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State Waste Discharge Permit Application

200-E Chemical Drain Field

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

Approved for Public Release

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FOREWORD

As part of the *Hanford Federal Facility Agreement and Consent Order* negotiations (Ecology et al. 1994), the U.S. Department of Energy, Richland Operations Office, the U.S. Environmental Protection Agency, and the Washington State Department of Ecology agreed that liquid effluent discharges to the ground on the Hanford Site which affect groundwater or have the potential to affect groundwater would be subject to permitting under the structure of Chapter 173-216 (or 173-218 where applicable) of the *Washington Administrative Code*, the State Waste Discharge Permit Program. As a result of this decision, the Washington State Department of Ecology and the U.S. Department of Energy, Richland Operations Office entered into *Consent Order No. DE 91NM-177*, (Ecology and DOE-RL 1991).

The *Consent Order No. DE91NM-177* requires a series of permitting activities for liquid effluent discharges. Liquid effluents on the Hanford Site have been classified as Phase I, Phase II, and Miscellaneous Streams. The *Consent Order No. DE91NM-177* establishes milestones for State Waste Discharge Permit application submittals for all Phase I and Phase II streams, as well as the following 11 Miscellaneous Streams as identified in Table 4 of the *Consent Order No. DE91NM-177*.

- 209-E Building Steam Condensate
- 400 Area Sanitary Waste Water
- 200-W Powerhouse Ash Waste Water
- 200-E Powerhouse Ash Waste Water
- 300 Area Powerhouse Ash Waste Water
- 100-N Sanitary Sewer System
- 300 Area Filter Backwash
- 300 Area Sanitary Sewer System
- 234-5Z Steam Condensate/Dry Air Compressor Cooling
- 272-E, 2703-E Buildings Waste Water
- 183-N Filter Backwash Waste Water.

This document presents the State Waste Discharge Permit (SWDP) application for the 200-E Chemical Drain Field. Waste water from the 272-E Building enters the process sewer line directly through a floor drain, while waste water from the 2703-E Building is collected in two floor drains (north and south) that act as sumps and are discharged periodically. The 272-E and 2703-E Buildings constitute the only discharges to the process sewer line and the 200-E Chemical Drain Field.

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GLOSSARY

BMP	Best Management Practice
BOD	biological oxygen demand
CEL	Chemical Engineering Laboratory
CFR	Code of Federal Regulations
COD	chemical oxygen demand
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
gpd	gallons per day
GWQC	Ground Water Quality Criteria
mg/L	milligrams per liter
NPDES	National Pollutant Discharge Elimination System
PNL	Pacific Northwest Laboratory
PSPL	Puget Sound Power and Light Company
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
SIC	Standard Industrial Classification
SWDP	State Waste Discharge Permit
TKN	total Kjeldahl nitrogen
ug/L	micrograms per liter
USGS	United States Geological Survey
WAC	Washington Administrative Code
WHC	Westinghouse Hanford Company

METRIC CONVERSION CHART

INTO METRIC UNITS

OUT OF METRIC UNITS

If you know	Multiply by	To get	If you know	Multiply by	To get
Length			Length		
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			Area		
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			Mass (weight)		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			Volume		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76	cubic meters	cubic meters	1.308	cubic yards
Temperature			Temperature		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit

Source: Lindeburg 1990.

1.0 PERMIT APPLICATION

This section presents the State Waste Discharge Permit (SWDP) application for the 200-E Chemical Drain Field. Waste water from the 272-E Building enters the process sewer line directly through a floor drain, while waste water from the 2703-E Building is collected in two floor drains (north and south) that act as sumps and are discharged periodically. Waste waters from the 272-E and 2703-E Buildings constitute the only discharges to the process sewer line and the 200-E Chemical Drain Field.

1.1 ORGANIZATION

The Washington Administrative Code (WAC) 173-216 SWDP application form for the 200-E Chemical Drain Field is presented in this section. Information required by the SWDP application form is provided on the form when adequate space is available. Otherwise, information is provided in the appendices as noted on the completed form. The appendices follow precisely the format of the SWDP application and are designed to supplement the permit application form. Appendix A contains site location maps referenced in Section A of the permit application form. Appendices B through H correspond to Sections B through H in the permit application form. Within each appendix, those questions which require additional space have been restated and the answer directly follows the question. The questions in the appendices are worded precisely as they are in the application form, and are highlighted in bold capital letters which are underlined.

Many of the questions in the application form require separate responses for each of the contributing buildings included in the permit application. Questions requiring separate responses have been answered in the appendices. The response for the 272-E Building Waste Water is provided first followed by the response for the 2703-E Building Waste Water. This order is consistent throughout the document.

1.2 STATE WASTE DISCHARGE PERMIT APPLICATION FORM

The following pages contain SWDP application for the 200-E Chemical Drain Field.

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STATE WASTE DISCHARGE PERMIT APPLICATION FOR INDUSTRIAL DISCHARGES TO LAND

FOR STATE USE ONLYDate Application
ReceivedDate Fee
PaidApplication/
Permit No.Date Application
Accepted

Facility No.

Temporary Permit
Effective DateTemporary Permit
Expiration Date

This application is for a waste discharge permit as required in accordance with provisions of Chapter 90.48 RCW and Chapter 173-216 WAC. Additional information may be required. Information previously submitted and applicable to this application should be referenced in the appropriate section.

SECTION A. GENERAL INFORMATION

1. Company Name: U.S. Department of Energy, Richland Operations Office
2. Unified Business Identification Number (UBI#): 91-0565159 (DOE tax exempt number)
3. Mailing Address: P.O. Box 550
Street
Richland, Washington 99352
City/State Zip
4. Facility Location: 200 East Area - Hanford Site
Street or Other Description
See Maps in Appendix A.
City/State Zip
5. Person to contact who is familiar with the information contained in this application:
J. E. Rassmussen U.S. DOE, Branch Chief, Regulatory Permits (509) 376-2247
Name Title Telephone
6. Check One: ☐ Permit Renewal ☒ 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.

Signature*6/23/94
DateActing Program Manager, Office of Environmental
Assurance, Permits and Policy

Title

Steven H. Wisness

Printed Name

*Applications must be signed as follows: Corporation, by a principal executive officer of at least the level of vice-president; partnership, by a general partner; sole proprietorship, by the proprietor.

SECTION B. PRODUCT INFORMATION

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

SIC No(s): 9999

Description: See Appendix B, Item 1.

2. Include a production schematic flow diagram of the process and service activities described above on a separate sheet. See Appendix B, Item 2
3. List raw materials and products:

Type	RAW MATERIALS	Quantity
272-E: Piping (carbon steel, aluminum, stainless steel)	Stock of these items varies based on current work orders. Minimal amounts of common stock are stored. The remainder of materials are ordered as needed and stored for short periods of time.	
Bar (carbon steel, aluminum, or stainless steel)		
Plate (carbon steel, aluminum, or stainless steel)		
Angle (carbon steel, aluminum, or stainless steel)		
Channel (carbon steel, aluminum, or stainless steel)		
No raw materials are stored at the 2703 Building.	See Appendix B, Item 3 for more information.	
Type	PRODUCTS	Quantity
272-E: Pump assemblies	2 to 4	
Piping jumpers	100 to 120	
	Assemblies and jumpers are built as needed and are not stockpiled.	
The 2703-E Building is a laboratory facility and does not generate a product.		

SECTION C. PLANT OPERATIONAL CHARACTERISTICS

1. Identify the waste stream for each of the production processes or activities described in Section B.1. Assign each waste stream an identification number--use this number in subsequent questions.

Process	Waste Stream Name	Batch or Continuous Process	Waste Stream ID #
Pipe and rotating equipment fabrication (272-E Building)	272-E Floor Drain	Batch	1
Prototype testing laboratory (2703-E Building)	North Sump	Batch	2
	South Sump	Batch	3

2. On a separate sheet, describe in detail the treatment and disposal of all wastewaters as described above. Include a schematic flow diagram for all wastewater treatment and disposal systems. See Appendix C, Item 2.
3. Indicate treatment provided to each waste stream identified in C.1. above.
No treatment is provided to any of the waste streams identified in Section C, Item 1.

Waste Stream(s) ID #	Treatment	Waste Stream(s) ID #	Treatment
	Air flotation		pH correction
	Centrifuge		Ozonation
	Chemical precipitation		Reverse osmosis
	Chlorination		Screen
	Cyclone		Sedimentation
	Filtration		Septic tank
	Flow equalization		Solvent separation
	Grease or oil separation		Biological treatment, type:
	Grease trap		Rainwater diversion or storage
	Grit removal		Other chemical treatment type:
	Ion exchange		Other physical treatment type:

4. Describe any planned wastewater treatment improvements or changes in wastewater disposal methods and when they will occur (*use additional sheets, if necessary*).

There are no planned waste water treatment improvements or changes in waste water disposal methods in the 272-E and 2703-E Buildings waste waters.

5. If production processes are subject to seasonal variations, provide the following information. List discharge for each waste stream in gallons per day (GPD). The combined value for each month should equal the estimated total monthly flow.

Waste Stream ID #	MONTHS											
	J	F	M	A	M	J	J	A	S	O	N	D
Estimated Total Monthly Flow (GPD)												

The waste streams identified in Section C, Item 1 are not subject to seasonal variations.

6. Shift Information:

a. Number of shifts per work day:	<u>1</u>
b. Number of work days per week:	<u>5</u>
c. Average number of work days per year:	<u>252</u>
d. Maximum number of work days per year:	<u>252</u>
e. Number of employees per shift:	Shift start times
1st <u>See Appendix C.</u>	1st <u>See Appendix C.</u>
2nd <u> </u>	2nd <u> </u>
3rd <u> </u>	3rd <u> </u>

7. List all incidental materials like oil, paint, grease, solvents, soaps, cleaners, that are used or stored on-site. (Use additional sheets, if necessary.)

Material/Quantity Stored See Appendix C. Item 7.

8. Describe any water recycling or material reclaiming processes:

Materials and chemicals used in the laboratory at the 2703-E Building are recycled when possible for reuse. There are no water recycling or material reclaiming processes in the 272-E Building.

9. Does this facility have: See Appendix C, Item 9.

a. Spill Prevention, Control, and Countermeasure Plan
(per 40 CFR 112)?☐ Yes ☒ No

b. Emergency Response Plan (per WAC 173-303-350)?

☒ Yes ☐ No

c. Runoff, spillage, or leak control plan (per WAC 173-216-110(f))?

☐ Yes ☒ No

d. Does your current waste discharge permit require a spill plan?

☐ Yes ☐ No*If yes, submit an update with your application. Not Applicable.*

e. Solid Waste Management Plan?

☒ Yes ☐ No**SECTION D. WATER CONSUMPTION AND WATER LOSS**

1. Water Source(s):

☐ Public System (Specify) _____☐ Private Well☒ Surface Watera. Water Right Permit Number: N/A. The U.S. Government has a reserved water right to utilize water for purposes of Hanford Site activities.

b. Legal Description:

SW 1/4S, SE 1/4S, 2 Section, 13NTWN, 25E R2. a. Indicate total water use: Gallons per day (average) 450Gallons per day (Maximum) 500b. Is water metered? ☐ Yes ☒ No

3. Attach a line drawing showing the water flow through the facility. Indicate source of intake water, operations contributing wastewater to the effluent, and treatment units labeled to correspond to the more detailed descriptions in Item C. Construct a water balance on the line drawing by showing average flows between intakes, operations, treatment units, and outfalls. If a water balance cannot be determined (*e.g., for certain mining activities*), provide a pictorial description of the nature and amount of any sources of water and any collection or treatment measures.

See Appendix D, Item 3.

SECTION E. WASTEWATER INFORMATION

1. Provide measurements for treated wastewater prior to land application for the parameters listed below, unless waived by the permitting authority. All analytical methods used to meet these requirements shall, unless approved otherwise in writing by Ecology, conform to the Guidelines Establishing Test Procedures for the Analysis of Pollutants Contained in 40 CFR Part 136.

Parameter	Concentrations Measured	Analytical Method	Detection Limit
pH	See Appendix E, Item 1.		
Conductivity			
Total Dissolved Solids			
Total Suspended Solids			
BOD (5 day)			
COD			
Ammonia-N			
TKN-N			
Nitrate-N			
Ortho-phosphate-P			
Total-phosphate-P			
Total Oil & Grease			
Calcium			
Magnesium			
Sodium			
Potassium			
Chloride			
Sulfate			
Fluoride			
Cadmium (total)			
Chromium (total)			
Lead (total)			
Mercury			
Selenium (total)			
Silver (total)			
Copper (total)			
Iron (total)			
Manganese (total)			
Zinc (total)			
Barium (total)			
Total Coliform			

2. Wastewater characteristics for toxic pollutants.

The intent of this question is to determine which chemicals are or might be present in the process water or wastewater. For each chemical listed below:

- Use the letter **A** in the Absent column if the chemical is not likely to be present because it is not used in the production process or used on site.
- Use the letter **S** in the Absent column if the chemical may be present because it is used on site, but the chemical is not used in the production process.
- Use the letter **P** in the Present column if the chemical is likely to be present because it is used in the production process, but the effluent has not been tested.
- Use the letter **K** in the Present column if the effluent has been tested and the chemical was found to be present. Attach the analytical results.

Analytical Results
Wastewater Characterization for Toxic Pollutants

Absent / Present	Constituent/CAS No.	Absent / Present	Constituent/CAS No.
<u>A</u> <u> </u>	Acrylamide/79-06-1	<u>A</u> <u> </u>	1,2 Dichloropropane/78-87-5
<u>A</u> <u> </u>	Acrylonitrile/107-13-1	<u>A</u> <u> </u>	1,3 Dichloropropene/542-75-6
<u>A</u> <u> </u>	Aldrin/309-00-2	<u>A</u> <u> </u>	Dichlorvos/62-73-7
<u>A</u> <u> </u>	Aniline/62-53-3	<u>A</u> <u> </u>	Dieldrin/60-57-1
<u>A</u> <u> </u>	Aramite/140-57-8	<u>A</u> <u> </u>	3,3' Dimethoxybenzidine/119-90-4
<u>A</u> <u> </u>	Arsenic/7440-38-2	<u>A</u> <u> </u>	3,3 Dimethylbenzidine/119-93-7
<u>A</u> <u> </u>	Azobenzene/103-33-3	<u>A</u> <u> </u>	1,2 Dimethylhydrazine/540-73-8
<u>A</u> <u> </u>	Benzene/71-43-2	<u>A</u> <u> </u>	2,4 Dinitrotoluene/121-14-2
<u>A</u> <u> </u>	Benzidine/92-87-5	<u>A</u> <u> </u>	2,6 Dinitrotoluene/606-20-2
<u>A</u> <u> </u>	Benzo(a)pyrene/50-32-8	<u>A</u> <u> </u>	1,4 Dioxane/123-91-1
<u>A</u> <u> </u>	Benzotrichloride/98-07-7	<u>A</u> <u> </u>	1,2 Diphenylhydrazine/122-66-7
<u>A</u> <u> </u>	Benzyl chloride/100-44-7	<u>A</u> <u> </u>	Endrin/72-20-8
<u>A</u> <u> </u>	Bis(chloroethyl)ether/111-44-4	<u>A</u> <u> </u>	Epichlorohydrin/106-89-8
<u>A</u> <u> </u>	Bis(chloromethyl)ether/542-88-1	<u>A</u> <u> </u>	Ethyl acrylate/140-88-5
<u> </u> <u>K</u>	Bis(2-ethylhexyl)phthalate/ 117-81-7	<u>A</u> <u> </u>	Ethylene dibromide/106-93-4
<u>A</u> <u> </u>	Bromodichloromethane/75-27-4	<u>A</u> <u> </u>	Ethylene thiourea/96-45-7
<u>A</u> <u> </u>	Bromoform/75-25-2	<u>A</u> <u> </u>	Folpet/133-07-3
<u>A</u> <u> </u>	Carbazole/86-74-8	<u>A</u> <u> </u>	Furmecyclo/60568-05-0
<u>A</u> <u> </u>	Carbon tetrachloride/56-23-5	<u>A</u> <u> </u>	Heptachlor/76-44-8
<u>A</u> <u> </u>	Chlordane/57-74-9	<u>A</u> <u> </u>	Heptachlor epoxide/1024-57-3
<u>A</u> <u> </u>	Chlorodibromomethane/124-48-1	<u>A</u> <u> </u>	Hexachlorobenzene/118-74-1

Absent / Present	Constituent/CAS No.	Absent / Present	Constituent/CAS No.
<u> </u> <u> </u> K	Chloroform/67-66-3	<u> </u> <u> </u> A	Hexachlorocyclohexane (alpha)/ 319-84-6
<u> </u> <u> </u> A	Chlorthalonil/1897-45-6	<u> </u> <u> </u> A	Hexachlorocyclohexane (tech.)/ 608-73-1
<u> </u> <u> </u> A	2,4-D/94-75-7	<u> </u> <u> </u> A	Hexachlorodibenzo-p-dioxin, mix/ 19408-74-3
<u> </u> <u> </u> A	DDT/50-29-3	<u> </u> <u> </u> A	Hydrazine/hydrazine sulfate/ 302-01-2
<u> </u> <u> </u> A	Diallate/2303-16-4	<u> </u> <u> </u> A	Lindane/58-89-9
<u> </u> <u> </u> A	1,2 Dibromoethane/106-93-4	<u> </u> <u> </u> A	2 Methylaniline/100-61-8
<u> </u> <u> </u> A	1,4 Dichlorobenzene/106-46-7	<u> </u> <u> </u> A	2 Methylaniline hydrochloride/ 636-21-5
<u> </u> <u> </u> A	3,3' Dichlorobenzidine/91-94-1	<u> </u> <u> </u> A	4,4' Methylene bis(N,N- dimethyl)aniline/101-61-1
<u> </u> <u> </u> A	1,1 Dichloroethane/75-34-3	<u> </u> <u> </u> K	Methylene chloride (dichloromethane)/75-09-2
<u> </u> <u> </u> A	1,2 Dichloroethane/107-06-2	<u> </u> <u> </u> A	Mirex/2385-85-5
<u> </u> <u> </u> A	Nitrofurazone/59-87-0	<u> </u> <u> </u> A	O-phenylenediamine/106-50-3
<u> </u> <u> </u> A	N-nitrosodiethanolamine/ 1116-54-7	<u> </u> <u> </u> A	Propylene oxide/75-56-9
<u> </u> <u> </u> A	N-nitrosodiethylamine/55-18-5	<u> </u> <u> </u> A	2,3,7,8-Tetrachlorodibenzo-p-dioxin/ 1746-01-6
<u> </u> <u> </u> A	N-nitrosodimethylamine/62-75-9	<u> </u> <u> </u> A	Tetrachloroethylene/127-18-4
<u> </u> <u> </u> A	N-nitrosodiphenylamine/86-30-6	<u> </u> <u> </u> A	2,4 Toluenediamine/95-80-7
<u> </u> <u> </u> A	N-nitroso-di-n-propylamine/ 621-64-7	<u> </u> <u> </u> A	o-Toluidine/95-53-4
<u> </u> <u> </u> A	N-nitrosopyrrolidine/930-55-2	<u> </u> <u> </u> A	Toxaphene/8001-35-2
<u> </u> <u> </u> A	N-nitroso-di-n-butylamin / 924-16-3	<u> </u> <u> </u> A	Trichloroethylene/79-01-6
<u> </u> <u> </u> A	N-nitroso-n-methylethylamine/ 10595-95-6	<u> </u> <u> </u> A	2,4,6-Trichlorophenol/88-06-2
<u> </u> <u> </u> A	PAH/NA	<u> </u> <u> </u> A	Trimethyl phosphate/512-56-1
<u> </u> <u> </u> A	PBBs/NA	<u> </u> <u> </u> A	Vinyl chloride/75-01-4
<u> </u> <u> </u> A	PCBs/1336-36-3		

SECTION F. STORMWATER

1. Do you have a Washington State Storm Water Baseline General Permit? See Appendix F, Item 1. ☐ Yes ☒ No

If yes, please list the permit number here _____

2. Have you applied for a Washington State Storm Water Baseline General Permit. See Appendix F, Item 2. ☐ Yes ☒ No

3. Do you have any storm water quality or quantity data? ☐ Yes ☒ No

Note: If you answered "yes" to questions 1 or 2 above, skip questions 4 through 8.

4. Describe the size of the storm water collection area. See Appendix F, Item 4.

- a. Unpaved Area _____ 0 _____ sq. ft.
b. Paved Area _____ 0 _____ sq. ft.
c. Other Collection Areas (Roofs) _____ 0 _____ sq. ft.

5. Does your facility's storm water discharge to: (check all that apply) See Appendix F, Item 5.

- ☐ Storm sewer systems; name of storm sewer system (operator):
☐ Directly to surface waters or Washington State (e.g., river, lake, creek, estuary, ocean).
☐ Indirectly to surface waters of Washington State (i.e., flows over adjacent properties first).
☐ Directly to ground waters of Washington State: ☐ dry well ☐ drainfield ☐ Other

6. Areas with industrial activities at facility: (check all that apply) See Appendix F, Item 6.

- ☐ 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 _____

7. Material handling/management practices. See Appendix F, Item 7.

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

☐ Solvents	☐ Hazardous Wastes
☐ Scrap Metal	☐ Acids or Alkalies
☐ Petroleum or Petrochemical Products	☐ Paints/Coatings
☐ Plating Products	☐ Woodtreating Products
☐ Pesticides	☐ Other (Please list) _____

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

☐ Oil/Water Separator	☐ Detention Facilities
☐ Containment	☐ Infiltration Basins
☐ Spill Prevention	☐ Operational BMPs
☐ Surface Leachate Collection	☐ Vegetation Management
☐ Overhead Coverage	☐ Other (Please list) _____

8. Attach a map showing storm water drainage/collection areas, disposal areas and discharge points. See Appendix F, Item 8.

SECTION G. OTHER INFORMATION

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

See Appendix G, Item 1

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

See Appendix G, Item 2

3. Have you designated your wastes according to the procedures of Dangerous Waste Regulations, Chapter 173-303WAC?

☒ Yes ☐ No

SECTION H. SITE ASSESSMENT

1. Give the legal description of the land treatment site(s). Give the acreage of each land treatment site(s). Attach a copy of the contract(s) authorizing use of land for treatment.

See Appendix H, Item 1.

2. List all environmental control permits or approvals needed for this project; for example, septic tank permits, sludge application permits, or air emissions permits.

See Appendix H, Item 2.

3. Attach a United States Geological Survey (USGS) a topographic map. Show the following on this map:

See Appendix H, Item 3.

- a. Location and name of internal and adjacent streets
- b. Surface water drainage systems within 1/4 mile of the site
- c. All wells within 1 mile of the site
- d. Chemical and product handling and storage facilities
- e. Infiltration sources, such as drainfields and lagoons within 1/4 mile of the site
- f. Wastewater and cooling water discharge points with waste stream ID numbers (See Section C.1)
- g. Other activities and land uses within 1/4 mile of the site

4. Attach well logs and well I.D.# when available for all wells within 500 feet and any available water quality data.

See Appendix H, Item 4.

5. Describe soils on the site using information from local soil survey reports.
(Submit on separate sheet.)
See Appendix H, Item 5.

6. Describe the regional geology and hydrogeology within one mile of the site.
(Submit on separate sheet.)
See Appendix H, Item 6.

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

See Appendix H, Item 7.

2.0 REFERENCES

- Baker, V. R., B. N. Bjornstad, A. J. Busacca, K. R. Fecht, E. P. Kiver, U. L. Moddy, J. G. Rigby, D. F. Stradling, and A. M. Tallman, 1991, "Quaternary Geology of the Columbia Plateau," *Quaternary Nonglacial Geology: Conterminous U.S.*, R. B. Morrison, Editor, Geology of North America, Geological Society of America, Vol. K-2, Boulder, Colorado.
- DOE, 1988, *Site Characterization Plan, Reference Repository Location, Hanford Site, Washington; Consultation Draft*, DOE-RW-0164, U.S. Department of Energy, Office of Civilian Radioactive Waste Management, Washington, D.C.
- DOE-RL, 1993a, *200 East Groundwater Aggregate Area Management Study Report*, DOE-RL-92-19, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- DOE-RL, 1993b, *Phase I and II Feasibility Study Report for the 300-FF-5 Operable Unit*, DOE/RL-93-22, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- Ecology, EPA, DOE, 1994, *Hanford Federal Facility Agreement and Consent Order*, 2 volumes as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.
- Ecology and DOE-RL, 1991, *Consent Order No. DE 91NM-177*, Washington State Department of Ecology, Olympia, Washington and U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- EPA, 1979, *Methods for the Chemical Analysis of Water and Wastes*, EPA-600/4-79-020, U.S. Environmental Protection Agency, Washington D.C.
- EPA, 1980, *Design Manual, Onsite Wastewater Treatment and Disposal System*, EPA 625/1-80-012, U.S. Environmental Protection Agency, Washington D.C.
- EPA, 1992, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, SW-846, Latest Edition, U.S. Environmental Protection Agency, Washington D.C.
- Fecht, K. R., S. P. Reidel, and A. M. Tallman, 1987, *Paleodrainage of the Columbia River System on the Columbia Plateau of Washington: A Summary*, RHO-BW-SA-318P, Rockwell Hanford Operations, Richland, Washington.

- 1 Gephart, R. E., R. C. Arnett, R. G. Baca, L. S. Leonhart, and F. A. Spane Jr., 1979,
2 *Hydrologic Studies Within the Columbia Plateau, Washington: An Integration of*
3 *Current Knowledge*, RHO-BWI-ST-5, Rockwell Hanford Operations, Richland,
4 Washington.
5
6 Hajek, B. F., 1966, *Soil Survey: Hanford Project in Benton County, Washington*,
7 BNWL-243, Pacific Northwest Laboratory, Richland, Washington.
8
9 Lindeburg, M. R., *PE Engineering Unit Conversions*, Second Ed, 1990, Professional
10 Publications, Inc., Belmont, California.
11
12 Metcalf and Eddy, 1991, *Wastewater Engineering: Treatment, Disposal, and Reuse*, Third
13 Edition. Revised by George Tchobanoglous and Franklin L. Burton, McGraw-Hill
14 Publishing Company, New York, New York.
15
16 PNL, 1989, *Hydrogeology of the 200 Areas Low-Level Burial Grounds - An Interim Report*,
17 PNL-6820, Pacific Northwest Laboratory, Richland, Washington.
18
19 PSPL, 1982, *Skagit/Hanford Nuclear Project, Preliminary Safety Analysis Report*, Vol. 4,
20 App. 20, Amendment 23, Puget Sound Power and Light Company, Bellevue,
21 Washington.
22
23 Reidel, S. P. and K. R. Fecht, 1981, "Wanapum and Saddle Mountains Basalt in the Cold
24 Creek Syncline Area," *Subsurface Geology of the Cold Creek Syncline*,
25 RHO-BWI-ST-14, Rockwell Hanford Operations, Richland, Washington.
26
27 Smith, G. A., B. N. Bjornstad, and K. R. Fecht, 1989, "Neogene Terrestrial
28 Sedimentation on and Adjacent to the Columbia Plateau; Washington, Oregon, and
29 Idaho," *Volcanism and Tectonism in the Columbia River Flood-Basalt Province*,
30 Special Paper 239, S. P. Reidel and P. R. Hooper, editors, Geological Society of
31 America, Boulder, Colorado.
32
33 Tallman, A. M., K. R. Fecht, M. C. Marratt, and G. V. Last, 1979, *Geology of the*
34 *Separations Areas, Hanford Site, South Central Washington*, RHO-ST-23, Rockwell
35 Hanford Operations, Richland, Washington.
36
37 WHC, 1991a, *Geology and Hydrology of the 300 Area and Vicinity, Hanford Site, South-*
38 *Central Washington*, WHC-EP-0500, Westinghouse Hanford Company, Richland,
39 Washington.
40
41 WHC, 1991b, *Geology and Hydrology of the Hanford Site: A Standardized Text for Use in*
42 *Westinghouse Hanford Company Documents and Reports*, WHC-SD-ER-TI-003,
43 Westinghouse Hanford Company, Richland, Washington.

- 1 WHC, 1991c, *Geologic Setting of the 200 West Area: An Update*, WHC-SD-EN-TI-008,
2 Rev. 0, Westinghouse Hanford Company, Richland, Washington.
3
- 4 WHC, 1991d, *Revised Stratigraphy for the Ringold Formation, Hanford Site, South Central*
5 *Washington*, WHC-SD-EN-EE-004, Westinghouse Hanford Company, Richland,
6 Washington.
7
- 8 WHC, 1992a, *Geologic Setting of the 200 East Area: An Update*, WHC-SD-EN-TI-012,
9 Rev. 0, Westinghouse Hanford Company, Richland, Washington.
10
- 11 WHC, 1992b, *Summary of the Geology of the 200-BP-1 Operable Unit*,
12 WHC-SD-EN-TI-037, Rev. 0, Westinghouse Hanford Company, Richland,
13 Washington.
14
- 15 WHC, 1993a, *Characterization Report for the Table 4 Miscellaneous Streams in Consent*
16 *Order No. DE 91NM-177*, WHC-EN-EV-020, Westinghouse Hanford Company,
17 Richland, Washington.
18
- 19 WHC, 1993b, *Hanford Site Stormwater Pollution Prevention Plan*, WHC-SD-EN-EV-021,
20 Rev. 0, Westinghouse Hanford Company, Richland, Washington.
21
- 22 WHC, 1993c, *Sampling and Analysis Plan for Miscellaneous Streams*,
23 WHC-SD-WM-PNL-069, Rev. 0, Westinghouse Hanford Company, Richland,
24 Washington.
25
- 26 WHC, 1994, *Groundwater Map of the Hanford Site*, WHC-EP-0394-7, Westinghouse
27 Hanford Company, Richland, Washington.
28

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APPENDIX A

GENERAL INFORMATION

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Figure A-1. General Hanford Site Map.

Figure A-2. Location of the 200-E Chemical Drain Field.

APPENDIX B

PRODUCT INFORMATION

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1 **SECTION B, ITEM 1**

2
3 **BRIEFLY DESCRIBE ALL MANUFACTURING PROCESSES AND PRODUCTS,**
4 **AND/OR COMMERCIAL ACTIVITIES.**
5

6
7 **INTRODUCTION**
8

9 The 200-E Chemical Drain Field, located in the 200 East Area of the Hanford Site
10 (Figures A-1 and A-2, Appendix A), receives waste water from the 272-E and 2703-E
11 Buildings. Waste water from the 272-E Building floor drain discharges to a process sewer
12 line on the east side of the building which extends north to the 200-E Chemical Drain Field.
13 Waste water from two floor sumps in the 2703-E Building is discharged to the same process
14 sewer line and combines with the effluent from the 272-E Building before reaching the
15 disposal site. The 272-E floor drain and the north and south sumps in the 2703-E Building
16 are the three contributors to the waste water stream discharging to the 200-E Chemical Drain
17 Field. The combined waste water flow varies depending on the activities inside each of the
18 buildings.
19

20 Facility and process descriptions for the 272-E and 2703-E Buildings are given in the
21 following sections. In addition, a description of the disposal site is provided. This
22 information has been summarized from the *Characterization Report for the Table 4*
23 *Miscellaneous Streams in Consent Order DE-91NM-177* (WHC 1993a).
24
25

26 **FACILITY AND PROCESS DESCRIPTIONS**
27

28 **272-E Building**
29

30 The 272-E Building houses a pipe and rotating-equipment fabrication shop. The north
31 end of the building is designated as the pipe fitting area and the south end is where pumps
32 are fabricated and tested. The major activities in this building are hydrotesting of piping
33 jumpers, welding for the fabrication of equipment, and testing of pump assemblies. Water
34 sources to the 272-E Building, major activities inside the building, and effluent streams from
35 the building are shown in Figure B-1. Hydrostatic testing of pipes and testing of pump
36 assemblies are the two processes that discharge waste water to the floor drain. Domestic
37 waste water and steam condensate do not contribute to the waste water referred to in this
38 application.
39

40 Hydrotesting equipment is located in the western-central portion of the building.
41 Hydrotesting is conducted on sections of pipes to ensure pipe integrity under specific
42 pressure conditions. Hoses and clamps that enable the flow to be interrupted are connected
43 to each end of the pipe. Sanitary water is used to flush out the length of pipe and the water

1 is discharged through hoses to the floor drain. After the pipe has been flushed, the clamp on
2 the trailing end is tightened and water is no longer allowed to flow to the floor drain. The
3 water pressure is increased in the pipe for testing purposes. Once the test is completed, the
4 clamp at the trailing end is opened and the water is discharged to the floor drain. Finally, a
5 stream of air is passed through the hose and pipe for drying.

6
7 The pump test pit area is located in the south end of the building. Pump tests are
8 performed in a pit approximately 50 feet deep and 8 feet in diameter. After the test is
9 completed the water is drained to the floor drain.

10
11 In the past welding, the other major activity in the 272-E Building, discharged welder
12 cooling water to the floor drain. The welders now are equipped with radiators to create self-
13 contained cooling. The elimination of welding cooling water was implemented in an effort to
14 minimize the amount of waste water discharged to the floor drain.

15
16 Sanitary water and steam are supplied to the 272-E Building. The building uses steam
17 heat and discharges the steam condensate to a french drain located on the east side of the
18 building. Sanitary water is supplied for hydrotesting activities; pump assembly testing in the
19 pump run-in pit; and for bathrooms, kitchens, and drinking water. A backflow preventer
20 was installed on the sanitary water influent line so that sanitary water flowing into shop
21 regions (to be used for hydrotesting) is prevented from flowing backwards and entering the
22 kitchen or drinking water supplies.

23 24 25 2703-E Building

26
27 The 2703-E Building, also known as the Chemical Engineering Laboratory (CEL),
28 supports a variety of onsite activities. Prototypes of new and existing processes used on the
29 Hanford Site are constructed in the CEL. A majority of floor space in the 2703-E Building
30 is used in the construction of these prototypes. The CEL also tests process equipment, such
31 as pumps for integrity using various fluids as applicable, and creates simulated materials to
32 test mechanical equipment. For example, core material has been fabricated to test core
33 sampling equipment. The simulated materials are made to meet certain specifications, such
34 as hardness and density. A small area of the building containing a laboratory is used to
35 generate these test solutions and simulated materials.

36
37 Water sources to the 2703-E Building, major activities inside the building, and effluent
38 streams from the building are shown in Figure B-2. Waste water from the 2703-E Building
39 is collected in two floor sumps before discharge to the 200-E Chemical Drain Field. Waste
40 water includes floor wash, rinse water from cleaning containers and laboratory ware, cooling
41 water from condensers, steam condensate from two steam boilers, a wet scrubber on the
42 ventilation system, and nonregulated (under WAC 173-303) laboratory waste solutions. In
43 addition, a sink inside the wet laboratory hood drains to the south sump. The wet laboratory

1 hood is used to test small scale prototypes that have been constructed by personnel at the
2 CEL. Domestic waste water and organic and inorganic laboratory waste solutions are not
3 discharged to the 200-E Chemical Drain Field.
4

5 The boilers and condensers are operational only if these are used as part of the
6 apparatus being tested inside the CEL. When in use, the steam condensate is discharged to
7 the sump. The condenser cooling water is discharged directly to the process sewer lines via
8 a vertical pipe situated in the middle of the north sump.
9

10 A wet scrubber is available for cleaning the air that flows through the ventilation
11 system inside the CEL. The scrubber is used, as needed, as determined by the scope of tests
12 defined in approved test plans. When in use, the scrubber water is routed to a collection
13 tank (poly tank) located near the north sump. Based on the test process, the waste is either
14 nonregulated and is discharged to the sump or it is regulated (under WAC 173-303) and
15 placed in waste containers. The scrubber has not operated since 1988.
16

17 Liquid waste from the laboratory inside the CEL also could be discharged to the
18 process sewer lines via the vertical pipe situated in either sump. However, written approval
19 from Westinghouse Hanford Company (WHC) Solid Waste Management is required, stating
20 that the liquid waste is nonregulated. A description of the liquid waste in the container is
21 transmitted to WHC Solid Waste Management. WHC Solid Waste Management determines
22 whether or not the liquid waste is regulated and cites the available options for disposal. If
23 the liquid waste is nonregulated, it is discharged directly to the process sewer line.
24

25 Waste generated at the 2703-E Building that does not discharge to the 200-E Chemical
26 Drain Field includes regulated organic and inorganic waste generated in the laboratory and
27 nonregulated domestic waste water generated from bathrooms, showers, etc. Regulated
28 organic and inorganic waste is collected in satellite waste accumulation areas. When a
29 satellite waste container is full, it is transferred to the 90-day dangerous waste storage pad
30 outside of the 2703-E Building for subsequent transfer to the 616 Nonradioactive Dangerous
31 Waste Storage Facility.
32

33 Sanitary water is supplied to the bathrooms, showers, sinks, hoses, and processes by
34 one sanitary water line that enters the building on the south side.
35

36 Support structures surround the CEL, such as maintenance shops, a 90-day dangerous
37 waste storage pad, and chemical storage buildings. However, none of the support structures
38 discharge waste water to the process sewer line.
39

1 **Disposal Site Description**
2

3 The process sewer line that carries waste from the 272-E and 2703-E Buildings
4 continues north out of the 2703-E Building until the line terminates at a headwall located at
5 the south end of a trench. The trench continues north for 155 feet until it discharges into a
6 seepage basin which is a 155-foot square with side slopes of 2-1/2 feet. The seepage basin,
7 referred to as the 200-E Chemical Drain Field, has not been backfilled or filled with any
8 materials that would facilitate drainage.
9

10 At present, there are no free-standing liquids in the 200-E Chemical Drain Field, and
11 there have not been any for approximately 10 years. There is no sign of natural vegetative
12 growth in the 200-E Chemical Drain Field.
13
14

15 **SECTION B, ITEM 2**
16

17 **INCLUDE A PRODUCTION SCHEMATIC FLOW DIAGRAM OF THE PROCESS**
18 **AND SERVICE ACTIVITIES DESCRIBED ABOVE ON A SEPARATE SHEET.**
19

20 Figures B-1 and B-2 provide flow diagrams of water supplied to each building, the
21 activities performed, and the waste water generated by each building. Refer to Figure C-1
22 for the disposal of the generated waste streams.
23
24

25 **SECTION B, ITEM 3**
26

27 **LIST RAW MATERIALS AND PRODUCTS**
28

29 The 2703-E Building is a laboratory that does not produce specific products. In this
30 context, the laboratory does not have raw materials that normally would be used to produce a
31 product.

Figure B-1. Water Sources, Activities, and Liquid Effluents at the 272-E Building.

Figure B-2. Water Sources, Activities, and Liquid Effluents at the 2703-E Building.

APPENDIX C

PLANT OPERATIONAL CHARACTERISTICS

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CONTENTS

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INCLUDE A SCHEMATIC FLOW DIAGRAM FOR ALL WASTE
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272-EC-16

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C-1 Disposal Routes for Wastes Generated at the 272-E and 2703-E Buildings C-3

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1 **SECTION C, ITEM 2.**

2
3 **ON A SEPARATE SHEET, DESCRIBE IN DETAIL THE TREATMENT AND**
4 **DISPOSAL OF ALL WASTE WATERS AS DESCRIBED ABOVE. INCLUDE A**
5 **SCHEMATIC FLOW DIAGRAM FOR ALL WASTE WATER TREATMENT AND**
6 **DISPOSAL SYSTEMS.**
7

8
9 **Treatment and Disposal of Waste Water in the 272-E Building**

10
11 There is no treatment of the 272-E Building waste water before discharge to the floor
12 drain and disposal in the 200-E Chemical Drain Field. Figure C-1 provides a schematic flow
13 diagram of the waste water generated and its disposal route. The disposal of waste water
14 from the 272-E Building is discussed in the following paragraphs.

15
16 The 272-E Building floor drain is connected to a process sewer line that leads to the
17 200-E Chemical Drain Field. Waste water from the 272-E Building, identified as waste
18 stream ID #1, is deposited in the 200-E Chemical Drain Field.

19
20 Hydrotesting activities and pump assembly testing activities, as discussed in Section B
21 of this permit application, are conducted using sanitary water. After testing has been
22 performed, the water is discharged directly to the floor drain.

23
24
25 **Treatment and Disposal of Waste Water in the 2703-E Building**

26
27 The 2703-E Building waste water is not treated before discharging to the process sewer
28 line and being disposed of in the 200-E Chemical Drain Field. Figure C-1 provides a
29 schematic flow diagram of the waste water disposal systems from the 2703-E Building. The
30 disposal of waste water from the 2703-E Building is discussed in the following paragraphs.

31
32 With the exception of the condenser cooling water and nonregulated laboratory waste,
33 each of the 2703-E Building wastes shown in Figure C-1 that discharge to the process sewer
34 line is collected in one of two floor trenches that act as sumps. These trenches are the north
35 and south sumps. Approximately once a week, the waste water is tested for pH and
36 occasionally conductivity. If these measurements fall within acceptable limits
37 ($2 < \text{pH} < 12$, conductivity < 500 micromhos), the sumps are discharged through the
38 process sewer line to the 200-E Chemical Drain Field. After discharge, the sumps are
39 vacuumed to remove any remaining grit particles. If the conductivity and/or pH
40 measurements do not fall within acceptable limits, the waste water is transferred to waste
41 containers and is handled in accordance with direction from WHC Solid Waste Management.

1 Condenser cooling water and nonregulated laboratory waste, as described in Appendix
2 B, are discharged through one of two open pipes that extend vertically from the center of the
3 sumps. The pipe heights are greater than the height of the sumps so that waste water
4 contained in the sumps cannot enter the process sewer line through the pipes unless valves at
5 the base of the pipes are opened. The vertical pipes discharge directly to the process sewer
6 line. The waste water collected in the north sump is identified as ID #2 and the waste water
7 collected in the south sump is identified as ID #3. Additional information on the waste water
8 streams is provided in the following paragraphs.

9
10 The 2703-E Building floors are washed approximately once a week with sanitary
11 water. The floor of the building is slightly sloped so that rinse water collects in the north
12 and south floor sumps.

13
14 The laboratory sink is used for washing and rinsing laboratory ware. Sanitary water is
15 supplied to the sink and the sink drain outlets into the building's south sump.

16
17 Condensers are occasionally used in prototypes of processes being tested inside the
18 building. When condensers are operating, the cooling water is diverted directly to the
19 process sewer line via a vertical pipe situated in the middle of the north sump. Occasionally,
20 an apparatus with a condenser is constructed and tested inside a hood. In this case, the
21 condenser cooling water is discharged through a hose to the hood sink. The hood sink drains
22 to the south sump.

23
24 Boilers also could be used to provide steam for heating coils in prototypes of processes
25 being tested. The steam condensate generated is discharged to the north sump.

26
27 The wet scrubber operates as required on the hood and vessel ventilation system to
28 clean the air of particulates before emission to the atmosphere. The stream of water used by
29 the scrubber is diverted to a collection tank (poly tank) located next to the north sump. The
30 poly tank contents are either discharged to the sump or put into waste containers following
31 either a formal waste designation or a determination of suitability for discharge to the sumps
32 based on process knowledge. If a formal waste designation determines that the scrubber
33 stream is regulated, the waste in the collection tank is transferred to the 2703-E 90-day
34 dangerous waste storage pad and subsequently transferred to the 616 Nonradioactive
35 Dangerous Waste Storage Facility. There has been no need to scrub the ventilation stream
36 emanating from prototype tests in recent years. The scrubber is not in use and has not
37 operated since 1988.

Figure C-1. Disposal Routes for Wastes Generated at the 272-E and 2703-E Buildings.

SECTION C, ITEM 6

SHIFT INFORMATION:

INTRODUCTION

Shift information is slightly different for the 272-E Building than for the 2703-E Building. Therefore, the shift information for each building is provided in the following:

272-E Personnel

Number of employees per shift:

Shift start times

1st	23
2nd	NA
3rd	NA

1st	7:30 a.m.
2nd	NA
3rd	NA

2703-E Personnel

Number of employees per shift:

Shift start times

1st	18
2nd	NA
3rd	NA

1st	7:00 a.m.
2nd	NA
3rd	NA

1 **SECTION C, ITEM 7**

2
3 **LIST ALL INCIDENTAL MATERIALS LIKE OIL, PAINT, GREASE, SOLVENTS,**
4 **SOAPS, CLEANERS, THAT ARE USED OR STORED ON SITE.**
5
6

7 The 272-E Building stores all incidental materials in five flammable material storage
8 cabinets located inside the facility. Table C-1 provides a summary of all incidental materials
9 and quantities stored in these 5 cabinets. The information summarized is current as of
10 February, 1994. However, the 272-E Building incidental materials will vary over the course
11 of a year.
12

13 The 2703-E Building stores chemicals in cabinets and on shelving inside the building
14 and in a conex box located north of the building. The conex box is a pre-engineered, semi-
15 permanent metal storage container with wire shelving for chemical storage. There are no
16 secondary containment structures or berms, and there is no floor drain. However, the
17 chemicals stored in the conex box are in solid form and can be easily cleaned up in case of a
18 spill. A summary of selected chemicals and other incidental materials and quantities stored
19 in the 2703-E Building and conex box are given in Table C-2.
20

21 The information provided in these tables is based on a February 1994 assessment. The
22 2703-E Building is an experimental laboratory and the chemical inventory could vary slightly
23 depending on the chemical needs of the activities being performed. The chemical inventory
24 is updated as needed and a database containing the inventory is updated monthly.

Table C-1. Summary of Incidental Materials at the 272-E Building.
(Sheet 1 of 1)

PRODUCT	QUANTITY
Adhesive	5.0 gallons
Adhesive (solid)	2.1 pounds
Air freshener	< 5 gallons
Alcohol	7.7 gallons
Cleaner/degreaser	< 5 gallons
Cutting fluid	8.4 gallons
Enamel	< 5 gallons
Finish	< 5 gallons
Flux remover	< 5 gallons
Industrial coating	< 5 gallons
Ink	< 5 gallons
Lubricant	< 5 gallons
Lubricant (solid)	31 pounds
Oil	< 5 gallons
Paint	< 5 gallons
Pesticide	< 5 gallons
Primer	< 5 gallons
Sealant	< 5 gallons
Sealant (solid)	5 pounds
Solvent	< 5 gallons
Thinner	5 gallons
Varnish	< 5 gallons

**Table C-2. Summary of Selected Chemicals and Other Incidental Materials
at the 2703-E Building and the Conex Box.
(Sheet 1 of 9)**

CHEMICALS / MATERIALS	QUANTITY
2 TBP/1 CMPO ¹	< 5 gallons
2-(2-methoxyethoxy) ethanol	< 5 gallons
2-butanone	< 5 gallons
4-methyl-2-pentanone	< 5 gallons
Acetone	< 5 gallons
Air freshener	< 5 gallons
Alumina polishing powder	< 1 pounds
Aluminum chloride, anhydrous	3.3 pounds
Aluminum nitrate nonahydrate	25.2 pounds
Aluminum oxide	< 1 pound
Aluminum silicate hydroxide	200 pounds
Aluminum sulfate	< 1 pound
Ammonium carbonate	16.5 pounds
Ammonium chloride	< 1 pound
Ammonium hexafluorosilicate	20.5 pounds
Ammonium hydroxide	8 pounds
Ammonium molybdate	1.2 pounds
Ammonium nitrate	1 pound
Ammonium nitrate solution	8 gallons
Ammonium sulfate anhydrous	249 pounds
Amyl acetate	< 5 pounds
Aquafix ²	< 5 pounds
Barium chloride	5.1 pounds
Barium nitrate	7.0 pounds

**Table C-2. Summary of Selected Chemicals and Other Incidental Materials
at the 2703-E Building and the Conex Box.
(Sheet 2 of 9)**

CHEMICALS / MATERIALS	QUANTITY
Barium sulfate	20 pounds
Bentonite	150 pounds
Bismuth nitrate	15.2 pounds
Boric acid	52 pounds
Boron trioxide	35 pounds
Calcium carbonate	5 pounds
Calcium chloride	246 pounds
Calcium fluoride	5 pounds
Calcium hypochlorite	4.8 pounds
Calcium nitrate	18.2 pounds
Calcium sulfate dihydrate	2.2 pounds
Cement	100 pounds
Ceric ammonium nitrate	2.6 pounds
Ceric oxide	11 pounds
Ceric sulfate	1 pound
Cerium dioxide	1.5 pounds
Cerous nitrate	46.7 pounds
Cesium carbonate	1.5 pounds
Cesium chloride	11 pounds
Cesium nitrate	31 pounds
Charcoal lighter fluid	< 5 gallons
Chloroform	4.4 pounds
Chromic sesquioxide	5 pounds
Chromium nitrate	23.5 pounds

**Table C-2. Summary of Selected Chemicals and Other Incidental Materials
at the 2703-E Building and the Conex Box.
(Sheet 3 of 9)**

CHEMICALS / MATERIALS	QUANTITY
Citric acid	5.7 pounds
Cleaner/degreaser	135 pounds
Cleaner/degreaser	< 5 gallons
CMPO ³	4 pounds
Cobalt(ous) nitrate	< 1 pound
Copper (ii) carbonate, basic	1.1 pounds
Copper (ii) nitrate, hemipentahydrate	13.2 pounds
Copper (ii) sulfate, anhydrous	5.5 pounds
Cupric carbonate	2.0 pounds
Cupric nitrate n-hydrate	< 1 pound
Cupric sulfate	2.4 pounds
Cyanex 272 Extract ⁴	< 5 gallons
Cyanex in n-dodecane ⁵	< 5 gallons
Delimer powder	50 pounds
Dichloromethane (methylene chloride)	< 5 gallons
Dodecane, 99 percent	6.2 gallons
Duolite CS-100 ⁶	141 pounds
EDTA ⁷	17.3 pounds
Ethylene glycol	13.2 gallons
Ferric chloride	< 1 pound
Ferric nitrate	98 pounds
Ferric nitrate nanohydrate	14.1 pounds
Ferric oxide	34.2 pounds
Ferric sulfate	350 pounds

**Table C-2. Summary of Selected Chemicals and Other Incidental Materials
at the 2703-E Building and the Conex Box.
(Sheet 4 of 9)**

CHEMICALS / MATERIALS	QUANTITY
Ferrosoferric sulfate	< 5 gallons
Ferrous ammonium sulfate	7.9 pounds
Ferrous sulfate heptahydrate	11.0 pounds
Fluorescein disodium salt	< 1 pound
Glycerine	< 5 gallons
Glycerol	15.1 gallons
Glycolic acid	< 5 gallons
HEDPA ⁸ , .1M	< 5 gallons
HEDTA ⁹	8.6 pounds
Hydrochloric acid, 38 percent	11 pounds
Hydrofluoric acid, 48 percent	9 pounds
Hydrofluorosilicic acid, 30 percent	< 5 gallons
Hydrogen peroxide, 50 percent	4.5 gallons
Hydrogen peroxide, 30 percent	< 5 gallons
Isopropyl alcohol	< 5 gallons
Lanthanum nitrate	3.9 pounds
Lead nitrate	2.1 pounds
Lime (calcium oxide)	100 pounds
Limestone (raw material)	80 pounds
Liquified petroleum	< 5 gallons
Lithium carbonate	1 pound
Lithium chloride	< 1 pound
Lithium hydroxide	17 pounds
Magnesium dioxide	50 pounds

**Table C-2. Summary of Selected Chemicals and Other Incidental Materials
at the 2703-E Building and the Conex Box.
(Sheet 5 of 9)**

CHEMICALS / MATERIALS	QUANTITY
Magnesium nitrate, 6-hydrate	97.1 pounds
Magnesium oxide	2.6 pounds
Magnesium powder	1.1 pounds
Magnesium sulfate anhydrous	< 1 pound
Manganese dioxide	15 pounds
Manganese(ous) nitrate, 50 percent solution	33.1 pounds
Methanol	< 5 gallons
Methoxy triglycol	< 1 pound
Methylene blue	< 1 pound
Methylene chloride	< 5 gallons
Molybdenum (VI) oxide	1.5 pounds
Molybdic acid	1 pound
N,N-dimethyl-p-toluidine	< 5 gallons
N-butyl alcohol	< 5 gallons
N-hexane	5.3 gallons
N-nitrosodimethylamine/trichloroethane	< 5 gallons
N-tridecane, 99 percent	< 5 gallons
Neodymium nitrate	< 1 pound
Nickel (II) nitrate	< 1 pound
Nickel sulfate	6.4 pounds
Nitric acid, .2 M	< 5 gallons
Nitric acid, 70 percent	84 pounds
Normal paraffin hydrocarbon (NPH)	18 gallons
NPH from silica gel column	< 5 gallons

**Table C-2. Summary of Selected Chemicals and Other Incidental Materials
at the 2703-E Building and the Conex Box.
(Sheet 6 of 9)**

CHEMICALS / MATERIALS	QUANTITY
Oil	6 gallons
Oxalic acid	11 pounds
Paint and epoxy remover	< 5 gallons
Phenol red, .1 percent	< 5 gallons
Phenolphthalein	< 1 pound
Phosphoric acid, 85 percent	8 pounds
Potassium bromate	21 pounds
Potassium bromide	1 pounds
Potassium carbonate	68.5 pounds
Potassium chloride	3.0 pounds
Potassium fluoride	6.8 pounds
Potassium fluoride anhydrous	< 1 pound
Potassium hydroxide	40.4 pounds
Potassium iodate	1.1 pounds
Potassium nitrate	2.8 pounds
Potassium permanganate	1.5 pounds
Potassium phosphate, dibasic	24 pounds
Potassium sulfate	4.5 pounds
Primer	< 5 gallons
Propylene glycol industrial	55 gallons
Rare earth nitrate	55.5 gallons
Rare earth nitrate	< 1 pounds
Rare earth nitrate, 25 percent solution	< 5 gallons
Red liquid food color	< 5 gallons

**Table C-2. Summary of Selected Chemicals and Other Incidental Materials
at the 2703-E Building and the Conex Box.
(Sheet 7 of 9)**

CHEMICALS / MATERIALS	QUANTITY
Rubidium nitrate	< 1 pound
Ruthenium trichloride	< 1 pound
Silica, 30 percent in H ₂ O	28.6 pounds
Silicon dioxide	47 pounds
Silver nitrate	30 pounds
Sodium acetate	2.2 pounds
Sodium aluminate	< 1 pound
Sodium aluminate (solution)	14 gallons
Sodium aluminate (solid)	170 pounds
Sodium bicarbonate	3.1 pounds
Sodium carbonate	276.7 pounds
Sodium chloride	66 pounds
Sodium chromate	< 1 pound
Sodium dichromate	10.3 pounds
Sodium ferrocyanide	7.6 pounds
Sodium fluoride	16.7 pounds
Sodium fluosilicate	< 1 pound
Sodium formate	1.1 pounds
Sodium hydroxide	20.5 pounds
Sodium hydroxide, 50 percent	< 5 gallons
Sodium hydroxide, 5M	5 gallons
Sodium metabisulfite	10.5 pounds
Sodium metasilicate	33.1 pounds
Sodium nitrate	176.1 pounds

**Table C-2. Summary of Selected Chemicals and Other Incidental Materials
at the 2703-E Building and the Conex Box.
(Sheet 8 of 9)**

CHEMICALS / MATERIALS	QUANTITY
Sodium nitrite	97.4 pounds
Sodium orthosilicate	2.2 pounds
Sodium phosphate dibasic	30 pounds
Sodium phosphate monobasic	12.8 pounds
Sodium phosphate tribasic	14 pounds
Sodium silicate	< 5 gallons
Sodium sulfate	87.5 pounds
Sodium sulfide, 98.5 percent (assay)	1.1 pounds
Sodium sulfide, nonahydrate	1.3 pounds
Sodium sulfite	3.2 pounds
Sodium tetraborate decahydrate	6.4 pounds
Stannous chloride	1.8 pounds
Strontium fluoride	5.7 pounds
Strontium nitrate	99 pounds
Sucrose	11.1 pounds
Sulfamic acid	4.4 pounds
Sulfur	51 pounds
Sulfuric acid, 95 percent	81 pounds
Thinner-lacquer	< 5 gallons
Titanium dioxide	31 pounds
Toluene	< 5 gallons
Tributyl phosphate	49 gallons
Tridodecylamine	1.7 pounds
Ultrigel II ultrasonic couplant ¹⁰	< 5 gallons

**Table C-2. Summary of Selected Chemicals and Other Incidental Materials
at the 2703-E Building and the Conex Box.
(Sheet 9 of 9)**

CHEMICALS / MATERIALS	QUANTITY
Urea	94 pounds
Vanadium (V) oxide	< 1 pound
Xylene	< 5 gallons
Zinc chloride	5.2 pounds
Zinc nitrate	13.2 pounds
Zinc oxide	50 pounds
Zirconium (IV) phosphate	< 1 pound
Zirconium dinitrate oxide	6.2 pounds
Zirconium fluoride	< 1 pound
Zirconium nitrate	< 1 pound
Zirconium oxide	14.0 pounds
Zirconium sulfate	4.6 pounds
Zirconyl nitrate	< 1 pound
Zirconyl nitrate hydrate	3.3 pounds

- 1
- 2 1 2 parts Tributyl Phosphate, 1 part Octy(Phenyl) -N,N-Diisobutyl -
- 3 carbamoylmethylphosphine Oxide
- 4 2 Aquafix is a trademark for Aquaair Environmental, Inc.
- 5 3 Octy(Phenyl) -N,N-Diisobutyl - Carbamoylmethylphosphine Oxide
- 6 4 Cyanex 272 Extract is a trademark of American Cyanamid Company.
- 7 5 Cyanex in n-dodecane is a trademark of the Humphrey Chemical Company.
- 8 6 Duolite CS-100 is a trademark of the Rohm and Haas Company.
- 9 7 Ethylenediamine tetraacetic acid.
- 10 8 1-hydroxyethane-1, 1-diphosphonic acid.
- 11 9 Hydroxyethylethylene diaminetriacetic acid.
- 12 10 Ultragel II is a trademark of the Echo Ultrasound, Inc.
- 13

1 **SECTION C, ITEM 9**

2

3 **Answers to items a through e are the same for both the 272-E and 2703-E Buildings.**

4 **However, the 272-E and 2703-E Buildings each have a separate Emergency Response Plan.**

APPENDIX D

WATER CONSUMPTION AND WATER LOSS

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CONTENTS

SECTION D, ITEM 3

ATTACH A LINE DRAWING SHOWING THE WATER FLOW THROUGH THE FACILITY. INDICATE SOURCE OF INTAKE WATER, OPERATIONS CONTRIBUTING WASTE WATER TO THE EFFLUENT, AND TREATMENT UNITS LABELED TO CORRESPOND TO THE MORE DETAILED DESCRIPTIONS IN ITEM C. CONSTRUCT A WATER BALANCE ON THE LINE DRAWING BY SHOWING AVERAGE FLOWS BETWEEN INTAKES, OPERATIONS, TREATMENT UNITS, AND OUTFALLS. IF A WATER BALANCE CANNOT BE DETERMINED (*E.G., FOR CERTAIN MINING ACTIVITIES*), PROVIDE A PICTORIAL DESCRIPTION OF THE NATURE AND AMOUNT OF ANY SOURCES OF WATER AND ANY COLLECTION OR TREATMENT MEASURES. D-1

FIGURE

D-1 Water Flow Diagram for the 272-E and 2703-E Buildings. D-3

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1 SECTION D, ITEM 3

2
3 **ATTACH A LINE DRAWING SHOWING THE WATER FLOW THROUGH THE**
4 **FACILITY. INDICATE SOURCE OF INTAKE WATER, OPERATIONS**
5 **CONTRIBUTING WASTE WATER TO THE EFFLUENT, AND TREATMENT UNITS**
6 **LABELED TO CORRESPOND TO THE MORE DETAILED DESCRIPTIONS IN**
7 **ITEM C. CONSTRUCT A WATER BALANCE ON THE LINE DRAWING BY**
8 **SHOWING AVERAGE FLOWS BETWEEN INTAKES, OPERATIONS, TREATMENT**
9 **UNITS, AND OUTFALLS. IF A WATER BALANCE CANNOT BE DETERMINED**
10 **(E.G., FOR CERTAIN MINING ACTIVITIES), PROVIDE A PICTORIAL**
11 **DESCRIPTION OF THE NATURE AND AMOUNT OF ANY SOURCES OF WATER**
12 **AND ANY COLLECTION OR TREATMENT MEASURES.**

13
14 Figure D-1 is a line drawing showing the water flow through the 272-E and 2703-E
15 Buildings. Sanitary water from the 283-E Water Treatment Facility is supplied to both
16 buildings for use in the laboratory area of the 2703-E Building, the shop area of the 272-E
17 Building, and the bathrooms and kitchens of both buildings. The figure shows the waste
18 water generated in each building and the corresponding disposal route to either the 200-E
19 Chemical Drain Field, a domestic waste water discharge system, or other waste accumulation
20 areas. Flow measurements for the effluent discharged to the 200-E Chemical Drain Field are
21 indicated on the figure in gallons per minute.

22
23 Testing activities in the 272-E Building are performed in batches and create an
24 intermittent flow of waste water to the 200-E Chemical Drain Field. The 272-E Building
25 discharges an average of 0.113 gallons per minute to the 200-E Chemical Drain Field. This
26 volume was based on averaging estimates of water used during hydrotesting and pump testing
27 activities.

28
29 The pipes tested during hydrotesting activities range from 1/2 inch to 3 inches in
30 diameter and the testing process for each pipe uses anywhere from 20 to 200 gallons of
31 sanitary water. Estimates on the amount of waste water generated vary with a maximum
32 average of 50 gallons per hydrotest. Tests are conducted six to seven times per month.
33 Based on seven hydrotests performed per month using 50 gallons per test, 4,200 gallons of
34 waste water are generated per year.

35
36 During pump tests, the pump run-in pit is filled approximately 1/2 to 3/4 full with
37 sanitary water. A pump test is conducted every three to four months. Based on the pit
38 being filled to 3/4 capacity and four pump tests being conducted four times a year,
39 approximately 55,200 gallons of water per year are discharged to the process sewer line
40 through the floor drains from the testing of pump assemblies.

1 The 2703-E Building discharges 0.202 gallons per minute to the 200-E Chemical Drain
2 Field. This volume includes waste discharged from the sumps and nonregulated waste
3 discharged via the sumps to the process sewer lines. The discharge volume from the 2703-E
4 Building is based on an average of the total amount of waste water discharged annually from
5 1991 to 1993. The number of gallons discharged per year for the years 1991, 1992, and
6 1993 were 12, 550 gallons, 41,015 gallons, and 52,935 gallons, respectively. The average
7 flow rate in gallons per year was converted to gallons per minute (assuming 365 days per
8 year, 24 hours per day, and 60 minutes per hour).

Figure D-1. Water Flow Diagram for the 272-E and 2703-E Buildings.

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APPENDIX E

WASTE WATER INFORMATION

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CONTENTS

SECTION E, ITEM 1
PROVIDE MEASUREMENTS FOR TREATED WASTE WATER
PRIOR TO LAND APPLICATION FOR THE PARAMETERS LISTED
BELOW, UNLESS WAIVED BY THE PERMITTING AUTHORITY.
ALL ANALYTICAL METHODS USED TO MEET THESE
REQUIREMENTS SHALL, UNLESS APPROVED OTHERWISE IN
WRITING BY ECOLOGY, CONFORM TO THE GUIDELINES
ESTABLISHING TEST PROCEDURES FOR THE ANALYSIS OF
POLLUTANTS CONTAINED IN 40 CFR PART 136. E-1

TABLES

E-1 2703-E Building Waste Water Effluent Data E-2
E-2 272-E Building Waste Water Effluent Data E-6

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1 SECTION E, ITEM 1

2
3 **PROVIDE MEASUREMENTS FOR TREATED WASTE WATER PRIOR TO LAND**
4 **APPLICATION FOR THE PARAMETERS LISTED BELOW. UNLESS WAIVED BY**
5 **THE PERMITTING AUTHORITY. ALL ANALYTICAL METHODS USED TO**
6 **MEET THESE REQUIREMENTS SHALL, UNLESS APPROVED OTHERWISE IN**
7 **WRITING BY ECOLOGY, CONFORM TO THE GUIDELINES ESTABLISHING TEST**
8 **PROCEDURES FOR THE ANALYSIS OF POLLUTANTS CONTAINED IN 40 CFR**
9 **PART 136.**

10
11 The samples and resultant data presented below were obtained in accordance with a
12 sampling and analysis plan (WHC 1993c). Data has been provided for the waste water from
13 two different buildings since both are disposed of in the 200-E Chemical Drain Field. The
14 data from the two buildings were not combined because of the intermittent and variable
15 nature of the flow. The data for the 272-E Building waste water was obtained from a
16 maintenance hole (MHP1E) which accesses the chemical sewer line just outside of the
17 building. The data for the 2703-E Building waste water was obtained from the floor sump
18 just prior to the regularly scheduled weekly draining. The data confirm the available process
19 knowledge that indicate the constituent concentrations are generally consistent with typical
20 waste water streams as discussed in Metcalf and Eddy (1991) and the EPA design manual
21 (EPA 1980).

22
23 Only two constituents, Bis (2-ethylhexyl) phthalate and iron, were found in excess of
24 the WAC-173-200 Ground Water Quality Criteria (GWQC). The phthalate compound was
25 found in the 272-E Building waste water sample at a level of 20 ug/L and in the 2703-E
26 Building waste water sample at a level of 110 ug/L.

27
28 Phthalates are common in plastics, oils and greases, so it is possible that the compound
29 is in the waste water. However, because of their ubiquitous nature, the phthalates may have
30 been introduced inadvertently by the samplers and/or the laboratory.

Table E-1. 2703-E Building Waste Water Effluent Data.
Sheet 1 of 4

EFFLUENT ^a						
CONSTITUENT	n	MEAN CONC.	S.D.	UNITS	METHOD ^b	D.L. ^c
Waste Water Parameters ^d						
Conductivity	2	349	2	umho/cm	120.1	6
pH	2	7.2 (J2)	0.1	pH	9040	0.1
TDS	2	208	3	mg/L	160.1	5
TSS	2	17.5	2.1	mg/L	160.2	5
Total Phosphorous	2	0.13 (J2)	0.02	mg/L	365.2	0.05
Total Oil and Grease	2	5 (U)	N/A	mg/L	9070	5
Metals						
Ca	2	22300	N/A	ug/L	6010	10 (P)
Mg	2	6565	21	ug/L	6010	30 (P)
Na	2	28550	495	ug/L	6010	29 (P)
K	2	12500	141	ug/L	6010	N/A
Cd	2	1.7 (U2)	N/A	ug/L	6010	1.7
Cr	2	9.2 (B1)	2.0	ug/L	6010	2.5
Pb	2	11.2 (B,U)	0.1	ug/L	6010	11.1
Hg	2	0.10 (U2)	N/A	ug/L	7470	0.10
Se	2	32.8 (U2)	N/A	ug/L	6010	33
Ag	2	2.7 (B2)	0.1	ug/L	6010	7 (P)
Cu	2	153	N/A	ug/L	6010	6 (P)
Fe	2	548	71	ug/L	6010	7 (P)
Mn	2	40.2	0.6	ug/L	6010	2 (P)
Zn	2	252.5	2.1	ug/L	6010	2 (P)
Ba	2	41.3 (B2)	N/A	ug/L	6010	2 (P)
As	2	15.6 (U2)	N/A	ug/L	6010	15.6

Table E-1. 2703-E Building Waste Water Effluent Data.
Sheet 2 of 4

EFFLUENT *						
CONSTITUENT	n	MEAN CONC.	S.D.	UNITS	METHOD *	D.L. *
Anions						
Fl ⁻	2	2.6	0.1	mg/L	300.0	0.1-0.2
Cl ⁻	2	14.5	0.9	mg/L	300.0	0.2-0.4
SO ₄ ⁻	2	42	1	mg/L	300.0	1-2
NO ₂ ⁻ , NO ₃ ⁻	4	5 (U)	N/A	mg/L	353.2	5
Screening						
TOC	2	10.5 (J2)	0.7	mg/L	9060	1
TOX	2	213	129	ug/L	9020	10.0- 20.0
Organics						
Chloroform (VOC)	1	1 (J)	N/A	ug/L	8240	5
Methylene Chloride (VOC)	3	1 (J3)	N/A	ug/L	8240	5
Chloromethane (VOC)	2	1.5 (J2)	0.7	ug/L	8240	10
TIC - Unknown Hydrocarbon (VOC)	1	2.73 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	2.73 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	N/A	N/A	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	11.89 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	15.80 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	16.12 (J)	N/A	ug/L	8240	N/A

Table E-1. 2703-E Building Waste Water Effluent Data.
Sheet 3 of 4

EFFLUENT *						
CONSTITUENT	n	MEAN CONC.	S.D.	UNITS	METHOD *	D.L. *
Organics (continued)						
TIC - Unknown Hydrocarbon (VOC)	1	16.54 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	17.59 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	19.10 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Amine (VOC)	1	16.65 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Di-chlorocyclohexane (VOC)	1	10.00 (J)	N/A	ug/L	8240	N/A
Bis(2-ethylhexyl)-phthalate (SVOC)	1	110	N/A	ug/L	8270	10
Radionuclides *						
Gross Alpha	2	0.44 (U2)	0.21	pCi/L	EP-10	1
Gross Beta	2	8.75	0.21	pCi/L	EP-10	2-3

**Table E-1. 2703-E Building Waste Water Effluent Data.
Sheet 4 of 4**

BOD = Biological Oxygen Demand	mg/L = milligrams per liter
PAH = Polycyclic Aromatic Hydrocarbons	pCi/L = picocuries per liter
SVOC = Semi-Volatile Organic Compound	ug/L = micrograms per liter
TDS = Total Dissolved Solids	umho/cm = micromhos per centimeter
TIC = Tentatively Identified Compound	N/A = Not Applicable
TKN = Total Kjeldahl Nitrogen	ND = Not Detected
TOC = Total Organic Carbon	
TOX = Total Organic Halide	
TSS = Total Suspended Solids	
VOC = Volatile Organic Compound	

- a n = Number of sample results averaged.
 mean conc = mean concentration
 S.D. = one standard deviation about the mean
- b Three digit numbers with a decimal (i.e. 120.1, 300.0 etc.) are from EPA 1979.
 Four digit procedure numbers (i.e. 6010, 9131 etc.) are from EPA 1992. Four digit
 numbers with a letter following (i.e., 5210B) are from "Standard Methods for the
 Examination of Water and Wastewater", 18th Edition, (APHA, 1992).
- c D.L. detection level as reported by the laboratory or procedures (P) if no D.L. was
 reported with the data.
- d Qualifiers which may appear in this table are:
 (U) - Indicates the compound or analyte was analyzed for and not detected in the
 sample. The value reported is the sample quantitation limit (D.L.) corrected for
 sample dilution by the laboratory.
 (J) - Indicates the compound or analyte was analyzed for and detected, but due to a
 QC deficiency identified during data validation, the associated quantitation limit is an
 estimate. This flag is also used when estimating concentrations of TICs or when the
 presence of a target compound is confirmed at a concentration of less than the D.L.
 but greater than the instrument detection limit.
 (B) - This flag applies to results in which the analyte was detected in both the sample
 and the associated blank. For the metals, (B) also indicates the analyte concentration
 is less than the D.L. but greater than the instrument detection level.
 Data qualifiers may appear in combinations. An alpha numeric combination (i.e.,
 U2) indicates that two of the sample results used in the mean had a (U) qualifier.
 Two qualifiers separated by a comma (i.e., B,U) indicates that one of the samples in
 the mean has a (B) qualifier and one has a (U) qualifier.
- e Contractor internal laboratory procedures are used for radiochemical analysis.

Table E-2. 272-E Building Waste Water Effluent Data.
Sheet 1 of 4

EFFLUENT ^a						
CONSTITUENT	n	MEAN CONC.	S.D.	UNITS	METHOD ^b	D.L. ^c
Waste Water Parameters^d						
Conductivity	2	122.5	0.7	umho/ cm	120.1	6
pH	2	7.6 (J2)	0.1	pH	9040	0.1
TDS	2	74	N/A	mg/L	160.1	5
TSS	2	5.5 (U2)	N/A	mg/L	160.2	5.5
Total Phosphorous	2	0.05 (U2)	N/A	mg/L	365.2	0.05
Total Oil and Grease	2	5 (U2)	N/A	mg/L	9070	5
Metals						
Ca	2	15900 (J2)	283	ug/L	6010	10 (P)
Mg	2	3675 (J2)	92	ug/L	6010	30 (P)
Na	2	2230 (J2)	57	ug/L	6010	29 (P)
K	2	645.5 (B2)	6.4	ug/L	6010	N/A
Cd	2	2.7 (U2)	0.6	ug/L	6010	2.7
Cr	2	2.5 (U2)	N/A	ug/L	6010	2.5
Pb	2	17.9 (B2)	2.3	ug/L	6010	11.1
Hg	2	0.10 (U2)	N/A	ug/L	7470	0.1
Se	2	32.8 (U2)	N/A	ug/L	6010	33
Ag	2	2.1 (U2)	N/A	ug/L	6010	2.1
Cu	2	9.85 (U2)	0.21	ug/L	6010	10
Fe	2	174	11	ug/L	6010	7 (P)
Mn	2	39.2	0.2	ug/L	6010	2 (P)
Zn	2	980.5	0.7	ug/L	6010	2 (P)
Ba	2	35.6 (B2)	0.6	ug/L	6010	2 (P)
As	2	15.6 (U2)	N/A	ug/L	6010	15.6

Table E-2. 272-E Building Waste Water Effluent Data.
Sheet 2 of 4

EFFLUENT *						
CONSTITUENT	n	MEAN CONC.	S.D.	UNITS	METHOD *	D.L. *
Anions						
Fl ⁻	2	0.1 (U2)	N/A	mg/L	300.0	0.1
Cl ⁻	2	2.75	0.07	mg/L	300.0	0.2
SO ₄ ⁻	2	12	N/A	mg/L	300.0	1
NO ₂ ⁻ , NO ₃ ⁻	3	0.25 (U3)	N/A	mg/L	353.2	0.25
Screening						
TOC	2	1.4	N/A	mg/L	9060	1
TOX	2	54	21	ug/L	9020	10.0
Organics						
Chloroform (VOC)	2	5	N/A	ug/L	8240	5
Methylene Chloride (VOC)	1	1 (J)	N/A	ug/L	8240	5
TIC - Unknown Alcohol (VOC)	1	4.8 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Alcohol (VOC)	1	4.8 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Alcohol (VOC)	1	16 (J)	N/A	ug/L	8240	N/A
TIC - Butyl-Benzenesulfonamide (VOC)	1	19 (JN)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	5 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	8 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	5 (J)	N/A	ug/L	8240	N/A

Table E-2. 272-E Building Waste Water Effluent Data.
Sheet 3 of 4

EFFLUENT *						
CONSTITUENT	n	MEAN CONC.	S.D.	UNITS	METHOD *	D.L. *
Organics (continued)						
TIC - Unknown Hydrocarbon (VOC)	1	7 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	12 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	12 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	12 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	1	16 (J)	N/A	ug/L	8240	N/A
TIC - Unknown Hydrocarbon (VOC)	N/A	N/A	N/A	ug/L	8240	N/A
TIC - Unknown Di-chlorocyclohexane (VOC)	N/A	N/A	N/A	ug/L	8240	N/A
Bis(2-ethylhexyl)phthalate (SVOC)	1	20	N/A	ug/L	8270	10
Radionuclides *						
Gross Alpha	2	-0.04 (U2)	0.30	pCi/L	EP-10	1
Gross Beta	2	0.93	0.81	pCi/L	EP-10	2

**Table E-2. 272-E Building Waste Water Effluent Data.
Sheet 4 of 4**

BOD = Biological Oxygen Demand	mg/L = milligrams per liter
PAH = Polycyclic Aromatic Hydrocarbons	pCi/L = picocuries per liter
SVOC = Semi-Volatile Organic Compound	ug/L = micrograms per liter
TDS = Total Dissolved Solids	umho/cm = micromhos per centimeter
TIC = Tentatively Identified Compound	N/A = Not Applicable
TKN = Total Kjeldahl Nitrogen	ND = Not Detected
TOC = Total Organic Carbon	
TOX = Total Organic Halide	
TSS = Total Suspended Solids	
VOC = Volatile Organic Compound	

- a n = Number of sample results averaged.
 mean conc = mean concentration
 S.D. = one standard deviation about the mean
- b Three digit numbers with a decimal (i.e. 120.1, 300.0 etc.) are from EPA 1979.
 Four digit procedure numbers (i.e. 6010, 9131 etc.) are from EPA 1992. Four digit
 numbers with a letter following (i.e., 5210B) are from "Standard Methods for the
 Examination of Water and Wastewater", 18th Edition, (APHA, 1992).
- c D.L. detection level as reported by the laboratory or procedures (P) if no D.L. was
 reported with the data.
- d Qualifiers which may appear in this table are:
 (U) - Indicates the compound or analyte was analyzed for and not detected in the
 sample. The value reported is the sample quantitation limit (D.L.) corrected for
 sample dilution by the laboratory.
 (J) - Indicates the compound or analyte was analyzed for and detected, but due to a
 QC deficiency identified during data validation, the associated quantitation limit is an
 estimate. This flag is also used when estimating concentrations of TICs or when the
 presence of a target compound is confirmed at a concentration of less than the D.L.
 but greater than the instrument detection limit.
 (B) - This flag applies to results in which the analyte was detected in both the sample
 and the associated blank. For the metals, (B) also indicates the analyte concentration
 is less than the D.L. but greater than the instrument detection level.
 Data qualifiers may appear in combinations. An alpha numeric combination (i.e.,
 U2) indicates that two of the sample results used in the mean had a (U) qualifier.
 Two qualifiers separated by a comma (i.e., B,U) indicates that one of the samples in
 the mean has a (B) qualifier and one has a (U) qualifier.
- e Contractor internal laboratory procedures are used for radiochemical analysis.

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APPENDIX F

STORM WATER

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CONTENTS

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SECTION F, ITEM 2	
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1 **SECTION F**

2
3 Due to the overlap between Items 1 and 2, the items were combined and addressed in the
4 following statement.

5
6 **SECTION F, ITEM 1**

7
8 **DO YOU HAVE A WASHINGTON STATE STORM WATER BASELINE GENERAL**
9 **PERMIT?**

10
11
12 **SECTION F, ITEM 2**

13
14 **HAVE YOU EVER APPLIED FOR A WASHINGTON STATE STORM WATER**
15 **BASELINE GENERAL PERMIT.**

16
17 Federal facilities are excluded from coverage under the Washington State Storm Water
18 Baseline Permit, as are industrial facilities which have no point source discharge to surface
19 water or a municipal storm sewer. However, a National Pollutant Discharge Elimination
20 System (NPDES) General Permit was developed by EPA on September 9, 1992 for federal
21 facilities located in Washington State, engaged in discharging storm water associated with
22 industrial activities. To obtain site coverage under the NPDES General Permit, DOE-RL
23 filed a Notice Of Intent application before the EPA on October 1, 1992. Subsequently, the
24 Hanford Site has been issued an NPDES General Permit Number WA-R-00-A17F for site-
25 wide coverage of storm water discharge. As required by the NPDES General Permit, the
26 Hanford Site is implementing a storm water pollution prevention program according to the
27 *Hanford Site Stormwater Pollution Prevention Plan* (WHC 1993b). Storm water discharges
28 from the 200 East, 200 West and 400 Areas have no potential discharge to the Columbia or
29 Yakima Rivers and thus were not included in the *Hanford Site Stormwater Pollution*
30 *Prevention Plan* (WHC 1993b).

31
32
33 **SECTION F, ITEM 4**

34
35 **DESCRIBE THE SIZE OF THE STORM WATER COLLECTION AREA.**

36
37 The 272-E Building and 2703-E Building storm waters are not discharged from a point
38 source to the 200-E Chemical Drain Field. Therefore, the storm water collection area is
39 zero.

40
41 Facility boundaries have been drawn surrounding the 272-E Building and the 2703-E
42 Building to answer the remaining questions in Section F. The facility boundaries are shown
43 in Drawing H-13-000090. The notes and legend are depicted on Drawing H-13-000091.

1 **SECTION F, ITEM 5**

2

3 **DOES YOUR FACILITY'S STORM WATER DISCHARGE TO:**

4

5 Item 5 is not applicable to the 272-E and 2703-E Buildings because the size of the
6 storm water collection area requested in Item 4 is zero.

7

8

1 **SECTION F, ITEM 6**

2
3 **AREAS WITH INDUSTRIAL ACTIVITIES AT FACILITY: (CHECK ALL THAT**
4 **APPLY)**

5
6 **272-E** The 272-E facility boundary shown in Drawing H-13-000090 was used to answer
7 Item 6.

8
9
10 ☒ **Manufacturing Building**

11
12 ☐ **Material Handling**

13
14 ☒ **Material Storage**

15
16 ☐ **Hazardous Waste Treatment, Storage, or Disposal (*Refers to RCRA, Subtitle C Facilities***
17 ***Only*)**

18 ☐ **Waste Treatment, Storage, or Disposal**

19
20 ☐ **Application or Disposal of Waste Waters**

21
22 ☐ **Storage and Maintenance of Material Handling Equipment**

23
24 ☐ **Vehicle Maintenance**

25
26 ☐ **Areas Where Significant Materials Remain**

27
28 ☒ **Access Roads and Rail Lines for Shipping and Receiving**

29
30 ☐ **Other** _____
31

1 2703-E The 2703-E Facility boundary shown in Drawing H-13-000090 was used to answer
2 Item 6.
3

4
5
6 ☐ Manufacturing Building

7
8 ☒ Material Handling

9
10 ☒ Material Storage

11
12 ☐ Hazardous Waste Treatment, Storage, or Disposal (*Refers to RCRA, Subtitle C Facilities*
13 *Only*)

14 ☐ Waste Treatment, Storage, or Disposal

15
16 ☐ Application or Disposal of Waste Waters

17
18 ☐ Storage and Maintenance of Material Handling Equipment

19
20 ☐ Vehicle Maintenance

21
22 ☐ Areas Where Significant Materials Remain

23
24 ☒ Access Roads and Rail Lines for Shipping and Receiving

25
26 ☐ Other _____
27
28
29

1 **SECTION F, ITEM 7A**

2
3 **MATERIAL HANDLING/MANAGEMENT PRACTICES.**

4
5 **TYPES OF MATERIALS HANDLED AND/OR STORED OUTDOORS: (CHECK ALL**
6 **THAT APPLY)**

7
8 **272-E** The 272-E Facility boundary shown in Drawing H-13-000090 was used to answer
9 Item 7a.

11 ☐ Solvents	11 ☒ Hazardous Wastes
12	
13 ☒ Scrap Metal	13 ☐ Acids or Alkalies
14	
15 ☐ Petroleum or Petrochemical Products	15 ☐ Paints/Coatings
16	
17 ☐ Plating Products	17 ☐ Woodtreating Products
18	
19 ☐ Pesticides	19 ☒ Other (List) <u>Gas Bottles</u>
20	

21 Scrap metal is stored uncovered in the fenced storage yard behind the building.
22 Hazardous wastes are stored in a cabinet located outside and are handled only in transit to
23 the cabinet. Gas bottles, both empty and full, are located under covered storage outside the
24 building and are handled only during transfer from storage to the building.

25
26 **2703-E** The 2703-E facility boundary in Drawing H-13-000090 was used to answer Item
27 7a.

29 ☐ Solvents	29 ☒ Hazardous Wastes
30	
31 ☒ Scrap Metal	31 ☐ Acids or Alkalies
32	
33 ☐ Petroleum or Petrochemical Products	33 ☐ Paints/Coatings
34	
35 ☐ Plating Products	35 ☐ Woodtreating Products
36	
37 ☐ Pesticides	37 ☒ Other (List) <u>Chemicals stored in</u>
38 <u>in conex box.</u>
39 <u>empty/used gas bottles</u>

1 Hazardous wastes are stored in the 90-day dangerous waste storage pad. The pad is
2 enclosed on all sides, is covered, and is equipped with spill containment features. The
3 chemical conex box also is enclosed and covered. These wastes and materials are handled
4 only when transferred between the building and the storage area.

5
6
7 **SECTION F, ITEM 7B**

8
9 **MATERIAL HANDLING/MANAGEMENT PRACTICES.**

10
11 **IDENTIFY EXISTING MANAGEMENT PRACTICES EMPLOYED TO REDUCE**
12 **POLLUTANTS IN INDUSTRIAL STORM WATER DISCHARGES:**

13
14 Item 7b is not applicable to the 272-E and 2703-E Buildings because the size of the
15 storm water collection area requested in Item 4 is zero.

16
17
18 **SECTION F, ITEM 8**

19
20 **ATTACH A MAP SHOWING STORM WATER DRAINAGE/COLLECTION AREAS.**
21 **DISPOSAL AREAS AND DISCHARGE POINTS.**

22
23 The storm water collection area requested in Item 4 is zero. Therefore, no map has
24 been included showing storm water drainage/collection areas, etc. In lieu of a storm water
25 boundary map, facility boundaries have been drawn around the 272-E and 2703-E Buildings.
26 The facility boundaries are shown in Drawing H-13-000090.

27
28 Although there is no storm water collection area for the 272-E Building, storm water is
29 managed using rain gutters and downspouts. The 272-E Building roof collects storm water
30 and discharges it directly to the ground through rain gutters and down spouts. Rain gutters
31 run along the northwest, southwest, and southeast roof edges, covering approximately 1/4 of
32 the building. Downspouts are located on the southeast and southwest corners of the building,
33 allowing the storm water to discharge directly to the ground. Locations of downspouts are
34 shown on Drawing H-13-000090.

2 of 2

N.135,950

N.135,750

E.573,750

E.573,550

H-13-000222	200E AREA TOPOGRAPHIC MAP	MFO	REV NO	DESCRIPTION	REV BY DATE
REF NUMBER	TITLE	REV			
REFERENCE		REVISIONS			
NEXT USED ON	H-13-000200	CADFILE N00X1090A			CADCODE DC

N.135,550

FOR GENERAL NOTES AND LEGEND SEE: H-13-000091

SITE PLAN

SCALE: 1:1500

1 cm = 15 meters

OFFICIAL RELEASE
BY WHC
DATE MAY 10 1994

DRAWN RAFAEL TORRES				DATE 3/11/94		U.S. DEPARTMENT OF ENERGY DOE Field Office, Richland Westinghouse Hanford Company					
CHECKED <i>Larry J. [Signature]</i>				5/18/94		200-E CHEMICAL DRAIN FIELD FACILITY MAP					
DFTG APVD <i>J.A. [Signature]</i>				5/10/94							
COG ENGR <i>B.P. [Signature]</i>				5/10/94		SIZE B		BLDG NO 272-E/ 2703-E	INDEX NO 0110	DWG NO H-13-000090	REV 0
CHK BY DATE	DFTG APPVD DATE	COG ENGR	OTHER	OTHER	APPRVD						
APPRVD											
APPRVD											
S:6.0:ACD2:12.0:SS					SCALE SHOWN		EDT 604313		SHEET 1 OF 1		

CHK PRINT ☐

COMMENT PRINT ☐

DWG NO H-13-000090 SH 1 OF 1 REV 0

WIND ROSE FOR: 200E AREA
% CALM WINDS = .7
STATION NO.6

PERIOD COVERED
1/1/93 - 12/31/93

PADDLES INDICATE DIRECTION WIND IS COMING FROM.
RADIAL GRIDS REPRESENT 5.0% AND 10.0% OCCURRENCE.

WIND CLASS	MILES/HOUR
1-----	>1.0 - 3.0
2-----	4.0 - 7.0
3-----	8.0 - 12.0
4-----	13.0 - 18.0
5-----	19.0 - 24.0
6-----	25.0 - 31.0
7-----	32.0 +

WIND ROSE

LEGEND

7,47,000 HANFORD PLANT COORDINATES (FEET)
 4,48,000
 E578,250 WASHINGTON STATE COORDINATES (METERS)
 N138,000
 INDEX CONTOUR (METERS)
 INTERMEDIATE CONTOUR
 IMPROVED ROAD
 UNIMPROVED ROAD
 DIRT ROAD
 SIDEWALKS/PARKING LOTS
 RAILROADS
 SECURITY, WARNING, MISFENCES
 POST & CHAIN (CRIB, BURIAL GROUND FENCES)
 PERIMETER FENCES

BUILDINGS/STRUCTURES & TOWERS
 242-A BUILDING NUMBER
 227-1 WELL
 TANKS
 216-A-42 CRIB
 218-E-10 BURIAL GROUND
 CHEMICAL/HANDLING AND STORAGE FACILITIES
 DP DISCHARGE POINT
 DOWNSPOUTS

H-13-000089	200-E POWERHOUSE ASH PIT FACILITY MAP
H-13-000090	200-E CHEMICAL DRAIN FIELD FACILITY MAP
REF NUMBER	TITLE

REFERENCE	
NEXT USED ON	H-13-000200

REV NO	DESCRIPTION	REV BY DATE	CH BY DATE
MFG			
REV			
REL			
CADFILE N000391A		CADCODE D05:6

KEY PLAN

SCALE: NONE

GENERAL NOTES

OFFICIAL RELEASE
BY WHC

DATE MAY 10 1994

1. THESE GENERAL NOTES AND LEGEND ARE FOR H-13-000089 AND H-13-000090.
2. THIS MAP IS BASED ON AERIAL PHOTOGRAPHY FLOWN ON 6-24-89. THE ORIGINAL TOPOGRAPHIC MAP WAS PREPARED BY MERRICK & COMPANY AND CERTIFIED TO MEET NATIONAL MAP ACCURACY STANDARDS. OFFICIAL COPIES OF THE MERRICK MAPS THAT SHOW THE CERTIFICATE ARE LOCATED IN THE WESTINGHOUSE ENGINEERING FILES AS DRAWING NUMBERS H-2-79476 SHEET 1 AND H-2-79477 SHEET 1 THRU 37. NAMES OF ADDITIONAL FEATURES AND THE TITLE BLOCK WERE ADDED BY WESTINGHOUSE HANFORD COMPANY.
3. WASHINGTON STATE PLANE COORDINATE SYSTEM: THE OFFICIAL COORDINATE SYSTEM AS DEFINED BY THE REVISED CODE OF WASHINGTON (RCW). THE HANFORD SITE LIES WITHIN THE WASHINGTON COORDINATE SYSTEM, SOUTH ZONE. THIS GRID COVERS THE ENTIRE SITE AND USES X (EASTINGS) AND Y (NORTHINGS) COORDINATES.

HORIZONTAL DATUM: NAD-83 LAMBERT PROJECTION. WASHINGTON STATE PLANE COORDINATES ARE SHOWN IN METERS.
CONTOUR INTERVAL: 0.5 METERS.
4. HANFORD PLANT GRID: A LOCAL GRID SYSTEM WITH ITS INITIAL POINT NORTHEAST OF THE 400 AREA. IT COVERS 200 EAST AND 200 WEST AREA AS WELL AS GENERAL SITE WORK SUCH AS WELLS AND BURIAL GROUNDS. HANFORD COORDINATES ARE SHOWN IN FEET
5. THIS MAP IS TO BE USED FOR REFERENCE PURPOSES ONLY. DO NOT USE THIS MAP FOR CONSTRUCTION PURPOSES.

DRAWN	RAFAEL TORRES	DATE	5/10/94
CHECKED	<i>[Signature]</i>	DATE	5/10/94
DFTG APVD	<i>[Signature]</i>	DATE	5/10/94
COG ENGR	B.P. Otencio	DATE	5/10/94

U.S. DEPARTMENT OF ENERGY
DOE Field Office, Richland
Westinghouse Hanford Company

HANFORD SITE FACILITY MAP GENERAL NOTES AND LEGEND

CHK BY	DFTG	COG	OTHER	OTHER
DATE	APVD	ENGR	APPROVALS	BY/DATE

APPVD	
APPVD	
APPVD	

SIZE	B	BLDG NO	200E	INDEX NO	0110	DWG NO	H-13-000091	REV	0
SCALE SHOWN	EDT 604306			SHEET 1		OF 1			

DOS:6.0:ACD2:12.0:SS

CHK
PRINT ☐

COMMENT
PRINT ☐

DWG NO H-13-000091 SH 1 OF 1 REV 0

APPENDIX G

OTHER INFORMATION

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CONTENTS

SECTION G, ITEM 1

DESCRIBE LIQUID WASTES OR SLUDGES BEING GENERATED
THAT ARE NOT DISPOSED OF IN THE WASTE STREAM(S) AND
HOW THEY ARE DISPOSED OF. FOR EACH TYPE OF WASTE,
PROVIDE TYPE OF WASTE, NAME, ADDRESS, AND PHONE
NUMBER OF HAULER. G-1

SECTION G, ITEM 2

DESCRIBE STORAGE AREAS FOR RAW MATERIALS, PRODUCTS,
AND WASTES G-2

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1 **SECTION G, ITEM 1**

2
3 **DESCRIBE LIQUID WASTES OR SLUDGES BEING GENERATED THAT ARE NOT**
4 **DISPOSED OF IN THE WASTE STREAM(S) AND HOW THEY ARE DISPOSED OF.**
5 **FOR EACH TYPE OF WASTE. PROVIDE TYPE OF WASTE, NAME, ADDRESS,**
6 **AND PHONE NUMBER OF HAULER.**
7

8 Chemical waste could be generated during the activities in the 2703-E Building. Waste
9 is packaged and a written request for disposal is submitted to WHC Solid Waste
10 Management. If waste is liquid and nonregulated, it may be disposed of in the process
11 sewer. If waste is considered solid and/or regulated, it must be disposed of by a means other
12 than discharging to the process sewer. WHC Solid Waste Management offers options for
13 disposal.
14

15 Some dirt and grit are left over when the north and south sumps inside the 2703-E
16 Building are discharged. The dirt and grit enter the sump when the floors are washed. The
17 sumps are vacuumed approximately once a week (when the sumps are drained) to remove the
18 dirt. The vacuumed material is a nonhazardous, nonregulated solid waste and is disposed of
19 accordingly, with other nonhazardous solid waste streams generated at the 2703-E Building.
20

21 Inorganic waste from laboratory activities is collected in satellite waste accumulation
22 areas inside the building. When the satellite containers are full, they are moved to the 90-
23 day dangerous waste storage pad located outside on the west side of the building. Organic
24 waste from laboratory activities is collected in a separate satellite container inside the
25 building or a flammable container outside the building. These containers are transferred to
26 the 90-day dangerous waste storage pad when full. Waste is transported from the 90-day
27 dangerous waste storage pad to the 616 Nonradioactive Dangerous Waste Storage Facility by:
28

29 Solid Waste Disposal
30 Westinghouse Hanford Company
31 P.O. Box 1970
32 MSIN N3-11
33 Richland, WA 99352.
34 (509) 376-4646
35

36 Domestic waste water from the 272-E and 2703-E Buildings is discharged to the 2607-
37 E1 septic tank. This septic tank is pumped periodically as a preventative maintenance
38 measure and waste is transported to the 100-N Sewage Lagoon. WHC Sanitary Systems
39 Maintenance hauls the domestic waste water from the septic tanks to the 100-N Lagoon.
40 WHC also contracts to have Roto Rooter haul the sewage. The addresses are as follows:
41
42

1 Sanitary Systems Maintenance
2 Westinghouse Hanford Company
3 P.O. Box 1970
4 MSIN S4-61
5 Richland, WA 99352
6 (509) 373-5786
7

Roto-Rooter Sewer Service Co.
Route 4 - Box 4000-D
Kennewick, WA 99336
(509) 783-7311

8 Satellite waste accumulation areas are located outside of the 272-E Building. Waste
9 kept here consists of paints and solvents, paint rags, and dye-penetrant rags. When satellite
10 containers are full, they are transferred to the 90-day dangerous waste storage pad at the
11 2715-EA Building. From here the waste is hauled to the 616 Nonradioactive Dangerous
12 Waste Storage Facility by Solid Waste Disposal.
13
14

15 SECTION G, ITEM 2

16 DESCRIBE STORAGE AREAS FOR RAW MATERIALS, PRODUCTS, AND 17 WASTES 18 19 20

21 Storage Yard at the 272-E Building (Raw Materials)

22

23 A large fenced area on the west side of the 272-E Building is used as a material
24 storage area. Piping and other metal stock are stored on racks.
25
26

27 Satellite Waste Accumulation Areas at the 272-E Building

28

29 Cabinets serve as satellite waste accumulation areas at the 272-E Building. The
30 cabinets are located outside on the west side of the building in a small fenced area. The
31 cabinets are locked and protected from storm water. The fenced area is also locked. The
32 waste stored here includes paints, solvents, paint rags, and dye-penetrant rags.
33
34

35 Organic Satellite Waste Accumulation Area at the 2703-E Building

36

37 Liquid organic waste from laboratory activities is collected in satellite waste accumulation
38 areas inside the building. Solid organic waste (e.g., rags containing organic materials) is
39 collected in secure satellite enclosures outside of the building. The satellite waste
40 accumulation areas have secondary containment.
41
42

1 Inorganic Satellite Hazardous Waste Accumulation Area at the 2703-E Building

2
3 Inorganic waste from laboratory activities is collected in satellite accumulation areas
4 located inside the building. The satellite accumulation areas have secondary containment.
5
6

7 90-Day Dangerous Waste Storage Pad at 2703-E
8

9 The 90-day dangerous waste storage pad is a pre-engineered building with three
10 separate compartments. Each compartment is heated to prevent the waste from freezing.
11 Each compartment's electrical system is explosion proof and has a sump for secondary
12 containment of spills. Filled satellite containers from the laboratory are stored on the
13 90-day dangerous waste storage pad for up to 90 days before to transport to the 616
14 Nonradioactive Dangerous Waste Storage Facility.

DOE/RL-94-24, Rev. 0
06/94
200-E Chemical Drain Field

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APPENDIX H

SITE ASSESSMENT

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CONTENTS

SECTION H, ITEM 1 GIVE THE LEGAL DESCRIPTION OF THE LAND TREATMENT SITE(S). GIVE THE ACREAGE OF EACH LAND TREATMENT SITE(S). ATTACH A COPY OF THE CONTRACT(S) AUTHORIZING USE OF LAND FOR TREATMENT.	H-1
SECTION H, ITEM 2 LIST ALL ENVIRONMENTAL CONTROL PERMITS OR APPROVALS NEEDED FOR THIS PROJECT; FOR EXAMPLE, SEPTIC TANK PERMITS, SLUDGE APPLICATION PERMITS, OR AIR EMISSIONS PERMITS.	H-1
SECTION H, ITEM 3 ATTACH A UNITED STATES GEOLOGICAL SURVEY (USGS) TOPOGRAPHIC MAP. SHOW THE FOLLOWING ON THIS MAP:	H-1
SECTION H, ITEM 4 ATTACH WELL LOGS AND WELL I.D.# WHEN AVAILABLE FOR ALL WELLS WITHIN 500 FEET AND ANY AVAILABLE WATER QUALITY DATA.	H-2
SECTION H, ITEM 5 DESCRIBE SOILS ON THE SITE USING INFORMATION FROM LOCAL SOIL SURVEY REPORTS.	H-2
SECTION H, ITEM 6 DESCRIBE THE REGIONAL GEOLOGY AND HYDROGEOLOGY WITHIN ONE MILE OF THE SITE.	H-3
SECTION H, ITEM 7 LIST THE NAMES AND ADDRESSES OF CONTRACTORS OR CONSULTANTS WHO PROVIDED INFORMATION AND CITE SOURCES OF INFORMATION BY TITLE AND AUTHOR.	H-12

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H-1	Hanford Soils Map	H-13
H-2	Soils Map for the 200-E Chemical Drain Field	H-14
H-3	Hanford Geologic Map	H-15
H-4	Legend for Hanford Geologic map	H-16
H-5	Regional Stratigraphic Column	H-17
H-6	Geology Map for the 200-E Chemical Drain Field	H-18
H-7	Line of Cross-Section for the 200-E Area	H-19
H-8	Cross-Section for the 200-E Area	H-20
H-9	Hanford Water Table Map.	H-21

1 **SECTION H, ITEM 1**

2
3 **GIVE THE LEGAL DESCRIPTION OF THE LAND TREATMENT SITE(S). GIVE**
4 **THE ACREAGE OF EACH LAND TREATMENT SITE(S). ATTACH A COPY OF**
5 **THE CONTRACT(S) AUTHORIZING USE OF LAND FOR TREATMENT.**

6
7 Legal Description:

8
9 NW 1/4, SE 1/4, Section 3, Township 12N, Range 26E, Benton County, WA.

10
11 The land treatment site has the following acreage:

12
13 200-E Chemical Drain Field (Total Area): 0.55 acre

14
15 A specific contract authorizing use of the 200-E Chemical Drain Field for a land
16 treatment site does not exist, but the Hanford Site was created by the U.S. Government to
17 serve as a research and production facility for federal government nuclear projects. The
18 Hanford Site has been in use since the early 1940's and all disposal facilities, such as the
19 200-E Chemical Drain Field, have been authorized by the U.S. Government.

20
21
22 **SECTION H, ITEM 2**

23
24 **LIST ALL ENVIRONMENTAL CONTROL PERMITS OR APPROVALS NEEDED**
25 **FOR THIS PROJECT: FOR EXAMPLE, SEPTIC TANK PERMITS, SLUDGE**
26 **APPLICATION PERMITS, OR AIR EMISSIONS PERMITS.**

27
28 There are no permits specifically for this project. The following permits are general
29 permits for the Hanford Site:

- 30
31
 - Hanford Site Radioactive Air Emissions Permit: Number FF-01
 - 32 • Hanford Site Dangerous Waste Permit: Number WA7890008967
 - 33 • NPDES General Permit: Number WA-R-00-A17F.

34
35
36 **SECTION H, ITEM 3**

37
38 **ATTACH A UNITED STATES GEOLOGICAL SURVEY (USGS) TOPOGRAPHIC**
39 **MAP. SHOW THE FOLLOWING ON THIS MAP:**

- 40
41
 - a. Location and name of internal and adjacent streets
 - 42 b. Surface water drainage systems within 1/4 mile of the site

- c. All wells within 1 mile of the site
- d. Chemical and product handling and storage facilities
- e. Infiltration sources, such as drainfields and lagoons within 1/4 mile of the site
- f. Waste water and cooling water discharge points with waste stream ID numbers (See Section C.1)
- g. Other activities and land uses within 1/4 mile of the site

Drawing H-13-000086 addresses the above items as applicable. Although this drawing is not a USGS topographic map, it was derived from the Hanford Site topographic map database. The Hanford Site map database provides more detail and allows the items to be addressed at a more appropriate scale than a USGS map. The waste water discharge point shown for the waste stream on Drawing H-13-000086 includes all component substreams prior to discharge. The chemical and product handling and storage areas are difficult to see on a map of this scale and are shown on Drawing H-13-000090 in Appendix F.

SECTION H, ITEM 4

ATTACH WELL LOGS AND WELL I.D.# WHEN AVAILABLE FOR ALL WELLS WITHIN 500 FEET AND ANY AVAILABLE WATER QUALITY DATA.

Drawing H-13-000086 shows all of the wells within a one-mile radius of the 200-E Chemical Drain Field. All well numbers are preceded with a 299. There are no wells within 500 feet of the 200-E Chemical Drain Field.

SECTION H, ITEM 5

DESCRIBE SOILS ON THE SITE USING INFORMATION FROM LOCAL SOIL SURVEY REPORTS.

The most recent study of the soil on the Hanford Site was done by Hajek (1966). This study presents a soil map and a descriptive report of soils in the Benton County portion of the Hanford Site. On the basis of morphologic and genetic characteristics, 13 soil types were identified. An approximate land use capability classification is provided for these soils on the basis of soil limitations for, and damage risks associated with, agricultural use. Approximate engineering classifications for these soils, using the Unified Soil Classification System, are also provided in Hajek (1966). The soil types mapped on the Hanford Site are shown on Figure H-1. There is no soil data for the north slope of the Hanford Site. The soils in the vicinity of the 200 East Area consist of three soil types: the Burbank loamy sand, the Quincy sand (Rupert sand), and the Ephrata sandy loam. The following sections describe the soils types in the 200 East Area. A map depicting the soils within one mile of the 200-E Chemical Drain Field is provided as Figure H-2.

1 The Burbank loamy sand is a dark grayish brown, coarse-textured, excessively drained
2 soil underlain by gravel. The surface soil is usually about 16 inches thick, but can be as
3 much as 30 inches. The gravel content of the subsoil may range from 20 to 80 percent (by
4 volume). The surface of the Burbank loamy sand is Group SM (silty sand) and the subsoil is
5 Group GM (silty gravel) to GP (poorly-graded gravel). Group GM (silty gravel) are coarse-
6 grained soils composed predominantly of gravels with more than 12 percent fines. Group
7 GP (poorly-graded gravel) contains coarse-grained soils that are predominantly well-sorted
8 gravels with less than 5 percent fines.

9
10 The Quincy sand (Rupert sand) represents one of the most extensive soils at the
11 Hanford Site. The soil is a brown to grayish brown, moderately-deep, coarse sand. Quincy
12 soils developed under grass and sagebrush in coarse alluvial deposits mantled by wind-blown
13 sand. Relief characteristically consists of hummocky terraces and dune-like ridges. The
14 surface and subsoil of the Quincy sand (Rupert sand) were assigned to Group SM (silty
15 sand), which consists of coarse-grained soils composed predominantly of sands with more
16 than 12 percent fines.

17
18 The Ephrata sandy loam, occurring to an average depth of 12 inches, is a dark grayish
19 brown, medium-textured soil underlain by deep gravelly material. The topography is
20 generally level. The surface of the Ephrata sandy loam belongs to Group SM (silty sand) to
21 ML (silt), and the subsurface belongs to Group ML (silt). Group ML (silt) is fine-grained
22 soils composed of silts and clays with little or no plasticity.

23 24 SECTION H, ITEM 6

25 26 DESCRIBE THE REGIONAL GEOLOGY AND HYDROGEOLOGY WITHIN ONE 27 MILE OF THE SITE.

28 29 30 REGIONAL GEOLOGY

31
32 A summary of the regional geologic characteristics of the Pasco Basin and the Hanford
33 Site is presented below in terms of stratigraphy and structure. WHC (1992a), WHC
34 (1991b), and WHC (1991c) may be consulted for additional detail. Figure H-3 shows a map
35 depicting the geology of the Hanford Site. Figure H-4 is a legend explaining Figure H-3.

1 REGIONAL STRATIGRAPHY

2
3 The Hanford Site lies within the Pasco Basin, a regional structural and topographic,
4 sediment-filled depression. The sediments of the Pasco Basin are underlain by Miocene-age
5 basalt of the Columbia River Basalt Group, a thick sequence of flood basalts that covers a
6 large area in eastern Washington, western Idaho and northeastern Oregon. The sediments
7 overlying the basalts, from oldest to youngest, include: the Miocene-Pliocene Ringold
8 Formation, local alluvial deposits of possible late Pliocene or early Pleistocene age, local
9 "Palouse" soil of mostly eolian origin, glaciofluvial deposits of the Pleistocene Hanford
10 formation, and surficial Holocene eolian and fluvial sediments. The generalized stratigraphy
11 of the Hanford Site is described in the following paragraphs from the oldest to youngest
12 formation. The regional stratigraphy is depicted on Figure H-5.

14 Columbia River Basalt Group and the Ellensburg Formation

15
16 The Columbia River Basalt Group consists of an assemblage of tholeiitic, continental
17 flood basalts of Miocene Age with an accumulated thickness in excess of 10,000 feet within
18 the Pasco Basin. These flows cover an area of more than 63,000 square miles in
19 Washington, Oregon, and Idaho and have an estimated volume of about 40,800 cubic miles.
20 The majority of the flows were erupted 14.5 to 17 million years ago (WHC 1991b).

21
22 The Columbia River Basalt Group is formally divided into five formations (from oldest
23 to youngest): Imnaha Basalt, Picture Gorge Basalt, Grande Ronde Basalt, Wanapum Basalt,
24 and Saddle Mountains Basalt. Of these, all are present within the Pasco Basin except for the
25 Picture Gorge Basalt. The Saddle Mountains Basalt, divided into the Ice Harbor, Elephant
26 Mountain, Pomona, Esquatzel, Asotin, Wilbur Creek, and Umatilla Members, forms the
27 uppermost basalt unit throughout most of the Pasco Basin. The Elephant Mountain Member
28 is the uppermost unit beneath most of the Hanford Site except near the 300 Area where the
29 Ice Harbor Member is found and north of the 200 Areas where the Saddle Mountains Basalt
30 has been eroded down to the Umatilla Member in the Gable Gap area (WHC 1991b). The
31 Elephant Mountain Member has also been locally eroded in the vicinity of the northeast
32 corner of the 200 East Area (WHC 1991b). On anticlinal ridges bounding the Pasco Basin,
33 erosion has removed the Saddle Mountains Basalt, exposing the Wanapum and Grande Ronde
34 basalts (WHC 1991b).

35
36 The Ellensburg Formation consists of all sedimentary units that occur between the
37 basalt flows of the Columbia River Basalt Group in the central Columbia Basin (Reidel and
38 Fecht 1981). The Ellensburg Formation generally consists of two main lithologies:
39 volcanics and siliciclastics. The volcanics consist mainly of primary pyroclastic air
40 fall deposits and reworked epiclastics derived from volcanic terrains west of the Columbia
41 Plateau. Siliciclastic strata consist of clastic, plutonic, and metamorphic detritus derived
42 from the Rocky Mountain terrains located to the east.

1 At the Hanford Site, the three uppermost units of the Ellensburg Formation are the
2 Levy interbed, the Rattlesnake Ridge interbed, and the Selah interbed. The Levy interbed is
3 confined to the vicinity of the 300 Area. The Rattlesnake Ridge and Selah interbeds are
4 found beneath most of the Hanford Site (WHC 1992a).

5 6 **Suprabasalt Sediments**

7
8 The suprabasalt sedimentary sequence at the Hanford Site is up to approximately 750
9 feet thick in the west-central Cold Creek syncline, while it pinches out against the anticlinal
10 ridges that bound or are present within the Pasco Basin (WHC 1991a). The suprabasalt
11 sediments are dominated by laterally extensive deposits of the late Miocene to Pliocene-age
12 Ringold Formation and the Pleistocene-age Hanford formation. Locally occurring strata
13 separating the Ringold and Hanford formations are assigned to the informally defined Plio-
14 Pleistocene unit, early "Palouse" soil, and pre-Missoula gravels, which comprise the
15 remainder of the sequence (DOE-RL 1993b).

16
17 **Ringold Formation.** Overlying the Columbia River Basalt Group is the late Miocene
18 to Pliocene-age Ringold Formation (Fecht et al. 1987, DOE 1988). The Ringold Formation
19 accumulated to a thickness of up to 1,200 feet in the Pasco Basin (Tallman et al. 1979). On
20 the Hanford Site, the Ringold Formation is up to 600 feet thick in the deepest part of the
21 Cold Creek syncline south of the 200 West Area and 560 feet thick in the western Wahluke
22 syncline near the 100-B Area (WHC 1991b). The Ringold Formation pinches out against the
23 anticlinal flanks that bound or are present within the Pasco Basin, and is largely absent in the
24 northern and northeastern parts of the 200 East Area and adjacent areas to the north (WHC
25 1991b, WHC 1992a). The recent studies of the Ringold Formation (WHC 1991d) indicate it
26 is best described on the basis of sediment facies associations and their distribution. The
27 facies associations have been divided into fluvial gravel, fluvial sand, overbank deposits,
28 lacustrine deposits, and alluvial fans. The lower Ringold contains five separate stratigraphic
29 intervals dominated by fluvial gravels, which have been designated units A, B, C, D, and E,
30 from oldest to youngest. These gravel units are separated by basin-wide overbank and
31 lacustrine deposits (WHC 1992a). A more detailed discussion of the Ringold Formation
32 stratigraphy can be found in WHC (1991d).

33
34 **Post-Ringold Pre-Hanford Sediments.** Thin alluvial deposits situated stratigraphically
35 between the Ringold Formation and Hanford formation are found within the Pasco Basin.
36 The three informally defined units include: the Plio-Pleistocene unit, the early "Palouse"
37 soil, and the Pre-Missoula gravels. The Plio-Pleistocene unit and early "Palouse" soil are
38 not found in or near the 200 East Area. They are found to the west of the site area near the
39 eastern boundary of the 200 West Area. The pre-Missoula gravels are not found in the site
40 area. The Plio-Pleistocene unit and early "Palouse" soil are described in detail in PNL
41 (1989) and WHC (1991c). The pre-Missoula gravels are discussed in PSPL (1982) and
42 Fecht et al. (1987).

1 **Hanford formation.** The informally designated Hanford formation consists of
2 unconsolidated, glaciofluvial sediments that were deposited during several episodes of
3 cataclysmic flooding during the Pleistocene Epoch. The sediments are composed of pebble
4 to boulder-size gravel, fine- to coarse-grained sand, and silt. These sediments are divided
5 into three facies: gravel dominated, sand-dominated, and silt-dominated (WHC 1992a).
6 These facies are referred to as coarse-grained deposits, plane-laminated sand facies, and
7 rhythmite facies, respectively (Baker et al. 1991). The silt-dominated deposits are also
8 referred to as "Touchet" Beds, and the gravel-dominated facies generally correspond to the
9 Pasco gravels.

10
11 The Hanford formation is thickest in the vicinity of the 200 Areas where it is up to 350
12 feet thick (WHC 1992a). The formation was deposited by cataclysmic flood waters that
13 originated from glacial lake Missoula (Fecht et al. 1987, DOE 1988, Baker et al. 1991).
14 The deposits are absent from ridges above approximately 1,180 feet above mean sea level,
15 the highest level of cataclysmic flooding in the Pasco Basin (WHC 1991b).

16
17 **Holocene Surficial Deposits.** Holocene surficial deposits consist of silt, sand, and
18 gravel that form a <16-foot veneer across much of the Hanford Site. These sediments were
19 deposited by eolian and alluvial processes (WHC 1991b).

20 21 22 **REGIONAL GEOLOGIC STRUCTURE**

23
24 The Hanford Site is located within the Pasco Basin near the eastern edge of the Yakima
25 Fold Belt. The Yakima Fold Belt consists of a series of segmented, narrow, asymmetric,
26 east-west trending anticlines separated by broad synclines or basins that, in many cases,
27 contain thick accumulations of Neogene- to Quaternary-aged sediments (DOE 1988, Smith et
28 al. 1989). The Pasco Basin is one of the larger structural basins of the fold belt.

29
30 The northern limbs of the anticlines of the Yakima Fold Belt generally dip steeply to
31 the north or are vertical. The southern limbs generally dip at relatively shallow angles to the
32 south. Thrust or high-angle reverse faults with fault planes that strike parallel or subparallel
33 to the axial trends are principally found on the north sides of the anticlines. The amount of
34 vertical stratigraphic offset associated with these faults varies (WHC 1991b).

35
36 Deformation of the Yakima Folds occurred under north-south compression and was
37 contemporaneous with the eruption of the basalt flows. The fold belt was enlarging during
38 the eruption of the Columbia River Basalt Group and continued to enlarge through the
39 Pliocene, into the Pleistocene, and perhaps to the present (WHC 1991b).

40
41 The Pasco Basin is a structural depression bounded on the north by the Saddle
42 Mountain anticline; on the west by the Umtanum Ridge, Yakima Ridge, and Rattlesnake
43 Hills anticlines; and on the south by the Rattlesnake Mountain anticline. The Palouse slope,

1 a west-dipping monocline, bounds the Pasco Basin on the east. The Pasco Basin is divided
2 into the Wahluke and Cold Creek synclines by the Gable Mountain anticline, the eastern
3 extension of the Umtanum Ridge anticline.

4
5 The Cold Creek syncline lies between the Umtanum Ridge-Gable Mountain uplift and
6 the Yakima Ridge uplift and is an asymmetric and relatively flat-bottomed structure. The
7 bedrock of the northern limb dips gently to the south, and the southern limb dips steeply to
8 the north. The deepest parts of the Cold Creek syncline, the Wye Barricade depression, and
9 the Cold Creek depression, are located approximately 7.5 miles southeast of the 200 Areas
10 and just west-southwest of the 200 West Area, respectively (Tallman et al. 1979).

11 12 13 LOCAL GEOLOGY

14
15 The depth to the top to the Elephant Mountain Member basalt in the 200 East Area
16 ranges from approximately 280 feet in the northern part to approximately 520 feet in the
17 southern part. Overlying the basalt are the suprabasalt sediments of the Ringold Formation,
18 Hanford formation, and Holocene surficial deposits. The Plio-Pleistocene unit, early
19 "Palouse" soil, and the Pre-Missoula gravels are absent in the 200 East Area (WHC 1992a).
20 The following discussion of the local geology focuses on the suprabasalt sediments within the
21 200 East Area. A map depicting the geology within one mile of the 200-E Chemical Drain
22 Field is provided as Figure H-6. A local cross section has also been included for more
23 detailed information. The line of cross-section is shown on Figure H-7 and the cross-section
24 is provided on Figure H-8.

25 26 Ringold Formation

27
28 The Ringold Formation unconformably overlies the Elephant Mountain Member basalt
29 in the southern two thirds of the 200 East Area, but is absent in the northern part. The
30 Ringold Formation thickens and dips to the south, southeast, and southwest towards the axis
31 of the Cold Creek syncline (WHC 1992a). Unit A, the lower mud sequence, and unit E are
32 the only Ringold Formation units present in the 200 Areas.

33
34 The lowest unit of the Ringold Formation is fluvial gravel unit A. Unit A thickens and
35 dips towards the south in the direction of the Cold Creek syncline. Within the 200 East Area
36 unit A ranges from 0 feet thick in the northern part to approximately 100 feet thick near the
37 southern boundary. Unit A is generally described as a clast-supported granule to cobble
38 gravel with a sandy matrix. Clast composition is variable, with basalt, quartzite, porphyritic
39 volcanics, and greenstone being the most common. Clasts of silicic plutonic rocks, gneiss,
40 and volcanic breccias can also be found. Associated sands are generally quartzo-feldspathic
41 with basalt content ranging from 5 percent to 25 percent (WHC 1992a).

42
43 The lower mud sequence overlies unit A and also dips and thickens towards the south.

1 The thickness of the lower mud sequence ranges from 0 feet in the northern part to
2 approximately 50 feet near the southern boundary of the 200 East Area. The lower mud
3 sequence is composed of overbank and lacustrine deposits. The overbank deposits consist of
4 laminated to massive silt, silty fine-grained sand, and paleosols containing variable amounts
5 of pedogenic calcium carbonate. Plane laminated to massive clay with thin silt and sand
6 interbeds characterize the lacustrine deposits. The lacustrine deposits contain some soft-
7 sediment deformation (WHC 1992a).

8
9 Unit E locally overlies the lower mud sequence in the southwest corner of the 200 East
10 Area and in the vicinity of the Grout Treatment Facility. The unit appears to be absent from
11 the northern and central parts of the 200 East Area. The unit thickens towards the
12 separations area between the 200 East and 200 West Areas. The thickness of unit E ranges
13 from 0 feet in the northern and central parts of the 200 East Area to approximately 90 feet
14 southwest of the 200 East Area. Unit E is a clast-supported granule to cobble gravel, similar
15 to unit A. Locally, strata typical of the fluvial sand and overbank facies associations may be
16 encountered within unit E (WHC 1992a).

17 18 **Hanford formation**

19
20 In the 200 East Area, the Hanford formation consists predominately of gravel-
21 dominated and sand-dominated facies. Informally, the Hanford formation can be divided into
22 the upper gravel sequence, middle sand sequence, and lower gravel sequence (WHC 1992a).
23 Because of the variability of Hanford formation sediments, contacts between these sediments
24 can be difficult to distinguish, especially where the sandy sequence is missing and the upper
25 gravel directly overlies the lower gravel. In the 200 East Area, the Hanford formation
26 overlies the Ringold Formation in the southern two-thirds of the area and in the northern
27 part, the Hanford formation directly overlies the Elephant Mountain Member basalt where
28 the Ringold Formation is absent.

29
30 The lower gravel sequence consists of coarse-grained basaltic sand and granule to
31 boulder gravel. Other clast types include Ringold and Plio-Pleistocene rip-ups, granite,
32 quartzite and gneiss (WHC 1992b). Discontinuous intervals dominated by the sand-
33 dominated facies and localized horizons of silt-dominated deposits are also present within the
34 lower gravel sequence. The lower gravel sequence ranges in thickness from approximately
35 0 to 134 feet. The lower gravel sequence is absent in the east central part of the 200 East
36 Area (WHC 1992a).

37
38 The middle sand sequence overlies the lower gravel sequence and is dominated by
39 deposits of the sand-dominated facies, consisting of fine- to coarse-grained sand and granule
40 gravel displaying plane lamination and bedding. Intercalated horizons typical of both the
41 gravel-dominated and silt-dominated sequences also occur within the middle sand sequence,
42 with the gravel sequence more abundant in the northern part and the silt sequence more
43 abundant in the southern part of the 200 East Area. The middle sand sequence in the 200

1 East Area ranges in thickness from 0 to 275 feet. The middle sand unit thins and pinches
2 out to the north, east, and west of the 200 East Area (WHC 1992a).

3
4 The upper gravel sequence overlies the middle sand sequence in the southern part of
5 the 200 East Area and the lower gravel unit in the northern part of the 200 East Area.
6 Deposits comprising the upper gravel sequence are typical of the gravel-dominated facies.
7 Lenticular horizons of sand-dominated and silt-dominated facies are encountered locally in
8 the upper gravel sequence. The thickness of the upper gravel sequence ranges from 0 to 60
9 feet. The upper gravel sequence thickens to the north and is absent in the central part of the
10 200 East Area.

11 12 Holocene Surficial Deposits

13
14 Holocene surficial deposits consist of silt, very fine- to medium-grained sand and
15 gravel that form a <33 feet veneer across much of the Hanford Site. These sediments were
16 deposited by a combination of eolian and alluvial processes which have produced sheet sands
17 which blanket the surface. Locally most of the surficial deposits have been removed by
18 construction activities (WHC 1992a).

19 20 21 REGIONAL HYDROGEOLOGY

22
23 The hydrogeology of the Pasco Basin has been broadly characterized as consisting of
24 four primary hydrogeologic units (DOE 1988). These units correspond to the upper three
25 formations of the Columbia River Basalt Group (Grande Ronde Basalt, Wanapum Basalt, and
26 Saddle Mountains Basalt) and the suprabasalt sediments. The basalt aquifers consist of the
27 flood basalts of the Columbia River Basalt Group and relatively minor amounts of
28 intercalated fluvial and volcanoclastic sediments of the Ellensburg Formation. Confined
29 zones in the basalt aquifers are present in the sedimentary interbeds and/or interflow zones
30 that occur between dense basalt flows. The main water-bearing portions of the interflow
31 zones are networks of interconnecting vesicles and fractures of the basalt flow tops and
32 bottoms (DOE 1988).

33
34 The uppermost aquifer is part of a flow system that is local to the Pasco Basin, as are
35 the uppermost basalt interbed aquifers (Gephart et al. 1979, DOE 1988). The uppermost
36 aquifer system is regionally unconfined and occurs within the glaciofluvial sands and gravels
37 of the Hanford formation and the fluvial/lacustrine sediments of the Ringold Formation.
38 Confined to semi-confined aquifers of more limited extent also occur in the suprabasalt
39 sediments of the Pasco Basin. These confined zones are generally located within the local
40 flow system, between the unconfined aquifer and the underlying basalt surface. Groundwater
41 in these aquifer systems is most likely recharged and discharged locally. Deeper in the
42 basalt, interbed aquifer systems are part of the regional, or interbasin, flow system, which
43 extends outside the margins of the Pasco Basin (DOE 1988). A water table map of the

1 Hanford Site is provided as Figure H-9.
2
3

4 **LOCAL HYDROGEOLOGY** 5

6 The primary hydrostratigraphic units in the 200 East Area are the confined aquifer
7 system of the Saddle Mountain Basalt Formation and Ellensburg Formation, and the
8 unconfined to confined aquifer system of the Ringold Formation and the Hanford formation.
9 The following discussion focuses on the hydrogeology of the suprabasalt sediments.
10

11 In the vicinity of the 200 East Area, the vadose zone is primarily composed of the
12 Ringold gravel unit A through the central and southern portions of the area and the Ringold
13 lower mud sequence to the east near the 216-B-3 Pond. In the north part of 200 East where
14 the Ringold Formation is discontinuous, the vadose zone is dominantly composed of the
15 Hanford formation (DOE-RL 1993a). The vadose zone ranges from about 317 feet thick
16 near the southwestern part of the 200 East Area to 1230 feet thick in the vicinity of the 216-
17 B-3 Pond (DOE-RL 1993a).
18

19 The uppermost aquifer system comprises the unconfined aquifer, but also includes
20 localized semiconfined and confined areas. The hydrostratigraphy of the unconfined aquifer
21 in the 200 East Area is relatively complex because of depositional and erosional history of
22 the geologic units (DOE-RL 1993a). The unconfined aquifer in the 200 East Area occurs
23 within the Ringold Formation and Hanford formation. The base of the unconfined aquifer is
24 the top of the lower mud sequence along the southern and eastern areas of the 200 East Area.
25 Along the northern parts of the 200 East Area, the base of the unconfined aquifer is the top
26 of the Elephant Mountain Member basalt. The thickness of the unconfined aquifer varies
27 from 0 feet in the northeastern corner where basalt extends above the water table to more
28 than 262 feet to the south (DOE-RL 1993a).
29

30 The 200 East Area water table is relatively flat and gradients are difficult to discern.
31 Flow directions from the 200 East Area are the result of hydraulic effects of the B-Pond
32 system groundwater mound situated on the east side of the 200 East Area. The B-Pond
33 mound deflects eastward groundwater flow across the Hanford Site. Other miscellaneous
34 waste stream discharges in the 200 East Area may have minor localized effects on
35 groundwater flow patterns. Contaminant plume geometries provide some indication of flow
36 directions where gradients are relatively flat. For the unconfined aquifer, groundwater flow
37 away from the 200-East Area is bifurcated northward through the gap between Gable
38 Mountain and Gable Butte; or to the east-southeast across the site and ultimately to the
39 Columbia River.
40

1 A semiconfined to confined aquifer is observed in the vicinity of the 216-B-3 Pond
2 where the groundwater occurs in the Ringold unit A gravels and is confined by the lower
3 mud sequence. This aquifer appears to be near only the 216-B-3 Pond system (DOE-RL
4 1993a).

1 **SECTION H, ITEM 7**

2

3 **LIST THE NAMES AND ADDRESSES OF CONTRACTORS OR CONSULTANTS**
4 **WHO PROVIDED INFORMATION AND CITE SOURCES OF INFORMATION BY**
5 **TITLE AND AUTHOR.**

6

7

8 Westinghouse Hanford Company
9 P.O. Box 1970
10 Richland, WA 99352

11

12 Kaiser Engineers Hanford
13 P.O. Box 888
14 Richland, WA 99352

15

16 Science Applications International Corp.
17 1845 Terminal Drive
18 Richland, WA 99352

19

20 Golder Associates Inc.
21 1933 Jadwin Avenue, Suite 125
22 Richland, WA 99352

23

24 Enserch Environmental Corp.
25 1201 Jadwin Avenue, Suite 202
26 Richland, WA 99352

27

28 **References:** Sources of information used for Section H are included in
29 **REFERENCES.**

WIND ROSE FOR: 200E
 % CALM WINDS = .7
 STATION NO.6

WEST

PADDLES INDICATE DI
 RADIAL GRIDS REPRESENT

WIND CLASS

1	-----
2	-----
3	-----
4	-----
5	-----
6	-----
7	-----

WIN

ROSE FOR: 200E AREA
M WINDS = .7
N NO.6

PERIOD COVERED
1/1/93 - 12/31/93

LEGENDS INDICATE DIRECTION WIND IS COMING FROM.
CONCENTRIC GRIDS REPRESENT 5.0% AND 10.0% OCCURRENCE.

<u>WIND CLASS</u>	<u>MILES/HOUR</u>
1-----	>1.0 - 3.0
2-----	4.0 - 7.0
3-----	8.0 - 12.0
4-----	13.0 - 18.0
5-----	19.0 - 24.0
6-----	25.0 - 31.0
7-----	32.0 +

WIND ROSE

E 574,500

E 574,750

E 575,000

KEY F
SCALE:

LEGEND

N. 47,000
N. 48,000

HANFORD PLANT COORDINATES
(FEET)

E. 576 250

WASHINGTON STATE COORDINATES

32.0 +

ID ROSE

PLAN

E: NONE

END

E28-(63-66)
E28-(69-71)
E28-78 ABANDONED

LEGEN

W. 47,000 N. 48,000	HANFORD PLANT COORDINATES (FEET)
E. 576,250 N. 136,000	WASHINGTON STATE COORDINATES (METERS)
INDEX CONTOUR (METERS)
INTERMEDIATE CONTOUR
IMPROVED ROAD
UNIMPROVED ROAD
DIRT ROAD
SIDEWALKS/PARKING LOTS
RAILROADS
SECURITY, WARNING, MISC FENCES
POST & CHAIN (CRIB, BURIAL GROUND FENCES)
PERIMETER FENCES

GENERAL NOTES

1. THIS MAP IS BASED ON AERIAL PHOTOGRAPHY FLOWN ON 6-24-89. THE ORIGINAL TOPOGRAPHY BY MERRICK & COMPANY AND CERTIFIED TO MEET NATIONAL MAP ACCURACY STANDARDS. OFFICIAL COPIES OF THE MERRICK MAPS THAT SHOW THE CERTIFICATE ARE LOCATED IN THE ENGINEERING FILES AS DRAWING NUMBERS H-2-79476 SHEET 1 AND H-2-79477 SHEET 1. NAMES OF ADDITIONAL FEATURES AND THE TITLE BLOCK WERE ADDED BY WESTINGHOUSE HANFORD.
2. WASHINGTON STATE PLANE COORDINATE SYSTEM: THE OFFICIAL COORDINATE SYSTEM AS DEFINED BY THE REVISED CODE OF WASHINGTON (RCW). THE HANFORD SITE LIES WITHIN THE WASHINGTON COORDINATE SOUTH ZONE. THIS GRID COVERS THE ENTIRE SITE AND USES X (EASTINGS) AND Y (NORTHINGS).
HORIZONTAL DATUM: NAD-83 LAMBERT PROJECTION. WASHINGTON STATE PLANE COORDINATES
CONTOUR INTERVAL: 0.5 METERS.
3. HANFORD PLANT GRID: A LOCAL GRID SYSTEM WITH ITS INITIAL POINT NORTHEAST OF THE HANFORD PLANT. THE GRID COVERS 200 EAST AND 200 WEST AREA AS WELL AS GENERAL SITE WORK SUCH AS WELLS AND BUILDINGS. HANFORD COORDINATES ARE SHOWN IN FEET.

KEY PLAN

SCALE: NONE

LEGEND

COORDINATES

STATE COORDINATES

1 (METERS)

CONTOUR

1

ROAD

WORKING LOTS

MINING, MISC FENCES

N
GROUND FENCES)

FENCES

ES

39. THE ORIGINAL TOPOGRAPHIC MAP WAS PREPARED
ACCURACY STANDARDS.
STATE ARE LOCATED IN THE WESTINGHOUSE
AND H-2-79477 SHEET 1 THRU 37.
DEVELOPED BY WESTINGHOUSE HANFORD COMPANY.

COORDINATE SYSTEM AS DEFINED BY THE
WITHIN THE WASHINGTON COORDINATE SYSTEM,
(EASTINGS) AND Y (NORTHINGS) COORDINATES.

STATE PLANE COORDINATES ARE SHOWN IN METERS.

POINT NORTHEAST OF THE 400 AREA. IT
SITE WORK SUCH AS WELLS AND BURIAL

BUILDINGS/STRUCTURES & TOWERS
242-A			BUILDING NUMBER
	MOBILE OFFICES
E27-1			WELL
	ABANDONED WELL
	TANKS
216-A-42			CRIB
218-E-10			BURIAL GROUND
DP			DISCHARGE POINT

SITE PLAN

SCALE: 1:6000

1 cm = 60 meters

SITE PLAN

SCALE: 1:6000

1 cm = 60 meters

DRAWING TRACEABILITY LIST	
DWG NO	TITLE
5

OFFICIAL RELEASE
BY WHC
DATE MAY 12 1994

THIS MAP IS TO BE USED
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DRAWN	RAFAEL TORRES	DATE	3-12-94
CHECKED	<i>Luis A. Torres</i>	DATE	5-10-94
DFTG APVD	<i>[Signature]</i>	DATE	5-10-94
COC ENGR	B.P. Otencio	DATE	5-10-94
APVD	<i>[Signature]</i>	DATE	5-10-94
APVD			
APVD			
APVD			
APVD			
APVD			
APVD			

DESCRIPTION	REV BY DATE	CHK BY DATE	DFTG APVD DATE	COC ENGR	OTHER	OTHER
REVISIONS						
36A	CADCODE DOS:6.0:ACD2:12.0:SS					

SIZE
F
BLDG
272-
2703
SCALE
SHC

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DRAWN RAFAEL TORRES		DATE 3-12-94		U.S. DEPARTMENT OF ENERGY DOE Field Office, Richland Westinghouse Hanford Company <h2 style="text-align: center;">200-E CHEMICAL DRAIN FIELD</h2>																		
CHECKED <i>L. J. Johnson</i>		5-10-94																				
DFTG APVD <i>[Signature]</i>		5-10-94																				
COG ENGR B.P. Otencio		5-10-94																				
APVD <i>[Signature]</i>		5-10-94																				
APVD				<table border="1" style="width: 100%;"> <tr> <td>SIZE</td> <td>BLDG NO</td> <td>INDEX NO</td> <td>DWG NO</td> <td>REV</td> </tr> <tr> <td>F</td> <td>272-E/ 2703-E</td> <td>0110</td> <td>H-13-000086</td> <td>0</td> </tr> <tr> <td colspan="2">SCALE SHOWN</td> <td colspan="2">EDT 604309</td> <td>SHEET 1 of 1</td> </tr> </table>				SIZE	BLDG NO	INDEX NO	DWG NO	REV	F	272-E/ 2703-E	0110	H-13-000086	0	SCALE SHOWN		EDT 604309		SHEET 1 of 1
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2	CHK PRINT ☐ DATE	COMMENT PRINT ☐ DATE
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A

Hanford Soils Map

Figure H-1. Hanford Soils Map.

**Soils Map for
200E Chemical Drain Field**
Modified from Hajek 1966

- Burbank Loamy Sand
- Quincy Sand
- Ephrata Sandy Loam

Contour Interval is 1/2 meter

- Improved Road
- Unimproved Road
- Dirt or Gravel Road
- Railroad
- Buildings

WHC:app 03/22/94 snc_3.mxd

DOE/RL-94-24, Rev. 0
06/94
200-E Chemical Drain Field

Figure H-2. Soils Map for
the 200-E Chemical Drain Field.

Hanford Geologic Map

DOE/RL-94-24, Rev. 0
06/94
200-E Chemical Drain Field

Legend .

Qa	Qfg
Qls	Qfg3
Qd	QPlg
Mv(sp)	PlMc
Mv(wfs)	PlMcg
Mv(gN2)	Mv(sem)
Qda	Mv(se)
Qds	Mv(su)
Ql	Mv(wpr)
Qaf	Mv(wr)
Qfs4	Qfg(3-4u)
Qfs2	Qfs(3-4u)

Mc	See next page for full text description.
Wtr	
Fault	
Contact	

Scale Kilometers

Map Data Source: S.Reidel and K.Fecht
WHCLAD:2-3-94

Figure H-3. Hanford Geologic Map.

Legend

DOE/RL-94-24, Rev. 0

06/94

200-E Chemical Drain Field

- Qa-Alluvium (Holo.-Pleis.)
- Qls-Mass-wasting deposits (Holo.-Pleis.)
- Qd-Dune sand (Holocene)
- Mv(sp)-Saddle Mt Basalt, Pomona Mbr (M. Mio.)
- Mv(wfs)-Wanapum Basalt, Frenchman Spr. Mbr (M. Mio.)
- Mv(gN2)-Grande Ronde Basalt, U. flow-normal pol. (M. Mio.)
- Qda-Dune sand, active (Holocene)
- Qds-Dune sand, stabilized (Holocene)
- Ql-Loess (Holocene to Pleistocene)
- Qaf-Alluvial fans (Holo.-Pleis.)
- Qfs4-Outburst flood dep.(Pleis.), silt & sand, youngest
- Qfs2-Outburst flood dep.(Pleis.), silt & sand, 2nd oldest
- Qfg-Outburst flood dep.(Pleis.), gravels, undiv.
- Qfg3-Outburst flood dep.(Pleis.), gravels, 2nd youngest
- QPlg-Gravel (Pleistocene to Pliocene)
- PIMc-Ringold Fm., Continental sed. (Plio.-Mio.)
- PIMcg-Ringold Fm., Conglomerate (Plio.-Mio.)
- Mv(sem)-Saddle Mt Basalt, Elephant Mt Mbr (U. Mio.)
- Mv(se)-Saddle Mt Basalt, Esquatzel Mbr (M. Mio.)
- Mv(su)-Saddle Mt Basalt, Umatilla Mbr (M. Mio.)
- Mv(wpr)-Wanapum Basalt, Priest Rapids Mbr (M. Mio.)
- Mv(wr)-Wanapum Basalt, Roza Mbr (M. Mio.)
- Qfg(3-4u)-Outburst flood dep., gravels, undif.
- Qfs(3-4u)-Outburst flood dep., sands, undif.
- Mc-Cont. sed. dep.-interbeds in Columbia R. Basalt
- WTR-Water
- FAULT-Fault
- CONTACT-Contact between geologic units

Map source data: S.Reidel and K.Fecht
Map source data date: January 1994
Map source data scale: 1:100,000

WHC-LAD-3-22-94

Figure H-4. Legend for Hanford Geologic map.

H9210018.1A

Figure H-5. Regional Stratigraphic Column.

Unit Abbreviations

- Eo - Eolian (Holocene) deposits
- Hug - Upper Gravel Unit, Hanford formation
- Hun - Undifferentiated Hanford formation
- Hs - Sandy sequence, Hanford formation
- Hlg - Lower Fine Gravel Unit, Hanford formation
- H/R - Hanford/Ringold contact
- PP - Plio-Pleistocene unit
- UP - Upper unit, Ringold Formation
- E - Gravel unit E, Ringold Formation
- C - Gravel unit C, Ringold Formation
- LM - Lower mud sequence, Ringold Formation
- A - Gravel unit A, Ringold Formation
- EM - Elephant Mountain Member, Saddle Mountains Basalt
- RRI - Rattlesnake Ridge Interbed, Ellensburg Formation
- P - Pomona Member, Saddle Mountains Basalt

200east/asec2-5

Figure H-8. Cross-Section for the 200-E Area.

Hanford Water Table Map

WHC: JJA: 4-4-93

- Legend**
- Groundwater table elevation contour interval = 5 Feet
 - Contour lines are dashed where approximated
 - Areas where the basalt surface is above the water table

Source: Modified from WHC-EP-0394-7 (Kasza, et. al.)

Figure H-9. Hanford Water Table Map.

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