



Department of Energy  
Richland Operations Office  
P.O. Box 550  
Richland, Washington 99352

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Department of Ecology  
NWP - Richland

09-EMD-0116

AUG 19 2009

Ms. Kathleen A. Conaway  
Nuclear Waste Program  
State of Washington  
Department of Ecology  
3100 Port of Benton Blvd.  
Richland, Washington 99354

COPY FOR YOUR  
INFORMATION

Central Files \_\_\_\_\_  
File Name: \_\_\_\_\_  
Cross Reference: \_\_\_\_\_

Dear Ms. Conaway:

TRANSMITTAL OF APPLICATION OF RENEWAL FOR STATE WASTE DISCHARGE  
PERMIT ST 4511

Enclosed is an application for renewal for State Waste Discharge Permit ST 4511.

Condition G.5. of the Permit ST 4511 requires that the Permittee must reapply for permit renewal at least 180 days prior to the specified permit expiration date of the Permit ST 4511. The current permit expires on February 16, 2010. If you have any questions, please contact me or your staff may contact Ray J. Corey, Assistant Manager for Safety and Environment on (509) 376-0108.

Sincerely,

  
David A. Brockman  
Manager

EMD:DEJ

Enclosure

cc w/encl:  
W. J. Taylor, ORP  
Environmental Portal, LMSI, A3-95



**ENCLOSURE**

**APPLICATION FOR WASTEWATER DISCHARGE PERMIT**



# APPLICATION FOR A WASTEWATER DISCHARGE PERMIT FOR DISCHARGE OF INDUSTRIAL WASTEWATER TO GROUND WATER

This application is for a wastewater discharge permit as required in accordance with provisions of Chapter 90.48 RCW and Chapter 173-216 WAC. Permit applications provide the Washington Department of Ecology with information on pollutants in the waste stream, materials which may enter the waste stream, the flow characteristics of the discharge, and the site characteristics at the point of discharge.

The Department may request additional information at a later date to clarify the conditions of this discharge. Information previously submitted to the Department that is applicable to this application should be referenced in the appropriate section.

## SECTION A. GENERAL INFORMATION

- 1. Applicant name: Department of Energy, Richland Operations Office
- 2. Facility name: Hanford Site  
(if different from applicant)
- 3. Applicant mail address: 825 Jadwin Street  
Street  
Richland, Washington 99352  
City/State Zip
- 4. Facility location address (if different): Hanford Site  
Street  
Richland, Washington 99352  
City/State Zip
- 5. Latitude/longitude of the facility: 46° 33' 46.4" N 119° 35' 57.8" W  
Latitude/longitude of discharge location  
46° 33' 46.4" N 119° 35' 57.8" W
- 6. UBI No. 601 319 923

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Check One

New/Renewal  Modification

Date application received

Application/Permit no.

Date application accepted

Date fee paid

6. Person to contact who is familiar with the information contained in this application:

Dale E. Jackson

Name

Physical Scientist

Title

509-376-8086

Telephone number

509-376-4590

Fax number

7. Check One:

**Permit renewal** (including renewal of temporary permits authorized by RCW 90.48.200)

Does this application request a greater amount of wastewater discharge, a greater amount of pollutant discharge, or a discharge of different pollutants than specified in the last permit application for this facility?  YES  NO

For permit renewals, the current permit is an attachment, by reference, to this application.

**Permit modification**

**Existing unpermitted discharge**

**Proposed discharge**

Anticipated date of discharge: \_\_\_\_\_

*I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and/or imprisonment for knowing violations.*

Manager, U.S. Department of Energy,

  
Signature\*

8/19/09  
Date

Richland Operations Office  
Title

David A. Brockman  
Printed name

\*Applications must be signed as follows: Corporations, by a principal executive officer of at least the level of vice-president; partnership, by a general partner; sole proprietorship, by the proprietor. If these titles do not apply to your organization, the application is to be signed by the person who makes budget decisions for this facility.

Signature authority for submittals required by the permit such as monthly reports may be delegated to a suitable employee. The delegation may be to a particular, qualified individual or to a position which is expected to be filled by a qualified individual. If you wish to delegate signature authority please complete the following:

\_\_\_\_\_  
Signature of delegated employee

\_\_\_\_\_  
Date

\_\_\_\_\_  
Title or function at the facility

\_\_\_\_\_  
Printed name

## SECTION B. PRODUCT INFORMATION

1. Briefly describe all manufacturing processes and products, and/or commercial activities at this facility. Provide the applicable Standard Industrial Classification (SIC) Code(s) for each activity (see *Standard Industrial Classification Manual*, 1987 ed.).

Description:

Hanford is a 586-square mile site in southeastern Washington State, situated north and west of the cities of Richland, Kennewick, and Pasco. There are no manufacturing activities at Hanford. The current mission at Hanford focuses on remediation and waste management. The Site is being cleaned up through deactivation, demolition, and remediation. The SIC codes for the Site are 9999 (Nonclassifiable), 9511 (Air and Water Resources and Solid Waste management), 4961 (Steam supply), 8733 (Noncommercial Research Organization).

See Attachment B of this application for description of the processes generating wastewater.

2. List raw materials and products:

Type	RAW MATERIALS	Quantity
NA		
Type	PRODUCTS	Quantity
NA		

**SECTION C. PLANT OPERATIONAL CHARACTERISTICS**

1. For each process listed in B.1. that generates wastewater, list the process, assign the waste stream a name and an ID#, and describe whether it is a batch or continuous flow.

Process	Waste Stream Name	Waste Stream ID#	Batch (B) or Continuous (C) Process
See Tables C.1-1, C.1-2, C.1-4, C.1-5, C.1-7, and C.1-8 in Attachment C of this application.			Batch

2. On a separate sheet, produce a schematic drawing showing production processes and water flow through the facility and wastewater treatment devices. The drawing should indicate the source of intake water and the operations contributing wastewater to the effluent. The treatment units should be labeled. Construct the water balance by showing average flows between intakes, operations, treatment units, and points of discharge to land. If a water balance cannot be determined (*e.g., for certain mining activities*), provide a description of the nature and amount of any sources of water and any collection or treatment measures.

3. What is the maximum daily discharge flow: See discharge tables in Attachment C  
gallons/day?

What is the maximum average monthly discharge flow (daily flows averaged over a month): See discharge tables in attachment C  
gallons/day?

4. Describe any planned wastewater treatment improvements or changes in wastewater disposal methods and the schedule for the improvements or changes. (*Use additional sheets, if necessary and label as attachment C4.*)

NA. No wastewater treatment improvements planned.

5. If production processes are subject to seasonal variations, provide the following information. List discharge for each wastestream in gallons or million gallons per month. The combined value for each month should equal the estimated total monthly flow. Please indicate the proper unit by checking one of the following boxes:

gallons per month     million gallons per month

Waste Stream ID#	MONTHS											
	J	F	M	A	M	J	J	A	S	O	N	D
Minor seasonal variations occur												
Estimated total gallons												

6. If this is a discharge to a storage or evaporative lagoon, what is the size of the lagoon (give square footage at bottom of lagoon and total volume of lagoon). NA
7. If this is a discharge to a sprayfield, in the following table give the average gallons per acre per day proposed for each month

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept.	Oct	Nov	Dec
Estimated gallons per acre per day	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

8. How many hours a day does this facility typically operate?                    24  
 How many days a week does this facility typically operate?                    7  
 How many weeks per year does this facility typically operate?                    52
9. List all incidental materials such as oil, paint, grease, solvents, and cleaners that are used or stored on site (list only those with quantities greater than 10 gallons for liquids and 50 pound quantities for solids). For solvents and solvent-based cleaners, include a copy of the material safety data sheet for each material and estimate the quantity used. *Use additional sheets, if necessary and label as attachment C.7.)*

Materials/Quantity Stored: Material Safety Data Sheets for chemicals which are mixed with water prior to discharge are provided in Attachment E.7.

10. Some types of facilities are required to have spill or waste control plans. Does this facility have:

a. A spill prevention, control, and countermeasure plan (40 CFR 112)?  YES  NO

b. An emergency response plan (per WAC 173-303-350)?  YES  NO

c. A runoff, spillage, or leak control plan (per WAC 173-216-110(f))?  YES  NO

d. Any spill or pollution prevention plan required by local, state or  YES  NO

federal authorities? If yes specify: DOE/RL-97-67, Rev. 5, "Pollution Prevention and Best  
Mangement Practices for State Waste Discharge Permit ST  
4511

e. A solid waste management plan?  YES  NO



## SECTION E. WASTEWATER INFORMATION

1. How are the water intake and effluent flows measured?

Intake: NA

Effluent: NA

2. Provide measurements for treated wastewater prior to land application for the parameters with an "X" in the left column. Use the analytical methods given in the table unless an alternate method is approved by Ecology. All analyses (except pH) must be conducted by a laboratory registered or accredited by the Department of Ecology (WAC 173-216-125). If this is an application for permit renewal, provide data for the last year for those parameters that are routinely measured. For parameters measured only for this application, place values under maximum.

X	Parameter	Concentrations Measured			Number of Analyses	Analytical Method Std. Methods 19th edition	Detection Limit
		Minimum	Maximum	Average			
	BOD (5 day)				5210	2 mg/l	
	COD				5220 B, C, or D	5 mg/l	
	Total suspended solids				2540D	1 mg/l	
	Total dissolved solids				2540 C		
	Conductivity				2510 B		
	Ammonia-N				4500-NH <sub>3</sub> C	20 µg/l	
	pH				4500-H	0.1 units	
	Total residual chlorine				4500-Cl E	1 mg/l	
	Fecal coliform				9222 D		
	Total coliform				9221 B or 9222 B		
	Dissolved oxygen				4500-O C or 4500-O G		
	Nitrate + nitrite-N				4500-NO <sub>3</sub> E	0.5 mg/l	
	Total kjeldahl N				4500-N <sub>org</sub>	20 µg/l	
	Ortho-phosphate-P				4500-P E or 4500-P F	1 µg/l	
	Total-phosphate-P				4500-P B.4.	1 µg/l	
	Total oil & grease				5520 C	0.2 mg/l	

X	Parameter	Concentrations Measured			Number of Analyses	Analytical Method Std. Methods 19th edition	Detection Limit
		Minimum	Maximum	Average			
	Total petroleum hydrocarbon					5520 C, F	0.2 mg/l
	Calcium					3500-Ca B	3 µg/l
	Chloride					4500-Cl C	0.15 µg/l
	Fluoride					4500-F D	0.1 mg/l
	Magnesium					3500-Mg B	0.5 µg/l
	Potassium					3500-K B	5 µg/l
	Sodium					3500-Na B	2 µg/l
	Sulfate					4500-SO <sub>4</sub> E	1 mg/l
	Barium (total)					3500-Ba B	30 µg/l
	Cadmium (total)					3500-Cd B	5 µg/l
	Chromium (total)					3500-Cr B	50 µg/l
	Copper (total)					3500-Cu B	20 µg/l
	Iron (total)					3500-Fe B	20 µg/l
	Lead (total)					3500-Pb B	100 µg/l
	Manganese (total)					3500-Mn B	10 µg/l
	Mercury					3500-Hg B	0.2 µg/l
	Selenium (total)					3500-Se C	2 µg/l
	Silver (total)					3500-Ag B	10 µg/l
	Zinc (total)					3500-Zn B	5 µg/l

3. Describe the collection method for the samples which were analyzed above (i.e., grab, 24 hour composite).

This permit does not require sampling of waste streams

4. Has the effluent been analyzed for any other parameters than those identified in question E.2.? If yes, when? Attach results and label attachment E.4. (Note: Ecology may require additional testing.)  YES  NO

5. Does this facility use any of the following chemicals as raw materials in production, produce them as part of the manufacturing process, or are they present in the wastewater? (The number following the chemical name is the Chemical Abstract Service (CAS) reference number to aid in identifying the compound.)  YES  NO

If yes, specify how the chemical is used and the quantity used or produced:

Acrylamide/79-06-1  
 Acrylonitrile/107-13-1  
 Aldrin/309-00-2  
 Aniline/62-53-3  
 Aramite/140-57-8  
 Arsenic/7440-38-2  
 Azobenzene/103-33-3  
 Benzene/71-43-2  
 Benzidine/92-87-5  
 Benzo(a)pyrene/50-32-8  
 Benzotrifluoride/98-07-7  
 Benzyl chloride/100-44-7  
 Bis(chloroethyl)ether/111-44-4  
 Bis(chloromethyl)ether/542-88-1  
 Bis(2-ethylhexyl) phthalate/117-81-7  
 Bromodichloromethane/75-27-4  
 Bromoform/75-25-2  
 Carbazole/86-74-8  
 Carbon tetrachloride/56-23-5  
 Chlordane/57-74-9  
 Chlorodibromomethane/124-48-1  
 Chloroform/67-66-3  
 Chlorthalonil/1897-45-6  
 2,4-D/94-75-7  
 DDT/50-29-3  
 Diallate/2303-16-4  
 1,2 Dibromoethane/106-93-4  
 1,4 Dichlorobenzene/106-46-7  
 3,3' Dichlorobenzidine/91-94-1  
 1,1 Dichloroethane/75-34-3  
 1,2 Dichloroethane/107-06-2  
 Nitrofurazone/59-87-0

N-nitrosodiethanolamine/1116-54-7  
 N-nitrosodiethylamine/55-18-5  
 N-nitrosodimethylamine/62-75-9  
 N-nitrosodiphenylamine/86-30-6  
 N-nitroso-di-n-propylamine/621-64-7  
 N-nitrosopyrrolidine/930-55-2  
 N-nitroso-di-n-butylamine/924-16-3  
 N-nitroso-n-methylethylamine/10595-95-6  
 PAH/NA  
 PBBs/NA  
 PCBs/1336-36-3  
 1,2 Dichloropropane/78-87-5  
 1,3 Dichloropropene/542-75-6  
 Dichlorvos/62-73-7  
 Dieldrin/60-57-1  
 3,3' Dimethoxybenzidine/119-90-4  
 3,3 Dimethylbenzidine/119-93-7  
 1,2 Dimethylhydrazine/540-73-8  
 2,4 Dinitrotoluene/121-14-2  
 2,6 Dinitrotoluene/606-20-2  
 1,4 Dioxane/123-91-1  
 1,2 Diphenylhydrazine/122-66-7  
 Endrin/72-20-8  
 Epichlorohydrin/106-89-8  
 Ethyl acrylate/140-88-5  
 Ethylene dibromide/106-93-4  
 Ethylene thiourea/96-45-7  
 Folpet/133-07-3  
 Furmecyclohex/60568-05-0

Heptachlor/76-44-8  
 Heptachlor epoxide/1024-57-3  
 Hexachlorobenzene/118-74-1  
 Hexachlorocyclohexane (alpha)/319-84-6  
 Hexachlorocyclohexane (tech.)/608-73-1  
 Hexachlorodibenzo-p-dioxin, mix/19408-74-3  
 Hydrazine/hydrazine sulfate/302-01-2  
 Lindane/58-89-9  
 2 Methylaniline/100-61-8  
 2 Methylaniline hydrochloride/636-21-5  
 4,4' Methylene bis(N,N-dimethyl)aniline/101-61-1  
 Methylene chloride (dichloromethane)/75-09-2  
 Mirex/2385-85-5  
 O-phenylenediamine/106-50-3  
 Propylene oxide/75-56-9  
 2,3,7,8-Tetrachlorodibenzo-p-dioxin / 1746-01-6  
 Tetrachloroethylene/127-18-4  
 2,4 Toluenediamine/95-80-7  
 o-Toluidine/95-53-4  
 Toxaphene/8001-35-2  
 Trichloroethylene/79-01-6  
 2,4,6-Trichlorophenol/88-06-2  
 Trimethyl phosphate/512-56-1  
 Vinyl chloride/75-01-4

6. Are any other pesticides, herbicides, or fungicides used at this facility?  YES  NO  
 If yes, specify the material and quantity used.

See attachment E.6 for pesticides, herbicides and fungicides used by the group responsible for Sitewide application. Other contractors use small amount of pesticides which are not listed.

7. Are there other pollutants that you know of or believe to be present?  YES  NO  
 DON'T KNOW  
 If yes, specify the pollutants and their concentration if known (attach laboratory analyses if available). Some of the discharges include chemicals like Bleach or cleaning chemicals like Simple Green. MSDS for these chemicals are in Attachment E.7

## SECTION F. GROUND WATER INFORMATION

Provide available data measurements or range of measurements from monitoring wells or supply wells in the area of discharge. Provide the analytical method and detection limit, if known. Provide the location of each well on the map required in G.3 below. Attach well logs and well ID# when available. Copy this page as necessary for each well.

Well ID # No groundwater monitoring

is required by this Permit. Groundwater Well maps for Hanford Areas are provided in attachment F.

Parameter	Range of Measurements	Number of Analyses	Analytical Method	Detection Limit
BOD (5 day)				
COD				
Total organic carbon				
Ammonia-N				
pH				
Total dissolved solids				
Conductivity				
Total hardness				
Fecal coliform				
Total coliform				
Dissolved oxygen				
Nitrate + nitrite-N, nitrate				
Total kjeldahl N				
Ortho-phosphate-P				
Total-phosphate-P				
Total petroleum hydrocarbon				
Calcium				
Chloride				
Fluoride				
Magnesium				
Potassium				
Sodium				
Sulfate				
Barium				
Cadmium				
Chromium				
Copper				
Iron				
Lead				
Manganese				
Mercury				
Selenium				
Silver				
Zinc				
Water level				

## SECTION G. SITE ASSESSMENT

The local library and local city or county planning offices may be helpful in providing the information required in this section. You may consult the Department of Ecology Water Resources Program to help identify wells within one mile of your site.

1. Give the legal description of the land treatment site(s) by section/township/range and provide the latitude/longitude (center of the site). Indicate owner for each site. Give the acreage of each land treatment site(s). Attach a copy of the contract(s) authorizing use of land for each treatment site.

NA. No land treatment

2. If this is a new discharge, list all environmental control permits or approvals needed for this project; for example, SEPA review, septic tank permits, sludge application permits, or air emissions permits.

NA. No new discharge.

3. Attach an original United States Geological Survey (USGS) 7.5 minute topographic map. **USGS topographical maps are available from the Department of Natural Resources (360 902-1234), Metsker Maps (206 588-5222), some local bookstores, and internet vendors.** Show the following on this map:

- a. Location and name of internal and adjacent streets.
- b. Surface water drainage systems within ¼ mile of the site.
- c. All wells within 1 mile of the site.
- d. Wastewater discharge points.
- e. Land uses and zoning adjacent to the wastewater application site.
- f. Groundwater gradient.

4. Describe soils on the site using information from local soil survey reports. **Soils information is available from your local County Conservation District.** *(Submit on separate sheet and label as attachment G.4.)*

5. Describe the local geology and hydrogeology within one mile of the site. Include any groundwater quality data. **The local library or local Soil Conservation Service may have this information.** *(Submit on separate sheet and label as attachment G.5.)*

6. List the names and addresses of contractors or consultants who provided information and cite sources of information by title and author.

FLuor Hanford, Inc. P.O. Box 1000, Richland, WA 99352

## SECTION H. STORMWATER

1. Do you have coverage under the Washington State Industrial Stormwater NPDES General permit?  YES  NO  
If yes, please list the coverage certificate number here.
- If no, have you applied for coverage under the Washington State Industrial Stormwater NPDES permit?  YES  NO

**Note:** If you answered "no" to both questions above, complete the following questions 2 through 8.

2. Describe the size of the stormwater collection area.
- a. Unpaved area NA sq.ft.
  - b. Paved area NA sq.ft.
  - c. Other collection areas (roofs) NA sq.ft.
3. Does your facility's stormwater discharge to: *(Check all that apply)*
- Storm sewer system; name of storm sewer system *(operator)*:
  - Sanitary sewer
  - Directly to surface waters of Washington State *(e.g., river, lake, creek, estuary, ocean)*.  
Specify waterbody name Columbia River
  - Indirectly to surface waters of Washington State *(i.e., flows over adjacent properties first)*.
  - Directly to ground waters of Washington State via:
    - Dry well
    - Drainfield
    - Other
4. Areas with industrial activities at facility: *(check all that apply)*
- Manufacturing building
  - Material handling
  - Material storage
  - Hazardous waste treatment, storage, or disposal *(refers to RCRA, Subtitle C facilities only)*
  - Waste treatment, storage, or disposal
  - Application or disposal of wastewaters

- Storage and maintenance of material handling equipment
- Vehicle maintenance
- Areas where significant materials remain
- Access roads and rail lines for shipping and receiving
- Other \_\_\_\_\_

5. Material handling/management practices

a. Types of materials handled and/or stored outdoors: *(check all that apply)*

- |   |   |
|---|---|
| <input type="checkbox"/> Solvents                                       | <input checked="" type="checkbox"/> Hazardous wastes        |
| <input checked="" type="checkbox"/> Scrap metal                         | <input type="checkbox"/> Acids or alkalies                  |
| <input checked="" type="checkbox"/> Petroleum or petrochemical products | <input checked="" type="checkbox"/> Paints/coatings         |
| <input type="checkbox"/> Plating products                               | <input type="checkbox"/> Woodtreating products              |
| <input checked="" type="checkbox"/> Pesticides                          | <input type="checkbox"/> Other <i>(please list)</i> : _____ |

b. Identify existing management practices employed to reduce pollutants in industrial storm water discharges: *(check all that apply)*

- |   |   |
|---|---|
| <input checked="" type="checkbox"/> Oil/water separator | <input type="checkbox"/> Detention facilities               |
| <input checked="" type="checkbox"/> Containment         | <input checked="" type="checkbox"/> Infiltration basins     |
| <input checked="" type="checkbox"/> Spill prevention    | <input checked="" type="checkbox"/> Operational BMPs        |
| <input type="checkbox"/> Surface leachate collection    | <input checked="" type="checkbox"/> Vegetation management   |
| <input checked="" type="checkbox"/> Overhead coverage   | <input type="checkbox"/> Other <i>(please list)</i> : _____ |

6. Attach a map showing stormwater drainage/collection areas, disposal areas and discharge points. This may be a hand drawn map if no other site map is available. Label this as attachment H.8.

## SECTION I. OTHER INFORMATION

1. Describe liquid wastes or sludges being generated that are not disposed of in the waste stream(s) and how they are being disposed. For each type of waste, provide type of waste, name, address, and phone number of hauler.

NA. Some of the information is included in the Hanford Facility Dangerous Waste Permit, WA7 89000 8967, authorized under Washington Administrative Code 173-303.

2. Describe storage areas for raw materials, products, and wastes.

NA. Information included in the Hanford Facility Dangerous Waste Permit, WA7 89000 8967, authorized under Washington Administrative Code 173-303.

3. Have you designated the wastes described above according to the applicable procedures of Dangerous Waste Regulations, Chapter 173-303 WAC?  YES  NO

---

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### Summary of attachments that may be required for this application:

(Please check those attachments that are included)

- C.2. Production schematic flow diagram and water balance
- C.4. Wastewater treatment improvements
- C.7. Additional incidental materials
- E.4. Additional results of effluent testing
- G.1. Copies of land use contracts
- G.3. USGS topographical map
- G.4. Soils description
- G.5. Local geology and hydrology
- H.8. Stormwater drainage map

*The Department of Ecology is an equal opportunity agency and does not discriminate on the basis of race, creed, color, disability, age, religion, national origin, sex, marital status, disabled veteran's status, Vietnam Era veteran's status or sexual orientation.*

*If you need this publication in an alternate format, please call the Water Quality Program at 360-407-6401. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.*

**Attachment to Enclosure**

**Information on the State Waste Discharge Permit ST4511**

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Application for Wastewater Discharge Permit ST 4511  
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## **B. DESCRIPTION OF PROCESSES GENERATING WASTEWATER DISCHARGES TO SOIL COLUMN**

The wastewater discharges to the soil column addressed in this Permit application include hydrotesting, construction, and maintenance wastewater; cooling water and condensate; industrial stormwater; and miscellaneous discharges. These discharges and the processes that generate the discharges are discussed below and specific information about the discharges is provided in Attachment C.

- B.1 Hydrotesting Discharges:** Hydrotest discharges are generated during hydrotesting of a system or component of a system and during research and development testing. Research and development testing includes tracer studies and other types of experimental studies. Development testing is performed to provide or develop design information, concepts, or criteria.
- B.2 Maintenance Discharges:** Maintenance discharges are generated during routine drainage, flushing, washdown, and testing. Routine drainage includes draining various filter basins, water tanks, sumps, pipe systems, and reservoirs in order to perform maintenance activities. Flushing includes activities related to the removal of dirt and debris from the inside of pipes and equipment and disinfecting potable water lines. Washdown includes activities related to the pressure washing of equipment and building surfaces for painting and/or resurfacing, the removal of salts and debris from roadways, and general building cleaning associated with window and building washing.
- B.3 Construction Discharges:** Construction discharges are generated during concrete curing, acid etching, and pressure washing. Discharges related to concrete curing include water spray used during the curing process. Pressure washing of surfaces before application of a protective coating and the cutting of concrete with high-pressure water are included in this category of wastewater discharge streams.
- B.4 Cooling Water Discharges/Condensate Discharges:** Cooling water discharges are generated from heat-generating systems that use water to cool parts of the equipment. Discharges of cooling water from systems such as air compressors, diesel engines, air conditioning, evaporative cooling, and ice machines that are discharged to engineered structures are included in this Permit application. Discharges of cooling water that are not discharged to an engineered structure do not require permitting.
- Condensate discharges from heating, ventilation, and air conditioning systems, air compressors, ice machines and steam lines that discharge to an engineered structure are included in the Permit application. Condensate that is not discharged to an engineered structure does not require permitting.
- B.5 Miscellaneous Discharges:** Miscellaneous discharges include discharges from water tanks, incidental releases, and industrial stormwater. Waste Treatment and Immobilization Plant (WTP) discharges have been added under incidental releases. The miscellaneous discharges are described below.

**Water Tanks:** Potable and raw water stored in water tanks is allowed to discharge to help eliminate mineral and bacteria buildup within the tanks and to prevent freezing.

**Incidental Releases:** Activities associated with operations and routine maintenance may result in small incidental releases of wastewater within the facility's boundaries (e.g., water skid maintenance and pump testing) that do not meet the location or distance limits specified in Permit Condition S.4.A.1 or S.4.A.2. These facility activities are subject to permit conditions identified in S.7.D.1.

**Waste Treatment Plant:** Significant damage to High Level Waste (HLW) and Low Activity Waste (LAW) melters and LAW pour caves will occur in the event of a loss of cooling water to those components. A loss of site power (LOSP) would put these components in jeopardy of being without cooling water and subsequent damage. In the event of a LOSP, cooling water to the HLW and LAW melters and LAW pour caves cooling, needs to be restored within 15 minutes and 20 minutes respectively in order to prevent significant damage to the melters and other equipment.

Firewater will be hard piped to the process cooling water supply lines to the heat exchangers of each cooling loop. This firewater will be utilized to provide necessary cooling in the event of a LOSP. The initial discharge of firewater, up to the first hour, can be returned to the Cooling Tower Facility through normal cooling water return lines. After the initial discharge, controlled discharges to storm drains immediately outside HLW and LAW facilities would be required. Discharge volumes are estimated at 205 gallons per minute (gpm) for the HLW facility and 900 gpm for the LAW facility.

A large number of the tanks and vessels being installed at the WTP require hydrotest discharge rates and volumes that will exceed Special Permit Condition S1.B.2 of the Permit. Special Permit Condition S.7.F of the Permit was written to address the discharges resulting from the specific hydrotesting and flushing of these new tanks and vessels being installed at the WTP that are greater than 50,000 gallons in volume. The hydrotesting will be utilized to test the integrity of the newly installed tanks and vessels and their components under specific pressure conditions. Discharges related to flushing include washing dirt and construction debris from the inside of the tanks and vessels.

**Industrial Stormwater:** Industrial stormwater is stormwater that is collected in an engineered structure or other impervious surface directly associated with an industrial activity and then discharged to an engineered structure.

### C. WASTEWATER DISCHARGES TO THE SOIL COLUMN AT HANFORD

This attachment is intended to provide additional information or explanation for items in Section C of the application. The numbers below correspond to the subsection numbers from the application.

**C.1.** This section provides specific information about the discharges described in Section B of the Permit application. The information provided here is a snapshot of most commonly occurring discharges. The ST 4511 Permit requires recording only significant discharges. The significant discharges are defined as discharges more than 14,500 gallons in a period of 24 hours or more than 50,000 gallons a year from a single source. The discharge volumes listed in this section are estimated. The actual discharge location, volume, and frequency may vary from year to year. "NA" designations in the following tables indicate that no discharges are currently projected or recently document; however, future discharges may be possible. The list excludes discharges exempt under ST 4511 Permit. The list also does not include other discharges with specific permits or discharges that are solely covered under other regulatory programs (e.g., WAC 173-218). It is also based on regulatory guidance from Ecology.

The list also excludes discharges to the soil column related to *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) response actions, such as industrial stormwater discharges associated with CERCLA facilities, washing of buildings that support CERCLA actions, etc. Such discharges are performed in accordance with substantive provisions of applicable or relevant and appropriate requirements.

**C.2.** This is not applicable because there are no production processes or wastewater treatment processes (discharges subject to ST 4511) at Hanford.

**C.10.** The Spill Prevention Control and Counter-Measures (SPCC ) Plan is for a project in 100 Area. It does not cover the entire Hanford Site. The Solid Waste management Plan is for 400 Area only.

**Description of Discharges Listed in Table C-1 for 100-K Area:** The discharges listed in Table C.1-1 for 100-K Area are covered under the permit. A description of the discharges is provided because the discharges are new to 100-K Area. The discharges are associated with the construction of a new water supply and distribution system for 100-K Area and will involve construction in the 600 Area as well. The discharges consists of hydrotesting of the new water supply system to 100-K Area that will tie into the export water system and bring raw river water to 100-K Area, and discharges related to construction of new water treatment and distribution systems at the 100-K Area. The water supply systems will allow abandonment of the river intake structure and raw water supply system and water treatment/storage systems at the 183-KE facility. Engineering for the construction project is not complete. The information on the location of discharges is not available at this time.

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Table C.1-1. 100 Area Discharges.

Waste Stream ID Number	Activities Generating Discharges	Discharge Location	Number of Discharges per year	Estimated Volume Gallons/Year	Potential for Discharge to Come in Contact with Chemicals? [If yes, list the chemical(s)]
B.1	Hydrotesting				
B.1.1	System or Component Testing	100K Water Treatment Plant	Several	500,000 to 2,000,000	No
B.1.2	Research and Development Testing	See Attachment C.1-6	See Attachment C.1-6	Varies	Groundwater tracers or other chemicals either approved by Ecology or meeting GWQC were used (MSDS available upon request)
B.1.3	Other Experimental Discharges	NA	NA	NA	NA
B.2	Maintenance				
B.2.1	Drainage	NA	NA	NA	NA
B.2.2	Flushing	100K Water Treatment Plant	24	216,000	No
B.2.3	Wash Down Activities (Window and building washings, cleaning air conditioning unit coils, preparation for painting, road and equipment washings)	NA	NA	NA	NA
B.3	Construction				
B.3.1.	Concrete Curing	100K Water Treatment Plant	Several	100,000	No
B.3.2	Concrete Cutting	100K Water Treatment Plant	Several	100,000	No
B.3.3	Pressure Washing	100K Water Treatment Plant	Several	100,000	No

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Table C.1-1. 100 Area Discharges.

Waste Stream ID Number	Activities Generating Discharges	Discharge Location	Number of Discharges per year	Estimated Volume Gallons/Year	Potential for Discharge to Come in Contact with Chemicals? [If yes, list the chemical(s)]
B.4	Cooling Water/Condensate				
B.4.1	HVAC Systems discharging to an engineered structures	NA	NA	NA	NA
B.4.2	Air Compressors discharging to an engineered structures	NA	NA	NA	NA
B.4.3	Ice Machines discharging to an engineered structures	NA	NA	NA	NA
B.4.4	Steam Condensate	NA	NA	NA	NA
B.5	Miscellaneous				
B.5.1	Water Tank Overflows	NA	NA	NA	NA
B.5.2	Incidental Releases	NA	NA	NA	NA
B.5.3	Industrial Stormwater	NA	NA	NA	NA

GWQC= Groundwater Quality Criteria.

HVAC = Heating, Ventilation, and Air Conditioning.

MSDS = Material Safety Data Sheet.

NA = No discharges are currently projected or recently document; however, future discharges may be possible.

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Table C.1-2. 200 East Area Discharges.

Waste Stream ID Number	Activities Generating Discharges	Discharge Location	Number of Discharges per year	Estimated Volume Gallons/Year	Potential for Discharge to Come in Contact with Chemicals? [If yes, list the chemical(s)]
B.1	Hydrotesting				
B.1.1	System or Component Testing	200 Areas; adjacent or within a tank farm (new pipelines prior to use)	1-50	5,000	No
B.1.2	Research and Development Testing	200 Areas; Adjacent or Within a Tank Farm	3-5	<1,000	No
B.1.3	Other Experimental Discharges	NA	NA	NA	NA
B.2	Maintenance				
B.2.1	Drainage	Retention pond	As needed	100,000	No
B.2.2	Flushing	Effluent Treatment Facility (ETF)	52	1560	No
		See tables C.1-9 and in attachment C for Log of Significant Discharges	See tables C.1	9 and in attachment C for Log of Significant Discharges	No
		200 Areas; adjacent or within a tank farm (raw water supply to a tank farm)	30-50	~5,000	Chlorine for some, none for others
		Retention pond	As needed	50,000	No
B.2.3	Wash Down Activities (window and building washings, cleaning air conditioning unit coils, preparation for painting, road and equipment washings)	2101M	6	720	No
		Building Washing at 2750-E and 2704-HV	Twice per year per building	~1,000	No
		225B-BA 283E-BA 242A-BA	2	<1,000 each facility	

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Table C.1-2. 200 East Area Discharges.

Waste Stream ID Number	Activities Generating Discharges	Discharge Location	Number of Discharges per year	Estimated Volume Gallons/Year	Potential for Discharge to Come in Contact with Chemicals? [If yes, list the chemical(s)]
B.3	Construction				
B.3.1.	Concrete Curing	200 Areas Tank Farms	Several	~5,000	No
B.3.2	Concrete Cutting	NA	NA	NA	NA
B.3.3	Pressure Washing Activities	NA	NA	NA	NA
B.4	Cooling Water/Condensate				
B.4.1	HVAC Systems discharging to an engineered structures	ETF	Intermittent	1000	De-scalar and biocide chemical
B.4.2	Air Compressors discharging to an engineered structures	NA	NA	NA	NA
B.4.3	Ice Machines discharging to an engineered structures	2101M	1	1825	No
B.4.4	Steam Condensate	NA	NA	NA	NA
B.5	Miscellaneous				
B.5.1	Water Tank Overflows	200 Areas Tank Farms	~2	<300	No
B.5.2	Incidental Releases	See Attachment C.1-3 for discharges from Waste Treatment and Immobilization Plant	See Attachment C.1	3for discharges from Waste Treatment and Immobilization Plant	See Attachment C.1
		200 Areas Tank Farms	300	~5000	No
B.5.3	Industrial Stormwater	NA	NA	NA	NA

NA = No discharges are currently projected or recently document; however, future discharges may be possible.

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Table C.1-3. Description of Waste Treatment and Immobilization (WTP) Balance of Facilities (BOF) Vessels and Tanks Greater than 50,000 Gallons.

Vessel Number	Vessel Description	Maximum Volume (gal)
<b>Pretreatment Plant Tanks - Vessels over 50,000 Gallons</b>		
CXP-VSL-00001	Cesium Ion Exchange Feed Vessel	103,350
FEP-VSL-00017A	Waste Feed Evaporator Feed Vessel	85,496
FEP-VSL-00017B	Waste Feed Evaporator Feed Vessel	85,496
FRP-VSL-00002A	Waste Feed Receipt Vessel	474,000
FRP-VSL-00002B	Waste Feed Receipt Vessel	474,000
FRP-VSL-00002C	Waste Feed Receipt Vessel	474,000
FRP-VSL-00002D	Waste Feed Receipt Vessel	474,000
HLP-VSL-00022	HLW Feed Receipt Vessel	270,600
HLP-VSL-00027A	HLW Feed and Lag Storage Vessel	127,260
HLP-VSL-00027B	HLW Feed and Lag Storage Vessel	127,260
HLP-VSL-00028	HLW Feed Blending Vessel	142,200
PWD-VSL-00015	Acid/Alkaline Effluent Vessel	119,150
PWD-VSL-00016	Acid/Alkaline Effluent Vessel	119,150
PWD-VSL-00044	Plant Wash Vessel	103,024
RLD-TK-00006A	Process Condensate Vessel	343,734
RLD-TK-00006B	Process Condensate Vessel	343,734
TCP-VSL-00001	Treated LAW Concentrate Storage Vessel	146,740
TLP-VSL-00009A	LAW SBS Condensate Receipt Vessel	130,010
TLP-VSL-00009B	LAW SBS Condensate Receipt Vessel	130,010
UFP-VSL-00001A	Ultrafiltration Feed Preparation Vessel	75,593
UFP-VSL-00001B	Ultrafiltration Feed Preparation Vessel	75,593
<b>LAW Vitrification Plant Tank Systems - None over 50,000 Gallons</b>		
N/A		
<b>HLW Vitrification Plant Tank Systems - None over 50,000 Gallons</b>		
N/A		
<b>Analytical Laboratory Tank Systems - None over 50,000 Gallons</b>		
N/A		
<b>Balance of Facilities</b>		
Non-radioactive liquid waste disposal		620,000
Firewater A		345,000
Firewater B		345,000
Process Service Water A		190,000
Process Service Water B		130,000
Diesel Fuel		345,000

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Table C.1-3. Description of Waste Treatment and Immobilization (WTP) Balance of Facilities (BOF) Vessels and Tanks Greater than 50,000 Gallons.

Vessel Number	Vessel Description	Maximum Volume (gal)
Domestic Water		63,000
Demineralized Water		58,000

HLW = High-Level Waste.

LAW = Low-Activity Waste.

NA = No discharges are currently projected or recently document; however, future discharges may be possible.

SBS = Submerged Bed Scrubber.

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Table C.1-4. 200 West Area Discharges.

Waste Stream ID Number	Activities Generating Discharges	Discharge Location	Number of Discharges per year	Estimated Volume Gallons/Year	Potential for Discharge to Come in Contact with Chemicals? [If yes, list the chemical(s)]
B.1	Hydrotesting				
B.1.1	System or Component Testing	WRAP	100	100	No
B.1.2	Research and Development Testing	See Attachment C.1-6	See Attachment C.1-6	Varies	Groundwater tracers or other chemicals either approved by Ecology or meeting GWQC were used (MSDS available upon request)
B.1.3	Other Experimental Discharges	See Attachment C	2	1	No
B.2	Maintenance				
B.2.1	Drainage	Cutting and Capping of Steam and Water Lines (may occur in 200 East and 600 Areas also)	~1	~1000	No
B.2.2	Flushing	See tables C.1-9, C.1-10 and C.1-11 in this attachment for Log of Significant Discharges	See tables C.1	9, C.1	No
B.2.3	Wash Down Activities (Window and building washings, cleaning air conditioning unit coils, preparation for painting, road and equipment washings)	MO-279 222S-BA 234-5Z -BA 234-5Z-BE 283W-BA	2	<1000 each facility	

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Table C.1-4. 200 West Area Discharges.

Waste Stream ID Number	Activities Generating Discharges	Discharge Location	Number of Discharges per year	Estimated Volume Gallons/Year	Potential for Discharge to Come in Contact with Chemicals? [If yes, list the chemical(s)]
B.3	Construction				
B.3.1.	Concrete Curing	NA	NA	NA	NA
B.3.2	Concrete Cutting	NA	NA	NA	NA
B.3.3	Pressure Washing Activities	NA	NA	NA	NA
B.4	Cooling Water/Condensate				
B.4.1	HVAC Systems discharging to an engineered structures	NA	NA	NA	NA
B.4.2	Air Compressors discharging to an engineered structures	NA	NA	NA	NA
B.4.3	Ice Machines discharging to an engineered structures	NA	NA	NA	NA
B.4.4	Steam Condensate	NA	NA	NA	NA
B.5	Miscellaneous				
B.5.1	Water Tank Overflows	NA	NA	NA	NA
B.5.2	Incidental Releases	NA	NA	NA	NA
B.5.3	Industrial Stormwater	NA	NA	NA	NA

GWQC= Groundwater Quality Criteria.

MSDS = Material Safety Data Sheet.

NA = No discharges are currently projected or recently document; however, future discharges may be possible.

WRAP = Waste Receiving and Processing Facility.

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Table C.1-5. 300 Area Discharges.

Waste Stream ID Number	Activities Generating Discharges	Discharge Location	Number of Discharges per year	Estimated Volume Gallons/Year	Potential for Discharge to Come in Contact with Chemicals? [If yes, list the chemical(s)]
B.1	Hydrotesting				
B.1.1	System or Component Testing	Within 300 Area	~2/year	<2000	No
B.1.2	Research and Development Testing	See Attachment C.1-6	See Attachment C.1-6	200-35,000	Groundwater tracer or dyes, either approved by Ecology or meeting Groundwater Quality Criteria were used. (MSDS available upon request)
B.1.3	Other Experimental Discharges	NA	NA	NA	NA
B.2	Maintenance				
B.2.1	Drainage	Within 300 Area	2	<1000 each	No
B.2.2	Flushing	Within 300 Area	3	<500	No
B.2.3	Wash Down Activities (window and building washings, cleaning air conditioning unit coils, preparation for painting, road and equipment washings)	Within 300 Area	5	Maximum 10,000 gallons over 3 days	No
		Within 300 Area	5 building washings	Maximum 10,000 gallons over 3 days	No
		MO-258 MO-262 MO-263 318BA 320BA 323BA 324BA 325BA 326BA	2	<1000 each facility	No

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Table C.1-5. 300 Area Discharges.

Waste Stream ID Number	Activities Generating Discharges	Discharge Location	Number of Discharges per year	Estimated Volume Gallons/Year	Potential for Discharge to Come in Contact with Chemicals? [If yes, list the chemical(s)]
		331BA 382BA			
B.3	Construction				
B.3.1.	Concrete Curing	Within 300 Area	1	<100	No
B.3.2	Concrete Cutting	Within 300 Area	1	<100	No
B.3.3	Pressure Washing Activities	NA	NA	NA	NA
B.4	Cooling Water/Condensate				
B.4.1	HVAC Systems discharging to an engineered structures	NA	NA	NA	NA
B.4.2	Air Compressors discharging to an engineered structures	NA	NA	NA	NA
B.4.3	Ice Machines discharging to an engineered structures	NA	NA	NA	NA
B.4.4	Steam Condensate	Within 300 Area	2	<50	No
B.5	Miscellaneous				
B.5.1	Water Tank Overflows	NA	NA	NA	NA
B.5.2	Incidental Releases	Within 300 Area	~5	<50	No
B.5.3	Industrial Stormwater	NA	NA	NA	NA

Ecology = Washington State Department of Ecology

HVAC = Heating, Ventilation, and Air Conditioning.

MSDS = Material Safety Data Sheet.

NA = No discharges are currently projected or recently document; however, future discharges may be possible.

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Table C.1-6. Research and Development Testing Table for Years 2006-2008.

Year	Activity Description	Area	Volume (gallons)
2006	Pulse Jet Mixer Study Project (different aspects of the project performed at both APEL and the 336 Building)	300 Area	5,390
<b>2006 Total: 5,390 gallons</b>			
2007	WTP Anti-Foam Agent testing with clay slurries (APEL)	300 Area	1,600
<b>2007 Total: 1,600 gallons</b>			
2008	Pulse Jet Mixer Study Project (336 Building)	300 Area	21,133
2008	Chromium VI Groundwater Bioremediation Project (100H)	100H Area	60
2008	WTP System Pipeline Velocity Testing (PDLE)	300 Area	2,665
2008	Integrated Field Scale Subsurface Research Challenge studying uranium contamination in 300 Area groundwater (involves removal of groundwater from one well and reinjection into another well downgradient)	300 Area	0
2008	Hydrophone technology testing (300 Area)	300 Area	106
<b>2008 Total: 23,964 gallons</b>			

APEL= Applied Process Engineering Laboratory.  
 PDLE= Process Development Laboratory - East.  
 WTP = Waste Treatment Plant.

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Table C.1-7. 400 Area Discharges.

Waste Stream ID Number	Activities Generating Discharges	Discharge Location	Number of Discharges per year	Estimated Volume Gallons/Year	Potential for Discharge to Come in Contact with Chemicals? [If yes, list the chemical(s)]
B.1	Hydrotesting Discharges				
B.1.1	System or Component Testing	NA	NA	NA	NA
B.1.2	Research and Development Testing	NA	NA	NA	NA
B.1.3	Other Experimental Discharges	NA	NA	NA	NA
B.2	Maintenance Activities				
B.2.1	Drainage	NA	NA	NA	NA
B.2.2	Flushing	FFTF Water Treatment Plant	24	9000	No
B.2.3	Wash Down Activities (window and building washings, cleaning air conditioning unit coils, preparation for painting, road and equipment washings)	NA	NA	NA	NA
B.3	Construction Discharges				
B.3.1.	Concrete Curing	NA	NA	NA	NA
B.3.2	Concrete Cutting	NA	NA	NA	NA
B.3.3	Pressure Washing Activities	NA	NA	NA	NA
B.4	Cooling Water/Condensate Discharges				
B.4.1	HVAC Systems discharging to an engineered structures	NA	NA	NA	NA
B.4.2	Air Compressors discharging to an engineered structures	NA	NA	NA	NA
B.4.3	Ice Machines discharging to an engineered structures	NA	NA	NA	NA
B.4.4	Steam Condensate	NA	NA	NA	NA

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Table C.1-7. 400 Area Discharges.

Waste Stream ID Number	Activities Generating Discharges	Discharge Location	Number of Discharges per year	Estimated Volume Gallons/Year	Potential for Discharge to Come in Contact with Chemicals? [If yes, list the chemical(s)]
B.5	Miscellaneous Discharges				
B.5.1	Water Tank Overflows	NA	NA	NA	NA
B.5.2	Incidental Releases	NA	NA	NA	NA
B.5.3	Industrial Stormwater	NA	NA	NA	NA

FFTF = Fast Flux Test Facility.

HVAC = Heating, Ventilation, and Air Conditioning.

NA = No discharges are currently projected or recently document; however, future discharges may be possible.

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Table C.1-8. 600 Area Discharges.

Waste Stream ID Number	Activities Generating Discharges	Discharge Location	Number of Discharges per year	Estimated Volume Gallons/Year	Potential for Discharge to Come in Contact with Chemicals? [If yes, list the chemical(s)]
B.1	Hydrotesting				
B.1.1	System or Component Testing	NA	NA	NA	NA
B.1.2	Research and Development Testing	NA	NA	NA	NA
B.1.3	Other Experimental Discharges	NA	NA	NA	NA
B.2	Maintenance				
B.2.1	Drainage	NA	NA	NA	NA
B.2.2	Flushing	251W	Continuous	~450,000	NA
B.2.3	Wash Down Activities (Window and building washings, cleaning air conditioning unit coils, preparation for painting, road and equipment washings)	NA	NA	NA	NA
B.3	Construction Discharges				
B.3.1.	Concrete Curing	NA	NA	NA	NA
B.3.2	Concrete Cutting	NA	NA	NA	NA
B.3.3	Pressure Washing Activities	NA	NA	NA	NA
B.4	Cooling Water/Condensate				
B.4.1	HVAC Systems discharging to an engineered structures	NA	NA	NA	NA
B.4.2	Air Compressors discharging to an engineered structures	NA	NA	NA	NA
B.4.3	Ice Machines discharging to an engineered structures	NA	NA	NA	NA
B.4.4	Steam Condensate	NA	NA	NA	NA
B.5	Miscellaneous				
B.5.1	Water Tank Overflows	NA	NA	NA	NA
B.5.2	Incidental Releases	NA	NA	NA	NA

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Table C.1-8. 600 Area Discharges.

Waste Stream ID Number	Activities Generating Discharges	Discharge Location	Number of Discharges per year	Estimated Volume Gallons/Year	Potential for Discharge to Come in Contact with Chemicals? [If yes, list the chemical(s)]
B.5.3	Industrial Stormwater	NA	NA	NA	NA

HVAC = Heating, Ventilation, and Air Conditioning.

NA = No discharges are currently projected or recently document; however, future discharges may be possible.

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Table C.1-9. Significant Discharges Calendar Year 2006.

LOG OF SIGNIFICANT DISCHARGES FOR CALENDAR YEAR 2006

Date	Type of Discharge	Flush Source/Location	Source Water	Additive	Total Volume (Gallons)	Discharge Rate (gal/min)	Soil Loading Rate (gal/min/sq. ft <sup>2</sup> )	Responsible Person	Comments
01/08/06	Drinking Water Line Flushing	ETF/East	Potable	n/a	46200	140	5.33	Larry Goodenow	Water Quality
02/07/06	Drinking Water Line Flushing	ETF/East	Potable	n/a	47600	140	5.17	Sparks/Hexum	Water Quality
02/13/06	Drinking Water Line Flushing	T-7/East	Potable	n/a	14850	990	1.20	Woodford/Castro	Water Quality
03/07/06	Drinking Water Line Flushing	32-E/East	Potable	n/a	33350	145	1.59	Hexum/Sparks	Water Quality
03/18/06	Drinking Water Line Flushing	ETF/East	Potable	n/a	23000	115	2.74	Tamburello	Water Quality
03/21/06	Drinking Water Line Flushing	ETF/East	Potable	n/a	21700	140	1.30	Sparks/Leaverton	Water Quality
03/22/06	Drinking Water Line Flushing	32-E/East	Potable	n/a	38475	95	4.57	Sparks/Leaverton	Water Quality
03/30/06	Drinking Water Line Flushing	UC-1/East	Potable	n/a	15600	780	1.37	Hexum/Castro	Water Quality
04/24/06	Drinking Water Line Flushing	32-E/East	Potable	n/a	25650	95	2.77	Sparks	Water Quality
04/25/06	Drinking Water Line Flushing	BUF/East	Potable	n/a	16800	80	9.33	Sparks	Water Quality
04/27/06	Drinking Water Line Flushing	32-E/East	Potable	n/a	22800	95	2.71	Sparks	Water Quality
04/27/06	Drinking Water Line Flushing	BUF/East	Potable	n/a	16800	80	9.33	Leaverton/Sparks	Water Quality
04/27/06	Drinking Water Line Flushing	ETF/East	Potable	n/a	25200	140	2.10	Sparks/Castro	Water Quality
05/09/06	Drinking Water Line Flushing	BUF/East	Potable	n/a	27600	80	15.33	Leaverton/Sparks	Water Quality
05/09/06	Drinking Water Line Flushing	ETF/East	Potable	n/a	25200	140	2.10	Leaverton/Sparks	Water Quality
05/09/06	Drinking Water Line Flushing	32-E/East	Potable	n/a	17100	95	2.07	Sparks/Leaverton	Water Quality

LOG OF SIGNIFICANT DISCHARGES FOR CALENDAR YEAR 2006

Date	Type of Discharge	Flush Source/Location	Source Water	Additive	Total Volume (Gallons)	Discharge Rate (gal/min)	Soil Loading Rate (gal/min/sq. ft.)	Responsible Person	Comments
05/10/06	Drinking Water Line Flushing	32-E/East	Potable	n/a	30400	95	3.39	Sparks/Leaverton	Water Quality
06/09/06	Drinking Water Line Flushing	U.S.E/East	Potable	n/a	24300	20	2.43	Tamburello	Water Quality
06/10/06	Drinking Water Line Flushing	TEDF/East	Potable	n/a	25200	140	1.51	Tamburello	Water Quality
09/07/06	Drinking Water Line Flushing	16-E/East	Potable	n/a	17000	850	1.37	Beazer	Water Quality
09/07/06	Drinking Water Line Flushing	UC-1/East	Potable	n/a	19000	950	2.26	Beazer	Water Quality
10/25/06	Drinking Water Line Flushing	11-E/East	Potable	n/a	18000	900	1.23	Hexum/Castro	Water Quality

n/a = not applicable

gal/min = gallons/minute

gal/min/sq. ft. = gallons/minute/square feet

The submitted information is to the best of my knowledge and belief, true, accurate and complete based on my inquiry of the person(s) who manage the system or those persons directly responsible for gathering the submitted information.

Application for Wastewater Discharge Permit ST 4511  
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Table C.1-10. Significant Discharges Calendar Year 2007.

Log of Significant Discharges for Calendar Year 2007

Date	Type of Discharge	Source Water	Additive*	Flush Source	Location	Discharge Rate	Time	Total Volume	Soil Loading		Responsible Operator	Comments
									Area (sq ft)	Rate (gpm/sq ft)		
01/02/07	Drinking Water Line Flushing	Potable	Not Applicable	Hydrant /Blowoff	200 E	140	150	21000	20000	1.05	Tamburello	Water Quality
01/03/07	Drinking Water Line Flushing	Potable	Not Applicable	TEDF	200 E	140	262	36680	31400	1.17	Tamburello	Water Quality
01/09/07	Drinking Water Line Flushing	Potable	Not Applicable	TEDF	200 E	140	160	22400	21000	1.07	Hexum	Water Quality
03/17/07	Drinking Water Line Flushing	Potable	Not Applicable	USEC	200 E	20	930	18600	10400	1.79	Tamburello	Water Quality
03/22/07	Drinking Water Line Flushing	Potable	Not Applicable	UC1	200 E	850	20	17000	21000	0.81	Sparks	Water Quality
03/22/07	Drinking Water Line Flushing	Potable	Not Applicable	32E	200 E	90	200	18000	10600	1.67	Sparks	Water Quality
03/22/07	Drinking Water Line Flushing	Potable	Not Applicable	16E	200 E	1000	20	20000	24400	0.82	Sparks	Water Quality
03/22/07	Drinking Water Line Flushing	Potable	Not Applicable	BUFF	200 E	90	240	21600	12400	1.74	Sparks	Water Quality
04/02/07	Drinking Water Line Flushing	Potable	Not Applicable	UC1	200 E	850	20	17000	21400	0.79	Hexum	Water Quality
04/02/07	Drinking Water Line Flushing	Potable	Not Applicable	UC1	200 E	850	20	17000	20000	0.85	Hexum	Water Quality
04/05/07	Drinking Water Line Flushing	Potable	Not Applicable	BUFF	200 E	75	210	15750	11400	1.38	Sparks	Water Quality
04/05/07	Drinking Water Line Flushing	Potable	Not Applicable	7T	200 W	800	20	16000	19400	0.82	Sparks	Water Quality
04/05/07	Drinking Water Line Flushing	Potable	Not Applicable	TEDF	200 E	140	120	16800	14500	1.16	Sparks	Water Quality
04/05/07	Drinking Water Line Flushing	Potable	Not Applicable	12S	200 E	1000	20	20000	18800	1.06	Sparks	Water Quality
04/05/07	Drinking Water Line Flushing	Potable	Not Applicable	32E	200 E	130	360	46800	22400	2.09	Sparks	Water Quality
04/10/07	Drinking Water Line Flushing	Potable	Not Applicable	7T	200 W	1000	20	20000	18500	1.08	Sparks	Water Quality
04/10/07	Drinking Water Line Flushing	Potable	Not Applicable	BUFF	200 E	85	240	20400	12400	1.65	Sparks	Water Quality
04/10/07	Drinking Water Line Flushing	Potable	Not Applicable	32E	200 E	150	315	47250	18400	2.57	Sparks	Water Quality
04/12/07	Drinking Water Line Flushing	Potable	Not Applicable	TEDF	200 E	140	105	14700	6480	1.73	Sparks	Water Quality

Application for Wastewater Discharge Permit ST 4511  
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Log of Significant Discharges for Calendar Year 2007

Date	Type of Discharge	Source Water	Additive*	Flush Source Hydrant /Blowoff	Location Area	Discharge Rate gal/min	Time Minutes	Total Volume Gallons	Soil Loading		Responsible Operator	Comments
									Area (sq ft)	Rate (gpm/sq ft)		
04/12/07	Drinking Water Line Flushing	Potable	Not Applicable	11E	200 E	900	20	18000	19100	0.94	Sparks	Water Quality
04/12/07	Drinking Water Line Flushing	Potable	Not Applicable	BUFF	200 E	85	240	20400	12400	1.65	Sparks	Water Quality
04/12/07	Drinking Water Line Flushing	Potable	Not Applicable	32E	200 E	150	300	45000	20400	2.21	Sparks	Water Quality
04/13/07	Drinking Water Line Flushing	Potable	Not Applicable	28E	200 E	900	20	18000	16400	1.10	Sparks	Water Quality
04/14/07	Drinking Water Line Flushing	Potable	Not Applicable	USEC	200 E	20	895	17900	4140	4.32	Tamburello	Water Quality
04/16/07	Drinking Water Line Flushing	Potable	Not Applicable	16E	200 E	980	20	19600	17800	1.10	Sparks	Water Quality
04/17/07	Drinking Water Line Flushing	Potable	Not Applicable	7T	200 W	980	17	16660	8480	1.96	Hexum	Water Quality
04/23/07	Drinking Water Line Flushing	Potable	Not Applicable	BUFF	200 E	85	270	22950	8780	2.61	Sparks	Water Quality
04/23/07	Drinking Water Line Flushing	Potable	Not Applicable	32E	200 E	150	300	45000	18200	2.47	Sparks	Water Quality
04/24/07	Drinking Water Line Flushing	Potable	Not Applicable	UC1	200 E	750	20	15000	16400	0.91	Sparks	Water Quality
04/24/07	Drinking Water Line Flushing	Potable	Not Applicable	16E	200 E	909	20	18180	18600	0.98	Sparks	Water Quality
04/25/07	Drinking Water Line Flushing	Potable	Not Applicable	TEDF	200 E	150	110	16500	25120	0.66	Sparks	Water Quality
04/25/07	Drinking Water Line Flushing	Potable	Not Applicable	32E	200 E	150	360	54000	18200	2.97	Sparks	Water Quality
04/26/07	Drinking Water Line Flushing	Potable	Not Applicable	CM1	200 E	980	20	19600	17450	1.12	Sparks	Water Quality
04/27/07	Drinking Water Line Flushing	Potable	Not Applicable	3WA	200 W	980	20	19600	14450	1.36	Sparks	Water Quality
04/30/07	Drinking Water Line Flushing	Potable	Not Applicable	12S	200 W	980	20	19600	16400	1.20	Sparks	Water Quality
04/30/07	Drinking Water Line Flushing	Potable	Not Applicable	7T	200 W	980	20	19600	18700	1.05	Sparks	Water Quality
04/30/07	Drinking Water Line Flushing	Potable	Not Applicable	3WA	200 W	980	20	19600	16400	1.20	Sparks	Water Quality
05/07/07	Drinking Water Line Flushing	Potable	Not Applicable	TEDF	200 E	150	120	18000	15700	1.15	Sparks	Water Quality
05/07/07	Drinking Water Line Flushing	Potable	Not Applicable	WESF4	200 W	980	20	19600	16400	1.20	Sparks	Water Quality

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Log of Significant Discharges for Calendar Year 2007

Date	Type of Discharge	Source Water Raw or Potable	Additive*	Flush Source Hydrant /Blowoff	Location Area	Discharge Rate gal/min	Time Minutes	Total Volume Gallons	Soil Loading		Responsible Operator	Comments
									Area (sq ft)	Rate (gpm/sq ft)		
05/10/07	Drinking Water Line Flushing	Potable	Not Applicable	32E	200 E	150	305	45750	12700	3.60	Sparks	Water Quality
05/15/07	Drinking Water Line Flushing	Potable	Not Applicable	TEDF	200 E	150	120	18000	15700	1.15	Sparks	Water Quality
05/15/07	Drinking Water Line Flushing	Potable	Not Applicable	UC1	200 E	980	20	19600	16400	1.20	Sparks	Water Quality
05/17/07	Drinking Water Line Flushing	Potable	Not Applicable	BUFF	200 E	150	330	49500	12,400	3.99	Sparks	Water Quality
05/17/07	Drinking Water Line Flushing	Potable	Not Applicable	32E	200 E	150	360	54000	8200	6.59	Sparks	Water Quality
05/21/07	Drinking Water Line Flushing	Potable	Not Applicable	TEDF	200 E	150	105	15750	15700	1.00	Sparks	Water Quality
06/04/07	Drinking Water Line Flushing	Potable	Not Applicable	BUFF	200 E	85	300	25500	12400	2.06	Sparks	Water Quality
06/04/07	Drinking Water Line Flushing	Potable	Not Applicable	32E	200 E	150	230	34500	8750	3.94	Sparks	Water Quality
07/30/07	Drinking Water Line Flushing	Potable	Not Applicable	TEDF	200 E	150	135	20250	15700	1.29	Sparks	Water Quality
08/06/07	Drinking Water Line Flushing	Potable	Not Applicable	BUFF	200 E	85	240	20400	12400	1.65	Sparks	Water Quality
08/06/07	Drinking Water Line Flushing	Potable	Not Applicable	32E	200 E	150	260	39000	8750	4.46	Sparks	Water Quality

\* No additives were added

Table C.1-11. Significant Discharges Calendar Year 2008.

SIGNIFICANT DISCHARGE LOG

SIGNIFICANT DISCHARGE LOG FOR CALENDAR YEAR 2008												
FOR WASHINGTON STATE WASTE DISCHARGE PERMIT ST-4511												
WARNING												
Flushing flows are NOT to exceed 1,000 gpm. ALL flows in excess of 150 gpm are NOT to exceed 60 minutes in duration.												
Date	Type of Discharge	Source Water	Additive	Flush Source	Location	Discharge Rate	Time	Total Volume	Soil Loading		Responsible Person	Comments
									Area (ft <sup>2</sup> )	Rate (gpm/ft <sup>2</sup> )		
	Note #1	Raw or Potable	Note #2	Hydrant #/ Blowoff	Facility Area	Note #3	Minutes	Gallons	Area (ft <sup>2</sup> )	Rate (gpm/ft <sup>2</sup> )		
9/18/08	C	P	N/A	7T	T Plant	1,000	20	20,000	18,500	1.08	HE Sparks	Maintain Water Quality

Note #1: Type of Discharge/Limitation  
 C = Drinking Water Line Flushing - Staff not exceed 1000 gpm. Flows > 150 gpm shall not exceed 60 minutes. Implement BMP, Pollution Prevention.  
 Note #2: Additive is defined as any chemical / material added in addition to normal chlorine residual, e.g., tracing elements, or additional disinfectant.  
 Note #3: Measured at point of discharge (e.g., fire hydrant).  
 gpm = gallons per minute  
 P = Potable Water

#### **D. PUBLIC WATER SYSTEMS**

This attachment is intended to provide additional information or explanation for items in Section D of the application. The numbers below correspond to the subsection numbers from the application.

**D.1.** Hanford is served by six public water systems. The sources of water are Columbia River, groundwater and City of Richland. The U.S. Department of Energy currently maintains its water rights under the Federal Water Rights Doctrine. A legal description of the water source is not provided because of different sources of water.

**D.2.** The numbers for total water usage are not listed in the permit application because the water usage varies from system to system. The usage of water is not directly related to the quality and quantity of the discharges listed in this application. The distribution of water is not metered. However, 300Area public water system receives water from City of Richland, which is metered at the receiving point. The distribution of the water in the 300 Area is not metered.

**E. WASTEWATER INFORMATION**

This attachment is intended to provide additional information or explanation for items in Section E of the application. The numbers below correspond to the subsection numbers from the application.

**E.2.** No wastewater is treated therefore no analytical data is provided.

**E.7.** Chemicals are used for cleaning, disinfection, research, and development and are used in accordance with manufacturer's recommendations. Other discharges that have chemicals include R&D (e.g., groundwater tracers). Material Safety Data sheets for cleaning and disinfecting chemicals such as Simple Green and Bleach are provided in Attachment E.7 of this application.

**E.6. VEGETATION AND ANIMAL MANAGEMENT OPERATIONS**

Table E.6-1. Vegetation Management Operations.

Product Name	Quantity	Unit
Actamaster	200	lb
Agri Star Brox 2EC	400	gal
Agrilience 16-16-16	1,000	lb
All Pro Products Weed and Feed 13-2-3	1,000	lb
Aresenal	1	pint
Bio-Barrier II	6,000	sq ft
Choice	150	gal
Clean Crop Actamaster	500	lb
Clean Crop Malathion 57EC	1	gal
Dibro 2+2	30,000	lb
Endurance Herbicide	15	lb
ET Herbicide/Defoliant	10	gal
Feature 12-0-0	5	gal
Fighter F	300	gal
Garlon 3A	1	gal
Green Acres 16-16-16	500	lb
Hardball	400	gal
Hi-Light Blue Liquid	400	gal
Krovar IDF	10,000	lb
Liberate	200	gal
Magnafloc 155	300	lb
Metgard 60DF	15	lb
Milestone VM Herbicide	2	quart
MSO Concentrate	300	gal
Oust Herbicide	5	lb
Overdrive	200	lb
Payload Herbicide	600	lb
Pendulum AquaCap	50	gal
Perfect Spike (Lutz)	50	lb
Phase	150	gal
Plateau	100	gal
Predict Herbicide	100	lb
Quest	25	gal
Quicksilver IVM Herbicide	10	gal

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Table E.6-1. Vegetation Management Operations.

Product Name	Quantity	Unit
Riverdale Horse Power Selective Herbicide	12	gal
Roundup Pro Concentrate	500	gal
Sahara DG	10,000	lb
Scent Bubble Gum	1	gal
Soak-Up	1	lb
Spike/Diuron Blend	50	lb
Sprakil SK-26	2000	lb
Support	15	gal
Tank & Equipment Cleaner	12	lb
Topsite 2.5G	1,000	lb
Tordon 22K	100	gal
Tuff Trax Foam Marker	5	gal
UAP Timberland Platoon Herbicide	60	gal
Vanquish	75	gal
Verdicon 16-16-16	100	lb
Veteran 720 Herbicide	50	gal
Vista Herbicide	250	gal

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Table E.6-2. Animal Control Operations.

Product Name	Quantity	Unit
Advance Dual Choice (360A)	20	oz
Advance Dual Choice (Formula 1)	NA	NA
Aero-Cide	NA	NA
Avert Cockroach Gel Bait	NA	NA
Avitrol	NA	NA
Bio-Blast Biological Termiticide	NA	NA
CB-40 Extra	17	oz
Conquer	208	oz
CY-Kick CS	400	oz
DeltaGard G	650	lb
D-Foam	400	oz
D-Force HPX	100	oz
Dursban 50W (bags)		lb
First Line		
First Line GT		
ISOTRAC		
Malathion 57 EC (Clean Crop)		gal
MAXFORCE FC Ant Bait Stations	15	oz
MAXFORCE Fine Granular Insect Bait	50	lb
Maxforce Granular Fly Bait	2	oz
MAXFORCE Roach Bait	2	oz
Merit 0.5 G	300	lb
MERIT 75 WP	5	oz
NyGuard		
Premis Gell		
Premise Foam	50	oz
Pro-Control Plus	70	oz
PT 270		
PT 565 XLO Inspector		
Rozol, Pocket Gopher Bait	0.5	oz
Soak Up	2	oz
Sting Ray Wasp & Hornet Jet	90	oz
Suspend SC		
TANGLEFOOT		
TEMPO 0.1 Dust		oz

Application for Wastewater Discharge Permit ST 4511  
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Table E.6-2. Animal Control Operations.

Product Name	Quantity	Unit
TEMPO 20 WP	40	oz
TEMPO SC Ultra	450	oz
Termidor SC	1	oz
ULD 20		oz
ULD BP-300	150	oz
Wasp-Freeze Wasp and Hornet Killer	450	oz
Weather Blok XT	100	lb

**E.7. MATERIAL SAFETY DATA SHEETS**

Some discharges involve using cleaning or disinfecting chemicals. The material safety data sheets (MSDS) for such chemicals are attached in this section. Other MSDSs are available upon request.

E.7-1. BetzDearborn Material Safety Data Sheet.

HERCULES, CO Y 25, 200 0106 11

HERCULES, CO Y 25, 200 0106 11

010

Hercules MSDS - CONTINUUM AEC3109

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MSDS # 060702

ISSUE DATE 17-MAY-2001

**MATERIAL SAFETY DATA SHEET**

BetzDearborn, Division of Hercules Incorporated  
4636 Somerton Road  
Trevose, PA 19053  
Business telephone: (215) 355-3300

**HMS RATINGS**  
(See Section 16 for  
additional information)  
HEALTH: 1  
FLAMMABILITY: 1  
REACTIVITY: 0

**EMERGENCY TELEPHONE (HEALTH/ACCIDENT)**  
(800) 877-1940 (USA)

**1 PRODUCT IDENTIFICATION**

PRODUCT NAME:

**CONTINUUM AEC3109**

PRODUCT APPLICATION AREA:

**WATER-BASED CORROSION INHIBITOR/DEPOSIT CONTROL AGENT.**

**2 COMPOSITION / INFORMATION ON INGREDIENTS**

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

CAS#	CHEMICAL NAME
7664-38-2	PHOSPHORIC ACID Corrosive

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

**3 HAZARDS IDENTIFICATION**

\*\*\*\*\*

**EMERGENCY OVERVIEW**

**CAUTION**

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7/26/01

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Tuesday, July 28, 2009 8:04 PM

Iran Wachowski 912159423259

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Hercules MSDS - CONTINUUM AEC3109

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**MSDS # 060702**

May cause slight irritation to the skin. May cause moderate irritation to the eyes. Mists/aerosols may cause irritation to upper respiratory tract.

DOT hazard is not applicable  
Emergency Response Guide is not applicable  
Odor: Mild; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

\*\*\*\*\*

**POTENTIAL HEALTH EFFECTS**

**ACUTE SKIN EFFECTS:**

Primary route of exposure; May cause slight irritation to the skin.

**ACUTE EYE EFFECTS:**

May cause moderate irritation to the eyes.

**ACUTE RESPIRATORY EFFECTS:**

Mists/aerosols may cause irritation to upper respiratory tract.

**INGESTION EFFECTS:**

May cause slight gastrointestinal irritation.

**TARGET ORGANS:**

No evidence of potential chronic effects.

**MEDICAL CONDITIONS AGGRAVATED:**

Not known.

**SYMPTOMS OF EXPOSURE:**

May cause redness or itching of skin.

**4 FIRST AID MEASURES**

**SKIN CONTACT:**

Wash thoroughly with soap and water. Remove contaminated clothing. Get medical attention if irritation develops or persists.

**EYE CONTACT:**

Remove contact lenses. Hold eyelids apart. Immediately flush eyes with plenty of low-pressure water for at least 15 minutes. Get immediate medical attention.

**INHALATION:**

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

**INGESTION:**

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

**NOTES TO PHYSICIANS:**

No special instructions

**5 FIRE FIGHTING MEASURES**

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7/26/01

Application for Wastewater Discharge Permit ST 4511  
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10/25/01, 11:21 AM

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Hercules MSDS - CONTINUUM AEC3109

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**MSDS # 060702**

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical, carbon dioxide, foam or water

**HAZARDOUS DECOMPOSITION PRODUCTS:**

Thermal decomposition (destructive fires) yields elemental oxides.

**FLASH POINT:**

> 200F > 93C P-M(CC)

## 6 ACCIDENTAL RELEASE MEASURES

**PROTECTION AND SPILL CONTAINMENT:**

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

## 7 HANDLING & STORAGE

**HANDLING:**

Normal chemical handling.

**STORAGE:**

Keep containers closed when not in use. Do not freeze. If frozen, thaw and mix completely prior to use.

## 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### EXPOSURE LIMITS

**CHEMICAL NAME**

**PHOSPHORIC ACID**

PEL (OSHA): 1 MG/M3

TLV (ACGIH): 1 MG/M3

**ENGINEERING CONTROLS:**

Adequate ventilation to maintain air contaminants below exposure limits.

**PERSONAL PROTECTIVE EQUIPMENT:**

Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use a respirator with HEPA cartridges.

**SKIN PROTECTION:**

nitrile gloves-- Wash off after each use. Replace as necessary.

**EYE PROTECTION:**

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Thursday, July 28, 2006 10:47 AM

Frank Macrowski 7/28/2006

6:04

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splash proof chemical goggles

**MSDS # 060702**

## 9 PHYSICAL & CHEMICAL PROPERTIES

Specific Grav. (70F, 21C)	1.252	Vapor Pressure (mmHG)	< 16.0
Freeze Point (F)	16	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-9		
Viscosity(cps 70F, 21C)	66	Water Solubility (water)	100.0

Odor	Mild
Appearance	Colorless To Yellow
Physical State	Liquid
Flash Point	P-M(CC) > 200F > 93C
pH As Is (approx.)	4.3
Evaporation Rate (Ether=1)	< 1.00

NA = not applicable ND = not determined

## 10 STABILITY & REACTIVITY

### STABILITY:

Stable under normal storage conditions.

### HAZARDOUS POLYMERIZATION:

Will not occur.

### INCOMPATIBILITIES:

May react with strong oxidizers.

### DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

### RELEASABLE INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"B"

## 11 TOXICOLOGICAL INFORMATION

Oral LD50 RAT:	>2,000 mg/kg
NOTE - Estimated value	
Dermal LD50 RABBIT:	>2,000 mg/kg
NOTE - Estimated value	

## 12 ECOLOGICAL INFORMATION

### AQUATIC TOXICOLOGY

#### Fathead Minnow 96 Hour Acute Toxicity

Product toxicity determined from bioassays conducted on individual components.

LC50= 1830 mg/L

No Effect Level= 470 mg/L

#### Daphnia magna 48 Hour Acute Toxicity

Product toxicity determined from bioassays conducted on individual components.

LC50= 1550 mg/L

No Effect Level= 720 mg/L

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Portland, OR 97201 503 251 1000

Phone: 503 251 1000

0.05

Hercules MSDS - CONTINUUM AEC3109

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**BIODEGRADATION**

COD (mg/gm): 238 Calculated  
TOC (mg/gm): 100 Calculated  
BOD-5 (mg/gm): 8 Calculated  
BOD-28 (mg/gm): 20 Calculated

**MSDS # 060702**

**13 DISPOSAL CONSIDERATIONS**

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :  
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

**14 TRANSPORT INFORMATION**

DOT HAZARD: Not Applicable  
UN / NA NUMBER: Not applicable  
DOT EMERGENCY RESPONSE GUIDE #: Not applicable

**15 REGULATORY INFORMATION**

**TSCA:**

All components of this product are listed in the TSCA inventory.

**CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):**

No regulated constituent present at OSHA thresholds

**SARA SECTION 312 HAZARD CLASS:**

Immediate (acute)

**SARA SECTION 302 CHEMICALS:**

No regulated constituent present at OSHA thresholds

**SARA SECTION 313 CHEMICALS:**

No regulated constituent present at OSHA thresholds

**CALIFORNIA REGULATORY INFORMATION**

**CALIFORNIA SAFE DRINKING WATER AND TOXIC**

**ENFORCEMENT ACT (PROPOSITION 65) CHEMICALS PRESENT:**

No regulated constituent present at OSHA thresholds

**MICHIGAN REGULATORY INFORMATION**

No regulated constituent present at OSHA thresholds

**16 OTHER INFORMATION**

**NFPA/HMIS**

**CODE TRANSLATION**

Health	1	Slight Hazard
Fire	1	Slight Hazard
Reactivity	0	Minimal Hazard
Special	NONE	No special Hazard
(1) Protective Equipment	B	Goggles, Gloves

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7/26/01

Application for Wastewater Discharge Permit ST 4511  
Attachments

Thursday, July 28, 2001 10:47 AM

John Wachowski 312 3862820

0.00

Hercules MSDS - CONTINUUM AEC3109

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!!! Refer to section 8 of MSDS for additional protective equipment  
recommendations.

CHANGE LOG

**MSDS # 060702**

	EFFECTIVE DATE -----	REVISIONS TO SECTION: -----	SUPERCEDES -----
MSDS status:	11-FEB-1997		** NEW **
	17-MAY-2001	2, 3, 4, 8, 15	11-FEB-1997

Application for Wastewater Discharge Permit ST 4511  
Attachments

E.7-2. Clorox Material Safety Data Sheet.



The Clorox Company  
1221 Broadway  
Oakland, CA 94612  
Tel. (510) 271-7000

Material Safety  
Data Sheet

<b>I Product:</b> CLOROX REGULAR BLEACH	
<b>Description:</b> CLEAR, LIGHT YELLOW LIQUID WITH CHLORINE ODOR	
<b>Other Designations</b>	<b>Distributor</b>
Sodium hypochlorite solution Liquid chlorine bleach Clorox Liquid Bleach	Clorox Sales Company 1221 Broadway Oakland, CA 94612
<b>Emergency Telephone Nos.</b>	
For Medical Emergencies call: (800) 446-1014 For Transportation Emergencies Chemtrac (800) 424-9300	

<b>II Health Hazard Data</b>	<b>III Hazardous Ingredients</b>						
<p>Causes substantial but temporary eye injury. May irritate skin. May cause nausea and vomiting if ingested. Exposure to vapor or mist may irritate nose, throat and lungs. The following medical conditions may be aggravated by exposure to high concentrations of vapor or mist: heart conditions or chronic respiratory problems such as asthma, chronic bronchitis or obstructive lung disease. Under normal consumer use conditions the likelihood of any adverse health effects are low.</p> <p>Occasional clinical reports suggest a low potential for sensitization upon exaggerated exposure to sodium hypochlorite if skin damage (e.g. irritation) occurs during exposure. Routine clinical tests conducted on intact skin with Clorox Regular Bleach found no sensitization in the test subjects.</p> <p><b>FIRST AID:</b></p> <p><b>EYE CONTACT:</b> Immediately flush eyes with plenty of water. If irritation persists, see a doctor.</p> <p><b>SKIN CONTACT:</b> Remove contaminated clothing. Wash area with water.</p> <p><b>INGESTION:</b> Drink a glassful of water and call a physician.</p> <p><b>INHALATION:</b> If breathing problems develop remove to fresh air.</p>	<table border="1"> <thead> <tr> <th>Ingredients</th> <th>Concentration</th> <th>Worker Exposure Limit</th> </tr> </thead> <tbody> <tr> <td>Sodium hypochlorite CAS # 7681-52-9</td> <td>5.25%</td> <td>not established</td> </tr> </tbody> </table> <p>None of the ingredients in this product are on the IARC, NTP or OSHA carcinogen lists.</p> <p style="text-align: center; font-size: 24pt;"><b>MSDS # 012915</b></p>	Ingredients	Concentration	Worker Exposure Limit	Sodium hypochlorite CAS # 7681-52-9	5.25%	not established
Ingredients	Concentration	Worker Exposure Limit					
Sodium hypochlorite CAS # 7681-52-9	5.25%	not established					

<b>IV Special Protection and Precautions</b>	<b>V Transportation and Regulatory Data</b>
<p><b>Hygienic Practices:</b> Wear safety glasses. With repeated or prolonged use, wear gloves.</p> <p><b>Engineering Controls:</b> Use general ventilation to minimize exposure to vapor or mist.</p> <p><b>Work Practices:</b> Avoid eye and skin contact and inhalation of vapor or mist.</p> <p><b>KEEP OUT OF THE REACH OF CHILDREN.</b></p>	<p><b>U.S. DOT Hazard Class:</b> Not restricted</p> <p><b>U.S. DOT Proper Shipping Name:</b> Hypochlorite solution with not more than 7% available chlorine. Not Restricted per 49CFR172.101(c)(12)(iv).</p> <p><b>EPA - SARA Title III/CERCLA:</b></p> <p>Bottled product is not reportable under Sections 311/312; contains no chemicals regulated under Section 313; and contains a chemical (sodium hypochlorite ≤ 5.25%) which is regulated under Section 304/CERCLA.</p> <p><b>TSCA/DSL:</b> All chemicals in this product are listed on the TSCA Inventory and the Canadian Domestic Substances List.</p>

<b>VI Spill Procedures/Waste Disposal</b>	<b>VII Reactivity Data</b>
<p><b>Spill Procedures:</b> Absorb and containerize. Wash residual down to sanitary sewer. Contact the sanitary treatment facility in advance to assure ability to process washed down material. For spills of multiple products, responders should evaluate the MSDS's of the products for incompatibility with sodium hypochlorite. Breathing protection should be worn in enclosed, and/or poorly ventilated areas until hazard assessment is complete.</p> <p><b>Waste Disposal:</b> Dispose of in accordance with all applicable federal, state and local regulations.</p>	<p>Stable under normal use and storage conditions. Strong oxidizing agent. Reacts with other household chemicals such as toilet bowl cleaners, rust removers, vinegar, acids or ammonia containing products to produce hazardous gases, such as chlorine and other chlorinated species. Prolonged contact with metal may cause pitting or discoloration.</p>

<b>VIII Fire and Explosion Data</b>	<b>IX Physical Data</b>
<p>Not flammable or explosive. In a fire, cool containers to prevent rupture and release of sodium chlorate.</p>	<p>Boiling point.....212°F/100°C (decomposes)</p> <p>Specific Gravity (H<sub>2</sub>O=1).....1.085</p> <p>Solubility in Water.....complete</p> <p>pH.....11.4</p>

©1991 1991 THE CLOROX COMPANY  
DATA SUPPLIED IS FOR USE ONLY IN CONNECTION WITH OCCUPATIONAL SAFETY AND HEALTH DATE PREPARED 11/91

E.7-3. Dawn Material Safety Data Sheet.

Attachment to 24590-WTP-MSDS-SA-09-1154, REV. 000



Page 1 of 4  
Procter & Gamble  
Fabric and Home Care Division  
Ivorydale Technical Center  
5299 Spring Grove Avenue  
Cincinnati, OH 45217-1087

## MATERIAL SAFETY DATA SHEET

MSDS #: LDL 0004  
Supersedes: LDL 0003

Issue Date: 04/29/02  
Issue Date: 12/03/01

### SECTION I - CHEMICAL PRODUCT

Identity: Liquid Hand Dishwashing Detergents

Brands:

DAWN (All Variations)

IVORY (All Variations)

JOY (All Variations)

Hazard Rating:

Health:	1	4=EXTREME
Flammability:	0	3=HIGH
Reactivity:	0	2= MODERATE
		1=SLIGHT

Emergency Telephone Number: 24hr P&G Operator:

DAWN - 1-800-725-3296 (DAWN)

IVORY 1-800-253-2753 (IVORY)

JOY - 1-800-436-1569 (JOY)

or call Local Poison Control Center or your physician

### SECTION II - COMPOSITION AND INGREDIENTS

Ingredients/Chemical Name: Cleaning and sudsing agents (anionic and nonionic surfactants), dispensing aid (ethyl alcohol), water, stabilizing agents, colorant and perfume.

Dawn and Joy Antibacterial Hand Soaps also contain the antibacterial active Triclosan.

Dawn Hand Care product contains a protease enzyme.

Hazardous Ingredients as defined by OSHA, 29 CFR 1910.1200.

Chemical Name	Common Name	CAS No.	Recommended Limits	Composition Range	LD50/LC50
Ethyl alcohol	Ethanol	64-17-5	ACGIH TLV: 1880 mg/m <sup>3</sup>	1-6%	
Subtilisin	Protease	9014-01-1	NIOSH STEL 0.00006 mg/m <sup>3</sup>	<0.01%	

**Attachment to 24590-WTP-MSDS-SA-09-1154, REV. 000**

LIQUID HAND DISHWASHING DETERGENTS MSDS (Continued)

Page 2 of 4

SECTION III - HAZARDS IDENTIFICATION	
<b>Health Hazards (Acute and Chronic):</b>	
Ingestions:	Ingestion may cause transient gastrointestinal irritation.
Eye Contact:	May cause mild, transient irritation.
Skin:	Transient irritation with prolonged exposure to concentrated material.
<b>Signs and Symptoms of Exposure:</b>	
Ingestion:	May result in nausea, vomiting, and/or diarrhea.
Eye Contact:	May cause stinging, tearing, itching, swelling, and/or redness.
Skin:	Prolonged contact with concentrated material may be drying or transiently irritating to skin.

SECTION IV - FIRST AID INFORMATION	
<b>Emergency and First Aid Procedures:</b>	
Ingestion:	Drink 1 or 2 glasses of water.
Eye Contact:	Flush thoroughly with water for 15 minutes.
Skin:	If prolonged contact occurs, rinse thoroughly with water. If spilled on clothing, change clothes. If symptoms persist or recur, seek medical attention.
Other: Consumer product package has a voluntary avoid accidents statement.	

SECTION V - FIRE FIGHTING INFORMATION			
<b>Flash Point (Method Used):</b> 115-135°F. Pensky-Martens (Closed cup)	<b>Explosive Limits:</b>	<b>LEL:</b> N/A	<b>UEL:</b> N/A
<b>Extinguishing Media:</b> CO <sub>2</sub> , water or dry chemical.			
<b>Special Fire Fighting Procedures:</b> None. Although this product has a flash point below 200°F (closed cup), it is a >50% aqueous solution that does not sustain combustion.			
DOT classification is non-hazardous.			
<b>Unusual Fire Hazards:</b> None			
<b>Stability</b>	<i>Unstable:</i>	<i>Conditions to Avoid:</i> None known	
	<i>Stable: X</i>		
<b>Incompatibility (Materials to Avoid):</b> None known			
<b>Hazardous Decomposition/By Products:</b> None known			
<b>Hazardous Polymerization:</b>	<i>May Occur:</i>	<i>Conditions to Avoid:</i> None known	
	<i>Will Not Occur: X</i>		

SECTION VI - ACCIDENTAL RELEASE MEASURES	
<b>Personal Precautions:</b> None	
<b>Environmental Precautions:</b> DISPOSAL IS TO BE PERFORMED IN COMPLIANCE WITH ALL REGULATIONS. Solutions of the detergents may be allowed to be flushed down sewer. First check with your local water treatment plant. Recycling is recommended for undiluted scrap product. Do not landfill.	
<b>Steps To Be Taken in Case Material is Released or Spilled:</b> Prevent spills from reaching a waterway. Sorbents may be used. Read "Waste Disposal Method" below for further information.	

**Attachment to 24590-WTP-MSDS-SA-09-1154, REV. 000**

LIQUID HAND DISHWASHING DETERGENTS MSDS (Continued)

Page 3 of 4

**SECTION VII - HANDLING AND STORAGE**

Precautions To Be Taken In Handling and Storing: No unusual precautions necessary.

Other Precautions: None known

**SECTION VIII - EXPOSURE CONTROLS, PERSONAL PROTECTION**

Respiratory Protection (Specify Type): None required with normal use.

Ventilation *Local Exhaust:* None required with normal consumer use. *Special:* None

*Mechanical (General):* Normal/general dilution ventilation is acceptable. *Other:* None

Eye Protection: None required with normal consumer use.

*Industrial Setting:* For splash protection, use chemical goggles. Eye Wash fountain is desirable.

Protective Gloves: None required with normal use.

*Industrial Setting:* Protective gloves (rubber, neoprene) should be used for prolonged direct contact.

Other Protective Equipment: None required with normal use.

**SECTION IX - PHYSICAL AND CHEMICAL PROPERTIES**

Boiling Point °F: Not known

Specific Gravity (H<sub>2</sub>O=1): ca. 1

Vapor Pressure (mm Hg): N/A

Percent Volatile by Volume (%): ~60-65%

Vapor Density (Air=1): N/A

Evaporation Rate (nBuOAc=1): Unknown

Odor Threshold: N/A

Freezing Point: ~ 30 F

Coefficient of Water/Oil Distribution: N/A

pH (1% solution): ~ 8

Scooped Density: N/A

Solubility in Water: Completely

Appearance and Odor: Purple, Blue, Green, Yellow,

Reserve Alkalinity: N/A

Pink or Orange liquids. All products are perfumed.

**SECTION X - STABILITY AND REACTIVITY**

Possible Hazardous Reactions/Conditions: None known

Conditions to Avoid: None

Materials to Avoid: None

Hazardous Decomposition Products: None known

Other Recommendations: None

**SECTION XI - TOXICOLOGICAL INFORMATION**

LD50 (rats oral): approx 12 mL/kg

ED50 approx 2.3 mL/kg

Liquid hand dishwashing detergents have a relatively low order of toxicity. They may be irritating, but they are not expected to be corrosive. They are expected to be emetic.

**Attachment to 24590-WTP-MSDS-SA-09-1154, REV. 000**

LIQUID HAND DISHWASHING DETERGENTS MSDS (Continued)

Page 4 of 4

**SECTION XII - ECOLOGICAL INFORMATION**

All surfactants are readily biodegradable. These products are safe for septic tanks.

**SECTION XIII - DISPOSAL CONSIDERATIONS**

**Waste Disposal Method:** Disposal is to be performed in compliance with Federal, state and local regulations. Household product is safe for disposal down the drain during use or in the trash.  
**Industrial Setting:** Solutions of diluted detergent in the course of use, may be allowed to be flushed down sewer. First check with your local water treatment plant. Recycling is recommended for undiluted scrap product.  
Do not landfill.

**SECTION XIV - TRANSPORT INFORMATION**

Dawn, Joy and Ivory are non-hazardous under DOT.

**SECTION XV - ADDITIONAL REGULATORY INFORMATION**

All components are listed on the US TSCA Inventory. No components are affected by Significant New Use Rules (SNURs) under TSCA §5.  
No components of Dawn, Ivory or Joy are subject to California Proposition 65 labeling.  
All ingredients are CEPA approved for import to Canada by Procter & Gamble only. This product has been classified with Hazard Criteria of the Canadian Control Products Regulation (CPR) and this MSDS contains all information required by the Canadian Products Regulation.

**SECTION XVI - OTHER INFORMATION**

\*N/A. - Not Applicable

\*N/K. - Not Known

The submission of this MSDS may be required by law, but this is not an assertion that the substance is hazardous when used in accordance with proper safety practices and normal handling procedures. Data supplied is for use only in connection with occupational safety and health.

The information contained herein has been compiled from sources considered by Procter & Gamble to be dependable and is accurate to the best of the Company's knowledge. The information relates to the specific material designated herein, and does not relate to the use in combination with any other material or any other process. Procter & Gamble assumed no responsibility for injury to the recipient or third persons, for any damage to any property resulting from misuse of the controlled product.

Application for Wastewater Discharge Permit ST 4511  
Attachments

E.7-4. Simple Green Material Safety Data Sheet.

**Hanford**

**MSDS#: 012261**

Material Safety Data Sheet: Simple Green® All-Purpose Cleaner  
Simple Green® Scrubbing Pad  
Version No. 1300509A Date of Issue: January 2009

ANSI-Z400.1-2003 Format

**Section 1: PRODUCT & COMPANY IDENTIFICATION**

Product Name: Simple Green® All-Purpose Cleaner  
Simple Green® Scrubbing Pad  
Additional Name: Simple Green® Concentrated Cleaner/Degreaser/Deodorizer

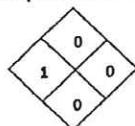
Manufacturer's Product Code Numbers: \*Please refer to page 4

Company: Sunshine Makers, Inc.  
15922 Pacific Coast Highway  
Huntington Harbour, CA 92649 USA  
Telephone: 800-228-0709 • 562-795-6000 Fax: 562-592-3830  
Emergency Phone: Chem-Tel 24-Hour Emergency Service: 800-255-3924

Use of Product: An all purpose cleaner and degreaser used diluted in water for direct, spray and dip tank procedures. Scrubbing pad is used with water for manual scrubbing applications. Both are for cleaning water-safe surfaces.

**Section 2: HAZARDS IDENTIFICATION**

Emergency Overview: CAUTION. Mild eye irritant.  
Simple Green® is a dark green liquid with a sassafras odor. Scrubbing Pad is a green fibrous rectangle.



HMS Rating:  
Health = 1 = slight  
Fire = 0  
Reactivity, and Special = 0 = minimal

Eye Contact: Mild Eye Irritant.  
Skin Contact: No adverse effects expected under typical use conditions. Prolonged exposure may cause dryness. Under this condition, use of gloves or skin moisturizer after washing may be indicated.  
Ingestion: May cause stomach or intestinal upset if swallowed (due to detergent properties.)  
Inhalation: No adverse effects expected under typical use conditions. Adequate ventilation should be present when using Simple Green® over a prolonged period of time. Open windows or ventilate via fan or other air-moving equipment if necessary.  
Carcinogens: No ingredients are listed by OSHA, IARC, or NTP as known or suspected carcinogens.  
Medical Conditions: No medical conditions are known to be aggravated by exposure to Simple Green®. Dermal-sensitive users may experience mild but reversible reactions.  
UN Number: Not Required Dangerous Goods Class: Non-hazardous

**Section 3: COMPOSITION/INFORMATION ON INGREDIENTS**

The only ingredient of Simple Green® with established exposure limits is undiluted 2-butoxyethanol (<4%) (Butyl Cellosolve; CAS No. 111-76-2) [1% for Scrubbing Pad]; the ACGIH TLV-TWA is 20 ppm (97 mg/m<sup>3</sup>). Based upon chemical analysis, Simple Green® contains no known EPA priority pollutants, heavy metals or chemicals listed under RCRA, CERCLA, or CWA. Analysis by TCLP (Toxicity Characteristic Leaching Procedure) according to RCRA revealed no toxic organic or inorganic constituents.

All components of Simple Green® are listed on the TSCA Chemical Substance Inventory.  
This product does not contain any ingredients covered by the provisions of 29 CFR 1910.1200.

**Hanford**

**MSDS#: 012261**

Material Safety Data Sheet: **Simple Green® All-Purpose Cleaner**  
**Simple Green® Scrubbing Pad**

Version No. 1300509A

Date of Issue: January 2009

ANSI-Z400.1-2003 Format

**Section 4: FIRST AID MEASURES**

**Eye Contact:** Reddening may develop. Immediately rinse the eye with large quantities of cool water; continue 10-15 minutes or until the material has been removed; be sure to remove contact lenses, if present, and to lift upper and lower lids during rinsing. Get medical attention if irritation persists.

**Skin Contact:** Minimal effects, if any; rinse skin with water, rinse shoes and launder clothing before reuse. Reversible reddening may occur in some dermal-sensitive users; thoroughly rinse area and get medical attention if reaction persists.

**Swallowing:** Essentially non-toxic. Give several glasses of water to dilute; do not induce vomiting. If stomach upset occurs, consult physician.

**Inhalation:** Non-toxic. Exposure to concentrate may cause mild irritation of nasal passages or throat; remove to fresh air. Get medical attention if irritation persists.

**Section 5: FIRE FIGHTING MEASURES**

Simple Green® is stable, not flammable, and will not burn. No special procedures required.

Flash Point/Auto-Ignition: Not flammable.

Extinguishing Media: Not flammable/non-explosive.

Flammability Limits: Not flammable.

Special Fire Fighting Procedures: None required.

**Section 6: ACCIDENTAL RELEASE MEASURES**

**Personal Precautions:** Avoid contact with eyes. Do not rub eyes with hands during cleanup. No special precautions for dermal contact are needed. Wash hands thoroughly after cleaning up spill or leak.

**Method for cleaning up:** Recover usable material by convenient method, residual may be removed by wipe or wet mop. If necessary, unrecoverable material may be washed to drain with large quantities of water.

**Section 7: HANDLING AND STORAGE**

No Special precautions are required. This product is non-hazardous for storage and transport according to the U.S. Department of Transportation Regulations. Simple Green® requires no special labeling or placarding to meet U.S. Department of Transportation requirements.

UN Number: Not Required

Dangerous Goods Class: Non-hazardous

**Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

**Exposure Limits:** The Simple Green® formulation presents no health hazards to the user when used according to label directions for its intended purposes. Mild skin and eye irritation is possible (please see Eye contact and Skin contact in section IV.) No special precautionary measures required under normal use conditions.

**Ventilation:** No special ventilation, precautions or respiratory protection is required during normal use. Large-scale use indoors should provide an increased rate of air exchange.

**Human Health Effects or Risks From Exposure:** Adverse effects on human health are not expected from Simple Green®, based on 20 years of use of Simple Green® without reported adverse health incidence in diverse population groups, including extensive use by inmates of U.S. Federal prisons in cleaning operations.

**Eye protection:** Simple Green® is a mild eye irritant; mucous membranes may become irritated by concentrate. Eye protection not generally required. Wash hands after using wipes.

**Skin protection:** Simple Green® is not likely to irritate the skin in the majority of users. Repeated daily application to the skin without rinsing, or continuous contact on the skin may lead to temporary, but reversible, irritation. Rinse completely from skin after contact.

Material Safety Data Sheet: SIMPLE GREEN® ALL-PURPOSE CLEANER & SCRUBBING PAD

2 of 4

## Hanford

**MSDS# : 012261**

Material Safety Data Sheet: Simple Green® All-Purpose Cleaner  
Simple Green® Scrubbing Pad

Version No. 1300509A

Date of Issue: January 2009

ANSI-Z400.1-2003 Format

### Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION – continued –

General hygiene conditions: There are no known hazards associated with this material when used as recommended. The following general hygiene considerations are recognized as common good industrial hygiene practices:

- Avoid breathing vapor or mist.
- Avoid contact with eyes.
- Wash thoroughly after handling and before eating, drinking, or smoking.

### Section 9: PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Cleaner is a dark green liquid, pad is a fibrous green matrix; both exhibit a sassafras odor.			
Specific Gravity:	1.010 ± 0.010	Vapor Pressure:	18 mm Hg @ 20°C; 23.5 mmHg @ 26°C
Evaporation:	>1 (butyl acetate = 1)	Vapor Density:	1.3 (air = 1)
Water Solubility:	100%	Density:	8.5 lbs/gallon
Boiling Point:	100.6°C (212°F)	pH:	9.5 ± 0.3
Ash Content:	At 600°F: 1.86% by weight	Nutrient Content:	
Freezing Point:	Approx -9 °C (16 °F) <i>If product freezes, it will reconstitute without loss of efficacy when brought back to room temperature and agitated.</i>	Phosphorus: 0.3% by formula Nitrogen <1.0% by weight (fusion and qualitative test for ammonia) Sulfur: 0.6% by weight (barium chloride precipitation method)	
VOC Composite Partial Pressure: 0.006 mmHg @ 20°C			
Volatile Organic Compounds (VOCs): Cleaner meets CARB & BAAQMD regulations. Cleaner must be diluted 1:1 with water to Meet SCAQMD Rule 1171 & Rule 1122 VOC requirements for solvent cleaning operations. [Scrubber VOCs = 3.3% prior to dilution w/water]			
CARB Method 310	3.8%		
SCAQMD Method 313	2.8%		

### Section 10: STABILITY AND REACTIVITY

Stability: Stable  
Materials to Avoid: None known  
Hazardous Decomposition Products: None expected

### Section 11: TOXICOLOGICAL INFORMATION

Toxicology information is based on chemical profile of ingredients and extrapolation of data from similar formulas.

Acute Toxicity: Oral LD<sub>50</sub> (rat) >5 g/kg body weight\*  
Dermal LD<sub>50</sub> (rabbit) >2 g/kg body weight  
*\*Calculation from OECD series on testing and assessment number 33, Chapter 3.2*

Eye Irritation: Moderate/Mild reversible eye irritation may occur based on relevant laboratory studies. This potential is reduced by immediate rinsing of eyes in case of eye contact.

Dermal Irritation: Mild, reversible skin irritation may occur based on relevant laboratory studies. A 6-hour exposure to human skin under a patch did not produce irritation

Repeat Exposure Via Skin Contact: Based on relevant laboratory studies, no toxic effects are expected to be associated with daily skin exposures (with up to 2 g/kg/day tested for 13 weeks on rabbits). Skin irritation may, however, occur with repeated or prolonged exposures.

Reproductive Effects Assessment: Based on relevant laboratory studies (CD-1 mouse 18-week fertility assessment continuous breeding), no adverse effects on reproduction, fertility, or health of offspring are expected.

E.7-5. Spectrus NX1106 Material Safety Data Sheet.



GE **MSDS # 056490**  
Water & Process Technologies

Material Safety Data Sheet

Issue Date: 29-JUN-2007  
Supercedes: 22-MAR-2007

SPECTRUS NX1106

**1 Identification of Product and Company**

Identification of substance or preparation  
SPECTRUS NX1106

Product Application Area  
Water-based microbial control agent.

Company/Undertaking Identification  
GE Belz, Inc.  
4636 Somerton Road  
Trevose, PA 19053  
T 215 355-3300, F 215 953 5524

Emergency Telephone  
(800) 877-1940

Prepared by Product Stewardship Group: 215 355-3300

**2 Composition / Information On Ingredients**

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

**HAZARDOUS INGREDIENTS:**

Cas#	Chemical Name	Range (w/w%)
10377-60-3	MAGNESIUM NITRATE Oxidizer; irritant (eyes and skin)	1-5
26172-55-4	5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE Corrosive; toxic (by ingestion and skin absorption); sensitizer (skin)	1-5

**3 Hazards Identification**

\*\*\*\*\*  
**EMERGENCY OVERVIEW**

**DANGER**

Corrosive to skin. Skin sensitizer with delayed onset of symptoms.  
Corrosive to the eyes. Mists/aerosols cause irritation to the upper respiratory tract.

DOT hazard: Corrosive to skin

Substance or Preparation: SPECTRUS NX1106

Page 1

Application for Wastewater Discharge Permit ST 4511  
Attachments

MSDS # 056490

Odor: Slight; Appearance: Light Yellow To Green, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, foam or water

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:

Primary route of exposure; Corrosive to skin. Skin sensitizer with delayed onset of symptoms.

ACUTE EYE EFFECTS:

Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:

Mists/aerosols cause irritation to the upper respiratory tract.

INGESTION EFFECTS:

May cause severe irritation or burning of mouth, throat, and gastrointestinal tract with severe chest and abdominal pain, nausea, vomiting, diarrhea, lethargy and collapse. Possible death when ingested in very large doses.

TARGET ORGANS:

Prolonged or repeated exposures may cause tissue necrosis and/or skin sensitization.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

Direct contact with skin will cause severe delayed skin reactions or burns if not washed off immediately- follow first aid instructions.

#### 4 First Aid Measures

SKIN CONTACT:

URGENT! Wash thoroughly with soap and water. Remove contaminated clothing. Get immediate medical attention. Thoroughly wash clothing before reuse.

EYE CONTACT:

URGENT! Immediately flush eyes with plenty of low-pressure water for at least 20 minutes while removing contact lenses. Hold eyelids apart. Get immediate medical attention.

INHALATION:

If nasal, throat or lung irritation develops - remove to fresh air and get medical attention.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

NOTES TO PHYSICIANS:

Material is corrosive. It may not be advisable to induce vomiting. Possible mucosal damage may contraindicate the use of gastric lavage.

#### 5 Fire Fighting Measures

Application for Wastewater Discharge Permit ST 4511  
Attachments

**MSDS # 056490**

**FIRE FIGHTING INSTRUCTIONS:**

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

**EXTINGUISHING MEDIA:**

dry chemical, carbon dioxide, foam or water

**HAZARDOUS DECOMPOSITION PRODUCTS:**

oxides of carbon, nitrogen, and sulfur; and hydrogen chloride

**FLASH POINT:**

> 200F > 93C P-M(CC)

**MISCELLANEOUS:**

Corrosive to skin

UN 3265;Emergency Response Guide #153

## 6 Accidental Release Measures

**PROTECTION AND SPILL CONTAINMENT:**

**WARNING:** Keep spills and clean-up residuals out of municipal sewers and open bodies of water. Adsorb the spill with spill pillows or inert solids such as clay or vermiculite, and transfer contaminated materials to suitable containers for disposal. Deactivate spill area with freshly prepared solution of 5% sodium bicarbonate and 5% sodium hypochlorite in water. Apply solution to the spill area at a ratio of 10 volumes deactivation solution per estimated volume of residual spill to deactivate any residual active ingredient. Let stand for 30 minutes. Flush spill area with copious amounts of water to chemical sewer (if in accordance with local procedures, permits and regulations). DO NOT add deactivation solution to the waste pail to deactivate the adsorbed material.

**DISPOSAL INSTRUCTIONS:**

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Dispose of in approved pesticide facility or according to label instructions.

## 7 Handling & Storage

**HANDLING:**

Contains an oxidizer. Avoid all contact with reducing agents, oils, greases, organics and acids. Corrosive to skin and/or eyes.

**STORAGE:**

Keep containers closed when not in use. Store between 20-100F for no more than 6 months. Store upright in original vented containers. Product evolves CO2 slowly. Store samples in plastic bottles due to pressure build-up.

## 8 Exposure Controls / Personal Protection

**EXPOSURE LIMITS**

**CHEMICAL NAME**

**MAGNESIUM NITRATE**

PEL (OSHA): NOT DETERMINED

TLV (ACGIH): NOT DETERMINED

**5-CHLORO-2-METHYL-4-ISOTHIAZOLIN-3-ONE**

PEL (OSHA): NOT DETERMINED

TLV (ACGIH): NOT DETERMINED

MISC: Note-mfg. sugg. exp. limit: 0.1 mg/m<sup>3</sup> TWA; 0.3mg/m<sup>3</sup> STEL total isothiazoline).

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8) EXPOSURE CONTROLS/PERSONAL PROTECTION (continued)

**MSDS # 056490**

**ENGINEERING CONTROLS:**

Adequate ventilation to maintain air contaminants below exposure limits.

**PERSONAL PROTECTIVE EQUIPMENT:**

Use protective equipment in accordance with 29CFR 1910 Subpart I

**RESPIRATORY PROTECTION:**

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE. USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS. If air-purifying respirator use is appropriate, use organic vapor cartridges and any of the following particulate respirators: N95, N99, N100, R95, R99, R100, P95, P99 or P100.

**SKIN PROTECTION:**

gauntlet-type butyl gloves, chemical resistant apron-- Wash off after each use. Replace as necessary.

**EYE PROTECTION:**

splash proof chemical goggles, face shield

## 9 Physical & Chemical Properties

Specific Grav. (70F, 21C)	1.033	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	28	Vapor Density (air=1)	< 1.00
Freeze Point (C)	-2		
Viscosity(cps 70F, 21C)	8	% Solubility (water)	100.0
Odor		Slight	
Appearance		Light Yellow To Green	
Physical State		Liquid	
Flash Point	P-M(CC)	> 200F > 93C	
pH As Is (approx.)		3.0	
Evaporation Rate (Ether=1)		< 1.00	
Percent VOC:		0.0	

NA = not applicable ND = not determined

## 10 Stability & Reactivity

**STABILITY:**

Stable under normal storage conditions.

**HAZARDOUS POLYMERIZATION:**

Will not occur.

**INCOMPATIBILITIES:**

May react with organics or reducing agents.

**DECOMPOSITION PRODUCTS:**

oxides of carbon, nitrogen, and sulfur; and hydrogen chloride

**INTERNAL PUMPOUT/CLEANOUT CATEGORIES:**

'B'

## 11 Toxicological Information

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Oral LD50 RAT: >5,000 mg/kg  
Teratology : NEGATIVE  
Dermal LD50 RABBIT: >2,000 mg/kg  
NOTE - Estimated value  
Skin Sensitization HUMAN: POSITIVE  
Non-Ames Mutagenicity : NEGATIVE

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## 12 Ecological Information

### AQUATIC TOXICOLOGY

Bluegill Sunfish 96 Hour Static Acute Bioassay  
LC50= 12.1; No Effect Level= 6.5 mg/L  
Daphnia magna 48 Hour Flow-Thru Bioassay  
LC50= 2.9; 10% Mortality= .6 mg/L  
Fathead Minnow 36 Day Early Life Stage Test  
LOEC= 4; No Effect Level= 1.3 mg/L  
Fathead Minnow 96 Hour Flow-Thru Bioassay  
LC50= 6.6; No Effect Level= 2.5 mg/L  
Rainbow Trout 14 Day Chronic Bioassay  
LC50= 4.6; No Effect Level= 3.3 mg/L  
Rainbow Trout 96 Hour Static Acute Bioassay  
LC50= 8.7; No Effect Level= 6.5 mg/L  
Sheepshead Minnow 96 Hour Static Acute Bioassay  
LC50= 20; No Effect Level= 12 mg/L

### BIODEGRADATION

BOD-28 (mg/g): 0  
BOD-5 (mg/g): 0  
COD (mg/g): 17  
TOC (mg/g): 6

## 13 Disposal Considerations

If this undiluted product is discarded as a waste, the US RCRA hazardous waste identification number is :  
Not applicable.

Please be advised; however, that state and local requirements for waste disposal may be more restrictive or otherwise different from federal regulations. Consult state and local regulations regarding the proper disposal of this material.

## 14 Transport Information

DOT HAZARD: Corrosive to skin  
PROPER SHIPPING NAME: CORROSIVE LIQUID, ACIDIC, ORGANIC,  
N.O.S. (5-CHLORO-2-METHYL-4-ISOTHIAZOLIN  
-3-ONE)  
8, UN 3265, PG II

DOT EMERGENCY RESPONSE GUIDE #: 153

Note: Some containers may be DOT exempt, please check BOL for exact container classification

## 15 Regulatory Information

### TSCA:

This is an EPA registered biocide and is exempt from TSCA inventory requirements.

CERCLA AND/OR SARA REPORTABLE QUANTITY (RQ):

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**MSDS # 056490**

No regulated constituent present at OSHA thresholds

**FIFRA REGISTRATION NUMBER:**  
 3876- 143

**FOOD AND DRUG ADMINISTRATION:**  
 The ingredients in this product are approved by FDA under 21 CFR 176.300.

**USDA FOOD PLANT APPROVALS:**  
 SEC.G7

**SARA SECTION 312 HAZARD CLASS:**  
 Immediate (acute); Delayed (Chronic)

**SARA SECTION 302 CHEMICALS:**  
 No regulated constituent present at OSHA thresholds

**SARA SECTION 313 CHEMICALS:**

CAS#	CHEMICAL NAME	RANGE
10377-60-3	MAGNESIUM NITRATE	2.0-5.0%

**CALIFORNIA REGULATORY INFORMATION**

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):**

No regulated constituents present

**MICHIGAN REGULATORY INFORMATION**

No regulated constituent present at OSHA thresholds

**16 Other Information**

NFPA/HMIS		CODE TRANSLATION
Health	3	Serious Hazard
Fire	0	Minimal Hazard
Reactivity	0	Minimal Hazard
Special	CORR	DOT corrosive
(1) Protective Equipment	D	Goggles, Face Shield, Gloves, Apron

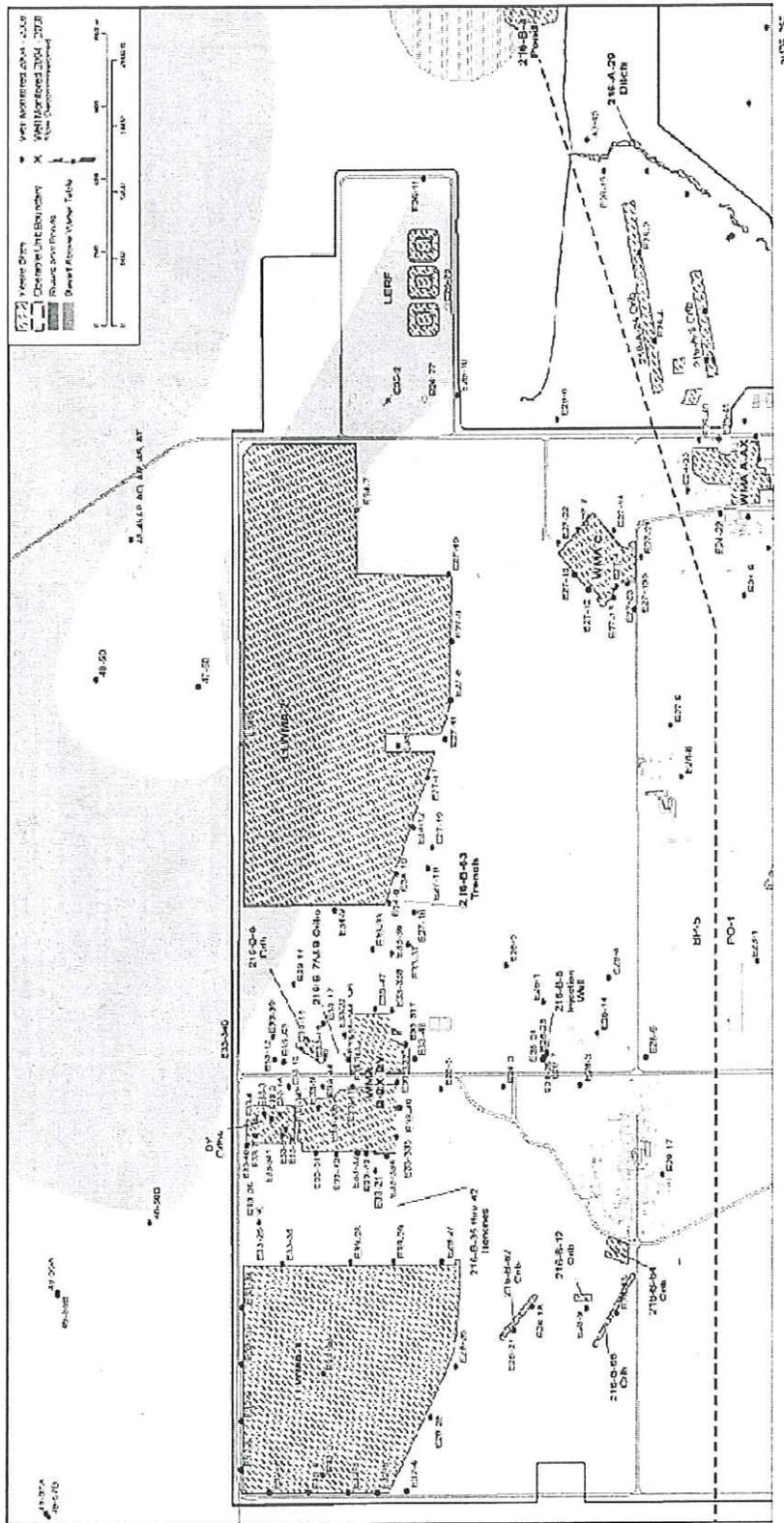
(1) refer to section 8 of MSDS for additional protective equipment recommendations.

**CHANGE LOG**

EFFECTIVE DATE	REVISIONS TO SECTION:	SUPERCEDES
MSDS status: 03-OCT-1997		** NEW **
02-DEC-1997	15	03-OCT-1997
23-DEC-1997	15	02-DEC-1997
01-MAY-1998	15; EDIT:9	23-DEC-1997
08-APR-1999	; EDIT:9	01-MAY-1998
17-MAY-2001	4,16	08-APR-1999
16-MAY-2006	10	17-MAY-2001
22-MAR-2007	9	16-MAY-2006
29-JUN-2007	5,6,8,10,16	22-MAR-2007



Figure G-3-2. 200 East Area Well Map (Adapted from DOE/RL-2008-66, Rev. 0).



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Figure G-3-3. 200 West Area Well Map (Adapted from DOE/RL-2008-66, Rev. 0).

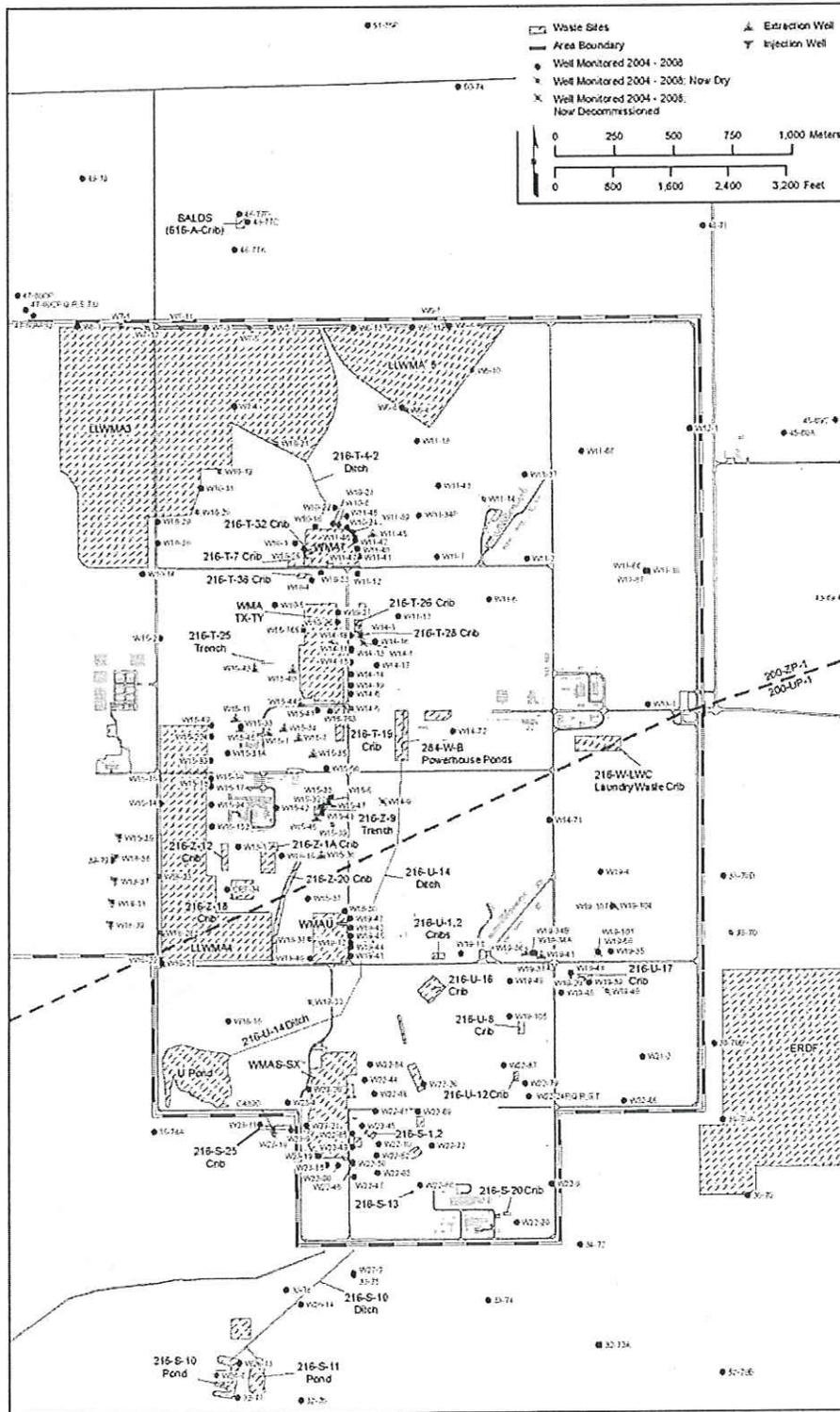
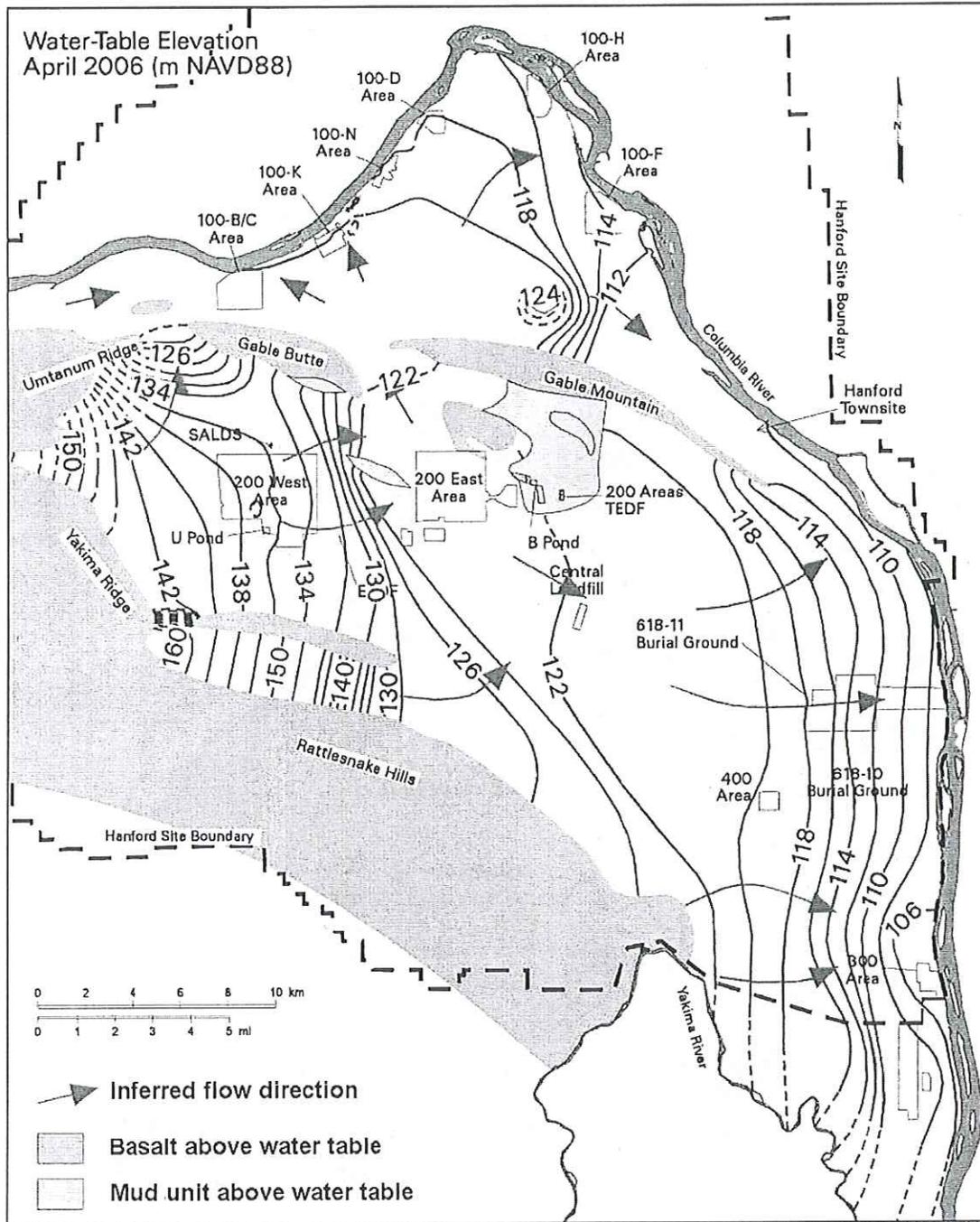




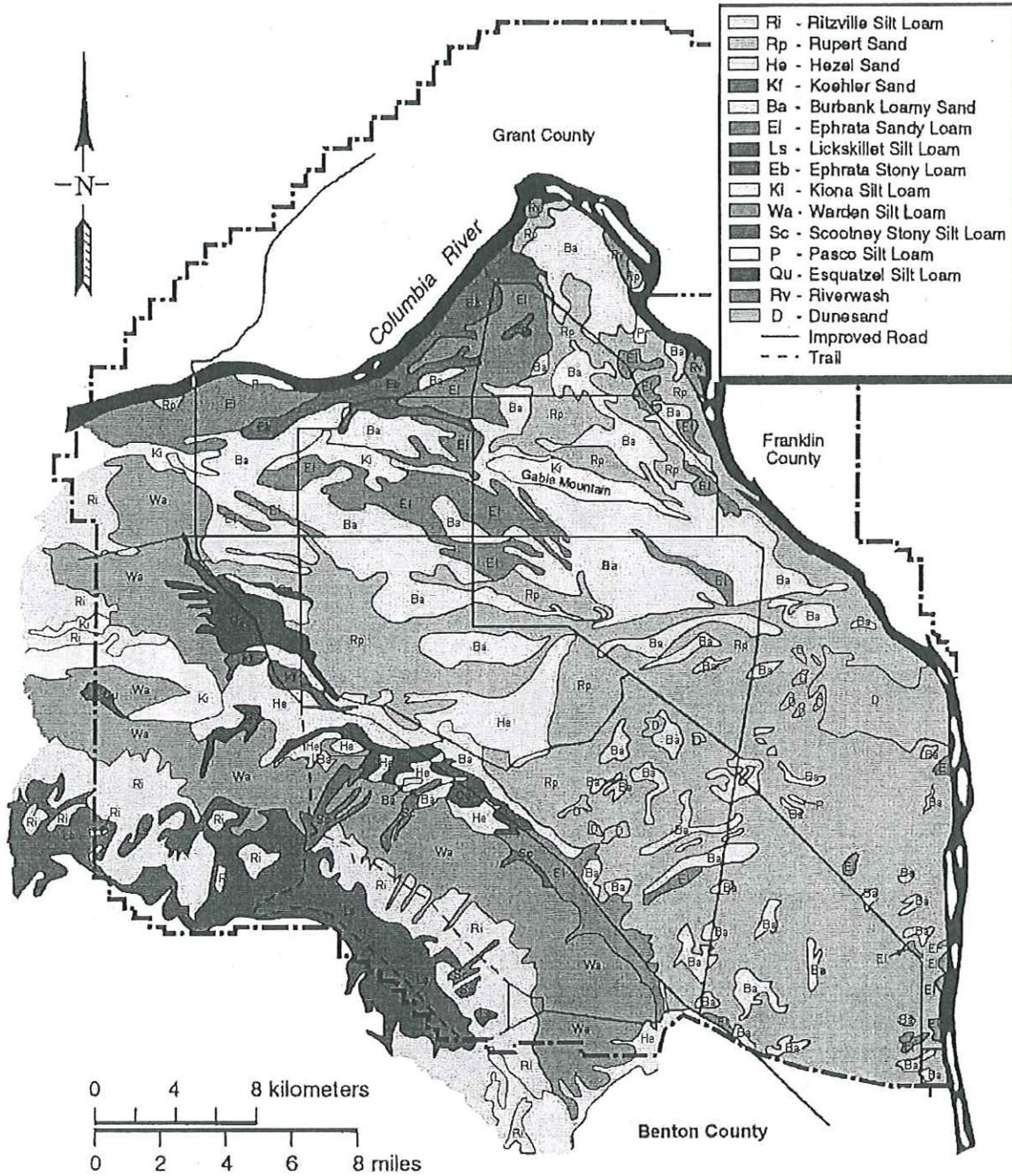
Figure G.3-5. Groundwater Gradient for the Hanford Site (Adapted from PNNL-6415, Rev. 18).



The  
USGS map for the Hanford Site can be accessed through  
<http://rocky2.ess.washington.edu/data/raster/drgclip/index.html>

### G.4. HANFORD SITE SOIL

Figure G.4-1. Soil Map Of The Hanford Site (Adapted from PNNL-6415, Rev. 18).



jp04-4-26

## **G.5. GEOLOGY AND HYDROLOGY SPECIFIC TO THE MAJOR HANFORD SITE AREAS**

This section briefly describes geology and hydrology of the major operational Hanford Site Areas.<sup>1</sup>

### G.5.1. Geology Specific to the Major Hanford Site Areas

This section briefly describes the geology of the major operational areas on the Hanford Site.

#### G.5.1.1. Geology of the 100 Areas

The 100 Areas extend along the Columbia River in the northern portion of the Pasco Basin. With the exception of the 100-B/C Area, the 100 Areas lie on the northern limb of the Wahluke syncline. The 100-B/C Area lies over the axis of the syncline. The top of the basalt in the 100 Areas ranges in elevation from 46 m (150 ft) near the 100-H Area to -64 m (-210 ft) below sea level near the 100-B/C Area. The Ringold Formation and Hanford formation occur throughout this area; the Cold Creek unit may be present near the 100-B/C and 100-K Areas but is not readily distinguished from the Ringold and Hanford sediments.

The Ringold Formation shows a marked west-to-east variation in the 100 Areas. The main channel of the ancestral Columbia River flowed along the front of Umtanum Ridge and through the 100-B/C and 100-K Areas, before turning south to flow along the front of Gable Mountain and/or through Gable Gap. This main channel deposited coarse-grained sand and gravel of the Ringold Formation (Units A, B, C, and E) in the western and southern parts of the Wahluke synclinal valley. Farther to the north and east, however, the Ringold formation sediments gradually become dominated by the lake and river overbank deposits and associated paleosols of the Ringold Formation lower mud unit, with the 100-H Area showing almost none of the gravel sediments.

The Hanford formation in the 100 Areas consists primarily of coarse sand and gravel sediments, with local minor occurrences of the sand-dominated sediments.

#### G.5.1.2. Geology of the 200 Areas

The uppermost basalt flow beneath the 200 Areas is the Elephant Mountain Member of the Saddle Mountains Basalt. Between the 200 East Area and Gable Gap to the north, several basalt flows have been eroded to expose the Umatilla basalt. There is also a suspected window eroded through the Elephant Mountain Member near the northeast corner of the 200 East Area.

Unit A of the Ringold Formation overlies the basalt beneath much of the 200 Areas. The unit is thickest to the north and south of the 200 West Area. Generally, Unit A is a conglomerate with clasts of basalt and other lithologies in a silty sand matrix interbedded with sand and silt layers. The sediments are well compacted and/or cemented in places.

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<sup>1</sup> Source: PNNL-6415, 2007, *Hanford Site National Environmental Policy Act (NEPA) Characterization*, Rev. 18, Pacific Northwest National Laboratory, Richland, Washington.  
[http://www.pnl.gov/main/publications/external/technical\\_reports/PNNL-6415Rev18.pdf](http://www.pnl.gov/main/publications/external/technical_reports/PNNL-6415Rev18.pdf)

The Ringold Formation lower mud unit has had a more complex history in the 200 Areas. The lower mud is eroded or was never deposited from beneath most of the 200 East Area. There is also a poorly defined channel cut through the lower mud unit in the northeastern corner of the 200 West Area. The lower mud unit consists primarily of lake bed silt and clay deposits, with at least one well developed paleosol at the top of the sequence noted in the 200 West Area.

Unit E of the Member of Wooded Island is by far the thickest of the Ringold Formation units present beneath the 200 Areas. It consists of bimodal well-rounded gravel in a sand and silt matrix deposited by major rivers. Erosion by the Columbia River during Cold Creek time and cataclysmic floods through Gable Gap during Hanford formation time has removed Unit E from most of the northeastern part of the 200 East Area.

The Ringold Formation Member of Taylor Flat consists of a sequence of fluvial sands and overbank deposits. The Member of Taylor Flat has been eroded from beneath all of the 200 East Area. Erosional remnants of the Member of Taylor Flat are found beneath parts of the 200 West Area.

The laterally discontinuous Cold Creek unit overlies the tilted and eroded Ringold Formation in the vicinity of the 200 West Area. The lower Cold Creek unit in the 200 West Area is a highly weathered paleosurface that developed on top of the Ringold Formation. The lower Cold Creek unit consists of basaltic to quartzitic gravels, sands, silt, and clay that are cemented with one or more layers of calcium carbonate. Also included in the lower Cold Creek unit are basaltic gravel and calcic fine-grained sediments deposited by local side streams with sources in the nearby basalt ridges.

The upper Cold Creek unit consists of a distinctive silt-rich interval representing wind blown deposits in the 200 West Area. Locally, interbedded layers of fine sand and silt, more characteristic of stream deposits, are found with the wind blown deposits. The silt-dominated deposits can be correlated across most of the 200 West Area.

The Cold Creek unit in the 200 East Area may be represented by the mainstream "pre-Missoula gravels." The exact origin of the sedimentary deposits overlying the Columbia River Basalt Group and underlying the Hanford formation is uncertain and still open to interpretation. Wood et al. (2000) show two Cold Creek unit sediment types beneath some of the 200 East tank farms: fine-grained silt up to 10 m (33 ft) thick and sandy gravel to gravelly sand.

The Hanford formation is the main stratigraphic unit at the surface for both the 200 Areas. The Hanford formation is thickest in the vicinity of the 200 East Area, where it is over 100 m (330 ft) thick. Gravel-dominated sediments make up most of the Hanford formation in the northern part of the 200 East and 200 West Areas and were deposited by high energy water in or immediately adjacent to the main cataclysmic flood channels. The sand-dominated sediments are most common in the central to southern parts of the 200 Areas and were deposited adjacent to the main flood channels during the waning stages of flooding. Rhythmite deposits are primarily found south and west of the 200 Areas.

#### G.5.1.3. Geology of the 300 Area

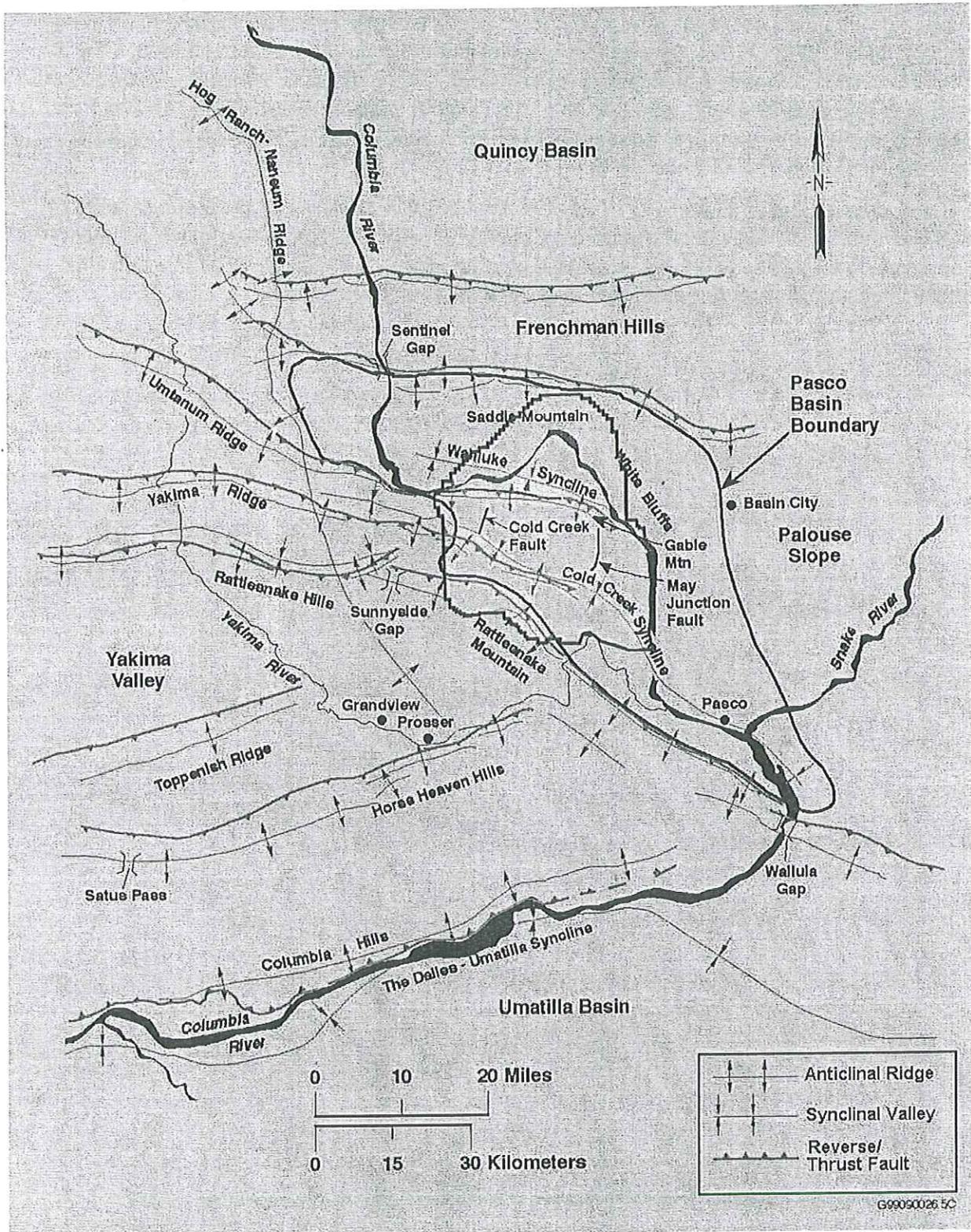
The 300 Area, located in the southeastern portion of the Hanford Site, lies above the gentle eastern extension of the Cold Creek syncline (Figure G.5-1). Over most of the Hanford Site, the uppermost basalt flows belong to the Elephant Mountain Member, but near the 300 Area

younger flows belonging to the Ice Harbor Member are present, causing a relatively high region in the top of the basalt surface.

The Ringold Formation overlies the basalt in the 300 Area. The lower 17 m (56 ft) of Ringold Formation is composed of the lower mud sequence and is laterally extensive in the area. This is overlain by about 10 m (33 ft) of gravel that is correlated to Ringold Formation Units B, C, and E of the Member of Wooded Island (Lindberg and Chou 2001). There is evidence of erosion and formation of one or more channels in the top of the Ringold Formation throughout the 300 Area. The eroded surface of the Ringold Formation is approximately 3 to 9 m (10 to 30 ft) lower in these channels (Lindberg and Chou 2001).

The Hanford formation in the vicinity of the 300 Area is about 15 m (49 ft) thick and consists of both gravel-dominated and sand-dominated sediment. Locally, the gravel-dominated sediment can be divided into pebble to cobble gravel and boulder gravel. The pebble to cobble gravel is the most abundant Hanford formation sediment type beneath the 300 Area.

Figure G.5-1. Physical and Structural Geology of the Hanford Site (Adapted from PNNL-6415, Rev. 18).



### G.5.2. Hydrology Specific to the Major Hanford Site Areas

This section briefly describes the hydrology of major Hanford operational areas.

#### G.5.2.1. 100 Areas Hydrology

The hydrology of the 100 Areas is affected by its location adjacent to the Columbia River. The water table ranges in depth from near 0 m (0 ft) at the river edge to 30 m (107 ft). The groundwater flow direction is generally toward the river. However, during high river stage, the flow direction may reverse immediately adjacent to the river. The unconfined aquifer in the 100 Areas is composed of either the Ringold Unit E gravels or a combination of the Unit E gravels and the Hanford formation. There are two large areas where the water table is within the Ringold Formation (Lindsey 1992), and the Hanford formation is unsaturated. In the 100-H and 100-F Areas, the Ringold Unit E gravels are missing and the Hanford formation lies directly over the fine-grained Ringold lower-mud unit. In most of the 100 Areas, the lower Ringold mud forms an aquitard, and the Ringold gravels below the mud are locally confined.

#### G.5.2.2. 200 Areas Hydrology

In the 200 West Area, the water table occurs almost entirely in the Ringold Unit E gravels, while in the 200 East Area, it occurs primarily in the Hanford formation and in the Ringold Unit A gravels. Along the southern edge of the 200 East Area, the water table is in the Ringold Unit E gravels. The upper Ringold facies were eroded in most of the 200 East Area by the ancestral Columbia River and, in some places, by the Missoula floods that subsequently deposited Hanford gravels and sands on what was left of the Ringold Formation. Because the Hanford formation and possibly the Cold Creek unit sand and gravel deposits are much more permeable than the Ringold gravels, the water table is relatively flat in the 200 East Area, but groundwater flow velocities are higher. On the north side of the 200 East Area, there is evidence of erosional channels that may allow interaquifer flow between the unconfined and uppermost basalt-confined aquifer

The hydrology of the 200 Areas has been strongly influenced by the discharge of large quantities of wastewater to the ground during a 50-year period. The discharges caused elevated groundwater levels across much of the Hanford Site resulting in a large groundwater mound beneath the former U Pond in the 200 West Area and a smaller mound beneath the former B Pond, east of the 200 East Area. Water table changes beneath the 200 West Area have been greatest because of the lower transmissivity of the aquifer in this area (Cole et al. 2001). Discharges of water to the ground have been greatly reduced, and corresponding decreases in the elevation of the water table have been observed.

The decline in part of the 200 West Area groundwater mound has been more than 8 m (26 ft) (Hartman et al. 2007). Water levels are expected to continue to decrease as the unconfined groundwater system reaches equilibrium with the new level of artificial recharge.

#### G.5.2.3. 300 Area Hydrology

The unconfined aquifer water table in the 300 Area is found in both the Hanford formation and the Ringold Formation. It is 0 to 19 m (0 to 62 ft) below ground surface depending on location. Elevation of the Columbia River stage strongly affects the groundwater levels and flow near the river in the 300 Area. Water table contours in the vicinity of the 300 Area are somewhat concentric, showing that there is a groundwater discharge area for the unconfined aquifer system

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in the area of convergence. Groundwater flows from the northwest, west, and even the southwest to discharge into the Columbia River near the 300 Area.

## H. STORMWATER

This attachment is intended to provide additional information or explanation for items in Section H of the application. The numbers below correspond to the subsection numbers from the application.

**H.2.** This section is not applicable because on the Hanford Site, there is no collection area for the stormwater that is subject to this Permit.

**H.6.** This section is not applicable because there is no stormwater drainage/collection areas and disposal areas for the stormwater that is subject to this Permit.

## REFERENCES

- Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).*
- DOE/RL-2008-66, *Hanford Site Groundwater Monitoring For Fiscal Year 2008*, Rev. 0,  
U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- PNNL-6415, 2007, *Hanford Site National Environmental Policy Act (NEPA) Characterization*, Rev. 18,  
Pacific Northwest National Laboratory, Richland, Washington.  
[http://www.pnl.gov/main/publications/external/technical\\_reports/PNNL-6415Rev18.pdf](http://www.pnl.gov/main/publications/external/technical_reports/PNNL-6415Rev18.pdf)
- WAC 173-218, "Underground Injection Control Program," *Washington Administrative Code*, Olympia,  
Washington.