0				x
10	d	2,4-Dinitrophenol	51-28-5	P048			x
10	d	2,4-Dinitrotoluene	121-14-2	U105			x
10	d	2,6-Dinitrotoluene	606-20-2	U106			x
10	d	4,6-Dinitro-o-cresol	534-52-1	F039			x
10	d	5-Nitro-o-toluidine	99-55-8	U181			x
10	d	Nitrobenzene	98-95-3	F001-5, U169		t	
10	d	Pentachloronitrobenzene (PCNB)	82-68-8	U185			x

Table 4-1. Constituents Delisted and Considered in Delisting Modification.

Treatability Group		Constituent	CAS no.	Waste Number	Delisting Level (ppm)	Considered in Initial Delisting Petition	Considered in Modified Delisting
10	d	p-Nitrophenol	100-02-7	U170			x
10	e	Dibenz[a,h]acridine	226-36-8				x
10	e	Dibenz[a,j]acridine	224-42-0				x
10	e	N-Nitrosodiethylamine	55-18-5	U174			x
10	e	N-Nitrosodimethylamine	62-75-9	P082		t	
10	e	N-Nitrosodi-n-butylamine	924-16-3	U172			x
10	e	N-Nitroso-di-n-dipropylamine	621-64-7	U111		t	
10	e	N-Nitrosodiphenylamine	86-30-6	F039			x
10	e	N-Nitrosomethylethylamine	10595-95-6	F039			x
10	e	N-Nitrosomorpholine	59-89-2	F039			x
10	e	N-Nitrosopiperidine	100-75-4	U179			x
10	e	N-Nitrosopyrrolidine	930-55-2	U180			x
10	f	Methapyrilene	91-80-5	U155			x
10	f	Pyridine	110-86-1	F001-5, U196		t	
10		Aldicarb sulfone	1646-88-4	P203			x
10		Disulfiram	97-77-8				x
10		Manganese dimethyldithiocarbamate	15339-36-3	P196			x
10		Physostigmine	57-47-6	P204			x
10		Physostigmine salicylate	57-64-7	P188			x
10		Potassium n-hyroxymethyl-n-methyl-dithiocarbamate	51026-28-9				x
10		Sodium diethyldithiocarbamate	148-18-5				x
10		Tetrabutylthiuram disulfide	1634-02-2				x
11		A2213	30558-43-1	U394			x
11		Aldrin	309-00-2	P004			x
11		Alpha-BHC	319-84-6	U129			x
11		Aramite	140-57-8	F039			x
11		Barban	101-27-9	U280			x
11		Bendiocarb	22781-23-3	U278			x
11		Benomyl	17804-35-2	U271			x

Table 4-1. Constituents Delisted and Considered in Delisting Modification.

Treatability Group	Constituent	CAS no.	Waste Number	Delisting Level (ppm)	Considered in Initial Delisting Petition	Considered in Modified Delisting**
11	Beta-BHC	319-85-7	U129			x
11	Chlordane	57-74-9	D020, U036			x
11	Butylate	2008-41-5				x
11	Carbaryl	63-25-2	U279			x
11	Carbendazim	10605-21-7	U372			x
11	Carbofuran	1563-66-2	P127			x
11	Copper dimethyldithiocarbamate	137-29-1				x
11	DDD (p,p"-DDD)	72-54-8	U060, U061			x
11	DDE (p,p'-DDE)	72-55-9	U061			x
11	DDT (p,p'-DDT)	50-29-3	U061			x
11	Delta-BHC	319-86-8	U129			x
11	Dieldrin	60-57-1	P037			x
11	Dinoseb	88-85-7	P020			x
11	Disolfoton	298-04-4	P039			x
11	Endosulfan I	959-98-8	P050			x
11	Endosulfan II	33213-65-9	P050			x
11	Endosulfan sulfate	1031-07-8	P050			x
11	Endrin	72-20-8	P051			x
11	Endrin aldehyde	7421-93-4	P051			x
11	EPTC	759-94-4				x
11	Ethyl Ziram	14324-55-1				x
11	Famphur	52-85-7	P097			x
11	Ferbam	14484-64-1				x
11	Heptachlor	76-44-8	P059			x
11	Heptachlor epoxide	1024-57-3	P059			x
11	Isodrin	465-73-6	P060			x
11	Lindane [gamma-BHC]	58-89-9	U129		t	
11	Metam Sodium	137-42-8				x
11	Methiocarb	2032-65-7	P199			x
11	Methoxychlor	72-43-5	U247			x

Table 4-1. Constituents Delisted and Considered in Delisting Modification.

Treatability Group	Constituent	CAS no.	Waste Number	Delisting Level (ppm)	Considered in Initial Delisting Petition*	Considered in Modified Delisting**
11	Methyl parathion	298-00-0	P071			x
11	Mexacarbate	315-18-4	P128			x
11	Molinate	2212-67-1				x
11	o,p'-DDD	53-19-0	U060, U061			x
11	o,p'-DDE	3424-82-6	U061			x
11	o.p'-DDT	789-02-6	U061			x
11	Oxamyl	23135-22-0	P194			x
11	Parathion	56-38-2	P089			x
11	Pebulate	1114-71-2				x
11	Phorate	298-02-2	P094			x
11	Potassium dimethyl dithiocarbamate -	128-03-0				x
11	Potassium n-methyldithiocarbamate	137-41-7				x
11	Promecarb	2631-37-0	P201			x
11	Propham	122-42-9	U373			x
11	Propoxur	114-26-1	U411			x
11	Selenium, tetrakis(dimethyl-dithiocarbamate	144-34-3				x
11	Sodium dibutyldithiocarbamate	136-30-1				x
11	Sodium dimethyldithiocarbamate	128-04-1				x
11	Thiodicarb	59669-26-0	U410			x
11	Thiophanate-methyl	23564-05-8	U409			x
11	Toxaphene	8001-35-2	P123			x
11	Triallate	2303-17-5	U389			x
11	Vernolate	1929-77-7				x
11	Ziram	137-30-4	P205			x
12	4,4'-Dichlorobiphenyl	2050-68-2			t	
12	Polychlorinated biphenyls	1336-36-3	F039			x
13	1,1,1,2-Tetrachloroethane	630-20-6	U208			x
13	1,1,1-Trichloroethane	71-55-6	U226	2	t	
13	1,1,2,2-Tetrachloroethane	79-34-5	U209			x

Table 4-1. Constituents Delisted and Considered in Delisting Modification.

Treatability Group	Constituent	CAS no.	Waste Number	Delisting Level (ppm)	Considered in Initial Delisting Petition	Considered in Modified Delisting**
13	1,1,2-Trichloro-1,2,2-triflouroethane	76-13-1	F001-5			x
13	1,1,2-Trichloroethane	79-00-5	U227	0.05	t	
13	1,1-Dichloroethane	75-34-3	U076			x
13	1,2,3-Trichloropropane	96-18-4	F039			x
13	1,2,Dibromo-3-chloropropane	96-12-8	U066			x
13	1,2-Dichloropropane [Propylene dichloride]	78-87-5	U083			x
13	Bromodichloromethane	75-27-4	F039			x
13	Bromoform	75-25-2	U225			x
13	Bromomethane [Methyl bromide]	74-83-9	U029			x
13	Carbon tetrachloride	56-23-5	F001-5, U211	0.05	t	
13	Chloroethane	75-00-3	F039			x
13	Chloroform	67-66-3	U044	0.1	t	
13	Chloromethane [Methyl chloride]	74-87-3	U045			x
13	Dibromochloromethane	124-48-1	F039			x
13	Dibromomethane [Methylene bromide]	74-95-3	U068			x
13	Dichlorodifluoromethane	75-71-8	U075			x
13	Ethylene dibromide [1,2-Dibromoethane]	106-93-4	U067			x
13	Ethylene dichloride [1,2-Dichloroethane]	107-06-2	U077	0.05		
13	Iodomethane [Methyl iodide]	74-88-4	U138			x
13	Methylene chloride [Dichloromethane]	75-09-2	U080		t	
13	Trichlorofluoromethane	75-69-4	F001-5, U121			x
14	1,1-Dichloroethylene	75-35-4	U078	0.07		
14	Allyl chloride [3-Chloropropene]	107-05-1	F039			x
14	cis-1,2-Dicloroethylene	156-59-2				x
14	Tetrachloroethene [Tetrachloroethylene]	127-18-4	F001-5, U210	0.05	t	

Table 4-1. Constituents Delisted and Considered in Delisting Modification.

Treatability Group		Constituent	CAS no.	Waste Number	Delisting Level (ppm)	Considered in Initial Delisting Petition*	Considered in Modified Delisting**
14		trans-1,2-Dichloroethylene	156-60-5	U079			x
14		trans-1,3-Dichloropropene	10061-02-6	U084			x
14		Trichloroethylene	79-01-6	F001-5, U228	0.05		
14		Vinyl chloride	75-01-4	U043	0.02		
15	a	Ethylbenzene	100-41-4	F001-5			x
15	a	Toluene	108-88-3	F001-5, U051, U220	10	t	
15	a	Xylenes (total)	1330-20-7	U051, U239			x
16		Chlorobenzene	108-90-7	F001-5, U037	1		
16		Dichlorophenylarsine (Arsenic)	696-28-6				x
17	a	Acrolein	107-02-8	P003		t	
18	a	Isosafrole	120-58-1	U141			x
18		Ethyl ether	60-29-7	F001-5, U117			x
18		Ethyl methacrylate	97-63-2	U118			x
18		Tetrahydrofuran	109-99-9			t	
19		Acetone	67-64-1	F001-5, U002	40	t	
19		Acetophenone	98-86-2	U004			x
19		Cyclohexanone	108-94-1	F001-5, U057			x
19		Methyl ethyl ketone [2-Butanone]	78-93-3	F001-5, U159	200	t	
19		Methyl isobutyl ketone [2-Methyl-4-pentanone]	108-10-1	F001-5, U161	30	t	
20		Carbon disulfide	75-15-0	F001-5, P022			x
20		tris(2,3-Dibromopropyl) phosphate	126-72-7	U235			x
21		Aluminum	7429-90-5			t	
21		Antimony	7440-36-0	F039	0.06		
21		Barium	7440-39-3	P013	20	t	
21		Beryllium	7440-41-7	P015	0.04	t	
21		Cadmium	7440-43-9	[D006]	0.05	t	
21		Cesium	7440-46-2			t	
21		Chromium	7440-47-3	U032	1	t	
21		Cobalt	7440-48-4				x

Table 4-1. Constituents Delisted and Considered in Delisting Modification.

Treatability Group		Constituent	CAS no.	Waste Number	Delisting Level (ppm)	Considered in Initial Delisting Petition*	Considered in Modified Delisting**
21		Copper	7440-50-8			t	
21		Iron	7439-89-6			t	
21		Nickel	7440-02-0	P073, P074	1	t	
21		Osmium tetroxide (Osmium)	20816-12-0	P087			x
21		Ruthenium				t	
21		Silicon	7440-21-3			t	
21		Silver	7440-22-4	P099, P104	2	t	
21		Sodium	7440-23-5			t	
21		Strontium	7440-24-6			t	
21		Thallium	7440-28-0	P113, P115, U214, U215, U216, U217			x
21		Tin	7440-31-5				x
21		Vanadium	7440-62-2	P119, P120	2	t	
21		Zinc	7440-66-6		100	t	
22		Arsenic	7440-38-2	P010, P011, P012, P036, P038, U136	0.5	t	
22		Lead	7439-92-1	P110, U051, U144, U145, U146	0.15	t	
22		Mercury	7439-97-6	P065, P092, U151	0.02	t	
22		Selenium	7782-49-2	P103, P114, P204, P205	0.5	t	
23	a	Chloride				t	
23	a	Fluoride	16964-48-8	P056, U134	40	t	
23		Carbonate				t	
23		Nitrate				t	
23		Nitrite				t	
23		Phosphate				t	
23		Sulfate				t	
24		Ammonium			10	t	

Table 4-1. Constituents Delisted and Considered in Delisting Modification.

Treatability Group		Constituent	CAS no.	Waste Number	Delisting Level (ppm)	Considered in Initial Delisting Petition*	Considered in Modified Delisting**
24		Cyanide	57-12-5	P013, P021, P029, P030, P063, P074, P098, P099, P014, P106, P121	2	t	
24		Mercury fulminate [Mercury cyanate]	628-86-4				1
24		Sulfide	8496-25-8	F039			x
25	a	O,O,O-Triethyl phosphorothioate	126-68-1				x
25	a	Tributyl phosphate	126-73-8		0.2	t	
25	b	Tridecane	629-50-5			t	
25		Isophorone	7778-73-6				x
25		Tetraethyl lead (Lead)	78-00-2				x

* t indicates constituents tested and reported as part of the initial delisting petition.
** x = indicates the constituent considered in this delisting modification.
1 = this compound is a cyanate and will not be considered further because there is a delisting level for both mercury and cyanide.

CAS no. = Chemical Abstract Service number.
ppm = parts per million.

Table 4-2. Treatability Groups.

Group Name	Group No.*
Phenols	1
Substituted phenols	2
Low molecular weight aromatics	3
High molecular weight PAHs	4
Chlorinated aromatic hydrocarbons	5
Chlorinated benzenes	5a
Chlorinated aiphatic hydrocarbons	6
Halogenated alkanes	6a
Halogenated alkenes	6b
Halogenated ethers	7
Halogenated alkyl ethers	7a
Halogenated aryl ethers	7b
Phthalates	8
Miscellaneous oxygenated compounds	9
Alcohol	9a
Organonitrogen compounds	10
Amines	10a
Nitriles	10b
Anilines	10c
Nitroaromatics	10d
Nitrosoamines	10d
Pyridines	10f
Pesticides	11
PCBs	12
Volatile halogenated alkanes	13
Volatile halogenated alkenes	14
Volatile aromatic hydrocarbons	15
Low molecular weight aromatics	15a
Volatile chlorinated aromatic hydrocarbons	16
Volatile unsaturated carbonyl compounds	17
Aldehyde	17a
Volatile ethers	18
Cyclic ether	18a
Volatile ketones	19
Miscellaneous volatile compounds	20
Inductively coupled plasma (ICP) metals (added group)	21
Non ICP cations (added group)	22
Anions (added group)	23
Halides	23a
Single analyte methods (added group)	24
Miscellaneous semivolatile compounds (added group)	25
Alkly phosphates	25a
Long chain alkanes	25b
Radioactive	26

* Treatability Groups based on "A Project Manager's Guide to Requesting and Evaluating Chemical Analysis", August 1991, EPA Contract No. 68D80085.

Table 4-3. Organic Constituent Modified Treatability Envelope.

Major group	Chemical Name	CAS	HBL mg/L	HBL Value used for TBD (mg/L) (1)	EE/O (2)	Limiting factor (3)	Maximum Influent Concentration Envelope to Meet 10 * HBL (mg/L)
1	2,4-Dimethylphenol	105-67-9	0.7		10	S	5.90E+02
1	Coal tar creosote	8007-45-2	TBD	1	10	S	1.00E+02
1	Creosote	8001-58-9	TBD	1	10	S	1.00E+02
1	Cresol [Cresylic acid] (DL)[5]	1319-77-3	2		10	S	3.10E+04
1	m-Cresol [3-Methylphenol]	108-39-4	TBD	1	10	S	2.50E+04
1	o-Cresol [2-Methylphenol]	95-48-7	TBD	1	10	S	2.50E+04
1	p-Cresol [4-Methylphenol]	106-44-5	TBD	1	10	S	2.50E+04
1	Phenol	108-95-2	20		4	S	9.30E+04
2	2,3,4,6-Tetrachlorophenol	58-90-2	1		10	S	1.00E+03
2	2,3,4,6-tetrachlorophenol, potassium salt [2,3,4,6-tetrachlorophenol salt]	53535-27-6	TBD	1	10	S	1.00E+03
2	2,3,4,6-tetrachlorophenol, sodium salt [2,3,4,6-tetrachlorophenol, salt]	25567-55-9	TBD	1	10	S	1.00E+03
2	2,4,5-Trichlorophenol	95-95-4	4		10	S	1.19E+03
2	2,4,6-Tribromophenol	118-79-6	TBD	1	10	S	7.00E+01
2	2,4,6-Trichlorophenol	88-06-2	0.008		10	S	8.00E+02
2	2,4-Dichlorophenol	120-83-2	0.1		10	L	2.00E+03
2	2,6-Dichlorophenol	87-65-0	TBD	1	10	L	2.00E+03
2	m-Chloro-3-methylphenol	59-50-7	TBD	1	10	L	2.00E+03
2	o-Chlorophenol	95-57-8	0.2		10	L	2.00E+03
2	Pentachlorophenol	87-86-5	0.001		4	S	1.40E+01
2	Potassium pentachlorophenate [Pentachlorophenol salt]	7778-73-6	0.001		4	L	1.00E+05
2	Sodium pentachlorophenate [Pentachlorophenol salt]	131-52-2	0.001		4	L	1.00E+05
3	Acenaphthene	83-32-9	2		10	S	3.42E+00
3	Acenaphthylene	208-96-8	TBD	1	10	S	3.93E+00
3	Anthracene	120-12-7	10		10	S	1.29E+00
3	Benzene (DL)[5]	71-43-2	0.005		3	S	1.75E+03
3	Benzenearsonic acid (Arsenic)	98-05-5	TBD	1	10	S	2.50E+04
3	Fluorene	86-73-7	1		10	S	1.69E+00

Table 4-3. Organic Constituent Modified Treatability Envelope.

Major group		Chemical Name	CAS	HBL mg/L	HBL Value used for TBD (mg/L) (1)	EE/O (2)	Limiting factor (3)	Maximum Influent Concentration Envelope to Meet 10 * HBL (mg/L)
3		Naphthalene (DL)[5]	91-20-3	1		3	S	3.40E+01
3		Phenanthrene	85-01-8	TBD	1	10	S	1.60E+00
3		Styrene	100-42-5	0.1		7	S	3.00E+02
4		3-Methylcholanthrene	56-49-5	3E-08		10	H	7.87E-01
4		Benzo(a)anthracene	56-55-3	4E-06		10	S	5.70E-03
4		Benzo(a)pyrene	50-32-8	0.0002		10	S	1.20E-03
4		Benzo(b)fluoranthene	205-99-2	0.0001		10	S	1.40E-02
4		Benzo(ghi)perylene	191-24-2	TBD	1	10	S	2.60E-04
4		Benzo(k)fluoranthene	207-08-9	TBD	1	10	S	7.60E-04
4		Chrysene	218-01-9	0.001		10	S	1.80E-03
4		Dibenzo[a,e]pyrene	192-65-4	TBD	1	10	S	1.00E+00
4		Dibenzo[a,h]anthracene	53-70-3	2E-06		10	S	5.00E-04
4		Dibenzo[a,h]pyrene	189-64-0	TBD	1	10	S	1.00E+00
4		Fluoranthrene	206-44-0	1		10	S	2.06E-01
4		Indeno(1,2,3,cd)pyrene	193-39-5	0.0001		15	S	5.30E-04
4		Pyrene	129-00-0	1		4	S	1.32E-01
5	a	1,2,4,5-Tetrachlorobenzene	95-94-3	0.01		20	S	6.00E+00
5	a	1,2,4-Trichlorobenzene	120-82-1	0.07		15	S	3.00E+01
5	a	m-Dichlorobenzene	541-73-1	TBD	1	15	S	1.23E+02
5	a	o-Dichlorobenzene	95-50-1	0.6		15	S	1.00E+02
5	a	p-Dichlorobenzene (DL)[5]	106-46-7	0.075		5	S	7.90E+01
5	a	Pentachlorobenzene	608-93-5	0.03		20	S	1.35E-01
5		2-Chloronaphthalene [beta-Chloronaphthalene]	91-58-7	3		10	S	6.74E+00
5		Heptachlorodibenzofuran	38998-75-3	TBD	1	15	S	1.00E+00
5		Heptachlorodibenzo-p-dioxins	35822-46-9	TBD	1	15	S	1.00E+00
6	a	Hexachloroethane (DL)[5]	67-72-1	0.006		100	H	2.63E-01
6	b	1,3-Dichloropropene	542-75-6	0.0005		7	L	2.00E+03
6	b	Chloroprene [2-Chloro-1,3-butadiene]	126-99-8	0.7		10	S	3.00E+02
6	b	cis-1,3-Dichloropropene	10061-01-5	TBD	1	7	L	2.00E+03
6	b	Hexachlorobutadiene	87-68-3	0.001		10	S	1.50E-01

Table 4-3. Organic Constituent Modified Treatability Envelope.

Major group		Chemical Name	CAS	HBL mg/L	HBL Value used for TBD (mg/L) (1)	EE/O (2)	Limiting factor (3)	Maximum Influent Concentration Envelope to Meet 10 * HBL (mg/L)
6	b	Hexachloropropene	1888-71-7	0.01		10	S	4.00E-03
7	a	bis(2-Chloroethoxy) methane	111-91-1	TBD	1	15	L	2.00E+03
7	a	Bis(2-Chloroethyl) ether	111-44-4	0.00008		5	L	2.00E+03
7	a	Bis(2-Chloroisopropyl) ether	39638-32-9	0.001		15	H	1.90E+02
7	a	Dichloroisopropyl ether	108-60-1	0.001		15	H	1.90E+02
7	b	4-Bromophenylphenyl ether	101-55-3	TBD	1	10	S	1.00E+00
7	b	4-Chlorophenyl phenyl ether	7005-72-3	TBD	1	4	S	3.30E+00
8		Bis(2-Ethylhexyl) phthalate	117-81-7	0.006		5	S	4.00E-01
8		Butylbenzylphthalate	85-68-7	0.1		15	S	2.90E+00
8		Diethylphthalate	84-66-2	30		15	S	8.96E+02
8		Dimethyl phthalate	131-11-3	400		15	S	4.30E+03
8		Di-n-butylphthalate	84-74-2	4		15	S	1.30E+01
8		Di-n-octylphthalate (DL)[5]	117-84-0	0.7		15	S	3.00E+00
9	a	1-Butanol (DL)[5]	71-36-3	4		10	S	9.10E+04
9	a	Benzyl alcohol (DL)[5]	100-51-6	TBD	1	10	S	4.00E+04
9	a	Isobutyl alcohol	78-83-1	10		20	S	7.60E+04
9	a	Methanol	67-56-1	20		15	L	5.00E+05
9		1,4-Dioxane [1,4-Diethyleneoxide]	123-91-1	0.008		5	L	2.00E+03
9		2,4,5-T	93-76-5	0.4		20	S	2.40E+02
9		2,4,5-TP [Silvex]	93-72-1	0.05		20	S	1.40E+02
9		2,4-D [2,4-Dichlorophenoxyacetic acid]	94-75-7	0.07		20	S	8.90E+02
9		Carbofuran phenol	1563-38-8	TBD	1	30	S	1.00E+00
9		Ethyl Acetate	141-78-6	30		15	L	1.00E+05
9		Kepone	143-50-0	2E-06		15	H	3.80E-01
9		Lead subacetate (Lead)	1335-32-6	TBD	1	15	H	1.90E+04
9		Methyl methacrylate	80-62-6	3		20	S	2.00E+01
9		Methyl methanesulfonate	66-27-3	TBD	1	20	H	1.62E+03
9		Phenyl mercuric acetate	62-38-4	TBD	1	15	S	4.37E+03
9		Phthalic anhydride	85-44-9	TBD	1	15	L	2.00E+03
9		Safrole	94-59-7	0.0005		20	H	8.10E+00
9		TCDD	1746-01-6	TBD	1	15	S	2.00E-05

Table 4-3. Organic Constituent Modified Treatability Envelope.

Major group		Chemical Name	CAS	HBL mg/L	HBL Value used for TBD (mg/L) (1)	EE/O (2)	Limiting factor (3)	Maximum Influent Concentration Envelope to Meet 10 * HBL (mg/L)
9		Vinyl acetate	108-05-4	40		15	S	2.00E+04
10	a	2-Acethylaminofluorene	53-96-3	TBD	1	10	S	1.44E+02
10	a	4-Aminobiphenyl	92-67-1	TBD	1	10	S	8.42E+02
10	a	Diphenylamine	122-39-4	0.9		15	S	5.76E+01
10	a	o-Phenylenediamine	95-54-5	TBD	1	30	S	1.00E+02
10	a	Phenacetin [p-Acetophenetidide]	62-44-2	TBD	1	20	S	5.30E+02
10	a	p-Phenylenediamine	106-50-3	7		30	L	2.00E+03
10	a	Pronamide	23950-58-5	0.005		20	H	8.10E+01
10	a	Selenourea (Selenium)	630-10-4	TBD	1	30	H	1.38E+02
10	a	Toluene-2,4-diamine	95-80-7	0.00003		30	H	4.14E-02
10	b	4,4'-Methylenebis(2-chloroaniline)	101-14-4	TBD	1	10	S	1.00E+00
10	b	Aniline	62-53-3	0.01		4	L	2.00E+03
10	b	o-Nitroaniline	88-74-4	TBD	1	10	S	1.47E+03
10	b	p-Chloroaniline	106-47-8	0.1		10	L	2.00E+03
10	b	p-Nitroaniline	100-01-6	TBD	1	10	S	6.00E+02
10	c	Acetonitrile	75-05-8	0.2		50	H	3.84E+01
10	c	Acrylonitrile	107-13-1	0.0002		5	L	2.00E+03
10	c	Methacrylonitrile	126-98-7	0.004		10	L	2.00E+03
10	d	1,3-Dinitrobenzene	99-65-0	0.004		15	S	4.70E+02
10	d	2,4-Dinitrophenol	51-28-5	0.07		7	L	2.00E+03
10	d	2,4-Dinitrotoluene	121-14-2	0.0001		10	S	1.32E+03
10	d	2,6-Dinitrotoluene	606-20-2	TBD	1	10	S	1.00E+00
10	d	4,6-Dinitro-o-cresol	534-52-1	TBD	1	7	S	1.30E+02
10	d	5-Nitro-o-toluidine	99-55-8	TBD	1	10	S	1.00E+00
10	d	Nitrobenzene	98-95-3	0.02		4	S	1.90E+03
10	d	Pentachloronitrobenzene (PCNB)	82-68-8	0.0003		40	S	7.11E-02
10	d	p-Nitrophenol	100-02-7	TBD	1	20	H	1.62E+03
10	e	Dibenz[a,h]acridine	226-36-8	TBD	1	30	S	1.00E+00
10	e	Dibenz[a,j]acridine	224-42-0	TBD	1	30	S	1.00E+00
10	e	N-Nitrosodiethylamine	55-18-5	6E-07		10	H	1.57E+01
10	e	N-Nitrosodimethylamine	62-75-9	2E-06		10	H	5.24E+01

Table 4-3. Organic Constituent Modified Treatability Envelope.

Major group		Chemical Name	CAS	HBL mg/L	HBL Value used for TBD (mg/L) (1)	EE/O (2)	Limiting factor (3)	Maximum Influent Concentration Envelope to Meet 10 * HBL (mg/L)
10	e	N-Nitrosodi-n-butylamine	924-16-3	0.00002		15	H	3.80E+00
10	e	N-Nitroso-di-n-dipropylamine	621-64-7	0.00001		4	S	9.90E+03
10	e	N-Nitrosodiphenylamine	86-30-6	0.02		15	S	4.00E+01
10	e	N-Nitrosomethylethylamine	10595-95-6	4E-06		10	H	1.05E+02
10	e	N-Nitrosomorpholine	59-89-2	TBD	1	10	L	1.00E+05
10	e	N-Nitrosopiperidine	100-75-4	2E-06		15	H	3.80E-01
10	e	N-Nitrosopyrrolidine	930-55-2	0.00004		15	H	7.61E+00
10	f	Methapyrilene	91-80-5	TBD	1	15	S	8.79E+02
10	f	Pyridine	110-86-1	0.04		4	S	4.00E+04
10		Aldicarb sulfone	1646-88-4	TBD	1	30	H	1.38E+02
10		Disulfiram	97-77-8	TBD	1	30	H	1.38E+02
10		Manganese dimethyldithiocarbamate	15339-36-3	TBD	1	30	S	1.00E+00
10		Physostigmine	57-47-6	TBD	1	30	S	1.00E+02
10		Physostigmine salicylate	57-64-7	TBD	1	30	H	1.38E+02
10		Potassium n-hyroxymethyl-n-methyl-dithiocarbamate	51026-28-9	TBD	1	30	H	1.38E+02
10		Sodium diethyldithiocarbamate	148-18-5	TBD	1	30	H	1.38E+02
10		Tetrabutylthiuram disulfide	1634-02-2	TBD	1	30	S	1.00E+00
11		A2213	30558-43-1	TBD	1	30	S	1.00E+00
11		Aldrin	309-00-2	5E-06		30	H	6.89E-03
11		Alpha-BHC	319-84-6	0.00001		60	H	1.17E-03
11		Aramite	140-57-8	0.003		30	S	1.00E-01
11		Barban	101-27-9	TBD	1	30	S	1.10E+01
11		Bendiocarb	22781-23-3	TBD	1	30	S	4.00E+01
11		Benomyl	17804-35-2	TBD	1	30	S	3.80E+00
11		Beta-BHC	319-85-7	0.00005		60	H	5.87E-03
11		Chlordane	57-74-9	0.002		60	H	2.35E-01
11		Butylate	2008-41-5	TBD	1	30	S	4.40E+01
11		Carbaryl	63-25-2	TBD	1	30	S	1.20E+02
11		Carbendazim	10605-21-7	TBD	1	30	S	1.00E+00
11		Carbofuran	1563-66-2	TBD	1	30	H	1.38E+02

Table 4-3. Organic Constituent Modified Treatability Envelope.

Major group	Chemical Name	CAS	HBL mg/L	HBL Value used for TBD (mg/L) (1)	EE/O (2)	Limiting factor (3)	Maximum Influent Concentration Envelope to Meet 10 * HBL (mg/L)
11	Copper dimethyldithiocarbamate	137-29-1	TBD	1	30	S	1.00E+00
11	DDD (p,p"-DDD)	72-54-8	0.0004		30	S	1.00E-01
11	DDE (p,p'-DDE)	72-55-9	0.0003		30	S	4.00E-02
11	DDT (p,p'-DDT)	50-29-3	0.0003		30	S	5.00E-03
11	Delta-BHC	319-86-8	TBD	1	60	S	1.00E+01
11	Dieldrin	60-57-1	5E-06		30	H	6.89E-03
11	Dinoseb	88-85-7	0.007		30	H	9.65E+00
11	Disolfoton	298-04-4	0.001		20	H	1.62E+01
11	Endosulfan I	959-98-8	TBD	1	20	S	1.00E+00
11	Endosulfan II	33213-65-9	TBD	1	20	S	1.00E+00
11	Endosulfan sulfate	1031-07-8	TBD	1	20	S	1.17E-01
11	Endrin	72-20-8	0.002		20	S	2.50E-01
11	Endrin aldehyde	7421-93-4	TBD	1	20	S	2.50E-01
11	EPTC	759-94-4	TBD	1	30	H	1.38E+02
11	Ethyl Ziram	14324-55-1	TBD	1	30	S	1.00E+00
11	Famphur	52-85-7	0.001		20	H	1.62E+01
11	Ferbam	14484-64-1	TBD	1	30	S	1.20E+02
11	Heptachlor	76-44-8	0.0004		60	H	4.70E-02
11	Heptachlor epoxide	1024-57-3	0.0002		20	S	3.50E-01
11	Isodrin	465-73-6	TBD	1	20	S	1.00E+00
11	Lindane [gamma-BHC]	58-89-9	0.0002		40	H	8.05E-02
11	Metam Sodium	137-42-8	TBD	1	30	H	1.38E+02
11	Methiocarb	2032-65-7	TBD	1	30	S	1.00E+00
11	Methoxychlor	72-43-5	0.04		20	S	4.00E-02
11	Methyl parathion	298-00-0	0.009		20	S	6.00E+01
11	Mexacarbate	315-18-4	TBD	1	30	S	1.00E+02
11	Molinate	2212-67-1	TBD	1	30	H	1.38E+02
11	o,p'-DDD	53-19-0	TBD	1	30	S	1.00E+00
11	o,p'-DDE	3424-82-6	TBD	1	30	S	1.00E+00
11	o.p'-DDT	789-02-6	TBD	1	30	S	1.00E+00
11	Oxamyl	23135-22-0	TBD	1	30	H	1.38E+02

Table 4-3. Organic Constituent Modified Treatability Envelope.

Major group	Chemical Name	CAS	HBL mg/L	HBL Value used for TBD (mg/L) (1)	EE/O (2)	Limiting factor (3)	Maximum Influent Concentration Envelope to Meet 10 * HBL (mg/L)
11	Parathion	56-38-2	0.2		20	S	2.40E+01
11	Pebulate	1114-71-2	TBD	1	30	S	6.00E+01
11	Phorate	298-02-2	0.007		20	S	5.00E+01
11	Potassium dimethyl dithiocarbamate -	128-03-0	TBD	1	30	H	1.38E+02
11	Potassium n-methyldithiocarbamate	137-41-7	TBD	1	30	S	1.00E+00
11	Promecarb	2631-37-0	TBD	1	30	S	9.10E+01
11	Propham	122-42-9	TBD	1	30	S	3.20E+01
11	Propoxur	114-26-1	TBD	1	30	H	1.38E+02
11	Selenium, tetrakis(dimethyl-dithiocarbamate	144-34-3	TBD	1	30	S	1.00E+00
11	Sodium dibutyldithiocarbamate	136-30-1	TBD	1	30	H	1.38E+02
11	Sodium dimethyldithiocarbamate	128-04-1	TBD	1	30	S	1.00E+00
11	Thiodicarb	59669-26-0	TBD	1	30	S	3.50E+01
11	Thiophanate-methyl	23564-05-8	TBD	1	30	S	3.50E+00
11	Toxaphene	8001-35-2	0.003		20	S	5.00E-01
11	Triallate	2303-17-5	TBD	1	30	S	4.00E+00
11	Vernolate	1929-77-7	TBD	1	30	S	1.07E+02
11	Ziram	137-30-4	TBD	1	30	S	6.50E+01
12	4,4'-Dichlorobiphenyl	2050-68-2	TBD	1	4	S	1.00E+00
12	Polychlorinated biphenyls	1336-36-3	0.0005		15	S	3.10E-02
13	1,1,1,2-Tetrachloroethane	630-20-6	0.003		80	H	1.90E-01
13	1,1,1-Trichloroethane (DL)[5]	71-55-6	0.2		150	H	5.36E+00
13	1,1,2,2-Tetrachloroethane	79-34-5	0.0004		80	H	2.54E-02
13	1,1,2-Trichloro-1,2,2-triflouroethane	76-13-1	0.00001		80	H	6.34E-04
13	1,1,2-Trichloroethane (DL)[5]	79-00-5	0.005		150	H	1.34E-01
13	1,1-Dichloroethane	75-34-3	0.0009		40	H	3.62E-01
13	1,2,3-Trichloropropane	96-18-4	0.00001		40	H	4.02E-03
13	1,2,Dibromo-3-chloropropane	96-12-8	0.0002		40	H	8.05E-02
13	1,2-Dichloropropane [Propylene dichloride]	78-87-5	0.005		40	H	2.01E+00
13	Bromodichloromethane	75-27-4	0.001		40	H	4.02E-01
13	Bromoform	75-25-2	0.01		60	H	1.17E+00

Table 4-3. Organic Constituent Modified Treatability Envelope.

Major group		Chemical Name	CAS	HBL mg/L	HBL Value used for TBD (mg/L) (1)	EE/O (2)	Limiting factor (3)	Maximum Influent Concentration Envelope to Meet 10 * HBL (mg/L)
13		Bromomethane [Methyl bromide]	74-83-9	0.05		40	H	2.01E+01
13		Carbon tetrachloride (DL)[5]	56-23-5	0.005		200	H	1.05E-01
13		Chloroethane	75-00-3	TBD	1	40	H	4.02E+01
13		Chloroform (DL)[5]	67-66-3	0.01		100	H	4.38E-01
13		Chloromethane [Methyl chloride]	74-87-3	0.007		30	H	9.65E+00
13		Dibromochloromethane	124-48-1	0.001		40	H	4.02E-01
13		Dibromomethane [Methylene bromide]	74-95-3	0.4		30	H	5.52E+02
13		Dichlorodifluoromethane	75-71-8	7		80	S	2.80E+02
13		Ethylene dibromide [1,2-Dibromoethane]	106-93-4	0.00005		40	H	2.01E-02
13		Ethylene dichloride [1,2-Dichloroethane] (DL)[5]	107-06-2	0.005		40	H	2.01E+00
13		Iodomethane [Methyl iodide]	74-88-4	TBD	1	30	H	1.38E+02
13		Methylene chloride [Dichloromethane]	75-09-2	0.005		60	H	5.87E-01
13		Trichlorofluoromethane	75-69-4	10		80	H	6.34E+02
14		1,1-Dichloroethylene (DL)[5]	75-35-4	0.007		4	L	2.00E+03
14		Allyl chloride [3-Chloropropene]	107-05-1	0.004		5	S	1.00E+02
14		cis-1,2-Dicloroethylene	156-59-2	0.07		5	L	2.00E+03
14		Tetrachloroethene [Tetrachloroethylene] (DL)[5]	127-18-4	0.005		4	S	1.50E+02
14		trans-1,2-Dichloroethylene	156-60-5	0.1		5	L	2.00E+03
14		trans-1,3-Dichloropropene	10061-02-6	TBD	1	5	L	2.00E+03
14		Trichloroethylene (DL)[5]	79-01-6	0.005		4	S	1.10E+03
14		Vinyl chloride (DL)[5]	75-01-4	0.002		4	L	2.00E+03
15	a	Ethylbenzene	100-41-4	0.7		7	S	1.52E+02
15	a	Toluene (DL)[5]	108-88-3	1		2	S	5.35E+02
15	a	Xylenes (total)	1330-20-7	10		7	S	1.98E+02
16		Chlorobenzene (DL)[5]	108-90-7	0.1		5	S	4.66E+02
16		Dichlorophenylarsine (Arsenic)	696-28-6	TBD		4	S	1.00E+00
17	a	Acrolein	107-02-8	0.7		4	L	2.00E+03
18	a	Isosafrole	120-58-1	TBD	1	15	S	1.00E+00
18		Ethyl ether	60-29-7	7		20	L	2.00E+03
18		Ethyl methacrylate	97-63-2	3		20	S	7.00E+02

Table 4-3. Organic Constituent Modified Treatability Envelope.

Major group		Chemical Name	CAS	HBL mg/L	HBL Value used for TBD (mg/L) (1)	EE/O (2)	Limiting factor (3)	Maximum Influent Concentration Envelope to Meet 10 * HBL (mg/L)
18		Tetrahydrofuran	109-99-9	TBD	1	4	L	2.00E+03
19		Acetone (DL)[5]	67-64-1	4		10	L	2.00E+05
19		Acetophenone	98-86-2	4		20	S	5.50E+03
19		Cyclohexanone	108-94-1	TBD	1	30	H	1.38E+02
19		Methyl ethyl ketone [2-Butanone] (DL)[5]	78-93-3	20		3	L	2.00E+05
19		Methyl isobutyl ketone [2-Methyl-4-pentanone] (DL)[5]	108-10-1	3		3	S	1.91E+04
20		Carbon disulfide	75-15-0	4		5	L	2.00E+03
20		tris(2,3-Dibromopropyl) phosphate	126-72-7	9E-06		10	S	1.20E+02
25	a	O,O,O-Triethyl phosphorothioate	126-68-1	TBD	1	30	S	1.00E+00
25	a	Tributyl phosphate (DL)[5]	126-73-8	0.02		5	S	2.80E+02
25	b	Tridecane	629-50-5	TBD	1	150	S	1.00E+00
25		Isophorone	7778-73-6	0.09		30	H	1.24E+02
25		Tetraethyl lead (Lead)	78-00-2	TBD	1	30	S	2.90E-01

(1) The EPA Docket Report did not include a HBL. TBD indicates to be determined. To complete the evaluation, a HBL of 1 mg/L was assumed. When a HBL is established for an organic constituent not included in the referenced Docket Report, the maximum influent concentration envelope at 10 times the HBL is determined by multiplying the newly determined HBL by the maximum influent concentration envelope from this table.

(2) EE/O is defined in Section 4.1. Shading indicates hard to treat organic compounds.

(3) The maximum influent concentration envelope depends on one of three factors: H indicates the envelope is based on 10 times HBL, L indicates the envelope is limited by the LERF liner compatibility, S indicates the envelope is limited by the organic compound solubility. Refer to Appendix B for solubility data and LERF liner compatibility data.

(4) The ETF influent waste concentration where following upon once-through treatment, the treated waste concentration is less than 10 times the HBL.

(5) DL indicates a delisting limit established in the final delisting (40 CFR 261 Appendix IX, Table 2).

CAS = Chemical Abstract Service.

EE/O = Electrical Energy per Order.

HBL = health-based level.

mg/L = milligrams per liter.

TBD = to be determined.

Table 4-4. Standards Treated Waste Must Meet.

Constituent	Delisting limit (micrograms per liter)	Washington State Waste Discharge Permit limits (micrograms per liter)		
		Enforcement limit monthly average	Enforcement limit daily maximum	Early warning value
1,1,1-Trichloroethane	2,000			
1,1,2-Trichloroethane	50			5
1,1-Dichloroethene	70			
1,2-Dichloroethane	50			
1,4-Dichlorobenzene	750			
1-Butanol	40,000			
Methyl ethyl ketone	200,000			
Methyl isobutyl ketone	30,000			
Acetone	40,000			
Acetophenone				10
Ammonia (as N)				830
Ammonium	10,000			
Antimony	60			
Arsenic	500	15	30	
Barium	20,000			
Benzene	50			5
Benzyl alcohol	100,000			
Beryllium	40			40
Cadmium	50			7.5
Carbon tetrachloride	50	5	10	
Chloride				250,000
Chlorobenzene	1,000			
Chloroform	100			5
Chromium	1,000	20		
Copper				70
Cyanide	2,000			
Di-n-octyl phthalate	7,000			
Fluoride	40,000			
Hexachloroethane	60			
Lead	150			38
Mercury	20			2
Naphthalene	10,000			
Nickel	1,000			
Nitrate (as N)		3,800		
Nitrite (as N)				100
Nitrogen total (TKN)				600
N-Nitrosodimethylamine		20		
Selenium	500			
Silver	2,000			
Sulfate		10,000		
Tetrachloroethylene	50	5	10	
Tetrahydrofuran				100

Table 4-4. Standards Treated Waste Must Meet.

Constituent	Delisting limit (micrograms per liter)	Washington State Waste Discharge Permit limits (micrograms per liter)		
		Enforcement limit monthly average	Enforcement limit daily maximum	Early warning value
Toluene	10,000			
Total cresol	20,000			
Total dissolved solids				380,000
Total organic carbon				1,100
Total suspended solids				4,000
Tributyl phosphate	200			
Trichloroethylene	50			
Vanadium	2,000			
Vinyl chloride	20			
Zinc	100,000			

This page intentionally left blank.

5.0 SAMPLING AND ANALYSIS

The ETF/LERF sampling and analysis, as part of the waste analysis plan, is detailed in the Hanford Facility RCRA Permit (Chapter 4). The waste analysis plan includes sections that define the ETF/LERF process for accepting waste and the sample analysis requirements for verification tank samples to confirm that the waste is treated below the regulatory limits before disposal.

The leachate to be treated at the ETF will be generated from solid waste identified in Chapter 2.0 as a typical distribution of waste to be managed at the LLBG. Using Table 2-1 as a typical distribution of what the leachate might contain and the treatability evaluation, detailed in Chapter 4.0, strong evidence is provided that no additional delisting limits or analytical requirements need to be imposed by the waste analysis plan as a result of treating multi-source leachate. The following reasons justify this recommendation.

- There are only three organic compounds that are hard to treat and are greater than one-tenth of one percent of the typical waste volume to be disposed at the LLBG (refer to Table 2-1). These three compounds, 1,2-dichloroethane, carbon tetrachloride, and chloroform, currently have delisting limits as part of the Final Delisting (40 CFR 261 Appendix IX, Table 2). Based on the treatability analysis in Chapter 4.0, the halogenated hydrocarbon treatability groups (e.g., volatile halogenated alkanes and chlorinated aliphatic hydrocarbons) are the most difficult to treat. This is consistent with the conclusion drawn in the initial delisting petition. The sample and analysis plan currently includes these compounds.

- There are seven other organics that are hard to treat and are each less than one-tenth of one percent of the typical waste volume to be disposed at the LLBG (refer to Table 2-1). Of the seven compounds, hexachloroethane and 1,1,1-trichloroethane have delisting levels and are included in the sample and analysis plan. The other five compounds are acetonitrile, chlordane, heptachlor, methylene chloride, and trichlorofluorormethane. As shown in Table 2-1, only 17 waste containers have a waste designation including these five compounds. Methylene chloride, a common laboratory contaminate, is also included in the sample and analysis plan. Because of the very low percentage of waste volume designated due to these compounds and the fact that the LDR requirements for these organic compounds must be met before disposal at the LLBG, these compounds will not be included in the analytical requirements.

- Sulfide does not have a delisting limit and currently is identified as being associated with less than one percent of the waste identified for disposal at the LLBG. Sulfide is readily removed at the ETF, refer to Section 4.3. Cyanide is used to represent sulfide because it is associated with a much larger volume of waste and, as with sulfide, is removed easily by the ETF processes as shown in the initial delisting petition (DOE/RL-92-72). Cyanide currently has a delisting limit. Using a constituent to represent other constituents is a basic tenant of the treatability group concept.

- Cobalt, osmium, thallium, and tin are not identified as metals in the typical waste volume to be disposed at the LLBG (refer to Table 2-1). These metals are removed easily at the ETF (refer to Section 4.3). Mercury, a metal expected in waste disposed at the LLBG, has the same HBL as thallium and is used to represent thallium. The other three metals have representative metals based on similar valance states. Cobalt is represented by zinc, and osmium and tin are represented by selenium. Mercury, selenium, and zinc currently have delisting limits and are included in the sample and analysis plan. Using a constituent to represent other constituents is a basic tenant of the treatability group concept.

For these reasons, no additional delisting limits are required, no additional analytical requirements are needed, and no changes are required in the verification tank sampling frequency. The requirements in the current waste analysis plan ensure that LERF/ETF treatment and storage of multi-source leachate is monitored to ensure the waste is rendered nonhazardous and nondangerous before disposal.

Given the upfront delisting approach employed by this delisting modification document, sampling and analysis information required by 40 CFR 260.22(i)(1), (2), (3), (10), and (11) is not available.

6.0 F039 LEACHATE DELISTING CONCLUSION

The waste management process described shows that ETF can effectively treat multi-source leachate. Given the cradle-to-grave control of multi-source leachate, the treatment capabilities of the ETF, and the regulatory control over this process, the ETF effluent "is not capable of posing a substantial present or potential threat to public health or the environment. . ." [WAC 173-303-072(4)]. This is ensured based on the following.

- Waste being disposed into the lined RCRA-compliant disposal trenches must meet federal and state LDRs. Disposal trenches operate under strict adherence to waste acceptance criteria, which is verified for concentration based LDRs by sampling and analysis. This ensures metals are stabilized/immobilized, inorganics are deactivated, and organics are destroyed before disposal.

- When leachate is generated from the lined RCRA-compliant disposal trench, the leachate is designated with the F039 listed waste number, and characterized per the requirements of the LERF/ETF waste analysis plan, the sampling and generator provisions outlined in WAC 173-303-200 (40 CFR 262.34), as well as Sections 2.2 and 2.2.3 of this document. This ensures that LERF/ETF personnel are involved early in the leachate management process, thus minimizing problems with accepting the waste.

- ETF provides flexible and robust wastewater treatment capabilities using best available technology/all known and available technologies for chemical constituents. This ensures that if constituents are reasonably expected to be present in the leachate, these constituents will be destroyed or removed effectively from ETF treated effluent.

- Before treated effluent from ETF is land disposed, verification (by means of sampling and analysis) is performed to ensure the treated effluent meets all discharge requirements. If the effluent fails any of the strict controls, the effluent is rejected and retreated through ETF treatment units.

This page intentionally left blank.

7.0 REFERENCES

DOE/RL-98-09, *1998 Report on Hanford Site Land Disposal Restrictions for Mixed Waste*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-97-03, *Hanford Facility Dangerous Waste Permit Application, Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-92-72, *200 Area Effluent Treatment Facility Delisting Petition*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-91-17, *Hanford Facility Dangerous Waste Permit Application, Central Waste Complex*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-88-20, *Hanford Facility Dangerous Waste Permit Application, Low-Level Burial Grounds*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-88-21, *Hanford Facility Dangerous Waste Part A Permit Application*, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

DOE/RL-98-47, *Environmental Restoration Disposal Facility Leachate Delisting Petition*, Draft B, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

Ecology, 1994, *Dangerous Waste Portion of the Resource Conservation and Recovery Act Permit*, Number WA7890008967, revised periodically, Washington State Department of Ecology, Olympia, Washington.

EPA, 1991, "A Project Manager's Guide to Requesting and Evaluating Chemical Analysis", EPA Contract No. 68D80085.

EPA 530/R-93/007, *Petition to Delist Hazardous Wastes, A Guidance Manual*, Second Edition, Prepared by the Science Applications International Corporation, Falls Church, VA for the Delisting Section Office of Solid Waste, U.S. Environmental Protection Agency, Washington, D.C.

EPA, 1994, *Docket Report on Health-Based Levels and Solubilities Used in the Evaluation of Delisting Petitions, Submitted Under 40 CFR 260.20 and 260.22*, Delisting Section, Waste Identification Branch, Office of Solid Waste, Environmental Protection Agency, Washington, D.C.

Hanford Facility RCRA Permit, Dangerous Waste Portion: Part III, Chapter 4, Liquid Effluent Retention Facility and 200 Area Effluent Treatment Facility; Part VI, Chapter 2, 183-H Solar Evaporation Basins.

HSDB, 1987, "Hazardous Substance Data Bank", National Library of Medicine, Bethesda, Maryland (CD-ROM version), MICROMEDEX, Inc., Englewood, Colorado.

ST 4500, *State Waste Discharge Permit, State of Washington Department of Ecology*, Washington State Department of Ecology, Olympia, Washington.

WHC-SD-WM-TI-714, High-Density Polyethylene Liner Chemical Compatibility for Radioactive Mixed Waste Trenches, Westinghouse Hanford Company, Richland, Washington.

60 FR 6054, "Hazardous Waste Management System; Identifications and Listing of Hazardous Waste; Proposed Exclusion".

60 FR 31115, "Hazardous Waste Management System; Identification and Listing of Hazardous Waste; Final Exclusion".

APPENDIX A

EFFLUENT TREATMENT FACILITY ACTUAL TREATMENT EFFICIENCIES

This page intentionally left blank.

Effluent Treatment Facility Actual Treatment Efficiencies.

Constituent [1]	Units	ETF Influent Aqueous Waste for Treatment				ETF Treated Aqueous Waste for Disposal				ETF Removal Efficiency Based on Averages[3]
		Count [2]	Minimum	Average	Maximum	Count [2]	Minimum	Average	Maximum	
1,1,1-TRICHLOROETHANE	ug/L	29	0	0.00E+00	0	61	0	0.00E+00	0	ND
1,1,2-TRICHLOROETHANE	ug/L	29	0	2.34E-02	0.68	61	0	0.00E+00	0	100.00%
1,1-DICHLOROETHANE	ug/L	26	0	0.00E+00	0	61	0	0.00E+00	0	ND
1,1-DICHLOROETHENE	ug/L	26	0	0.00E+00	0	61	0	0.00E+00	0	ND
1,2,4-TRICHLOROBENZENE	ug/L	14	0	0.00E+00	0	58	0	0.00E+00	0	ND
1,2- DICHLOROETHENE (TOTAL)	ug/L	27	0	0.00E+00	0	61	0	0.00E+00	0	ND
1,2-DICHLOROETHANE	ug/L	26	0	0.00E+00	0	61	0	0.00E+00	0	ND
1,4-DICHLOROBENZENE	ug/L	39	0	7.69E-01	10	61	0	0.00E+00	0	100.00%
1-BUTANOL	ug/L	58	0	7.63E+02	3000	61	0	0.00E+00	0	100.00%
2,4-DINITROTOLUENE	ug/L	14	0	0.00E+00	0	58	0	0.00E+00	0	ND
2-BUTANONE	ug/L	72	0	1.35E+01	61	61	0	0.00E+00	0	100.00%
2-BUTOXYETHANOL	ug/L	60	0	1.93E+02	590	59	0	1.69E-02	1	99.99%
2-CHLOROPHENOL	ug/L	14	0	0.00E+00	0	58	0	0.00E+00	0	ND
2-HEXANONE	ug/L	58	0	1.98E+00	7	61	0	0.00E+00	0	100.00%
2-METHYLPHENOL	ug/L	14	0	0.00E+00	0	59	0	0.00E+00	0	ND
2-PENTANONE	ug/L	72	0	6.72E+00	23	61	0	0.00E+00	0	100.00%
3-METHYLPHENOL	ug/L	14	0	0.00E+00	0	59	0	0.00E+00	0	ND
4-CHLORO-3-METHYLPHENOL	ug/L	14	0	0.00E+00	0	59	0	0.00E+00	0	ND
4-METHYL-2-PENTANONE	ug/L	26	0	0.00E+00	0	61	0	0.00E+00	0	ND
4-NITROPHENOL	ug/L	14	0	0.00E+00	0	58	0	0.00E+00	0	ND
ACENAPHTHENE	ug/L	14	0	0.00E+00	0	58	0	0.00E+00	0	ND
ACETONE	ug/L	75	0	3.41E+02	1000	79	0	1.81E+01	180	94.70%
ACETOPHENONE	ug/L	60	0	3.87E+00	10	73	0	6.30E-02	0.5	98.37%
ALKALINITY (mg CaCO3/L)	mg/L	14	108.4	2.37E+02	358.9	NA [4]	NA	NA	NA	NA
ALUMINUM	ug/L	60	0	4.69E+01	115	64	0	7.52E+00	177	83.97%
AMMIONIA	ug/L	28	110	2.20E+02	300	NA	NA	NA	NA	NA
AMMONIA (AS N)	ug/L	32	0	1.00E+02	209.4	73	0	7.38E-03	0.125	99.99%
ANTIMONY	ug/L	69	0	1.24E+00	42	85	0	1.94E+00	28.2	ND
ARSENIC	ug/L	38	0	4.63E-01	3	76	0	1.99E-01	4.7	57.11%
BARIUM	ug/L	60	0	1.00E+01	108	86	0	1.40E+00	114	86.07%

Effluent Treatment Facility Actual Treatment Efficiencies.

Constituent [1]	Units	ETF Influent Aqueous Waste for Treatment				ETF Treated Aqueous Waste for Disposal				ETF Removal Efficiency Based on Averages[3]
		Count [2]	Minimum	Average	Maximum	Count [2]	Minimum	Average	Maximum	
BENZENE	ug/L	29	0	8.62E-02	2.5	61	0	0.00E+00	0	100.00%
BENZYL ALCOHOL	ug/L	44	0	2.23E+00	6	59	0	0.00E+00	0	100.00%
BERYLLIUM	ug/L	60	0	0.00E+00	0	86	0	0.00E+00	0	ND
BROMIDE	ug/L	22	0	2.50E-02	0.2	62	0	0.00E+00	0	100.00%
BROMODICHLOROMETHANE	ug/L	3	0	0.00E+00	0	9	0	0.00E+00	0	ND
CADMIUM	ug/L	44	0	2.50E-02	0.4	75	0	2.67E-03	0.2	ND
CALCIUM	ug/L	60	259	1.11E+04	112000	64	0	3.25E+01	327	99.71%
CARBON DISULFIDE	ug/L	21	0	0.00E+00	0	61	0	0.00E+00	0	ND
CARBON TETRACHLORIDE	ug/L	32	0	1.78E+01	50	61	0	0.00E+00	0	100.00%
CHLORIDE	mg/L	42	0	6.22E+00	22.45	63	0	5.29E-03	0.15	99.92%
CHLOROBENZENE	ug/L	29	0	0.00E+00	0	61	0	0.00E+00	0	ND
CHLOROFORM	ug/L	32	0	1.89E+00	5.58	61	0	9.84E-03	0.6	99.48%
CHROMIUM	ug/L	28	0	2.48E+00	6.5	71	0	6.61E-01	13	73.35%
COBALT	ug/L	60	0	1.26E-01	7.54	64	0	3.18E-01	11.6	ND
COPPER	ug/L	61	0	3.68E+00	11	91	0	5.35E-01	28	85.47%
CYANIDE	ug/L	29	0	1.91E+00	13.1	72	0	1.31E-01	4.64	93.14%
DI-N-OCTYL PHTHALATE	ug/L	14	0	7.86E-02	1.1	59	0	0.00E+00	0	100.00%
FLUORIDE	mg/L	41	0	2.72E-01	0.575	62	0	1.53E-02	0.1	94.37%
FORMATE	mg/L	19	0	1.75E-01	0.65	NA	NA	NA	NA	NA
HEXACHLOROETHANE	ug/L	14	0	0.00E+00	0	59	0	0.00E+00	0	ND
IRON	ug/L	60	0	2.52E+01	161	64	0	1.39E+01	115	44.73%
LEAD	ug/L	40	0	1.50E-01	2	75	0	8.25E-02	3	45.00%
MAGNESIUM	ug/L	60	0	3.57E+03	36000	64	0	8.26E+00	116	99.77%
MANGANESE	ug/L	60	0	4.83E-01	8	64	0	1.73E+00	111	ND
MERCURY	ug/L	61	0	8.03E-02	0.8	83	0	2.54E-02	0.6	68.41%
METHYLENE CHLORIDE	ug/L	26	0	7.69E-02	2	61	0	3.28E-02	2	ND
N-NITROSODI-N-PROPYLAMINE	ug/L	14	0	0.00E+00	0	58	0	0.00E+00	0	ND
N-NITROSODIMETHYLAMINE	ug/L	44	0	9.57E+00	40	59	0	0.00E+00	0	100.00%
NAPHTHALENE	ug/L	14	0	0.00E+00	0	62	0	2.42E-02	1	ND
NICKEL	ug/L	60	0	2.88E+00	48	86	0	1.65E+00	26.3	42.61%

Effluent Treatment Facility Actual Treatment Efficiencies.

Constituent [1]	Units	ETF Influent Aqueous Waste for Treatment				ETF Treated Aqueous Waste for Disposal				ETF Removal Efficiency Based on Averages[3]
		Count [2]	Minimum	Average	Maximum	Count [2]	Minimum	Average	Maximum	
NITRATE (AS N)	mg/L	51	0	3.33E+01	75.3	73	0	1.48E-02	0.264	99.96%
NITRITE (AS N)	mg/L	25	0	3.53E-01	1.54	63	0	4.13E-04	0.026	99.88%
NITROGEN TOTAL (TKN)	mg/L	59	0	1.49E+02	270	85	0	1.22E-01	1.322	99.92%
PENTACHLOROPHENOL	ug/L	14	0	0.00E+00	0	58	0	0.00E+00	0	ND
pH MEASUREMENT	pH	82	7	9.52E+00	10.76	NA	NA	NA	NA	NA
PHENOL	ug/L	14	0	0.00E+00	0	58	0	0.00E+00	0	ND
PHOSPHATE	mg/L	23	0	0.00E+00	0	62	0	0.00E+00	0	ND
PHOSPHORUS, ALL FORMS	ug/L	4	0	2.93E+01	117	NA	NA	NA	NA	NA
POTASSIUM	ug/L	60	0	8.07E+02	7060	63	0	0.00E+00	0	100.00%
PROPIONITRILE	ug/L	30	0	3.67E-01	4	61	0	0.00E+00	0	100.00%
PYRENE	ug/L	14	0	0.00E+00	0	58	0	0.00E+00	0	ND
SELENIUM	ug/L	40	0	1.22E+00	14.3	75	0	7.08E-01	21.1	41.82%
SILICA (SILICON DIOXIDE	mg/L	14	24	3.78E+01	52	NA	NA	NA	NA	NA
SILICON	ug/L	24	11.2	6.99E+03	24300	59	0	3.41E+01	1110	99.51%
SILVER	ug/L	60	0	8.33E-02	5	86	0	4.19E-01	17	ND
SODIUM	ug/L	60	236	1.42E+04	12300	64	0	1.27E+02	1150	99.10%
SPECIFIC CONDUCTIVITY	umhos/cm	81	110.5	4.94E+02	1101	88	1	2.78E+00	35.03	99.44%
STRONTIUM	ug/L	6	5.8	1.55E+02	480	NA	NA	NA	NA	NA
SULFATE	mg/L	56	0	4.56E+01	311	71	0	9.86E-02	2.2	99.78%
TETRACHLOROETHYLENE	ug/L	29	0	8.62E-02	2.5	61	0	9.84E-02	6	ND
TETRAHYDROFURAN	ug/L	68	0	8.19E+01	180	62	0	3.23E-02	2	99.96%
THALLIUM	ug/L	60	0	0.00E+00	0	64	0	0.00E+00	0	ND
TITANIUM	ug/L	32	0	1.56E+00	8	64	0	9.95E-02	6.37	93.63%
TOLUENE	ug/L	30	0	1.83E-01	3	65	0	5.23E-02	1	ND
TOTAL CRESOL	ug/L	14	0	0.00E+00	0	59	0	0.00E+00	0	ND
TOTAL DISSOLVED SOLIDS	mg/L	35	1	2.29E+02	706	67	0	2.70E+00	42	98.82%
TOTAL ORGANIC CARBON	mg/L	68	0	4.60E+00	9.93	96	0	5.33E-02	0.599	98.84%
TOTAL SUSPENDED SOLIDS	mg/L	62	0	2.09E+00	16.6	78	0	5.80E-01	6.67	72.21%
TRIBUTYL PHOSPHATE	ug/L	38	0	4.69E+02	1200	59	0	2.20E-02	0.5	100.00%
TRICHLOROETHENE	ug/L	28	0	1.29E+00	6.3	61	0	0.00E+00	0	100.00%

Effluent Treatment Facility Actual Treatment Efficiencies.

Constituent [1]	Units	ETF Influent Aqueous Waste for Treatment				ETF Treated Aqueous Waste for Disposal				ETF Removal Efficiency Based on Averages[3]
		Count [2]	Minimum	Average	Maximum	Count [2]	Minimum	Average	Maximum	
URANIUM (TOTAL)	ug/L	41	0	1.02E+02	360	83	0	1.45E-02	1.2	99.99%
VANADIUM	ug/L	60	0	2.52E+00	23	86	0	2.16E-01	11	91.42%
VINYL CHLORIDE	ug/L	26	0	0.00E+00	0	61	0	0.00E+00	0	ND
XYLENE (TOTAL)	ug/L	28	0	8.93E-02	2.5	62	0	3.23E-02	2	ND
ZINC	ug/L	60	0	2.08E+01	41	86	0	3.72E+00	38.1	82.14%

[1] Zero was substituted when a constituent was reported as nondetected.

[2] COUNT indicates the number of analyses performed.

[3] ND indicates not determined because not detected or to close to detection level that the efficiency calculation can not be interpreted.

[4] NA indicates not analyzed.

APPENDIX B

BACKGROUND INFORMATION USED TO DETERMINE THE TREATABILITY ENVELOPE FOR ORGANICS

This page intentionally left blank.

Background Information Used to Determine the Treatability Envelope for Organics.

Treatability Group	Constituent Name	CAS no.	Waste Number	Final Delisting	Pilot Testing	HBL (mg/L)	HBL Value used for TBD (mg/L) (1)	Solubility (mg/L)	Solubility Preference	LERF Liner Compatibility Limits (mg/L) (2)	EE/O
1	2,4-Dimethylphenol	105-67-9	U101			0.7		5.90E+02	EPA	2000	10
1	Coal tar creosote	8007-45-2				TBD	1	slightly soluble	HSDB	100000	10
1	Creosote	8001-58-9				TBD	1	slightly soluble	HSDB	100000	10
1	Cresol [Cresylic acid]	1319-77-3	F001-5, U052	c	t	2		3.10E+04	EPA	100000	10
1	m-Cresol [3-Methylphenol]	108-39-4	F001-5, U052			TBD	1	2.50E+04	HSDB	100000	10
1	o-Cresol [2-Methylphenol]	95-48-7	F001-5, U052			TBD	1	2.50E+04	HSDB	100000	10
1	p-Cresol [4-Methylphenol]	106-44-5	F001-5, U052			TBD	1	2.50E+04	HSDB	100000	10
1	Phenol	108-95-2	U188		t	20		9.30E+04	EPA	100000	4
2	2,3,4,6-Tetrachlorophenol	58-90-2	F020-23, F026-28			1		1.00E+03	EPA	100000	10
2	2,3,4,6-tetrachlorophenol, potassium salt [2,3,4,6-tetrachlorophenol salt]	53535-27-6				TBD	1	1.00E+03	EPA	100000	10
2	2,3,4,6-tetrachlorophenol, sodium salt [2,3,4,6-tetrachlorophenol, salt]	25567-55-9				TBD	1	1.00E+03	EPA	100000	10
2	2,4,5-Trichlorophenol	95-95-4	F020-23, F026-28			4		1.19E+03	EPA	100000	10
2	2,4,6-Tribromophenol	118-79-6				TBD	1	7.00E+01	HSDB	100000	10
2	2,4,6-Trichlorophenol	88-06-2	F020-23, F026-28			0.008		8.00E+02	EPA	100000	10
2	2,4-Dichlorophenol	120-83-2	U081			0.1		4.60E+03	EPA	2000	10
2	2,6-Dichlorophenol	87-65-0	U082			TBD	1	4.60E+03	HSDB	2000	10
2	m-Chloro-3-methylphenol	59-50-7	U039			TBD	1	3.85E+03	HSDB	2000	10
2	o-Chlorophenol	95-57-8	U048			0.2		2.85E+04	EPA	2000	10
2	Pentachlorophenol	87-86-5	F020-23, F026-28		t	0.001		1.40E+01	EPA	100000	4
2	Potassium pentachlorophenate [Pentachlorophenol salt]	7778-73-6				0.001		3.30E+05	HSDB	100000	4
2	Sodium pentachlorophenate [Pentachlorophenol salt]	131-52-2				0.001		3.30E+05	HSDB	100000	4
3	Acenaphthene	83-32-9	F039			2		3.42E+00	EPA	2000	10
3	Acenaphthylene	208-96-8	F039			TBD	1	3.93E+00	HSDB	2000	10
3	Anthracene	120-12-7	F039			10		1.29E+00	EPA	2000	10
3	Benzene	71-43-2	F001-5, U019	c	t	0.005		1.75E+03	EPA	2000	3
3	Benzenearsonic acid (Arsenic)	98-05-5				TBD	1	2.50E+04	MSDS	100000	10
3	Fluorene	86-73-7	F039			1		1.69E+00	EPA	2000	10
3	Naphthalene	91-20-3	U051, U165	c	t	1		3.40E+01	EPA	2000	3
3	Phenanthrene	85-01-8	U051			TBD	1	1.60E+00	HSDB	2000	10
3	Styrene	100-42-5				0.1		3.00E+02	EPA	5000	7
4	3-Methylcholanthrene	56-49-5	U157			0.00000003		unk		2000	10
4	Benzo(a)anthracene	56-55-3	U018			0.000004		5.70E-03	EPA	2000	10

Background Information Used to Determine the Treatability Envelope for Organics.

Treatability Group		Constituent Name	CAS no.	Waste Number	Final Delisting	Pilot Testing	HBL (mg/L)	HBL Value used for TBD (mg/L) (1)	Solubility (mg/L)	Solubility Preference	LERF Liner Compatibility Limits (mg/L) (2)	EE/O
4		Benzo(a)pyrene	50-32-8	U022			0.0002		1.20E-03	EPA	2000	10
4		Benzo(b)fluoranthene	205-99-2	F039			0.0001		1.40E-02	EPA	2000	10
4		Benzo(ghi)perylene	191-24-2	F039			TBD	1	2.60E-04	HSDB	2000	10
4		Benzo(k)fluoranthene	207-08-9	F039			TBD	1	7.60E-04	HSDB	2000	10
4		Chrysene	218-01-9	U050			0.001		1.80E-03	EPA	2000	10
4		Dibenzo[a,e]pyrene	192-65-4	F039			TBD	1	unk		2000	10
4		Dibenzo[a,h]anthracene	53-70-3	U063			0.000002		5.00E-04	EPA	2000	10
4		Dibenzo[a,h]pyrene	189-64-0				TBD	1	insoluble	MSDS	2000	10
4		Fluoranthrene	206-44-0	U120			1		2.06E-01	EPA	2000	10
4		Indeno(1,2,3,cd)pyrene	193-39-5	F039			0.0001		5.30E-04	EPA	2000	15
4		Pyrene	129-00-0	U051		t	1		1.32E-01	EPA	2000	4
5	a	1,2,4,5-Tetrachlorobenzene	95-94-3	U207			0.01		6.00E+00	EPA	2000	20
5	a	1,2,4-Trichlorobenzene	120-82-1	F039			0.07		3.00E+01	EPA	2000	15
5	a	m-Dichlorobenzene	541-73-1	F001-5, U071			TBD	1	1.23E+02	HSDB	2000	15
5	a	o-Dichlorobenzene	95-50-1	U070			0.6		1.00E+02	EPA	2000	15
5	a	p-Dichlorobenzene	106-46-7	U072	c	t	0.075		7.90E+01	EPA	2000	5
5	a	Pentachlorobenzene	608-93-5	U183			0.03		1.35E-01	EPA	2000	20
5		2-Chloronaphthalene [beta-Chloronaphthalene]	91-58-7	U047			3		6.74E+00	EPA	2000	10
5		Heptachlorodibenzofuran	38998-75-3				TBD	1	unk		2000	15
5		Heptachlorodibenzo-p-dioxins	35822-46-9				TBD	1	insoluble	CAMSOFT	2000	15
6	a	Hexachloroethane	67-72-1	U131	c	t	0.006		5.00E+01	EPA	2000	100
6	b	1,3-Dichloropropene	542-75-6	U084			0.0005		2.80E+03	EPA	2000	7
6	b	Chloroprene [2-Chloro-1,3-butadiene]	126-99-8	F039			0.7		3.00E+02	EPA	2000	10
6	b	cis-1,3-Dichloropropene	10061-01-5	U084			TBD	1	2.70E+03	HSDB	2000	7
6	b	Hexachlorobutadiene	87-68-3	U128			0.001		1.50E-01	EPA	2000	10
6	b	Hexachloropropene	1888-71-7	U243			0.01		4.00E-03	EPA	2000	10
7	a	bis(2-Chloroethoxy) methane	111-91-1	U024			TBD	1	8.10E+04	HSDB	2000	15
7	a	Bis(2-Chloroethyl) ether	111-44-4	U025		t	0.00008		1.02E+04	EPA	2000	5
7	a	Bis(2-Chloroisopropyl) ether	39638-32-9	U027			0.001		1.70E+03	EPA	2000	15
7	a	Dichloroisopropyl ether	108-60-1	U027			0.001		1.70E+03	EPA	2000	15
7	b	4-Bromophenylphenyl ether	101-55-3	U030			TBD	1	insoluble	HSDB	2000	10
7	b	4-Chlorophenyl phenyl ether	7005-72-3			t	TBD	1	3.30E+00	HSDB	2000	4
8		Bis(2-Ethylhexyl) phthalate	117-81-7	U028		t	0.006		4.00E-01	EPA	2000	5
8		Butylbenzylphthalate	85-68-7	F039			0.1		2.90E+00	EPA	200000	15

Background Information Used to Determine the Treatability Envelope for Organics.

Treatability Group		Constituent Name	CAS no.	Waste Number	Final Delisting	Pilot Testing	HBL (mg/L)	HBL Value used for TBD (mg/L) (1)	Solubility (mg/L)	Solubility Preference	LERF Liner Compatibility Limits (mg/L) (2)	EE/O
8		Diethylphthalate	84-66-2	U088			30		8.96E+02	EPA	100000	15
8		Dimethyl phthalate	131-11-3	U102			400		4.30E+03	EPA	100000	15
8		Di-n-butylphthalate	84-74-2	U069			4		1.30E+01	EPA	100000	15
8		Di-n-octylphthalate	117-84-0	U107	c		0.7		3.00E+00	EPA	100000	15
9	a	1-Butanol	71-36-3	F001-5, U031	c	t	4		9.10E+04	HSDB	500000	10
9	a	Benzyl alcohol	100-51-6		c	t	TBD	1	4.00E+04	HSDB	500000	10
9	a	Isobutyl alcohol	78-83-1	F001-5, U140			10		7.60E+04	EPA	500000	20
9	a	Methanol	67-56-1	F001-5, U154			20		1.00E+06	EPA	500000	15
9		1,4-Dioxane [1,4-Diethyleneoxide]	123-91-1	U108			0.008		4.31E+05	EPA	2000	5
9		2,4,5-T	93-76-5	F039			0.4		2.40E+02	EPA	2000	20
9		2,4,5-TP [Silvex]	93-72-1	[D017]			0.05		1.40E+02	EPA	2000	20
9		2,4-D [2,4-Dichlorophenoxyacetic acid]	94-75-7	U240			0.07		8.90E+02	EPA	2000	20
9		Carbofuran phenol	1563-38-8	U367			TBD	1	unk		2000	30
9		Ethyl Acetate	141-78-6	F039			30		1.00E+05	EPA	100000	15
9		Kepone	143-50-0	U142			0.000002		7.60E+00	EPA	2000	15
9		Lead subacetate (Lead)	1335-32-6				TBD	1	6.25E+04	HSDB	100000	15
9		Methyl methacrylate	80-62-6	U162			3		2.00E+01	EPA	2000	20
9		Methyl methanesulfonate	66-27-3	F039			TBD	1	2.00E+05	HSDB	2000	20
9		Phenyl mercuric acetate	62-38-4	P092			TBD	1	4.37E+03	HSDB	100000	15
9		Phthalic anhydride	85-44-9	U190			TBD	1	6.17E+03	HSDB	2000	15
9		Safrole	94-59-7	U203			0.0005		1.50E+03	EPA	2000	20
9		TCDD	1746-01-6				TBD	1	2.00E-05	HSDB	2000	15
9		Vinyl acetate	108-05-4				40		2.00E+04	EPA	100000	15
10	a	2-Acethylaminofluorene	53-96-3	U005			TBD	1	1.44E+02	HSDB	2000	10
10	a	4-Aminobiphenyl	92-67-1	F039			TBD	1	8.42E+02	HSDB	2000	10
10	a	Diphenylamine	122-39-4	F039			0.9		5.76E+01	EPA	2000	15
10	a	o-Phenylenediamine	95-54-5				TBD	1	slightly soluble	HSDB	2000	30
10	a	Phenacetin [p-Acetophenetidide]	62-44-2	U187			TBD	1	5.30E+02	HSDB	2000	20
10	a	p-Phenylenediamine	106-50-3				7		3.80E+04	EPA	2000	30
10	a	Pronamide	23950-58-5	U192			0.005		1.00E+02	EPA	2000	20
10	a	Selenourea (Selenium)	630-10-4				TBD	1	soluble	HSDB	2000	30
10	a	Toluene-2,4-diamine	95-80-7				0.00003		4.77E+04	EPA	2000	30
10	b	4,4'-Methylenebis(2-chloroaniline)	101-14-4	U158			TBD	1	insoluble	HSDB	2000	10
10	b	Aniline	62-53-3	U012		t	0.01		3.50E+04	EPA	2000	4
10	b	o-Nitroaniline	88-74-4				TBD	1	1.47E+03	HSDB	2000	10

Background Information Used to Determine the Treatability Envelope for Organics.

Treatability Group		Constituent Name	CAS no.	Waste Number	Final Delisting	Pilot Testing	HBL (mg/L)	HBL Value used for TBD (mg/L) (1)	Solubility (mg/L)	Solubility Preference	LERF Liner Compatibility Limits (mg/L) (2)	EE/O
10	b	p-Chloroaniline	106-47-8	P024			0.1		3.90E+03	EPA	2000	10
10	b	p-Nitroaniline	100-01-6				TBD	1	6.00E+02	HSDB	2000	10
10	c	Acetonitrile	75-05-8	U003		t	0.2		1.00E+06	EPA	2000	50
10	c	Acrylonitrile	107-13-1	U009			0.0002		7.90E+04	EPA	2000	5
10	c	Methacrylonitrile	126-98-7	U152			0.004		2.50E+04	EPA	2000	10
10	d	1,3-Dinitrobenzene	99-65-0				0.004		4.70E+02	EPA	2000	15
10	d	2,4-Dinitrophenol	51-28-5	P048			0.07		5.60E+03	EPA	2000	7
10	d	2,4-Dinitrotoluene	121-14-2	U105			0.0001		1.32E+03	EPA	2000	10
10	d	2,6-Dinitrotoluene	606-20-2	U106			TBD	1	unk		2000	10
10	d	4,6-Dinitro-o-cresol	534-52-1	F039			TBD	1	1.30E+02	HSDB	2000	7
10	d	5-Nitro-o-toluidine	99-55-8	U181			TBD	1	unk		2000	10
10	d	Nitrobenzene	98-95-3	F001-5, U169		t	0.02		1.90E+03	EPA	2000	4
10	d	Pentachloronitrobenzene (PCNB)	82-68-8	U185			0.0003		7.11E-02	EPA	2000	40
10	d	p-Nitrophenol	100-02-7	U170			TBD	1	1.60E+04	HSDB	2000	20
10	e	Dibenz[a,h]acridine	226-36-8				TBD	1	unk		2000	30
10	e	Dibenz[a,j]acridine	224-42-0				TBD	1	unk		2000	30
10	e	N-Nitrosodiethylamine	55-18-5	U174			0.0000006		4.10E+05	EPA	100000	10
10	e	N-Nitrosodimethylamine	62-75-9	P082		t	0.000002		2.00E+02	EPA	100000	10
10	e	N-Nitrosodi-n-butylamine	924-16-3	U172			0.00002		6.70E+03	EPA	100000	15
10	e	N-Nitroso-di-n-dipropylamine	621-64-7	U111		t	0.00001		9.90E+03	EPA	100000	4
10	e	N-Nitrosodiphenylamine	86-30-6	F039			0.02		4.00E+01	EPA	100000	15
10	e	N-Nitrosomethylethylamine	10595-95-6	F039			0.000004		2.00E+04	EPA	100000	10
10	e	N-Nitrosomorpholine	59-89-2	F039			TBD	1	1.00E+06	HSDB	100000	10
10	e	N-Nitrosopiperidine	100-75-4	U179			0.000002		1.00E+06	EPA	100000	15
10	e	N-Nitrosopyrrolidine	930-55-2	U180			0.00004		1.00E+06	EPA	100000	15
10	f	Methapyrilene	91-80-5	U155			TBD	1	8.79E+02	HSDB	100000	15
10	f	Pyridine	110-86-1	F001-5, U196		t	0.04		4.00E+04	EPA	100000	4
10		Aldicarb sulfone	1646-88-4	P203			TBD	1	9.00E+03	MSDS	2000	30
10		Disulfiram	97-77-8				TBD	1	2.00E+03	HSDB	2000	30
10		Manganese dimethyldithiocarbamate	15339-36-3	P196			TBD	1	unk		2000	30
10		Physostigmine	57-47-6	P204			TBD	1	slightly soluble	HSDB	2000	30
10		Physostigmine salicylate	57-64-7	P188			TBD	1	1.33E+04	HazardText(R)	2000	30
10		Potassium n-hyroxymethyl-n-methyl-dithiocarbamate	51026-28-9				TBD	1	soluble	ECDIN	2000	30
10		Sodium diethyldithiocarbamate	148-18-5				TBD	1	1.00E+05	CAMSOFT	2000	30

Background Information Used to Determine the Treatability Envelope for Organics.

Treatability Group	Constituent Name	CAS no.	Waste Number	Final Delisting	Pilot Testing	HBL (mg/L)	HBL Value used for TBD (mg/L) (1)	Solubility (mg/L)	Solubility Preference	LERF Liner Compatibility Limits (mg/L) (2)	EE/O
10	Tetrabutylthiuram disulfide	1634-02-2				TBD	1	unk		2000	30
11	A2213	30558-43-1	U394			TBD	1	unk		2000	30
11	Aldrin	309-00-2	P004			0.000005		1.80E-01	EPA	2000	30
11	Alpha-BHC	319-84-6	U129			0.00001		1.63E+00	EPA	2000	60
11	Aramite	140-57-8	F039			0.003		1.00E-01	HSDB	2000	30
11	Barban	101-27-9	U280			TBD	1	1.10E+01	HSDB	2000	30
11	Bendiocarb	22781-23-3	U278			TBD	1	4.00E+01	HSDB	2000	30
11	Benomyl	17804-35-2	U271			TBD	1	3.80E+00	HSDB	2000	30
11	Beta-BHC	319-85-7	U129			0.00005		2.40E-01	EPA	2000	60
11	Chlordane	57-74-9	D020, U036			0.002		5.6E-01	EPA	2000	60
11	Butylate	2008-41-5				TBD	1	4.40E+01	HSDB	2000	30
11	Carbaryl	63-25-2	U279			TBD	1	1.20E+02	HSDB	2000	30
11	Carbendazim	10605-21-7	U372			TBD	1	insoluble	MSDS	2000	30
11	Carbofuran	1563-66-2	P127			TBD	1	7.00E+02	HSDB	2000	30
11	Copper dimethyldithiocarbamate	137-29-1				TBD	1	unk		2000	30
11	DDD (p,p"-DDD)	72-54-8	U060, U061			0.0004		1.00E-01	EPA	2000	30
11	DDE (p,p'-DDE)	72-55-9	U061			0.0003		4.00E-02	EPA	2000	30
11	DDT (p,p'-DDT)	50-29-3	U061			0.0003		5.00E-03	EPA	2000	30
11	Delta-BHC	319-86-8	U129			TBD	1	1.00E+01	HSDB	2000	60
11	Dieldrin	60-57-1	P037			0.000005		1.95E-01	EPA	2000	30
11	Dinoseb	88-85-7	P020			0.007		5.00E+01	EPA	2000	30
11	Disolfoton	298-04-4	P039			0.001		2.50E+01	EPA	2000	20
11	Endosulfan I	959-98-8	P050			TBD	1	unk		2000	20
11	Endosulfan II	33213-65-9	P050			TBD	1	unk		2000	20
11	Endosulfan sulfate	1031-07-8	P050			TBD	1	1.17E-01	HSDB	2000	20
11	Endrin	72-20-8	P051			0.002		2.50E-01	EPA	2000	20
11	Endrin aldehyde	7421-93-4	P051			TBD	1	2.50E-01	HSDB	2000	20
11	EPTC	759-94-4				TBD	1	3.75E+02	HSDB	2000	30
11	Ethyl Ziram	14324-55-1				TBD	1	insoluble	HSDB	2000	30
11	Famphur	52-85-7	P097			0.001		1.43E+02	EPA	2000	20
11	Ferbam	14484-64-1				TBD	1	1.20E+02	HSDB	2000	30
11	Heptachlor	76-44-8	P059			0.0004		1.80E-01	EPA	2000	60
11	Heptachlor epoxide	1024-57-3	P059			0.0002		3.50E-01	EPA	2000	20
11	Isodrin	465-73-6	P060			TBD	1	unk		2000	20
11	Lindane [gamma-BHC]	58-89-9	U129		t	0.0002		7.80E+00	EPA	2000	40

Background Information Used to Determine the Treatability Envelope for Organics.

Treatability Group	Constituent Name	CAS no.	Waste Number	Final Delisting	Pilot Testing	HBL (mg/L)	HBL Value used for TBD (mg/L) (1)	Solubility (mg/L)	Solubility Preference	LERF Liner Compatibility Limits (mg/L) (2)	EE/O
11	Metam Sodium	137-42-8				TBD	1	7.22E+05	MSDS	2000	30
11	Methiocarb	2032-65-7	P199			TBD	1	insoluble	HSDB	2000	30
11	Methoxychlor	72-43-5	U247			0.04		4.00E-02	EPA	2000	20
11	Methyl parathion	298-00-0	P071			0.009		6.00E+01	EPA	2000	20
11	Mexacarbate	315-18-4	P128			TBD	1	1.00E+02	HSDB	2000	30
11	Molinate	2212-67-1				TBD	1	8.00E+02	HSDB	2000	30
11	o,p'-DDD	53-19-0	U060, U061			TBD	1	unk		2000	30
11	o,p'-DDE	3424-82-6	U061			TBD	1	unk		2000	30
11	o.p'-DDT	789-02-6	U061			TBD	1	unk		2000	30
11	Oxamyl	23135-22-0	P194			TBD	1	2.80E+05	HSDB	2000	30
11	Parathion	56-38-2	P089			0.2		2.40E+01	EPA	2000	20
11	Pebulate	1114-71-2				TBD	1	6.00E+01	HSDB	2000	30
11	Phorate	298-02-2	P094			0.007		5.00E+01	EPA	2000	20
11	Potassium dimethyl dithiocarbamate -	128-03-0				TBD	1	soluble	ECDIN	2000	30
11	Potassium n-methyldithiocarbamate	137-41-7				TBD	1	unk		2000	30
11	Promecarb	2631-37-0	P201			TBD	1	9.10E+01	HSDB	2000	30
11	Propham	122-42-9	U373			TBD	1	3.20E+01	MSDS	2000	30
11	Propoxur	114-26-1	U411			TBD	1	2.00E+03	HSDB	2000	30
11	Selenium, tetrakis(dimethyl-dithiocarbamate	144-34-3				TBD	1	insoluble	HSDB	2000	30
11	Sodium dibutyldithiocarbamate	136-30-1				TBD	1	soluble	MSDS	2000	30
11	Sodium dimethyldithiocarbamate	128-04-1				TBD	1	unk		2000	30
11	Thiodicarb	59669-26-0	U410			TBD	1	3.50E+01	MSDS	2000	30
11	Thiophanate-methyl	23564-05-8	U409			TBD	1	3.50E+00	MSDS	2000	30
11	Toxaphene	8001-35-2	P123			0.003		5.00E-01	EPA	100000	20
11	Triallate	2303-17-5	U389			TBD	1	4.00E+00	HSDB	2000	30
11	Vernolate	1929-77-7				TBD	1	1.07E+02	HSDB	2000	30
11	Ziram	137-30-4	P205			TBD	1	6.50E+01	MSDS	2000	30
12	4,4'-Dichlorobiphenyl	2050-68-2			t	TBD	1	unk		2000	4
12	Polychlorinated biphenyls	1336-36-3	F039			0.0005		3.10E-02	EPA	2000	15
13	1,1,1,2-Tetrachloroethane	630-20-6	U208			0.003		2.90E+03	EPA	2000	80
13	1,1,1-Trichloroethane	71-55-6	U226	c	t	0.2		1.50E+03	EPA	2000	150
13	1,1,2,2-Tetrachloroethane	79-34-5	U209			0.0004		2.90E+03	EPA	2000	80
13	1,1,2-Trichloro-1,2,2-triflouroethane	76-13-1	F001-5			0.00001		1.00E+01	EPA	2000	80
13	1,1,2-Trichloroethane	79-00-5	U227	c	t	0.005		4.50E+03	EPA	2000	150

Background Information Used to Determine the Treatability Envelope for Organics.

Treatability Group		Constituent Name	CAS no.	Waste Number	Final Delisting	Pilot Testing	HBL (mg/L)	HBL Value used for TBD (mg/L) (1)	Solubility (mg/L)	Solubility Preference	LERF Liner Compatibility Limits (mg/L) (2)	EE/O
13		1,1-Dichloroethane	75-34-3	U076			0.0009		5.50E+03	EPA	2000	40
13		1,2,3-Trichloropropane	96-18-4	F039			0.00001		4.00E+03	EPA	2000	40
13		1,2,Dibromo-3-chloropropane	96-12-8	U066			0.0002		1.00E+03	EPA	2000	40
13		1,2-Dichloropropane [Propylene dichloride]	78-87-5	U083			0.005		2.70E+03	EPA	2000	40
13		Bromodichloromethane	75-27-4	F039			0.001		4.70E+03	EPA	2000	40
13		Bromoform	75-25-2	U225			0.01		3.01E+03	EPA	2000	60
13		Bromomethane [Methyl bromide]	74-83-9	U029			0.05		1.00E+03	EPA	2000	40
13		Carbon tetrachloride	56-23-5	F001-5, U211	c	t	0.005		7.57E+02	EPA	2000	200
13		Chloroethane	75-00-3	F039			TBD	1	5.74E+03	HSDB	2000	40
13		Chloroform	67-66-3	U044	c	t	0.01		8.20E+03	EPA	2000	100
13		Chloromethane [Methyl chloride]	74-87-3	U045			0.007		6.50E+03	EPA	2000	30
13		Dibromochloromethane	124-48-1	F039			0.001		4.40E+03	EPA	2000	40
13		Dibromomethane [Methylene bromide]	74-95-3	U068			0.4		1.30E+04	EPA	2000	30
13		Dichlorodifluoromethane	75-71-8	U075			7		2.80E+02	EPA	2000	80
13		Ethylene dibromide [1,2-Dibromoethane]	106-93-4	U067			0.00005		4.30E+03	EPA	2000	40
13		Ethylene dichloride [1,2-Dichloroethane]	107-06-2	U077	c		0.005		8.52E+03	EPA	2000	40
13		Iodomethane [Methyl iodide]	74-88-4	U138			TBD	1	1.40E+04	HSDB	2000	30
13		Methylene chloride [Dichloromethane]	75-09-2	U080		t	0.005		2.00E+04	EPA	2000	60
13		Trichlorofluoromethane	75-69-4	F001-5, U121			10		1.10E+03	EPA	2000	80
14		1,1-Dichloroethylene	75-35-4	U078	c		0.007		2.25E+03	EPA	2000	4
14		Allyl chloride [3-Chloropropene]	107-05-1	F039			0.004		1.00E+02	EPA	2000	5
14		cis-1,2-Dicloroethylene	156-59-2				0.07		3.50E+03	EPA	2000	5
14		Tetrachloroethene [Tetrachloroethylene]	127-18-4	F001-5, U210	c	t	0.005		1.50E+02	EPA	2000	4
14		trans-1,2-Dichloroethylene	156-60-5	U079			0.1		6.30E+03	EPA	2000	5
14		trans-1,3-Dichloropropene	10061-02-6	U084			TBD	1	2.80E+03	EPA	2000	5
14		Trichloroethylene	79-01-6	F001-5, U228	c		0.005		1.10E+03	EPA	2000	4
14		Vinyl chloride	75-01-4	U043	c		0.002		2.67E+03	EPA	2000	4
15	a	Ethylbenzene	100-41-4	F001-5			0.7		1.52E+02	EPA	2000	7
15	a	Toluene	108-88-3	F001-5, U051, U220	c	t	1		5.35E+02	EPA	2000	2
15	a	Xylenes (total)	1330-20-7	U051, U239			10		1.98E+02	EPA	2000	7
16		Chlorobenzene	108-90-7	F001-5, U037	c		0.1		4.66E+02	EPA	2000	5
16		Dichlorophenylarsine (Arsenic)	696-28-6				TBD		insoluble	HSDB	2000	4
17	a	Acrolein	107-02-8	P003		t	0.7		5.00E+05	EPA	2000	4
18	a	Isosafrole	120-58-1	U141			TBD	1	insoluble	HSDB	2000	15

Background Information Used to Determine the Treatability Envelope for Organics.

Treatability Group		Constituent Name	CAS no.	Waste Number	Final Delisting	Pilot Testing	HBL (mg/L)	HBL Value used for TBD (mg/L) (1)	Solubility (mg/L)	Solubility Preference	LERF Liner Compatibility Limits (mg/L) (2)	EE/O
18		Ethyl ether	60-29-7	F001-5, U117			7		6.05E+04	EPA	2000	20
18		Ethyl methacrylate	97-63-2	U118			3		7.00E+02	EPA	2000	20
18		Tetrahydrofuran	109-99-9			t	TBD	1	3.00E+05	HSDB	2000	4
19		Acetone	67-64-1	F001-5, U002	c	t	4		1.00E+06	EPA	200000	10
19		Acetophenone	98-86-2	U004			4		5.50E+03	EPA	200000	20
19		Cyclohexanone	108-94-1	F001-5, U057			TBD	1	5.00E+04	HSDB	200000	30
19		Methyl ethyl ketone [2-Butanone]	78-93-3	F001-5, U159	c	t	20		2.68E+05	EPA	200000	3
19		Methyl isobutyl ketone [2-Methyl-4-pentanone]	108-10-1	F001-5, U161	c	t	3		1.91E+04	EPA	200000	3
20		Carbon disulfide	75-15-0	F001-5, P022			4		2.94E+03	EPA	2000	5
20		tris(2,3-Dibromopropyl) phosphate	126-72-7	U235			0.000009		1.20E+02	EPA	2000	10
25	a	O,O,O-Triethyl phosphorothioate	126-68-1				TBD	1	unk		2000	30
25	a	Tributyl phosphate	126-73-8		c	t	0.02		2.80E+02	HSDB	2000	5
25	b	Tridecane	629-50-5			t	TBD	1	insoluble	HSDB	500000	150
25		Isophorone	7778-73-6				0.09		1.20E+04	EPA	2000	30
25		Tetraethyl lead (Lead)	78-00-2				TBD	1	2.90E-01	HSDB	500000	30

(1) The EPA Docket Report did not include a HBL. TBD indicates to be determined. To complete the evaluation, a HBL of 1 mg/L was assumed.
(2) Information taken from WHC-SD-WM-TI-714 High-Density Polyethylene Liner Chemical Compatibility for Radioactive Mixed Waste Trenches. The same vendor and material were used for the LERF liner. If a constituent was not included in this reference document, the constituent was classified by parameter, as listed in referenced document, and the LERF liner compatibility limit was estimated based on a listed compound with similar chemical characteristics.
ECDIN = indicates the solubility was taken from the Environmental Chemicals Data Information Network from Institute for Systems, Informatics and Safety
EPA = indicates the solubility was taken from the EPA Docket Report (EPA 1994).
CAMSOFT = indicates the solubility was taken from the CAMSOFT database (Cambridge Software Corp.)
HazardText (R) = indicates the solubility was taken from the HazardText(R) database.
HSDB = indicates the solubility was taken from the Hazardous Substances Database (HSDB 1987).
MSDS = indicates the solubility was taken from the material safety data sheet.
The following solubility assumptions were made to complete the treatability analysis:
insoluble = 1 mg/L
slightly soluble = 100 mg/L
soluble = 10000 mg/L
unk is assumed insoluble.

DISTRIBUTION

	MSIN
Washington State Department of Ecology	
M. N. Jaraysi	B5-18
R. J. Julian	B5-18
S. J. Skurla	B5-18
M. A. Wilson	B5-18
U.S. Environmental Protection Agency	
Dave Bartus-Region 10	
D. R. Sherwood-Region 10	B5-01
J. Wilkinson Confederated Tribes of the Umatilla Indian Nation P. O. Box 638 Pendleton, Oregon 97801	
D. Powaukee Nez Perce Tribe P. O. Box 365 Lapwai, Idaho 93540	
R. Jim, Manager Environmental Restoration/Waste Management Program Yakama Indian Nation P. O. Box 151 Toppenish, Washington 98948	
U.S. Department of Energy, Richland Operations Office	
H. E. Bilson	S7-41
E. M. Bowers (2)	S7-55
C. E. Clark	A5-15
A. C. McKarns	A5-15
J. E. Rasmussen	A5-15
G. L. Sinton	S7-55
Reading Room	H2-53
Bechtel Hanford, Inc.	
F. V. Roeck	H0-17
Fluor Daniel Hanford, Inc.	
A. G. Miskho	H6-23
S. M. Price	H6-23
B. D. Williamson	B3-15
Pacific Northwest National Laboratory	
Hanford Technical Library	P8-55

DISTRIBUTION

	MSIN
Waste Management Federal Services of Hanford, Inc.	
L. T. Blackford	T4-05
R. R. Bloom	S6-71
R. C. Bowman (2)	H6-24
R. H. Engelmann	H6-24
D. L. Flyckt	S6-71
T. L. Moore	H6-30
D. E. Nester	H6-06
P. M. Olson	R3-45
J. A. Winterhalder	H6-21
Permitting Documentation (5)	L4-97
Lockheed Martin Services, Inc.	
Central Files	B1-07
DPC	H6-08
EDMC (2)	H6-08