2. To: (Receiving Organization) Retrieval Engineering 73530	3. From: (Originating Organization) Process Technology 73510	4. Related EDT No.: N/A
5. Proj./Prog./Dept./Div.: Waste Management	6. Design Authority/ Design Agent/Cog. Engr.: GF Boothe	7. Purchase Order No.: N/A
8. Originator Remarks: This document is being processed for release.		9. Equip./Component No.: N/A
11. Receiver Remarks: 11A. Design Baseline Document? ☐ Yes ☒ No		10. System/Bldg./Facility: N/A
		12. Major Assm. Dwg. No.: N/A
		13. Permit/Permit Application No.: N/A
		14. Required Response Date: N/A

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Designator	Reason for Transmittal	Originator Disposition	Receiver Disposition
1	WHC-SD-WM-TI-769		0	Predominant Chemicals in Hanford Site Waste Tanks	NA	2		

16. KEY					
Approval Designator (F)		Reason for Transmittal (G)		Disposition (H) & (I)	
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)		1. Approval	4. Review	1. Approved	4. Reviewed no/comment
		2. Release	5. Post-Review	2. Approved w/comment	5. Reviewed w/comment
		3. Information	6. Dist. (Receipt Acknow. Required)	3. Disapproved w/comment	6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
		Design Authority									
		Design Agent									
1	/	Cog. Eng. GF Boothe	<i>[Signature]</i>	9/18/96	H5-27						
1	/	Cog. Mgr. DJ Washburn	<i>[Signature]</i>	9/18/96	H5-27						
		QA									
1	/	Safety MN Islam	<i>[Signature]</i>	9/18/96	R3-08						

18. GF Boothe <i>[Signature]</i> 9/18/96 Signature of EDT Originator	19. EA Fridenburg <i>[Signature]</i> 9/18/96 Authorized Representative Date for Receiving Organization
20. <i>[Signature]</i> 9/18/96 Design Authority/ Cognizant Manager	21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments

Predominant Chemicals in Hanford Site Waste Tanks

Gary F. Boothe

Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 615774	UC: 2000
Org Code: 73510	Charge Code: D2086
B&R Code: EW3130010	Total Pages: 45

Key Words: chemicals, waste, tanks, hazards

Abstract: Predominant chemical constituents in Hanford Site single-shell and double-shell tanks are determined. Predominant chemical constituents are defined as those anions, cations, and compounds presenting over 99 percent of the routine risks to workers or members of the public. Toxic chemicals and those chemical constituents in tanks that present the 99 percentile hazards to groundwater and air are identified.

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.

Printed in the United States of America. To obtain copies of this document, contact: WHC/BCS Document Control Services, P.O. Box 1970, Mailstop H6-08, Richland WA 99352, Phone (509) 372-2420; Fax (509) 376-4989.

Gary F. Boothe 9-23-96
Release Approval Date

Approved for Public Release

PREDOMINANT CHEMICALS IN HANFORD SITE WASTE TANKS

August 1996

Gary F. Boothe

Westinghouse Hanford Company
Richland, Washington

CONTENTS

1.0 INTRODUCTION	1
2.0 PURPOSE OF DOCUMENT	1
3.0 SCOPE AND LIMITATIONS	1
4.0 METHODOLOGY	2
5.0 RESULTS	5
6.0 COMPARISON WITH OTHER STUDIES	7
7.0 REFERENCES	10
APPENDIX A: CHEMICAL CONSTITUENTS	A-1
APPENDIX B: CONSTITUENT PREVALENCE RANK	B-1
APPENDIX C: HAZARDOUS RANK OF CONSTITUENTS	C-1
APPENDIX D: MTCA RANK OF CHEMICALS	D-1

Abbreviations and Acronyms

ALI	annual limits on intake
DTPA	diamine-triamine-pentacetic acid
EDTA	ethylenediamine-tetracetic acid
HEDTA	hydroxy-ethylethylene-diamine-triacetic acid
MCL	maximum contaminant levels
MTCA	Model Toxics Control Act
PNL	Pacific Northwest Laboratory
TOC	total organic carbon

PREDOMINANT CHEMICALS IN HANFORD SITE WASTE TANKS

1.0 INTRODUCTION

The chemical inventories of Hanford single-shell and double-shell waste tanks include a large number of organic and inorganic compounds, anions and cations. The vast majority of tank wastes originated from *process chemicals* (i.e., chemicals that were used in the processing of nuclear fuels). Fairly reliable information is available on process chemical inventories (Agnew 1996, Shelton 1996). Tank waste also includes a large number and variety of incidental chemicals from supporting plants and operations (Klem 1990). Inventories of these chemicals are not well known. The question addressed by this document is: Out of the hundreds of process and incidental chemical constituents present in waste tanks, which ones are important relative to occupational health and safety and long-term public risk?

2.0 PURPOSE OF DOCUMENT

The purpose of this document is to determine the *predominant* chemical constituents in Hanford Site Waste tanks. By predominant constituents it is meant those chemical species that represent over 99% of the routine risks to the public or to workers. The predominant constituents are those that should be included in the best-estimate inventory (Kupfer 1996), those that should be considered in environmental impact statements, those that should be considered in facility design and safety evaluations, and those that should be considered relative to tank closure plans.

3.0 SCOPE AND LIMITATIONS

The determination of predominant constituents, as defined above, is relevant to both current tank waste inventories and inventories of tank waste residuals after completion of saltwell pumping and sludge washing. The total mass of chemical constituents has no bearing on the determination of predominance, provided that no chemical differentiation is involved in saltwell pumping or sludge washing beyond that differentiation due to solubilities. This is because soluble and insoluble species are ranked in importance separately, and because predominance is strictly determined by the relative ratios of components.

For purposes of this study it was assumed that saltwell pumping and sludge washing would remove 90% of the soluble constituents and 50% of the insoluble constituents from the tanks. The recovered waste would be sent to melters for vitrification and the remaining waste would be the tank residuals. It is recognized that sluicing of the tanks may in fact remove most of the soluble and insoluble constituents (e.g., 99% removal of waste to achieve Hanford Federal Facility Agreement and Consent Order objectives [Ecology 1993]). However, varying the percentage of waste removal has no impact on the determination of predominance, relative to tank waste residuals or that waste that is sent to the melters for vitrification.

The predominant chemical constituents determined here are based on global inventories. Individual tank inventories may vary considerably from the global inventory, not necessarily in the list of constituents, but certainly in the ratios of constituents. Therefore, there may be additional predominant chemicals on a tank-by-tank basis beyond those identified by this document, or there may be fewer predominant constituents based on tank history. This document provides a starting point in identifying which constituents are of concern in tank waste in general.

This document does not consider accident risks from chemical products or chemical reactions in the tanks. For example, hydrogen generated from radiolysis is not listed as a tank constituent. Fires, explosions and other upset conditions have been addressed in previous safety screening documents and safety analyses.

4.0 METHODOLOGY

In an ideal risk ranking of chemical constituents, each constituent would have a water quality standard and an air quality standard, all derived from the same risk basis. Groundwater and airborne hazard indices could then be developed for each constituent by simply dividing the mass of each constituent by its water quality standard and its airborne quality standard. The hazard indices could be modified by transport factors, such as the vadose zone distribution coefficient (K_d), and other factors that account for different degrees of release, transport or concentration in the environment. This type of ranking has been performed for radionuclides, based on ingestion annual limits on intake (ALIs) and inhalation ALIs (Boothe 1996). Unfortunately, it is not possible to perform such a simple ranking for chemical constituents.

An idealized ranking of chemical constituents is not possible because there are no uniform water quality standards or airborne quality standards for all chemical species. Some chemicals have drinking water standards (WHC 1995) such as the maximum contaminant levels (MCLs), and others do not. Some chemicals have Model Toxics Control Act (MTCA) levels (Ecology 1996), and others do not. Some chemicals have no MCLs or MTCAs but may be either toxic or carcinogenic. There are toxicity categories given in hazardous waste regulations, but these have a different basis than drinking water standards. Some chemicals have airborne threshold limits for occupational exposure, and others do not. In any case, airborne standards do not have the same basis as water quality standards.

In order to determine which chemical constituents are important from a risk standpoint, it is necessary to consider several parameters collectively: the prevalence of the constituent, the toxicity of the constituent or its compounds, the available water quality standards, the listed MTCA values, the available airborne standards, and the mobility and volatility factors.

In this document, four general criteria were developed and employed to determine if a tank waste constituent is predominant:

1. If a soluble constituent (or the constituent's soluble tank compounds) is toxic (i.e., has a toxicity category of A, B, C, D, or X in accordance with 10 CFR Part 302 Spill Table [EPA 1985]), then the constituent is predominant if global mass concentrations exceed:
 - 1 part per ten million for Category X
 - 1 part per one million for Category A
 - 1 part per 100 thousand for Category B
 - 1 part per ten thousand for Category C
 - 5 parts per ten thousand for Category D

The concentrations listed above are approximately the defining aquatic concentrations for the toxicity categories (EPA 1985). A great deal of effort was made to assign the appropriate and conservative toxicity category to the tank ionic constituents. For example, lead is listed as a tank constituent. Lead compounds are generally toxicity level D; however, for purposes here ionic lead or lead phosphate is conservatively assumed, which is toxicity category X. No particular compound is assumed for anions such as chloride, fluoride, hydroxide, nitrate, etc., but the metals are assumed to form compounds with these anions and, consequently, they are covered.

The above criteria does not quantify the risks from the identified toxic materials. Even though a chemical constituent is within a toxicity category based on global concentrations, it does not mean that it is within the 99 percentile risk. However, in the interests of conservatism it is assumed here that **together**, the toxic materials meeting the above criteria represent some fraction of the 99 percentile risk.

2. If the chemical constituent is within the 99 percentile groundwater hazard based on MCLs, it is considered a predominant constituent. The groundwater hazard is measured by an index (H_{gw}) which is defined by:

$$H_{gw} = M \times MF/MCL_{gw},$$

where M is the mass of the constituent (g), MF is a mobility factor, and MCL is a water quality standard (g/L) given in the Environmental Protection Manual (WHC 1995). The MF is given by:

$$MF = 1/(1 + 5K_d),$$

where K_d is the distribution coefficient in migrating through the vadose zone to the groundwater. The distribution coefficients were taken from the Tank Waste Remediation System Environmental Impact Statement (DOE 1996).

3. If the chemical constituent is within the 99 percentile groundwater hazard based on MTCAs, it is considered a predominant constituent. The groundwater hazard is measured by an index (H_{gw}) which is defined by:

$$H_{gw} = M \times MF/MTCA_{gw},$$

where M is the mass of the constituent (g), MF is a mobility factor, and MTCA is a water quality standard (ug/L) given in the Model Toxics Control Act (Ecology 1996). The MF is given by:

$$MF = 1/(1 + 5K_d),$$

where K_d is the distribution coefficient in migrating through the vadose zone to the groundwater. The distribution coefficients were taken from the Tank Waste Remediation System Environmental Impact Statement (DOE 1996).

4. If the chemical constituent is within the 99 percentile airborne hazard, it is considered a predominant constituent. The airborne hazard is measured by an index (H_a) which is defined by:

$$H_a = M \times VF/S_a,$$

where M is the mass of the constituent (g), VF is a volatility factor, and S_a is an airborne quality standard (g/L). The airborne quality standard used is the Threshold Limiting Value (ACGIH 1992). The VF is an estimate of the fraction of the constituent that would go airborne under melter conditions, derived from Stegen (1994). No factor for retardation through high-efficiency particulate air filters was used.

Collectively, there is a high level of assurance that the above criteria, applied to the known or bounding inventories assumed, identify the predominant chemical constituents, even though the quantities of specific compounds are not known. Although some constituents have no toxicity category, and some have no MCL, MTCA value, or air quality standard, there are no highly hazardous materials without at least one of these four parameters.

5.0 RESULTS

Appendix A alphabetically lists 140 *chemical constituents of interest* in Hanford single-shell and double-shell tanks. By chemical constituents of interest it is meant: 1) those chemicals species (anions, cations and specific compounds) that are known to be in the tanks either from waste processing or incidental support operations, and 2) those chemical species that are either major tank waste constituents (> 1 part in 100 million on a global mass basis), or that present aquatic or airborne hazards.

Three separate data bases were used, Agnew (1996), Shelton (1996), and Klem (1990), to derive the chemical constituent list. Agnew lists the major process chemical constituents based on process knowledge, Shelton lists major and minor chemical constituents based on historical inventory records, and Klem lists incidental chemical constituents known to have been transferred to tank farms. Many of the constituents from these data bases probably no longer exist in significant quantities in the tanks, having either degraded, evaporated or otherwise escaped from the waste.

Bounding masses of incidental constituents were established from a subjective evaluation of procurement records. Bounding masses of 10 kg or 100 kg were assumed, depending on the level of procurement, as indicated by solid waste records (Olson 1991). Some constituents were eliminated because they cannot exist in significant quantities in the caustic tank environs (Borsheim and Kirsch 1991). These constituents include ammonium nitrate and acids. Also, it was assumed that those constituents with boiling points less than 100 degrees centigrade would have evaporated from the tanks or would have escaped the waste via the evaporator.

The first section of Appendix A (pages 1 through 6) gives global inventories, water quality standards, soluble fractions, soluble residual masses, K_d values, calculated mobility factors, and calculated water hazard indices. The second section of Appendix A (pages 7 through 11) gives insoluble tank residuals, air quality standards, volatility factors, calculated airborne hazard indices and toxicity category. The constituents in bold are toxic chemicals, in accordance with 10 CFR Part 302.

Appendix B is a ranking of soluble tank residuals and melter feed based on prevalence alone. It is assumed that saltwell pumping and sluicing will remove 90% of the soluble tank inventory and 50% of the insoluble tank inventory. In applying Criteria 1 above, the predominant toxic soluble constituents are given in Table 1.

Except for ethylenediamine-tetracetic acid (EDTA) and butanol, Table 1 lists no organic compounds other than total organic carbon (TOC). The EDTA is a complexant (along with hydroxy-ethylene-diamine-triacetic acid [HEDTA] and diamine-triamine-pentacetic acid [DTPA]). These complexants are actually covered as toxic by total sodium, because they are sodium salts within the tank waste (Agnew 1996). The complexants are also covered as toxic by TOC. However, Table 1 indicates that these organic compounds are especially significant and they should be accounted for separately.

There are no other specific toxic organic compounds that are of special concern if the global inventory assumptions are valid. This means that specific organic compounds other than EDTA and butanol need not be sampled or analyzed for, since none of them are predominant by themselves.

Table 1. Predominant Toxic Soluble Constituents.

TOXICITY CATEGORY	GLOBAL CONCENTRATION	SOLUBLE CONSTITUENT
X	> .00001%	ANTIMONY CADMIUM CHROMIUM COPPER LEAD MERCURY NICKEL THALLIUM TOC
A	> .0001%	CYANIDE SODIUM
B	> .001%	AMMONIA
C	> .01%	IRON
D	> .05%	BUTANOL EDTA

Appendix C is a ranking of chemical constituents in accordance with groundwater hazard and airborne hazard. In accordance with the criteria of items 2 and 3 above, the predominant chemical constituents presenting over 99% of the groundwater and airborne hazards are:

GROUNDWATER HAZARD

Cadmium
Chromium
Fluoride
Lead
Mercury
Nitrate
Nitrite

AIRBORNE HAZARD

Ammonia
Cadmium
Cyanide
Dibutyl/Tributyl Phosphate
Hydroxide
Lead
Mercury
Nickel
Selenium
Silver
Uranium

The uranium appears on the above list because of its chemical toxicity, not because it is radioactive.

Appendix C shows that even if global inventories of incidental chemical constituents are increased by one or two orders of magnitude, there generally would be no change in the predominant constituent list. This is because the hazard index falls off very rapidly after the 99 percentile constituents. For example, the groundwater hazard index for toluene is $1.0E+7$, which is over 5 orders of magnitude lower than the hazard index of nitrite ($1.35E+12$).

Appendix D ranks chemical constituents in accordance with MTCA groundwater values. The 99 percentile hazardous constituents are:

Antimony	EDTA	Nitrite
Butanol	Fluoride	Sodium
Cadmium	Hydroxide	Sulfate
Chloride	Mercury	TOC
Chromium	Nickel	Uranium
Cyanide	Nitrate	

Based on the preceding analyses, the predominant tank waste constituents, representing over 99% of the routine hazards to occupational and public health and safety, are listed in Table 2. Those chemical constituents that are listed as groundwater hazards, either by the MCL or MTCA ranking, or as toxic should be included in tank closure characterization plans. Other chemical constituents that might become important relative to future waste acceptance criteria or future process requirements may be added to Table 2 from the list of constituents in Appendix A.

6.0 COMPARISON WITH OTHER STUDIES

Pacific Northwest Laboratory (PNL) has previously ranked hazardous constituents based on the TRAC data base and vadose zone modeling (PNL 1991). According to this ranking, the greatest nonradiological and noncarcinogenic risks to the groundwater are from:

Antimony	Cyanide	Nitrate
Beryllium	EDTA	Nitrite
Cadmium	Fluoride	Silver
Chloride	Iron	Sodium
Chromium	Mercury	Sulfate
Copper	Nickel	Vanadium

The preceding list is quite similar to the predominant constituent list in Table 2, even though older TRAC data was used in the PNL study (1991), whereas re-normalized TRAC, Agnew (1996) and Klem (1990) were used in this document. The only real differences between the two studies are the appearance of vanadium and beryllium in the PNL list but not the predominant list, and the appearance of TOC, lead, thallium, ammonia, butanol, dibutyl/tributyl phosphate, hydroxide, selenium, and uranium on the predominant list.

The appearance of vanadium in the PNL report (1991) is simply inexplicable, since this element's inventory is not listed in the PNL report, nor is it listed by Shelton (1996) or Agnew (1996).

The appearance of beryllium in the PNL report is explicable because it is a major constituent in the TRAC data base; however, Appendices C and D show that beryllium is are not within the 99 percentile groundwater or airborne hazard.

The inclusion of TOC, lead, thallium, ammonia, butanol, and hydroxide on the predominant list but not in the PNL study is due to differences in data bases. It should be noted that TOC is conservatively considered to be toxicity category X in this document.

The inclusion of dibutyl/tributyl phosphate and selenium on the predominant list is explicable because these are airborne hazards, which the PNL study does not address.

Table 2. Predominant Tank Waste Constituents.

PREDOMINANT TANK WASTE CONSTITUENT	REASON
AMMONIA	TOXIC COMPOUNDS, AIRBORNE HAZARD
ANTIMONY	TOXIC COMPOUNDS, GROUNDWATER HAZARD
BUTANOL	TOXIC, GROUNDWATER HAZARD
CADMIUM	TOXIC COMPOUNDS, GROUNDWATER HAZARD, AIRBORNE HAZARD
CHLORIDE	GROUNDWATER HAZARD
CHROMIUM	TOXIC COMPOUNDS, GROUNDWATER HAZARD
COPPER	TOXIC COMPOUNDS
CYANIDE	TOXIC COMPOUNDS, GROUNDWATER HAZARD, AIRBORNE HAZARD
DIBUTYL/TRIBUTYL PHOSPHATE	AIRBORNE HAZARD
EDTA	TOXIC, GROUNDWATER HAZARD
FLUORIDE	GROUNDWATER HAZARD
HYDROXIDE	GROUNDWATER HAZARD, AIRBORNE HAZARD
IRON	TOXIC COMPOUNDS
LEAD	TOXIC COMPOUNDS, GROUNDWATER HAZARD, AIRBORNE HAZARD
MERCURY	TOXIC COMPOUNDS, GROUNDWATER HAZARD, AIRBORNE HAZARD
NICKEL	TOXIC COMPOUNDS, GROUNDWATER HAZARD, AIRBORNE HAZARD
NITRATE	GROUNDWATER HAZARD
NITRITE	GROUNDWATER HAZARD
SELENIUM	AIRBORNE HAZARD
SILVER	AIRBORNE HAZARD
SODIUM	TOXIC COMPOUNDS, GROUNDWATER HAZARD
SULFATE	GROUNDWATER HAZARD
THALLIUM	TOXIC COMPOUNDS
TOC	TOXIC COMPOUNDS, GROUNDWATER HAZARD
URANIUM	AIRBORNE HAZARD, GROUNDWATER HAZARD

7.0 REFERENCES

- ACGIH, 1992, *Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices*, American Conference of Governmental Industrial Hygienists, Cincinnati, Ohio.
- Agnew, S. F., 1996, *Hanford Tank Chemical and Radionuclide inventories: HDW Model Rev. 3*, LA-UR-96-858, Los Alamos National Laboratory, Los Alamos, New Mexico.
- Boothe, G. F., 1996, *Predominant Radionuclides in Hanford Site Waste Tanks*, WHC-SD-WM-TI-731, Westinghouse Hanford Company, Richland, Washington.
- Borsheim, G. L., Kirch, N. W., 1991, *Summary of Single-Shell Tank Waste Stability*, WHC-EP-0347, Westinghouse Hanford Company, Richland, Washington.
- DOE, 1996, *Draft Environmental Impact Statement for the Tank Waste Remediation System*, DOE/EIS-0189D, U. S. Department of Energy and Washington State Department of Ecology, Richland, Washington.
- Ecology, EPA, and DOE, 1993, *Hanford Federal Facility Agreement and Consent Order*, as amended, Washington State Department of Ecology, Olympia, Washington, and U.S. Environmental Protection Agency and U.S. Department of Energy, Washington D.C.
- Ecology, 1996, *Model Toxics Control Act Cleanup Levels and Risk Calculations (CLARC) Update*, Washington State Department of Ecology, Publication #94-145, Olympia, Washington.
- EPA, 1985, *List of Hazardous Substances and Reportable Quantities*, 10 CFR 300, U. S. Environmental Protection Agency, Washington, D. C.
- Klem, M. J., 1990, *Inventory of Chemicals Used at Hanford Site Production Plants and Support Operations (1944-1980)*, WHC-EP-0172, REV 1, Westinghouse Hanford Company, Richland, Washington.
- Kupfer, M. J., 1996, *Interim Report: Best-Basis Inventories of Chemicals and Radionuclides in Hanford Site Tank Waste*, WHC-SD-WM-TI-740, Rev. C, Westinghouse Hanford Company, Richland, Washington.
- Olson, W. W., 1991, *Solid Waste Stream Hazardous and Dangerous Components Study*, WHC-SD-WM-RPT-056, Westinghouse Hanford Company, Richland, Washington.
- PNL, 1991, *Single-Shell Tank Constituent Rankings for Use in Preparing Waste Characterization Plans*, PNL-7572, Pacific Northwest Laboratory, Richland, Washington.
- Shelton, L. W., 1996, *Chemical and Radionuclide Inventory for Single and Double-Shell Tanks*, Internal Memo 74A20-96-30, Westinghouse Hanford Company, Richland, Washington.

Stegen, G. E., 1994, *Volatile and Easily Reduced Components in Melter Feed*, DSI194-GES, Westinghouse Hanford Company, Richland, Washington.

WHC, 1993, *Environmental Protection Manual*, WHC-CM-7-5, Westinghouse Hanford Company, Richland, Washington.

APPENDIX A: CHEMICAL CONSTITUENTS

APPENDIX A

WHC-SD-WM-TI-769
CHEMICAL CONSTITUENTS
SINGLE-SHELL AND DOUBLE-SHELL TANKS

	SST	DST	TOTAL	WATER	TANK				
TANK WASTE	MASS	MASS	MASS	QUALITY	ASSUMED	SOLUBLE	ASSUMED	MOBILITY	HAZARD
CONSTITUENT(1)	(kg)(2)	(kg)(2)	(kg)(3)	STANDARD	SOLUBLE	RESIDUALS	Kd(6)	FACTOR(6)	INDEX(7)
				(mg/L)(4)	FRACTION(5)	(kg)(5)			
ACETATE	5.70E+04	4.25E+04	9.95E+04	1000	1.00E+00	9.95E+03	0.00E+00	1.00E+00	9.95E+06
ACETONE(12)			0.00E+00	1000	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
ALUMINUM	5.53E+06	2.19E+06	7.72E+06	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
AMMONIA (NH3)	9.06E+04	3.22E+05	4.13E+05	1000	1.00E+00	4.13E+04	0.00E+00	1.00E+00	4.13E+07
ANTIMONY			1.00E+02	0.006	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.67E+09
ARSENIC			2.30E+00	0.05	1.80E-02	4.14E-03	5.00E+01	3.98E-03	3.30E+02
BARIUM			4.53E+03	2	1.72E-01	7.79E+01	1.00E+01	1.96E-02	7.64E+05
BENZENE(12)			0.00E+00	0.005	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
BERYLLIUM			3.10E+00	0.004	8.00E-03	2.48E-03	5.00E+01	3.98E-03	2.47E+03
BICARBONATE			1.00E+02	1000	1.00E+00	1.00E+01	1.67E-01	1.67E-01	1.67E+03
BISMUTH	5.13E+05	1.13E+04	5.24E+05	1000	4.50E-02	2.36E+03	1.00E+00	1.67E-01	3.93E+05
BISULFATE (AMMONIUM)			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
BISULFITE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
BORON			3.43E+01	1000	1.00E+00	3.43E+00	5.00E+01	3.98E-03	1.37E+01
BROMATE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
BROMINE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
BROMOCRESOL PURPLE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
BROMONAPHTHALENE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
BUTANOL (BUTYL ALCOHOL)	1.15E+05	8.34E+04	1.98E+05	1000	1.00E+00	1.98E+04	0.00E+00	1.00E+00	1.98E+07
C6H5O7	3.72E+05	3.06E+05	6.78E+05	1000	1.00E+00	6.78E+04	0.00E+00	1.00E+00	6.78E+07
CADMIUM			1.42E+04	0.005	5.38E-01	7.64E+02	1.00E+00	1.67E-01	2.55E+10
CALCIUM	4.97E+05	1.22E+05	6.19E+05	1000	1.02E-01	6.31E+03	1.00E+00	1.67E-01	1.05E+06
CANCRINITE			2.70E+06	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
CARBIDE (BORON)			1.00E+02	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
CARBON TETRACHLORIDE(12)			0.00E+00	0.005	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
CARBONATE	2.88E+06	1.95E+06	4.83E+06	1000	9.66E-01	4.67E+05	5.00E+01	3.98E-03	1.86E+06
CERIUM			2.37E+05	1000	1.00E-02	2.37E+02	5.00E+01	3.98E-03	9.44E+02
CESIUM			2.09E+03	1000	9.01E-01	1.88E+02	5.00E+01	3.98E-03	7.50E+02
CHLORIDE	5.76E+05	3.81E+05	9.57E+05	250	9.87E-01	9.45E+04	0.00E+00	1.00E+00	3.78E+08
CHROMIUM	6.52E+05	1.33E+05	7.85E+05	0.1	7.40E-01	5.81E+04	0.00E+00	1.00E+00	5.81E+11
COBALT			4.23E+01	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
COPPER			2.87E+02	1000	3.44E-01	9.87E+00	5.00E+01	3.98E-03	3.93E+01
CYANIDE	1.44E+05	0.00E+00	1.44E+05	1000	1.00E+00	1.44E+04	0.00E+00	1.00E+00	1.44E+07

WHC-SD-WM-TI-769, Rev. 0

WHC-SD-WM-TI-769
CHEMICAL CONSTITUENTS
SINGLE-SHELL AND DOUBLE-SHELL TANKS

	SST	DST	TOTAL	WATER	ASSUMED	TANK			
TANK WASTE	MASS	MASS	MASS	QUALITY	SOLUBLE	SOLUBLE	ASSUMED	MOBILITY	HAZARD
CONSTITUENT(1)	(kg)(2)	(kg)(2)	(kg)(3)	(mg/L)(4)	FRACTION(5)	(kg)(5)	Kd(6)	FACTOR(6)	INDEX(7)
DIATOMACEOUS EARTH			1.00E+05	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
DIBUTYL PHOSPHANATE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
DIBUTYL/TRIBUTYL PHOSPHATE	4.12E+05	1.82E+05	5.94E+05	1000	1.00E+00	5.94E+04	0.00E+00	1.00E+00	5.94E+07
DICHROMATE			1.00E+02	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
DIHYDROXYANTHRAQUINONE(12)			0.00E+00	1000	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
DIOXANE(12)			0.00E+00	7	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
DTPA			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
DUODECANE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
EDTA	2.95E+05	3.24E+05	6.19E+05	1000	1.00E+00	6.19E+04	0.00E+00	1.00E+00	6.19E+07
ETHANOL			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
ETHYL ETHER(12)			0.00E+00	1000	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
ETHYLENE GLYCOL			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
FERROUS SULFAMATE			1.00E+03	1000	1.00E+00	1.00E+02	0.00E+00	1.00E+00	1.00E+05
FLUORIDE			1.21E+06	4	9.43E-01	1.14E+05	0.00E+00	1.00E+00	2.85E+10
FLUOROSILICATE (AMMONIUM)			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
FORMALDEHYDE(12)			0.00E+00	1000	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
GALLIUM			1.00E+02	1000	1.00E+00	1.00E+01	5.00E+01	3.98E-03	3.98E+01
GLUCONATE (SODIUM)			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
GLYCEROL			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
GLYCOLATE	4.07E+05	6.93E+05	1.10E+06	1000	1.00E+00	1.10E+05	0.00E+00	1.00E+00	1.10E+08
GOLD			0.00E+00	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
HEDTA	4.79E+05	5.55E+05	1.03E+06	1000	1.00E+00	1.03E+05	0.00E+00	1.00E+00	1.03E+08
HYDRAZINE(12)			0.00E+00	0.03	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
HYDROGEN SULFIDE(12)			0.00E+00	1000	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
HYDROXIDE			1.99E+07	1000	7.18E-01	1.43E+06	0.00E+00	1.00E+00	1.43E+09
HYDROXYLAMINE (NITRATE)			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
HYDROXYLAMINE HYDR.(12)			0.00E+00	1000	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
HYDROXYQUINOLINE(12)			0.00E+00	1000	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
HYPOCHLORITE (SODIUM)			1.00E+01	1000	1.00E+00	1.00E+00	0.00E+00	1.00E+00	1.00E+03
IODINE(12)			0.00E+00	1000	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
IRON	1.61E+06	2.20E+05	1.83E+06	0.3	4.00E-02	7.32E+03	1.00E+00	1.67E-01	4.07E+09
ISOAMYL ACETATE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
ISOPROPYL ALCOHOL(12)			0.00E+00	1000	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00

WHC-SD-WM-TI-769
CHEMICAL CONSTITUENTS
SINGLE-SHELL AND DOUBLE-SHELL TANKS

	SST	DST	TOTAL	WATER	ASSUMED	TANK			
TANK WASTE	MASS	MASS	MASS	QUALITY	SOLUBLE	SOLUBLE	ASSUMED	MOBILITY	WATER
CONSTITUENT(1)	(kg)(2)	(kg)(2)	(kg)(3)	STANDARD	FRACTION(5)	RESIDUALS	Kd(6)	FACTOR(6)	HAZARD
	(kg)(2)	(kg)(2)	(kg)(3)	(mg/L)(4)	FRACTION(5)	(kg)(5)	Kd(6)	FACTOR(6)	INDEX(7)
KEROSENE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
LANTHANUM	4.03E+04	1.40E+02	4.04E+04	1000	1.00E-02	4.04E+01	5.00E+01	3.98E-03	1.61E+02
LEAD	2.68E+05	1.07E+04	2.79E+05	0.002	2.47E-01	6.88E+03	1.00E+01	1.96E-02	6.75E+10
LITHIUM			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
MAGNESIUM			8.25E+03	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
MANGANESE			1.90E+05	0.05	5.70E-02	1.08E+03	1.00E+01	1.96E-02	4.25E+08
MERCURY	5.81E+03	1.05E+03	6.86E+03	0.002	3.98E-01	2.73E+02	0.00E+00	1.00E+00	1.37E+11
METHANOL(12)			0.00E+00	1000	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
METHYL ETHYL KEYTONE(12)			0.00E+00	1000	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
METHYL ISOBUTYL KETONE(12)			0.00E+00	1000	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
MOLYBDENUM			3.94E+01	1000	1.83E-01	7.21E-01	5.00E+01	3.98E-03	2.87E+00
MORPHOLINE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
NAPHTHYLAMINE			1.00E+01	1000	1.00E+00	1.00E+00	0.00E+00	1.00E+00	1.00E+03
NEODYMIUM			1.00E+02	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
NICKEL			2.14E+05	1000	3.80E-02	8.13E+02	1.00E+00	1.67E-01	1.36E+05
NIOBIUM			1.00E+02	1000	1.00E+00	1.00E+01	5.00E+01	3.98E-03	3.98E+01
NITRATE			1.08E+08	10	9.91E-01	1.07E+07	0.00E+00	1.00E+00	1.07E+12
NITRITE	8.98E+06	4.58E+06	1.36E+07	1	9.95E-01	1.35E+06	0.00E+00	1.00E+00	1.35E+12
OPHENATROLINE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
OXALATE (SODIUM)	6.91E+04	7.40E+01	6.92E+04	1000	1.00E+00	6.92E+03	0.00E+00	1.00E+00	6.92E+06
PARAFFIN (NORMAL) HYDROCAR.			1.00E+02	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
PERMANGANATE (POTASSIUM)			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
PERSULFATE (POTASSIUM)			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
PERSULFATE (SODIUM)			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
PHOSPHATE	3.31E+06	7.15E+05	4.03E+06	1000	6.33E-01	2.55E+05	1.00E+01	1.96E-02	5.00E+06
PHOSPHORUS PENTOXIDE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
PLATINUM			0.00E+00	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
POTASSIUM			7.36E+05	1000	9.60E-01	7.07E+04	0.00E+00	1.00E+00	7.07E+07
PRASEODYMIUM			1.00E+02	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
RHENIUM			9.73E-02	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
RHODIUM			1.94E+02	1000	1.00E+00	1.94E+01	0.00E+00	1.00E+00	1.94E+04
RUBIDIUM			1.17E+01	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
RUTHENIUM			1.17E+00	1000	1.00E+00	1.17E-01	0.00E+00	1.00E+00	1.17E+02

WHC-SD-WM-TI-769
CHEMICAL CONSTITUENTS
SINGLE-SHELL AND DOUBLE-SHELL TANKS

TANK WASTE CONSTITUENT(1)	SST MASS (kg)(2)	DST MASS (kg)(2)	TOTAL MASS (kg)(3)	WATER QUALITY STANDARD (mg/L)(4)	TANK ASSUMED SOLUBLE FRACTION(5)	SOLUBLE RESIDUALS (kg)(5)	ASSUMED Kd(6)	MOBILITY FACTOR(6)	WATER HAZARD INDEX(7)
SDIPHENYL CARBAZIDE			1.00E+02	1000	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
SELENIUM			3.31E+03	0.05	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
SILICON (SILICATE)	4.77E+05	1.36E+05	6.13E+05	1000	6.40E-02	3.92E+03	5.00E+01	3.98E-03	1.56E+04
SILVER			1.80E+03	1000	1.78E-01	3.20E+01	5.00E+01	3.98E-03	1.28E+02
SODIUM			6.88E+07	1000	9.88E-01	6.80E+06	0.00E+00	1.00E+00	6.80E+09
STRONTIUM			3.69E+04	1000	1.00E-02	3.69E+01	1.00E+01	1.96E-02	7.24E+02
STYRENE			1.00E+01	1000	1.00E+00	1.00E+00	0.00E+00	1.00E+00	1.00E+03
SUGAR			1.00E+05	1000	1.00E+00	1.00E+04	0.00E+00	1.00E+00	1.00E+07
SULFATE	2.00E+06	1.22E+06	3.22E+06	250	9.87E-01	3.18E+05	0.00E+00	1.00E+00	1.27E+09
SULFITE (AMMONIUM)			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
TANTALUM			1.00E+02	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
TARTRATE (SODIUM)			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
TECHNETIUM(OXIDE)			3.11E+03	1000	7.09E-01	2.20E+02	0.00E+00	1.00E+00	2.20E+05
TELLURIUM			1.00E+02	1000	1.00E+00	1.00E+01	5.00E+01	3.98E-03	3.98E+01
TETRABROMOETHANE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
TETRAHYDROFURAN			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
TETRAPHENYL BORON			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
THALLIUM			1.54E+02	1000	1.00E+00	1.54E+01	5.00E+01	3.98E-03	6.14E+01
THENOYLTRIFLUOROACETONE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
THIOCYANATE (AMMONIUM, Na)			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
THIOCYANATE (MERCURIC)			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
THIOSULFATE (AMMONIUM, Na)			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
THORIUM			2.79E+03	1000	0.00E+00	0.00E+00	1.00E+01	1.96E-02	0.00E+00
THYMOLPHTHALEIN			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
TIN			1.00E+02	1000	1.00E+00	1.00E+01	1.00E+01	1.96E-02	1.96E+02
TITANIUM			1.55E+02	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
TOC	9.08E+05	8.97E+05	1.81E+06	1000	9.24E-01	1.67E+05	0.00E+00	1.00E+00	1.67E+08
TOLUENE			1.00E+02	1	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+07
TRICHLOROETHANE(12)			0.00E+00	0.2	1.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
TRISOCTYLAMINE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
TRINDODECYLAMINE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
TRINOCYLAMINE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
TRIS(HYDRO.)AMINOMETHANE			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04

A-5

WHC-SD-WM-TI-769, Rev. 0

APPENDIX A

WHC-SD-WM-TI-769
CHEMICAL CONSTITUENTS
SINGLE-SHELL AND DOUBLE-SHELL TANKS

	SST	DST	TOTAL	WATER	TANK				
TANK WASTE	MASS	MASS	MASS	QUALITY	ASSUMED	SOLUBLE			WATER
CONSTITUENT(1)	(kg)(2)	(kg)(2)	(kg)(3)	STANDARD	SOLUBLE	RESIDUALS	ASSUMED	MOBILITY	HAZARD
				(mg/L)(4)	FRACTION(5)	(kg)(5)	Kd(6)	FACTOR(6)	INDEX(7)
TUNGSTEN			1.00E+02	1000	0.00E+00	0.00E+00	0.00E+00	1.00E+00	0.00E+00
URANIUM			1.60E+06	1000	6.44E-01	1.03E+05	0.00E+00	1.00E+00	1.03E+08
UREA			1.00E+02	1000	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+04
VANADIUM (PENTOXIDE)			1.00E+02	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
WATER			5.08E+08	1000	1.00E+00	5.08E+07	0.00E+00	1.00E+00	5.08E+10
XYLENE			1.00E+02	10	1.00E+00	1.00E+01	0.00E+00	1.00E+00	1.00E+06
ZINC			5.05E+02	1000	0.00E+00	0.00E+00	5.00E+01	3.98E-03	0.00E+00
ZIRCONIUM			1.21E+06	1000	6.20E-03	7.50E+02	5.00E+01	3.98E-03	2.99E+03
			7.59E+08			7.33E+07			

WHC-SD-WM-TI-769
CHEMICAL CONSTITUENTS
SINGLE-SHELL AND DOUBLE-SHELL TANKS

		AIR			
TANK WASTE	MELTER	QUALITY		AIRBORNE	
CONSTITUENT(1)	FEED	STANDARD	VOLATILITY	HAZARD	
	(kg)(5)	(ug/L)(8)	FACTOR(9)	INDEX(10)	TOXICITY(11)
ACETATE	8.96E+04	1000000	1	8.96E-02	
ACETONE(12)	0.00E+00	2400	1	0.00E+00	D
ALUMINUM	3.86E+06	1000000	0	0.00E+00	
AMMONIA (NH3)	3.71E+05	35	1	1.06E+04	B
ANTIMONY	9.00E+01	0.5	0.25	4.50E+01	X
ARSENIC	1.17E+00	0.5	1	2.33E+00	X
BARIUM	2.58E+03	0.5	0.01	5.15E+01	C
BENZENE(12)	0.00E+00	80	1	0.00E+00	C
BERYLLIUM	1.56E+00	0.002	0.1	7.80E+01	X
BICARBONATE	9.00E+01	1000000	0.01	9.00E-07	
BISMUTH	2.72E+05	1000000	0.1	2.72E-02	
BISULFATE (AMMONIUM)	9.00E+01	1000000	1	9.00E-05	
BISULFITE	9.00E+01	1000000	1	9.00E-05	
BORON	3.09E+01	1000000	0.25	7.72E-06	
BROMATE	9.00E+01	1000000	1	9.00E-05	
BROMINE	9.00E+01	0.7	1	1.29E+02	
BROMOCRESOL PURPLE	9.00E+01	1000000	1	9.00E-05	
BROMONAPHTHALENE	9.00E+01	1000000	1	9.00E-05	
BUTANOL (BUTYL ALCOHOL)	1.79E+05	1000000	1	1.79E-01	D
C6H5O7	6.10E+05	1000000	1	6.10E-01	
CADMIUM	1.02E+04	0.2	0.5	2.54E+04	X
CALCIUM	3.35E+05	1000000	0.01	3.35E-03	
CANCRINITE	1.35E+06	1000000	0.01	1.35E-02	
CARBIDE (BORON)	5.00E+01	1000000	0.01	5.00E-07	
CARBON TETRACHLORIDE(12)	0.00E+00	65	1	0.00E+00	D
CARBONATE	4.28E+06	1000000	0.01	4.28E-02	
CERIUM	1.19E+05	1000000	0.01	1.19E-03	
CESIUM	1.80E+03	1000000	0.5	8.99E-04	
CHLORIDE	8.56E+05	1000000	1	8.56E-01	
CHROMIUM	6.25E+05	1000000	0.1	6.25E-02	X
COBALT	2.12E+01	0.1	0.25	5.29E+01	
COPPER	1.83E+02	1	0.01	1.83E+00	X
CYANIDE	1.30E+05	5	1	2.59E+04	A

APPENDIX A

WHC-SD-WM-TI-769
CHEMICAL CONSTITUENTS
SINGLE-SHELL AND DOUBLE-SHELL TANKS

		AIR			
	MELTER	QUALITY		AIRBORNE	
TANK WASTE	FEED	STANDARD	VOLATILITY	HAZARD	
CONSTITUENT(1)	(kg)(5)	(ug/L)(8)	FACTOR(9)	INDEX(10)	TOXICITY(11)
DIATOMACEOUS EARTH	5.00E+04	1000000	0.01	5.00E-04	
DIBUTYL PHOSPHANATE	9.00E+01	1000000	1	9.00E-05	
DIBUTYL/TRIBUTYL PHOSPHATE	5.35E+05	5	1	1.07E+05	
DICHROMATE	5.00E+01	1000000	0.1	5.00E-06	
DIHYDROXYANTHRAQUINONE(12)	0.00E+00	1000000	1	0.00E+00	
DIOXANE(12)	0.00E+00	360	1	0.00E+00	
DTPA	9.00E+01	1000000	1	9.00E-05	
DUODECANE	9.00E+01	1000000	1	9.00E-05	
EDTA	5.57E+05	1000000	1	5.57E-01	D
ETHANOL	9.00E+01	1900	1	4.74E-02	
ETHYL ETHER(12)	0.00E+00	1200	1	0.00E+00	
ETHYLENE GLYCOL	9.00E+01	1.2	1	7.50E+01	
FERROUS SULFAMATE	9.00E+02	1000000	1	9.00E-04	
FLUORIDE	1.06E+06	1000000	1	1.06E+00	
FLUOROSILICATE (AMMONIUM)	9.00E+01	1000000	1	9.00E-05	
FORMALDEHYDE(12)	0.00E+00	6	1	0.00E+00	C
GALLIUM	9.00E+01	1000000	0.01	9.00E-07	
GLUCONATE (SODIUM)	9.00E+01	1000000	1	9.00E-05	
GLYCEROL	9.00E+01	1000000	1	9.00E-05	
GLYCOLATE	9.90E+05	1000000	1	9.90E-01	
GOLD	0.00E+00	1000000	0.01	0.00E+00	
HEDTA	9.31E+05	1000000	1	9.31E-01	
HYDRAZINE(12)	0.00E+00	1.3	1	0.00E+00	X
HYDROGEN SULFIDE(12)	0.00E+00	15	1	0.00E+00	B
HYDROXIDE	1.57E+07	2	0.01	7.83E+04	
HYDROXYLAMINE (NITRATE)	9.00E+01	1000000	1	9.00E-05	
HYDROXYLAMINE HYDR.(12)	0.00E+00	1000000	1	0.00E+00	
HYDROXYQUINOLINE(12)	0.00E+00	1000000	1	0.00E+00	
HYPOCHLORITE (SODIUM)	9.00E+00	1000000	1	9.00E-06	
IODINE(12)	0.00E+00	1	1	0.00E+00	
IRON	9.44E+05	1000000	0.01	9.44E-03	C
ISOAMYL ACETATE	9.00E+01	525	1	1.71E-01	
ISOPROPYL ALCOHOL(12)	0.00E+00	900	1	0.00E+00	

APPENDIX A

WHC-SD-WM-TI-769
CHEMICAL CONSTITUENTS
SINGLE-SHELL AND DOUBLE-SHELL TANKS

	AIR				
	MELTER	QUALITY		AIRBORNE	
TANK WASTE	FEED	STANDARD	VOLATILITY	HAZARD	
CONSTITUENT(1)	(kg)(5)	(ug/L)(8)	FACTOR(9)	INDEX(10)	TOXICITY(11)
KEROSENE	9.00E+01	1000000	1	9.00E-05	
LANTHANUM	2.04E+04	1000000	0.01	2.04E-04	
LEAD	1.67E+05	0.2	0.5	4.17E+05	X
LITHIUM	9.00E+01	1000000	0.1	9.00E-06	
MAGNESIUM	4.13E+03	15	0.01	2.75E+00	
MANGANESE	9.93E+04	1000000	0.01	9.93E-04	
MERCURY	4.52E+03	0.01	1	4.52E+05	X
METHANOL(12)	0.00E+00	260	1	0.00E+00	D
METHYL ETHYL KEYTONE(12)	0.00E+00	1000000	1	0.00E+00	D
METHYL ISOBUTYL KETONE(12)	0.00E+00	1000000	1	0.00E+00	D
MOLYBDENUM	2.26E+01	5	0.5	2.26E+00	
MORPHOLINE	9.00E+01	70	1	1.29E+00	
NAPHTHYLAMINE	9.00E+00	0.002	1	4.50E+03	X
NEODYMIUM	5.00E+01	1000000	0.01	5.00E-07	
NICKEL	1.10E+05	1	0.1	1.10E+04	X
NIObIUM	9.00E+01	1000000	0.01	9.00E-07	
NITRATE	9.68E+07	1000000	1	9.68E+01	
NITRITE	1.22E+07	1000000	1	1.22E+01	
OPHENATROLINE	9.00E+01	1000000	1	9.00E-05	
OXALATE (SODIUM)	6.23E+04	1000000	1	6.23E-02	
PARAFFIN (NORMAL) HYDROCAR.	5.00E+01	1000000	1	5.00E-05	
PERMANGANATE (POTASSIUM)	9.00E+01	1000000	1	9.00E-05	B
PERSULFATE (POTASSIUM)	9.00E+01	1000000	1	9.00E-05	
PERSULFATE (SODIUM)	9.00E+01	1000000	1	9.00E-05	
PHOSPHATE	3.03E+06	1000000	0.25	7.58E-01	
PHOSPHORUS PENTOXIDE	9.00E+01	1000000	0.25	2.25E-05	
PLATINUM	0.00E+00	0.002	0.01	0.00E+00	
POTASSIUM	6.51E+05	1000000	0.25	1.63E-01	
PRASEODYMIUM	5.00E+01	1000000	0.01	5.00E-07	
RHENIUM	4.87E-02	1000000	0.01	4.87E-10	
RHODIUM	1.75E+02	1000000	0.01	1.75E-06	
RUBIDIUM	5.85E+00	1000000	0.01	5.85E-08	
RUTHENIUM	1.05E+00	1000000	1	1.05E-06	

APPENDIX A

WHC-SD-WM-TI-769
CHEMICAL CONSTITUENTS
SINGLE-SHELL AND DOUBLE-SHELL TANKS

		AIR			
TANK WASTE	MELTER	QUALITY		AIRBORNE	
CONSTITUENT(1)	FEED	STANDARD	VOLATILITY	HAZARD	TOXICITY(11)
	(kg)(5)	(ug/L)(8)	FACTOR(9)	INDEX(10)	
SDIPHENYL CARBAZIDE	5.00E+01	1000000	0.01	5.00E-07	
SELENIUM	1.66E+03	0.2	1	8.28E+03	X
SILICON (SILICATE)	3.22E+05	1000000	0.01	3.22E-03	
SILVER	1.03E+03	0.01	0.25	2.57E+04	C
SODIUM	6.16E+07	1000000	0.25	1.54E+01	A
STRONTIUM	1.86E+04	1000000	0.01	1.86E-04	
STYRENE	9.00E+00	420	1	2.14E-02	C
SUGAR	9.00E+04	1000000	1	9.00E-02	
SULFATE	2.88E+06	1000000	1	2.88E+00	
SULFITE (AMMONIUM)	9.00E+01	1000000	1	9.00E-05	D
TANTALUM	5.00E+01	5	0.01	1.00E-01	
TARTRATE (SODIUM)	9.00E+01	1000000	1	9.00E-05	
TECHNETIUM(OXIDE)	2.44E+03	1000000	1	2.44E-03	
TELLURIUM	9.00E+01	0.1	1	9.00E+02	
TETRABROMOETHANE	9.00E+01	1000000	1	9.00E-05	
TETRAHYDROFURAN	9.00E+01	590	1	1.53E-01	
TETRAPHENYL BORON	9.00E+01	1000000	1	9.00E-05	
THALLIUM	1.39E+02	0.1	1	1.39E+03	X
THENOYLTRIFLUOROACETONE	9.00E+01	1000000	1	9.00E-05	
THIOCYANATE (AMMONIUM, Na)	9.00E+01	1000000	1	9.00E-05	
THIOCYANATE (MERCURIC)	9.00E+01	1000000	1	9.00E-05	
THIOSULFATE (AMMONIUM, Na)	9.00E+01	1000000	1	9.00E-05	
THORIUM	1.40E+03	1000000	0.01	1.40E-05	
THYMOLPHTHALEIN	9.00E+01	1000000	1	9.00E-05	
TIN	9.00E+01	2	0.25	1.13E+01	
TITANIUM	7.75E+01	15	0.01	5.17E-02	
TOC	1.57E+06	1000000	1	1.57E+00	X
TOLUENE	9.00E+01	750	1	1.20E-01	C
TRICHLOROETHANE(12)	0.00E+00	1000000	1	0.00E+00	X
TRISOOCTYLAMINE	9.00E+01	1000000	1	9.00E-05	
TRINDODECYLAMINE	9.00E+01	1000000	1	9.00E-05	
TRINOCTYLAMINE	9.00E+01	1000000	1	9.00E-05	
TRIS(HYDRO.)AMINOMETHANE	9.00E+01	1000000	1	9.00E-05	

APPENDIX A

WHC-SD-WM-TI-769
CHEMICAL CONSTITUENTS
SINGLE-SHELL AND DOUBLE-SHELL TANKS

		AIR			
	MELTER	QUALITY		AIRBORNE	
TANK WASTE	FEED	STANDARD	VOLATILITY	HAZARD	
CONSTITUENT(1)	(kg)(5)	(ug/L)(8)	FACTOR(9)	INDEX(10)	TOXICITY(11)
TUNGSTEN	5.00E+01	5	0.01	1.00E-01	
URANIUM	1.21E+06	0.05	0.01	2.42E+05	
UREA	9.00E+01	1000000	1	9.00E-05	
VANADIUM (PENTOXIDE)	5.00E+01	0.5	0.01	1.00E+00	C
WATER	4.57E+08	1000000	1	4.57E+02	
XYLENE	9.00E+01	435	1	2.07E-01	C
ZINC	2.53E+02	1000000	0.5	1.26E-04	X
ZIRCONIUM	6.08E+05	5	0.01	1.22E+03	
	6.72E+08				

A-11

WHC-SD-WM-TI-769, Rev. 0

CHEMICAL CONSTITUENTS

NOTES

1. These are the constituents that are potentially in Hanford Site waste tanks, according to either Agnew (Agnew 1996), Shelton (Shelton 1996) or Klem (Klem 1990). The TOC includes all organic. Combinations of the constituents are not listed. The first word of the constituent designation is the anion or cation that is being compared. Constituents in bold (or their major tank compounds) are toxic (see note 11).
2. SST and DST masses are taken from LA-UR-96-858 (Agnew 1996).
3. Masses are from Agnew (Agnew 1996) or Shelton (Shelton 1996), except that values in bold are bounding estimates based on historical procurement records (e.g., Olson 1992). If masses are listed by both Shelton and Agnew, Agnew's numbers were used.
4. The numbers are groundwater quality standards (nonradiological only) from the Environmental Protection Manual (WHC 1993) or the maximum contaminant levels (MCL) of the federal drinking water standard, also taken from the Environmental Protection Manual. If no MCL or comparable standard exists, a value of 1000 mg/L was assigned for calculation purposes.
5. The assumed soluble fractions are derived from Shelton 1996. The soluble tank residuals are the estimated maximum amounts of soluble constituents remaining in the tanks after saltwell pumping and sludge washing. The soluble tank residuals are the Assumed Soluble Fractions (column 6) times the Total Mass (column 4) times 10% assumed residual. It is assumed that a minimum of 50% of insoluble material is retrieved. The melter feed, then, consists of 90% of the soluble plus 50% of the insoluble material.
6. The Kd values were taken from the TWRS EIS (DOE 1996). The mobility factor considers the mobility of the chemical in migrating to the groundwater. The mobility factor (MF) is given by: $MF = 1/(1 + (5 \times Kd))$, where the Kd is the distribution coefficient taken from DOE 1996.
7. This column is the quotient of the soluble inventory (g) and the groundwater quality standard (g/L), times the mobility factor. Consequently, the index is in units of liters.
8. The air quality standards (nonradiological only) are the Threshold Limiting Values (TLV) given by the American Conference of Governmental Industrial Hygienists (ACGIH 1967). If no TLV exists, a value of 1 g/L was assigned for calculation purposes.
9. The volatility factor is the estimated fraction of a constituent that would go airborne under melter conditions (Stegen 1994). All organic constituents are given a factor of 1, all refractories are arbitrarily given a value of .01. Constituents such as nitrate and nitrite that evolve into gases or vapors under melter conditions were given a value of 1.
10. This column is the quotient of the soluble and insoluble inventory (g) and the air quality standard (g/L) x the volatility factor.
11. The 10 CFR 302, Table 302.4 toxicity category is given.
12. It is assumed that this chemical has been lost from the tanks either through evaporation or vaporization in the evaporators, because its boiling point is less than 100 degrees C.

APPENDIX B: CONSTITUENT PREVALENCE RANK

WHC-SD-WM-TI-769
CONSTITUENT PREVALENCE RANK

		SOLUBLE				MELTER	
		TANK				FEED	
TANK WASTE		RESIDUALS	%	TANK WASTE			%
CONSTITUENT(1)	TOXICITY	(kg)(2)	CUMULATIVE	CONSTITUENT(1)	TOXICITY	(kg)(2)	CUMULATIVE
WATER		5.08E+07	69.34076%	WATER		4.57E+08	67.98836%
NITRATE		1.07E+07	83.94982%	NITRATE		9.68E+07	82.38476%
SODIUM	A	6.80E+06	93.22816%	SODIUM	A	6.16E+07	91.54352%
HYDROXIDE		1.43E+06	95.17846%	HYDROXIDE		1.57E+07	93.87304%
NITRITE		1.35E+06	97.02011%	NITRITE		1.22E+07	95.68382%
CARBONATE		4.67E+05	97.65698%	CARBONATE		4.28E+06	96.32048%
SULFATE		3.18E+05	98.09079%	ALUMINUM		3.86E+06	96.89448%
PHOSPHATE		2.55E+05	98.43856%	PHOSPHATE		3.03E+06	97.34530%
TOC	X	1.67E+05	98.66621%	SULFATE		2.88E+06	97.77376%
FLUORIDE		1.14E+05	98.82196%	TOC	X	1.57E+06	98.00718%
GLYCOLATE		1.10E+05	98.97211%	CANCRINITE		1.35E+06	98.20793%
HEDTA		1.03E+05	99.11325%	URANIUM		1.21E+06	98.38818%
URANIUM		1.03E+05	99.25389%	FLUORIDE		1.06E+06	98.54602%
CHLORIDE		9.45E+04	99.38282%	GLYCOLATE		9.90E+05	98.69324%
POTASSIUM		7.07E+04	99.47927%	IRON	C	9.44E+05	98.83366%
C6H5O7		6.78E+04	99.57181%	HEDTA		9.31E+05	98.97205%
EDTA	D	6.19E+04	99.65630%	CHLORIDE		8.56E+05	99.09939%
DIBUTYL/TRIBUTYL PHOSPHATE		5.94E+04	99.73738%	POTASSIUM		6.51E+05	99.19614%
CHROMIUM	X	5.81E+04	99.81668%	CHROMIUM	X	6.25E+05	99.28906%
AMMONIA (NH3)	B	4.13E+04	99.87299%	C6H5O7		6.10E+05	99.37980%
BUTANOL (BUTYL ALCOHOL)	D	1.98E+04	99.90008%	ZIRCONIUM		6.08E+05	99.47021%
CYANIDE	A	1.44E+04	99.91973%	EDTA	D	5.57E+05	99.55306%
SUGAR		1.00E+04	99.93338%	DIBUTYL/TRIBUTYL PHOSPHATE		5.35E+05	99.63256%
ACETATE		9.95E+03	99.94696%	AMMONIA (NH3)	B	3.71E+05	99.68778%
IRON	C	7.32E+03	99.95695%	CALCIUM		3.35E+05	99.73756%
OXALATE (SODIUM)		6.92E+03	99.96640%	SILICON (SILICATE)		3.22E+05	99.78547%
LEAD	X	6.88E+03	99.97579%	BISMUTH		2.72E+05	99.82585%
CALCIUM		6.31E+03	99.98441%	BUTANOL (BUTYL ALCOHOL)	D	1.79E+05	99.85241%
SILICON (SILICATE)		3.92E+03	99.98977%	LEAD	X	1.67E+05	99.87722%
BISMUTH		2.36E+03	99.99299%	CYANIDE	A	1.30E+05	99.89650%
MANGANESE		1.08E+03	99.99446%	CERIUM		1.19E+05	99.91426%
NICKEL	X	8.13E+02	99.99557%	NICKEL	X	1.10E+05	99.93065%
CADMIUM	X	7.64E+02	99.99662%	MANGANESE		9.93E+04	99.94543%

WHC-SD-WM-TI-769
CONSTITUENT PREVALENCE RANK

		SOLUBLE				MELTER	
		TANK				FEED	
TANK WASTE		RESIDUALS	%	TANK WASTE			%
CONSTITUENT(1)	TOXICITY	(kg)(2)	CUMULATIVE	CONSTITUENT(1)	TOXICITY	(kg)(2)	CUMULATIVE
ZIRCONIUM		7.50E+02	99.99764%	SUGAR		9.00E+04	99.95881%
MERCURY	X	2.73E+02	99.99801%	ACETATE		8.96E+04	99.97213%
CERIUM		2.37E+02	99.99834%	OXALATE (SODIUM)		6.23E+04	99.98138%
TECHNETIUM(OXIDE)		2.20E+02	99.99864%	DIATOMACEOUS EARTH		5.00E+04	99.98882%
CESIUM		1.88E+02	99.99890%	LANTHANUM		2.04E+04	99.99185%
FERROUS SULFAMATE		1.00E+02	99.99903%	STRONTIUM		1.86E+04	99.99462%
BARIUM	C	7.79E+01	99.99914%	CADMIUM	X	1.02E+04	99.99613%
LANTHANUM		4.04E+01	99.99919%	MERCURY	X	4.52E+03	99.99680%
STRONTIUM		3.69E+01	99.99924%	MAGNESIUM		4.13E+03	99.99741%
SILVER	C	3.20E+01	99.99929%	BARIUM	C	2.58E+03	99.99779%
RHODIUM		1.94E+01	99.99931%	TECHNETIUM(OXIDE)		2.44E+03	99.99816%
THALLIUM	X	1.54E+01	99.99934%	CESIUM		1.80E+03	99.99842%
ANTIMONY	X	1.00E+01	99.99935%	SELENIUM	X	1.66E+03	99.99867%
BICARBONATE		1.00E+01	99.99936%	THORIUM		1.40E+03	99.99888%
BISULFATE (AMMONIUM)		1.00E+01	99.99938%	SILVER	C	1.03E+03	99.99903%
BISULFITE		1.00E+01	99.99939%	FERROUS SULFAMATE		9.00E+02	99.99916%
BROMATE		1.00E+01	99.99940%	ZINC	X	2.53E+02	99.99920%
BROMINE		1.00E+01	99.99942%	COPPER	X	1.83E+02	99.99923%
BROMOCRESOL PURPLE		1.00E+01	99.99943%	RHODIUM		1.75E+02	99.99926%
BROMONAPHTHALENE		1.00E+01	99.99944%	THALLIUM	X	1.39E+02	99.99928%
DIBUTYL PHOSPHANATE		1.00E+01	99.99946%	ANTIMONY	X	9.00E+01	99.99929%
DTPA		1.00E+01	99.99947%	BICARBONATE		9.00E+01	99.99930%
DUODECANE		1.00E+01	99.99949%	BISULFATE (AMMONIUM)		9.00E+01	99.99932%
ETHANOL		1.00E+01	99.99950%	BISULFITE		9.00E+01	99.99933%
ETHYLENE GLYCOL		1.00E+01	99.99951%	BROMATE		9.00E+01	99.99934%
FLUOROSILICATE (AMMONIUM)		1.00E+01	99.99953%	BROMINE		9.00E+01	99.99936%
GALLIUM		1.00E+01	99.99954%	BROMOCRESOL PURPLE		9.00E+01	99.99937%
GLUCONATE (SODIUM)		1.00E+01	99.99955%	BROMONAPHTHALENE		9.00E+01	99.99938%
GLYCEROL		1.00E+01	99.99957%	DIBUTYL PHOSPHANATE		9.00E+01	99.99940%
HYDROXYLAMINE (NITRATE)		1.00E+01	99.99958%	DTPA		9.00E+01	99.99941%
ISOAMYL ACETATE		1.00E+01	99.99959%	DUODECANE		9.00E+01	99.99942%
KEROSENE		1.00E+01	99.99961%	ETHANOL		9.00E+01	99.99944%
LITHIUM		1.00E+01	99.99962%	ETHYLENE GLYCOL		9.00E+01	99.99945%

WHC-SD-WM-TI-769
CONSTITUENT PREVALENCE RANK

		SOLUBLE				MELTER	
		TANK				FEED	
TANK WASTE		RESIDUALS	%	TANK WASTE			%
CONSTITUENT(1)	TOXICITY	(kg)(2)	CUMULATIVE	CONSTITUENT(1)	TOXICITY	(kg)(2)	CUMULATIVE
MORPHOLINE		1.00E+01	99.99964%	FLUOROSILICATE (AMMONIUM)		9.00E+01	99.99946%
NIOBIUM		1.00E+01	99.99965%	GALLIUM		9.00E+01	99.99948%
OPHENATROLINE		1.00E+01	99.99966%	GLUCONATE (SODIUM)		9.00E+01	99.99949%
PERMANGANATE (POTASSIUM)	B	1.00E+01	99.99968%	GLYCEROL		9.00E+01	99.99950%
PERSULFATE (POTASSIUM)		1.00E+01	99.99969%	HYDROXYLAMINE (NITRATE)		9.00E+01	99.99952%
PERSULFATE (SODIUM)		1.00E+01	99.99970%	ISOAMYL ACETATE		9.00E+01	99.99953%
PHOSPHORUS PENTOXIDE		1.00E+01	99.99972%	KEROSENE		9.00E+01	99.99954%
SULFITE (AMMONIUM)	D	1.00E+01	99.99973%	LITHIUM		9.00E+01	99.99956%
TARTRATE (SODIUM)		1.00E+01	99.99974%	MORPHOLINE		9.00E+01	99.99957%
TELLURIUM		1.00E+01	99.99976%	NIOBIUM		9.00E+01	99.99958%
TETRABROMOETHANE		1.00E+01	99.99977%	OPHENATROLINE		9.00E+01	99.99960%
TETRAHYDROFURAN		1.00E+01	99.99979%	PERMANGANATE (POTASSIUM)	B	9.00E+01	99.99961%
TETRAPHENYL BORON		1.00E+01	99.99980%	PERSULFATE (POTASSIUM)		9.00E+01	99.99962%
THENOYLTRIFLUOROACETONE		1.00E+01	99.99981%	PERSULFATE (SODIUM)		9.00E+01	99.99964%
THIOCYANATE (AMMONIUM, Na)		1.00E+01	99.99983%	PHOSPHORUS PENTOXIDE		9.00E+01	99.99965%
THIOCYANATE (MERCURIC)		1.00E+01	99.99984%	SULFITE (AMMONIUM)	D	9.00E+01	99.99966%
THIOSULFATE (AMMONIUM, Na)		1.00E+01	99.99985%	TARTRATE (SODIUM)		9.00E+01	99.99968%
THYMOLPHTHALEIN		1.00E+01	99.99987%	TELLURIUM		9.00E+01	99.99969%
TIN		1.00E+01	99.99988%	TETRABROMOETHANE		9.00E+01	99.99970%
TOLUENE	C	1.00E+01	99.99989%	TETRAHYDROFURAN		9.00E+01	99.99972%
TRISOOCTYLAMINE		1.00E+01	99.99991%	TETRAPHENYL BORON		9.00E+01	99.99973%
TRINDODECYLAMINE		1.00E+01	99.99992%	THENOYLTRIFLUOROACETONE		9.00E+01	99.99974%
TRINOCYLAMINE		1.00E+01	99.99994%	THIOCYANATE (AMMONIUM, Na)		9.00E+01	99.99976%
TRIS(HYDRO)AMINOMETHANE		1.00E+01	99.99995%	THIOCYANATE (MERCURIC)		9.00E+01	99.99977%
UREA		1.00E+01	99.99996%	THIOSULFATE (AMMONIUM, Na)		9.00E+01	99.99978%
XYLENE	C	1.00E+01	99.99998%	THYMOLPHTHALEIN		9.00E+01	99.99980%
COPPER	X	9.87E+00	99.99999%	TIN		9.00E+01	99.99981%
BORON		3.43E+00	99.99999%	TOLUENE	C	9.00E+01	99.99982%
HYPOCHLORITE (SODIUM)		1.00E+00	100.00000%	TRISOOCTYLAMINE		9.00E+01	99.99984%
NAPHTHYLAMINE	X	1.00E+00	100.00000%	TRINDODECYLAMINE		9.00E+01	99.99985%
STYRENE	C	1.00E+00	100.00000%	TRINOCYLAMINE		9.00E+01	99.99986%
MOLYBDENUM		7.21E-01	100.00000%	TRIS(HYDRO)AMINOMETHANE		9.00E+01	99.99988%
RUTHENIUM		1.17E-01	100.00000%	UREA		9.00E+01	99.99989%

WHC-SD-WM-TI-769
CONSTITUENT PREVALENCE RANK

		SOLUBLE				MELTER	
		TANK				FEED	
TANK WASTE		RESIDUALS	%	TANK WASTE			%
CONSTITUENT(1)	TOXICITY	(kg)(2)	CUMULATIVE	CONSTITUENT(1)	TOXICITY	(kg)(2)	CUMULATIVE
ARSENIC	X	4.14E-03	100.00000%	XYLENE	C	9.00E+01	99.99991%
BERYLLIUM	X	2.48E-03	100.00000%	TITANIUM		7.75E+01	99.99992%
ACETONE(12)	D	0.00E+00	100.00000%	CARBIDE (BORON)		5.00E+01	99.99992%
ALUMINUM		0.00E+00	100.00000%	DICHROMATE		5.00E+01	99.99993%
BENZENE(12)	C	0.00E+00	100.00000%	NEODYMIUM		5.00E+01	99.99994%
CANCRINITE		0.00E+00	100.00000%	PARAFFIN (NORMAL) HYDROCAR.		5.00E+01	99.99995%
CARBIDE (BORON)		0.00E+00	100.00000%	PRASEODYMIUM		5.00E+01	99.99995%
CARBON TETRACHLORIDE(12)	D	0.00E+00	100.00000%	SDIPHENYL CARBAZIDE		5.00E+01	99.99996%
COBALT		0.00E+00	100.00000%	TANTALUM		5.00E+01	99.99997%
DIATOMACEOUS EARTH		0.00E+00	100.00000%	TUNGSTEN		5.00E+01	99.99998%
DICHROMATE		0.00E+00	100.00000%	VANADIUM (PENTOXIDE)	C	5.00E+01	99.99998%
DIHYDROXYANTHRAQUINONE(12)		0.00E+00	100.00000%	BORON		3.09E+01	99.99999%
DIOXANE(12)		0.00E+00	100.00000%	MOLYBDENUM		2.26E+01	99.99999%
ETHYL ETHER(12)		0.00E+00	100.00000%	COBALT		2.12E+01	99.99999%
FORMALDEHYDE(12)	C	0.00E+00	100.00000%	HYPOCHLORITE (SODIUM)		9.00E+00	100.00000%
GOLD		0.00E+00	100.00000%	NAPHTHYLAMINE	X	9.00E+00	100.00000%
HYDRAZINE(12)	X	0.00E+00	100.00000%	STYRENE	C	9.00E+00	100.00000%
HYDROGEN SULFIDE(12)	B	0.00E+00	100.00000%	RUBIDIUM		5.85E+00	100.00000%
HYDROXYLAMINE HYDR.(12)		0.00E+00	100.00000%	BERYLLIUM	X	1.56E+00	100.00000%
HYDROXYQUINOLINE(12)		0.00E+00	100.00000%	ARSENIC	X	1.17E+00	100.00000%
IODINE(12)		0.00E+00	100.00000%	RUTHENIUM		1.05E+00	100.00000%
ISOPROPYL ALCOHOL(12)		0.00E+00	100.00000%	RHENIUM		4.87E-02	100.00000%
MAGNESIUM		0.00E+00	100.00000%	ACETONE(12)	D	0.00E+00	100.00000%
METHANOL(12)	D	0.00E+00	100.00000%	BENZENE(12)	C	0.00E+00	100.00000%
METHYL ETHYL KEYTONE(12)	D	0.00E+00	100.00000%	CARBON TETRACHLORIDE(12)	D	0.00E+00	100.00000%
METHYL ISOBUTYL KETONE(12)	D	0.00E+00	100.00000%	DIHYDROXYANTHRAQUINONE(12)		0.00E+00	100.00000%
NEODYMIUM		0.00E+00	100.00000%	DIOXANE(12)		0.00E+00	100.00000%
PARAFFIN (NORMAL) HYDROCAR.		0.00E+00	100.00000%	ETHYL ETHER(12)		0.00E+00	100.00000%
PLATINUM		0.00E+00	100.00000%	FORMALDEHYDE(12)	C	0.00E+00	100.00000%
PRASEODYMIUM		0.00E+00	100.00000%	GOLD		0.00E+00	100.00000%
RHENIUM		0.00E+00	100.00000%	HYDRAZINE(12)	X	0.00E+00	100.00000%
RUBIDIUM		0.00E+00	100.00000%	HYDROGEN SULFIDE(12)	B	0.00E+00	100.00000%
SDIPHENYL CARBAZIDE		0.00E+00	100.00000%	HYDROXYLAMINE HYDR.(12)		0.00E+00	100.00000%

[illegible]

APPENDIX C: HAZARDOUS RANK OF CONSTITUENTS

WHC-SD-WM-TI-769
HAZARDOUS RANK OF CONSTITUENTS

		%			%
	WATER	CUMULATIVE		AIRBORNE	CUMULATIVE
TANK WASTE	HAZARD	WATER	TANK WASTE	HAZARD	AIRBORNE
CONSTITUENT(1)	INDEX	HAZARD	CONSTITUENT	INDEX	HAZARD
NITRITE	1.35E+12	41.19%	MERCURY	4.52E+05	32.01%
NITRATE	1.07E+12	73.87%	LEAD	4.17E+05	61.55%
CHROMIUM	5.81E+11	91.61%	URANIUM	2.42E+05	78.71%
MERCURY	1.37E+11	95.78%	DIBUTYL/TRIBUTYL PHOSPHATE	1.07E+05	86.28%
LEAD	6.75E+10	97.84%	HYDROXIDE	7.83E+04	91.82%
FLUORIDE	2.85E+10	98.71%	CYANIDE	2.59E+04	93.66%
CADMIUM	2.55E+10	99.48%	SILVER	2.57E+04	95.48%
SODIUM	6.80E+09	99.69%	CADMIUM	2.54E+04	97.27%
IRON	4.07E+09	99.82%	NICKEL	1.10E+04	98.05%
ANTIMONY	1.67E+09	99.87%	AMMONIA (NH3)	1.06E+04	98.81%
HYDROXIDE	1.43E+09	99.91%	SELENIUM	8.28E+03	99.39%
SULFATE	1.27E+09	99.95%	NAPHTHYLAMINE	4.50E+03	99.71%
MANGANESE	4.25E+08	99.96%	THALLIUM	1.39E+03	99.81%
CHLORIDE	3.78E+08	99.97%	ZIRCONIUM	1.22E+03	99.89%
TOC	1.67E+08	99.98%	TELLURIUM	9.00E+02	99.96%
GLYCOLATE	1.10E+08	99.98%	BROMINE	1.29E+02	99.97%
HEDTA	1.03E+08	99.99%	NITRATE	9.68E+01	99.97%
URANIUM	1.03E+08	99.99%	BERYLLIUM	7.80E+01	99.98%
POTASSIUM	7.07E+07	99.99%	ETHYLENE GLYCOL	7.50E+01	99.99%
C6H5O7	6.78E+07	99.99%	COBALT	5.29E+01	99.99%
EDTA	6.19E+07	99.99%	BARIUM	5.15E+01	99.99%
DIBUTYL/TRIBUTYL PHOSPHATE	5.94E+07	100.00%	ANTIMONY	4.50E+01	100.00%
AMMONIA (NH3)	4.13E+07	100.00%	SODIUM	1.54E+01	100.00%
BUTANOL (BUTYL ALCOHOL)	1.98E+07	100.00%	NITRITE	1.22E+01	100.00%
CYANIDE	1.44E+07	100.00%	TIN	1.13E+01	100.00%
SUGAR	1.00E+07	100.00%	SULFATE	2.88E+00	100.00%
TOLUENE	1.00E+07	100.00%	MAGNESIUM	2.75E+00	100.00%
ACETATE	9.95E+06	100.00%	ARSENIC	2.33E+00	100.00%
OXALATE (SODIUM)	6.92E+06	100.00%	MOLYBDENUM	2.26E+00	100.00%
PHOSPHATE	5.00E+06	100.00%	COPPER	1.83E+00	100.00%
CARBONATE	1.86E+06	100.00%	TOC	1.57E+00	100.00%
CALCIUM	1.05E+06	100.00%	MORPHOLINE	1.29E+00	100.00%
XYLENE	1.00E+06	100.00%	FLUORIDE	1.06E+00	100.00%

WHC-SD-WM-TI-769
HAZARDOUS RANK OF CONSTITUENTS

		%			%
	WATER	CUMULATIVE		AIRBORNE	CUMULATIVE
TANK WASTE	HAZARD	WATER	TANK WASTE	HAZARD	AIRBORNE
CONSTITUENT(1)	INDEX	HAZARD	CONSTITUENT	INDEX	HAZARD
BARIUM	7.64E+05	100.00%	VANADIUM (PENTOXIDE)	1.00E+00	100.00%
BISMUTH	3.93E+05	100.00%	GLYCOLATE	9.90E-01	100.00%
TECHNETIUM(OXIDE)	2.20E+05	100.00%	HEDTA	9.31E-01	100.00%
NICKEL	1.36E+05	100.00%	CHLORIDE	8.56E-01	100.00%
FERROUS SULFAMATE	1.00E+05	100.00%	PHOSPHATE	7.58E-01	100.00%
RHODIUM	1.94E+04	100.00%	C6HSO7	6.10E-01	100.00%
SILICON (SILICATE)	1.56E+04	100.00%	EDTA	5.57E-01	100.00%
BISULFATE (AMMONIUM)	1.00E+04	100.00%	XYLENE	2.07E-01	100.00%
BISULFITE	1.00E+04	100.00%	BUTANOL (BUTYL ALCOHOL)	1.79E-01	100.00%
BROMATE	1.00E+04	100.00%	ISOAMYL ACETATE	1.71E-01	100.00%
BROMINE	1.00E+04	100.00%	POTASSIUM	1.63E-01	100.00%
BROMOCRESOL PURPLE	1.00E+04	100.00%	TETRAHYDROFURAN	1.53E-01	100.00%
BROMONAPHTHALENE	1.00E+04	100.00%	TOLUENE	1.20E-01	100.00%
DIBUTYL PHOSPHANATE	1.00E+04	100.00%	TANTALUM	1.00E-01	100.00%
DTPA	1.00E+04	100.00%	TUNGSTEN	1.00E-01	100.00%
DUODECANE	1.00E+04	100.00%	SUGAR	9.00E-02	100.00%
ETHANOL	1.00E+04	100.00%	ACETATE	8.96E-02	100.00%
ETHYLENE GLYCOL	1.00E+04	100.00%	CHROMIUM	6.25E-02	100.00%
FLUOROSILICATE (AMMONIUM)	1.00E+04	100.00%	OXALATE (SODIUM)	6.23E-02	100.00%
GLUCONATE (SODIUM)	1.00E+04	100.00%	TITANIUM	5.17E-02	100.00%
GLYCEROL	1.00E+04	100.00%	ETHANOL	4.74E-02	100.00%
HYDROXYLAMINE (NITRATE)	1.00E+04	100.00%	CARBONATE	4.28E-02	100.00%
ISOAMYL ACETATE	1.00E+04	100.00%	BISMUTH	2.72E-02	100.00%
KEROSENE	1.00E+04	100.00%	STYRENE	2.14E-02	100.00%
LITHIUM	1.00E+04	100.00%	CANCRINITE	1.35E-02	100.00%
MORPHOLINE	1.00E+04	100.00%	IRON	9.44E-03	100.00%
OPHENATROLINE	1.00E+04	100.00%	CALCIUM	3.35E-03	100.00%
PERMANGANATE (POTASSIUM)	1.00E+04	100.00%	SILICON (SILICATE)	3.22E-03	100.00%
PERSULFATE (POTASSIUM)	1.00E+04	100.00%	TECHNETIUM(OXIDE)	2.44E-03	100.00%
PERSULFATE (SODIUM)	1.00E+04	100.00%	CERIUM	1.19E-03	100.00%
PHOSPHORUS PENTOXIDE	1.00E+04	100.00%	MANGANESE	9.93E-04	100.00%
SULFITE (AMMONIUM)	1.00E+04	100.00%	FERROUS SULFAMATE	9.00E-04	100.00%
TARTRATE (SODIUM)	1.00E+04	100.00%	CESIUM	8.99E-04	100.00%

WHC-SD-WM-TI-769
HAZARDOUS RANK OF CONSTITUENTS

		%			%
TANK WASTE	WATER	CUMULATIVE	TANK WASTE	AIRBORNE	CUMULATIVE
HAZARD	HAZARD	WATER	HAZARD	HAZARD	AIRBORNE
CONSTITUENT(1)	INDEX	HAZARD	CONSTITUENT	INDEX	HAZARD
TETRABROMOETHANE	1.00E+04	100.00%	DIATOMACEOUS EARTH	5.00E-04	100.00%
TETRAHYDROFURAN	1.00E+04	100.00%	LANTHANUM	2.04E-04	100.00%
TETRAPHENYL BORON	1.00E+04	100.00%	STRONTIUM	1.86E-04	100.00%
THENOYLTRIFLUOROACETONE	1.00E+04	100.00%	ZINC	1.26E-04	100.00%
THIOCYANATE (AMMONIUM, Na)	1.00E+04	100.00%	BISULFATE (AMMONIUM)	9.00E-05	100.00%
THIOCYANATE (MERCURIC)	1.00E+04	100.00%	BISULFITE	9.00E-05	100.00%
THIOSULFATE (AMMONIUM, Na)	1.00E+04	100.00%	BROMATE	9.00E-05	100.00%
THYMOLPHTHALEIN	1.00E+04	100.00%	BROMOCRESOL PURPLE	9.00E-05	100.00%
TRISOOCTYLAMINE	1.00E+04	100.00%	BROMONAPHTHALENE	9.00E-05	100.00%
TRINDODECYLAMINE	1.00E+04	100.00%	DIBUTYL PHOSPHANATE	9.00E-05	100.00%
TRINOCTYLAMINE	1.00E+04	100.00%	DTPA	9.00E-05	100.00%
TRIS(HYDRO.)AMINOMETHANE	1.00E+04	100.00%	DUODECANE	9.00E-05	100.00%
UREA	1.00E+04	100.00%	FLUOROSILICATE (AMMONIUM)	9.00E-05	100.00%
ZIRCONIUM	2.99E+03	100.00%	GLUCONATE (SODIUM)	9.00E-05	100.00%
BERYLLIUM	2.47E+03	100.00%	GLYCEROL	9.00E-05	100.00%
BICARBONATE	1.67E+03	100.00%	HYDROXYLAMINE (NITRATE)	9.00E-05	100.00%
HYPOCHLORITE (SODIUM)	1.00E+03	100.00%	KEROSENE	9.00E-05	100.00%
NAPHTHYLAMINE	1.00E+03	100.00%	OPHENATROLINE	9.00E-05	100.00%
STYRENE	1.00E+03	100.00%	PERMANGANATE (POTASSIUM)	9.00E-05	100.00%
CERIUM	9.44E+02	100.00%	PERSULFATE (POTASSIUM)	9.00E-05	100.00%
CESIUM	7.50E+02	100.00%	PERSULFATE (SODIUM)	9.00E-05	100.00%
STRONTIUM	7.24E+02	100.00%	SULFITE (AMMONIUM)	9.00E-05	100.00%
ARSENIC	3.30E+02	100.00%	TARTRATE (SODIUM)	9.00E-05	100.00%
TIN	1.96E+02	100.00%	TETRABROMOETHANE	9.00E-05	100.00%
LANTHANUM	1.61E+02	100.00%	TETRAPHENYL BORON	9.00E-05	100.00%
SILVER	1.28E+02	100.00%	THENOYLTRIFLUOROACETONE	9.00E-05	100.00%
RUTHENIUM	1.17E+02	100.00%	THIOCYANATE (AMMONIUM, Na)	9.00E-05	100.00%
THALLIUM	6.14E+01	100.00%	THIOCYANATE (MERCURIC)	9.00E-05	100.00%
GALLIUM	3.98E+01	100.00%	THIOSULFATE (AMMONIUM, Na)	9.00E-05	100.00%
NIوبيUM	3.98E+01	100.00%	THYMOLPHTHALEIN	9.00E-05	100.00%
TELLURIUM	3.98E+01	100.00%	TRISOOCTYLAMINE	9.00E-05	100.00%
COPPER	3.93E+01	100.00%	TRINDODECYLAMINE	9.00E-05	100.00%
BORON	1.37E+01	100.00%	TRINOCTYLAMINE	9.00E-05	100.00%

APPENDIX C
HAZARDOUS RANK OF CONSTITUENTS

TANK WASTE CONSTITUENT(1)	%		TANK WASTE CONSTITUENT	%	
	WATER HAZARD INDEX	CUMULATIVE WATER HAZARD		AIRBORNE HAZARD INDEX	CUMULATIVE AIRBORNE HAZARD
MOLYBDENUM	2.87E+00	100.00%	TRIS(HYDRO)AMINOMETHANE	9.00E-05	100.00%
ACETONE(12)	0.00E+00	100.00%	UREA	9.00E-05	100.00%
ALUMINUM	0.00E+00	100.00%	PARAFFIN (NORMAL) HYDROCAR.	5.00E-05	100.00%
BENZENE(12)	0.00E+00	100.00%	PHOSPHORUS PENTOXIDE	2.25E-05	100.00%
CANCRINITE	0.00E+00	100.00%	THORIUM	1.40E-05	100.00%
CARBIDE (BORON)	0.00E+00	100.00%	HYPOCHLORITE (SODIUM)	9.00E-06	100.00%
CARBON TETRACHLORIDE(12)	0.00E+00	100.00%	LITHIUM	9.00E-06	100.00%
COBALT	0.00E+00	100.00%	BORON	7.72E-06	100.00%
DIATOMACEOUS EARTH	0.00E+00	100.00%	DICHROMATE	5.00E-06	100.00%
DICHROMATE	0.00E+00	100.00%	RHODIUM	1.75E-06	100.00%
DIHYDROXYANTHRAQUINONE(12)	0.00E+00	100.00%	RUTHENIUM	1.05E-06	100.00%
DIOXANE(12)	0.00E+00	100.00%	BICARBONATE	9.00E-07	100.00%
ETHYL ETHER(12)	0.00E+00	100.00%	GALLIUM	9.00E-07	100.00%
FORMALDEHYDE(12)	0.00E+00	100.00%	NIOBIUM	9.00E-07	100.00%
GOLD	0.00E+00	100.00%	CARBIDE (BORON)	5.00E-07	100.00%
HYDRAZINE(12)	0.00E+00	100.00%	NEODYMIUM	5.00E-07	100.00%
HYDROGEN SULFIDE(12)	0.00E+00	100.00%	PRASEODYMIUM	5.00E-07	100.00%
HYDROXYLAMINE HYDR.(12)	0.00E+00	100.00%	SDIPHENYL CARBAZIDE	5.00E-07	100.00%
HYDROXYQUINOLINE(12)	0.00E+00	100.00%	RUBIDIUM	5.85E-08	100.00%
IODINE(12)	0.00E+00	100.00%	RHENIUM	4.87E-10	100.00%
ISOPROPYL ALCOHOL(12)	0.00E+00	100.00%	ACETONE(12)	0.00E+00	100.00%
MAGNESIUM	0.00E+00	100.00%	ALUMINUM	0.00E+00	100.00%
METHANOL(12)	0.00E+00	100.00%	BENZENE(12)	0.00E+00	100.00%
METHYL ETHYL KEYTONE(12)	0.00E+00	100.00%	CARBON TETRACHLORIDE(12)	0.00E+00	100.00%
METHYL ISOBUTYL KETONE(12)	0.00E+00	100.00%	DIHYDROXYANTHRAQUINONE(12)	0.00E+00	100.00%
NEODYMIUM	0.00E+00	100.00%	DIOXANE(12)	0.00E+00	100.00%
PARAFFIN (NORMAL) HYDROCAR.	0.00E+00	100.00%	ETHYL ETHER(12)	0.00E+00	100.00%
PLATINUM	0.00E+00	100.00%	FORMALDEHYDE(12)	0.00E+00	100.00%
PRASEODYMIUM	0.00E+00	100.00%	GOLD	0.00E+00	100.00%
RHENIUM	0.00E+00	100.00%	HYDRAZINE(12)	0.00E+00	100.00%
RUBIDIUM	0.00E+00	100.00%	HYDROGEN SULFIDE(12)	0.00E+00	100.00%
SDIPHENYL CARBAZIDE	0.00E+00	100.00%	HYDROXYLAMINE HYDR.(12)	0.00E+00	100.00%
SELENIUM	0.00E+00	100.00%	HYDROXYQUINOLINE(12)	0.00E+00	100.00%

WHC-SD-WM-TI-769
HAZARDOUS RANK OF CONSTITUENTS

		%			%
	WATER	CUMULATIVE		AIRBORNE	CUMULATIVE
TANK WASTE	HAZARD	WATER	TANK WASTE	HAZARD	AIRBORNE
CONSTITUENT(1)	INDEX	HAZARD	CONSTITUENT	INDEX	HAZARD
TANTALUM	0.00E+00	100.00%	IODINE(12)	0.00E+00	100.00%
THORIUM	0.00E+00	100.00%	ISOPROPYL ALCOHOL(12)	0.00E+00	100.00%
TITANIUM	0.00E+00	100.00%	METHANOL(12)	0.00E+00	100.00%
TRICHLOROETHANE(12)	0.00E+00	100.00%	METHYL ETHYL KEYTONE(12)	0.00E+00	100.00%
TUNGSTEN	0.00E+00	100.00%	METHYL ISOBUTYL KETONE(12)	0.00E+00	100.00%
VANADIUM (PENTOXIDE)	0.00E+00	100.00%	PLATINUM	0.00E+00	100.00%
ZINC	0.00E+00	100.00%	TRICHLOROETHANE(12)	0.00E+00	100.00%
	3.28E+12			1.41E+06	
Notes: (1) Water is not included in the ranking.					

APPENDIX D: MTCA RANK OF CHEMICALS

WHC-SD-WM-769
 MTCA RANK OF CHEMICALS

	TANK		MTCA(1)	MTCA	MTCA	MTCA	%
	SOLUBLE		WATER	WATER	RANK OF	WATER	CUMULATIVE
TANK WASTE	RESIDUALS	MOBILITY	STANDARD	HAZARD	TANK WASTE	HAZARD	MTCA WATER
CONSTITUENT	(kg)	FACTOR	(ug/L)	INDEX(2)	CONSTITUENTS	INDEX(2)	HAZARD
ACETATE	9.95E+03	1.00E+00	1000000	9.95E-03	URANIUM	2.15E+03	46.19%
ACETONE	0.00E+00	1.00E+00	800	0.00E+00	NITRITE	8.43E+02	64.34%
ALUMINUM (PHOSPHIDE)	0.00E+00	3.98E-03	6.4	0.00E+00	CHROMIUM (VI)	7.26E+02	79.97%
AMMONIA (NH3)	4.13E+04	1.00E+00	272000	1.52E-01	NITRATE	4.18E+02	88.96%
ANTIMONY (TRIOXIDE)	1.00E+01	1.00E+00	6.4	1.56E+00	EDTA	1.93E+02	93.13%
ARSENIC	4.14E-03	3.98E-03	4.8	3.44E-06	FLUORIDE	1.19E+02	95.68%
BARIUM	7.79E+01	1.96E-02	1120	1.36E-03	CHLORIDE	5.90E+01	96.95%
BENZENE	0.00E+00	1.00E+00	1.51	0.00E+00	MERCURY	5.69E+01	98.18%
BERYLLIUM	2.48E-03	3.98E-03	0.0203	4.87E-04	CYANIDE	4.50E+01	99.15%
BICARBONATE	1.00E+01	1.67E-01	1000000	1.67E-06	CADMIUM	1.59E+01	99.49%
BISULFATE (AMMONIUM)	1.00E+01	1.00E+00	1000000	1.00E-05	BUTANOL (BUTYL ALCOHOL)	1.24E+01	99.76%
BISULFITE	1.00E+01	1.00E+00	1000000	1.00E-05	SODIUM	6.80E+00	99.90%
BORON	3.43E+00	3.98E-03	1440	9.49E-06	ANTIMONY (TRIOXIDE)	1.56E+00	99.94%
BROMATE	1.00E+01	1.00E+00	1000000	1.00E-05	HYDROXIDE	1.43E+00	99.97%
BROMINE	1.00E+01	1.00E+00	1000000	1.00E-05	NICKEL	4.24E-01	99.98%
BROMOCRESOL PURPLE	1.00E+01	1.00E+00	1000000	1.00E-05	SULFATE	3.18E-01	99.98%
BROMONAPHTHALENE	1.00E+01	1.00E+00	1000000	1.00E-05	TOC	1.67E-01	99.99%
BUTANOL (BUTYL ALCOHOL)	1.98E+04	1.00E+00	1600	1.24E+01	AMMONIA (NH3)	1.52E-01	99.99%
C6H5O7	6.78E+04	1.00E+00	1000000	6.78E-02	GLYCOLATE	1.10E-01	99.99%
CADMIUM	7.64E+02	1.67E-01	8	1.59E+01	HEDTA	1.03E-01	99.99%
CALCIUM	6.31E+03	1.67E-01	1000000	1.05E-03	POTASSIUM	7.07E-02	99.99%
CANCRINITE	0.00E+00	3.98E-03	1000000	0.00E+00	C6H5O7	6.78E-02	100.00%
CARBIDE (BORON)	0.00E+00	3.98E-03	1440	0.00E+00	DIBUTYL/TRIBUTYL PHOSPHATE	5.94E-02	100.00%
CARBON TETRACHLORIDE(12)	0.00E+00	1.00E+00	5.6	0.00E+00	THALLIUM	5.48E-02	100.00%
CARBONATE	4.67E+05	3.98E-03	1000000	1.86E-03	SUGAR	1.00E-02	100.00%
CERIUM	2.37E+02	3.98E-03	1000000	9.44E-07	ACETATE	9.95E-03	100.00%
CESIUM	1.88E+02	3.98E-03	1000000	7.50E-07	MANGANESE	9.48E-03	100.00%
CHLORIDE	9.45E+04	1.00E+00	1600	5.90E+01	OXALATE (SODIUM)	6.92E-03	100.00%
CHROMIUM (VI)	5.81E+04	1.00E+00	80	7.26E+02	TOLUENE	6.25E-03	100.00%
COBALT	0.00E+00	3.98E-03	1000000	0.00E+00	PHOSPHATE	5.00E-03	100.00%
COPPER	9.87E+00	3.98E-03	592	6.64E-05	CARBONATE	1.86E-03	100.00%
CYANIDE	1.44E+04	1.00E+00	320	4.50E+01	SILVER	1.60E-03	100.00%
DIATOMACEOUS EARTH	0.00E+00	3.98E-03	1000000	0.00E+00	BARIUM	1.36E-03	100.00%

D-2

WHC-SD-WM-TI-769, Rev. 0

WHC-SD-WM-769
MTCA RANK OF CHEMICALS

	TANK		MTCA(1)	MTCA	MTCA	MTCA	%
	SOLUBLE		WATER	WATER	RANK OF	WATER	CUMULATIVE
TANK WASTE	RESIDUALS	MOBILITY	STANDARD	HAZARD	TANK WASTE	HAZARD	MTCA WATER
CONSTITUENT	(kg)	FACTOR	(ug/L)	INDEX(2)	CONSTITUENTS	INDEX(2)	HAZARD
DIBUTYL PHOSPHANATE	1.00E+01	1.00E+00	1000000	1.00E-05	IRON	1.22E-03	100.00%
DIBUTYL/TRIBUTYL PHOSPHATE	5.94E+04	1.00E+00	1000000	5.94E-02	CALCIUM	1.05E-03	100.00%
DICHROMATE	0.00E+00	3.98E-03	1000000	0.00E+00	STYRENE	6.25E-04	100.00%
DIHYDROXYANTHRAQUINONE(12)	0.00E+00	1.00E+00	1000000	0.00E+00	XYLENE	6.25E-04	100.00%
DIOXANE(12)	0.00E+00	1.00E+00	7.95	0.00E+00	BERYLLIUM	4.87E-04	100.00%
DTPA	1.00E+01	1.00E+00	1000000	1.00E-05	ETHYLENE GLYCOL	3.13E-04	100.00%
DUODECANE	1.00E+01	1.00E+00	1000000	1.00E-05	TECHNETIUM(OXIDE)	2.20E-04	100.00%
EDTA	6.19E+04	1.00E+00	320	1.93E+02	LEAD	1.35E-04	100.00%
ETHANOL	1.00E+01	1.00E+00	1000000	1.00E-05	FERROUS SULFAMATE	1.00E-04	100.00%
ETHYL ETHER(12)	0.00E+00	1.00E+00	1600	0.00E+00	STRONTIUM	7.54E-05	100.00%
ETHYLENE GLYCOL	1.00E+01	1.00E+00	32000	3.13E-04	COPPER	6.64E-05	100.00%
FERROUS SULFAMATE	1.00E+02	1.00E+00	1000000	1.00E-04	MOLYBDENUM	3.59E-05	100.00%
FLUORIDE	1.14E+05	1.00E+00	960	1.19E+02	TIN	2.04E-05	100.00%
FLUOROSILICATE (AMMONIUM)	1.00E+01	1.00E+00	1000000	1.00E-05	RHODIUM	1.94E-05	100.00%
FORMALDEHYDE(12)	0.00E+00	1.00E+00	1.46	0.00E+00	SILICON (SILICATE)	1.56E-05	100.00%
GALLIUM	1.00E+01	3.98E-03	1000000	3.98E-08	BISULFATE (AMMONIUM)	1.00E-05	100.00%
GLUCONATE (SODIUM)	1.00E+01	1.00E+00	1000000	1.00E-05	BISULFITE	1.00E-05	100.00%
GLYCEROL	1.00E+01	1.00E+00	1000000	1.00E-05	BROMATE	1.00E-05	100.00%
GLYCOLATE	1.10E+05	1.00E+00	1000000	1.10E-01	BROMINE	1.00E-05	100.00%
GOLD	0.00E+00	3.98E-03	1000000	0.00E+00	BROMOCRESOL PURPLE	1.00E-05	100.00%
HEDTA	1.03E+05	1.00E+00	1000000	1.03E-01	BROMONAPHTHALENE	1.00E-05	100.00%
HYDRAZINE(12)	0.00E+00	1.00E+00	0.0146	0.00E+00	DIBUTYL PHOSPHANATE	1.00E-05	100.00%
HYDROGEN SULFIDE(12)	0.00E+00	1.00E+00	24	0.00E+00	DTPA	1.00E-05	100.00%
HYDROXIDE	1.43E+06	1.00E+00	1000000	1.43E+00	DUODECANE	1.00E-05	100.00%
HYDROXYLAMINE (NITRATE)	1.00E+01	1.00E+00	1000000	1.00E-05	ETHANOL	1.00E-05	100.00%
HYDROXYLAMINE HYDR.(12)	0.00E+00	1.00E+00	1000000	0.00E+00	FLUOROSILICATE (AMMONIUM)	1.00E-05	100.00%
HYDROXYQUINOLINE(12)	0.00E+00	1.00E+00	1000000	0.00E+00	GLUCONATE (SODIUM)	1.00E-05	100.00%
HYPOCHLORITE (SODIUM)	1.00E+00	1.00E+00	1000000	1.00E-06	GLYCEROL	1.00E-05	100.00%
IODINE(12)	0.00E+00	1.00E+00	1000000	0.00E+00	HYDROXYLAMINE (NITRATE)	1.00E-05	100.00%
IRON	7.32E+03	1.67E-01	1000000	1.22E-03	ISOAMYL ACETATE	1.00E-05	100.00%
ISOAMYL ACETATE	1.00E+01	1.00E+00	1000000	1.00E-05	KEROSENE	1.00E-05	100.00%
ISOPROPYL ALCOHOL(12)	0.00E+00	1.00E+00	1000000	0.00E+00	LITHIUM	1.00E-05	100.00%
KEROSENE	1.00E+01	1.00E+00	1000000	1.00E-05	MORPHOLINE	1.00E-05	100.00%

WHC-SD-WM-769
MTCA RANK OF CHEMICALS

	TANK		MTCA(1)	MTCA	MTCA	MTCA	%
	SOLUBLE		WATER	WATER	RANK OF	WATER	CUMULATIVE
TANK WASTE	RESIDUALS	MOBILITY	STANDARD	HAZARD	TANK WASTE	HAZARD	MTCA WATER
CONSTITUENT	(kg)	FACTOR	(ug/L)	INDEX(2)	CONSTITUENTS	INDEX(2)	HAZARD
LANTHANUM	4.04E+01	3.98E-03	1000000	1.61E-07	OPHENATROLINE	1.00E-05	100.00%
LEAD	6.88E+03	1.96E-02	1000000	1.35E-04	PERMANGANATE (POTASSIUM)	1.00E-05	100.00%
LITHIUM	1.00E+01	1.00E+00	1000000	1.00E-05	PERSULFATE (POTASSIUM)	1.00E-05	100.00%
MAGNESIUM	0.00E+00	3.98E-03	1000000	0.00E+00	PERSULFATE (SODIUM)	1.00E-05	100.00%
MANGANESE	1.08E+03	1.96E-02	2240	9.48E-03	PHOSPHORUS PENTOXIDE	1.00E-05	100.00%
MERCURY	2.73E+02	1.00E+00	4.8	5.69E+01	SULFITE (AMMONIUM)	1.00E-05	100.00%
METHANOL(12)	0.00E+00	1.00E+00	4000	0.00E+00	TARTRATE (SODIUM)	1.00E-05	100.00%
METHYL ETHYL KEYTONE(12)	0.00E+00	1.00E+00	4800	0.00E+00	TETRABROMOETHANE	1.00E-05	100.00%
METHYL ISOBUTYL KETONE(12)	0.00E+00	1.00E+00	640	0.00E+00	TETRAHYDROFURAN	1.00E-05	100.00%
MOLYBDENUM	7.21E-01	3.98E-03	80	3.59E-05	TETRAPHENYL BORON	1.00E-05	100.00%
MORPHOLINE	1.00E+01	1.00E+00	1000000	1.00E-05	THENOYLTRIFLUOROACETONE	1.00E-05	100.00%
NAPHTHYLAMINE	1.00E+00	1.00E+00	1000000	1.00E-06	THIOCYANATE (AMMONIUM, Na)	1.00E-05	100.00%
NEODYMIUM	0.00E+00	3.98E-03	1000000	0.00E+00	THIOCYANATE (MERCURIC)	1.00E-05	100.00%
NICKEL	8.13E+02	1.67E-01	320	4.24E-01	THIOSULFATE (AMMONIUM, Na)	1.00E-05	100.00%
NIOBUM	1.00E+01	3.98E-03	1000000	3.98E-08	THYMOLPHTHALEIN	1.00E-05	100.00%
NITRATE	1.07E+07	1.00E+00	25600	4.18E+02	TRIISOCTYLAMINE	1.00E-05	100.00%
NITRITE	1.35E+06	1.00E+00	1600	8.43E+02	TRINDODECYLAMINE	1.00E-05	100.00%
OPHENATROLINE	1.00E+01	1.00E+00	1000000	1.00E-05	TRINOCTYLAMINE	1.00E-05	100.00%
OXALATE (SODIUM)	6.92E+03	1.00E+00	1000000	6.92E-03	TRIS(HYDRO)AMINOMETHANE	1.00E-05	100.00%
PARAFFIN (NORMAL) HYDROCAR.	0.00E+00	3.98E-03	1000000	0.00E+00	UREA	1.00E-05	100.00%
PERMANGANATE (POTASSIUM)	1.00E+01	1.00E+00	1000000	1.00E-05	BORON	9.49E-06	100.00%
PERSULFATE (POTASSIUM)	1.00E+01	1.00E+00	1000000	1.00E-05	ARSENIC	3.44E-06	100.00%
PERSULFATE (SODIUM)	1.00E+01	1.00E+00	1000000	1.00E-05	ZIRCONIUM	2.99E-06	100.00%
PHOSPHATE	2.55E+05	1.96E-02	1000000	5.00E-03	BICARBONATE	1.67E-06	100.00%
PHOSPHORUS PENTOXIDE	1.00E+01	1.00E+00	1000000	1.00E-05	HYPOCHLORITE (SODIUM)	1.00E-06	100.00%
PLATINUM	0.00E+00	3.98E-03	1000000	0.00E+00	NAPHTHYLAMINE	1.00E-06	100.00%
POTASSIUM	7.07E+04	1.00E+00	1000000	7.07E-02	CERIUM	9.44E-07	100.00%
PRASEODYMIUM	0.00E+00	3.98E-03	1000000	0.00E+00	CESIUM	7.50E-07	100.00%
RHENIUM	0.00E+00	3.98E-03	1000000	0.00E+00	LANTHANUM	1.61E-07	100.00%
RHODIUM	1.94E+01	1.00E+00	1000000	1.94E-05	RUTHENIUM	1.17E-07	100.00%
RUBIDIUM	0.00E+00	3.98E-03	1000000	0.00E+00	GALLIUM	3.98E-08	100.00%
RUTHENIUM	1.17E-01	1.00E+00	1000000	1.17E-07	NIOBUM	3.98E-08	100.00%
SDIPHENYL CARBAZIDE	0.00E+00	1.00E+00	1000000	0.00E+00	TELLURIUM	3.98E-08	100.00%

WHC-SD-WM-769
MTCA RANK OF CHEMICALS

	TANK		MTCA(1)	MTCA	MTCA	MTCA	%
	SOLUBLE		WATER	HAZARD	RANK OF	WATER	CUMULATIVE
TANK WASTE	RESIDUALS	MOBILITY	STANDARD	HAZARD	TANK WASTE	HAZARD	MTCA WATER
CONSTITUENT	(kg)	FACTOR	(ug/L)	INDEX(2)	CONSTITUENTS	INDEX(2)	HAZARD
SELENIUM	0.00E+00	1.00E+00	80	0.00E+00	ACETONE	0.00E+00	100.00%
SILICON (SILICATE)	3.92E+03	3.98E-03	1000000	1.56E-05	ALUMINUM (PHOSPHIDE)	0.00E+00	100.00%
SILVER	3.20E+01	3.98E-03	80	1.60E-03	BENZENE	0.00E+00	100.00%
SODIUM	6.80E+06	1.00E+00	1000000	6.80E+00	CANCRINITE	0.00E+00	100.00%
STRONTIUM	3.69E+01	1.96E-02	9600	7.54E-05	CARBIDE (BORON)	0.00E+00	100.00%
STYRENE	1.00E+00	1.00E+00	1600	6.25E-04	CARBON TETRACHLORIDE(12)	0.00E+00	100.00%
SUGAR	1.00E+04	1.00E+00	1000000	1.00E-02	COBALT	0.00E+00	100.00%
SULFATE	3.18E+05	1.00E+00	1000000	3.18E-01	DIATOMACEOUS EARTH	0.00E+00	100.00%
SULFITE (AMMONIUM)	1.00E+01	1.00E+00	1000000	1.00E-05	DICHROMATE	0.00E+00	100.00%
TANTALUM	0.00E+00	3.98E-03	1000000	0.00E+00	DIHYDROXYANTHRAQUINONE(12)	0.00E+00	100.00%
TARTRATE (SODIUM)	1.00E+01	1.00E+00	1000000	1.00E-05	DIOXANE(12)	0.00E+00	100.00%
TECHNETIUM(OXIDE)	2.20E+02	1.00E+00	1000000	2.20E-04	ETHYL ETHER(12)	0.00E+00	100.00%
TELLURIUM	1.00E+01	3.98E-03	1000000	3.98E-08	FORMALDEHYDE(12)	0.00E+00	100.00%
TETRABROMOETHANE	1.00E+01	1.00E+00	1000000	1.00E-05	GOLD	0.00E+00	100.00%
TETRAHYDROFURAN	1.00E+01	1.00E+00	1000000	1.00E-05	HYDRAZINE(12)	0.00E+00	100.00%
TETRAPHENYL BORON	1.00E+01	1.00E+00	1000000	1.00E-05	HYDROGEN SULFIDE(12)	0.00E+00	100.00%
THALLIUM	1.54E+01	3.98E-03	1.12	5.48E-02	HYDROXYLAMINE HYDR.(12)	0.00E+00	100.00%
THENOYLTRIFLUOROACETONE	1.00E+01	1.00E+00	1000000	1.00E-05	HYDROXYQUINOLINE(12)	0.00E+00	100.00%
THIOCYANATE (AMMONIUM, Na)	1.00E+01	1.00E+00	1000000	1.00E-05	IODINE(12)	0.00E+00	100.00%
THIOCYANATE (MERCURIC)	1.00E+01	1.00E+00	1000000	1.00E-05	ISOPROPYL ALCOHOL(12)	0.00E+00	100.00%
THIOSULFATE (AMMONIUM, Na)	1.00E+01	1.00E+00	1000000	1.00E-05	MAGNESIUM	0.00E+00	100.00%
THORIUM	0.00E+00	1.96E-02	1000000	0.00E+00	METHANOL(12)	0.00E+00	100.00%
THYMOLPHTHALEIN	1.00E+01	1.00E+00	1000000	1.00E-05	METHYL ETHYL KEYTONE(12)	0.00E+00	100.00%
TIN	1.00E+01	1.96E-02	9600	2.04E-05	METHYL ISOBUTYL KETONE(12)	0.00E+00	100.00%
TITANIUM	0.00E+00	3.98E-03	1000000	0.00E+00	NEODYMIUM	0.00E+00	100.00%
TOC	1.67E+05	1.00E+00	1000000	1.67E-01	PARAFFIN (NORMAL) HYDROCAR.	0.00E+00	100.00%
TOLUENE	1.00E+01	1.00E+00	1600	6.25E-03	PLATINUM	0.00E+00	100.00%
TRICHLOROETHANE(12)	0.00E+00	1.00E+00	7200	0.00E+00	PRASEODYMIUM	0.00E+00	100.00%
TRISOCTYLAMINE	1.00E+01	1.00E+00	1000000	1.00E-05	RHENIUM	0.00E+00	100.00%
TRINDODECYLAMINE	1.00E+01	1.00E+00	1000000	1.00E-05	RUBIDIUM	0.00E+00	100.00%
TRINOCTYLAMINE	1.00E+01	1.00E+00	1000000	1.00E-05	SDIPHENYL CARBAZIDE	0.00E+00	100.00%
TRIS(HYDRO)AMINOMETHANE	1.00E+01	1.00E+00	1000000	1.00E-05	SELENIUM	0.00E+00	100.00%
TUNGSTEN	0.00E+00	1.00E+00	1000000	0.00E+00	TANTALUM	0.00E+00	100.00%

WHC-SD-WM-769
MTCA RANK OF CHEMICALS

	TANK		MTCA(1)	MTCA	MTCA	MTCA	%
	SOLUBLE		WATER	WATER	RANK OF	WATER	CUMULATIVE
TANK WASTE	RESIDUALS	MOBILITY	STANDARD	HAZARD	TANK WASTE	HAZARD	MTCA WATER
CONSTITUENT	(kg)	FACTOR	(ug/L)	INDEX(2)	CONSTITUENTS	INDEX(2)	HAZARD
URANIUM	1.03E+05	1.00E+00	48	2.15E+03	THORIUM	0.00E+00	100.00%
UREA	1.00E+01	1.00E+00	1000000	1.00E-05	TITANIUM	0.00E+00	100.00%
VANADIUM (PENTOXIDE)	0.00E+00	3.98E-03	144	0.00E+00	TRICHLOROETHANE(12)	0.00E+00	100.00%
XYLENE	1.00E+01	1.00E+00	16000	6.25E-04	TUNGSTEN	0.00E+00	100.00%
ZINC	0.00E+00	3.98E-03	4800	0.00E+00	VANADIUM (PENTOXIDE)	0.00E+00	100.00%
ZIRCONIUM	7.50E+02	3.98E-03	1000000	2.99E-06	ZINC	0.00E+00	100.00%
						4.65E+03	
Notes							
1. These are groundwater standards from the Model Toxics Control Act (MTCA) Method B (WDOE 1996). Where no value was listed, a value of 1.0E+6 ug/l was used for calculational purposes.							
2. The hazard index is the inventory times the mobility factor (previously defined) divided by the MTCA standard.							

DISTRIBUTION SHEET

To	From	Page 1 of 1			
Distribution	Process Technology 73510	Date 8/30/96			
Project Title/Work Order		EDT No. 615774			
Predominant Chemicals in Hanford Site Waste Tanks/D2086		ECN No.			
Name	MSIN	Text With All Attach.	Text Only	Attach./ Appendix Only	EDT/ECN Only
A. L. Boldt	H5-49	x			
G. F. Boothe (20)	H5-27	x			
L. E. Borneman	R1-90	x			
E. A. Fredenburg (5)	H5-61	x			
M. E. Hevland	P7-02	x			
M. N. Islam	R3-08	x			
M. J. Klem	H5-27	x			
M. J. Kupfer (5)	H5-27	x			
G. A. Meyer	S2-48	x			
C. A. Petersen	H5-27	x			
D. E. Place	H5-27	x			
J. C. Sonnichsen	H6-24	x			
W. E. Toebe	H6-22	x			
D. J. Washenfelder	H5-27	x			
C. D. West	S7-53	x			
Central Files	A3-88	x			