



AUG 31 2007

07-ESQ-149

CCN: 161097

Ms. Jane A. Hedges, Program Manager
Nuclear Waste Program
Washington State
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354

RECEIVED
SEP 06 2007
EDMC

Dear Ms. Hedges:

SUBMITTAL OF TOXIC VAPORS AND EMISSIONS FROM WASTE TREATMENT AND IMMOBILIZATION PLANT TANK SYSTEMS AND MISCELLANEOUS UNIT SYSTEMS, 24590-WTP-PER-PR-03-002, REVISION 3

- References:
1. Ecology letter from B. L. Becker-Khaleel to R. J. Schepens, ORP, and W. S. Elkins, BNI, "General Design Requirements for the Radioactive Liquid Waste Disposal (RLD) Tank System, RLD-VSL-00004, in the Low Activity Waste (LAW) Facility, located at the Waste Treatment and Immobilization Plant (WTP)," dated February 7, 2007.
 2. WA7890008967, "Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste, Part III, Operating Unit 10, 'Waste Treatment and Immobilization Plant.'"

0072102

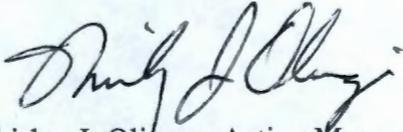
Reference 1 requested the permittees revise and resubmit "Toxic Vapors and Emissions from WTP Tank Systems and Miscellaneous Treatment Unit Systems," 24590-WTP-PER-PR-03-002 to the Washington State Department of Ecology (Ecology) by September 11, 2007. Ecology requested the document be revised in order to address migration of potentially toxic vapors from regulated vessels to occupied areas through floor drains. The subject document has been revised as requested and is attached. Comments provided by Ms. Brenda Becker-Khaleel, of your staff, were also incorporated.

Ms. Jane A. Hedges
07-ESQ-149

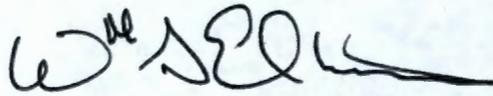
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If you have any questions, please contact either of us, or your staff may contact
Lori A. Huffman, ORP, (509) 376-0104, or Brad G. Erlandson, BNI, (509) 371-3428.



Shirley J. Olinger, Acting Manager
Office of River Protection



William S. Elkins, Project Director
Bechtel National, Inc.

ESQ:LAH

Attachment

cc w/attach:

C. M. Albert, BNI
G. R. Ashley, BNI
J. M. Colby, BNI
S. S. Crawford, BNI
W. S. Elkins, BNI
B. G. Erlandson, BNI
P. A. Fisher, BNI
N. F. Grover, BNI
D. A. Klein, BNI
P. E. Peistrup, BNI
L. J. Simmons, BNI
B. Becker-Khaleel, Ecology
S. L. Dahl, Ecology
E. A. Fredenburg, Ecology
S. A. Thompson, FHI
A. C. McKarns, RL
Administrative Record (WTP H-0-8)
BNI Correspondence
Environmental Portal, LMSI

Attachment
07-ESQ-149

Toxic Vapors and Emissions from WTP Tank Systems and
Miscellaneous Unit Systems, 24590-WTP-PER-PR-03-002,
Revision 3



ISSUED BY
RPP-WTP PDC

Document title: **Control of Toxic Vapors and Emissions from WTP Tank and Miscellaneous Unit Systems**

Contract number: DE-AC27-01RV14136

Department: Process Engineering

Author(s): N. Wilkins

Principal author signature:

Nancy Wilkins

Document number: 24590-WTP-PER-PR-03-002, Rev 3

Checked by:

J. Rouse

J. Rouse

Checker signature:

Date of issue:

8/21/07

Issue status:

Approved

Approved by:

R. Voke

Approver's position:

Mechanical and Process Discipline Production Engineering Manager

Approver signature:

R. Voke

Notice

Please note that source, special nuclear, and byproduct materials, as defined in the Atomic Energy Act of 1954 (AEA), are regulated at the US Department of Energy (DOE) facilities exclusively by DOE acting pursuant to its AEA authority. DOE asserts, that pursuant to the AEA, it has sole and exclusive responsibility and authority to regulate source, special nuclear, and byproduct materials at DOE-owned nuclear facilities. Information contained herein on radionuclides is provided for process description purposes only.

History Sheet

Rev	Date	Reason for revision	Revised by
0	20 October 2003	This document supercedes Document No. 24590-WTP-RPT-PR-02-004, Rev. B. Issued for Permitting use.	R. Peters
1	22 January 2004	Clarified application of ASME Boiler and Pressure Vessel Code in Section 3.1.	R. Peters
2	3 January 2005	Updated References.	B. Yorgesen
3	21 August 2007	This is an extensive revision, no changes are shown. Updated acronym list and references. Updated mitigative features in Section 3. Added Section 3.4 which pertains to emissions from C3/C5 floor drains. Added Appendix A concerning the Dangerous Waste Designation of RLD-VSL-00004 effluent.	N. Wilkins

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Acronyms

ASME	American Society of Mechanical Engineers
ASTM	American Society of Testing Materials
ASX	Autosampling System
BACT	Best Available Control Technology
BARCT	Best Available Radionuclide Control Technologies
C3	Contamination area where potential for direct contact with radioactive material and/or contaminated systems and components exists
C5	Contamination area that is highly contaminated, requires total enclosure to ensure contamination control
DBE	Design Basis Event
DOE	US Department of Energy
DWP	WTP Dangerous Waste Permit
EHW	Extremely Hazardous Waste
EPA	Environmental Protection Agency
HEPA	High Efficiency Particulate Air (Filter)
HLW	High-Level Waste
HOP	HLW Melter Offgas Treatment Process System
HVAC	Heating, Ventilation, and Air-Conditioning
ISA	Instrument Society of America
IEEE	Institute of Electrical and Electronic Engineers
LAB	Analytical Laboratory Facility
LAW	Low-Activity Waste
LOP	LAW Primary Offgas Process System
LVP	LAW Secondary Offgas/Vessel Vent Process System
MACT	Maximum Achievable Control Technology
NOC	Notice of Construction
NO _x	Nitrogen oxides
OSHA	Occupational Safety and Health Administration (U.S. Department of Labor)
PJV	Pulse Jet Ventilation System
PTF	Pretreatment Facility
PVP	Pretreatment Vessel Vent Process System
PVV	Process Vessel Vent Exhaust System

RLD	Radioactive Liquid Waste Disposal System
SO_x	Sulfur Oxides
T-BACT	Best Available Control Technology (for toxic air pollutants)
WAC	Washington Administrative Code
WTP	Hanford Tank Waste Treatment and Immobilization Plant

1 Introduction

This document describes the mitigative features of the Office of River Protection Project - Hanford Tank Waste Treatment and Immobilization Plant (WTP) tank systems and miscellaneous unit systems (as required by the Washington State Dangerous Waste Regulations) that prevent the escape of acutely or chronically toxic (upon inhalation) vapors and emissions. The following conditions in the WTP's Dangerous Waste Permit (DWP) are addressed in this document:

- Documentation that WTP tanks holding dangerous waste are designed to prevent escape of vapors and emissions of acutely or chronically toxic (upon inhalation) extremely hazardous waste (EHW) [Washington Administrative Code (WAC) 173-303-640(5)(e), WAC 173-303-806(4)(c)(xii)] [III.10.E.9.c.xii].
- Documentation that pretreatment facility (PTF) miscellaneous unit systems are designed to prevent escape of vapors and emissions of acutely or chronically toxic (upon inhalation) EHW [WAC 173-303-640(5)(e), in accordance with WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)] [III.10.G.10.c.xi].
- Documentation that low-activity waste (LAW) vitrification sub-systems are designed to prevent escape of vapors and emissions of acutely or chronically toxic (upon inhalation) EHW [WAC 173-303-640(5)(e), WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)] [III.10.H.5.c.xi].
- Documentation that high-level waste (HLW) vitrification sub-systems are designed to prevent escape of vapors and emissions of acutely or chronically toxic (upon inhalation) EHW [WAC 173-303-640(5)(e), WAC 173-303-680(2) and WAC 173-303-806(4)(i)(i)(B)] [III.10.J.5.c.xi].

This document will be entered into the Administrative Record.

In addition to controlling toxic vapor emissions from tanks and miscellaneous units, the WTP is also required to contain, treat, and monitor air emissions in accordance with a number of other regulatory programs. These regulatory programs include: General Regulations for Air Pollution Sources (WAC 173-400), Prevention of Significant Deterioration (WAC 173-400-720); Controls for New Sources of Toxic Air Pollutants (WAC 173-460); Radioactive Air Emissions (WAC 246-247); and Environmental Performance Standards for miscellaneous units LAW and HLW melter systems (WAC 173-303-680(2)). Approvals or permits have been issued by the Environmental Protection Agency (EPA), State of Washington Department of Ecology (Ecology) and Department of Health (WDOH) for WTP construction and/or operation under each of these programs.

2 Applicable Documents

24590-LAB-3YD-RLD-00001, *System Description for the Radioactive Liquid Waste Disposal System for the Analytical Laboratory.*

24590-PTF-3YD-PVP-00001, *System Description for Pretreatment Vessel Vent Process System, PVP.*

24590-PTF-3YD-PVV-00001, *Systems Description for Pretreatment Vessel Vent Exhaust System, PVV.*

24590-HLW-3YD-HOP-00001, *Systems Description for HLW Melter Offgas Treatment Process and Process Vessel Vent Extraction (HOP and PVV Systems)*

24590-LAW-3YD-LOP-00001, *System Description for LAW Primary Offgas Process (LOP) and LAW Secondary Offgas/Vessel Vent Process (LVP) Systems*

24590-LAB-3YD-60-00001, *Combined LAB Ventilation System Description for Systems CIV, C2V, C3V, and C5V*

WA7890008967, *Dangerous Waste Portion of the Hanford Facility Resource Conservation and Recovery Act Permit for the Treatment, Storage, and Disposal of Dangerous Waste, Part III, Operating Unit 10, "Waste Treatment and Immobilization Plant."*

24590-WTP-DB-ENG-01-001, *Basis of Design*

24590-WTP-RPT-PO-03-008, *Integrated Emissions Baseline Report for the Hanford Tank Waste Treatment and Immobilization Plant*

24590-WTP-RPT-ENV-01-007, *Prevention of Significant Deterioration Permit Application for the Hanford Tank Waste Treatment Plant*

24590-WTP-RPT-ENV-01-009, *Nonradioactive Air Emission Notice of Construction Permit Application for the River Protection Project - Waste Treatment Plant.*

24590-WTP-RPT-ENV-01-005, *Best Available Control Technology Analysis for Toxic Air Pollutants for the WTP.*

24590-WTP-RPT-ENG-02-015, *Washington State Department of Health Code Compliance Matrices for the Waste Treatment Plant Process Gas Treatment Systems.*

3 Mitigative Features

Standard design and safety requirements are incorporated into the process vessels and miscellaneous unit systems as described in equipment specifications submitted under requirements of the WTP DWP conditions. These features are summarized in Section 3.1.

WTP tank systems and miscellaneous unit systems will prevent the escape of acutely or chronically toxic vapors through containment and treatment of the offgas. These mitigative features are discussed in Sections 3.2 and 3.3, respectively.

3.1 Design Criteria for Process Vessels and Miscellaneous Unit Systems

The process vessels and miscellaneous unit systems in the PTF, HLW, LAW, and analytical laboratory (LAB) facilities meet the following functional criteria:

- Maintain structural integrity for the entire life of the design and remain intact following a design basis earthquake

- Contain process liquids and aerosols with high reliability
- Withstand the high radiation environment, the corrosive effects of the process streams, and the erosive nature of the suspended solids, as applicable
- Prevent escape of vapors and emissions that are acutely or chronically toxic upon inhalation.

The codes and standards associated with construction of the vessels and miscellaneous units are identified in the latest version of 24590-WTP-DB-ENG-01-001, *Basis of Design*.

3.2 Containment of Vapors and Emissions in the Vessel Vent Systems

The process vessels and miscellaneous unit systems will provide a containment barrier for process liquids under normal and abnormal conditions. The functional requirements are generally met by designing the vessels and miscellaneous treatment units to the standards of ASME, *Boiler and Pressure Vessel Code*, Section VIII or ASME AG-1 *Code on Nuclear Air Treatment Systems*. Specific design codes and standards are identified in equipment specifications, drawings, and mechanical data sheets provided under requirements of the DWP conditions.

Hazard identification, evaluation, and development of control strategies has been completed for WTP facilities. Design basis events (e.g., loss of power, fire, earthquake) have been evaluated for each facility to identify important to safety structures, systems and components and technical safety requirements that are necessary to protect the health and safety of workers and the public. These analyses are described in the Preliminary Safety Analysis Report to Support Construction Authorization; General Information (24590-WTP-PSAR-ESH-01-002-01) and facility specific Safety Envelope Documents.

3.3 Treatment of Vapors and Emissions in the Vessel Vent Systems

The toxic vapor emissions from HLW, PT, LAW, and LAB vessel ventilation systems are generated by agitation or movement of vessel contents. Use of best available control technology (BACT) provides the primary method to control toxic vapors and emissions in the PTF, HLW, LAW, and LAB facilities. Best available control technology for toxic air pollutants (T-BACT) and BACT for criteria air pollutants are required pursuant to WAC 173-460, *Controls for New Sources of Toxic Air Pollutants* and 173-400, *General Regulations for Air Pollution Sources*. Radioactive air emissions are regulated by the WDOH in accordance with WAC 246-247, *Radiation Protection - Air Emissions*. WDOH has approved construction permits for WTP facilities that include the identification of Best Available Radionuclide Control Technology (BARCT) and Ecology has approved BACT and T-BACT through issuance of Approval Orders for the "Nonradioactive Air Emissions Notice of Construction (NOC) Permit Application for the Hanford Tank Waste Treatment and Immobilization Plant", 24590-WTP-RPT-ENV-01-009 and "Prevention of Significant Deterioration (PSD) Permit Application for the Hanford Tank Waste Treatment and Immobilization Plant", 24590-WTP-RPT-ENV-01-007.

As identified in the NOC, the WTP will not exceed any of the Class A or Class B acceptable impact levels for toxic air pollutants identified in WAC 173-460.

The following air pollution control equipment are identified as T-BACT, and thus serve to control the discharge of toxic vapors and emissions. They are listed below in sequential order as they exist in the system.

3.3.1 PT Facility

Pretreatment Vessel Vent Process System (PVP) and Exhaust System (PVV)

- Caustic scrubber (PVP-SCB-00002) functions to reduce particulate loading to the HEPA filters, provides process vessel offgas cooling and quenching and serves to remove acid gases and NO_x
- High Efficiency Mist Eliminators (PVP-HEME-00001A/B/C) function to reduce particulate loading to the HEPA filters
- HEPA filters (PVV-HEPA-00001A/B, -00002A/B) function to remove particulates
- Thermal oxidizer (PVP-OXID-00001) functions to remove organic compounds
- Carbon Absorber (PVP-ABS-00001A/B) functions to remove organic compounds

Pulse Jet Ventilation System (PJV)

- Demisters function to reduce particulate and aerosol loading to the HEPA filters
- HEPAs function to remove particulates

3.3.2 LAW Vitrification

- HEPA filters (LVP-HEPA-00001A/B, -00002A/B, -00003A) function to remove particulates and aerosols
- Carbon Adsorber (LVP-ADBR-00001A/B) removes mercury, halides, and organics
- Thermal catalytic oxidizer (LVP-SCO-00001) functions to remove organic compounds
- Selective catalytic reducer (LVP-SCR-00001) removes NO_x
- Caustic scrubber (LVP-SCB-00001) functions to remove sulfur oxide gases and provide off-gas cooling

3.3.3 HLW Vitrification

Vessel Ventilation

- High Efficiency Mist Eliminators (HOP-HEME-00001A/B, -00002A/B) function to reduce particulate loading to the HEPA filters
- HEPA filters (HOP-HEPA-00001A/B, -00002A/B, -00007A/B, -00008A/B) functions to remove particulates and aerosols
- Carbon Adsorber (HOP-ADBR-00001A/B, -00002A/B) functions to remove organics and mercury
- Silver mordenite columns (HOP-ABS-00002, -00003) functions to remove gaseous halogens
- Thermal catalytic oxidizer (HOP-SCO-00001, -00004) functions to remove organics
- Selective catalytic reducer (HOP-SCR-00001, 00002) functions to remove NO_x

Pulse Jet Ventilation System

- HEPAs filters function to remove particulates

3.3.4 LAB Facility

- HEPA filters function to remove particulates and aerosols

3.4 Emissions from C3/C5 Floor Drains

Vessels in WTP facility designs that are associated with open C3/C5 drain lines (e.g., floor drains, sink drains, etc.) dipped in a vessel. Since these lines are not trapped or otherwise sealed have been evaluated for toxic vapor migration from the vessel to the room where the floor drain is located. These vessels are LAB RLD-VSL-00164, LAW RLD-VSL-00004, and PTF PWD-VSL-00033 (applicable drains associated with each vessel are identified in Table 1). Based on the concentration of compounds in the vessels, LAW RLD-VSL-00004 is determined to represent the bounding scenario. LAW RLD-VSL-00004 contains primarily water with low organic content and low toxic vapor content. The majority of the liquid is clean condensate from Heating, Ventilation, and Air-Conditioning (HVAC) units. LAW RLD-VSL-00004 is characteristic for toxicity, but is not determined to be toxic by inhalation or ingestion in accordance with WAC 173-303-100, *Dangerous Waste Criteria*. A dangerous waste designation for the LAW RLD-VSL-00004 is provided in Appendix A. Any potential for facility worker inhalation of vapors through open C3/C5 floor drains that are dipped in a vessel and are not trapped or otherwise sealed, are mitigated as follows:

- Dipped drain lines that tie into floor drain headers represent a very small percentage of the total surface area of the vessel.
- Dipped drain lines usually contain stagnant air.
- C3 floor drains are inside rooms with cascading ventilation from areas of lower potential contamination to higher potential contamination.
- Each room with floor drains will have an average of three to five room air changes per hour.
- Access to C3/C5 areas are generally controlled by room ventilation airlocks or ventilation sub-change rooms.
- Potential industrial hazards will be monitored for and managed under the WTP Industrial Safety Program.

Table 1: C3/C5 Drains Dipped in a Vessel that are not Trapped or Otherwise Sealed

LAB RLD-VSL-00164		
RLD-FD-00137	RLD-FD-00138	RLD-FD-00139
RLD-FD-00140	RLD-FD-00145	RLD-FD-00146
RLD-FD-00147	RLD-FD-00148	RLD-FD-00149
RLD-FD-00150	RLD-FD-00169	LIH-HOOD-00001
LIH-HOOD-00002	LIH-HOOD-00003	
LAW RLD-VSL-00004		
RLD-FD-00012	RLD-FD-00013	RLD-FD-00014
RLD-FD-00015	RLD-FD-00016	RLD-FD-00019
RLD-FD-00023	RLD-FD-00024	RLD-FD-00025
RLD-FD-00027	RLD-FD-00032	RLD-FD-00033
RLD-FD-00034	RLD-FD-00036	RLD-FD-00037
RLD-FD-00038	RLD-FD-00039	RLD-FD-00121
RLD-FD-00180	RLD-FD-00181	RLD-FD-00182
RLD-FD-00185		
PTF PWD-VSL-00033		
PWD-FD-00502	PWD-FD-00503	

Appendix A - Dangerous Waste Designation

SAY IT — Write It!

TO: Chris Strand WTP/WGI
 cc: Clay McCurley WTP/BNI

DATE: August 17, 2007

FROM: Jean T. Quigley, Technical Waste R1-51
 Services, CH2MHill
 Telephone: 373-7393

SUBJECT: Waste Designation Predetermination for
 RLD-VSL-00004 Effluent represented by WESP Stream LOP07

Please see the attached for the requested predetermined waste designation for the future effluent stream associated with LAW process vessel RLD-VSL-00004 represented by WESP Stream LOP07.

Waste designation applies only if the generator identifies the future RLD-VSL-00004/WESP Stream LOP07 effluent waste stream as a solid waste per the definition found in Washington State Department of Ecology Dangerous Waste Regulations WAC 173-303-016. Waste designation is applicable when a solid waste is generated that is not exempted or excluded by the Department. Waste designation determines if a solid waste is dangerous or extremely hazardous to the public health and environment.

This waste designation was performed in accordance with the Washington State Department of Ecology Dangerous Waste Regulations WAC 173-303-070 through -100. Waste designation for the effluent predetermined the following waste codes:

Contaminant	Dangerous Waste Code
1,1,1 - Trichloroethane	F001
Methylene chloride	F002
Acetone	
Methyl isobutyl ketone	F003
Cresols and Cresylic acid	F004
Methyl ethyl ketone	F005
Leachate resulting from the disposal of more than one restricted waste classified as dangerous under WAC 173-303-9903, 173-303-9904, and 173-303-9905.	F039
Corrosivity	D002
Arsenic	D004
Cadmium	D006
Chromium	D007
Lead	D008
2,4,6-Trichlorophenol	D042

The effluent does not designate as a Washington State Toxic or Persistent dangerous waste.

The waste designation was prepared by using the effluent process engineering modeling data and generator process knowledge provided to CH2MHill Technical Waste Services by Bechtel National Inc. on 04/09/07, 05/17/07, and 06/26/07. The designation was performed using the following assumptions:

1. Effluent characterization is based upon process engineering modeling data and process knowledge.
2. Current process engineering modeling data does not represent results as would be determined by the Toxicity Characteristic Leaching Procedure (TCLP), test Method 1311 in "Test Methods for Evaluating solid Waste, Physical/Chemical Methods," EPA Publication SW-846.
3. Process engineering modeling data predetermined that the effluent pH = 1.7.
4. Process engineering modeling data predetermined the effluent to be 91.8% water.
5. Process knowledge, associated with the chemical processes contributing to the effluent waste stream, predetermined that the following listed waste codes apply: F001, F002, F003, F004, F005, and F039.

Attachments:

CONST%	CAS #	CHEMICAL NAME	CONST EC%	TOX	IGNT	CORR	REACT	PERS
91.93368	7732-18-5	WATER	0	N	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: RTECS HAS > SIGN								
2.51	62-76-0	ETHANEDIOIC ACID, DISODIUM SALT (SODIUM OXALATE)	0	N	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: NO USABLE RTECS								
1.42	7447-40-7	POTASSIUM CHLORIDE	0.000142	D	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes:								
1.31	7647-14-5	SODIUM CHLORIDE	0.000131	D	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes:								
0.752	1303-96-4	SODIUM BORATE, DECAHYDRATE	0.0000752	D	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes:								
0.738	554-13-2	LITHIUM CARBONATE	0.0000738	D	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes:								
0.52	65997-17-3	FIBERGLASS WOOL	0	N	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: NO USABLE RTECS								
0.134	100-21-0	TEREPHTHALIC ACID	0	N	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: EXCEEDS RTECS LIMITS								

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 Control of Toxic Vapors and Emissions from WTP Tank
 and Miscellaneous Unit Systems

CONST%	CAS #	CHEMICAL NAME	CONST EC%	TOX	IGNT	CORR	REACT	PERS
0.13	1305-62-0	CALCIUM HYDROXIDE	0	N	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes:								
0.127	1309-42-8	MAGNESIUM HYDROXIDE	0	N	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: EXCEEDS RTECS LIMITS								
0.112	7664-38-2	PHOSPHORIC ACID	0.0000112	D	NA	A	NA	NA
Listed/TC Codes: D002			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: UN1805 DOT 8 PG III								
0.0716	7784-18-1	ALUMINUM FLUORIDE HYDRATE	0	N	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: NO USABLE RTECS								
0.0619	1314-13-2	ZINC OXIDE	0	N	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: NO APPLICABLE RTECS FOUND								
0.043	1310-73-2	SODIUM HYDROXIDE	0	N	NA	B	NA	NA
Listed/TC Codes: <i>not at this concentration</i>			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: NO APPLICABLE RTECS FOUND								
0.0322	1333-82-0	CHROMIUM TRIOXIDE	0.0000322	C	O	A	NA	NA
Listed/TC Codes: <i>not on this matrix</i> D001 D002 D007			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: <i>MW = 99.99, Cr @ 52% = 0.0167% = 167 mg/L RCRA = 5 mg/L</i>								
0.0305	7440-26-8	Technetium	0	N	NA	NA	NA	N
Listed/TC Codes: NA			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: No info RTECS, ECOTOX, HSDB. Tc-99 most common, Tc-99m = med. Isotope. Dissolves								

CONST%	CAS #	CHEMICAL NAME	CONST EC%	TOX	IGNT	CORR	REACT	PERS
0.0301	1310-65-2	LITHIUM HYDROXIDE	0.000301	B	NA	B	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: <i>not at this D002 concentration</i>								
0.0265	1309-37-1	FERRIC OXIDE	0	N	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: NO APPLICABLE RTECS FOUND								
0.0254	1314-23-4	ZIRCONIUM OXIDE	0	N	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: NO APPLICABLE RTECS FOUND								
0.0125	1344-28-1	ALUMINUM OXIDE	0	N	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: NO USABLE RTECS								
0.012	191-24-2	BENZO (GHI) PERYLENE	0	N	NA	NA	NA	PAH
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: NO USABLE RTECS								
0.012	117-81-7	BIS(2-ETHYLHEXYL)PHTHALATE (DOP)	0	N	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: EXCEEDS RTECS LIMITS								
0.00762	50-32-8	BENZO (A) PYRENE	0	N	NA	NA	NA	PAH
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: NO APPLICABLE RTECS FOUND								
0.00265	1306-19-0	CADMIUM OXIDE	0.00000265	B	NA	NA	NA	NA
Listed/TC Codes:			TC 1	S (mg/L) L	TC 2	S (mg/L) L	WW	NWW
Notes: <i>MW = 128.41 Cd @ 87.54 % = 0.00233 % = 23 mg/L RCRA threshold = 5 mg/L</i> D006			D006	1				

CONST%	CAS #	CHEMICAL NAME	CONST EC%	TOX	IGNT	CORR	REACT	PERS
0.00258	1327-53-3	ARSENIC TRIOXIDE <i>MW = 197.84, As @ 75.74% = 0.0020% = 2.0 mg/l RCRA threshold = 5 mg/l</i>	0.0000258	(B)	NA	NA	NA	NA
Listed/TC Codes: <u>D004</u>			TC 1 S (mg/L) L	TC 2	S (mg/L) L	WW	NWW	
Notes: UN1561, DOT 6.1 PG II POISON <i>B012 UHC not sole active ingredient</i>			D004	5				
0.00215	7440-02-0	NICKEL	0	N	NA	NA	NA	NA
Listed/TC Codes: <u>UHC</u>			TC 1 S (mg/L) L	TC 2	S (mg/L) L	WW	NWW	
Notes: NO RTECS DATA						3.98	11	
0.00148	85-68-7	BENZYL BUTYL ESTER PHTHALIC ACID	0.00000148	(D)	NA	NA	NA	NA
Listed/TC Codes: <u>UHC</u>			TC 1 S (mg/L) L	TC 2	S (mg/L) L	WW	NWW	
Notes:						0.017	28	
0.00147	84-74-2	DIBUTYL PHTHALATE	0	N	NA	NA	NA	NA
Listed/TC Codes: <u>UHC</u>			TC 1 S (mg/L) L	TC 2	S (mg/L) L	WW	NWW	
Notes: <i>not sole active ingredient</i>						0.057	28	
0.00107	1317-36-8	LEAD MONOXIDE <i>MW = 223.20 Pb @ 92.83% = 0.00107% = 10 mg/l RCRA threshold = 5 mg/l</i>	0	N	NA	NA	NA	NA
Listed/TC Codes: <u>D008</u>			TC 1 S (mg/L) L	TC 2	S (mg/L) L	WW	NWW	
Notes: NO APPLICABLE RTECS FOUND			D008	5				
0.000414	88-06-2	2,4,6-TRICHLOROPHENOL <i>MW = 197.45 @ 100% = 0.000414% = 4.14 mg/l RCRA threshold = 2 mg/l</i>	4.14E-08	(D)	NA	NA	NA	(HOC)
Listed/TC Codes: <u>D042</u>			TC 1 S (mg/L) L	TC 2	S (mg/L) L	WW	NWW	
Notes: pH of satd soln 11.0-13.0 <i>E027 UHC not sole active ingredient no source unknown</i>			D042	2		0.035	7.4	
0.000414	92-93-3	4-NITRO BIPHENYL	4.14E-08	(D)	NA	NA	NA	NA
Listed/TC Codes:			TC 1 S (mg/L) L	TC 2	S (mg/L) L	WW	NWW	
Notes:								
0.000414	120-83-2	2,4-DICHLOROPHENOL <i>not sole active ingredient</i>	0.00000414	(B)	NA	NA	NA	(HOC)
Listed/TC Codes: <u>UHC</u>			TC 1 S (mg/L) L	TC 2	S (mg/L) L	WW	NWW	
Notes: UN 2020, DOT 6.1 PG II (CHLORPHENOLS SOLID)						0.044	14	

CONST%	CAS #	CHEMICAL NAME	CONST EC%	TOX	IGNT	CORR	REACT	PERS
0.000414	107-18-6	ALLYL ALCOHOL	0.00000414	(B)	FL	NA	X	NA
Listed/TC Codes: D001 D005			TC 1 S (mg/L) L	TC 2 S (mg/L) L			WW	NWW
Notes: UN 1098, DOT 6.1 PG I, POISON MAY FORM PEROXIDES, POLYMERIZE								
0.000276	100-00-5	1-CHLORO-4-NITRO-BENZENE	0.00000276	(C)	NA	NA	NA	NA
Listed/TC Codes:			TC 1 S (mg/L) L	TC 2 S (mg/L) L			WW	NWW
Notes: UN 1578 POISON								
0.000138	122-39-4	DIPHENYLAMINE	1.38E-08	(D)	NA	NA	NA	NA
Listed/TC Codes:			TC 1 S (mg/L) L	TC 2 S (mg/L) L			WW	NWW
Notes: UHC							0.92	13
0.000069	108-93-0	CYCLOHEXANOL	6.9E-09	(D)	NA	NA	NA	NA
Listed/TC Codes:			TC 1 S (mg/L) L	TC 2 S (mg/L) L			WW	NWW
Notes: COMBUSTIBLE								
0.000069	60-34-4	METHYLHYDRAZINE	0.0000069	(A)	FL	O	NA	NA
Listed/TC Codes: D001 D002			TC 1 S (mg/L) L	TC 2 S (mg/L) L			WW	NWW
Notes: UN1244, DOT 6.1, 3, 8, PG I POISON PIH								
0.000069	64-17-5	ETHANOL	0	N	FL	NA	NA	NA
Listed/TC Codes: D001			TC 1 S (mg/L) L	TC 2 S (mg/L) L			WW	NWW
Notes:								
0.000069	67-56-1	METHANOL	6.9E-09	(D)	FL	NA	NA	NA
Listed/TC Codes: D001			TC 1 S (mg/L) L	TC 2 S (mg/L) L			WW	NWW
Notes: UN1230 DOT 3 PG II							5.6	0.75
0.0000342	129-00-0	PYRENE	3.42E-09	(D)	NA	NA	NA	PAH
Listed/TC Codes:			TC 1 S (mg/L) L	TC 2 S (mg/L) L			WW	NWW
Notes: UHC							0.067	8.2

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CONST%	CAS #	CHEMICAL NAME	CONST EC%	TOX	IGNT	CORR	REACT	PERS
0.0000138	123-91-1	DIOXANE (1,4-DIETHYLENE DIOXIDE)	1.38E-09	D	FL	NA	X	NA
			TC 1 S (mg/L) L	TC 2	S (mg/L) L		WW	NWW
							12	170

Listed/TC Codes: D801 *not in this matrix* D883 *not at this concentration*

not sole active
list ingredients

Notes: UN 1165, DOT 3, PG II

UHC

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