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DOE/RL-94-22
Revision 0

UC-630,721

State Waste Discharge Permit Application

100-N Sewage Lagoon

Date Published
June 1994

United States
Department of Energy
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Richland, Washington 99352

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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 constitutes the State Waste Discharge Permit application for the 100-N Sewage Lagoon. Since the influent to the sewer lagoon is domestic waste water, the State Waste Discharge Permit application for Public Owned Treatment Works Discharges to Land was used. Although the 100-N Sewage Lagoon is not a Public Owned Treatment Works, the Public Owned Treatment Works application is more applicable than the application for industrial waste water.

The 100-N Sewage Lagoon serves the 100-N Area and other Hanford Site areas by receiving domestic waste from two sources. A network of sanitary sewer piping and lift stations transfers domestic waste water from the 100-N Area buildings directly to the

100-N Sewage Lagoon. Waste is also received by trucks that transport domestic waste pumped from on site septic tanks and holding tanks. Three ponds comprise the 100-N Sewage Lagoon treatment system. These include a lined aeration pond and stabilization pond, as well as an unlined infiltration pond. Both piped-in and trucked-in domestic waste is discharged directly into the aeration pond.

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GLOSSARY

BMP	Best Management Practice
BOD	biological oxygen demand
CFR	Code of Federal Regulations
COD	chemical oxygen demand
DOE	U.S. Department of Energy
DOE-RL	U.S. Department of Energy, Richland Operations Office
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
gpd	gallons per day
GWQC	Ground Water Quality Criteria
MGD	million gallons per day
mg/L	milligrams per liter
PNL	Pacific Northwest Laboratory
POTW	Public Owned Treatment Works
PSPL	Puget Sound Power and Light Company
RCRA	Resource Conservation and Recovery Act
RCW	Revised Code of Washington
SAP	Sampling and Analysis Plan
SWDP	State Waste Discharge Permit
TKN	total Kjedldahl 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 100-N Sewage Lagoon. The 100-N Sewage Lagoon serves the 100-N Area and other Hanford Site areas by receiving domestic waste from two sources. A network of sanitary sewer piping and lift stations transfers domestic waste water from the 100-N Area buildings directly to the 100-N Sewage Lagoon. Waste is also received by trucks that transport domestic waste pumped from on site septic tanks and holding tanks. Three ponds comprise the 100-N Sewage Lagoon treatment system. These include a lined aeration pond and stabilization pond, as well as an unlined infiltration pond. Both piped-in and trucked-in domestic waste are discharged directly into the aeration pond.

1.1 ORGANIZATION

The Washington Administrative Code (WAC) 173-216 SWDP application form for the 100-N Sewage Lagoon 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 E correspond to Sections B through E 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.

1.2 STATE WASTE DISCHARGE PERMIT APPLICATION FORM

The following pages contain the SWDP application for the 100-N Sewage Lagoon.

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Site: 100-N Sewage Lagoon

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DOE/RL-94-22, Rev. 0
06/94

WASHINGTON STATE DEPARTMENT OF ECOLOGY

STATE WASTE DISCHARGE PERMIT APPLICATION FOR POTW DISCHARGES TO LAND

FOR STATE USE ONLY

Date Application Received		Date Fee Paid		Application/ Permit No.	
Date Application Accepted				Facility No.	
Temporary Permit Effective Date				Temporary 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. Applicant Name: U.S Department of Energy, Richland Operations Office

2. Facility Name: 100-N Sanitary Sewer System
(If different from applicant)

3. Unified Business Identification Number (UBI #): 91-0565159 (DOE tax exempt number)

4. Mailing Address: P.O. Box 550
Street
Richland, WA 99352
City/State Zip

5. Facility Address: 100-N Area - Hanford Site
Street
See Maps in Appendix A.
City/State Zip

6. Person to contact who is familiar with the information contained in this application:
J.E. Rasmussen — US DOE, Branch Chief, Regulatory Permits — 509-376-2247
Name Title Telephone

7. 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* — Date: 6/23/94

Acting Program Manager, Office of Environmental Assurance, Permits and Policy
Title

Steven H. Wisness
Printed Name

*Applications must be signed by either a principal executive officer or a ranking elected official.

SECTION B. TREATMENT PLANT INFORMATION

1. Identify communities or areas connected to the Public Owned Treatment Works (POTW):

	Name	Population Served
a.	See Appendix B, Item 1.	
b.		
c.		
d.		

2. Identify all industries connected to the POTW or to the collection system by type of industry, name, address, and telephone number. Attach extra sheet(s) if needed.

See Appendix B, Item 2.

3. Plant Design and Operation Manuals:

	Type	Copy at POTW Yes	Copy at POTW No
a.	Engineering Report	☒	☐
b.	Operation and Maintenance Manual	☐	☒

4. Plant Design Data:

a.	Average Influent Flow for Maximum Month (MGD):	0.05
b.	Influent BOD Load (lbs/day):	75
c.	Influent SS Load (lbs/day):	75
d.	Began Operation (year):	1987
e.	Last Major Revision (year):	NA
f.	Planned Revisions (year):	See Appendix B
g.	Design Population:	2500

5. Attach a simple schematic drawing of POTW indicating process and process discharge in MGD (*attachments should be 11 x 17", or smaller*). Include all unit processes identified in question B.6. **See Appendix B, Item 5.**

6. Check appropriate unit process.

Treatment	Unit Process			Check
Preliminary Treatment	Manually Operated Bar Screens			
	Mechanically Operated Bar Screens			
	Grit Removal			
	Pre-Aeration			
	Comminutors/Grinders			
	Other (*specify*)			
Primary Treatment	Primary Sedimentation Tank/Clarifiers			
	Other (*specify*)			
Secondary Treatment	Oxidation Ditch			
	Aerated Lagoon			✓
	Non-aerated Lagoon			
	Secondary Clarifiers			
	Polishing Ponds			
	Other (*specify*) **Stabilization Pond**			✓
Additional Treatment	Coagulation			
	Filtration			
	Storage (Lined Lagoon)			
	Storage (Unlined Lagoon)			
	Other (*specify*)			
Disinfection	Chlorination			
	Other (*specify*)			
Land Application	**Method**	**Check**	**Method**	**Check**
	Drainfield		Flood Irrigation	
	Rapid Infiltration		Ridge and Furrow Irrigation	
	Constructed Wetlands		Subsurface Irrigation	
	Sprinkler Irrigation		Other-**Infiltration Pond**	✓

SECTION C. 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 C, Item 1.		
Conductivity			
Total Dissolved Solids			
Total Suspended Solids			
BOD (5 day)			
Total Residual Chlorine			
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)			
Fecal Coliform			
Total Coliform			

2. Has the effluent been analyzed for any other parameters than those identified in question C.1? If so, when? Attach results. *(Note: Ecology may require additional testing.)* **See Appendix C, Item 2.**

SECTION D. SLUDGE MANAGEMENT AND DISPOSAL

1. Sludge Management Plan ☐ Yes ☒ No
   Plan approved by:

   ☐ Local Health District _____
   Date approved

   ☐ Department of Ecology _____
   Date approved

2. Describe sludge generation, stabilization, utilization, and disposal. Attach extra sheets as necessary.

   See Appendix D, Item 2.

SECTION E. 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 E, 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 E, Item 2.

3. Attach a United States Geological Survey (USGS) topographic map. Show the following on this map:
   a. Location and name of internal and adjacent streets
   b. Surface water drainage systems within ¼ mile of the site
   c. All wells within 1 mile of the site
   d. Chemical and product handling and storage facilities
   e. Infiltration sources, such as drainfields and lagoons within ¼ mile of the site
   f. Wastewater discharge points including bypasses
   g. Other activities and land uses within ¼ mile of the site

See Appendix E, Item 3.

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

See Appendix E, Item 4.

5. Describe soils on the site using information from local soil survey reports. *(Submit on separate sheet.)*

   See Appendix E, Item 5.

6. Describe the local geology and hydrogeology within one mile of the site. *(Submit on separate sheet.)*

   See Appendix E, Item 6.

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

See Appendix E, Item 7.

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APPENDICES

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APPENDIX B TREATMENT PLANT INFORMATION B-1

APPENDIX C WASTE WATER INFORMATION C-1

APPENDIX D SLUDGE MANAGEMENT AND DISPOSAL D-1

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APPENDIX A

GENERAL INFORMATION

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FIGURES

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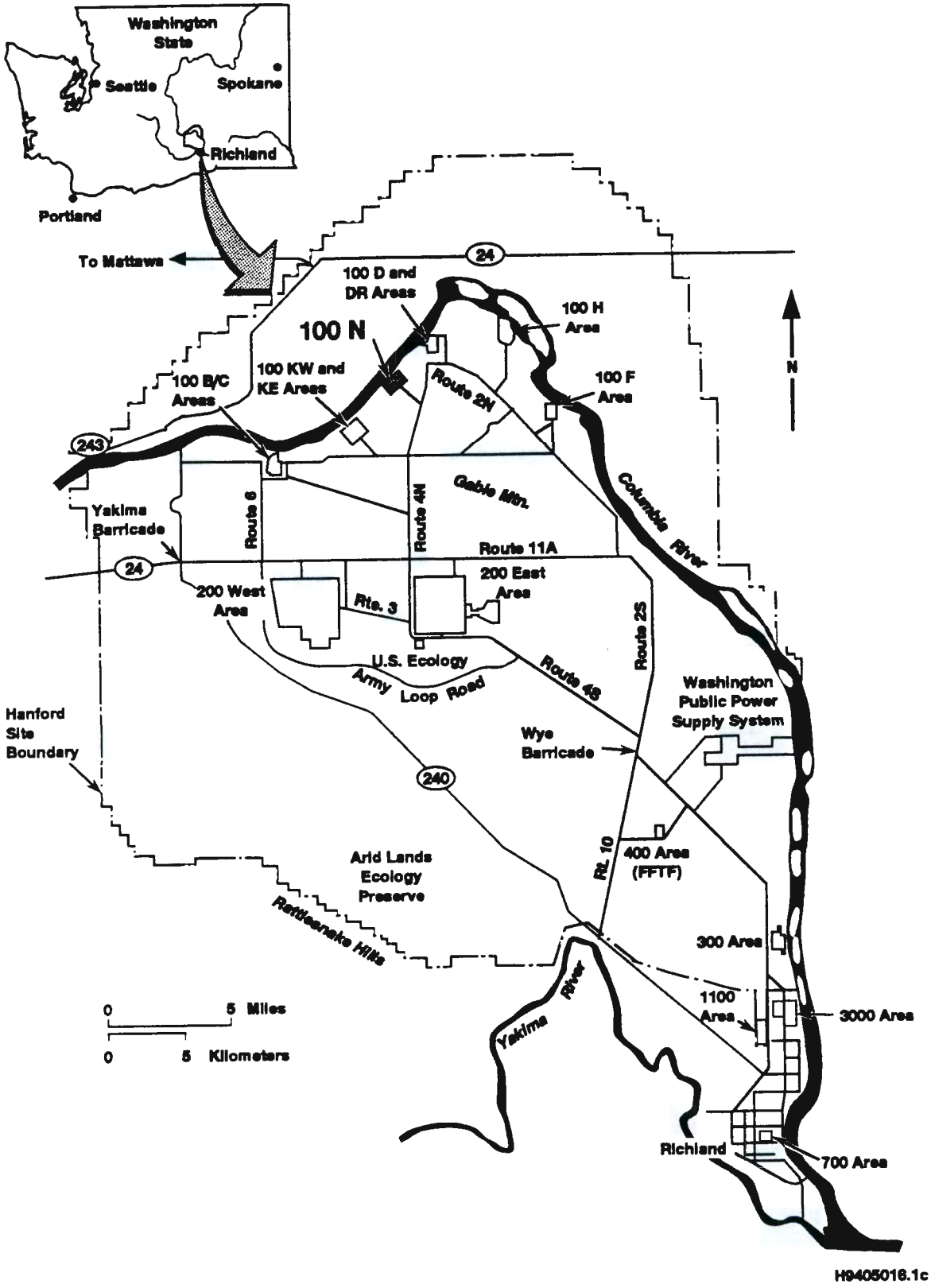

Figure A-1. General Hanford Site Map.

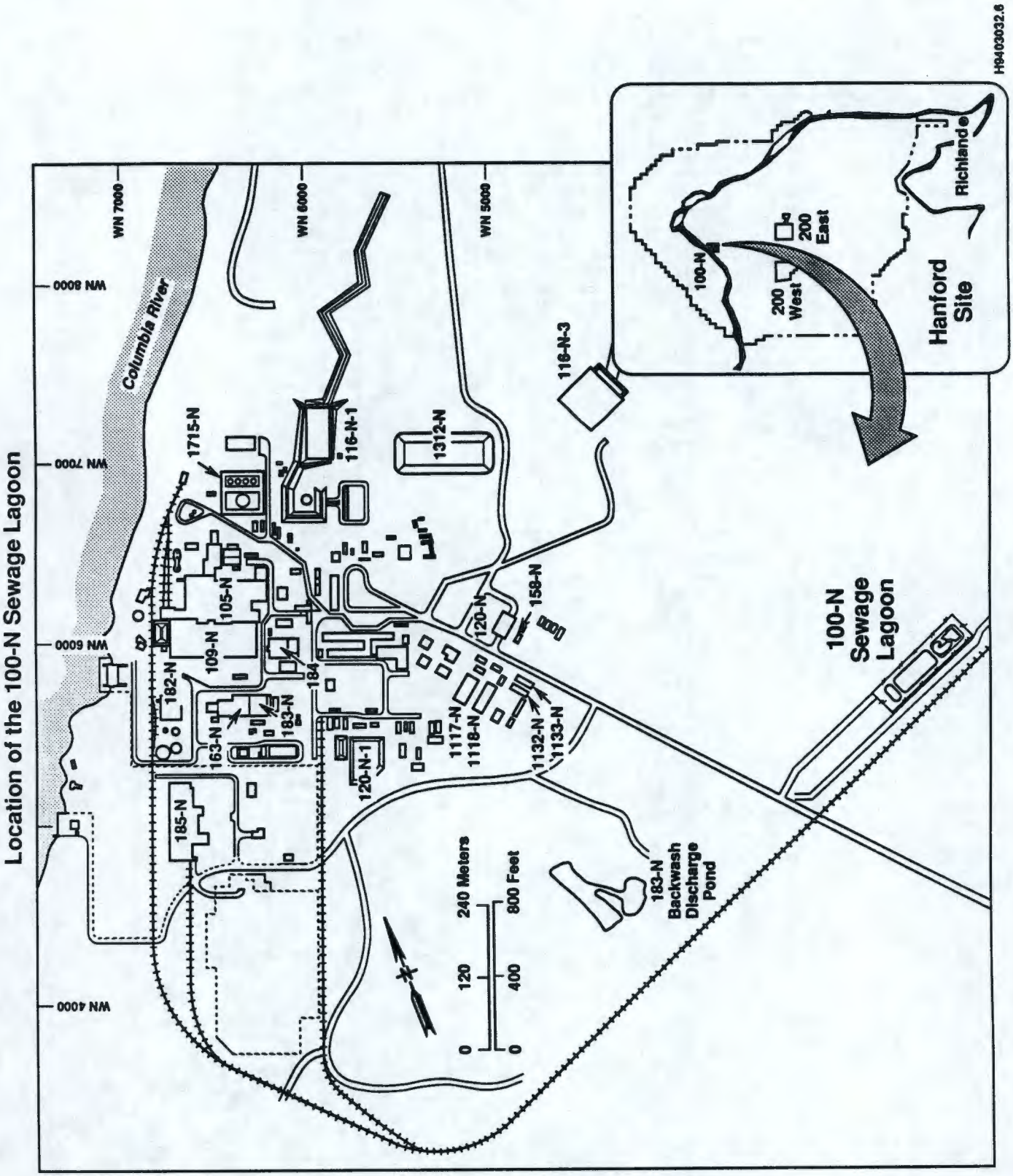

Figure A-2. Location of the 100-N Sewage Lagoon.

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APPENDIX B

TREATMENT PLANT INFORMATION

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IDENTIFY COMMUNITIES OR AREAS CONNECTED TO THE PUBLIC OWNED TREATMENT WORKS (POTW) B-1

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IDENTIFY ALL INDUSTRIES CONNECTED TO THE POTW OR TO THE COLLECTION SYSTEM BY TYPE OF INDUSTRY, NAME, ADDRESS, AND TELEPHONE NUMBER. B-1

SECTION B, ITEM 4f
PLANNED REVISIONS (YEAR): B-16

SECTION B, ITEM 5
ATTACH A SIMPLE SCHEMATIC DRAWING OF POTW INDICATING PROCESS AND PROCESS DISCHARGE IN MGD (*ATTACHMENTS SHOULD BE 11 x 17", OR SMALLER*). INCLUDE ALL UNIT PROCESSES IDENTIFIED IN QUESTION B.6. ..... B-16

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B-2 Current Schematic for the 100-N Sewage Lagoon B-18

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SECTION B

Due to the overlap between Item 1 and Item 2, the items were combined. One process description is included followed by two lists of buildings contributing to the 100-N Sanitary Sewer System.

SECTION B, ITEM 1

IDENTIFY COMMUNITIES OR AREAS CONNECTED TO THE PUBLIC OWNED TREATMENT WORKS (POTW).

SECTION B, ITEM 2

IDENTIFY ALL INDUSTRIES CONNECTED TO THE POTW OR TO THE COLLECTION SYSTEM BY TYPE OF INDUSTRY, NAME, ADDRESS, AND TELEPHONE NUMBER.

INTRODUCTION

The 100-N Sewage Lagoon serves the 100-N Area and other Hanford Site areas by receiving domestic waste from two sources. A network of domestic sewer piping and lift stations transfers domestic waste water from the 100-N Area buildings directly to the system. Waste is also received by trucks that transport domestic waste pumped from on site septic tanks and holding tanks. Three ponds are used to treat the waste discharged to the 100-N Sewage Lagoon. These include an aeration pond, a stabilization pond, and an infiltration pond. Both piped-in and trucked-in waste are discharged directly into the aeration pond. This informaiton has been summarized and updated from the *Characterization Report for the Table 4 Miscellaneous Streams in Consent Order No. DE 91NM-177* (WHC 1993a).

Sanitary Waste Generated from 100-N Area Buildings

Raw water is supplied to the 100-N Area from export lines originating in the 100-B and 100-D Areas. At the 183-N Water Treatment Facility, the raw water is chemically treated with chlorine, alum, and polyacrylamide (separan) in a mixing tank. Chlorine is added as a biocide to control the growth of algae, bacteria, and other organisms. Aluminum sulfate (alum) is used to aid in the coagulation process. The water is then piped to a coagulator where separan is added to allow the sand filters to operate more efficiently. Water is then passed through gravity sand filters that remove the remaining

solid particles. Once filtered, the resulting sanitary (potable) water is stored in the clearwell and is dispensed to the 100-N facilities.

Domestic waste water in the 100-N Area is discharged directly to either the sewage lagoon or the septic tanks that discharge to individual drain fields or cesspools. The 100-N Area buildings discharging waste directly to the 100-N Sewage Lagoon have been identified and classified as 'administrative' or 'process' buildings. Buildings that do not contain processes, and generate domestic waste water from bathroom and kitchen use only are classified as 'administrative.' Buildings with functions or purposes other than administrative are classified as 'process' (even though these buildings may only generate domestic waste from bathroom and kitchen use). Process buildings do not discharge process waste water to the 100-N Sewage Lagoon. Table B-1 provides a list of buildings and their corresponding classifications.

The 100-N Area buildings directly connected to the Sewage Lagoon by pipes discharge an average of 3,400 gallons per day or 102,000 gallons per month to the sewage lagoon. However, future plans involve decommissioning all of the buildings within the protected fence at the 100-N Area. There will be plans to disconnect drains to the sewage lagoon and septic tanks. As a result of decomissioning activities, the volume of sanitary sewage discharged to the sewage lagoon may fall below the volume required for normal operation of the sewage lagoon system. For this reason, an alternative sewer system may be needed to handle the remaining minor amount of sewage from the mobile offices. Two possible options are installing a centrally located septic tank or locating portable toilets throughout the 100-N Area.

Sanitary Waste Generated from Hanford Site Septic Tanks

Sanitary sewage is also trucked in from other septic tanks on the Hanford Site to the 100-N Sewage Lagoon. The septic tanks are pumped out and the contents sent to the 100-N Sewage Lagoon if the tanks have failed, or as preventive maintenance. Preventive maintenance is performed on the septic tanks once every 3 to 5 years. Table B-2 lists the building names and identification numbers of the corresponding septic tanks from each area. There are also a small number of holding tanks that are used to store domestic sewage. These tanks are routinely emptied and the contents trucked to the 100-N Sewage Lagoon for discharge.

The trucked-in sewage from approximately 75 onsite septic tanks and sumps is discharged to the 100-N Sewage Lagoon at a rate of five to 15 truckloads per day, resulting in an estimated of 15,000 gallons per day to 450,000 gallons of influent per month.

Table B-1. Buildings Directly Connected to the 100-N Sewage Lagoon.

(Sheet 1 of 2)

Building Number	Mobile Office No.	Building Name	Building Classification	Occupancy
105-N		Reactor Facility	Process	224
109-N		Heat Exchanger	Process	
184-N		Plant Service Boiler House	Process	
1100-N		Badgehouse- Administration and First Aid	Administrative	
1101-N		Administration Building	Administrative	
1102-N		Drafting Office Building	Administrative	
1103-N	MO-415	Administrative Office	Administrative	
1107-N	MO-925	Training Classroom	Administrative	
1111-N	MO-101	Mobile Offices	Administrative	
1112-N		Guard Station	Administrative	
1113-N	MO-054	Mobile Office	Administrative	
1114-N	MO-055	Mobile Office	Administrative	
1115-N	MO-050	Mobile Office	Administrative	
1116-N	MO-358	Training Simulator	Administrative	
1117-N	MO-401	Mobile Office	Administrative	
1118-N	MO-402	Mobile Office	Administrative	
1119-N	MO-403	Change and Lunchroom	Administrative	
1123-N	MO-928	Mobile Office	Administrative	
1124-N	MO-900	Mobile Office	Administrative	
1125-N		Office Building (trailer)	Administrative	
1126-N	MO-923	Mobile Office	Administrative	
1133-N	MO-301	Staging Area Trailer	Administrative	

Table B-1. Buildings Directly Connected to the 100-N Sewage Lagoon.

(Sheet 2 of 2)

	Building Number	Mobile Office No.	Building Name	Building Classification	Occupancy
1	1134-N	MO-229	Autocad/Draft	Administrative	224
2	1135-N	MO-352	Mobile Office	Administrative	(continued)
3	1146-N	MO-910	Mobile Office	Administrative	
4	1147-N	MO-381	Office Facility	Administrative	
5	1153-N	MO-200	Office Facility	Administrative	
6	1154-N		Office Facility	Administrative	
7	1313-N		Change and Control Building	Administrative	
8	1512-N	MO-549	Craft Lunchroom	Administrative	
9	1514-N	MO-550	Office Facilities	Administrative	
10	1705-N		Instrument and Electrical Facility	Process	
11		MO-314	Mobile Office	Administrative	
12		MO-425	Mobile Service Laboratory	Process	
13		MO-427	Mobile Service Laboratory	Process	
14					

Table B-2. List of Septic Tanks Potentially Providing Sewage to the 100-N Sewage Lagoon.

(Sheet 1 of 11)

AREA	ESTIMATED OCCUPANCY	BUILDING NUMBER	BUILDING NAME	SEPTIC TANK NUMBER	SEPTIC TANK CAPACITY (gallons)
100B	0	105-B	Reactor Facility	1607-B2	Unknown
100B		190-B	Pumphouse	1607-B2	
100B		100-B/C	Reactor (out of service)	1607-B2	
100B		151-B	Primary Substation	1607-B6	Unknown
100B		182-B	Reservoir and Pumphouse	1607-B12	Unknown
100D	10	183-D	Filter Plant Power Operation Facility	1607-D2	Unknown
100D		182-D	Reservoir and Pumphouse	1607-D2	
100D		105-D	Reactor Facility	1607-D2	
100D		190-DA	Main Process Pump Houses Annex	1607-D2	
100D		189-D	Mechanical Development Laboratory	1607-D2	
100D		185-D	Development Laboratory	1607-D2	
100D		151-D	Primary Substation	1607-D3	Unknown
100K	75	1720-K	Office and Telephone Exchange	1607-K1	1,000
100K		1721-K	Mobile Office	1607-K1	
100K		183-KE	Headhouse/Chlorine	1607-K2	500
100K		1717-K	Maintenance Transportation Shop	1607-K4	7,500
100K		165-KE	Power Control Building	1607-K5	1,750
100K		115-KE	Gas Recirculation Building	1607-K5	
100K		105-KE	Reactor Facility	1607-K5	

Table B-2. List of Septic Tanks Potentially Providing Sewage to the 100-N Sewage Lagoon.

(Sheet 2 of 11)

AREA	ESTIMATED OCCUPANCY	BUILDING NUMBER	BUILDING NAME	SEPTIC TANK NUMBER	SEPTIC TANK CAPACITY (gallons)
100K	75 (Continued)	1706-KE	Water Studies Semiworks Facility	1607-K5	1,750 (Continued)
100K		1706-KER	Water Studies Recirculation Building	1607-K5	
100K		165-KW	Power Control Building	1607-K6	
100K		105-KW	Reactor Facility	1607-K6	
100K		115-KW	Gas Recirculation Building	1607-K6	
100N	15	1141-N	Men's Restroom	124-N-1	2,300
100N		183-N	Water Filter Plant Building	124-N-1	
100N		163-N	Demineralization Plant Building	124-N-1	
100N		1140-N	Women's Restroom	124-N-1	
100N		182-N	High Lift Pumphouse	124-N-2	2,300
100N		107-N	Recirculation Cooling Building	124-N-3	500
100N		1120-N	Storage and Training Facility	124-N-9	3,000
200E	2,000	209-E	Strontium Semi-Works	2607-E	Unknown
200E		2719-E	Office Machine Storage	2607E1	20,000
200E		2715-EC	Paint Shop	2607E1	
200E		2722-E	Office Building	2607E1	
200E		2719-EA	Medical Aid Station	2607E1	
200E		2707-E	Change House	2607E1	
200E		2703-E	Waste Management Facility Control Room	2607E1	

Table B-2. List of Septic Tanks Potentially Providing Sewage to the 100-N Sewage Lagoon.

(Sheet 3 of 11)

AREA	ESTIMATED OCCUPANCY	BUILDING NUMBER	BUILDING NAME	SEPTIC TANK NUMBER	SEPTIC TANK CAPACITY (gallons)
200E	2,000	2713-E	Office Administration Building	2607E1	20,000
200E	(Continued)	2710-E	Coal Handlers Shelter	2607E1	(Continued)
200E		MO-104	Mobile Office at 2719-E	2607E1	
200E		MO-414	Mobile Office at Old 2704-E Site	2607E1	
200E		MO-387	Control Room Trailer at 2703-E	2607E1	
200E		MO-934	Change/Lunchroom Trailer at 284-E	2607E1	
200E		MO-922	Office/Change Trailer at 2703-E	2607E1	
200E		MO-257	Mobile Office at 2711-E	2607E1	
200E		MO-256	Mobile Office at 2711-E	2607E1	
200E		MO-384	Mobile Office at 2703-E	2607E1	
200E		MO-324	Change Room Trailer at 284-E	2607E1	
200E		275-E	Carpenter Shop Building	2607E1	
200E		283-E	Water Filtration Plant	2607E1	
200E		272-E	Fabrication, Mockup Shop Building	2607E1	
200E		274-E	Landlord and Maintenance Shop	2607E1	
200E		284-E	Power House and Steam Plant	2607E1	
200E		15358	Administrative Building	2607E1	
200E		18648	Administrative Building	2607E1	
200E		52108	Administrative Building	2607E1	
200E		15347	Administrative Building	2607E1	
200E		15000	Administrative Building	2607E1	

Table B-2. List of Septic Tanks Potentially Providing Sewage to the 100-N Sewage Lagoon.

(Sheet 4 of 11)

AREA	ESTIMATED OCCUPANCY	BUILDING NUMBER	BUILDING NAME	SEPTIC TANK NUMBER	SEPTIC TANK CAPACITY (gallons)
200E	2,000 (Continued)	2911	Administrative Building	2607E1	6,620
200E		15346	Administrative Building	2607E1	
200E		MO-247	Mobile Office at Gate 815	2607E2	
200E		MO-246	Mobile Office at Gate 815	2607E2	
200E		MO-245	Mobile Office at Gate 815	2607E2	
200E		MO-248	Mobile Office at Gate 815	2607E2	
200E		12668	Administrative Building	2607E3	14,377
200E		17533	Administrative Building	2607E3	
200E		224-B	Storage Building	2607E3	
200E		221-B	Process Treatment Building, Canyon	2607E3	
200E		222-B	Office Building	2607E3	
200E		221-B	Process Treatment Building, Canyon	2607E4	240
200E		MO-543	Change Room/Lunchroom Trailer at 2704-C	2607E5	14,377
200E		2704-C	Office Administration and Gate House	2607E5	
200E		MO-317	Mobile Office at 2704-C	2607E5	
200E		MO-337	Change Room Trailer at 2704-C	2607E5	
200E		2701-EC	Guard Station for 209-E	2607E5	
200E		209-E	Tank Farm Waste Support Facility	2607E5	
200E		275-EA	Warehouse Essential Materials	2607E6	10,400
200E		202-A	Purex Canyon and Service Facility	2607E6	

Table B-2. List of Septic Tanks Potentially Providing Sewage to the 100-N Sewage Lagoon.

(Sheet 5 of 11)

AREA	ESTIMATED OCCUPANCY	BUILDING NUMBER	BUILDING NAME	SEPTIC TANK NUMBER	SEPTIC TANK CAPACITY (gallons)
200E	2,000 (Continued)	209-E	Tank Farm Waste Support Facility	2607E7	240
200E		MO-317	Mobile Office at 2704-C	2607E7	
200E		MO-543	Changeroom/Lunchroom at 2704-C	2607E7	
200E		2701-EC	Guard Station for 209-E	2607E7	
200E		MO-337	Change Room Trailer at 2704-C	2607E7	
200E		2704-C	Office Administration and Gate House	2607E7	
200E		MO-413	Mobile Office at 2750-E	2607E8	13,200
200E		MO-407	Mobile Office at 2101-M	2607E8	
200E		MO-234	Mobile Office at 2750-E	2607E8	
200E		MO-043	Mobile Office (Dosimetry) at 2750	2607E8	
200E		2101-M	Spare Parts Warehouse/Office Building	2607E8	
200E		MO-021	Mobile Office at 2101-M	2607E8	
200E		MO-042	Mobile Office at 2750-E	2607E8	
200E		242-B	Tank Farm General Area	2607E9	500
200E		242-BL	Tank Farm General Area	2607E9	
200E		2702-E	Grout Trailer	2607E10	2,250
200E		2719-E	Grout Trailer	2607E10	
200E		2719-EA	Grout Trailer	2607E10	
200E		MO-386	Mobile Office	2607E11	2,250
200E		2400-E	Dry Material Facility Control Room	2607E11	

Table B-2. List of Septic Tanks Potentially Providing Sewage to the 100-N Sewage Lagoon.

(Sheet 6 of 11)

AREA	ESTIMATED OCCUPANCY	BUILDING NUMBER	BUILDING NAME	SEPTIC TANK NUMBER	SEPTIC TANK CAPACITY (gallons)
200E	2,000	242-A	Evaporator	2607E12	10,000
200E	(Continued)	MO-996	Mobile Office at 272-AW	2607E12	
200E		272-AW	Tank Farm Operations Support Facility	2607E12	
200E		MO-267	Mobile Office at 272-AW	2607E12	
200E		MO-266	Mobile Office at 272-AW	2607E12	
200E		241-A	Tank Farm General Area	2607E12	
200E		MO-393	Mobile Office at 272-AW Tank Farms	2607E12	
200E		MO-268	Mobile Office at 272-AW	2607E12	
200E		241-AP	Tank Farm General Area	2607E12	
200E		MO-337	Mobile Office at 2704-C	2607E	Unknown
200E		MO-543	Mobile Office at 2704-C	2607E	
200E		2707-AR	Sludge Vault Change House	2607EA	Unknown
200E		244-AR	Sludge Vault Storage and Processing	2607EA	
200E		241-BY-254	Control House and Compressor	2607EB	500
200E		241-A-271	Tank Farm Control House	2607EC	Unknown
200E		2707-AX	Change House AX Farm	2607ED	Unknown
200E		202-A	Purex Canyon and Service Facility	2607EE	Unknown
200E		271-BXR	West of 271-BXR	2607EF	Unknown
200E		271-CR	Service and Office Building	2607EG	Unknown
200E		2750-E	Waste Management and Operating Facility	2607EK	15,000
200E		2721-E	Central Alarm Fac	2607EM	5,000

Table B-2. List of Septic Tanks Potentially Providing Sewage to the 100-N Sewage Lagoon.

(Sheet 7 of 11)

AREA	ESTIMATED OCCUPANCY	BUILDING NUMBER	BUILDING NAME	SEPTIC TANK NUMBER	SEPTIC TANK CAPACITY (gallons)
200E	2,000 (Continued)	2727-E	Safeguards and Security Offices	2607EN	2,500
200E		2711-E	Garage	2607EO	2,500
200E		2721-EA	Helicopter Support Facility	2607EP	1,500
200E		MO-388	Trailer at 2721-EA	2607EP	
200E		2751-E	Office Facility	2607EQ	10,000
200E		2753-E	200 East Office	2607EQ	
200E		2752-E	200 East Office	2607EQ	
200E		MO-253	Mobile Office at Gate 850	2607ER	1,600
200E		MO-252	Mobile Office at Gate 850	2607ER	
200E		MO-047	Mobile Office at 2101-M	2607ER	1,000
200E		MO-251	Mobile Office at Gate 850	2607ER	
200W	1,500	274-W	Office Building	2607W1	20,880
200W		275-W	Heavy Equipment Shop	2607W1	
200W		272-W	Machine Shop Building	2607W1	
200W		2719-WA	First Aid Station and Offices	2607W1	
200W		2707-W	Change House	2607W1	
200W		2723-W	Mask Laundry and Office Building	2607W1	
200W		2724-W	Laundry Facility	2607W1	
200W		284-W	Power House Steam Plant	2607W1	
200W		2713-W	Garage	2607W1	

Table B-2. List of Septic Tanks Potentially Providing Sewage to the 100-N Sewage Lagoon.

(Sheet 8 of 11)

AREA	ESTIMATED OCCUPANCY	BUILDING NUMBER	BUILDING NAME	SEPTIC TANK NUMBER	SEPTIC TANK CAPACITY (gallons)
2200W	1,500	2704-W	Office Building	2607W1	20,880 (Continued)
200W	(Continued)	2701-WA	Administrative Offices (janitors)	2607W2	6,620
200W		2720-W	Patrol Headquarters and Changeroom	2607W2	
200W		2709-W	Office Building	2607W2	
200W		224-T	Transuranic Storage and Assay Facility	2607W3	14,380
200W		222-T	Office Administration Building	2607W3	
200W		221-T	Process, Canyon, Laboratory and Office	2607W3	
200W		271-T	Office and Service Building	2607W3	
200W		221-T	Process, Canyon, Laboratory and Office	2607W4	240
200W		221-U	U-Plant Canyon and Service Building	2607W5	14,380
200W		271-U	Plutonium Storage	2607W5	
200W		224-UA	Calcination Facility	2607W5	14,380
200W		222-U	Office and Laboratory Building	2607W5	
200W		224-U	Concentration Facility, UO3 Plant	2607W5	
200W		MO-037	Mobile Office at 222-S	2607W6	20,000
200W		MO-346	Mobile Office at 222-S	2607W6	
200W		MO-039	Administrative Offices	2607W6	
200W		MO-924	Mobile Office at 202-S	2607W6	
200W		MO-028	Training Trailer at 2704-S	2607W6	
200W		MO-947	Mobile Office at 2704-S	2607W6	
200W		222-S	Control Laboratory	2607W6	

Table B-2. List of Septic Tanks Potentially Providing Sewage to the 100-N Sewage Lagoon.

(Sheet 9 of 11)

AREA	ESTIMATED OCCUPANCY	BUILDING NUMBER	BUILDING NAME	SEPTIC TANK NUMBER	SEPTIC TANK CAPACITY (gallons)
200W	1,500 (Continued)	202-S	REDOX Canyon and Service Facility	2607W6	20,000 (Continued)
200W		2704-S	Office Building	2607W6	
200W		MO-936	Mobile Office at 202-S	2607W6	
200W		221-U	U-Plant Canyon and Service Building	2607W7	240
200W		231-Z	Materials Engineering Laboratory	2607W8	5,070
200W		2707-SX	Change House	2607W9	500
200W		MO-281	Mobile Office at Central Waste Complex	2607W10	3,000
200W		MO-720	Mobile Office at Central Waste Complex	2607W11	2,000
200W		MO-721	Mobile Office at Central Waste Complex	2607W12	2,000
200W		MO-244	Mobile Office at 234-5Z	2607WA	2,000
200W		MO-250	Mobile Office at 234-5Z	2607WA	
200W		MO-249	Mobile Office at 234-5Z	2607WA	
200W		MO-011	200W Patrol Headquarters at 234-5Z	2607WA	
200W		MO-032	Mobile Office at 234-5Z	2607WB	2,400
200W		MO-016	Mobile Office at 234-5Z	2607WB	
200W		MO-015	Mobile Office at 234-5Z	2607WB	
200W		MO-017	Mobile Office at 234-5Z	2607WB	
200W		MO-031	Mobile Office at 234-5Z	2607WB	
200W		MO-939	Mobile Office at 234-5Z	2607WB	
200W		272-S	Maintenance Shop	2607WC	3,000
200W		242-S	Evaporator Facility	2607WC	

Table B-2. List of Septic Tanks Potentially Providing Sewage to the 100-N Sewage Lagoon.

(Sheet 10 of 11)

AREA	ESTIMATED OCCUPANCY	BUILDING NUMBER	BUILDING NAME	SEPTIC TANK NUMBER	SEPTIC TANK CAPACITY (gallons)
200W	1,500 (Continued)	MO-027	Mobile Office at 272-S	2607WC	3,000 (Continued)
200W		272-WA	Tank Farm Support Facility	2607WL	4,000
200W		270-Z	Plutonium Finishing Plant Operations and Support Facility	2607Z	25,000
200W		2704-Z	Office Administration Building	2607Z	
200W		234-5Z	Plutonium Fabrication Facility	2607Z	
200W		2701-Z	Plutonium Finishing Plant Gatehouse	2607Z	
200W		2701-ZA	Central Alarm Station Facility	2607Z	
200W		2736-ZB	Plutonium Storage Support Facility	2607Z1	750
200W		234-5Z	Office Annex	2607Z1	
300	500	ALL	All Buildings in the 300 Area	3707	100,000
300		331-D	Animal Sciences	AWC	Unknown
300		331-D	Animal Sciences	AWS	Unknown
300		331	Life Sciences Laboratories	AWS	
400	700	ALL	All Buildings in the 400 Area	4607	50,000
				4608	3,000
600	170	609	Central Fire Station, 100 Areas	2607FSM	Unknown
600		6292	Rigger Loft	6607-1	1,500
600		MO-254	Mobile Office at 6[illegible]	6607-2	1,720

Table B-2. List of Septic Tanks Potentially Providing Sewage to the 100-N Sewage Lagoon.

(Sheet 11 of 11)

AREA	ESTIMATED OCCUPANCY	BUILDING NUMBER	BUILDING NAME	SEPTIC TANK NUMBER	SEPTIC TANK CAPACITY (gallons)
600	170 (Continued)	MO-255	Mobile Office at 622-G	6607-2	1,720 (Continued)
600		622-R/G	Atmosphere Science Annex	6607-2	
600		622-R	Weather Station	6607-2	
600		609-G	Fire Alarm and Testing Office Facility	6607-3	1,500
600		609-A	Fire Station, 200 Areas	6607-4	1,900
600		616	Nonradioactive, Hazardous Waste Facility	6607-5	1,000
600		6701	Wye Barricade Guard House	6607-6	1,250
600		604	Yakima Barricade Patrol Station, North of 200W	6607-7	1,600
600		251-W	Primary 230kV Switching Station, North of 200W	6607-8	Unknown
600		MO-990	Mobile Office at 251-W	6607-8	
600		6266	WSCF	6607-9	10,000
600		661	Hanford Patrol Academy	6607-10	3,000
PNL	Unknown	6652-J	Ecology Headquarters	6652I	6,000
PNL		6652-I	Arid Land Ecology Headquarters	6652I	
PNL		6652-H	Sample Preparation Building	6652I	

SECTION B, ITEM 4f

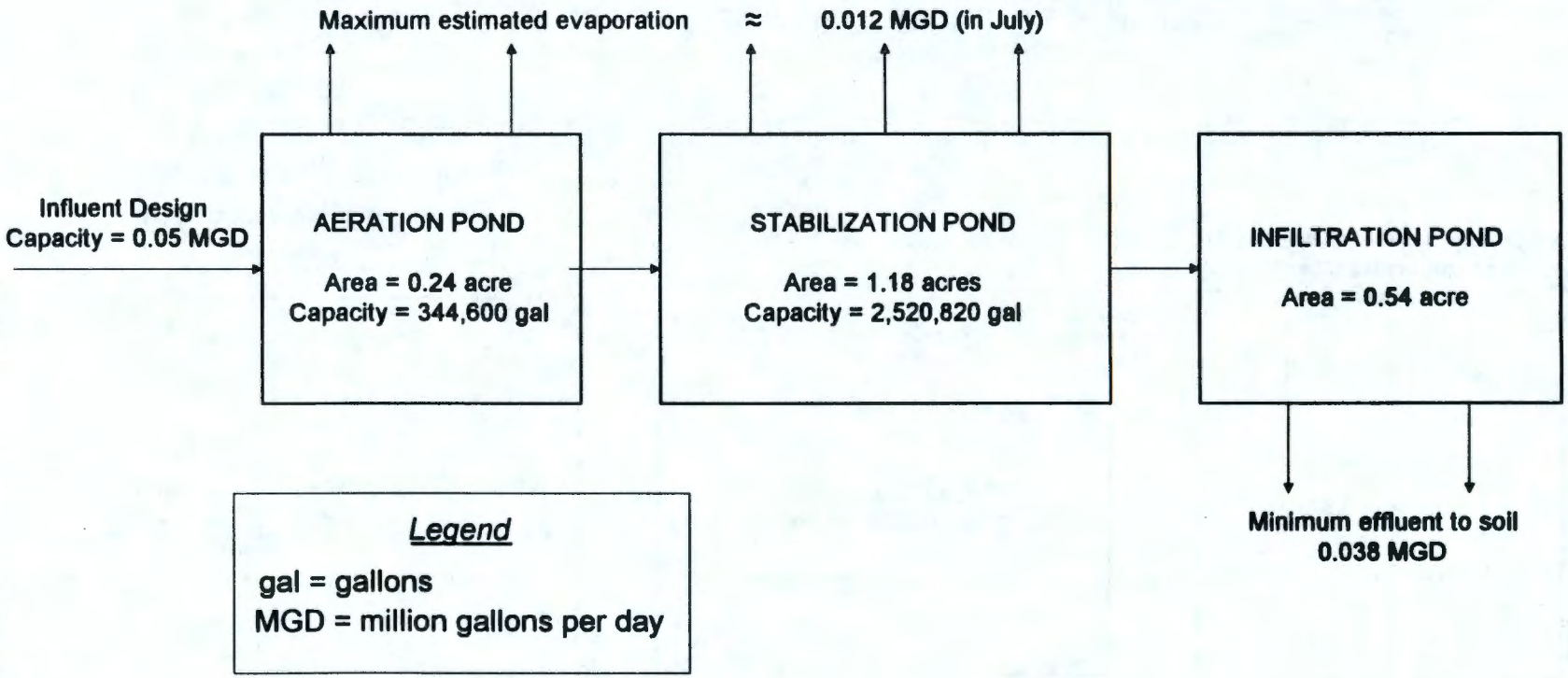
PLANNED REVISIONS (YEAR):

Future plans involve decommissioning all of the buildings within the protected fence at the 100-N Area. There will be plans to disconnect drains to the sewage lagoon and septic tanks. As a result of decomissioning activities, the volume of domestic sewage discharged to the sewage lagoon may fall below the volume required for normal operation of the sewage lagoon system. For this reason, an alternative sewer system may be needed to handle the remaining minor amount of sewage from the mobile offices. Two possible options are installing a centrally located septic tank or locating portable toilets throughout the 100-N Area. These changes are tentatively scheduled for the year 2018.

SECTION B, ITEM 5

ATTACHA SIMPLE SCHEMATIC DRAWING OF POTW INDICATING PROCESS AND PROCESS DISCHARGE IN MGD. INCLUDE ALL UNIT PROCESSES IDENTIFIED IN QUESTION B.6.

Two schematic drawings are attached. The first schematic shows the influent, evaporation, and effluent based on the design capacity (Figure B-1). The second schematic drawing shows the influent, evaporation, and effluent for what the sewer system is actually receiving as influent and discharging as effluent (Figure B-2).



Design Schematic of Treatment System

Figure B-1. Design Schematic for the 100-N Sewage Lagoon.

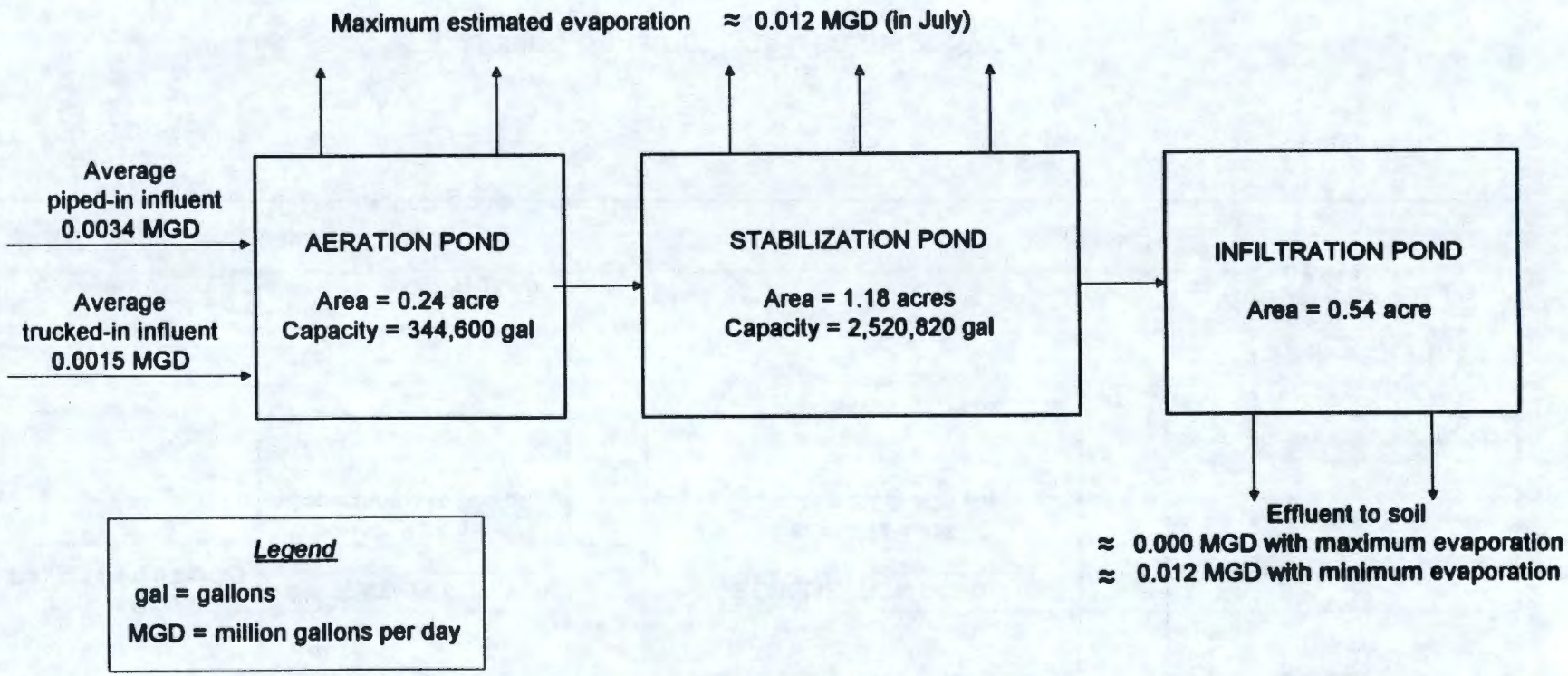


Figure B-2. Current Schematic for the 100-N Sewage Lagoon.

APPENDIX C

WASTE WATER INFORMATION

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CONTENTS

SECTION C, 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 ..... C-1

SECTION C, ITEM 2
HAS THE EFFLUENT BEEN ANALYZED FOR ANY OTHER PARAMETERS THAN THOSE IDENTIFIED IN QUESTION C.1? IF SO, WHEN? ATTACH RESULTS. *(NOTE: ECOLOGY MAY REQUIRE ADDITIONAL TESTING.)* C-1

TABLE

C-1 100-N Sanitary Sewer Data C-2

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SECTION C

All available data are provided in Table C-1. Therefore, Items 1 and 2 are combined and addressed in Table C-1.

SECTION C, 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.*

SECTION C, ITEM 2

HAS THE EFFLUENT BEEN ANALYZED FOR ANY OTHER PARAMETERS THAN THOSE IDENTIFIED IN QUESTION C.1? IF SO, WHEN? ATTACH RESULTS. *NOTE: ECOLOGY MAY REQUIRE ADDITIONAL TESTING.)*

The composite data presented below represent analytical results of the sampling on two occasions, once in September, 1993 and once in January, 1994. Samples were obtained from the outfall of the stabilization/settling pond. The samples obtained in January 1994 and resultant data were obtained in accordance with a sampling and analysis plan (WHC 1993c). The data obtained in September were part of an initial effort to provide systems operations personnel with data to evaluate performance of the lagoon system. The sampling was not performed to the WHC 1993c but the samples were taken by sampling personnel that are qualified to obtain RCRA/CERCLA samples and the laboratories that analyzed the samples are currently under contract to WHC to analyze RCRA/CERCLA samples. The analytical data were considered acceptable to include in the permit. The data confirm process knowledge information and show that the stream is consistent with the expected effluent from typical lagoon treatment systems. The constituent concentrations are consistent with typical waste water streams as discussed in Metcalf and Eddy (1991) and the EPA design manual (EPA 1980). No constituents were detected in excess of WAC-173-200 Ground Water Quality Criteria.

Table C-1. 100-N Sanitary Sewer Data.
Sheet 1 of 3

EFFLUENT [a]						
CONSTITUENT	n	MEAN CONC.	S.D.	UNITS	METHOD [b]	D.L. [c]
Waste Water Parameters [d]						
TDS	2	225	7	mg/L	160.1	5
TSS	3	47	13	mg/L	160.2	5
BOD	2	46	30	mg/L	5210	3.0
Ammonia (as N)	2	20.9	0.5	mg/L	351.3	0.05
Total Phosphorous	2	5550	71	mg/L	365.2	0.05
Total Oil and Grease	1	ND	N/A	mg/L	9070	5
Coliform Bacteria (Bact.)	1	ND	N/A	Bact./ 100ml	9131/ 9132	1
Metals						
Ca	1	3200	N/A	ug/L	6010	10
Mg	1	7100	N/A	ug/L	6010	30
Na	1	22000	N/A	ug/L	6010	29
K	1	14000	N/A	ug/L	6010	N/A
Cd	1	ND	N/A	ug/L	6010	4
Cr	1	ND	N/A	ug/L	6010	7
Pb	1	ND	N/A	ug/L	6010	42
Se	1	ND	N/A	ug/L	6010	75
Ag	1	ND	N/A	ug/L	6010	7
Cu	1	ND	N/A	ug/L	6010	6
Fe	1	200	N/A	ug/L	6010	7
Mn	1	40	N/A	ug/L	6010	2
Zn	1	50	N/A	ug/L	6010	2

Table C-1. 100-N Sanitary Sewer Data.
Sheet 2 of 3

EFFLUENT [a]						
CONSTITUENT	n	MEAN CONC.	S.D.	UNITS	METHOD [b]	D.L.[c]
Metals (continued)						
Ba	1	30	N/A	ug/L	6010	2
As	1	ND	N/A	ug/L	6010	53
P	1	5800	N/A	ug/L	6010	51
Sr	1	130	N/A	ug/L	6010	0.3
Anions						
Fl^-	2	0.5	N/A	mg/L	300.0	0.1
Cl^-	2	38	1	mg/L	300.0	0.2
$SO_4^=$	2	19	N/A	mg/L	300.0	1
$NO_2^=$, NO_3^-	5	3.8 (J2)	3.7	mg/L	353.2	0.05
Organics						
VOCs	1	ND	N/A	ug/L	8240	2-70
TIC - Unsaturated Hydrocarbon (SVOC)	1	14	N/A	ug/L	8270	N/A
TIC - Unsaturated Oxyhydrocarbon (SVOC)	1	14	N/A	ug/L	8270	N/A
TIC - Aromatic (SVOC)	1	18	N/A	ug/L	8270	N/A
TIC - Polycyclic Hydrocarbon (SVOC)	1	11	N/A	ug/L	8270	N/A

Table C-1. 100-N Sanitary Sewer Data.
Sheet 3 of 3

BOD= Biological Oxygen Demand
PAH = Polycyclic Aromatic Hydrocarbons
SVOC= Semi-Volatile Organic Compound
TDS =Total Dissolved Solids
TIC = Tenatively Identified Compound
TKN= Total Kjeldahl Nitrogen
TOC = Total Organic Carbon
TOX = Total Organic Halide
TSS = Total Suspended Solids
VOC = Volatile Organic Compound

mg/L = milligrams per liter
pCi/L = picocuries per liter
ug/L = micrograms per liter
umho/cm = micromhos per centimeter
N/A = Not Applicable
ND = Not Detected

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.

APPENDIX D

SLUDGE MANAGEMENT AND DISPOSAL

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CONTENTS

SECTION D, ITEM 2
DESCRIBE SLUDGE GENERATION, STABILIZATION, UTILIZATION, AND DISPOSAL. ATTACH EXTRA SHEETS AS NECESSARY. D-1

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SECTION D, ITEM 2

DESCRIBE SLUDGE GENERATION, STABILIZATION, UTILIZATION, AND DISPOSAL. ATTACH EXTRA SHEETS AS NECESSARY.

The 100-N Sewage Lagoon consists of an aeration pond, a stabilization pond, and an infiltration pond. The stabilization and infiltration ponds should only contain minor amounts of sludge if any. The primary sludge accumulation occurs in the aeration pond from two sources. Waste from buildings within the 100-N Area flows through a network of piping that discharges to the aeration pond. Waste is also hauled by trucks from septic and holding tanks throughout the Hanford Site and dumped directly into the aeration pond. The sludge settles in the aeration pond and begins decomposing; the fluid drains into the stabilization pond. Sludge may need to be removed from the bottom of the aeration pond every 5 to 10 years, depending on the amount of use and blowing sand. The sludge will be removed from the aeration pond and disposed of at an approved disposal site. The sludge removed from the aeration pond is not utilized for any other purpose.

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APPENDIX E

SITE ASSESSMENT

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CONTENTS

SECTION E, 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. E-1

SECTION E, 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. E-1

SECTION E, ITEM 3
ATTACH A UNITED STATES GEOLOGICAL SURVEY (USGS) TOPOGRAPHIC MAP. SHOW THE FOLLOWING ON THIS MAP: E-2

SECTION E, ITEM 4
ATTACH WELL LOGS AND WELL I.D.# WHEN AVAILABLE FOR ALL WELLS WITHIN 500 FEET AND ANY AVAILABLE WATER QUALITY DATA. E-2

SECTION E, ITEM 5
DESCRIBE SOILS ON THE SITE USING INFORMATION FROM LOCAL SOIL SURVEY REPORTS. E-3

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DESCRIBE THE REGIONAL GEOLOGY AND HYDROGEOLOGY WITHIN ONE MILE OF THE SITE. E-4

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LIST THE NAMES AND ADDRESSES OF CONTRACTORS OR CONSULTANTS WHO PROVIDED INFORMATION AND CITE SOURCES OF INFORMATION BY TITLE AND AUTHOR. E-11

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E-2 Soils Map for the 100-N Sewage Lagoon E-13
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E-9 Hanford Water Table Map. E-20

SECTION E, 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.

Legal Description:

NW 1/4 of the SW 1/4, Section 27, Township 14N, Range 26E, Benton County, WA, and
NE 1/4 of the SW 1/4, Section 27, Township 14N, Range 26E, Benton County, WA

The 100-N Sanitary Lagoon has a total area of 1.96 acres.

A specific contract authorizing use of the 100-N Sewage Lagoon for a land treatment site does not exist, but the Hanford Site was created by the U.S. Government to serve as a research and production facility for federal government nuclear projects. The Hanford Site has been in use since the early 1940's and all disposal facilities, such as the 100-N Sewage Lagoon, have been authorized by the U.S. Government.

SECTION E, 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.

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

- Hanford Site Radioactive Air Emissions Permit: Number FF-01
- Hanford Site Dangerous Waste Permit: Number WA7890008967
- National Pollutant Discharge Elimination System General Permit: Number WA-R-00-A17F.

SECTION E, ITEM 3

ATTACHA UNITED STATES GEOLOGICAL SURVEY (USGS) TOPOGRAPHIC MAP. SHOW THE FOLLOWING ON THIS MAP:

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. Waste water discharge points including bypasses
g. Other activities and land uses within 1/4 mile of the site.

Drawing H-13-000099 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 in Drawing H-13-000099 includes all component substreams prior to discharge. No chemical or product handling and storage areas are related directly to the disposal areas, thus none are shown on Drawing H-13-000099. No infiltration sources such as drainfields or lagoons are located within 1/4 mile of the disposal area. The waste water discharge point into the 100-N Sewage Lagoon is shown on Drawing H-13-000099. No other facilities or land uses are within 1/4 mile of the 100-N Sanitary Lagoons.

SECTION E, 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-13-000099 shows all of the wells drilled within a one-mile radius of the 100-N Sewage Lagoon. Well numbers beginning with 'N' are preceded by a 199. All other wells are preceded by a 699. Most of the 699 wells have been abandoned and filled in or were not completed. The abandoned wells were given a different symbol. There are no existing wells within 500 feet of the 183-N Backwash Discharge Pond. No well logs are available for the abandoned wells located within 500 feet of the 100-N Sewage Lagoon.

SECTION E, 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 performed by Hajek (1966). This study presents a soil map and 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 E-1. There is no soil data for the north slope of the Hanford Site. The soils in the vicinity of the 100-N Sewage Lagoon consist of Ephrata stony loam and Ephrata sandy loam. A map depicting the soils within one mile of the 100-N Sewage Lagoon is provided in Figure E-2.

The Ephrata stony loam is a dark grayish brown, medium-textured soil, which contains boulders up to several feet in diameter. The topography is composed of large hummocky ridges made up of debris released from the melting of glaciers. Areas between the hummocks contain many boulders several feet in diameter. The Ephrata stony loam is underlain by gravelly material that may continue for many feet. The surface of the Ephrata stony loam is classified a Group SM (silty sand) to ML (silt) under the Unified Soil Classification System. The subsoil is classified a Group ML (silt). Group ML (silt) is fine-grained soils composed of silts and clays with little or no plasticity.

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

SECTION E, ITEM 6

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

REGIONAL GEOLOGY

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

REGIONAL STRATIGRAPHY

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

Columbia River Basalt Group and the Ellensburg Formation

The Columbia River Basalt Group consists of an assemblage of tholeiitic, continental flood basalts of Miocene Age with an accumulated thickness in excess of 10,000 feet within the Pasco Basin. These flows cover an area of more than 63,000 mi^2 in Washington, Oregon, and Idaho, and have an estimated volume of about 40,800 mi^3. The majority of the flows were erupted 14.5 to 17 million years ago (WHC 1991c).

The Columbia River Basalt Group is formally divided into five formations (from oldest to youngest): Imnaha Basalt, Picture Gorge Basalt, Grande Ronde Basalt, Wanapum Basalt, and Saddle Mountains Basalt. Of these, all are present within the Pasco Basin except for the Picture Gorge Basalt. The Saddle Mountains Basalt, is divided into seven members (from oldest to youngest); the Umatilla, Wilbur Creek, Asotin, Esquatzel, Pomona, Elephant Mountian, and Ice Harbor Members, and forms

the uppermost basalt unit throughout most of the Pasco Basin. The Elephant Mountain Member is the uppermost unit beneath most of the Hanford Site except near the 300 Area where the Ice Harbor Member is found and north of the 200 Areas where the Saddle Mountains Basalt has been eroded down to the Umatilla Member in the Gable Gap area (WHC 1991c). The Elephant Mountain Member has also been locally eroded in the vicinity of the northeast corner of the 200 East Area (WHC 1991c). On anticlinal ridges bounding the Pasco Basin, erosion has removed the Saddle Mountains Basalt, exposing the Wanapum and Grande Ronde basalts (WHC 1991c).

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

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

Suprabasalt Sediments

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

Ringold Formation. Overlying the Columbia River Basalt Group is the late Miocene to Pliocene-age Ringold Formation (Fecht et al. 1987, DOE 1988). The Ringold Formation accumulated to a thicknesses of up to 1,200 feet in the Pasco Basin (Tallman et al. 1979). On the Hanford Site, the Ringold Formation is up to 600 feet thick in the deepest part of the Cold Creek syncline south of the 200 West Area and 560 feet thick in the western Wahluke syncline near the 100-B Area (WHC 1991c). The Ringold Formation pinches out against the anticlinal flanks that bound or are present within the Pasco Basin, and is largely absent in the northern and northeastern parts of the 200 East Area and adjacent areas to the north (WHC 1991c, WHC 1992a). The recent studies of the Ringold Formation (WHC 1991d) indicate it is best described on

the basis of sediment facies associations and their distribution. The facies associations have been divided into fluvial gravel, fluvial sand, overbank deposits, lacustrine deposits, and alluvial fans. The lower Ringold contains five separate stratigraphic intervals dominated by fluvial gravels, which have been designated units A, B, C, D, and E, from oldest to youngest. These gravel units are separated by basin-wide overbank andlacustrine deposits (WHC 1992a). A more detailed discussion of the Ringold Formation stratigraphy can be found in WHC (1991d).

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

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

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

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

REGIONAL GEOLOGIC STRUCTURE

The Hanford Site is located within the Pasco Basin near the eastern edge of the Yakima Fold Belt. The Yakima Fold Belt consists of a series of segmented, narrow,

asymmetric, east-west trending anticlines separated by broad synclines or basins that, in many cases, contain thick accumulations of Neogene- to Quaternary-aged sediments (DOE 1988, Smith et al. 1989). The Pasco Basin is one of the larger structural basins of the fold belt.

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

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

The Pasco Basin is a structural depression bounded on the north by the Saddle Mountain anticline; on the west by the Umtanum Ridge, Yakima Ridge, and Rattlesnake Hills anticlines; and on the south by the Rattlesnake Mountain anticline. The Palouse slope, a west-dipping monocline, bounds the Pasco Basin on the east. The Pasco Basin is divided into the Wahluke and Cold Creek synclines by the Gable Mountain anticline, the eastern extension of the Umtanum Ridge anticline.

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

LOCAL GEOLOGY

The depth to the top of the Elephant Mountain Member basalt in the vicinity of the 100-N Area is approximately 520 feet. Overlying the basalt are sediments of the Ringold Formation, Hanford formation, and Holocene surfical deposits. The Plio-Pleistocene unit, early "Palouse" soil, and the Pre-Missoula gravels are absent in the vicinity of the 100-N Area (WHC 1992b). The following discussion focuses on the suprabasalt sediments in the vicinity of the 100-N Area. Figure E-6 is a map depicting the geology within one mile of the 100-N Sewage Lagoon. A local cross-section has also

been included for more detailed information. The line of cross-section is shown on Figure E-7 and the cross section is provided on Figure E-8.

Ringold Formation

The Ringold Formation unconformably overlies the Elephant Mountain Member basalt and is approximately 470 to 480 feet thick in the 100-N Area. Overlying the basalt are fluvial gravels of unit A, which are generally less than 32 feet thick. Unit A thickens to the west and south, towards the axis of the Wahluke syncline and is generally described as a clast-supported granule to cobble gravel with a sandy matrix. Clast composition is variable with basalt, quartzite, porphyritic volcanics, and greenstone being the most common. Associated sands are generally quartzo-feldspathic with basalt content ranging from 5 to 25 percent (WHC 1991d).

Overlying unit A is the lower mud sequence. The lower mud sequence is approximately 98 feet thick around 100-N and also thickens towards the axis of the Wahluke Syncline. The lower mud sequence is composed of lacustrine deposits (WHC 1992b). Plane-laminated to massive clay with thin silt and sand interbeds characterize the lacustrine deposits.

The second gravel-dominated facies, unit B, overlies the lower mud sequence and is from 65 to 80 feet thick. This unit is much finer grained in the 100-N Area and is composed predominately of fluvial sands with interbedded gravels. The fluvial sands are generally quartzo-feldspathic and display cross-bedding and cross-lamination (WHC 1991d).

A thick sequence of interbedded overbank deposits composed of silt and fine-grained silty sand overlies unit B. Pedogenic calcium is present in the overbank deposits near the top of the sequence (WHC 1991d). The thickness of this sequence is approximately 131 feet thick.

Unit C overlies the overbank deposits and is composed of sandy fluvial strata. This unit is less than 32 feet thick around the 100-N Area. The sand is primarily quartzo-feldspathic in composition (WHC 1991d).

Overlying unit C is a 49- to 98-feet-thick sequence of interbedded overbank deposits and lacustrine mud facies (WHC 1991d). The overbank deposits consist of laminated to massive silt, silty fine-grained sand, and paleosols. The lacustrine deposits consist of plane-laminated to massive clay with silt and sand interbeds. Pedogenic carbonate can be found near the base of this unit (WHC 1991d).

The uppermost Ringold Formation unit in the 100-N Area is unit E. This unit is a clast-supported pebble-cobble gravel in a quartzo-feldspathic sandy matrix. Clast

composition varies with basalt, quartzite, porphyritic volcanics, and greenstone being the most common. Unit E ranges in thickness from 49 to 65 feet (WHC 1991d).

Hanford Formation

The contact between the underlying Ringold Formation and the Hanford formation is irregular in the 100-N Area. The Hanford formation is 32 to 65 feet thick and is composed primarily of the gravel-dominated facies with some lenticular silty interbeds (WHC 1992b). The gravel-dominated facies generally consist of coarse-grained basaltic sand and granule to boulder gravel. These gravels are generally matrix poor and display an open-framework texture. Gravel clasts are dominated by basalt with minor amounts of Ringold and Plio-Pleistocene rip-ups, granite, quartzite, and gneiss (WHC 1991d).

Holocene Surficial Deposits

Surfical eolian deposits locally overlie the Hanford formation in the 100-N Area. These deposits are typically heterogenous and poorly mixed and are primarily derived from reworked Hanford formation sediments (WHC 1992b). The surfical deposits are less than 3.2 feet thick in the 100-N Area.

REGIONAL HYDROGEOLOGY

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

The uppermost aquifer is part of a flow system that is local to the Pasco Basin, as are the uppermost basalt interbed aquifers (Gephart et al. 1979, DOE 1988). The uppermost aquifer system is regionally unconfined and occurs within the glaciofluvial sands and gravels of the Hanford formation and the fluvial/lacustrine sediments of the Ringold Formation. Confined to semi-confined aquifers of more limited extent also occur in the suprabasalt sediments of the Pasco Basin. These confined zones are generally located within the local flow system, between the unconfined aquifer and the underlying basalt surface. Groundwater in these aquifer systems is most likely recharged and discharged locally. Deeper in the basalt, interbed aquifer systems are part of the

regional, or interbasin, flow system, which extends outside the margins of the Pasco Basin (DOE 1988). A water table map of the Hanford Site is provided as Figure E-9.

LOCAL HYDROGEOLOGY

The primary hydrostratigraphic units in the 100-N Area are the confined aquifer system of the Saddle Mountain Basalt Formation and Ellensburg Formation, and the unconfined to confined aquifer system of the Ringold Formation and the Hanford formation. The following discussion focuses on the hydrogeology of the suprabasalt sediments.

The vadose zone is contained in the Hanford formation and the Ringold unit E. The thickness of the vadose zone in the 100-N Area is up to 80 feet. The presence of perched water was noted in one well drilled near a liquid waste disposal facility approximately 1/2 mile from the 100-N Sewage Lagoon (WHC 1993b).

The uppermost aquifer system is largely composed of the unconfined aquifer, but also includes semiconfined and confined areas. The upper part of the unconfined aquifer is in the fluvial sands and gravels of Ringold unit E. The unconfined aquifer is approximately 40 to 50 feet thick (WHC 1993b).

The central and lower parts of the unconfined aquifer are composed of a series of confining layers and confined aquifers. The top of the confined aquifer series is defined by the overbank/lacustrine deposits underlying unit E. The base of the confined aquifer series is the top of the Elephant Mountain Member. The thickness of the confined aquifer series is up to 400 feet (WHC 1992c).

Groundwater flow in the 100-N Area was greatly influenced by artificial recharge caused by effluent disposal. Effluent discharged to the 116-N-1 trench and crib (1963 to 1985), the 120-N-1 percolation ponds (1977 to 1989), and 116-N-3 trench and crib (1983 to 1991) provided large volume of artificial recharge in the 100-N Area, resulting in the creation of groundwater mounds. The groundwater mounding created a radial flow pattern in the 100-N Area (DOE-RL 1993b). Effluent discharges have steadily decreased from 1989 to the present and the groundwater mounds have virtually dissipated. Groundwater flow presently is toward the north-northwest, in the direction of the Columbia River (DOE-RL 1993b).

SECTION E, ITEM 7

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

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1933 Jadwin Avenue, Suite 125
Richland, WA 99352

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

References: Sources of information used for Section E are included in REFERENCES.

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9513316.2367

N 148,000

N 147,800

N 147,600

N 147,400

REV 0

SH 1 OF 1

DWG NO H-13-000099

1994

THIS MAP IS TO BE USED FOR REFERENCE PURPOSES ONLY.
DO NOT USE THIS MAP FOR CONSTRUCTION PURPOSES.

AWN RAFAEL TORRES	DATE 3-12-94	
ECKED	5-10-94	
TG APVD	5-10-94	
G ENGR B.P. Atencio	5-10-94	
VD	5-10-94	
VD		
VD		
VD		
VD		
VD		

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

100-N SEWAGE LAGOON

SIZE	BLDG NO	INDEX NO	DWG NO	REV
F	100G	0110	H-13-000099	0

SCALE SHOWN | EDT 604316 | SHEET 1 OF 1

CHK PRINT ☐ DATE | COMMENT PRINT ☐ DATE

A

2

1

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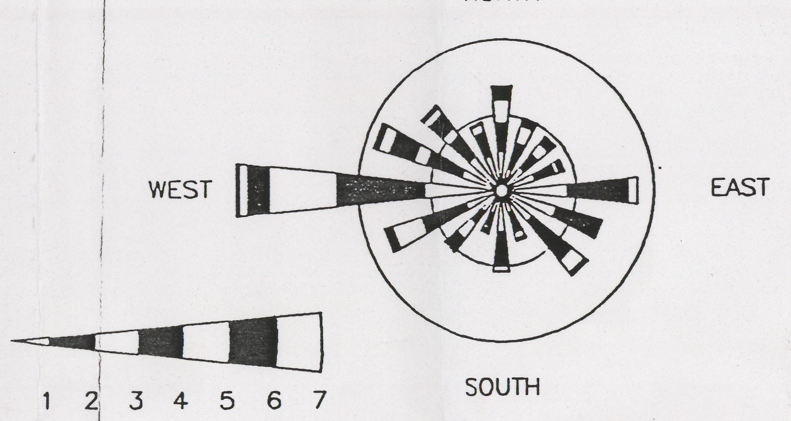
WIND ROSE FOR: 100N-AREA
% CALM WINDS = 1.3
STATION NO.13

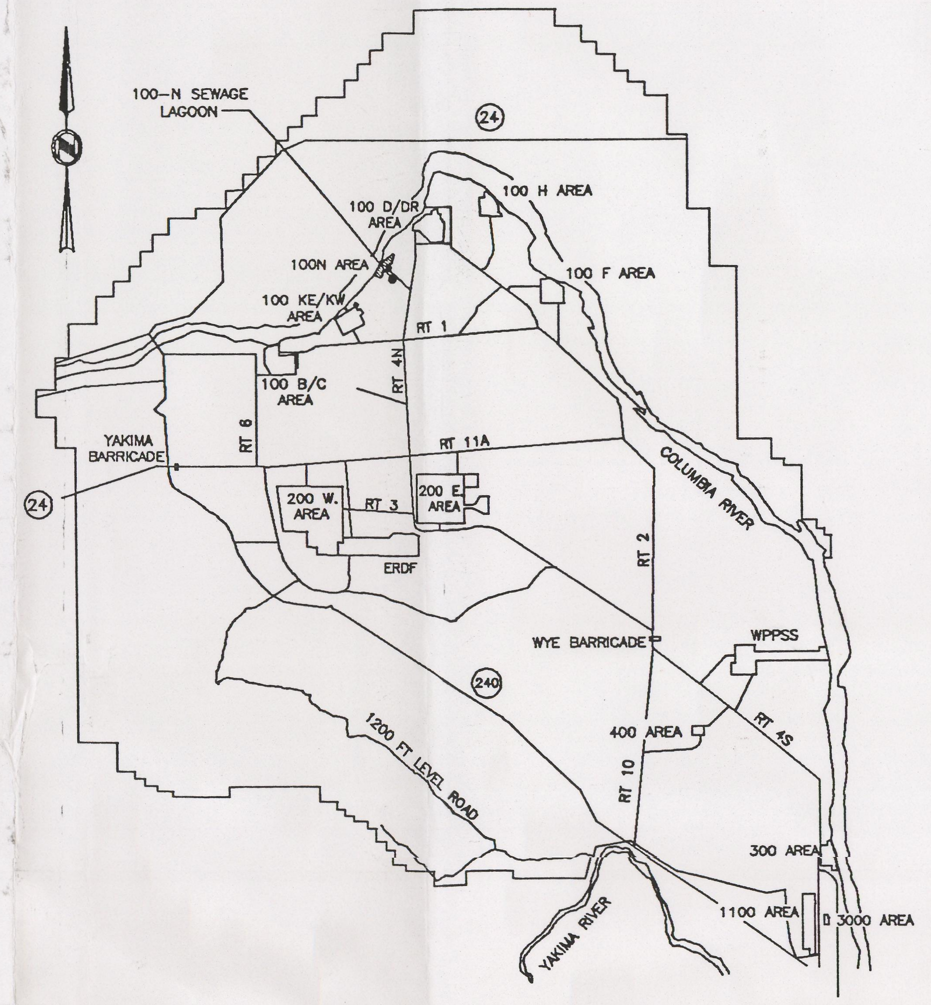
PERIOD COVERED
1/1/93 – 12/31/93



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-------	6.0 – 12.0
4-------	13.0 – 18.0
5-------	19.0 – 24.0
6-------	25.0 – 31.0
7-------	32.0 +

WIND ROSE



KEY PLAN

SCALE: NONE

LEGEND

W.47,000 N.43,000	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
	BUILDINGS/STRUCTURES & TOWERS
242-A	BUILDING NUMBER
	MOBILE OFFICES
N-27	WELL
	ABANDONED WELL
	TANKS
216-A-42	CRIB
218-E-10	BURIAL GROUND
DP	DISCHARGE POINT

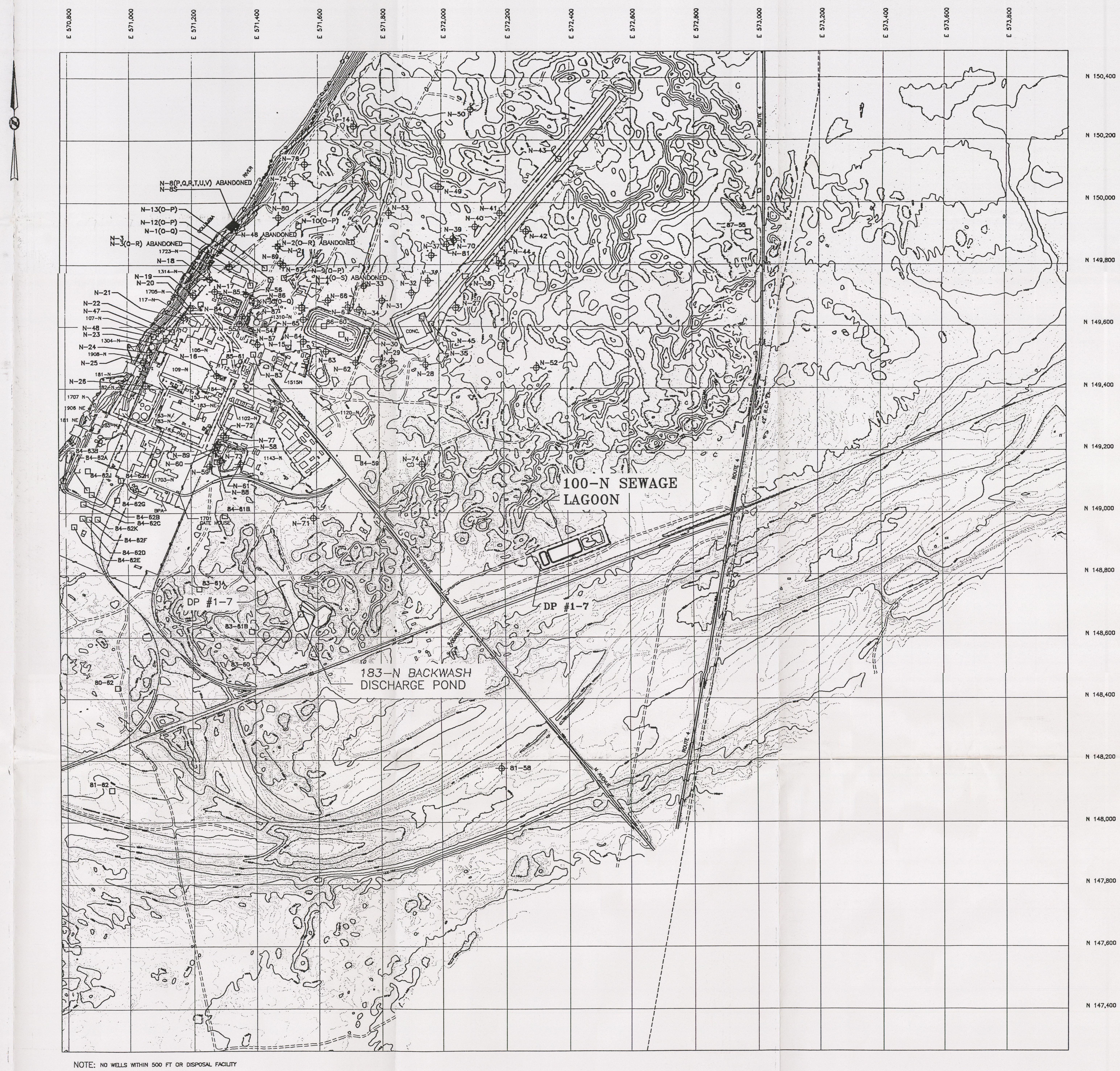
GENERAL NOTES

1. THIS MAP IS BASED ON AERIAL PHOTOGRAPHY FLOWN ON 6-20-90. THE ORIGINAL TOPOGRAPHIC MAP WAS PREPARED BY WILLIAM E. BROWN AND CERTIFIED TO MEET NATIONAL MAP ACCURACY STANDARDS.
OFFICIAL COPIES OF THE GEONEX SACRAMENTO MAPS THAT SHOW THE CERTIFICATE ARE LOCATED IN THE WESTINGHOUSE ENGINEERING FILES AS DRAWING NUMBERS H-1-52166 SHEET 1 THROUGH 55.
NAMES OF ADDITIONAL FEATURES AND THE TITLE BLOCK WERE ADDED BY WESTINGHOUSE HANFORD COMPANY.
MAPS WERE ADDED BY WESTINGHOUSE HANFORD COMPANY.

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 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 SHOWN IN METERS.

CONTOUR INTERVAL: 0.5 METERS.



NOTE: NO WELLS WITHIN 500 FT OR DISPOSAL FACILITY

SITE PLAN

SCALE: 1:6000

0 60 120 240 360 480

1 cm = 60 meters

0 400 600 800 1200 1600 2000 FEET

OFFICIAL RELEASE
BY WHC
DATE MAY 10 1994

THIS MAP IS TO BE USED FOR REFERENCE PURPOSES ONLY.
DO NOT USE THIS MAP FOR CONSTRUCTION PURPOSES.

REF NUMBER	TITLE
H-13-000114	100 AREA TOPOGRAPHIC MAP
H-13-000115	100 AREA TOPOGRAPHIC MAP
H-13-000116	100 AREA TOPOGRAPHIC MAP
H-13-000118	100 AREA TOPOGRAPHIC MAP
H-13-000119	100 AREA TOPOGRAPHIC MAP
H-13-000120	100 AREA TOPOGRAPHIC MAP
H-13-000123	100 AREA TOPOGRAPHIC MAP
H-13-000124	100 AREA TOPOGRAPHIC MAP
H-13-000125	100 AREA TOPOGRAPHIC MAP

REFERENCES

NEXT USED ON H-13-000100

DWG NO	TITLE

DRAWING TRACEABILITY LIST

MFD REV REL	REV NO	DESCRIPTION	REV BY DATE	CHK BY DATE	DFTG APVD DATE	COG ENGR	OTHER	OTHER

REVISIONS

APPROVALS BY/DATE

CADFILE N000099A
CADCODE DOS:6.0:ACD2:12.0:SS

		DATE
DRAWN	RAFAEL TORRES	3-12-94
CHECKED	[signature]	5-10-94
DFTG APVD	[signature]	5-10-94
COG ENGR	B.P. Atencio	5-10-94
APVD	J. J. Luke	5-10-94
APVD		
APVD		
APVD		
APVD		
APVD		
APVD		

M

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

100-N SEWAGE LAGOON

SIZE	BLDG NO	INDEX NO	DWG NO	REV
F	100G	0110	H-13-000099	0

SCALE SHOWN | EDT 604316 | SHEET 1 OF 1

CHK PRINT ☐ DATE | COMMENT PRINT ☐ DATE

DWG NO H-13-000099 SH 1 OF 1 REV 0

54-6000-027(5/89)

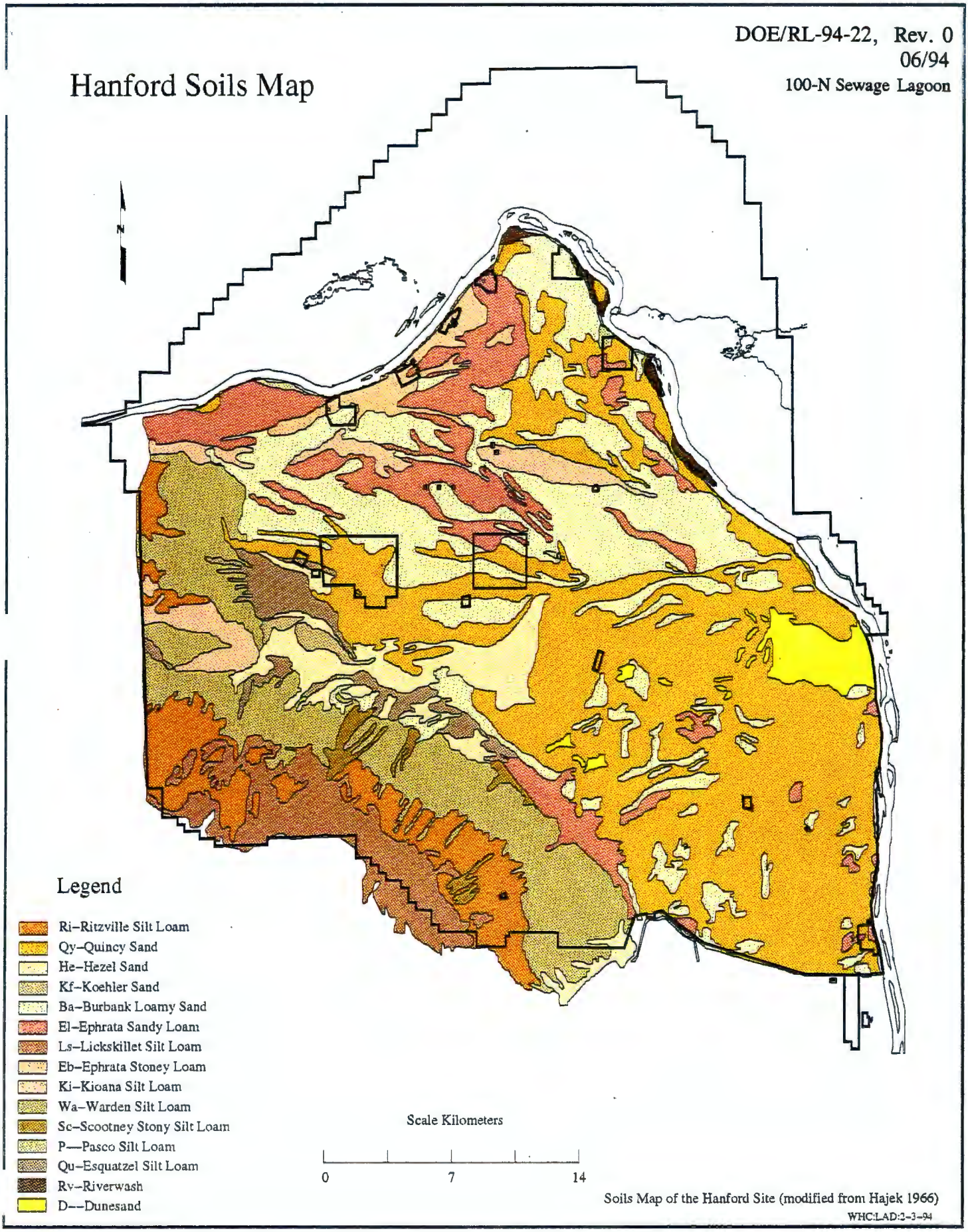


Figure E-1. Hanford Soils Map.

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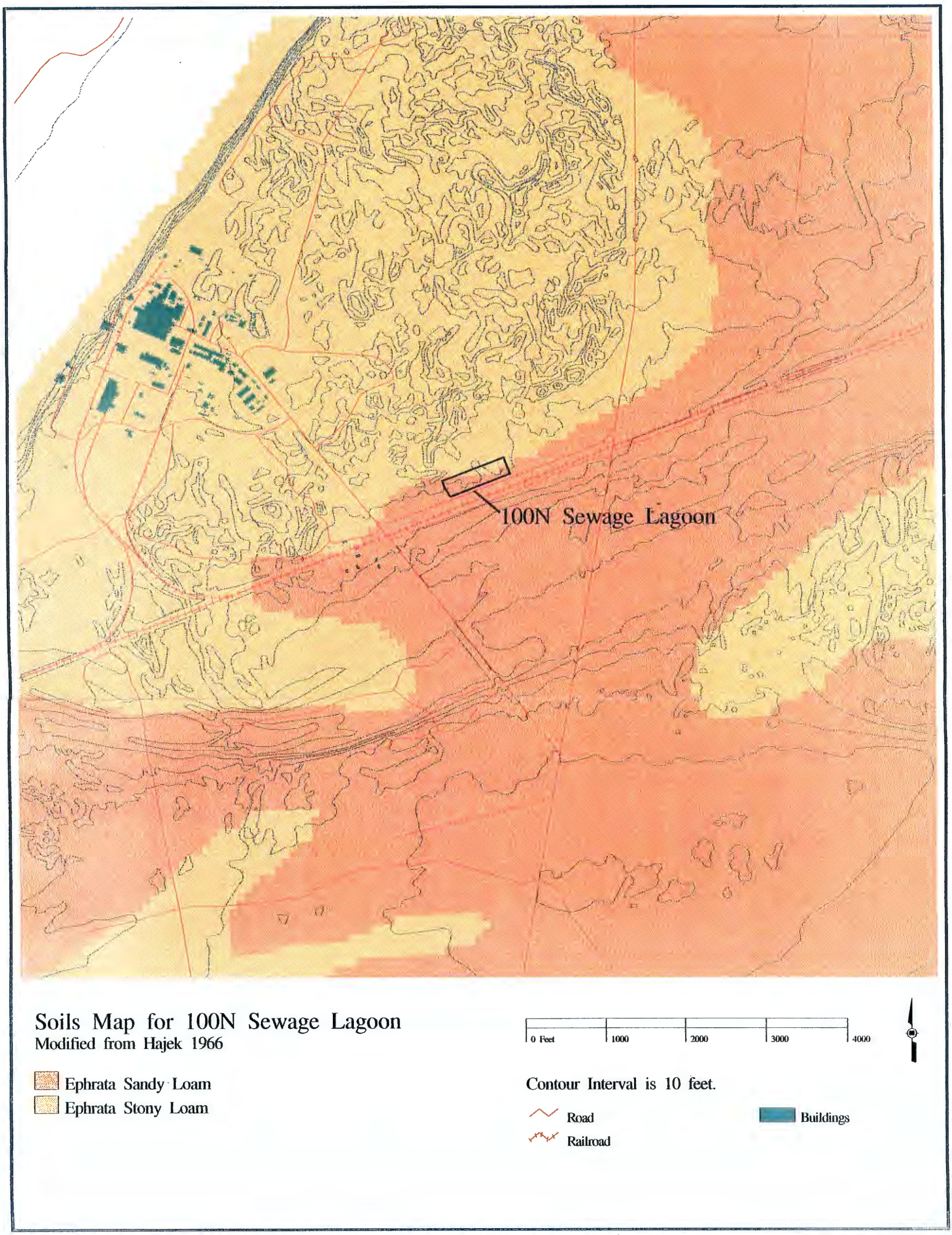
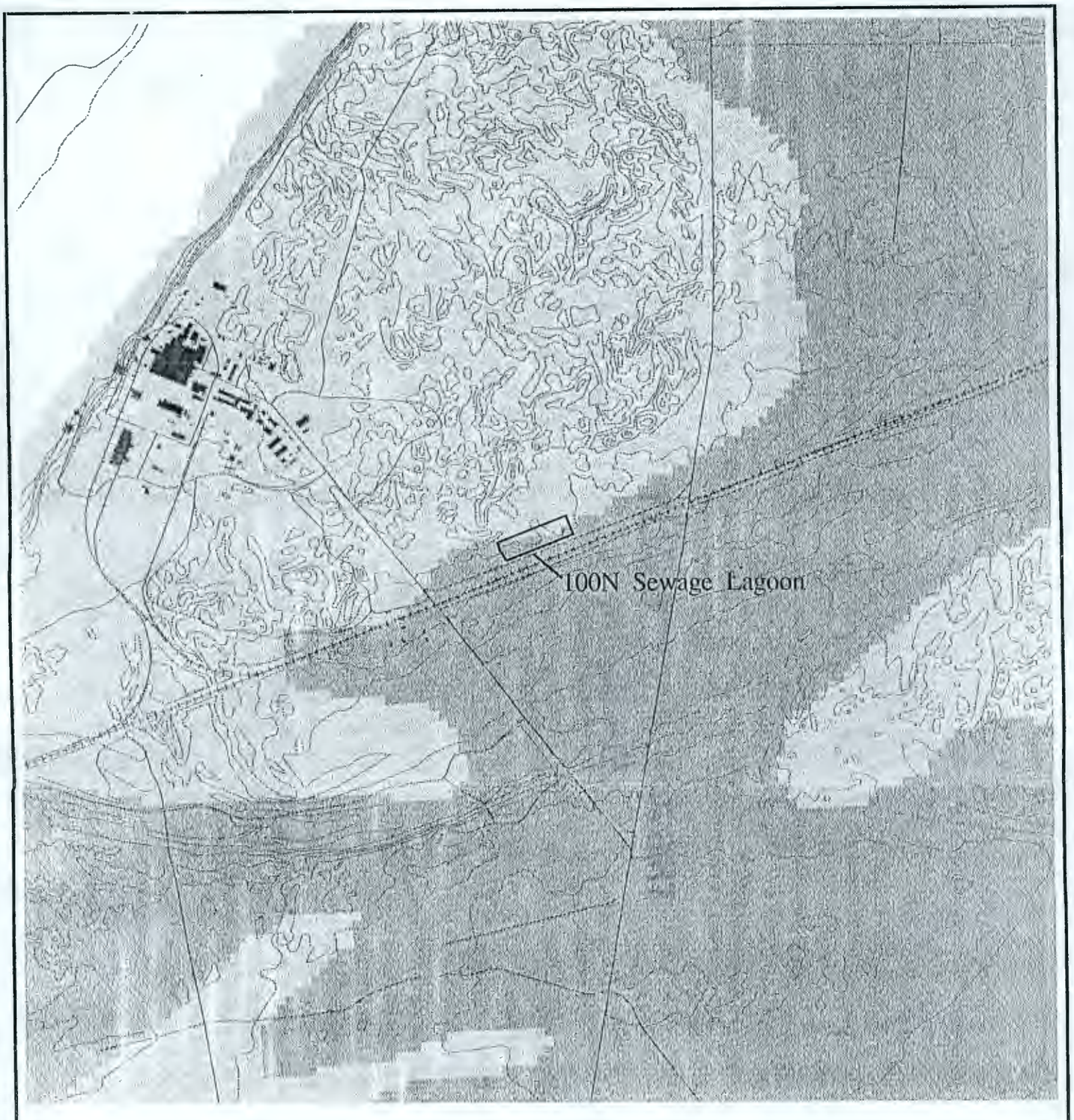


WHC:rpp 03/22/94 saic_1.aml

Figure E-2. Soils Map for the 100-N Sewage Lagoon.

9513316.2369



Soils Map for 100N Sewage Lagoon

Modified from Hajek 1966

- Ephrata Sandy Loam
- Ephrata Stony Loam

0 Feet | 1000 | 2000 | 3000 | 4000

Contour Interval is 10 feet.

- Road
- Railroad
- Buildings

WHC:pp 03/22/94 saic_Land

9513316.2369

Figure E-2. Soils Map for the 100-N Sewage Lagoon.

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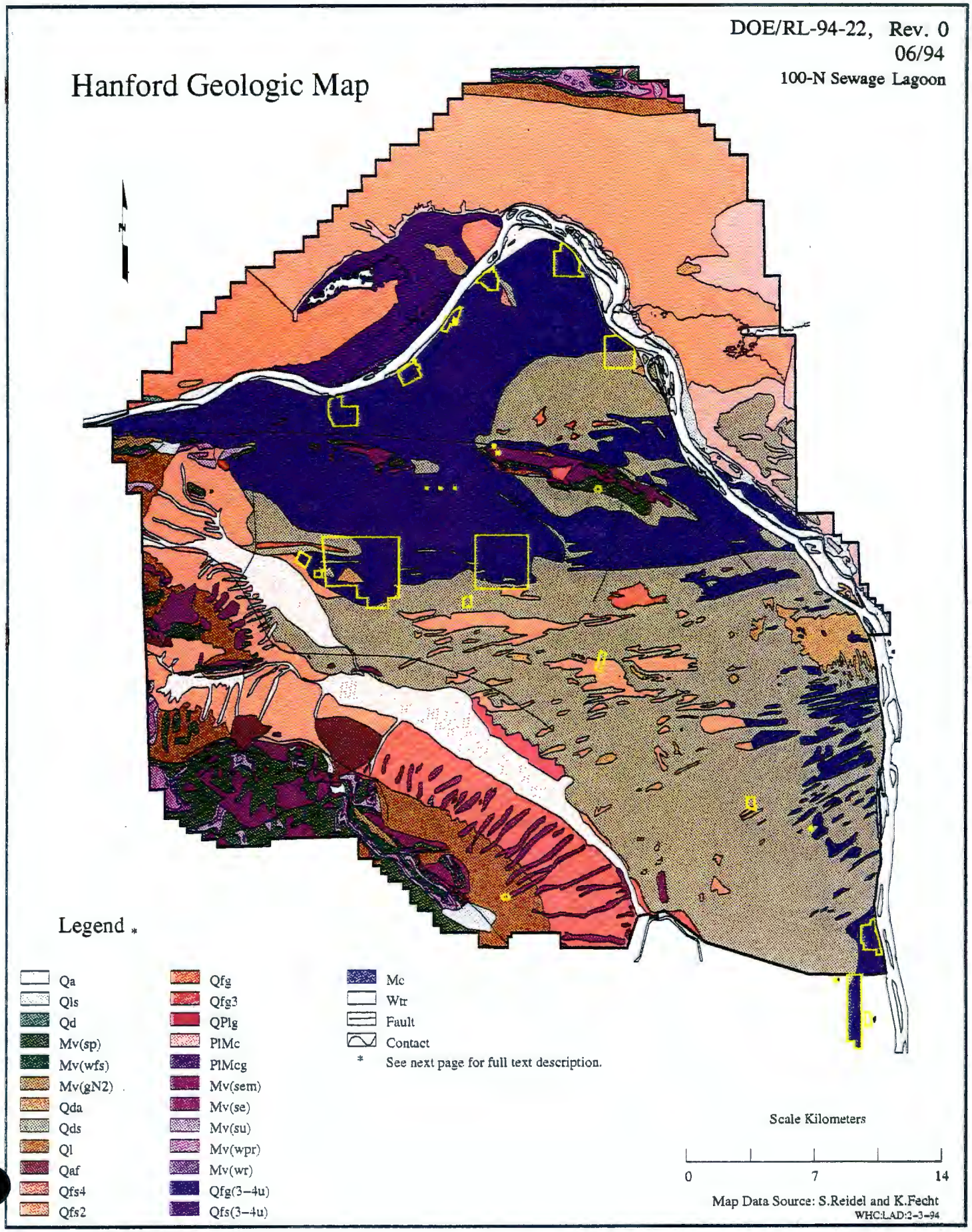

Figure E-3. Hanford Geologic Map.

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Legend

- 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)
- PlMc–Ringold Fm., Continental sed. (Plio.–Mio.)
- PlMcg–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 E-4. Legend for Hanford Geologic Map.

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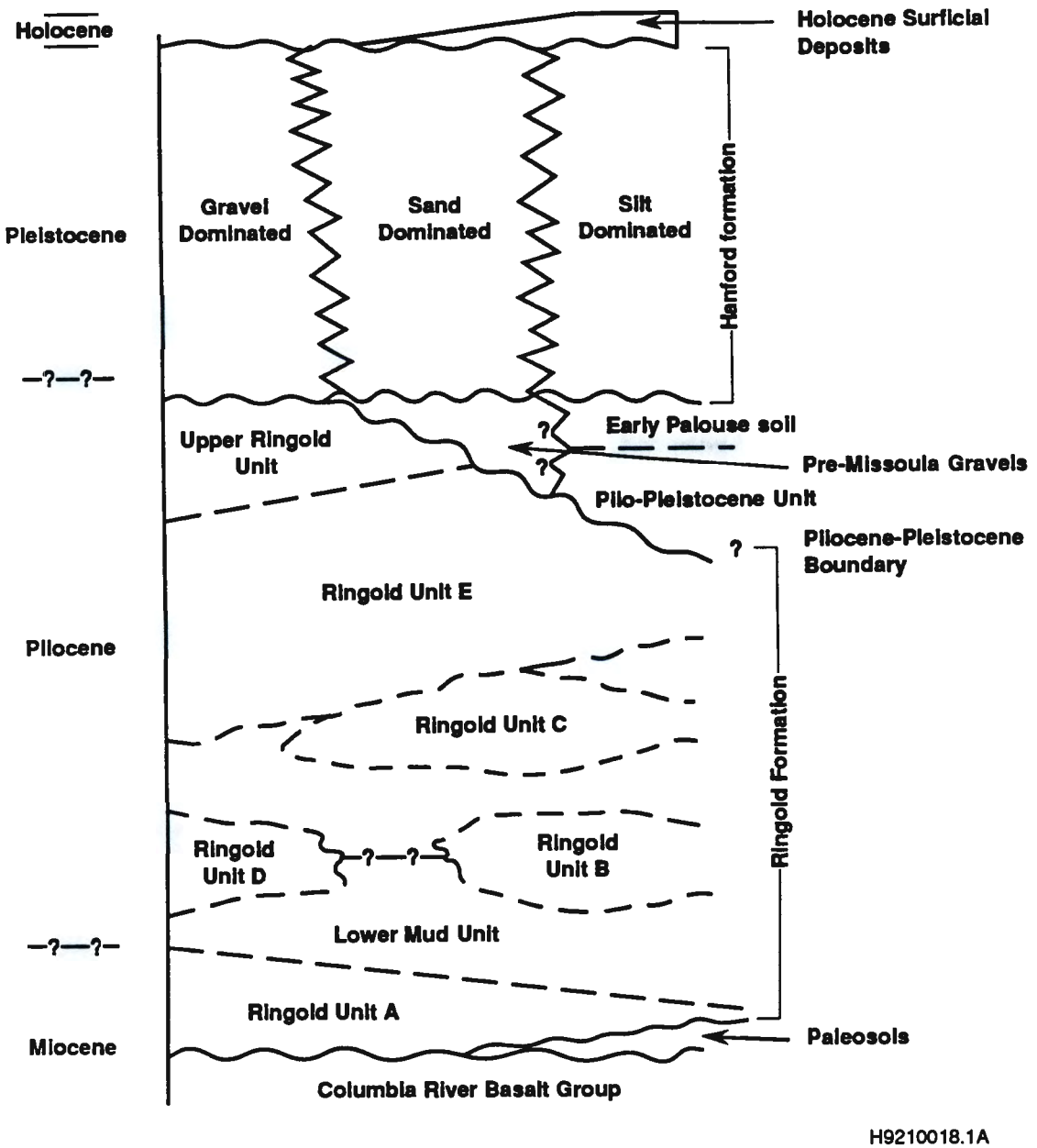

Figure E-5. Regional Stratigraphic Column.

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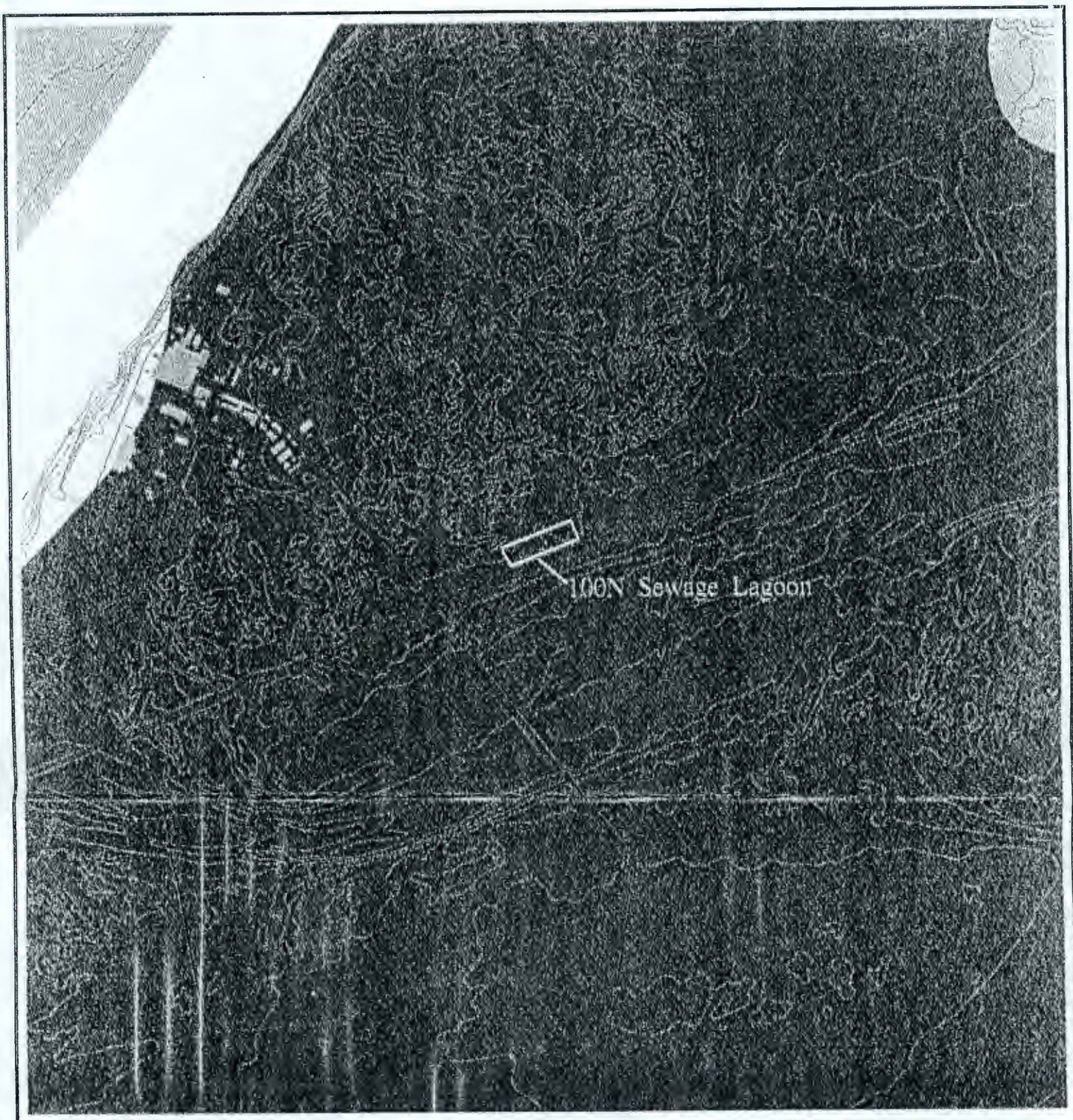

Geology Map for
100N Sewage Lagoon
Map source: S. Reidel and K. Fecht

- Qa
- Qfs4
- Qfg(3-4u)
- Qfs(3-4u)

0 Feet | 1000 | 2000 | 3000 | 4000

Contour Interval is 10 feet.

- Road
- Railroad
- Buildings

WHC:pp 03/24/94 saic_1g.aml

Figure E-6. Geology Map for the 100-N Sewage Lagoon.

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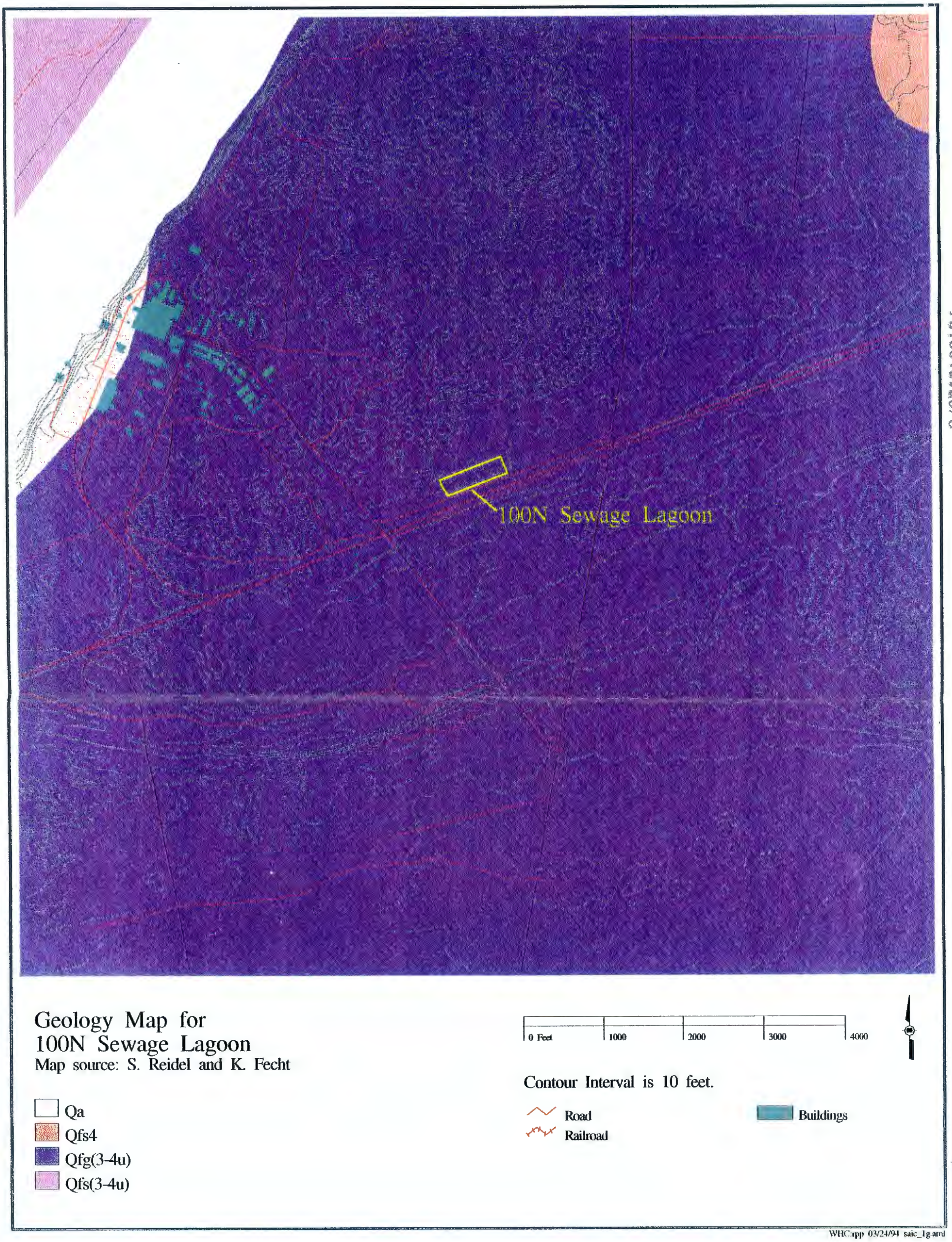

Figure E-6. Geology Map for the 100-N Sewage Lagoon.

9513316.2373

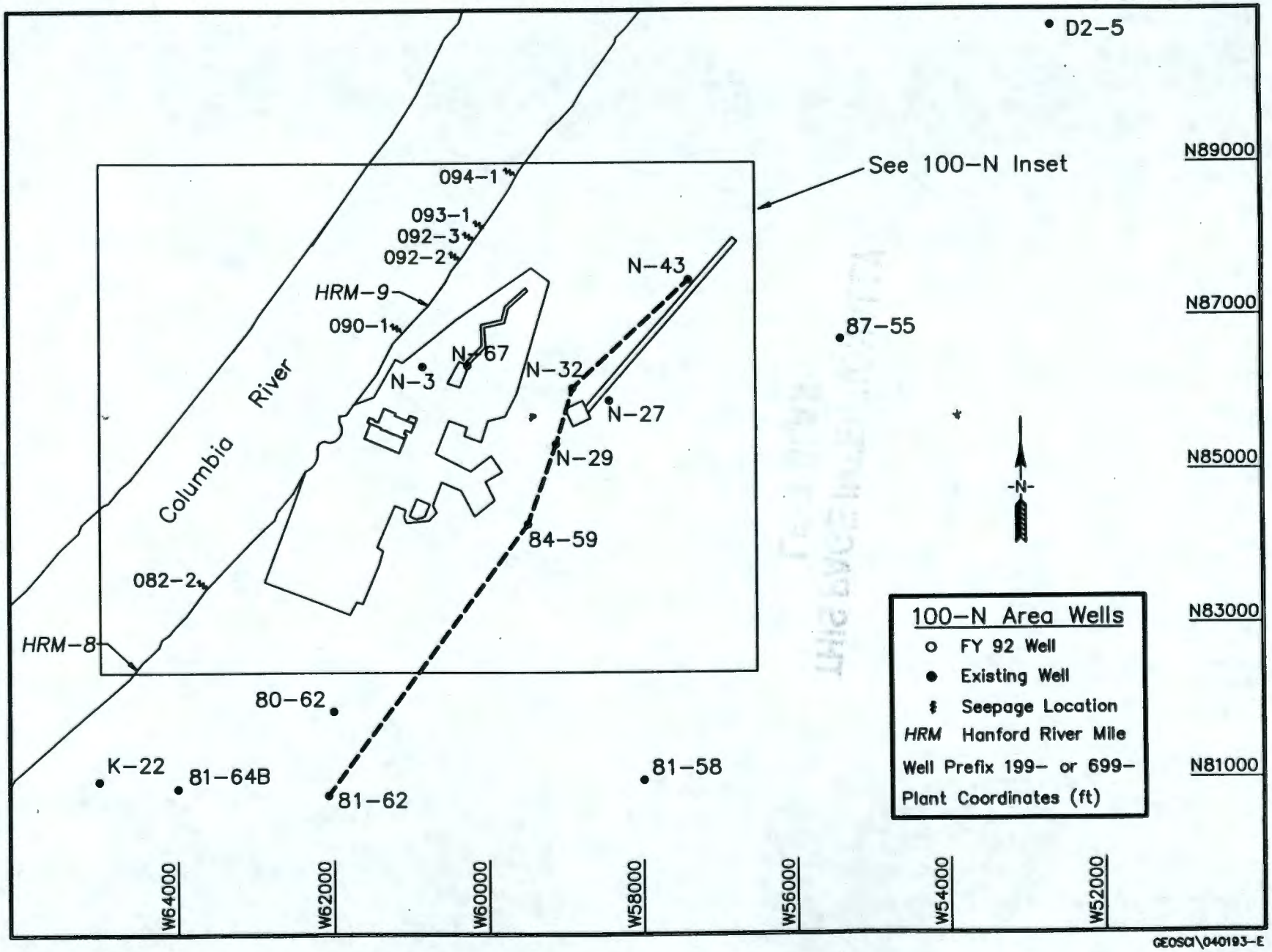

Figure E-7. Line of Cross-Section for the 100-N Area.

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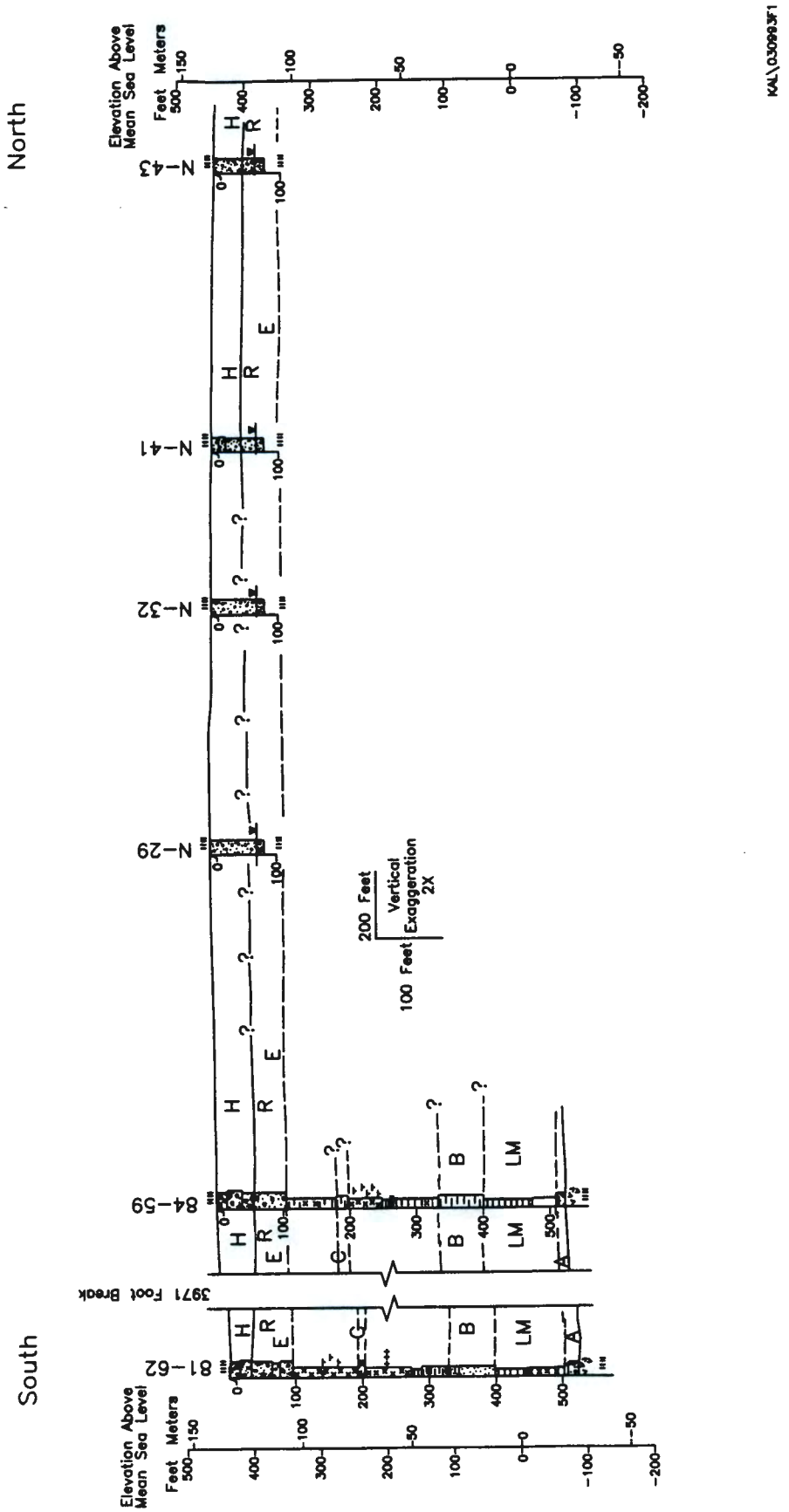

Figure E-8. Cross-Section for the 100-N Area.

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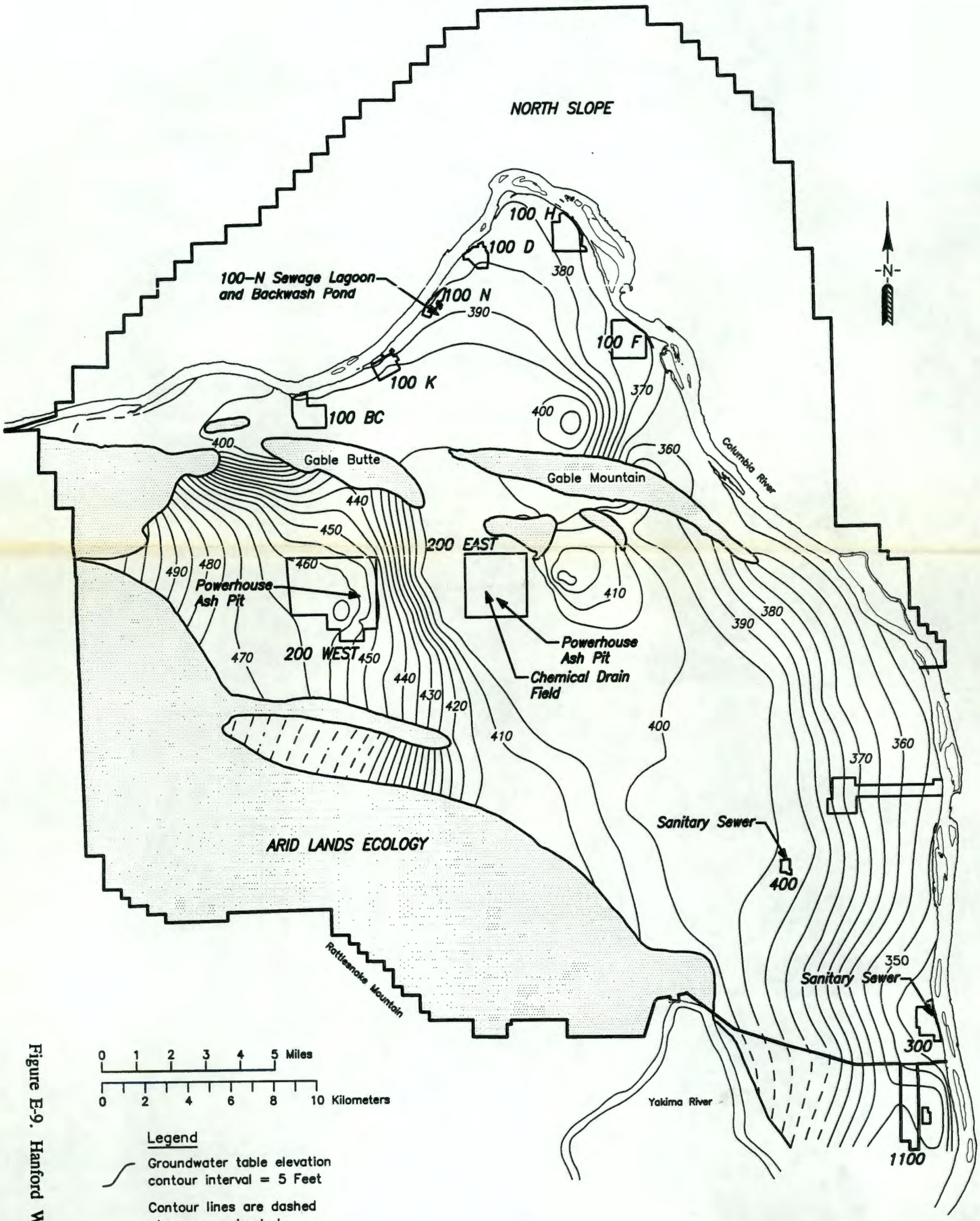
Hanford Water Table Map

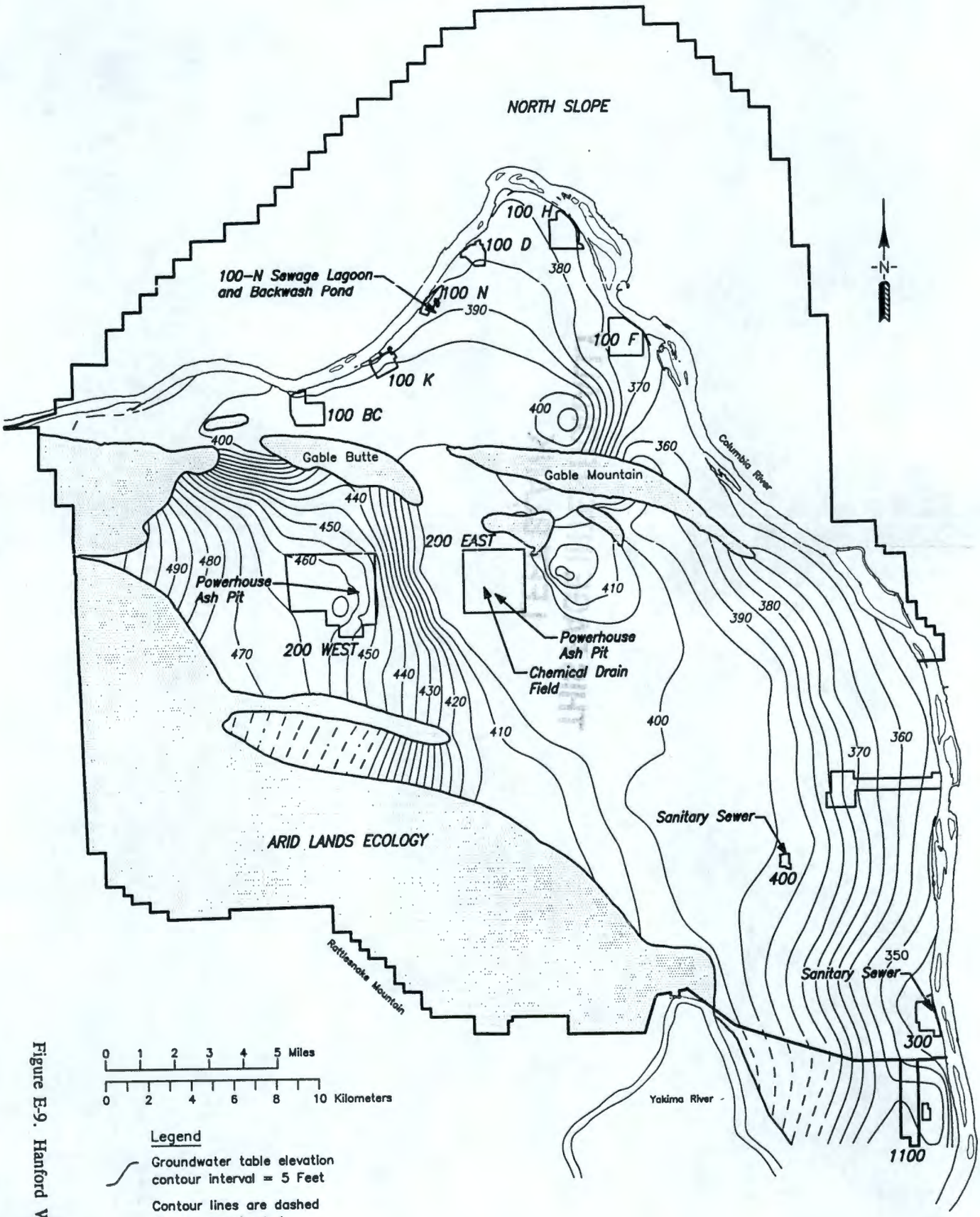


Source: Modified from WHC-EP-0394-7 (Kasza, et. al.)

WHC: JJA: 4-4-93

Figure E-9. Hanford Water Table Map.

Hanford Water Table Map



0 1 2 3 4 5 Miles

0 2 4 6 8 10 Kilometers

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.)

WHC: JJA: 4-4-93

Figure E-9. Hanford Water Table Map.

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