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DOE/RL-93-61
Revision 0
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State Waste Discharge Permit Application for Industrial Discharge to Land

200 East Area W-252 Streams

9413206.0002

United States
Department of Energy
Richland, Washington

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DOE/RL-93-61
Revision 0

UC-630, 721

State Waste Discharge Permit Application for Industrial Discharge to Land

200 East Area W-252 Streams

Date Published
December 1993

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

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FOREWORD

Fourteen liquid effluent streams were identified as Phase II streams in the *Annual Status Report of the Plan and Schedule to Discontinue Disposal of Contaminated Liquid into the Soil Column at the Hanford Site* (WHC 1988). Of these fourteen Phase II streams, one (209-E Laboratory reflector water) has been discontinued. Four streams (Plutonium-Uranium Extraction Plant cooling water which has been rerouted to the Plutonium-Uranium Extraction Plant chemical sewer, 242-S Evaporator steam condensate, T-Plant laboratory wastewater, and 284-W Power Plant cooling water) were designated to be discharged to the 200 Area Treated Effluent Disposal Facility (Project W-049H), and will be permitted accordingly. The remaining nine Phase II streams were subsequently categorized as "Other" Phase II streams, and were identified as such in Table 3 of *Consent Order No. DE 91NM-177* (216 Consent Order) (Ecology and DOE-RL 1991). These nine streams include the following:

- 241-AY/AZ Tank Farm steam condensate (currently inoperative)
- 242-A Evaporator cooling water
- 242-A Evaporator steam condensate
- 241-A Tank Farm cooling water
- 244-AR Vault cooling water
- 284-E Power Plant waste water
- B Plant cooling water
- 183-D Filter backwash
- 400 Area secondary cooling water

Implementation of Best Available Technology/All Known and Reasonable Treatment and disposal for these streams, with the exception of the 400 Area secondary cooling water and the 183-D Filter Backwash, will be under Project W-252, and as such, these streams are identified as the "W-252 streams". Washington Administrative Code 173-216 State Waste Discharge Permit applications are required to be submitted to the Washington Department of Ecology by December 31, 1993 for the W-252 streams, in accordance with Table 3 of the 216 Consent Order.

This document constitutes the WAC 173-216 State Waste Discharge Permit application for these six W-252 liquid effluent streams:

- 242-A Evaporator cooling water;
- 242-A Evaporator steam condensate;
- 241-A Tank Farm cooling water;
- 244-AR Vault cooling water;
- 284-E Power Plant waste water;
- B Plant cooling water.

The 241-AY/AZ Tank Farm steam condensate is currently inoperative. When operative, this stream is routed to a double-shell tank in the AY/AZ Tank Farm. Therefore, the 241-AY/AZ Tank Farm steam condensate does not require a State Waste Discharge Permit application. The State Waste Discharge Permit application for the 400 Area secondary cooling water was submitted to Washington State Department of Ecology in December of 1992. The 183-D Filter Backwash is scheduled to cease discharge by June of 1994. A modification to the 216 Consent Order for not submitting a State Waste Discharge Permit application for the 183-D Filter Backwash has been submitted to the Washington State Department of Ecology and is scheduled to be approved in December 1993. The remaining six W-252 streams are commingled either before or at the discharge point into the 216-B-3-3 Ditch leading to the B Pond complex, and are therefore being addressed collectively under this State Waste Discharge Permit application. The six W-252 streams are planned to be rerouted, via a new pipeline under Project X-009, during 1994. This rerouting will eliminate discharges to the 216-B-3-3 ditch, the main lobe, and the A-lobe of the B Pond complex.

Analytical data from WHC 1992a has been presented in the State Waste Discharge Permit application for both the 242-A Evaporator cooling water and the 242-A Evaporator steam condensate streams. The 242-A Evaporator is currently in a facility shutdown mode and the Sampling and Analysis Plan data will not be available until the streams are sampled after planned facility restart in early 1994. Since both of the 242-A Evaporator streams will discharge to the B Pond complex after facility restart, they have been included in this State Waste Discharge Permit application. The remaining four streams included in the State Waste Discharge Permit application are currently active.

Analytical data presented for the 241-A Tank Farm cooling water, 244-AR Vault cooling water, 284-E Power Plant waste water, and the B Plant cooling water streams are from validated round one sampling results collected and analyzed in accordance with the approved Sampling and Analysis Plans for those streams.

In addition to the six 200 East Area W-252 streams included in this State Waste Discharge Permit application three additional streams are currently routed to the B Pond complex for disposal. These three additional streams are not included in this State Waste Discharge Permit application because they are planned to be rerouted to the 200 Area Treated Effluent Disposal Facility (Project W-049H), and permitted as such.

CONTENTS

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GLOSSARY

Alum	aluminum sulfate
BAT/AKART	best available technology/all known and reasonable treatment
BCE	B Plant chemical sewer
BCS	B Plant condensate system
Btu	British Thermal Unit
CASS	computer automated surveillance system
CBC	B Plant cooling water
CFR	Code of Federal Regulations
C.T.	cooling tower
DOE	U.S. Department of Energy
DOE/RL	U.S. Department of Energy Richland Operations Office
ECWS	emergency cooling water system
EPA	U.S. Environmental Protection Agency
ETF	effluent treatment facility
gpm	gallons per minute
HEPA	high-efficiency particulate air
HEIS	Hanford Environmental Information System
HP	high pressure
HVAC	heating, ventilation, and air conditioning
H/X	heat exchanger
JGV	jet gang valve
LERF	Liquid Effluent Retention Facility
LLW	low-level waste
M	million
Ma	million years
msl	mean sea level
N/A	not applicable
NCAW	neutralized current acid waste
NPDES	National Pollutant Discharge Elimination System
OG	operating gallery
ppb	parts per billion
psig	pounds per square inch gauge
PUREX	plutonium-uranium extraction (Plant)
RCRA	Resource Conservation and Recovery Act of 1976
SAP	sampling and analysis plan
SARA	Superfund Amendment and Reauthorization Act of 1986
SEPA	State Environmental Policy Act of 1971
SIC	standard industrial classification
SOW	statement of work
SWDP	state waste discharge permit
TEDF	Treated Effluent Disposal Facility
TRUEX	transuranic extraction
USGS	United States Geological Survey
WAC	Washington Administrative Code
WESF	Waste Encapsulation and Storage Facility
Westinghouse Hanford	Westinghouse Hanford Company
WTF	water treatment facility

METRIC CONVERSION CHART

INTO METRIC		
If you know	Multiply by	To get
Length		
inches	2.54	centimeters
feet	30.48	centimeters
Volume		
gallons	3.786	liters
cubic feet	0.02832	cubic meters
Temperature		
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius
Pressure		
inches water	1.87	mm Hg
inches water	249	pascal (Pa)
OUT OF METRIC		
Length		
centimeters	0.3937	inches
meters	3.28	feet
Volume		
milliliters	1.247×10^{-3}	cubic feet
liters	0.264	gallons
cubic meters	35.31	cubic feet
Temperature		
Celsius	Multiply by 9/5ths, then add 32	Fahrenheit
Pressure		
mm Hg	0.5353	inches water
pascal (Pa)	4.02×10^{-3}	inches water

1.0 PERMIT APPLICATION

This section presents the State Waste Discharge Permit application for the Project W-252 streams. The streams are included in Table 3 of the 216 Consent Order as "Other Phase II Streams."

1.1 ORGANIZATION

The Washington Administrative Code (WAC) 173-216 State Waste Discharge Permit application form for the W-252 streams generated in the 200 East Area and disposed of in the B Ponds Complex is enclosed in Section 1.2. Information required by the State Waste Discharge Permit application form is provided in the appendices, as noted in the completed form. The appendices follow precisely the format of the State Waste Discharge Permit application and are designed to read as a complete "stand-alone" State Waste Discharge Permit application containing all of the required information for the six 200 East Area W-252 streams. 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, sections correspond directly to the respective questions on the application form. For example, question 1 in Section B of the application form is answered in Appendix B, Section 1.0. The question in the appendices are worded precisely as they are in the application form, and are highlighted in bold underline.

Many of the questions in the application form require separate responses for each of the six W-252 streams included in the permit application. For questions requiring separate responses for each of the six W-252 streams, subsections are utilized under each section to answer the questions for each of the streams. The order in which the streams are addressed in these subsections is consistent throughout the document. This order is as follows:

- 242-A Evaporator Cooling Water;
- 242-A Evaporator Steam Condensate;
- 241-A Tank Farm Cooling Water;
- 244-AR Vault Cooling Water;
- 284-E Power Plant Waste Water;
- B Plant Cooling Water.

All of the questions in the permit application are answered in the appendices to ensure continuity when reviewing the document. As a result, it is not necessary to refer to the application form itself when reviewing the remainder of the document. This organizational format allows the reviewer to read the permit application cover to cover without referring back to the application form itself.

1.2 STATE WASTE DISCHARGE PERMIT APPLICATION FORM

The following pages contain the State Waste Discharge Permit Application for the W-252 streams.

WASHINGTON STATE DEPARTMENT OF ECOLOGY

STATE WASTE DISCHARGE PERMIT APPLICATION FOR INDUSTRIAL DISCHARGES TO LAND

For Office 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. Company Name: U.S. Department of Energy, Richland Operations Office

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

3. Facility Address: 200 East Area - Hanford Site
   Street
   See Appendix A
   City/State Zip

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

5. Check One: ☒ Existing 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.

John D. Wagoner (signature) 12/30/93 — Manager, Department of Energy, Richland Operations Office
Signature* Date Title

John D. Wagoner
Seal if applicable Printed Name

*Applications must be signed by either the owner, the principal executive officer or a duly authorized representative.

SECTION B. PRODUCT OR SERVICE INFORMATION

1. Briefly describe all manufacturing processes and products, and/or service activities. Provide the applicable Standard Industrial Classification (SIC) Code(s) for each activity.

   SIC No(s): See Appendix B, Section 1

   Description: See Appendix B, Section 1

2. Include a production schematic flow diagram of the process and service activities described above on a separate sheet.
   See Appendix B, Section 2

3. List raw materials and products:

RAW MATERIALS	
Type	Quantity
See Appendix B, Section 3	
PRODUCTS	

SECTION C. PLANT OPERATIONAL CHARACTERISTICS

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

Process	Waste Stream Name	Batch or Continuous Process	Waste Stream ID #
See Appendix C, Section 1			

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, Section 2
3. Indicate treatment provided to each waste stream identified above.
   See Appendix C, Section 3

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		Bio. treatment, type:
	Grease trap		Rainwater diversion or storage
	Grit removal		Other chem. treatment, type:
	Ion exchange		Other phys. treatment, type:

4. Describe any planned wastewater treatment improvements or changes in wastewater disposal methods:

See Appendix C, Section 4

5. If production processes are subject to seasonal variations, provide the following information. Write "Yes" for each month waste stream is produced.

Waste Stream ID #	MONTHS											
	J	F	M	A	M	J	J	A	S	O	N	D
See Appendix C, Section 5												

6. Shift information: See Appendix C, Section 6

a. Number of shifts per work day: ______

b. Number of work days per week: ______

c. Average number of work days per year: ______

d. Maximum number of work days per year: ______

e. Number of employees per shift: Shift start times

1st ______ 1st ______

2nd ______ 2nd ______

3rd ______ 3rd ______

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, Section 7

8. Describe any water recycling or material reclaiming processes:
See Appendix C, Section 8

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

-Spill Control and Containment Plan (per 40 CFR 112)?	☐ Yes	☐ No
-Emergency Response Plan (per WAC 173-303-350)?	☐ Yes	☐ No
-Runoff, spillage, or leak control plan (per WAC 173-216-110(f))?	☐ Yes	☐ No

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SECTION D. WATER CONSUMPTION AND WATER LOSS

1. Water source(s): See Appendix D, Section 1

   ☐ Public System (Specify) __________

   ☐ Private Well ☐ Surface Water

   a. Water Right Permit Number: __________

   b. Legal Description:
   ____ 1/4S, ____ 1/4S, ____ Section, ____ TWN, ____ R

2. a. Indicate total water use: Gallons per day (average) See Appendix D, Section 2

   Gallons per day (maximum) __________

   b. 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, Section 3

SECTION E. WASTEWATER INFORMATION

1. Provide measurements 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/CAS No.	Concentrations Measured	Analytical Method	Detection Limit
pH			
Conductivity	See Appendix E, Section 1		
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/7740-70-2			
Magnesium/7439-95-4			
Sodium/7440-23-5			
Potassium/7440-09-7			
Chloride			
Sulfate			
Fluoride			
Cadmium/7440-43-9			
Chromium/7440-49-3			
Lead/7439-92-1			
Mercury/7439-97-6			
Selenium/7782-49-2			
Silver/7440-22-4			
Copper/7440-50-8			
Iron/7439-89-6			
Manganese			
Zinc/7440-66-6			
Barium/7440-39-3			
Total Coliform			

2. Wastewater characteristics for toxic pollutants.
See Appendix E, Section 2
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:

a. Use the letter **A** in the **ABST** column if the chemical is not likely to be present because it is not used in the production process or used on site.

b. Use the letter **S** in the **ABST** column if the chemical may be present because it is used on site, but the chemical is not used in the production process.

c. Use the letter **P** in the **PRST** column if the chemical is likely to be present because it is used in the production process, but the effluent has not been tested.

d. Use the letter **K** in the **PRST** column if the effluent has been tested and found to be present.

Attach the analytical results.

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Analytical Results
Wastewater Characterization for Toxic Pollutants

ABST / PRST	CONSTITUENT/CAS No.	ABST / PRST	CONSTITUENT/CAS No.
___ ___	Acrylamide/79-06-1	___ ___	1,2 Dichloropropane/78-87-5
___ ___	Acrylonitrile/107-13-1	___ ___	1,3 Dichloropropene/542-75-6
___ ___	Aldrin/309-00-2	___ ___	Dichlorvos/62-73-7
___ ___	Aniline/62-53-3	___ ___	Dieldrin/60-57-1
___ ___	Aramite/140-57-8	___ ___	3,3' Dimethoxybenzidine/119-90-4
___ ___	Arsenic/7440-38-2	___ ___	3,3 Dimethylbenzidine/119-93-7
___ ___	Azobenzene/103-33-3	___ ___	1,2 Dimethylhydrazine/540-73-8
___ ___	Benzene/71-43-2	___ ___	2,4 Dinitrotoluene/121-14-2
___ ___	Benzidine/92-87-5	___ ___	2,6 Dinitrotoluene/606-20-2
___ ___	Benzo(a)pyrene/50-32-8	___ ___	1,4 Dioxane/123-91-1
___ ___	Benzotrichloride/98-07-7	___ ___	1,2 Diphenylhydrazine/122-66-7
___ ___	Benzyl chloride/100-44-7	___ ___	Endrin/72-20-8
___ ___	Bis(chloroethyl)ether/111-44-4	___ ___	Epichlorohydrin/106-89-8
___ ___	Bis(chloromethyl)ether/542-88-1	___ ___	Ethyl acrylate/140-88-5
___ ___	Bis(2-ethylhexyl)phthalate/ 117-81-7	___ ___	Ethylene dibromide/106-93-4
___ ___	Bromodichloromethane/75-27-4	___ ___	Ethylene thioureae/96-45-7
___ ___	Bromoform/75-25-2	___ ___	Folpet/133-07-3
___ ___	Carbazole/86-74-8	___ ___	Furmecyclox/60568-05-0

ABST / PRST	CONSTITUENT/CAS No.	ABST / PRST	CONSTITUENT/CAS No.
___ ___	Carbon tetrachloride/56-23-5	___ ___	Heptachlor/76-44-8
___ ___	Chlordane/57-74-9	___ ___	Heptachlor epoxide/1024-57-3
___ ___	Chlorodibromomethane/124-48-1	___ ___	Hexachlorobenzene/118-74-1
___ ___	Chloroform/67-66-3	___ ___	Hexachlorocyclohexane (alpha)/ 319-84-6
___ ___	Chlorthalonil/1897-45-6	___ ___	Hexachlorocyclohexane (tech.)/ 608-73-1
___ ___	2,4-D/94-75-7	___ ___	Hexachlorodibenzo-p-dioxin, mix/ 19408-74-3
___ ___	DDT/50-29-3	___ ___	Hydrazine/hydrazine sulfate/ 302-01-2
___ ___	Diallate/2303-16-4	___ ___	Lindane/58-89-9
___ ___	1,2 Dibromoethane/106-93-4	___ ___	2 Methylaniline/100-61-8
___ ___	1,4 Dichlorobenzene/106-46-7	___ ___	2 Methylaniline hydrochloride/ 636-21-5
___ ___	3,3' Dichlorobenzidine/91-94-1	___ ___	4,4' Methylene bis(N,N-dimethyl)aniline/101-61-1
___ ___	1,1 Dichloroethane/75-34-3	___ ___	Methylene chloride (dichloromethane)/75-09-2
___ ___	1,2 Dichloroethane/107-06-2	___ ___	Mirex/2385-85-5
___ ___	Nitrofurazone/59-87-0	___ ___	O-phenylenediamine/106-50-3
___ ___	N-nitrosodiethanolamine/ 1116-54-7	___ ___	Propylene oxide/75-56-9
___ ___	N-nitrosodiethylamine/55-18-5	___ ___	2,3,7,8-Tetrachlorodibenzo-p-dioxin/ 1746-01-6
___ ___	N-nitrosodimethylamine/62-75-9	___ ___	Tetrachloroethylene/127-18-4
___ ___	N-nitrosodiphenylamine/86-30-6	___ ___	2,4 Toluenediamine/95-80-7
___ ___	N-nitroso-di-n-propylamine/ 621-64-7	___ ___	o-Toluidine/95-53-4
___ ___	N-nitrosopyrrolidine/930-55-2	___ ___	Toxaphene/8001-35-2
___ ___	N-nitroso-di-n-butylamine/ 924-16-3	___ ___	Trichloroethylene/79-01-6
___ ___	N-nitroso-n-methylethylamine/ 10595-95-6	___ ___	2,4,6-Trichlorophenol/88-06-2
___ ___	PAH/NA	___ ___	Trimethyl phosphate/512-56-1
___ ___	PBBs/NA	___ ___	Vinyl chloride/75-01-4
___ ___	PCBs/1336-36-3		

SECTION F. STORMWATER

1. Do you have a stormwater NPDES permit? ☐ Yes ☐ No

   See Appendix F, Section 1

2. Have you applied for a stormwater NPDES permit? ☐ Yes ☐ No

   See Appendix F, Section 2

3. Are you covered or have you applied for coverage under a general or group stormwater permit? ☐ Yes ☐ No

   See Appendix F, Section 3

4. Describe the size of the stormwater collection area. See Appendix F, Section 4

   a. Unpaved Area ________ sq. ft.

   b. Paved Area ________ sq. ft.

   c. Other Collection Areas (Roofs) ________ sq. ft.

5. Describe the stormwater management systems.

   See Appendix F, Section 5

6. Attach a map showing stormwater drainage/collection areas, disposal areas and discharge points.

   See Appendix F, Section 6

SECTION G. OTHER INFORMATION

1. Describe liquid wastes or sludges being generated that are not disposed of in the waste stream(s).

   See Appendix G, Section 1

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

   See Appendix G, Section 2

3. Have you designated your wastes according to the procedures of Dangerous Waste Regulations, Chapter 173-303 WAC? ☐ Yes ☐ No

   See Appendix G, Section 3

4. Waste hauled off-site by: ☐ Wastehauler; ☐ Self; ☐ Other (identify)______

See Appendix G, Section 4

Name	Name
Address	Address
City/State	City/State
Telephone	Telephone

5. Have you filed a SARA Title 313 Disclosure? ☐ Yes ☐ No

   See Appendix G, Section 5

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, Section 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, Section 2

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3. Attach a topographic map with contour intervals used by USGS. Show the following on this map:
   See Appendix H, Section 3
   a. Location and name of internal and adjacent streets
   b. Surface water drainage systems
   c. Water supply and other wells within 500 feet of the site
   d. Surface water diversions within 500 feet of the site
   e. Chemical and product handling and storage facilities
   f. Infiltration sources, such as drainfields, lagoons, dry wells, and abandoned wells within 500 feet of the site
   g. Wastewater and cooling water discharge points with ID numbers (See Section C.1)
   h. Other activities and land uses within 1/4 mile of the site

4. Identify all wells within 500 feet of the site. Attach well logs when available and any available water quality data.
   See Appendix H, Section 4

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

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

   See Appendix, Section 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, Section 7

END — END — END

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APPENDICES

Appendix A	Location Maps
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APPENDIX A

LOCATION MAPS

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CONTENTS

FIGURES

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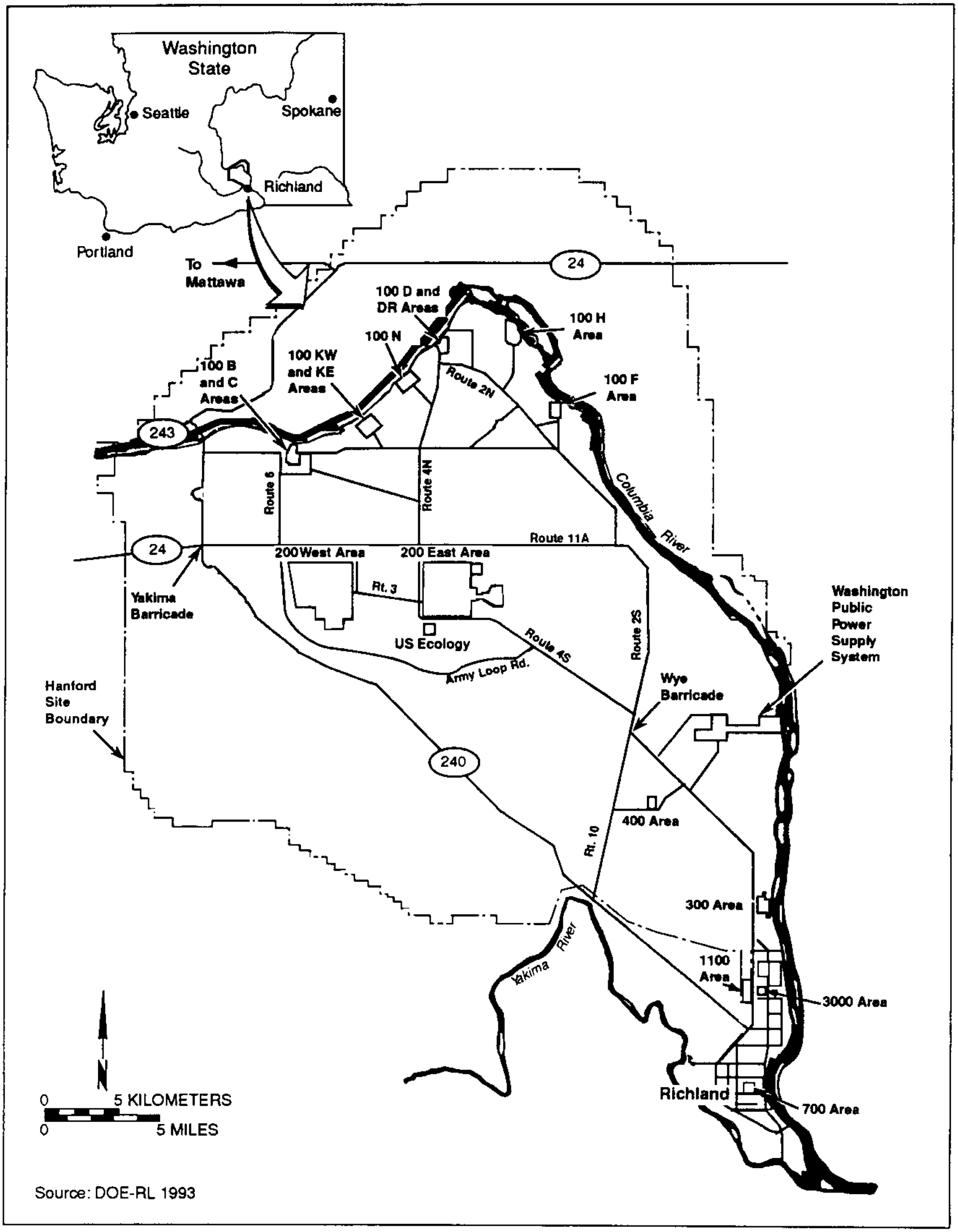

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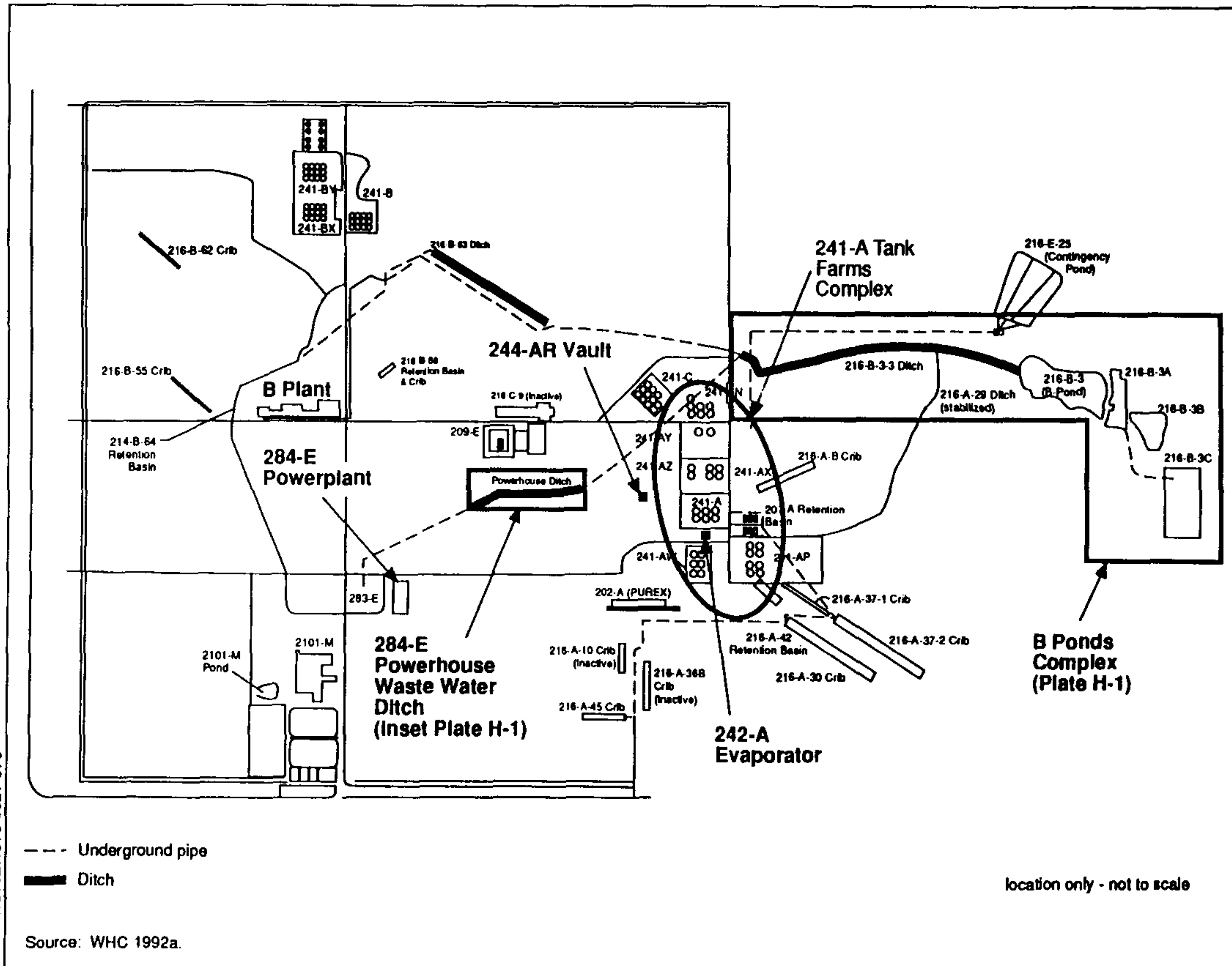
Figure A-1. Hanford Site Map.



Source: WHC 1992a.

Figure A-2. 200 East Area W-252 Facilities Location Map.

APPENDIX B

PRODUCT OR SERVICE INFORMATION

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1.0 BRIEFLY DESCRIBE ALL MANUFACTURING PROCESSES AND PRODUCTS, AND/OR SERVICE ACTIVITIES. PROVIDE THE APPLICABLE STANDARD INDUSTRIAL CLASSIFICATION (SIC) CODE(S) FOR EACH ACTIVITY.

This section describes the W-252 streams, their operation, and associated processes.

The following information was taken from the *Phase II Liquid Effluent Program (Project W-252) Wastewater Engineering Report and BAT/AKART Studies* (WHC 1992a). The sections, figures and tables, have been renumbered for use in this document.

Waste stream source types were categorized in the *Phase II Liquid Effluent Program (Project W-252) Waste water Engineering Report and BAT/AKART Studies* (WHC 1992a) into six categories denoted A through F and described in Table B-1, to evaluate the impact of the source waste streams. Table B-1 is provided as a reference when evaluating the process diagrams and assessing the potential stream impacts to the disposal site.

TABLE B-1. Waste Source Categories and Best Available Technology/All Known and Reasonable Treatment (BAT/AKART) Options/Alternatives

CATEGORY[1]	WASTE SOURCE TYPES	POTENTIAL BAT/AKART OPTIONS
A Boiler Discharge	- Steam Heating Condensate - Boiler Blowdown - Water Softener Regenerant	0[2] Modify/adjust equipment to reduce/eliminate contaminants* 1 Reuse, return to steam plant or electric reboiler* 2 Electric coil in duct* 3 Air source heat pump with supplementary electric heat* 4 Discharge untreated to collection/disposal facility or other suitable disposal site (solar/percolation/spray pond)
B Domestic Waste water	- Domestic Waste water=Gray Water - Related Floor Drains - Air Conditioner Condensate	0[2] Modify/adjust equipment to reduce/eliminate contaminants* 1 Existing septic system 2 New septic system 3 New treatment works on the Hanford Site 4 Discharge untreated to collection/disposal facility or other suitable disposal site (solar/percolation/spray pond)
C Miscellaneous Clean Effluent	- Floor Drains - Yard and Roof Stormwater - Air Compressor Condensate - Others	0[2] Modify/adjust equipment to reduce/eliminate contaminants 1 Collect and discharge stormwater to ground locally 2 Collect and evaporate (solar or spray) 3 Discharge untreated to collection/disposal facility 4 Discharge untreated to collection/disposal facility or other suitable disposal site (solar/percolation/spray pond)
D Once-Through Cooling Water	- Once-through Cooling	0[2] Modify/adjust equipment to reduce/eliminate contaminants 1 Closed loop - air cooled fan/dry coil* 2 Closed loop - air cooled refrigerated* 3 Cooling tower - closed or open loop 4 Replace equipment with air cooled equipment* 5 Recycle to supply water treatment* 6 Discharge untreated to collection/disposal facility or other suitable disposal site (solar/percolation/spray pond)
E Evaporative Cooling Water	- Evaporative Cooling Blowdown - Cooling Tower Blowdown	0[2] Modify/adjust equipment to reduce/eliminate contaminants 1 Air cooled water chiller with electric heat* 2 Discharge untreated to collection/disposal facility or other suitable disposal site (solar/percolation/spray pond)
F** Potentially or Slightly Contaminated Effluent	- Floor Drains - Condensate - Yard or Roof Stormwater - Air Compressor Condensate - Vacuum Pump Seal Water - Filter Backwash - Others	0[2] Modify/adjust equipment to reduce/eliminate contaminants 1 Retain entire stream and discharge or treat in-plant and discharge to collection/disposal facility 2 On-line monitor entire stream and divert off-normal fraction, treat in-plant and discharge to collection/disposal facility 3 Retain intermittent discharge, treat in-plant and discharge to collection/disposal facility 4 Deflect stormwater to ground away from yard drains 5 Cleanup, encapsulate or replace contaminated piping/vessels/sumps etc. 6 Replace equipment with dry equipment* 7 Treat at other approved facility

Source: WHC 1992a
[1] Categories are described in detail in WHC 1992a.
[2] Examples include detainer on concentrator and plug floor drain.
* Denotes technology that achieves zero discharge.
** Denotes only category with existing or potential contaminant concentrations that may require treatment before disposal.

1.1 242-A EVAPORATOR COOLING WATER SIC Code: 9999

1.1.1 242-A Evaporator Cooling Water Facility Description

The 242-A Evaporator facility is a waste management unit located in the 200 East Area of the Hanford Site. The primary processing unit commenced operation in 1977 and operated until March 1989. The Evaporator was used to reduce the volume of aqueous solutions of radioactive wastes by evaporating water from the solutions, reducing the storage volume requirements in the double-shell tank farm. At the time the Evaporator was shut down, the process condensate stream was determined to be a dangerous waste and discharge of the wastestream was halted. New facilities have been and are being constructed to allow the retention and treatment of the process condensate to permit restart of this facility. Life extension upgrades are also in progress that will ensure the safe and efficient operation of the evaporator through the year 2000.

Figure B-1 shows the location of the 242-A Evaporator facility in the 200 East Area of the Hanford Site. Figure B-2 shows the 242-A Evaporator and its related facilities.

1.1.2 242-A Evaporator Cooling Water Process Description

Figure B-3 is a process flow diagram of the 242-A Evaporator Cooling Water System. The 242-A Evaporator concentrates radioactive liquid wastes from the waste tanks by boiling off the process water. The water vapor is condensed in shell-and-tube primary, intermediate, and after condensers utilizing raw water from the 200 East Area. The cooling water effluent from the condensers is the primary contributor to the effluent stream, with a maximum flow of approximately 3,650 gallons per minute. The cooling water, in the tube side of the condensers, is maintained at a pressure of approximately 80 pounds per square inch gauge. The process condensate, containing radioactivity in the shell side, is maintained at a negative pressure of approximately 0.8 to 1.6 pounds per square inch atmosphere. This differential pressure across the tubes prevents the process condensate from entering the cooling water stream in case of tube wall failure or leakage. Overall, the 242-A Evaporator Cooling Water system is designed to prevent the condenser cooling water and other waste streams from contacting contaminated surfaces, solutions, or vapors.

The condenser cooling water effluent is combined with eight low flow effluent streams as described below. This combined effluent is routed via a 24-in diameter pipe to the 216-B-3 pond for disposal to the soil column.

The waste water effluent is comprised of the following nine stream contributors:

- Source 1: Condenser Cooling Water (design basis 3,650 gallons per minute, 400 gallons per minute annualized average)

- Source 2: Air Compressor Cooling Water (10 gallons per minute when operating)

- Source 3: Emergency Steam Turbine Condensate, typically one day per month (approximately 64 gallons per day annualized average)
- Source 4: Steam Trap Condensate (<10 gallons per day)
- Source 5: Compressed Air Dryer Discharge (permanently eliminated)
- Source 6: Water Filter Catch Pan Drainage (<10 gallons per day)
- Source 7: Heating, Ventilation, and Air Conditioning Room Floor Drainage (<1 gallon per day)
- Source 8: Steam System Relief Valve Discharge (<1 gallon per day)
- Source 9: Compressed Air Receiver Condensate (<1 gallon per day)

As reported in (WHC 1990a, Addendum 21), during evaporator processing operations, all nine contributors were potentially adding liquid to the stream. During shutdown and maintenance periods, the condenser cooling water and the water filter catch pan drainage will not contribute to the stream. The 242-A Evaporator runs in campaigns and not on a year-round basis, leading to wide variations in the average daily flowrate for this stream over selected periods of time. The total flow information, for the interval in which samples reported in WHC 1990a, Addendum 21 were taken, was utilized in calculating the average flowrate of 400 gallons per minute during this timeframe. The purpose of establishing the 400 gallons per minute rate is to calculate the annual toxic mass discharged in the evaluation of alternatives.

1.1.3 242-A Evaporator Cooling Water Waste Water Source Description

The waste water from the 242-A Evaporator Complex consists of nine streams. These are listed in Table B-2 and shown in Figures B-3, B-4, and B-5. Each of the source streams has been assigned to one of the six categories (A through F) described in Table B-1. Total flow based on average yearly flow is approximately 400 gallons per minute. Raw cooling water flows through the condensers. Upon restart of the evaporator, antifoam agents and a corrosion inhibitor will be added to the cooling water. An off-line radiation monitor and a proportional sampler are located downstream of the condensers.

1.1.3.1 Condenser Cooling Waste Water (Source 1). The condenser cooling waste water stream is considered a Category F waste, defined as once-through cooling water that is a potentially contaminated effluent that may pose some risk of contamination. Total flow based on average yearly flow is approximately 400 gallons per minute. Raw cooling water flows through the condensers. Upon restart of the evaporator, antifoam agents and a corrosion inhibitor will be added to the cooling water. An off-line radiation monitor and a proportional sampler are located downstream of the condensers.

1.1.3.2 Minor Contributors. Discharges of the eight minor contributors are minimal and, with the exception of the air compressor cooling water (Source 2), intermittent in nature. These eight effluents contribute both raw water and utility steam condensate to the cooling water effluent stream as described in the following sections.

Air Compressor Cooling Water (Source 2). Single pass raw water cools two air compressors supplying process and instrument air. One compressor is used as the on-line unit; the other is used as a standby unit. The air compressors are vertical, reciprocating, and nonlubricated and are designed to deliver 100 standard cubic feet per minute at 100 pounds per square inch gauge. Each compressor is cooled with a water jacket. The cooling water is required to keep the compressors at the proper operating temperature. If the cooling water is above the maximum temperature, an interlock will shut the compressors down. The source of the cooling water is raw water from the Columbia River that is supplied from the 200 East Area Powerhouse. The total compressor cooling water flow is estimated to be 10 gallons per minute. No chemicals are added to the stream and the stream is not in proximity to any waste or hazardous materials. This is considered a once-through cooling water, Category D, waste stream.

Emergency Steam Turbine Condensate (Source 3): A back-up steam turbine maintains ventilation in the facility in the event of a power outage and during maintenance to the primary fans. The raw water is provided from the 200 East Area Powerhouse. The maximum flow from this source is 8 gallons per minute when operating; the operation is sporadic other than a monthly operational check. Operational information indicates that the monthly operational check is for a four hour period and that typically, the unit operates for an additional four hours during power outages. The condensate is not in proximity to any waste processing or chemical handling, and there is no path for introduction of hazardous constituents. This is considered a boiler discharge, Category A, waste stream.

Steam Trap Condensate (Source 4): Steam, provided by the 200 East Area Powerhouse, is used in the heating, ventilation, and air conditioning system to heat incoming air for the facility. Steam traps, which remove steam condensate from the steam lines, are located within the heating, ventilation, and air conditioning room. These traps are automatically actuated by the buildup of condensate and empty into the heating, ventilation, and air conditioning drain lines. While the facility is being heated, the steam traps produce less than 10 gallons of condensate per day. The condensate is not in proximity to any waste processing or chemical handling, and no chemicals are added. This is considered a boiler discharge, Category A, waste stream.

Compressed Air Dryer Discharge (Source 5): An air dryer was previously used to process compressed air for use in the instrument air system. Fresh atmospheric air was filtered before compressing. No chemicals were added. The steam discharged less than 10 gallons per day (WHC 1990a) when it operated. This stream was considered a miscellaneous clean, Category C, waste stream. This source was permanently eliminated by replacing the dryer with an electric heater.

Water Filter Catch Pan Drainage (Source 6): Raw water is filtered to protect spray nozzles in process equipment. Filters are located in the heating, ventilation, and air conditioning room. Runoff only occurs during routine maintenance such as filter changes. Runoff from the filters and strainers is collected in a catch pan, with a drain to the main cooling water drain line. The source of the raw water is from the Columbia River via the 200 East Area Powerhouse. The estimated intermittent flow is less than 10 gallons per day. No chemicals are added and the pans are not in proximity to any hazardous material. This is considered a miscellaneous clean, Category C, waste stream.

Heating, Ventalation, and Air Conditioning Room Floor Drainage (Source 7): There are two floor drains in the heating, ventilation, and air conditioning room that serve the air washers (evaporative coolers). Potential sources are leaks from the steam lines for building heating, the raw water main, and some fire protection water lines that run through the room. There are no chemicals or hazardous materials stored or used in the room. The flow rate is intermittent and not calculable; less than gallon per day is assumed. There is no source of hazardous material to contribute to this waste stream. This is considered a miscellaneous clean, Category C, waste stream.

Steam System Relief Valve Discharge (Source 8): There are several relief valves in the steam system used to heat the incoming air to the facility. The influent stream is provided from the 200 East Area Powerhouse which uses raw water from the Columbia River. These relief valves are located in the heating, ventilation, and air conditioning room. If the steam heating system pressure exceeds the settings, they vent through a drain funnel to the cooling water waste stream main drain. The contribution is less than gallon per day. The condensate is not in proximity to any waste processing or chemical handling, and no chemicals are added. This is considered a boiler discharge, Category A, waste stream.

Compressed Air Receiver Condensate (Source 9): The compressed air receiver, or storage tank, is a steel upright tank with a volume of 125 cubic feet. The tank contains a moisture trap and a drain valve. Moisture, which is in the compressed air, collects in the trap and is periodically drained. The contribution from this source is intermittent and estimated to be less than gallon per day. The source of the effluent is water vapor from the atmospheric air that has been compressed, contributing no hazardous waste. This is considered a miscellaneous clean, Category C, waste stream.

1.1.3.3 Utility Steam Condensate. The contribution of utility steam condensate to the evaporator cooling water effluent is minimal when compared with the volume of condenser cooling water effluent. This contribution of approximately 8 gallons of condensate per minute, is generated by the backup steam turbine when operated (Source 3), the steam trap condensate from the heating, ventilation, and air conditioning system (Source 4), and the relief valve condensate (Source 8) in event of overpressure in the heating, ventilation, and air conditioning system. These are considered as boiler discharge, Category A, waste streams.

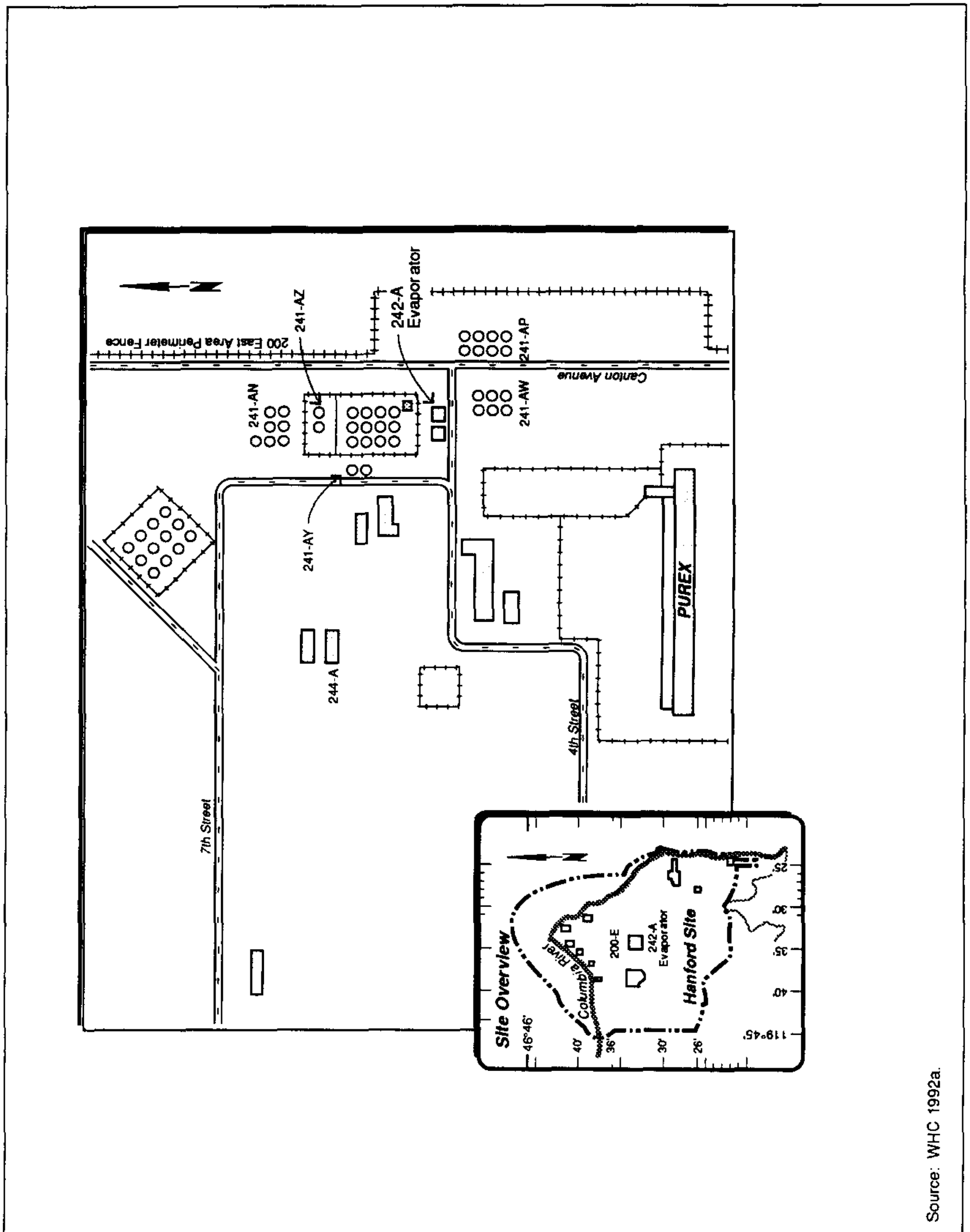

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Figure B-1. Location of the 242-A Evaporator in the 200 East Area.

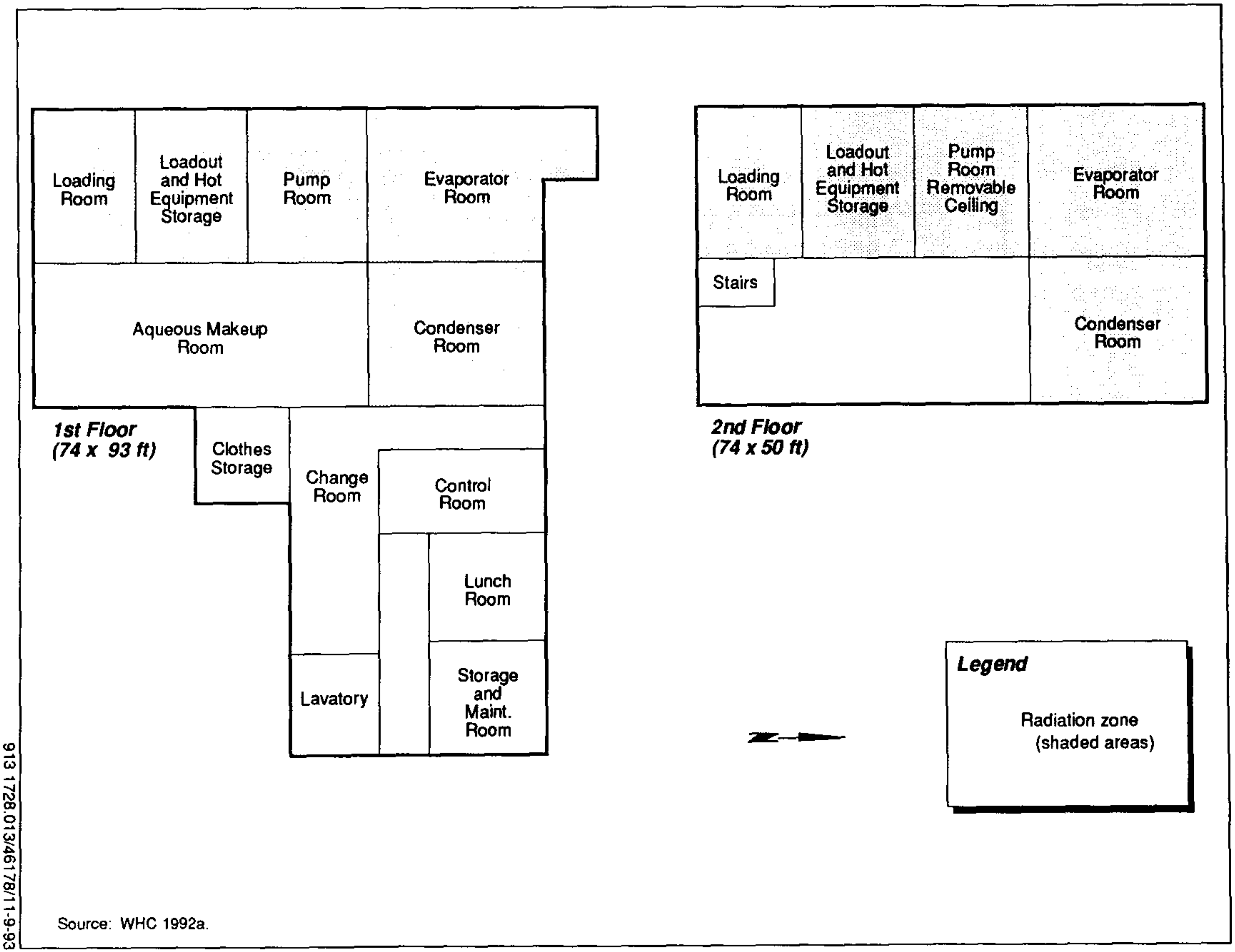

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Figure B-2. 242-A Evaporator Complex Floor Plan - 242-A Building.

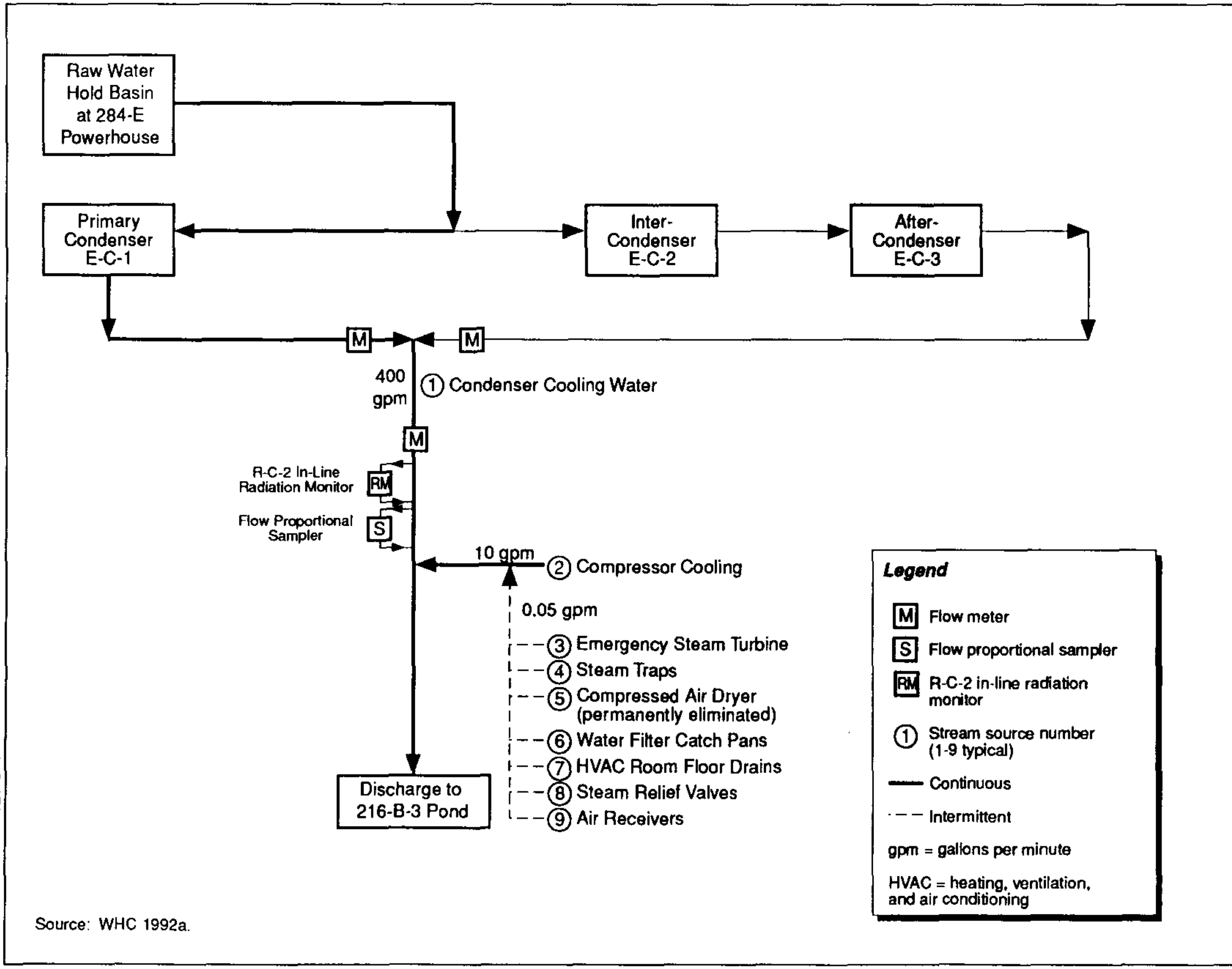

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Figure B-3. Current Flow Schematic for the 242-A Evaporator Cooling Water (Yearly Average Flows).

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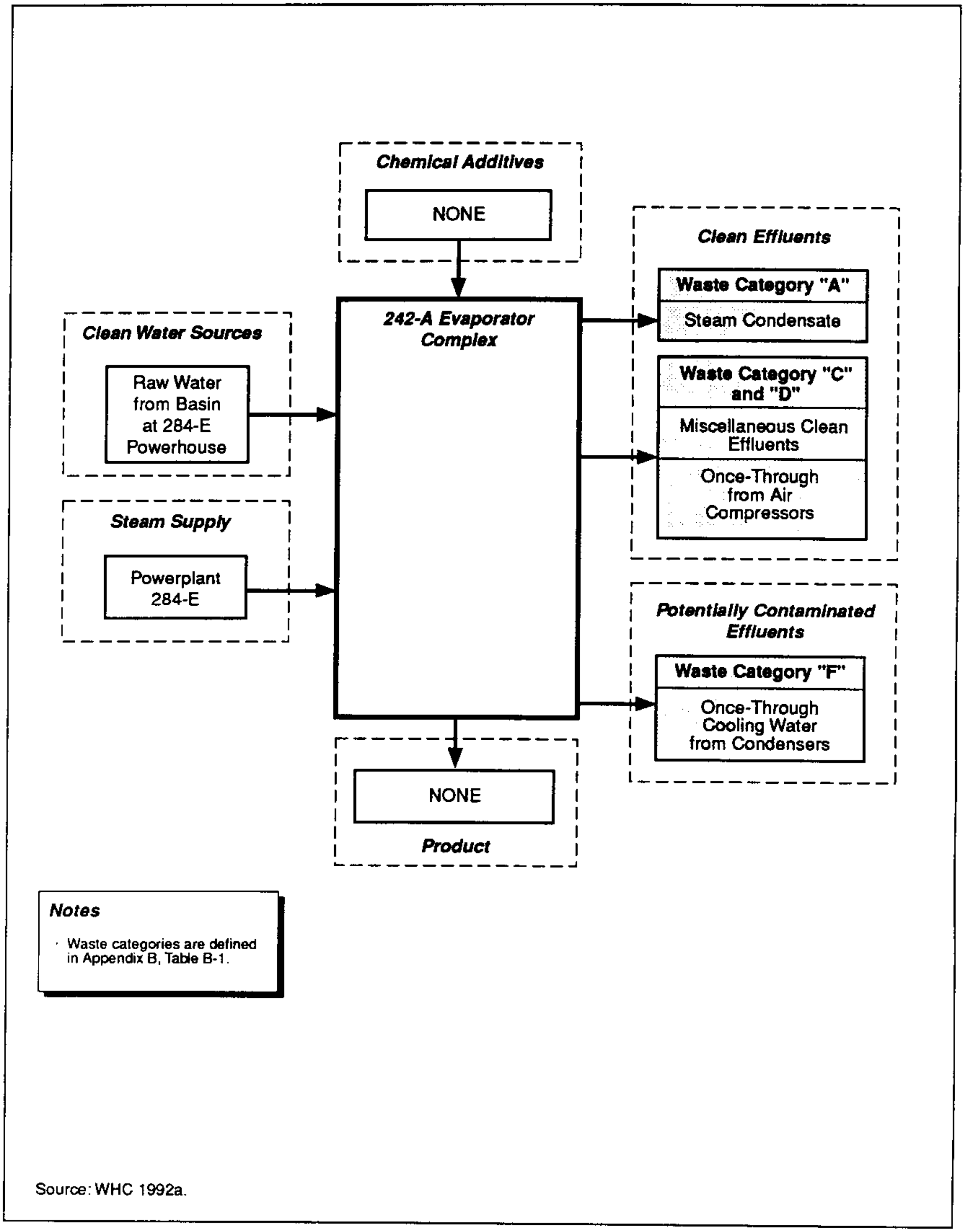

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Figure B-4. 242-A Evaporator Cooling Water Inputs and Outputs Schematic.

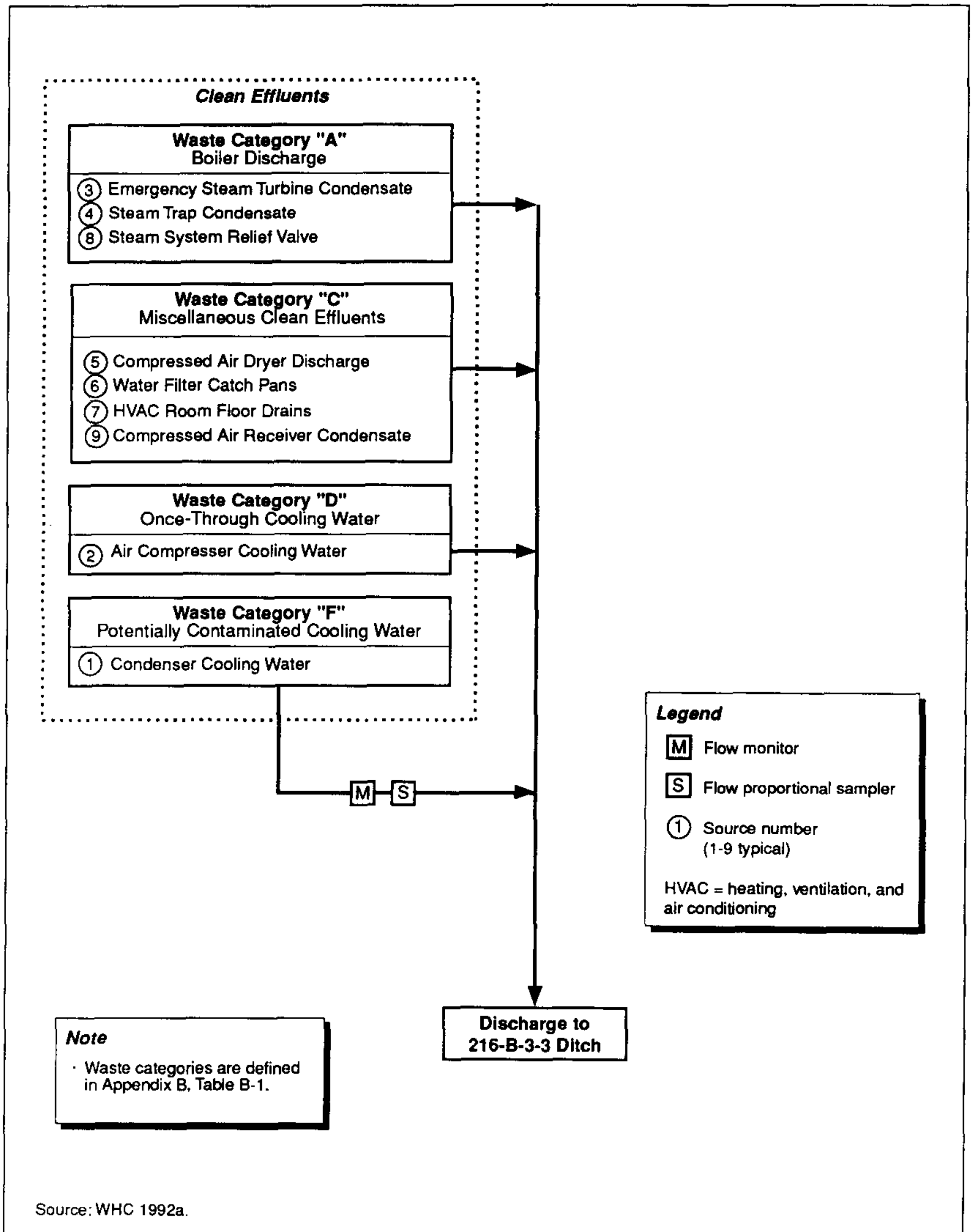

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Figure B-5. Flow Schematic for Current Status of 242-A Evaporator Cooling Water Effluents.

TABLE B-2. 242-A Evaporation Cooling Water Sources.

Source No.	Source Stream	Source Building	Source Category [1]	Effluent Water Type	Flow Type [2]	Estimated Flowrate [3] (gpm)	Status
1	Condenser Cooling Water	242-A	F	Raw	I/C	400	Inactive
2	Air Compressor Cooling Water	242-A	D	Raw	C	10	Active
3	Emerg. Steam Turbine Condensate	242-A	A	Steam Condensate	I	Negligible	Active
4	Steam Trap Condensate	242-A	A	Steam Condensate	I	Negligible	Active
5	Compressed Air Dryer Discharge [4]	242-A	C	Permanently Eliminated	I	0	Eliminated
6	Water Filter Catch Pan Drainage	242-A	C	Raw	I	Negligible	Inactive
7	Heating, Ventalation, and Air Conditioning (HVAC) Room Floor Drainage	242-A	C	Raw/ Condensate	I	Nebligible	Active
8	Steam System Relief Valve	242-A	A	Steam Condensate	I	Negligible	Active
9	Compressed Air Receiver Condensate	242-A	C	Air Moisture	I	Negligible	Active
						TOTAL 410	

Source: WHC 1992a

NOTES:

[1] Source categories are defined in Table B-1.
[2] I=Intermittent, C=Continuous, I/C=continuous when operating.
[3] Average flow rate is based on total annual flow. Includes substantial periods of nonoperation.
[4] Source permanently eliminated with the use of an electric heater.
gpm = gallons per minute

1.2 242-A EVAPORATOR STEAM CONDENSATE SIC Code: 9999

1.2.1 242-A Evaporator Steam Condensate Facility Description

Section 1.1.1 and Figure B-1 describe the 242-A Evaporator facility. Figure B-6 is a flow schematic showing the eleven contributors that combine to make up the 242-A Evaporator Steam Condensate waste water stream.

1.2.2 242-A Evaporator Steam Condensate Process Description

The 242-A Evaporator started operation in 1977. The evaporator was used to reduce the volume of a liquid radioactive waste stream through evaporation and concentration, producing a concentrated slurry stream. The slurry was discharged from the 242-A Evaporator to double-shell storage tanks. Operation of the 242-A Evaporator effectively reduced the number of required double-shell tanks by 35 to 60 percent.

Figure B-7 shows a simplified block flow diagram of the Evaporator facility with current influent and effluent streams. The figure indicates the types of clean water that enter the facility and are eventually discharged as waste water. The figure also indicates waste water categories as defined in Table B-1.

Table B-3 lists the 11 individual effluents that collectively form the waste water stream. The table also gives the source and current status (active or inactive) of each effluent. This list of sources was derived from the 242-A Evaporator Steam Condensate Stream-Specific Report (WHC 1990b, Addendum 26). None of the 11 sources are currently active. However, it is anticipated that the facility will be fully operational in the near future. Table B-3 illustrates various parameters for these sources when the evaporator is operative, including flow (e.g., intermittent or continuous), the effluent water type, and the category to which each source belongs on the basis of data and/or assumptions regarding its characteristics. Identification of the different effluent water types facilitated subsequent calculations that were used to project modified stream characteristics based on reduction or elimination of individual sources. Assignment of waste water categories facilitated screening of Best Available Technology/All Known and Reasonable Treatment alternatives for individual waste waters. Table B-3 also provides estimated annual flowrates for the waste waters.

1.2.3 242-A Evaporator Steam Condensate Waste Water Source Description

Each of the eleven contributors that make up the 242-A Evaporator Steam Condensate has been assigned to one of six categories (A through F) as described in Table B-1. Figure B-8 shows the effluent streams grouped by assigned categories. This figure also shows the current route to disposal. The information shown in Figure B-8 represents the current process configuration and operating mode described in Section 1.2.2. Although the waste water streams are grouped by category in the figure, they retain the source numbers assigned previously in Table B-3.

The following sections describe the individual waste water streams and characterize these individual streams in terms of impact on the overall waste water stream.

1.2.3.1 Reboiler Steam Condensate (Source 1). The 242-A Evaporator uses the latent heat liberated by condensing steam in a shell-and-tube heat exchanger (a reboiler) to heat the waste feed solution. The condensed steam is discharged through a weir (C-103). A portion of this condensate is pumped from upstream of the weir through a proportional sampler and radiation monitor (R-C-1) and then returned to the condensate line upstream of the weir. From 1985 to 1988, the condensate flow from the reboiler averaged 32.4 gallons per minute and over this four year period, the month with the highest flow of condensate averaged 68 gallons per minute. The condensate is considered a potentially or slightly contaminated effluent, Category F waste stream.

The heated waste feed solution flows from the reboiler into a vapor/liquid separator vessel maintained at less-than-atmospheric pressure. Liquid from the bottom of the separator is returned to the reboiler for another heating cycle. Vapor from the top of the separator is condensed in a second, shell-and-tube heat exchanger that serves as a condenser. There is no contact between the steam or vapor streams and the liquid streams in either heat exchanger. Concentrated liquid is discharged from the bottom of the 242-A Evaporator to the double-shell tank farm for storage.

1.2.3.2 Steam Condensate (Source 2A) and Raw Water (Source 2B) from Heating and Cooling Jackets. Tanks AE-101 and AE-104 are equipped with jackets that allow the contents to be maintained at desired temperatures. The flow of raw water or steam condensate from these jackets is combined and discharged with the steam condensate effluent. The flow from these jackets is approximately 1 gallon per minute for the 2 sources combined. The steam condensate (Source 2A) is considered a boiler discharge, Category A waste stream. The raw water (Source 2B) is considered a once-through cooling water, Category D waste stream.

1.2.3.3 Purging System Steam Trap Condensate (Source 3). A purging system is used to clear the instrument piping that is used to obtain specific gravity measurements of tank waste. The steam supply used for this system is equipped with a steam trap that drains less than 0.02 gallons per minute into the steam condensate effluent stream. Source 3 is considered a boiler discharge, Category A waste stream.

1.2.3.4 Vacuum Pump Seal Water (Source 4). The air sample pump has been replaced with a pump that does not require seal water. This waste water stream and any associated potential for contaminating the facility waste water stream have been permanently eliminated. The vacuum pump seal water was considered a miscellaneous clean effluent, Category C waste stream.

1.2.3.5 Steam Strainer Condensate (Source 5). A steam ejector system maintains a reduced pressure atmosphere in the evaporator vessel. Steam strainers are located in the steam supply lines to the ejectors. Condensate from the strainers flows into a drain funnel that drains to the main steam condensate line to Tank C-103.

this flow is negligible and has been assumed to be less than 0.02 gallons per minute (WHC 1992a). Source 5 is classified as boiler discharge, a Category A waste stream.

1.2.3.6 Steam Separator Condensate (Source 6). Condensate from the steam separator in the steam ejector system flows into the steam strainer drain funnel that drains to the main steam condensate line to Tank C-103. This flow is negligible and has been assumed to be less than 0.02 gallons per minute (WHC 1992a). Source 6 is classified as boiler discharge, a Category A waste stream.

1.2.3.7 Steam Separator Strainer Condensate (Source 7). Blowdown from the steam separator strainer flows into the steam strainer drain funnel that drains to the main steam condensate line to Tank C-103. This flow is negligible and has been assumed to be less than 0.02 gallons per minute (WHC 1992a). Source 7 is classified as boiler discharge, a Category A waste stream.

1.2.3.8 Seal Water Pressure Control Valve Discharge (Source 8). Seal water from the process pumps is bled into the waste stream when the seal water pressure exceeds 150 pounds per square inch guage. The valve remains open until the pressure falls below 150 pounds per square inch guage. The discharge from this waste stream flows into the steam strainer drain funnel that drains to the main steam condensate line to Tank C-103. This flow is negligible and has been assumed to be less than 0.02 gallons per minute (WHC 1992a). Source 8 is considered miscellaneous clean effluent, a Category C waste stream.

1.2.3.9 Micro-filter Catch Pan Drainage (Source 9). Micro-filters filter the raw water used to spray the de-entrainer pad in the evaporator. Drainage from these filters flows into a catch pan and then flows into the steam strainer drain funnel that drains to the main steam condensate line to Tank C-103. This flow is negligible and has been assumed to be less than 0.02 gallons per minute (WHC 1992a). Source 9 is considered miscellaneous clean effluent, a Category C waste stream.

1.2.3.10 Seal Water Pumps and Filter Catch Pan Drainage (Source 10). Leakage from the pump seal water system and drainage from the seal water pump filters drain into a catch pan. The flow from the catch pan flows into the steam strainer drain funnel that drains to the main steam condensate line to Tank C-103. This flow is negligible and has been assumed to be less than 0.02 gallons per minute (WHC 1992a). Source 10 is considered miscellaneous clean effluent, a Category C waste stream.

1.2.3.11 R-C-1 Sampler/Monitor Cooler Raw Water Discharge (Source 11). Raw water used as coolant for the R-C-1 sampler flows into the steam strainer drain funnel that drains to the main steam condensate line to Tank C-103. This flow is negligible and has been assumed to be less than 0.2 gallons per minute (WHC 1992a). Source 11 is classified as once-through cooling water, a Category D waste stream.

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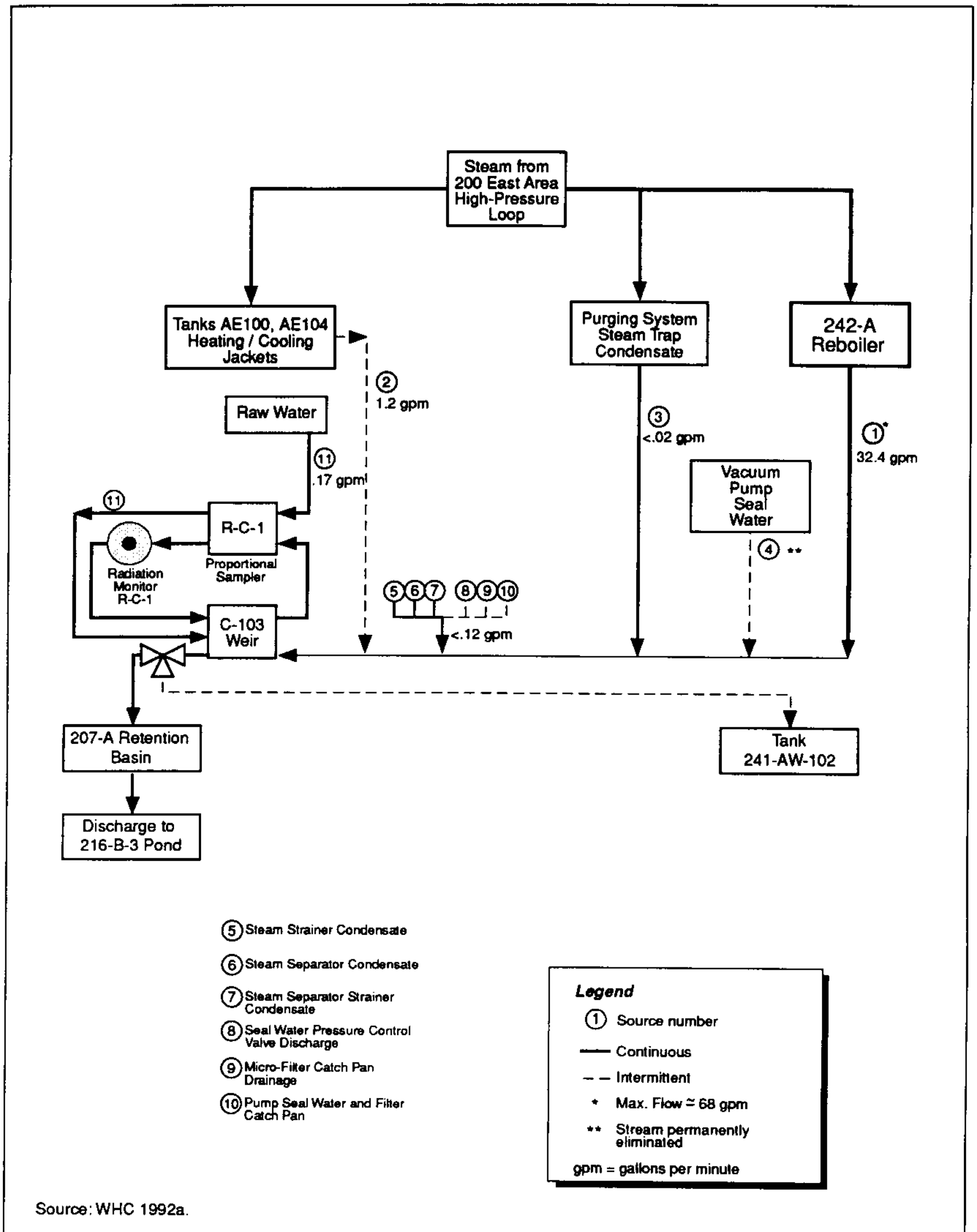

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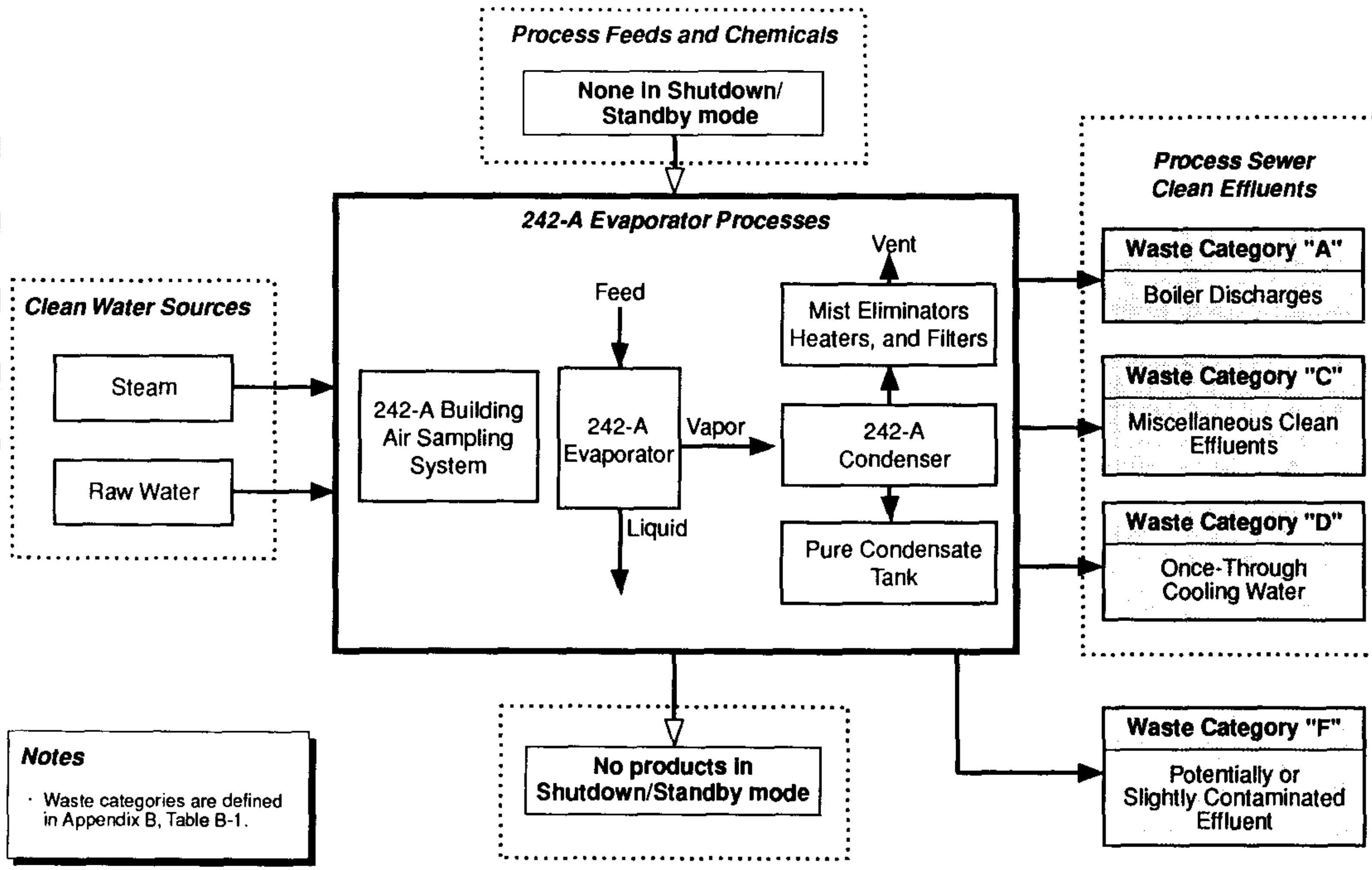
Figure B-6. Current Flow Schematic for the 242-A Evaporator Steam Condensate (Yearly Average Flows).



Source: WHC 1992a.

Figure B-7. 242-A Evaporator Inputs and Outputs.

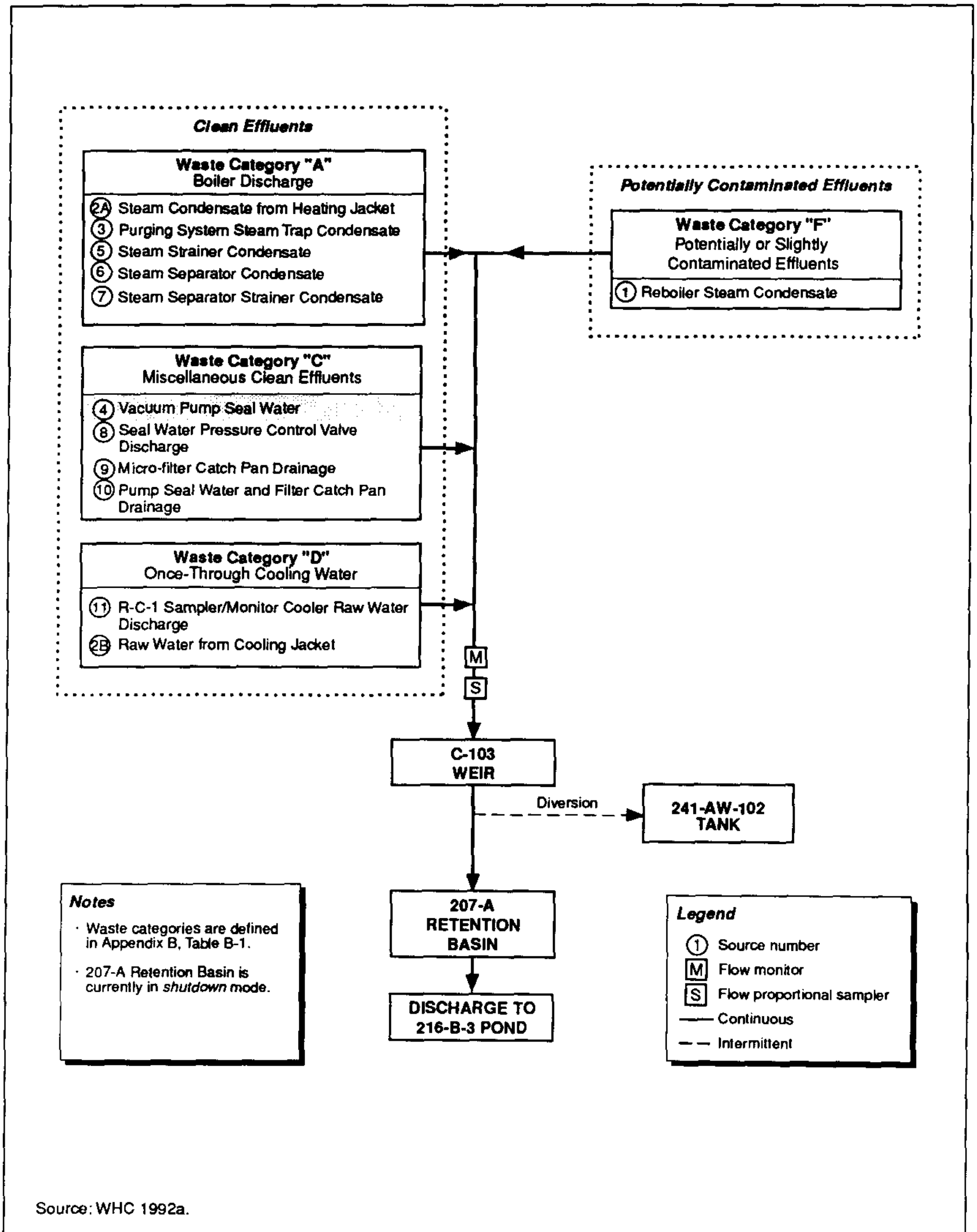


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Figure B-8. Schematic for Current Status of 242-A Evaporator Steam Condensate.

TABLE B-3. 242-A Evaporation Stream Condensate Effluent Sources.

Source No.	Source Stream	Source Building	Source Category [1]	Effluent Water Type	Flow Type [2]	Estimated Flowrate [3] (gpm)	Status [6]
1	Reboiler Steam Condensate	242-A	F	Condensate	C	3.24E+01 [5]	Inactive
2A	Steam Condensate from Heating Jacket	242-A	A	Condensate	I	0.58E+00	Inactive
2B	Raw Water from Cooling Jacket	242-A	D	Raw Water	I	0.58E+00	Inactive
3	Purging System Steam Trap Condensate	242-A	A	Condensate	C	<2.00E-02	Inactive
4	Vacuum Pump Seal Water [4]	242-A	C	Raw Water	I	1.50E+00	Inactive
5	Steam Strainer Condensate	242-A	A	Condensate	C	<2.00E-02	Inactive
6	Steam Separator Condensate	242-A	A	Condensate	C	<2.00E-02	Inactive
7	Steam Separator Strainer Condensate	242-A	A	Condensate	C	<2.00E-02	Inactive
8	Seal Water Pressure Control Valve Discharge	242-A	C	Raw Water	I	<2.00E-02	Inactive
9	Micro Filter Catch Pan Drainage	242-A	C	Raw Water	I	<2.00E-02	Inactive
10	Seal Water Pumps and Filter Catch Pan Drainage	242-A	C	Raw Water	I	<2.00E-02	Inactive
11	R-C-1 Sampler/Monitor Cooler Raw Water Discharge	242-A	D	Raw Water	C	1.70E-01	Inactive
					TOTAL	3.54E+01	

Source: WHC 1992a

NOTES:

[1] Source categories are defined in Table B-1.
[2] I=Intermittent, C=Continuous.
[3] Average flow rate is based on total annual flow divided by 526,000 minutes (one year).
[4] This source stream has been permanently eliminated following completion of sampling period.
[5] This annualized flow based on Table A-1 from WHC 1990b, Addendum 26, Page A-3.
[6] Facility is currently not operational so all streams are listed as inactive. When the evaporator is operative all streams, with the exception of stream 4, will be active. Stream 4 has been permanently eliminated.

gpm = gallons per minute

1.3 241-A TANK FARM COOLING WATER SIC Code: 9999

1.3.1 241-A Tank Farm Cooling Water Facility Description

The 241-A Tank Farm complex consists of a number of individual double-shell and single-shell tank farms. Double-shell tank farms 241-AY and 241-AZ, referred to as the "aging waste" tanks, are capable of storing high-level radioactive waste. These tanks have a ventilation system and steam coils that are designed to allow heating the waste to maintain a desired water boil-off rate. The main purpose of the 241-A Tank Farm Cooling Water is to provide a cooling mechanism for the exhaust vapors emitted by the 241-AY/AZ Tank Farm so that water can be condensed and returned to the tanks.

The "aging waste" tanks are kept under slight vacuum by the ventilation system, and the exhaust of the vent system is directed to the shell side of the off-gas condensers. Cooling water flows through the tube side of the condensers to remove the heat from the vent gas, thus condensing the contaminated water vapor. The condensed vapor is returned to the waste tanks.

The 241-A Tank Farm is located in the 200 East Area of the Hanford Site north of the Plutonium-Uranium Extraction (PUREX) Plant, as shown in Figure B-9. The 241-A Tank Farm cooling water system includes an emergency cooling water system which contains cooling towers. Figure B-10 shows a plan view of the 241-A Tank Farm, Building A-401, which houses the "aging waste" storage tanks ventilation off-gas condensers and Building A-701, which houses the air compressors and the emergency cooling water system cooling towers.

The 241-A Tank Farm cooling water is collected in an outdoor warm water sump from which the combined stream is discharged to the discharge site (216-B Pond) after it is monitored. The B Pond, which is a 100-acre percolation pond, is also shown in Figure B-9.

1.3.2 241-A Tank Farm Cooling Water Process Description

Figure B-11 shows a flow schematic of the 241-A Tank Farm Cooling Water System.

The Tank Farm cooling water is normally a once-through operation with raw water pumped from the 284-E Powerhouse through the C Tank Farm to 241-A-401 and -701 Buildings. When raw water is not available, the emergency cooling water system provides cooling water for the facility. The emergency cooling water system recirculates cooling water through the emergency cooling water system cooling towers for two cycles of concentration.

The A-401 condenser system consists of three condensers, two in operation in series and one as standby. The cooling water flowrate averages about 600 gallons per minute through the condensers and represents over 98% of the total effluent discharged. The water in the condenser tube side is maintained at a higher pressure relative to the off-gas pressure at the shell side. This reduces the probability of leaking off-gas contaminant into the condenser cooling system.

Figure B-11 shows that source stream 2 is sampled with source stream 1. The condenser cooling water is sampled by a continuous proportional sampler located in the A–401 Building condenser-facility before it flows to the warm water sump. Other contributors flow into the warm water sump downstream of the sampler.

Building A-401 has floor drains in an operating gallery that contains pipes with non-radioactive fluids. A service sink and safety shower, located in this gallery, drain to the floor drains. This flow is small and sporadic and has been estimated to be less than 0.016 gallons per minute of water on a normal basis.

The A-701 building includes four air compressors. Cooling water is circulated through the compressor cylinders and cylinder heads to remove heat generated from the compressor process. After passing through the compressors, the cooling water flows into a drain pipe, and then to the warm water sump. The compressed air dryer condensate, which is considered to be pure water, is collected in a receiver tank and is discharged to the warm water sump. The total effluent flow from the A-701 Building facility is normally 10 gallons per minute, most of which is from the cooling water.

The emergency cooling water system is intended to provide cooling water to the condensers located in the 241-A–401 Building during an interruption of the raw water supply. During emergency cooling water system operation, cooling water from the condensers circulates through the cooling tower. The water is cooled by evaporation before returning to the cold water sump of the cooling tower where 90 gallons per minute of makeup water from a deep well is added for evaporation loss and blowdown. The water from the cold water sump is then returned to the condensers as the cooling water supply.

1.3.3 241-A Tank Farm Cooling Water Source Description

Water enters the 241-A Tank Farm Cooling Water system from three different supplies: raw water, sanitary water, and deep well water. Raw water from the Columbia River is used for once-through condenser cooling and compressor cooling. Sanitary water provides a back up for the compressor raw water cooling. Deep well water is for the emergency cooling water system cooling tower for makeup of the evaporation and blowdown losses. Raw water is the primary supply to the cooling system and contributes nearly 100 percent of the waste water stream.

The 241-A Tank Farm cooling water waste consists of seven contributors. They are identified by source numbers and are shown in Table B-4 and Figure B-11. Figure B-12 shows a simplified block flow diagram for the facility as well as various influent and effluent water sources. The boxes on the left side of the figure show the types of clean water that enter the facility and are eventually discharged as process waste water. The sources listed in Table B-4 are shown in Figure B-13 flow schematic and have been assigned to into one of the six categories (A through F) described in Table B-1.

Normally Sources 1 through 3 are the only contributors and are piped to the warm water sump before discharge to 216-B-3 Pond at a total flowrate of approximate 610 gallons per minute. Because the emergency cooling water system is normally not in use, Sources 4 through 7 normally do not contribute to the effluent discharge. Waste water collected in the concrete warm water sump is typically clean and consistent with raw water quality (WHC 1992a).

1.3.3.1 A-401 Condensers Waste Cooling Water (Source 1). The Tank Farm cooling water is normally a once-through operation with raw water pumped from the 284-E Powerhouse through the C Tank Farm to 241-A-401. This effluent is consistent with raw water quality; however, due to the potential of radioactive contamination from the tank off-gas condensers, it is considered to be a Category F waste.

1.3.3.2 A-401 Building Condensers-Facility Floor Drainage (Source 2). The 241-A-401 Building condenser-facility floor drain line is fed from drains in the operation gallery where cold (non-radioactive) pipes are located. Discharges to these drains consist of water from the service sink and safety shower. No chemicals are stored or used in the 241-A-401 Building Operating-Gallery and there is no connection from this drain to any radioactive or hazardous source. Therefore, it is unlikely for this contributor to be contaminated by radioactive or hazardous material. This effluent is considered a Category C waste.

1.3.3.3 A-701 Building Compressor-Facility Drainage Including Compressor Cooling Water (Sources 3, 3A, and 3B). Once-through raw water is normally used for compressor cooling. The cooling water is not in direct contact with any contamination source. After passing through the compressors, the water flows into the drain pipe and to the warm water sump. This effluent is consistent with raw water quality and is considered a Category D waste. This effluent is referred to as Source 3.

Sanitary water is used for compressor cooling when raw water is not available. This effluent is consistent with the sanitary water quality and is considered a Category D waste. This effluent is referred to as Source 3A.

The condensate formed from the compressed air is collected in the receiver tank and is discharged periodically. There is also a source from the air dryer. This is considered to be pure water and is also discharged to the raw water sump. This effluent is consistent with the raw water quality and is considered a Category D Waste. This effluent is referred to as Source 3B.

1.3.3.4 Emergency Cooling Water System Sources 4 through 7. The emergency cooling water system is normally inactive with no flow addition to the 241-A Tank Farm cooling water waste stream. The best available data is that the emergency cooling water system is functionally tested once per month, but is rarely operated beyond that. When raw water is not available, cooling water from the condensers flow in the normal configuration to the warm water sump. It is then pumped to the emergency cooling water system cooling towers. Four contributors from emergency cooling water system are categorized as follows:

- **Cold water sump overflow (Source 4)** - This effluent is considered a Category F waste due to the potential of radioactive contamination from the Tank off-gas condensers.

- **Deep well makeup water bypass (Source 5)** - This effluent is considered a Category C waste as it is never mixed with water from the off-gas condensers in the cooling tower.

- **Cooling Tower blowdown (Source 6)** - The cooling tower is designed to operate at two cycles of concentration. This effluent is considered a Category F waste.

- **Drainage (Source 7)** - This drain is used to periodically drain the cooling tower. This effluent is considered a Category F waste.

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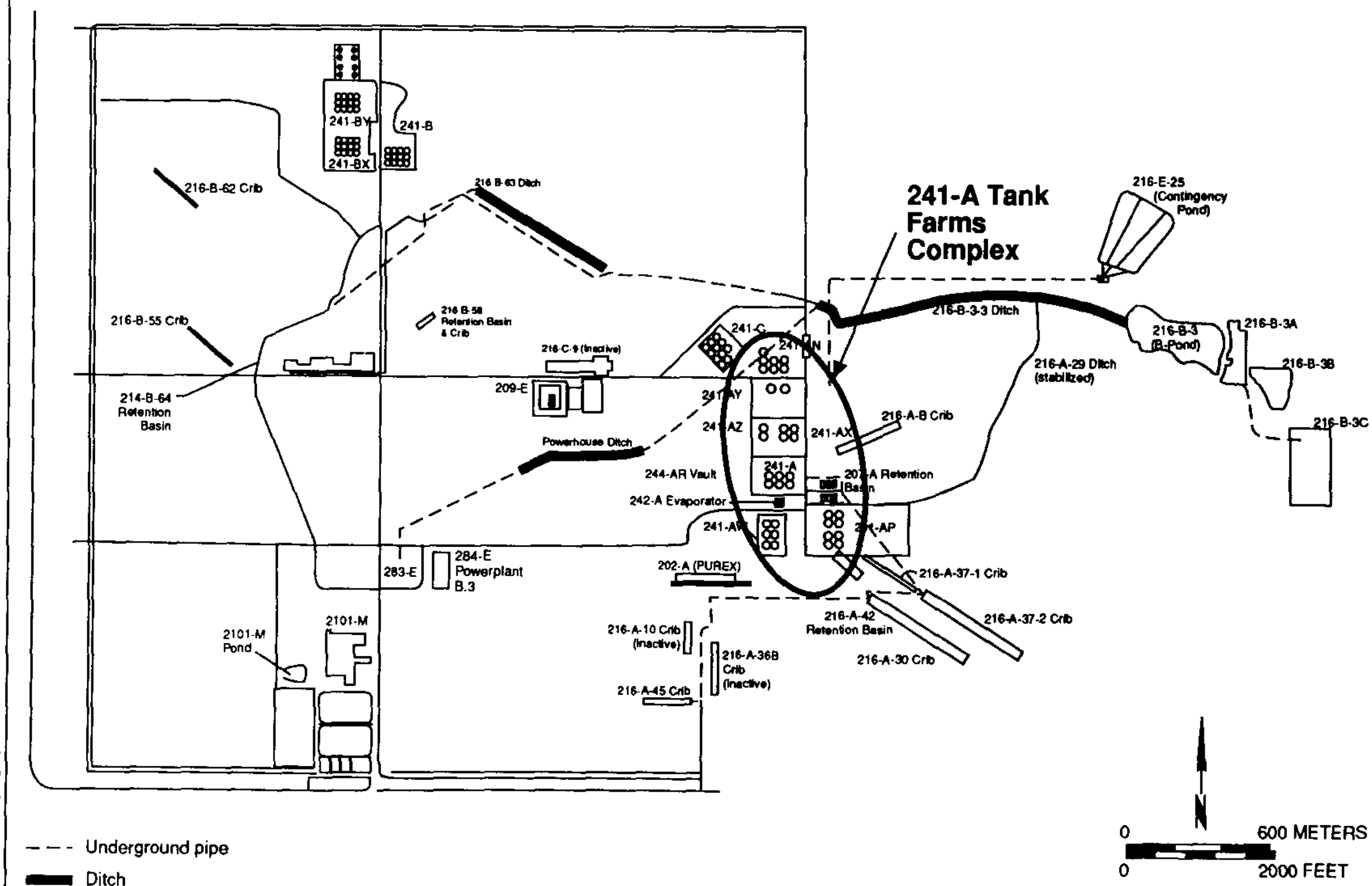

Source: WHC 1992a.

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Figure B-9. Location of 241-A Tank Farm Complex on the 200 East Area.

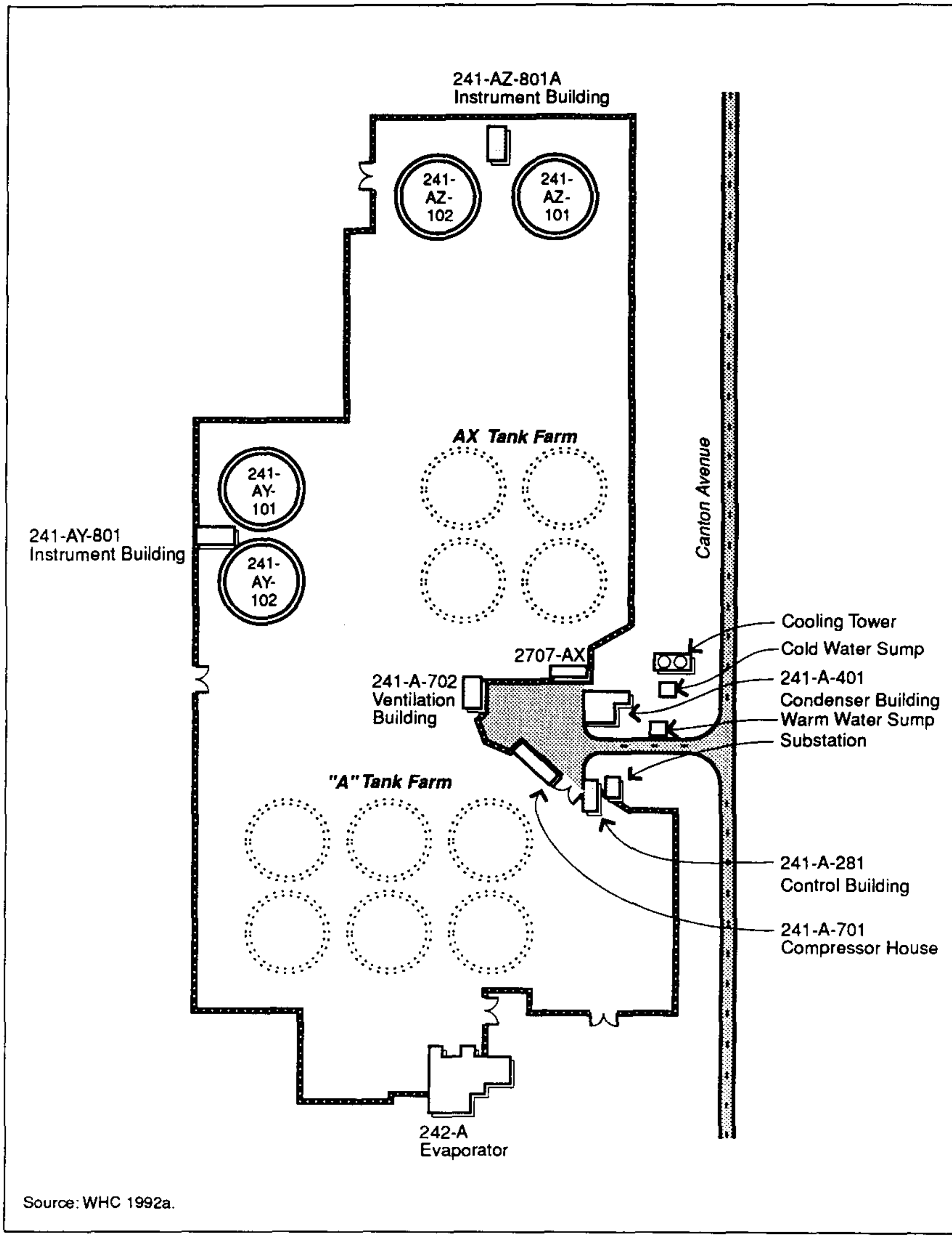

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Figure B-10. 241-AY and 241-AZ Tank Farm Complex Plot Plan.

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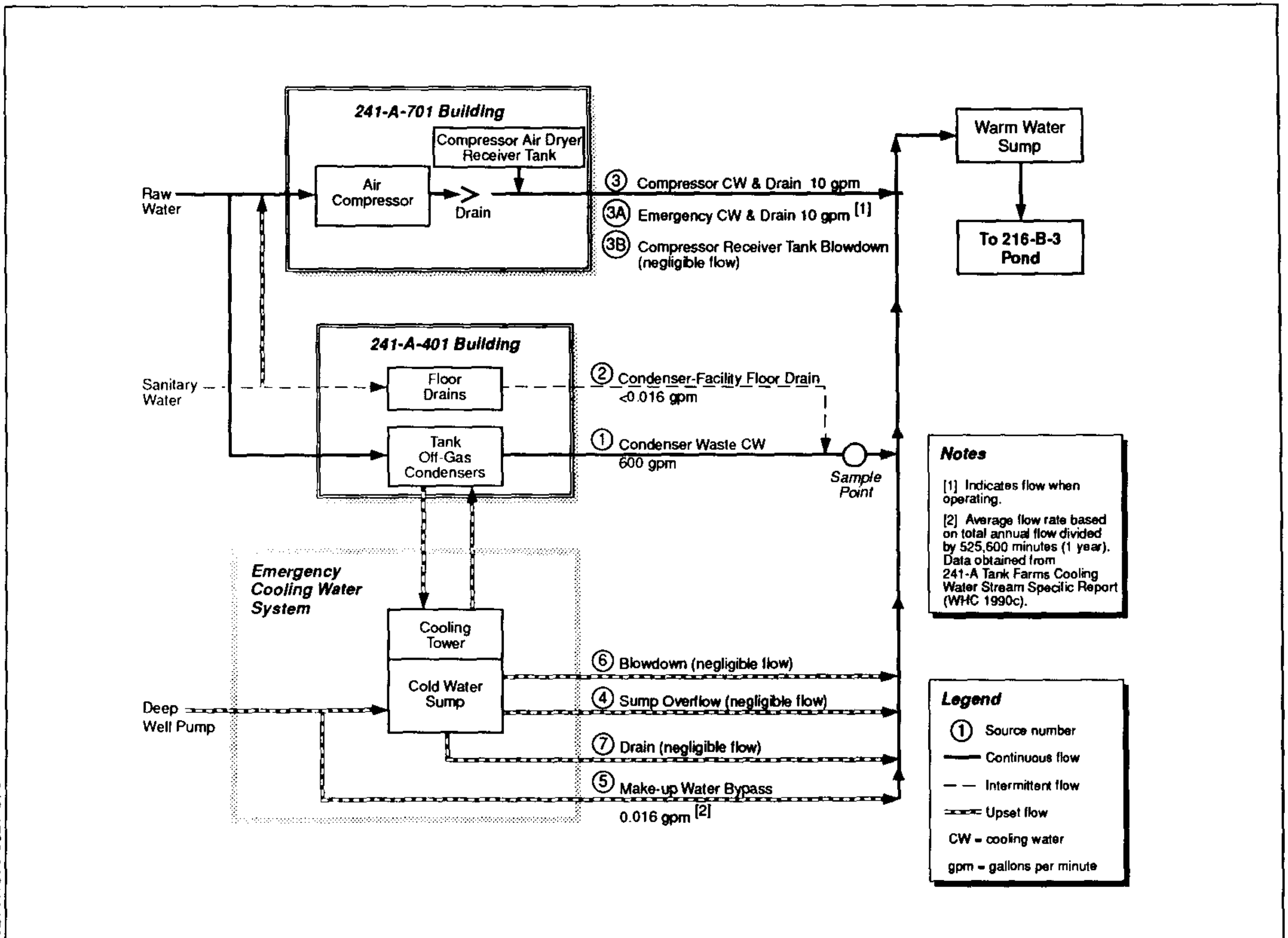

Source: WHC 1992a.

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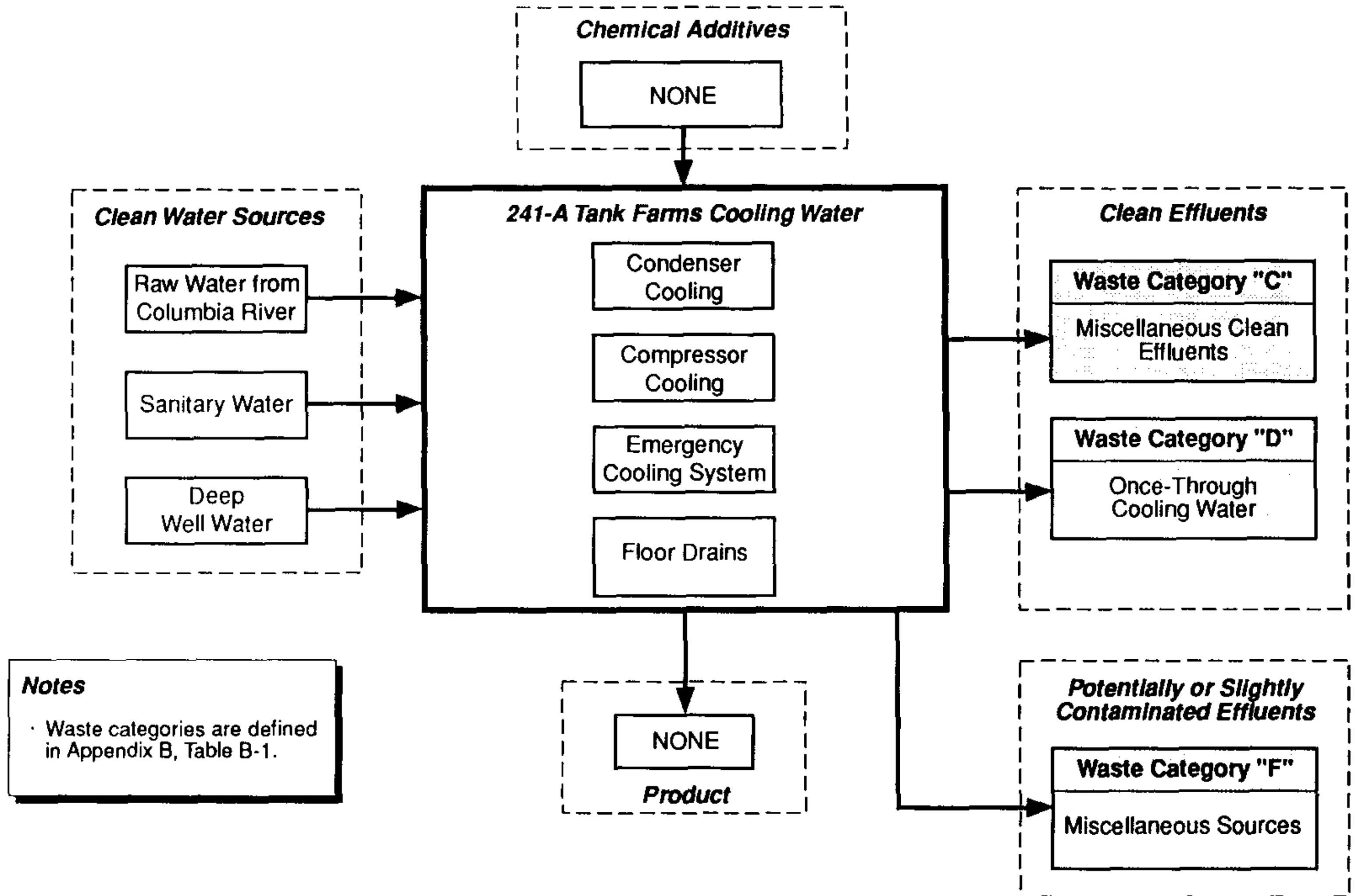
Figure B-11. Current Flow Schematic of the 241-A Tank Farm Cooling Water System (Yearly Average Flows).



Source: WHC 1992a.

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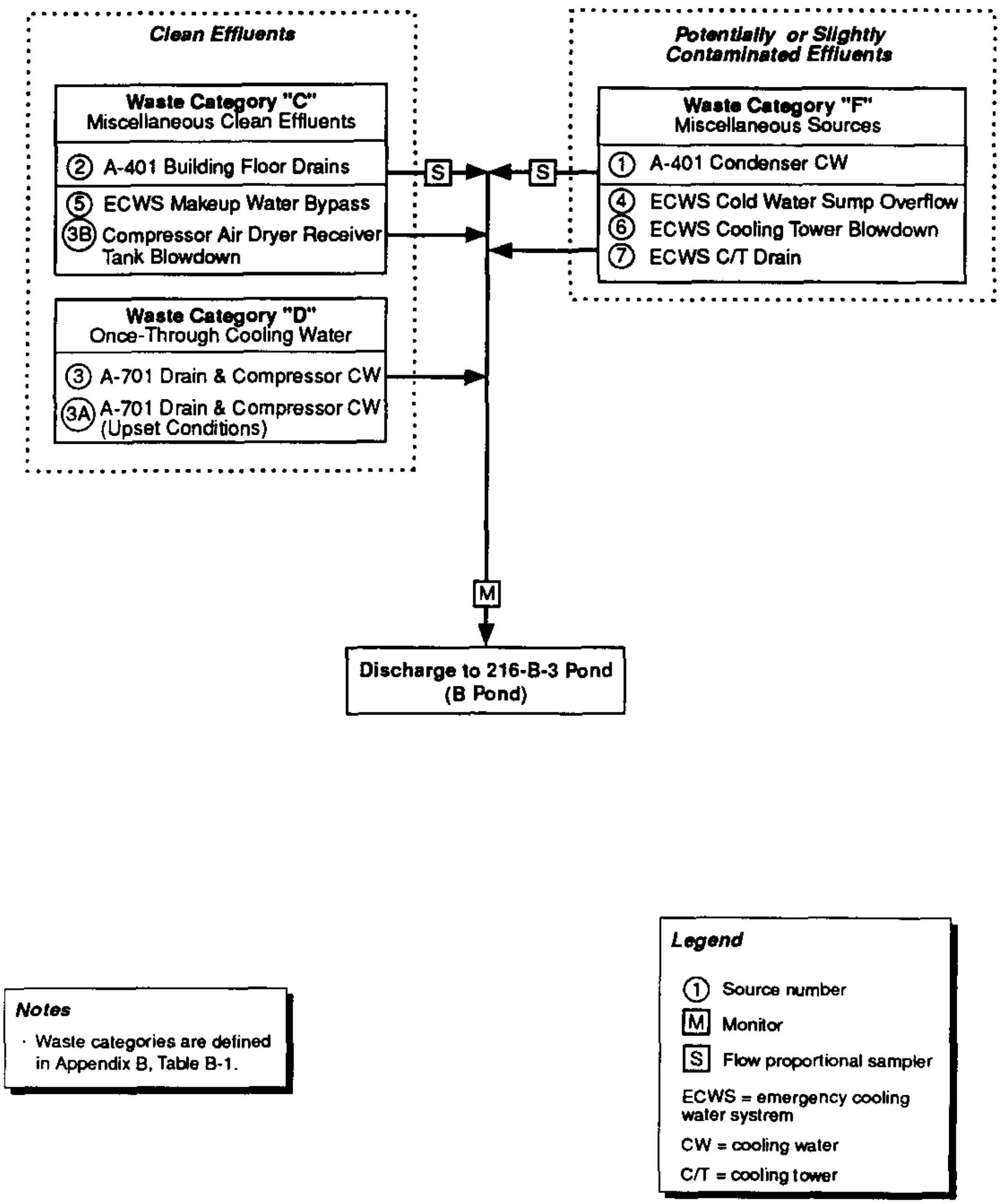
Figure B-12. 241-A Tank Farms Cooling Water Inputs and Outputs Schematic.



Source: WHC 1992a.

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Figure B-13. Flow Schematic for Current Status of 241-A Tank Farms Cooling Water.

TABLE B-4. 241-A Tank Farm Cooling Water Effluent Source

Source No.	Source Stream	Source Category [2]	Effluent Water Type	Flow Type [3]	Estimated Flowrate (gpm)	Status
1	A-401 Condensers Cooling Water	F	Raw	C	600	Active
2	A-401 Building Condenser-Facility Floor Drain	C	Sanitary	I	Negligible (<0.016) [5]	Active
3	A-701 Building Compressor-Facility Drains, Including Compressor Cooling Water	D	Raw	C	10	Active
3A	A-701 Building Compressor-Facility Drains, Including Compressor Cooling Water	D	Sanitary [1]	I/C	10 [4]	Standby
3B	Compressor Air Receiver Tank Blowdown	C	Condensate	I	Negligible	Active
4	ECWS Cold Water Sump Overflow	F	Deep Well	I	Negligible	Standby
5	ECWS Deep Well Makeup Water Bypass	C	Deep Well	I	0.016 [5]	Standby
6	ECWS Cooling Tower Blowdown	F	Deep Well	I	Negligible	Standby
7	ECWS Drain	F	Deep Well	I	Negligible	Standby
				TOTAL	610	

Source: WHC 1992a

NOTES:

[1] Sanitary water is used during emergency.

[2] Source category defined in Table B-1.

[3] I=Intermittent, C=Continuous, I/C=Continuous when operating.

[4] Indicates flow when operating.

[5] Average flow rate based on total annual flow divided by 525,600 minutes (1 year). Data obtained from *241-A Tank Farms Cooling Water Stream-Specific Report* (WHC 1990c).

gpm = gallons per minute.

ECWS = Emergency Cooling Water System.

1.4 244-AR VAULT COOLING WATER SIC Code: 9999

The 244-AR Vault facility was originally used to prepare radioactive wastes for transfer to B Plant for removal of cesium and strontium. These radioactive wastes were generated by other Hanford site activities and were temporarily stored in underground storage tanks prior to being transferred to the 244-AR Vault tanks. Currently the 244-AR Vault is on standby with no radioactive waste operations in progress. However, to maintain the facility for future use, some operational requirements are being met. Cooling water is used to cool the blocks, oil coolers, and compressors that supply instrument air to the facility. Cooling water and heating steam are also supplied to the ventilation system to control the temperature of the inlet air to the facility. Discharges from these systems make up the facility's current (standby mode) waste streams. At present, no record sampling or radiation monitoring instruments are associated with these waste streams. This is due to the inactive nature of the facility, and the fact that the waste streams are discharged from a closed system that has minimal potential for contamination. Currently the effluent goes to B Pond.

Modifications have been undertaken for the 244-AR Vault to become an interim storage and transfer facility for neutralized current acid waste. Neutralized current acid waste consists of acid wastes that have been neutralized and are currently stored in double shell tanks. This neutralized liquid waste contains both transuranic and non-transuranic wastes. Neutralized current acid waste will be transferred and cooled at the 244-AR vault prior to treatment at B Plant. One important completed modification has been the installation of the closed-loop cooling system for the Vault tanks. The waste stream will be continuously monitored and sampled at the 2904-AR Building after combining all waste streams at Manhole number 1. A small portion of the effluent stream will be split, with part flowing to the proportional sampler and part flowing through the continuous radiation monitor.

The following section briefly describes the 244-AR Vault and its associated processes.

1.4.1 244-AR Vault Cooling Water Facility Description

The 244-AR Vault is located in the 200 East Area of the Hanford Site north of the PUREX Plant, as shown in Figure B-14. Figure B-15 gives a plan view of the 244-AR Vault. A process area cross-section is provided in Figure B-16. The major service areas associated with this facility are the canyon building, tank cells, service and control building, compressor shelter, and closed-loop cooling equipment building. Other associated services include: a wind reduction facility, filter building, instrument building, changehouse building, and standby generator building.

1.4.1.1 **Canyon Building.** The canyon building is a reinforced concrete structure built to enclose and provide access to tank cells. Three tank cells and a failed equipment storage cell are located below the canyon deck level. The canyon building and cells are ventilated with filtered and temperature controlled inlet air. Cover blocks separate the three process cells and failed equipment storage area from the canyon deck. The canyon building is equipped with a motor-driven 20-ton capacity bridge crane and two 1-ton monorail hoists to facilitate cover block and equipment handling. The wind reduction building provides weather protection when the canyon building doors are opened.

1.4.1.2 Tank Cells. Each cell has walls constructed of reinforced concrete and contains a sump, sump jet, cell spray system, radiation monitoring equipment, and the necessary piping and instrumentation required for the process tanks. The failed equipment storage area is located next to Cell 1. The storage tubes are vented and drained to Cell 1. The isolation of the tank cells from the canyon by shielding plugs, the ventilation air flow path from the canyon to the cells, and the High Efficiency Particulate Absorber Filtration System on the ventilation exhaust provides a secondary containment in the event of cell contamination.

Tank TK-001 (Figure B-16) is located within Cell 1 and is approximately 43,000 gallons capacity. This tank is the primary neutralized current acid waste storage tank within the 244-AR Vault facility and is equipped with upper and lower stainless steel cooling coils, a transfer pump, a transfer jet, an agitator, spray rings, a purge air system, a sampler, vessel vent and chemical addition lines, and instrumentation. In 1985, the upper coil failed a pressure test and was replaced by an inner coil surrounding the agitator.

Tank TK-002 is located within Cell 2 and is of a similar size and design as that of TK-001. TK-002 is a backup to TK-001 and is equipped with stainless steel upper and lower dual service (heating and cooling) coils, a transfer pump, a sluice pump, a transfer jet, an agitator, spray rings, a purge air system, a sampler, vessel vent and chemical addition lines, a radiation monitoring drywell, and instrumentation.

Tanks TK-003 and TK-004 are both contained within Cell 3. These tanks receive waste streams from the pretreatment facility prior to returning this waste to the tank farms. TK-003 and TK-004 have approximately 4700 gallons capacity each. Each tank is equipped with two transfer jets, an agitator, a spray ring, a purge air system, a sampler, vessel vent and chemical addition lines, and instrumentation. TK-003 also has a stainless steel cooling coil and a purge ring. TK-004 is equipped with a dual service (heating and cooling) coil and a radiation monitoring drywell.

1.4.1.3 Service and Control Building. The service and control building is attached to the south wall of the canyon building. It contains the control room and a sample room. The control room houses the jet gang valves (used to control the steam transfer jets), the raw water control station, steam control station, the heating, ventilation, and air conditioning equipment, process instrumentation and control panels, the instrument air dryer, switchgear, and motor control centers. Tank sampling equipment is inoperative and sampling operations are not presently required. The crane control room is adjacent to the east end of the service and control building.

1.4.1.4 Compressor Shelter. The compressor shelter is located at the west end of the canyon building and houses both the normal operating compressor and the back-up compressor. The operating compressor supplies 100 pounds per square inch guage process air to an air receiver via an aftercooler and a condensate and oil separator. The backup compressor and the after-cooler are cooled by raw water, while the main compressor is provided with a glycol cooled, closed-loop system.

1.4.1.5 Closed-Loop Cooling System. A closed-loop cooling system is designed to remove the approximately 1.9-million British Thermal Units per hour (Btu/hr) heat load from TK-001, -002, -003, and -004. The system consists of redundant evaporative cooling units and recirculation pumps, air separator, make-up water treatment system, and radiation monitoring equipment. The cooling system equipment is installed in an instrument and equipment building located east of the compressor shelter next to the cooling towers.

The evaporative cooling units consist of redundant cooling towers. The closed-loop cooling water from the cell tanks is circulated through tubes in the heat exchanger within the cooling unit. Evaporative cooling water is cascaded over the tubes by a spray pump while air is forced upward over the tubes. Heat is removed from the closed-loop system by evaporation and the heat is discharged to the atmosphere. The remaining spray water falls to the sump and is recirculated. The only water consumed is the amount evaporated plus the small amount of blowdown which is bled to limit the concentration of impurities. The blowdown is discharged to the facility waste stream. For freeze protection during temporary shutdown periods, the immersion heaters in the units will maintain the sump water temperature at 40-45 degrees Fahrenheit.

Two identical 15 horsepower recirculation pumps are utilized to circulate the necessary cooling water to the cell tanks. Either pump can be used with either evaporative cooler.

An air separator and a compression tank are provided in the closed-loop piping to remove entrapped air, allow for expansion of the liquid in the closed-loop, and permit the addition of make-up water.

A packaged water treatment system is provided to control the water quality and reduce long-term corrosion. The system consists of water softening equipment and a chemical additive system with its associated metering pump. The softening unit has a 40 gallons per minute capacity and is used to supply water for cooling tower makeup and closed-loop fill.

A radiation detector is installed in the cooling water discharge header. If a leak occurs in one of the detector cooling coils and radioactive material enters the closed loop, the detector will alarm and automatically activate a three-way valve to divert the radioactive water into Cell 3. The leaking coil will then be isolated and cooling water will be routed through the secondary coil. Accumulated water within the Cell 3 sump is transferred to the cell tank by a sump jet. Radioactive cooling water is disposed of in the AY Tank Farm.

Indicators, recorders, controllers, alarms, and interlocks are used as necessary to monitor flow, temperature, radiation, and pressure in the closed-loop cooling system. These instruments are used to alert operating personnel in the control room, and to measure and identify the condition of the system during operation.

1.4.2 244-AR Vault Cooling Water Process Description

This section describes the processes that are associated with the 244-AR Vault cooling water waste stream. Process changes and enhancements that have been completed to reduce contributions to the waste stream and to prepare the facility for its future mission are described.

1.4.2.1 Primary Process. A flow schematic of the waste water flow paths of the 244-AR Vault facility is shown in Figure B-17. Figure B-18 shows the 244-AR Vault process and its relationship to the various influents and effluents.

Table B-5 lists the effluent source streams, depicted in Figure B-17 and B-19, and identifies the nature of the flow (e.g., intermittent, continuous), the effluent water type, and the category assigned to each source. The source categories of waste waters shown in the table are defined in Table B-1. Waste streams generated during facility operation as a functioning interim storage and transfer facility for neutralized current acid waste are designated as active. Some source streams have already been eliminated because the previous implementation of source controls.

1.4.2.2 Process Changes and Enhancements. Since fiscal year 1985, the 244-AR Vault systems have been upgraded and changes have been made to reduce potential radioactive discharges for facility operation. These changes are described below.

Cooling and heating coils have been pressurized with process air during facility standby/shutdown conditions at a pressure higher than the tank pressure to force any coil leakage toward the liquid waste and prevent contamination of the inside of the coil. A loss of process air will cause an alarm to annunciate in the control room and the Computerized Automated Surveillance System will alert operators of a potential coil leak.

Floor drains in the vicinity of the Jet Gang Valves have been blocked. If the jet gang valves leak or siphon, the effluents that drip to the floor would not flow to the 216-B-3 Pond. Collection and disposal of these leakages will be administratively controlled (i.e. collected and disposed according to written procedure rather than being sent to the cooling water waste stream).

The condensate from the K-1 (operating areas) and K-2 (canyon/process areas) inlet air systems is checked regularly in accordance with established procedures to ensure that the steam condensate and the cooling water are not contaminated.

Preventive maintenance and plant operating procedures have been implemented to ensure the integrity of the barriers that prevent contamination of the liquid effluents.

A closed-loop cooling system has been installed to replace the once-through vessel cooling system. To date, this closed-loop system has not been used due to the inactive status of the facility. The once-through cooling system has been retained as an emergency backup to the closed-loop cooling system.

1.4.3 244-AR Vault Cooling Water Waste Water Source Description

The 244-AR Vault cooling water effluent consists of sixteen waste streams (WHC, 1990d, Addendum 25). The sources listed in Table B-5 and shown in the Figure B-19 flow schematic, are discussed below. Each of the source streams has been placed into one of the six categories, A through F, as described in Table B-1.

1.4.3.1 Heating, Ventalation, and Air Conditioning System Drainage (Sources 1 and 2). The 244-AR Vault heating, ventilation, and air conditioning system provides filtered and temperature-controlled inlet air to the 244-AR Vault. The cooling portion of the heating, ventilation, and air conditioning system lowers the temperature of the incoming air by spraying sanitary water into the incoming air. The recovered water is then recycled from an internal sump. The sump overflow constitutes Source 1. The flowrate is seasonal and dependent upon the extent of cooling required. Operation of the coolers in both the K-1 and the K-2 heating, ventilation, and air conditioning systems will generate an average annual flowrate of about 5 gallons per minute. During the peak summer seasons the flowrate can approach 20 gallons per minute. The heating portion of the K-1 and K-2 heating, ventilation, and air conditioning systems uses steam supplied from the 284-E Powerhouse to heat the incoming air. Temperature control valves regulate the steam flow to the heaters. The steam is in an enclosed system and is not exposed to the air. The steam condensate constitutes Source 2. Its flowrate varies and is negligible during the summer months. An average annual flowrate of 2 gallons per minute has been estimated. During the colder winter months the flow can increase by a factor of 2 or 3 depending upon the outside temperature, but is not expected to exceed 7 gallons per minute. These effluents are considered Category E and A respectively.

1.4.3.2 Compressor Cooling Water (Sources 3, 4, and 16). Two air compressors are available to service the 244-AR Vault facility. These compressors supply the instrument air for the 244-AR Vault facility. The main compressor has a closed-loop, glycol-cooled system. A once-through, raw water stream cools the backup compressor. This cooling water (Source 3) removes the excess heat from the backup compressor block and oil cooler. This effluent is considered a Category D waste. Sanitary water may be used when raw water is not available. The cooling water requirement for the backup water-cooled compressor can vary from 5 to 15 gallons per minute, but an annual average flowrate of 0.5 gallons per minute has been utilized since the backup compressor is only utilized about 5 percent of the time.

Blowdown from the air receiver and dryer serving both air compressors is administratively controlled. Source 4 consists of condensed air moisture (essentially pure water), which may be contaminated with small quantities of oil. This source is intermittent and the flowrate depends on compressed air demand and seasonal fluctuations in ambient air temperature and humidity. The annual average flowrate is estimated to be less than 0.075 gallons per minute. This effluent is considered a Category C waste. Source 4 is planned for elimination when the closed loop glycol cooling system is operational as described in Section 1.4.3.8 in this Appendix.

A separate, once-through stream of raw water (Source 16) cools the compressor aftercooler. The annual average flowrate for this raw water stream has been estimated at 3 gallons per minute. This effluent is considered a Category D waste.

1.4.3.3 Evaporative Cooling Units Blowdown (Source 5 and 7). Cooling towers (2) will provide greater than 1.9 million British Thermal Units per hour evaporative cooling for the closed-loop cooling system. Closed-loop cooling system coils are located in the cooling tower. Softened raw water will be used for cooling tower makeup. A 4 gallons per minute blowdown (Source 5) will maintain an acceptable constituent concentration in the cooling tower water. The current anticipated blowdown rate will result in approximately 2 cycles of concentration. During actual operation, the cooling tower blowdown flowrate can be reduced if a higher number of cycles and resultant increase in constituent levels are determined to be acceptable.

The cooling towers will use softened raw water and will have an environmentally compatible chemical added in controlled amounts to control scaling, corrosion, and fouling and to maintain water quality. This additive will be selected at some future date prior to initiation of operations at the 244-AR Vault facility. The additive will be an effluent constituent at Manhole 1 because of the continuous blowdown. This effluent is considered a Category E waste.

An additional potential effluent is cooling tower overflow (Source 7). A maximum overflow condition would occur during system fill and could approach the softened water inlet flowrate of 40 gallons per minute. This is anticipated to be an infrequent upset condition resulting from a failure in the cooling tower level control system. The annual average flow resulting from this condition is estimated at 15 gallons per day (0.01 gallons per minute). This effluent is considered a Category E waste.

1.4.3.4 Vessel Vent Steam Heater Condensate (Source 6). The vessel vent system is designed to maintain a vacuum in the four tanks by removing and filtering contaminated offgases. To prevent condensation on the filters, the offgas passes through a steam heater. Condensate from the heater coils is routed to Manhole 1. Operations will maintain a positive pressure in the steam system relative to the tank, ensuring that the steam condensate is not contaminated if a leak occurs. The flow from this source is based on a supply of saturated steam at 177 pounds per hour which results in a 0.4 gallons per minute annual average flowrate. This effluent is considered a Category F waste.

1.4.3.5 Upset Vessel Cooling (Source 8). During an upset condition when the normal closed-loop cooling system makeup water is unavailable, another raw water source will be used. A manual effort is required to initiate the raw water supply to the cooling loop. This system would contribute up to 4 gallons per minute raw water to the 244-AR Vault waste stream, depending on the number of tanks used. This mode of operation is anticipated to be infrequent due to the reliability and redundancy built into the closed-loop and evaporative cooling systems. However, assuming it were to be utilized for about 2 days per year with an average operating flowrate of 4 gallons per minute, the annual average flow contribution to the waste stream is estimated to be about 0.02 gallons per minute.

This upset cooling capability would only be utilized on an infrequent emergency basis to allow sufficient cooling capability for waste transfer until re-establishment of closed-loop cooling. This effluent is considered a Category F waste.

1.4.3.6 Closed-Loop Cooling Water System Drainage (Source 9). The closed-loop cooling system removes approximately 1.9 million British Thermal Units per hour heat load from 244-AR Vault storage tanks TK-001, -002, -003, and -004. The system uses softened raw water as makeup. A radiation detector is installed in the cooling water discharge header. If a leak occurs in one of the cooling coils and radioactive material enters the closed loop, a radiation detector will alarm, automatically activate a three-way valve to divert the radioactive water into Cell 3, and shutdown the circulating water pump. The leaking coil will be isolated. For TK-001 and -002, cooling water may be rerouted through a secondary coil. Any water accumulated within the Cell 3 sump will be transferred by sump jet into TK-003. There is no continuous bleed-off from the closed cooling loop to the facility cooling water waste stream. The closed loop discharge valve to Manhole 1 is locked closed to prevent inadvertent operation. Loop drainage would be accomplished under controlled conditions. The annual average flowrate is estimated to be less than 0.1 gallons per minute. This effluent is considered a Category F waste.

Heating steam is no longer provided to the tank coils. The steam supply lines to the coils have been disconnected.

1.4.3.7 Miscellaneous Effluents (Sources 10, 12, 14, and 15). Other intermittent effluents that could be generated as a result of facility operation would consist of eyewash station drainage (Source 10), water softening equipment regenerant steam trap drainage (Source 12), water softening regenerant (Source 14) and raw water backflow preventer drainage (Source 15).

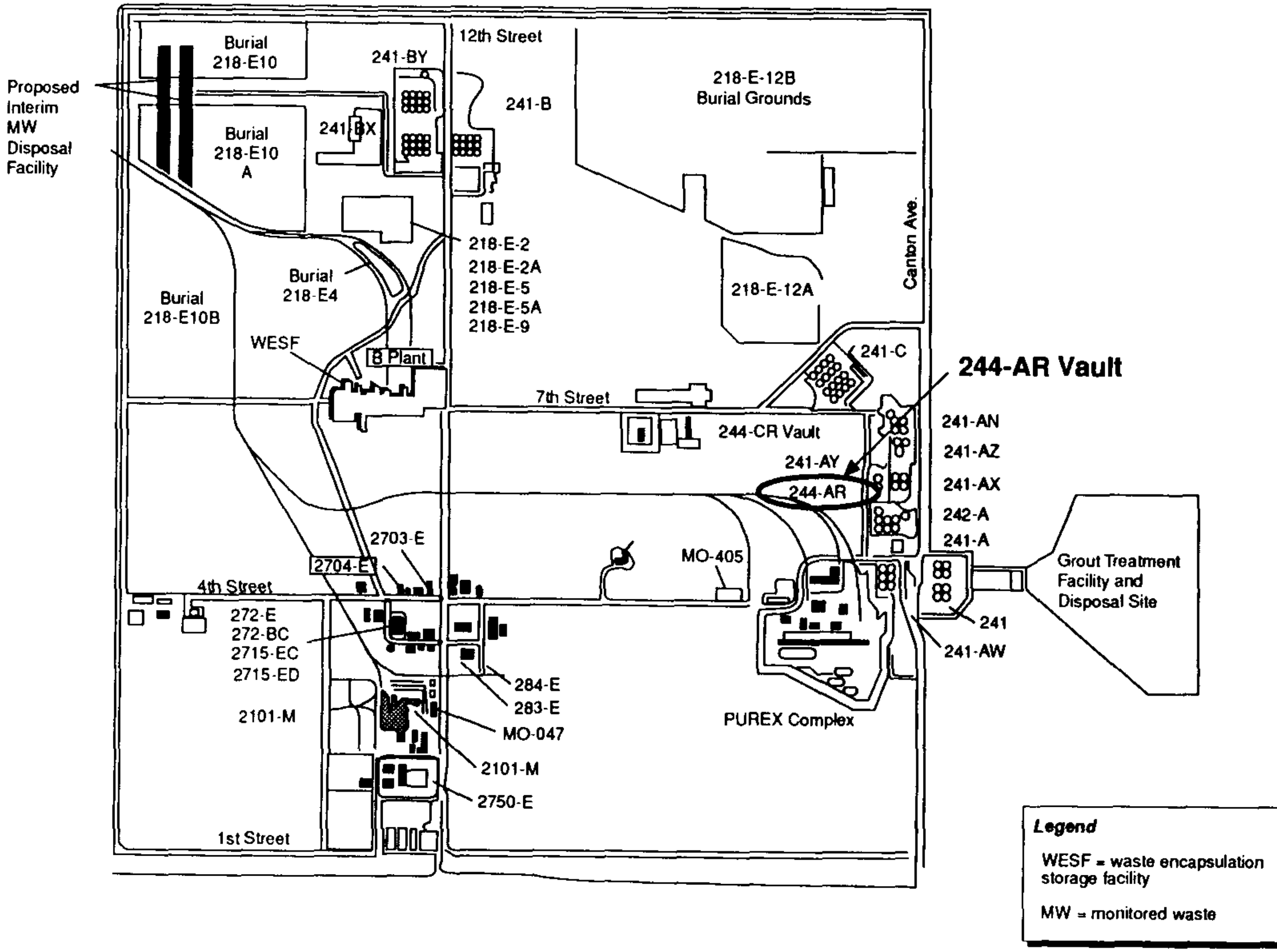
Effluent Sources 10, 14, and 15 are classified as Category C waste streams. Effluent Source 12 is classified as a Category A waste stream.

The eye wash station waste stream (Source 10) is planned to have intermittent flow of 0.001 gallons per minute, based on estimated yearly average flows. Steam traps from the steam jet lines (Source 12) contribute less than 1 gallon per minute continuous flow of steam condensate, based on yearly average flows.

Water softening regenerant waste stream (Source 14) contributes 0.16 gallons per minute based on estimated yearly average flows. The water softening regenerant waste stream is an administratively controlled intermittent (batch) waste stream. There are currently no plans to reuse spent brine or to recycle flush water.

The backflow preventer drain waste stream (Source 15) is a planned intermittent discharge estimated at 0.0002 gallons per minute based on projected yearly average flows.

1.4.3.8 Terminated Effluents Planned for Elimination (Sources 4, 11 and 13). Condensed moisture from Air Dryer (Source 4), jet gang valve Area Flow Drainage (Source 11) and TK-002 and -004 Heating Condensate (Source 13) are planned for elimination when the closed loop glycol cooling system is operational. Currently the closed loop glycol cooling system is approximately 95 percent complete, but a specific date for completion and start of operation has not been established.



Source: WHC 1992a.

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Figure B-14. 244-AR Vault Location in the 200 East Area.

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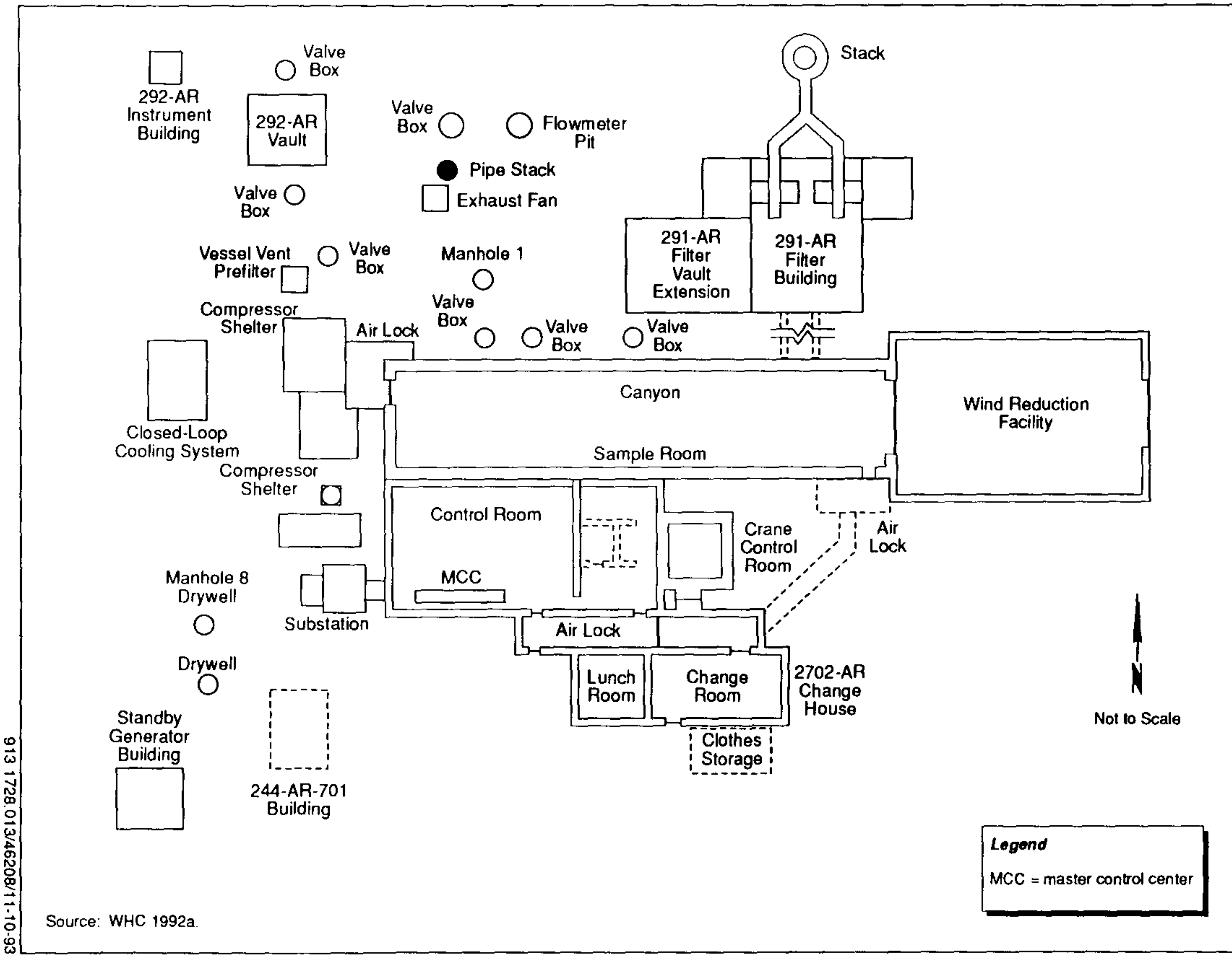
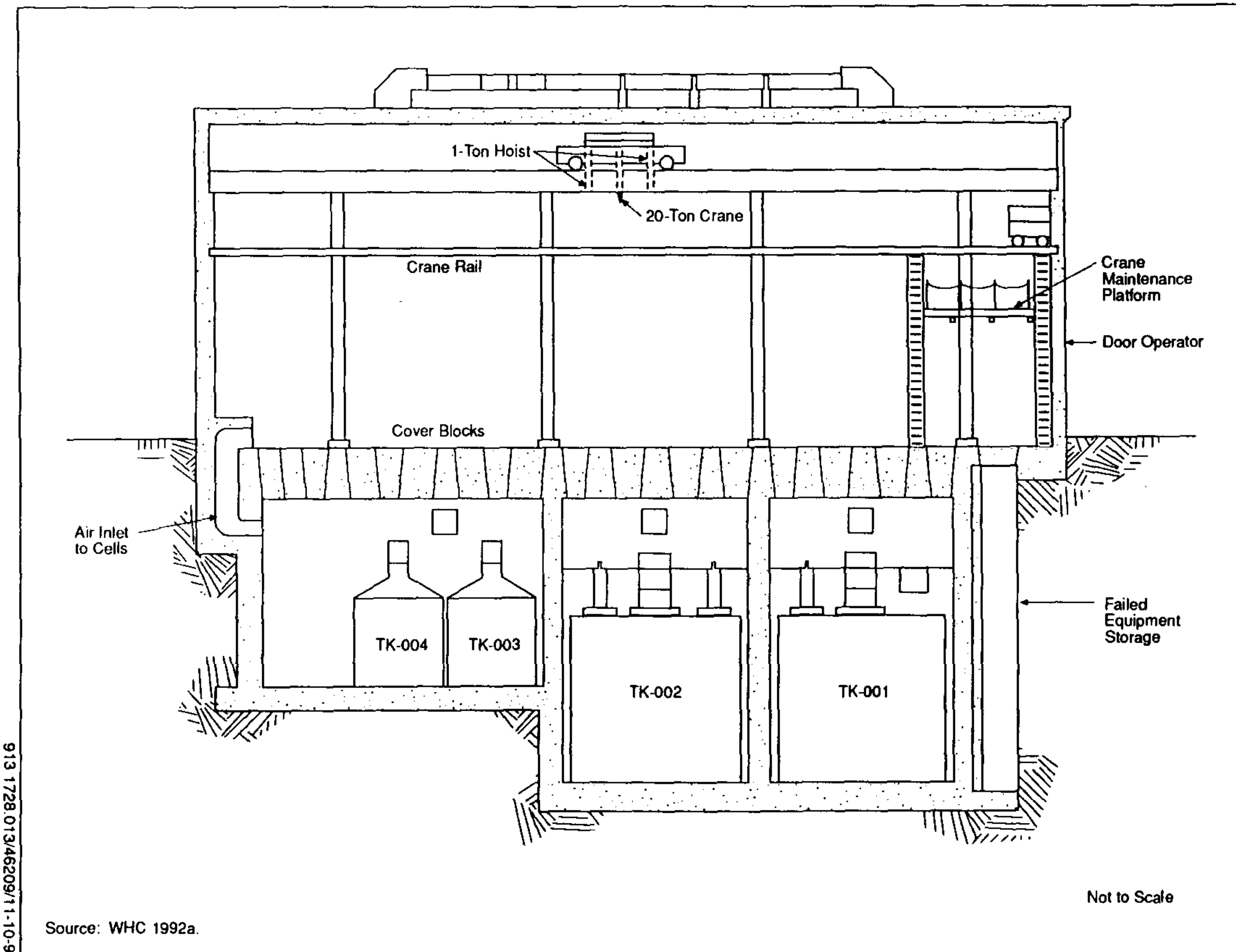


Figure B-15. Plot Plan of the 244-AR Vault Facility.



Source: WHC 1992a.

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Figure B-16. 244-AR Vault Process Area Cross Section.

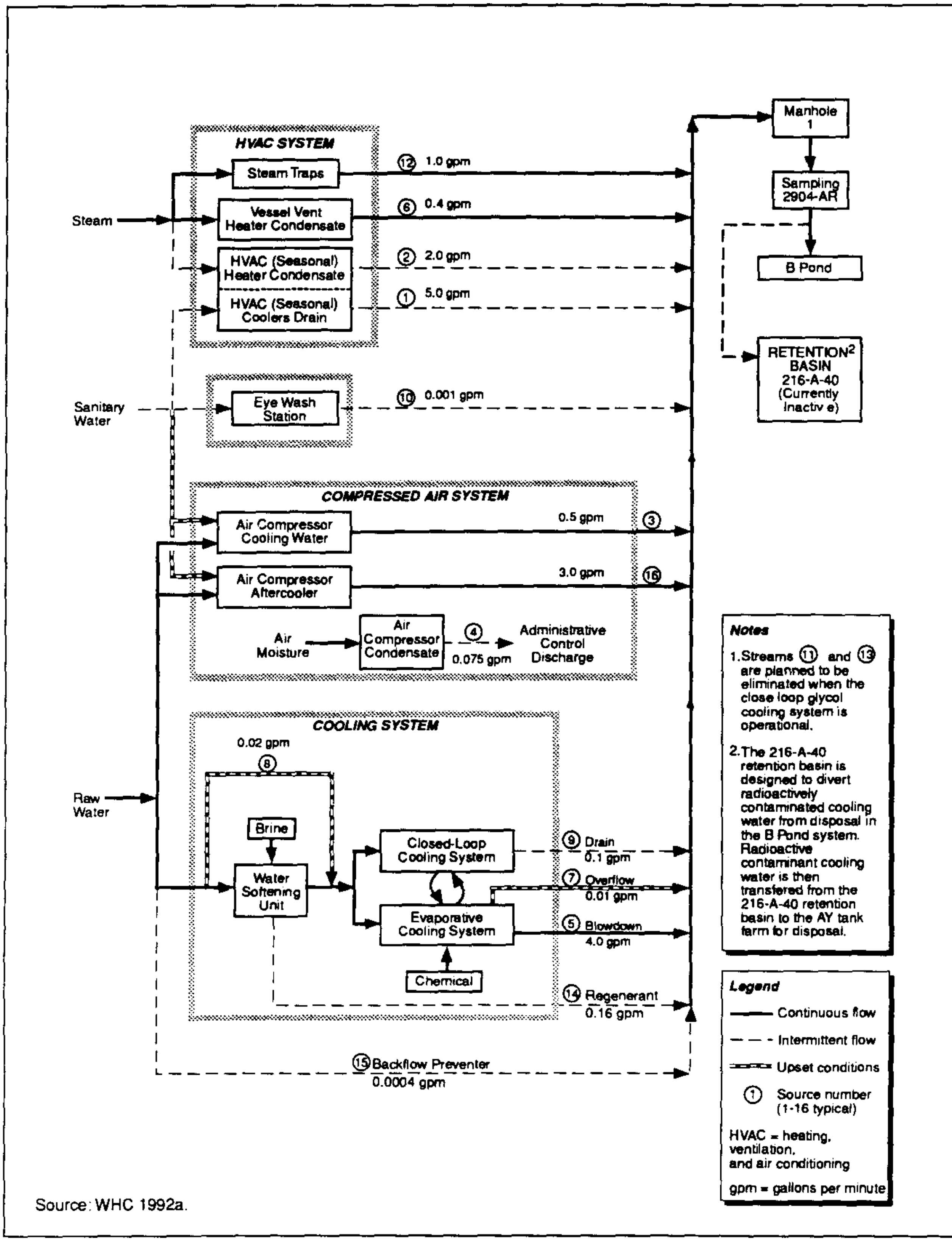

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Figure B-17. Current Flow Schematic of the 244-AR Vault (Yearly Average Flows).

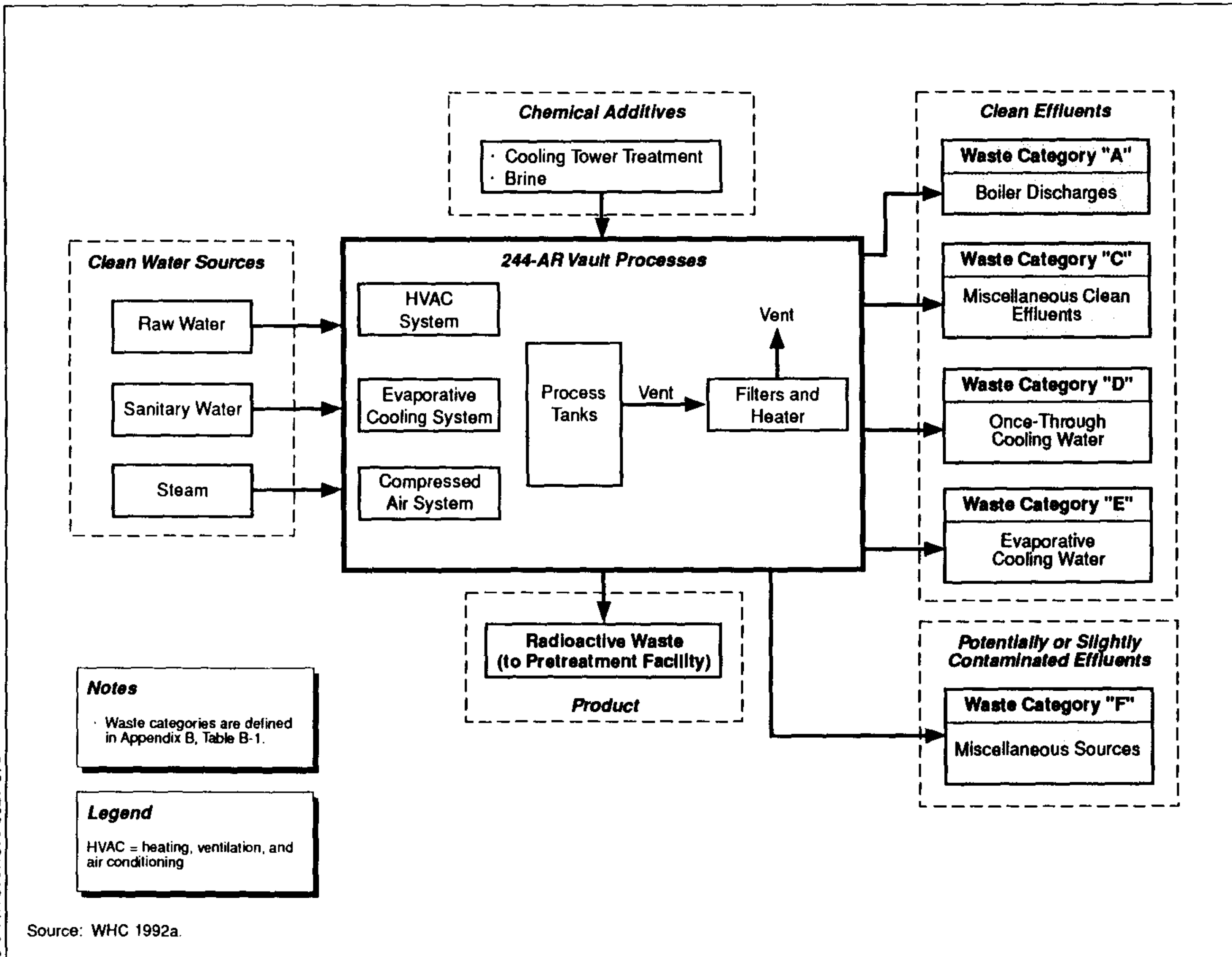

Figure B-18. 244-AR Vault Inputs and Outputs Water Schematic.

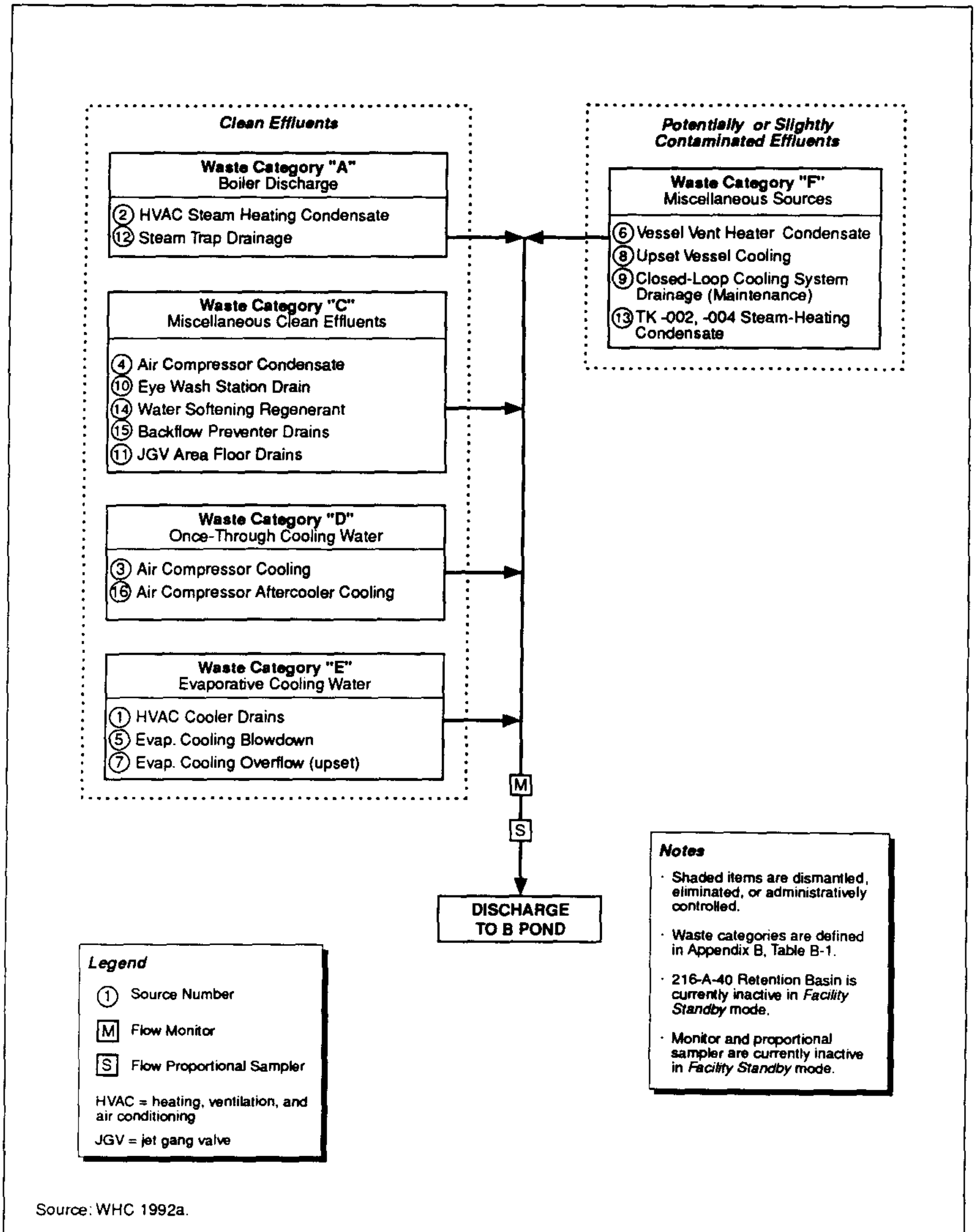

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Figure B-19. Flow Schematic for Current Status of 244-AR Vault Effluents.

TABLE B-5. 244-AR VAULT COOLING WATER EFFLUENT SOURCES

Source No.	Source Stream	Source Building	Source Category [3]	Effluent Water Type	Flow Type [4]	Estimated Flowrate [5] (gpm)	Status [6]
1	HVAC System Cooler Drains [1]	244-AR	E	Sanitary	I/C	5.0E+00	Active
2	HVAC System Heater Condensate [1]	244-AR	A	Condensate	I/C	2.0E+00	Active
3	Air Compressor Cooling Water [1]	244-AR	D	Raw [9]	C	5.0E-01	Active [8]
4	Air Compressor Condensate [2]	244-AR	C	Air Moisture	C	7.5E-02	Active
5	Evaporative Cooling Blowdown	244-AR	E	2X Softened Raw	C	4.0E+00	Active [P]
6	Vessel Vent Heater Condensate	244-AR	F	Condensate	C	4.0E-01	Active [P]
7	Evaporative Cooling System Overflow [2]	244-AR	E	2X Softened Raw	I	1.0E-02	Active [P]
8	Upset Vessel Cooling	244-AR	F	Raw	I/C	2.0E-02	Active [P]
9	Closed-Loop Cooling System Drain	244-AR	F	Softened Raw	I	1.0E-01	Active [P]
10	Eye Wash Station [2]	244-AR	C	Sanitary	I	1.0E-03	Active [P]
11	JGV Area Floor Drain [2]	244-AR	C	Condensate	I		Terminated [10]
12	Steam Trap Drainage [1] [2]	244-AR	A	Condensate	C	1.0E+00	Active
13	TK-002 & 004 Heating Condensate [2]	244-AR	F	Condensate	I		Terminated [10]
14	Water Softening Regenerant [2]	244-AR	C	Raw [7]	I	1.6E-01	Active [P]
15	Backflow Preventer Drain [2]	244-AR	C	Raw	I	2.0E-04	Active [P]
16	Air Compressor Aftercooler Cooling	244-AR	D	Raw [9]	I	3.0E+00	Active
				TOTAL	TOTAL	1.62E+01	

Source: WHC 1992a

NOTES:

[1] Sources 1, 2, 3, and 12 comprise the facility standby mode wastestream as identified in the 244-AR Vault Stream-Specific Report (WHC 1990d Addendum 25).
[2] New source not previously identified in the WHC 1990d Addendum 25.
[3] Source category defined in Table B-1.
[4] I=intermittent, C=continuous, I/C=continuous when operating.
[5] Average flow rate based on total annual flow divided by 526,000 minutes (1 year).
[6] Any active source that is generated as a result of planned future facility usage is identified with a 'P.'
[7] Calcium, magnesium, and chloride concentrations are increased to reflect anticipated concentrations resulting from the water softening resin bed regeneration process.
[8] Water cooled air compressor is assumed to be utilized about 5% of the time.
[9] Sanitary water is available as backup.
[10] Streams 11 and 13 will be eliminated when the closed loop glycol cooling system is operational.
gpm= gallons per minute
HVAC= Heating, Ventilation, and Air Conditioning
JGV= Jet Gang Valve

1.5 284-E POWER PLANT — SIC Code: 9999

1.5.1 284-E Powerplant Facility Description

The 284-E Powerplant is located in the 200 East Area of the Hanford Site, as shown in Figure B-20. Figure B-21 shows the location of the 284-E Powerplant in relation to the surrounding buildings including the 282-E Reservoir and the 283-E Water Treatment Facility. These facilities all share a common process drain which discharges to the 216-B-3-3 ditch via the powerhouse waste water ditch and piping. The powerhouse waste water ditch and associated piping conveying waste water from the 284-E powerplant facility to the 216-B-3-3 ditch is shown on Figure B-20. The 284-E Powerplant is the first to discharge to the process drain, followed by the 283-E WTF and the 282-E Reservoir overflow.

1.5.1.1 284-E Powerplant. Steam produced at the 284-E Powerplant is distributed to all facilities in the 200 East Area for both heating and process use. The 284-E Powerplant has a total capacity of 325,000 pounds of steam per hour with each boiler rated at 65,000 pounds per hour to establish and ensure a safety margin during operations. The 284-E Powerplant utilizes five coal fired boilers; three Erie City boilers and two Riley Stoker Corporation RX boilers. A backup oil-fired packaged boiler is no longer used. All three Erie City boiler units are water-tube, stoker-fired, three-drum Sterling type boilers using the dumping grate method for ash removal. The two RX boilers are stoker-fired with water-tube designs utilizing a traveling grate that discharges ash from the front of the boiler into the ash hopper. Steam is produced from sanitary water that is dechlorinated then sent through a water softener to remove as many minerals as possible. The softened water is introduced into the coal-fired boilers and steam is produced. This steam (225 pounds per square inch) is superheated 52-54 degrees Fahrenheit before distribution in the 200 East Area.

The powerplant is a five story, steel frame, concrete block, windowless structure. Included with the building is a coal storage pit, coal unloading hoppers, conveyer belt inclines, switch and crusher houses, brine pit, ash disposal pit, stacks, and bag houses. The 284 East Building has a coal storage silo that is no longer used.

Located on the ground floor (designated the auxiliary floor) are the emergency generator, chemical injection pumps, boiler feed pumps, ash pits, air compressors, and ash handling pumps. The maintenance shop, lockers, and shower rooms are located on the auxiliary floor. The ion exchange resin tanks for the water softener are also located on the auxiliary floor.

The chemical storage room, battery and generator room, flash tank, heat exchanger, steam manifolds, forced draft fans, boiler control panels, and stokers are located on the second floor.

The third floor is at the lower drum level and gives access to the flight conveyer, deaerator, and damper power cylinders. The fourth floor is at the upper drum level. The fifth floor is above the coal bunkers and contains the coal belt and belt tripper car.

1.5.1.2 282-E Reservoir and 283-E Water Treatment Facility. Raw water from the Columbia River is pumped from the 100-B Area Pumphouse into the 282-E Reservoir. Water from the reservoir is then pumped to the settling basins in 283–E WTF where alum is added, before settling and filtration. Chlorine is added to the settling basins in the 283-E water treatment facility as well as into the clearwells to provide residual chlorine for end use. Three out of four flocculators preceding the sedimentation basins are presently operational with one in a maintenance mode. From the settling basin, the water overflows a weir into the multimedia gravity filters. After filtration, chlorine is added as the treated water is being pumped to clearwells. The filtered water, which is sanitary (potable) water, is used in 284-E and is also used in the 200-E Area. Cleaning of the settling basin is done four times a year to remove deposited solids. The solids are removed through a settling basin drain in the bottom of each settling basin.

The 283-E water treatment facility Filter backwash is the waste water produced by washing the multimedia filter. This backwash is currently discharged from the building to the 216-B-3-3 Ditch.

1.5.2 284-E Powerplant Process Description

This section describes the processes associated with the 284-E Powerplant waste water stream. Process changes that have been made to reduce contributions to the waste stream are described.

1.5.2.1 Primary Processes. A flow schematic of the 284-E Powerplant waste water and associated flow paths in the 282-E, 283-E and 284-E facilities is shown in Figure B-22. The figure depicts the overall flow paths of the contributors to the effluent discharge into the 216-B-3-3 Ditch. This figure also shows the point at which the samples were taken for the effluent characterization chemical analyses reported in the 284-E Powerplant Waste Water Stream-Specific Report (WHC 1990e, Addendum 24).

The waste water discharged to the 216-B-3-3 Ditch includes boiler blowdown, miscellaneous clean and potentially contaminated effluents, and once-through cooling water. These categories of waste waters are defined in Table B-1. Figure B-23 shows the 284-E Powerplant water flow schematic and its relationship to the various influent and effluent sources. Table B-6 lists the potential effluent sources from the 284-E Powerplant waste water and describes their present status as either active or terminated. The source information was obtained from (WHC 1990e) and other information supplied by 284-E Powerplant operational personnel.

Water supply for the 200 East Area is drawn from the Columbia River at the 100-B Area or 100-D Area and pumped to a 25,000,000 gallon reservoir. Water is then pumped from there to the 3,000,000 gallon 282-E Reservoir in the 200 East Area. Water from the 282-E Reservoir is pumped to the 283-E Water Treatment Facility.

The water pumped to 283-E water treatment facility is first mixed with a coagulant, aluminum sulfate (alum), in a flash mixer. The alum acts to destabilize or neutralize the charge of suspended particles and colloids, allowing them to agglomerate or attach to other particles. This water is then fed to the flocculator and through a settling basin. Overflow from the settling basin is filtered through a gravity multimedia filter. The filter media consists of a bottom layer of ceramic media, a gravel layer, a layer of sand, and a top layer of anthracite. The 283-E water treatment facility contains four flocculation basins and four filter treatment trains. Filtered water is then chlorinated and routed to two covered storage vessels (clearwells) with a total capacity of 400,000 gallons. The filters in this facility are periodically backwashed to remove sediments. The water used to backwash the filters constitutes the filter backwash and is discharged to 216-B Ditch.

The only function of the 284-E Powerplant is steam production. To make steam, sanitary water from 283-E is sent through a water softener to remove the minerals that contribute to hardness, primarily calcium and magnesium. Additionally, sodium sulfite is added before the softeners to destroy residual chlorine in the sanitary water. A treatment chemical, Polyquest 683 (less than 4 percent potassium hydroxide), is added to control corrosion and scale formation. The softened and treated water is then introduced into one of the 284-E Powerplant coal-fired boilers and boiled into steam. The treatment chemical, Super Filmeen 14, is added to the steam to control corrosion.

1.5.2.2 Process Changes to Eliminate Contributions to the 284-E Powerplant Waste Water. Several measures that are intended to control the discharge of contaminants to the 284-E Powerplant waste water have been implemented since 1985. These changes pertain to the operation of the 284-E Boiler and 283-E Water Treatment Facility. They are described below.

The boiler feed water has treatment chemicals added to reduce corrosion and scale formation. Three of these, Dearborn 4846, 4856, and 4812, were previously used at the 284-E facility. They were replaced with the non-hazardous treatment chemical, Polyquest 683, in 1990. The treatment chemicals currently used are considered non-hazardous, pursuant to Washington Administrative Code 173-303.

Potassium permanganate has been used for water treatment at the 283-E Water Treatment Facility. Its use was discontinued in 1987. Barium chloride was used in very small quantities as a chemical reagent for testing water quality at the 283-E facility. Methyl purple indicator replaced barium chloride in 1990 in order to reduce the total stream mass.

1.5.3 284-E Powerplant Waste Water Source Description

The 284-E Powerplant waste water consists of two continuous flow streams and six intermittent discharge waste streams. The sources listed in Table B-6 are shown in the flow schematics, Figures B-24 and B-25, and are discussed below. Each of the source streams has been categorized in one of the six Categories, A through F, described in Table B-1.

1.5.3.1 Reservoir Overflow (Source 1). The 282-E Reservoir contains river water pumped from the 100-B Area River Pumphouse. This reservoir has a capacity of 3,000,000 gallons and an overflow sized for a maximum flow of 7,000 gallons per minute. The water level in the reservoir is maintained by manual adjustment of the inlet valve. Should the reservoir overflow, the water discharges into the 216-B-3-3 Ditch which also carries the other 284-E Powerplant Waste water contributors. The estimated annualized flow is 0.8 gallons per minute. The reservoir overflow is classified Category C, a miscellaneous clean effluent.

1.5.3.2 Filter Backwash (Source 2). Four gravity multimedia filters are used at 283-E water treatment facility to remove suspended solids from the treated water. Filter backwash is produced during routine water treatment operations. The backwash occurs as a batch operation, takes approximately 30 minutes, and generates 70,000 gallons of waste water. An average of four filter backwashes occur each month for each of the four filters. The filter backwash contains alum and filtered solids removed from the treated water. The backwash currently is discharged directly to the 284-E Powerplant sewer line. The filter backwash contains metals removed from the raw water in addition to aluminum added as a treatment chemical. This waste contributor is classified Category F, a potentially or slightly contaminated effluent.

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1.5.3.3 Cooling Water (Source 3). The main effluent from the 284-E Powerplant is cooling water. It is a constant flow discharge and averages 3,250,000 gallons per month with two boilers on-line. Cooling water is used for equipment such as air compressors, turbines, generators, boiler water jackets, and feed pumps. These cooling waters are classified as Category D, once-through cooling water.

1.5.3.4 Boiler Blowdown (Sources 4A and 4B). The boiler blowdown waste source consists of two separate operations: continuous (Source 4A) and batch (Source 4B). The continuous blowdown is set to 16 percent of the total boiler feed for a supply water solids concentration factor of 6. This results in an estimated flow of 26.4 gallons per minute for a steam load of 65,000 pounds per hour. The blowdown removes the minerals that naturally concentrate in the bottom of the boiler.

The batch blowdown is a periodic discharge from an operation to remove solids from the boiler. This blowdown occurs once per shift; an operator opens a manual discharge valve fully then immediately closes it.

The 284-E Powerplant boiler blowdown flow rates are variable, but predictable, for various plant operation modes. The average monthly discharge of boiler blowdown is 100,000 gallons per month and contains boiler treatment chemicals. The 284-E Powerplant provides steam for heating of all 200 East Area facilities, both processes and buildings. The functions or processes associated with these facilities do not have the potential to generate radioactive airborne or liquid effluents. Therefore, radiation monitoring equipment is not used on the discharge of these streams. The flow rates vary seasonably, with winter flow rates being higher due to the increased demand for steam heating throughout the 200 East Area during the colder months.

These waste contributors are classified Category A, boiler discharge.

1.5.3.5 Water Softener Regenerant (Source 5). The water softener regenerant is a spent brine solution that has been used to regenerate the zeolite water softener units. The softener regenerant stream has the highest concentration of dissolved solids in comparison with all the other 284-E Powerplant waste water streams. This stream contains approximately 9 percent Sodium Chloride by weight. The flow rate for the softener regeneration contributor averages about 300,000 gallons per month, which is 3 percent of the total 284-E flow. Each regeneration uses 10,000 to 12,000 gallons total over a 3 hour period. A 9 percent brine solution is added only during 30 minutes of this time. A total of 330 gallons of brine is used per regeneration. A saturated brine solution is transferred to 284-E Powerplant from the brine pit, located to the northwest of the Powerplant. This saturated solution is diluted with sanitary water to a concentration of 9percent. Preset valves are used to maintain the diluted brine at a 9 percent concentration. This waste contributor is classified Category A, boiler discharge.

1.5.3.6 Clearwell Overflow (Source 6). Sanitary water overflows from the 283-E Filter Plant Clearwells. The water level in the Clearwells has no control. Should the sanitary water overflow from the Clearwells, the water discharges into the process drain and is classified Category C, a miscellaneous clean effluent. This flow is considered to be less than 0.02 gallons per minute. There is no documented history of Clearwell overflow.

1.5.3.7 Settling Basin Drainage (Source 7). The settling basin drain is actually a clean out port. It is only used when the Basin and Clearwells are washed down and cleaned. This usage is administratively controlled and is utilized in operating the drain cycle. The effluent should contain metals removed from the raw water and alum added to the process. This waste contributor is classified Category F, a potentially or slightly contaminated effluent. This flow has been considered to be <0.02 gallons per minute.

1.5.3.8 Floor and Trench Drainage (Sources 8A and 8B). Numerous floor and trench drains are located throughout the 283-E water treatment facility (Source 8A) and 284-E Powerplant (Source 8B) facilities. Sources of liquid waste to these drains include safety showers, raw and sanitary water. It is not anticipated that any of these three sources will be an entering point for a potentially regulated waste; however, at least one of these drains can be the point through which a regulated waste could enter this waste stream. It is proposed that administrative controls be implemented to ensure that no waste be discharged through such a point. To minimize this potential the pump wells (sumps) have been plugged. In addition, plugs have been installed in all floor and trench drains within 5 feet of any pump to provide additional engineering controls. It is assumed that this area gives an average annual flow of less than 0.2 gallons per minute. These waste contributors have very low potentials of contamination and are classified Category C waste, miscellaneous clean effluents.

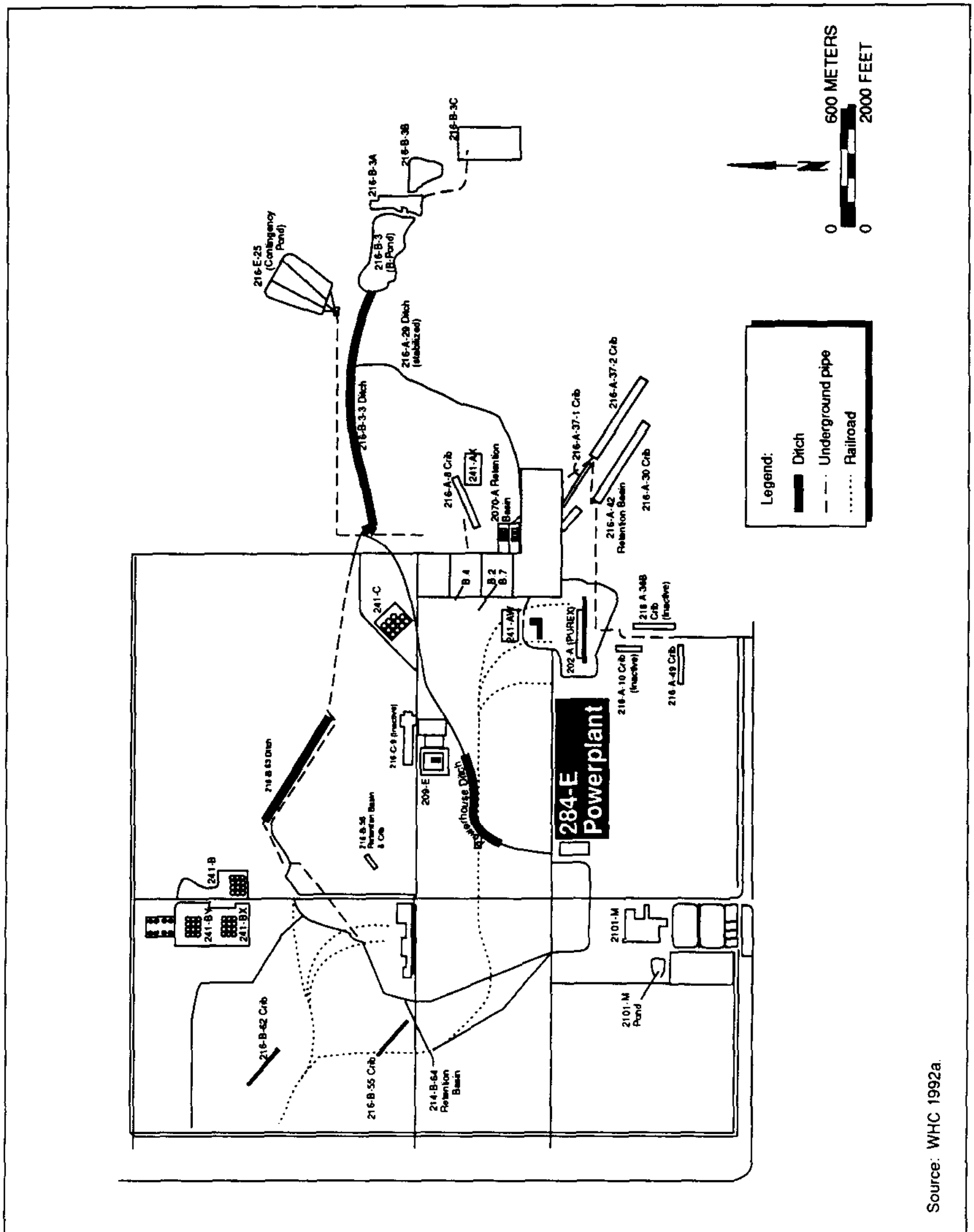

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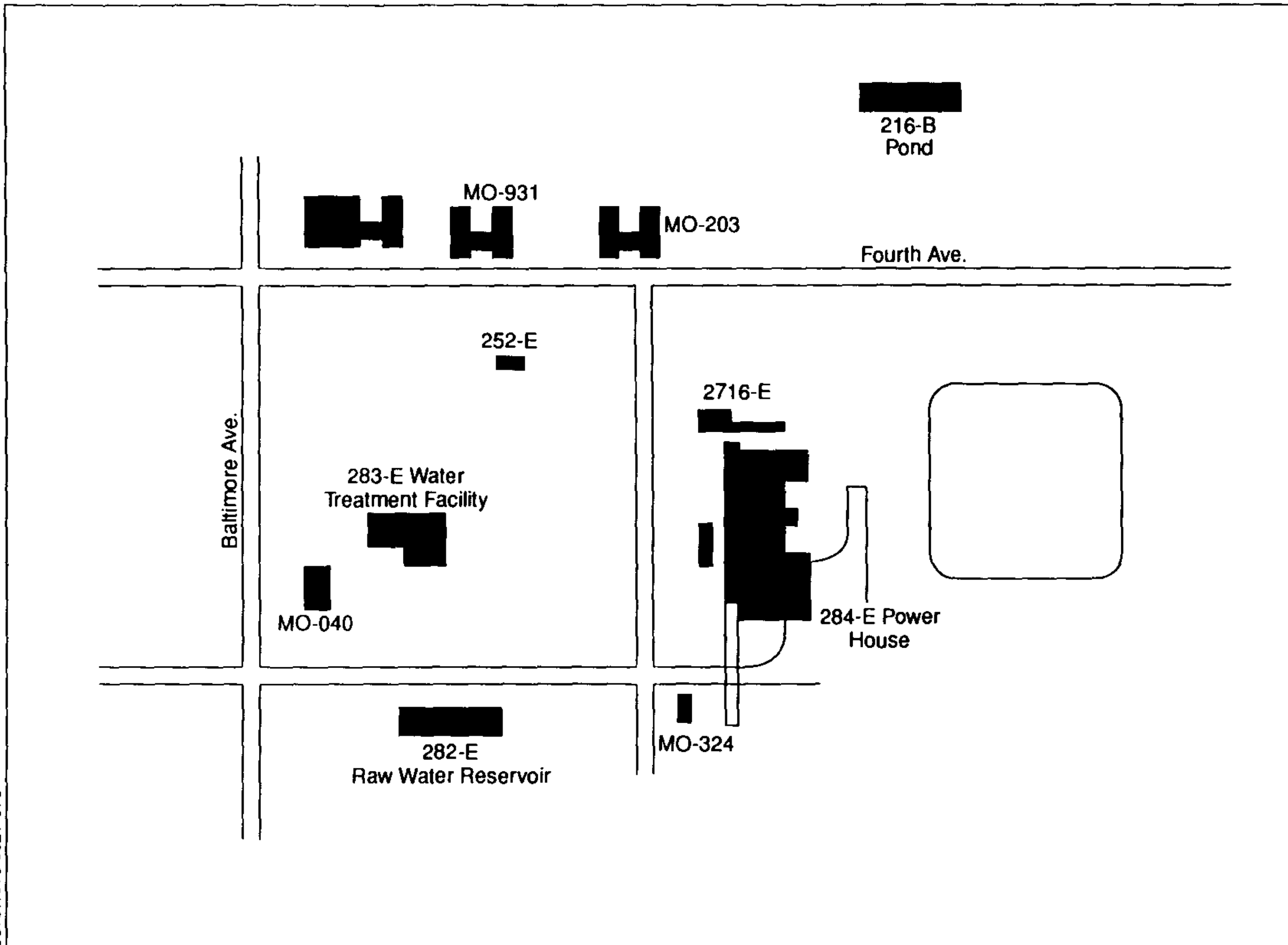
Figure B-20. Location of 284-E Powerplant in 200 East Area.



Source: WHC 1992a.

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Figure B-21. 284-E Powerplant Building.

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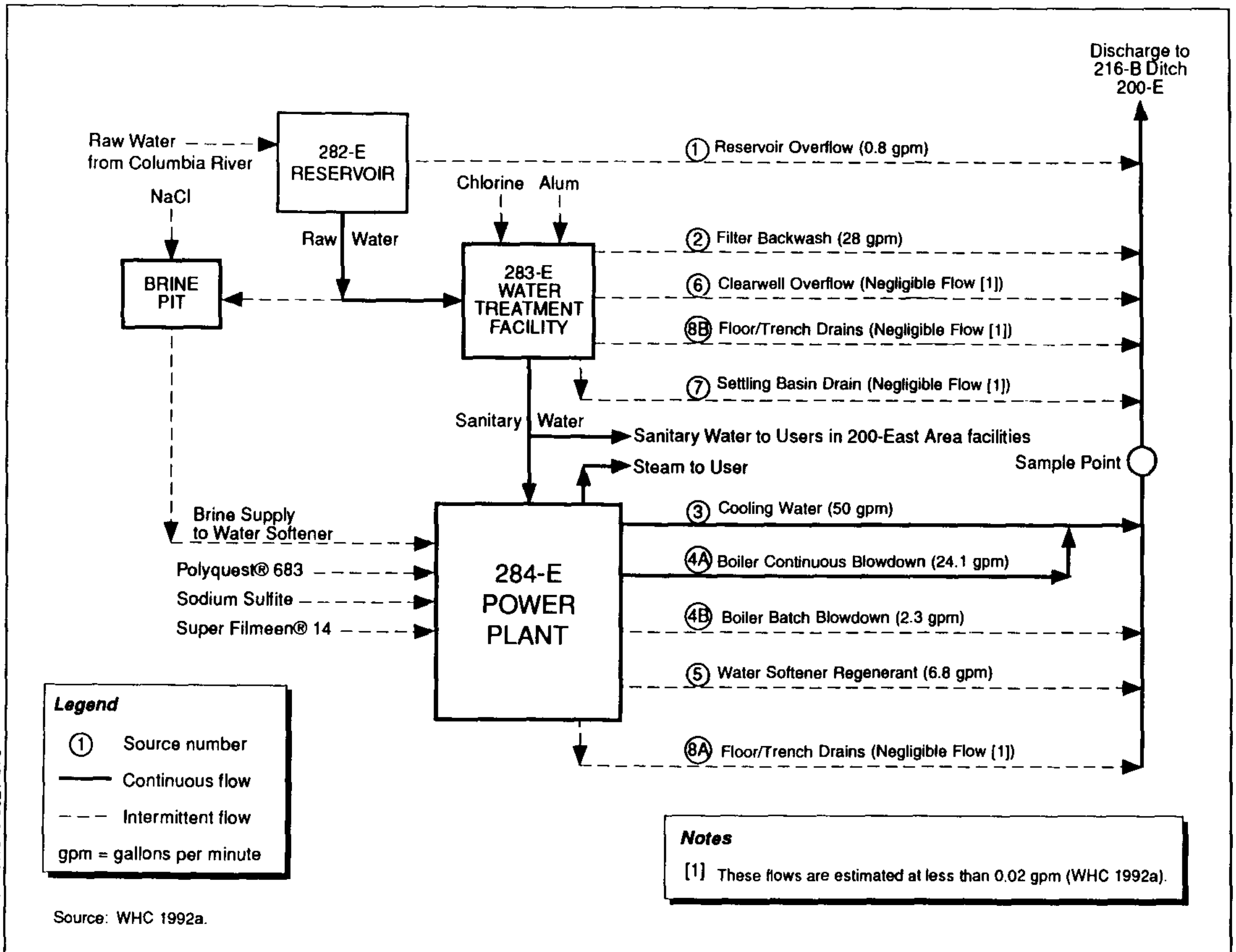

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Figure B-22. Flow Schematic of the 284-E Powerplant Waste Water (Yearly Average Flows).

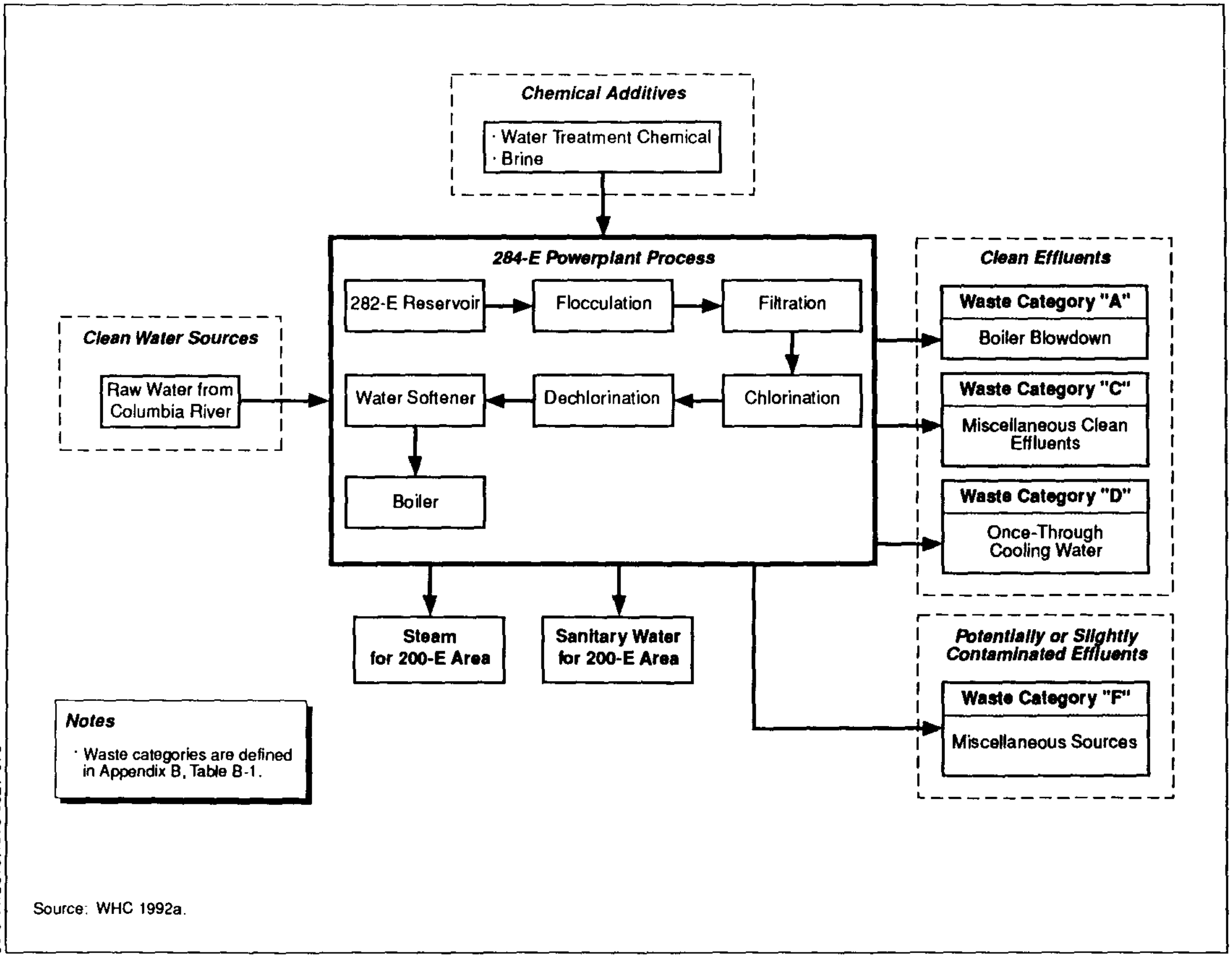
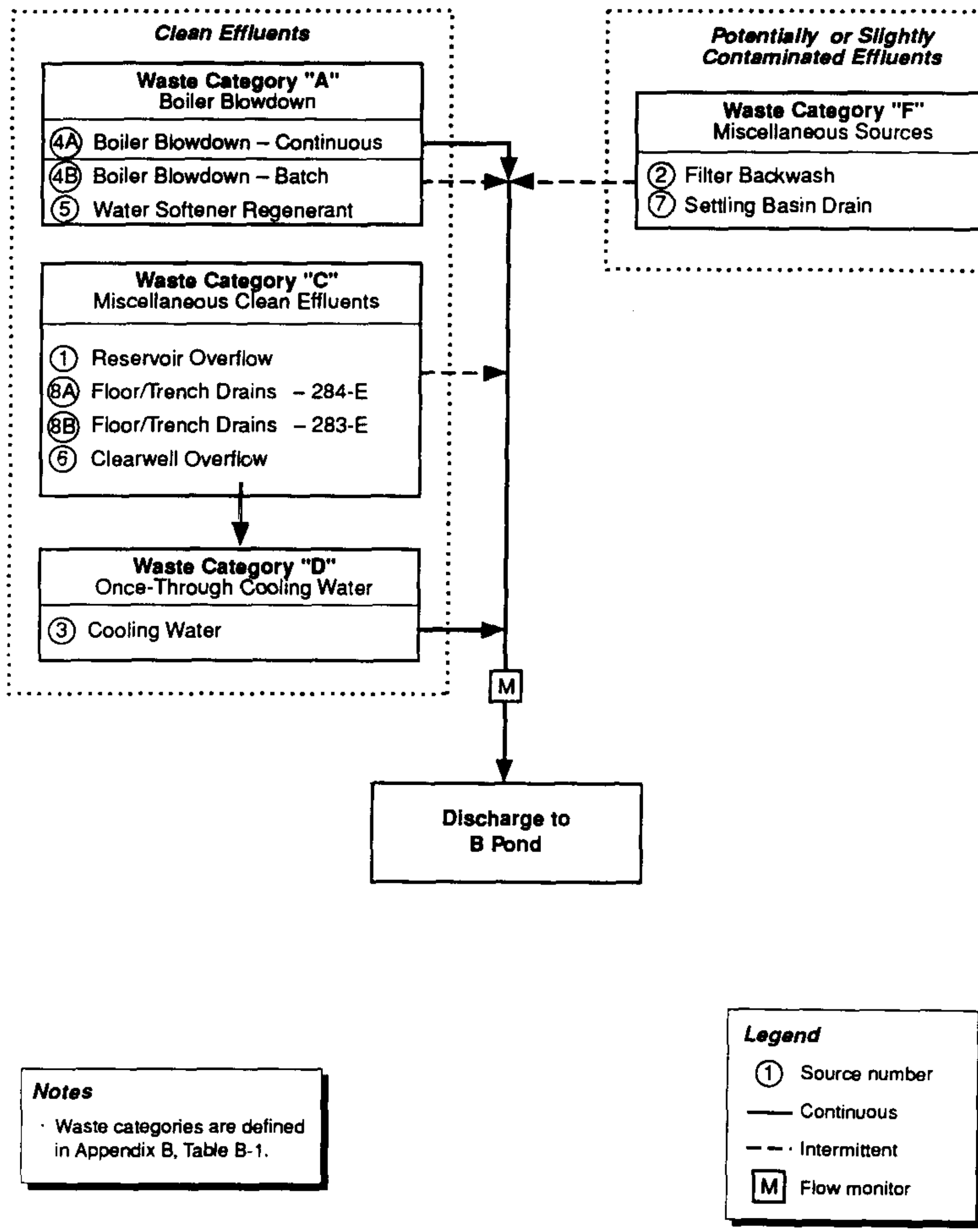


Figure B-23. 284-E Powerplant Inputs and Outputs Water Schematic.



Source: WHC 1992a.

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Figure B-24. Flow Schematic for Current Status of 284-E Powerplant Effluent.

Table B-6. 284-E Powerplant Effluent Sources

Source No.	Source Stream	Source Building	Source Category [2]	Effluent Water Type	Flow Type [3]	Estimated Flowrate [4] (gpm)	Status
1	Reservoir Overflow [1]	282-E	C	Raw	I	8.0E-1	Active
2	Filter Backwash [1]	283-E	F	Sanitary	I	2.8E+1	Active
3	Cooling Water	284-E	D	Sanitary	C	5.0E+1	Active
4A	Boiler Blowdown - continuous	284-E	A	6X Sanitary	C	2.41E+1	Active
4B	Boiler Blowdown - intermittent [1]	284-E	A	6X Sanitary	I	2.3E+0	Active
5	Water Softener Regenerant	284-E	A	36X Sanitary	I	6.8E+0	Active
6	Clearwell Overflow [1]	283-E	C	Sanitary	I	Negligible [5]	Active
7	Settling Basin Drain [1]	283-E	F	Raw	I	Negligible [5]	Active
8A	Floor/Trench Drains [1]	284-E	C	Sanitary	I	Negligible [5]	Active
8B	Floor/Trench Drains [1]	283-E	C	Raw	I	Negligible [5]	Active
					TOTAL	1.1E+2	

Source: WHC 1992a

NOTES:
[1] Source not identified in the *284-E Powerplant Wastewater Stream-Specific Report* (WHC 1990e).
[2] Source category defined in Table B-1.
[3] I = intermittent, C = continuous, I/C = continuous when operating.
[4] Average flow rate based on total annual flow divided by 526,000 minutes (1 year). Data obtained from *284-E Powerplant Wastewater Stream-Specific Report* (WHC 1990e).
[5] These flows are estimated at less than <0.02 gpm (WHC 1992a).
gpm = gallons per minute.
HVAC = Heating, Ventilation, and Air Conditioning.

1.6 B PLANT COOLING WATER SIC Code: 9999

1.6.1 B Plant Facility Description

The B Plant Area (Figure B-25) located in the 200 East Area at the Hanford Site was constructed in the mid 1940's as a fuel reprocessing facility. Figure B-26 shows the three main buildings: 221-B, 225-B (Processing Building - the Waste Encapsulation and Storage Facility), and 271-B (Office Building).

Several adjacent support facilities have been constructed to monitor and store the effluent B Plant Cooling Water discharge. The following is a brief description of the main B Plant Area buildings and the support facilities for the effluent B Plant cooling water operations:

1.6.1.1 221-B Processing Building. This building consists of a canyon and craneway, 40 process cells, a hot pipe trench, and a ventilation tunnel. The non-process portions of the building include an operating gallery, a pipe gallery, and an electrical gallery.

1.6.1.2 271-B Service Building. This service facility is attached to the 221-B building and includes offices, aqueous makeup facilities, and maintenance shops.

1.6.1.3 225-B Waste Encapsulation and Storage Facility. Built in 1974, this facility is separated into process hot cell areas, the canyon service areas, operating areas, building service areas, and the cesium and strontium capsule storage (pool cell) area.

1.6.1.4 282-B and 282-BA Deep Well Pumps. The well pumps are sources of emergency raw water supply.

1.6.1.5 Waste B Plant Cooling Water Support Facilities. The following is a brief summary of the effluent B Plant cooling water support facilities:

- 207-B Retention Basin — Two open basins, each with 500,000 gallons capacity, for the combined 24 inch diameter effluent cooling water pipe.
- 207-BA Sampling Building — This building contains a flow-proportional sampler and a flow-totalizer for the combined effluent B Plant cooling water stream.
- 216-B-2-3 Ditch — The effluent B Plant cooling water discharge route, via an open ditch, to the 216-B-3 Pond.
- 216-B-59 Retention Building — This basin receives and stores any emergency diversion of the 15 inch diameter effluent cooling water pipe.

- 216-B-3 Pond — This pond is the current and final discharge location of the waste B Plant cooling water.
- 221-BA and 221-BG Monitoring Buildings — Primary beta and gamma radiation monitoring stations for the 15 inch diameter and 24 inch diameter cooling water sewers, respectively.

1.6.2 B Plant Process Description

This section describes the processes that are associated with the B Plant and the B Plant cooling water system. Process changes that have been made to reduce contributions to the waste stream are described.

1.6.2.1 B Plant Processes. This process description of the B Plant is primarily derived from the Facility Effluent Monitoring Plan for the B Plant. Facilities for the B Plant were constructed in the mid 1940's to chemically process spent nuclear fuels. Following completion of extensive modifications in the early 1960's, the second mission of the B Plant was to remove radioactive cesium and strontium from the fission product waste stream following plutonium and uranium recovery from irradiated reactor fuels in the PUREX Plant. The recovered, purified, and concentrated strontium and cesium solutions were transferred to the waste encapsulation storage facility for conversion to solid compounds, encapsulation, and interim storage. The waste encapsulation storage facility was added to the B Plant in 1974. After strontium and cesium removal, the remaining waste was transferred from B Plant to the Tank Farm.

The B Plant is an operating facility that is required to ensure safe storage and management of the waste encapsulation storage facility cesium and strontium capsules, as well as radiological inventories remaining in the B Plant from previous campaigns. There are currently no production activities at the B Plant, but there are several operating systems required to accomplish the current B Plant mission; that is, treatment of low-level wastes generated at waste encapsulation storage facility and the B Plant.

Future B Plant process equipment that will impact the B Plant cooling water includes a transuranic extraction process pilot plant and the E-23-3 waste concentrator. A transuranic extractin process pilot plant with minimal cooling water requirement is being planned for inclusion in the waste encapsulation storage facility. The future operation of the Cell 23 waste concentrator will impact future cooling water requirements. The Cell 23 waste concentrator concentrates liquid low-level radioactive waste to minimize the waste stream that requires low-level radioactive disposal to the double-shell tank program.

1.6.2.2 B Plant cooling water Process. A once-through cooling water system supplies water to B Plant vessel cooling coils, condensers, waste encapsulation storage facility process vessels, and waste encapsulation storage facility heat exchangers and discharges to the effluent B Plant cooling water pipelines.

Figure B-27, a Flow Schematic for B Plant cooling water, shows the flow paths and major buildings in the B Plant Area. This figure depicts the overall flow paths of the effluent B Plant cooling water contributors to the final discharge location, the 216-B-3 Pond. The figure also shows the point at which the samples were taken for the chemical analyses reported in the B Plant Cooling Water Stream-Specific Report (WHC 1990f, Addendum 22).

Raw water is taken from the Columbia River and is pumped, via the 182-B Export Pumping Station, to the 282-E Pumphouse and Reservoir in the 200 East Area. From the 282-E Facility, the water is pumped (below grade) north along Baltimore Avenue to the B Plant. The raw water for the 221-B Building enters the building at both the east and west ends via 12 inch and 10 inch diameter pipes, respectively (see Figure B-28).

A 10 inch diameter pipe, located in the B Plant operating gallery, runs the entire length of the 221-B Building and supplies cooling water to the process cell vessels (tank cooling coils and condensers). The pressure, at both the east and west ends of the 221-B Building operating gallery, is approximately 150 pounds per square inch guage.

In the event of loss of raw water supply from the 282-E Facility reservoir, the 221-B Building and the waste encapsulation and storage facility have two emergency wells. Two diesel-driven backup Emergency Well Pumps 282-B and 282-BA (see Figure B-28) can supply the necessary volume of raw water to meet the minimum process cooling requirements for the 221-B Building and the waste encapsulation storage facility. Each of these emergency wells is alternately tested at two week intervals and the test water is discharged to the effluent B Plant cooling water pipeline.

A low level waste handling system consists of a series of vessels (which are holding tanks), associated process equipment, and piping to treat process wastes generated in the B Plant/waste encapsulation and storage facility. Operation of the Cell 23 waste concentrator system generates the largest (18 million British Thermal Units per hour) cooling water demand. The Cell 23 waste concentrator is presently inactive, when operated the operation was intermittent. The intermittent operation would be approximately 48 hours per month. When the Cell 23 waste concentrator operates, the amount of cooling water usage increases by about 700 gallons per minute. This additional flowrate includes source streams 6 and 7.

The waste water now being discharged to the 216-B-3 Pond includes the B Plant cooling water and a temporary connection for the B Plant chemical sewer. See Appendix N of the *200 Area Treated Effluent Disposal Facility (Project W-049H) Waste Water Engineering Report* (WHC 1992b) for additional BCE information. The chemical sewer is a Phase I liquid effluent as cited in WHC 1992b. The B Plant chemical sewer stream will be rerouted to the 200 Area Treated Effluent Disposal Facility when it becomes operational.

Additional source changes to the B Plant cooling water stream that are currently being considered include the temporary rerouting of the B Plant process condensate and B Plant steam condensate streams to the B Plant cooling water pipeline. These temporary connections would be very similar to the previously completed temporary rerouting of the BCE stream to the B Plant cooling water pipeline. The reroute of the condensate streams to the B Plant cooling water effluent pipeline would be discontinued upon startup and operation of the 200 Area treated effluent disposal facility prior to October 1997; the streams would discharge to the 200 Area treated effluent disposal facility.

1.6.2.3 Process Changes to Eliminate Sources. Several measures have been implemented to control the discharge of contaminants to the B Plant cooling water effluent pipelines and the 216-B-3 Pond in the last five years. These measures include administrative spill control procedures and training on spill cleanup and reporting. Since 1987, B Plant has implemented a waste minimization program that limits all but essential flows to the B Plant cooling water effluent.

In 1988, instrumentation was installed at the 221-BA and 221-BG monitoring stations and at the 207-BA sampling building. Contamination detected in the 15-inch diameter effluent pipeline by either a beta or gamma monitor (221-BA) automatically activates a downstream diverter valve and reroutes the stream to the 216-B-59 retention basin. The 216-B-59 retention basin has a working capacity of 100,000 gallons and is constructed with a concrete liner and cover. The retention basin is about 30 feet wide by 120 feet long, 10 feet deep and is situated in a 100 foot wide by 200 foot long by 15 foot deep excavation. Procedures have been prepared for treating a contaminated effluent (WHC 1992a).

Cross-over pipelines with manually operated diversion valves are installed to permit isolation of sources contributing to the 15 inch diameter effluent pipeline. Non-contaminated source flows can be diverted from the 15 inch effluent pipeline to the 24 inch effluent pipeline if necessary, thereby reducing the total volume of contaminants retained by the 216-B-59 retention basin.

Cooling water samples at the 207-BA Building are taken for process control and monthly composites. The existing upstream radiation analyzer in the 221-BG Monitoring Station is used for on-line monitoring and control of the 24 inch diameter effluent pipeline. Administrative controls have been developed to locate and isolate a radiation leak detected in either the 15 inch diameter or 24 inch diameter effluent pipelines.

1.6.3 B Plant Waste Water Source Description

The effluent B Plant cooling water to the 216-B-3 Pond consists of eight continuous and intermittent discharge waste streams (WHC 1990f, Addendum 22). These streams are listed in Table B-7 and shown in Figure B-31. The source streams have been placed into one of the six categories (A through F) described in Table B-1

The cooling water discharged from B Plant enters either a 24 inch diameter or a 15 inch diameter effluent pipeline. These cooling water effluent pipelines flow east from B Plant and combine into a common 24 inch diameter effluent pipeline just north of the 216-B-59 Retention Basin (see Figure B-28). This single line is designated as the combined 24 inch diameter B Plant cooling water effluent pipeline.

Effluent sources currently contributing to the 24 inch diameter effluent pipeline on a once-through basis and considered to have a low potential for contamination, include those from: 221-B Building (stairwell number 1 operating gallery heating, ventilation, and air conditioning, steam condensate and sanitary water), 225-B Building (pool cell heat exchanger raw water and pool cell demineralized water flushes), and from 282-B and 282-BA (emergency well pumps). Additional sources that can or could contribute to the 24 inch diameter effluent pipeline include those from the 221-B Building (condenser and heat exchanger raw water and steam jet condensate).

The effluent B Plant cooling water sources discharging into the 15 inch diameter effluent pipeline are from the 221-B Building (Cells 5 through 39). The 15 inch diameter effluent pipeline receives waste cooling water (once-through) from tank cooling coils considered to have a potential for possible contact with significant amounts of radioactive solutions should a leak occur. Differential pressures between the tank cooling coils and the tank solutions preclude inadvertent releases to the 15 inch diameter sewer.

Currently, the total flow in the combined 24 inch effluent pipeline is normally about 1,300 gallons per minute with the majority of the flow being from the waste encapsulation storage facility cell heat exchangers. A portion of the waste cooling water in the 24 inch diameter effluent pipeline is routed through the 221-BG monitoring station off-line monitors to monitor for gamma and beta contamination. If the cooling water has radioactive contamination one of two flow-through retention basins (designated as 207-B on Figure B-28) would provide minimal detainment.

The 207-B Retention Basins are concrete lined with an overall size of 246 feet long, 123 feet wide, and 6.5 feet deep. The retention facility is equally divided into two 500,000 gallon capacity retention basins. Cooling water typically flows through one of the retention basins and exits into a pipe which discharges in the 216-B-3-3 ditch, for disposal in the B Pond complex. If the radiation monitors detect radioactive contamination in the cooling water stream, the outlet from the 207-B retention basins can be automatically or manually closed, eliminating discharge to the B Pond system. The 207-B retention basins provide a second containment facility for radioactively contaminated cooling water downstream of the 216-B-59B retention basin. Radioactive contaminated cooling water contained in the 207-B retention basin can be pumped back to B Plant for reprocessing.

An additional facility to which radioactive contaminated cooling water from the 207-B retention basin can be disposed of in an emergency basis, after both retention facilities are at capacity, is the 216-B-63 trench/ditch. The 216-B-63 trench/ditch is an open, unlined earthen trench, approximately, 4 feet wide at the bottom, 1400 feet long and 10 feet deep. The 216-B-63 trench/ditch has never been used for emergency disposal of radioactive cooling water from B Plant.

1.6.3.1 221-B Building Discharge to the 24 in Effluent Pipeline (Sources 1 and 8). Effluent B Plant cooling water is primarily generated by the condensers in Cell 22 and discharges to the 24 inch diameter effluent pipeline. A steam condensate cooler and vessel vent number 2 steam jet condensate and surface condenser also discharge to the 24 inch diameter effluent pipeline. The flowrate from the preceding sources is included in the 100 gallons per minute of miscellaneous flows from the 221-B Building.

An existing but currently inactive condenser in Cell 23 may, in the future contribute to the effluent B Plant cooling water stream. This effluent, a once-through cooling water, is considered a potentially or slightly contaminated, Category F, waste and is referred to as Source 1.

Effluent from the Stairwell number 1 operating gallery heating, ventilation, and air conditioning system is steam condensate and sanitary water and discharges to the 24 inch diameter effluent pipeline. This effluent is considered a Category A waste and is referred to as Source 8.

1.6.3.2 Waste Encapsulation and Storage Facility Effluent (Source 2). The discharged effluent from the 225-B Building is demineralized water flushed from pool cells and raw water from single pass pool cell heat exchangers. The demineralized water discharged is a batch release of non-radioactive foul water not meeting the waste encapsulation storage facility pool cell storage specifications. This effluent is considered a potentially or slightly contaminated, Category F, waste and is referred to as Source 2.

1.6.3.3 The 212-B Cask Loadout Station Effluent (Source 3). Sources from the 212-B Cask Loadout Station are inactive and do not contribute to the cooling water effluent pipeline. This effluent is considered a potentially or slightly contaminated, Category F, waste and is referred to as Source 3.

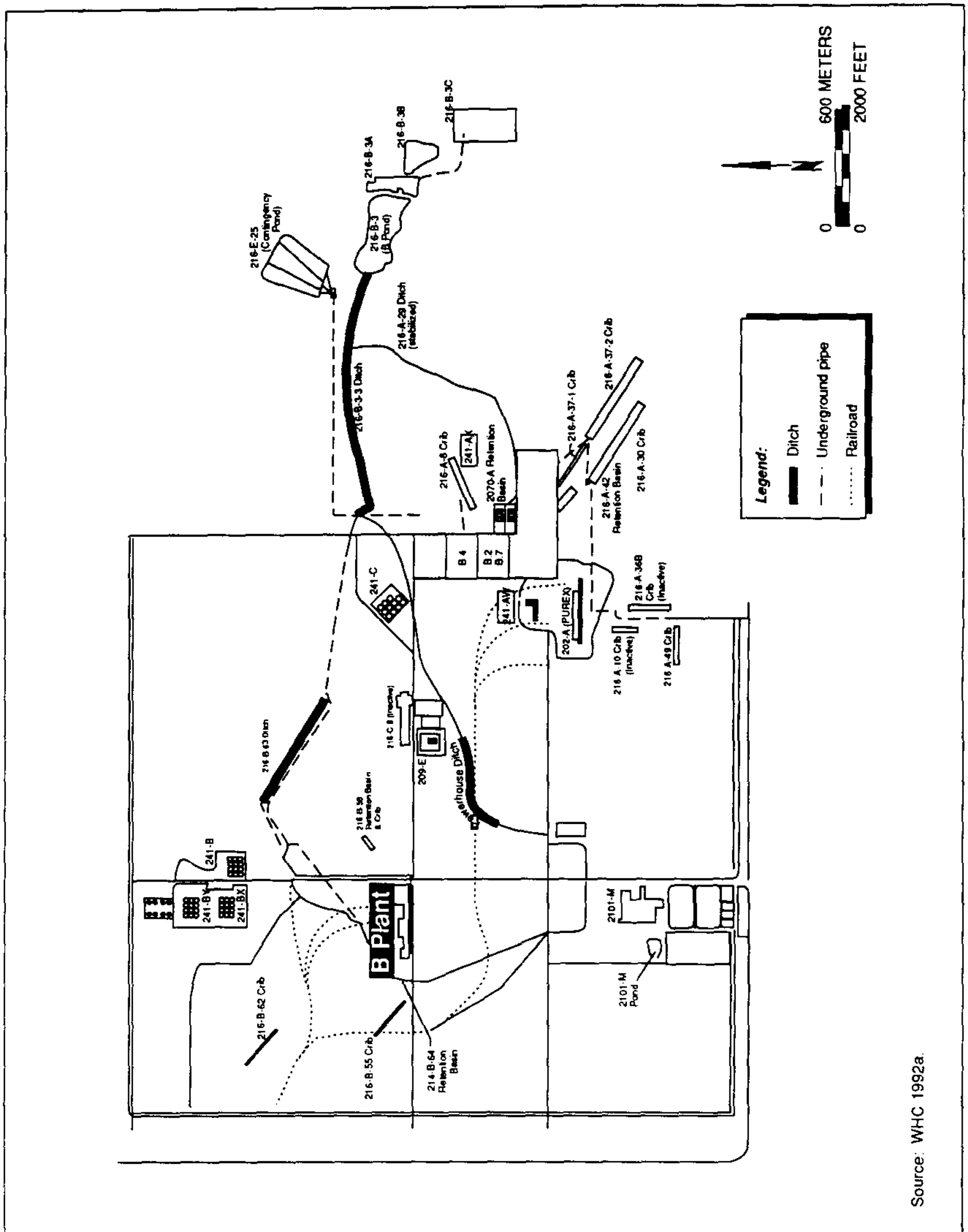
1.6.3.4 Emergency Well Pump Effluent (Source 4). The deep well pumps 282-B and 282-BA discharge into the B Plant cooling water effluent pipeline during their biweekly testing. This effluent is considered a potentially or slightly contaminated, Category F, waste and is referred to as Source 4.

1.6.3.5 221-B Building Discharge to the 15 inch Diameter Effluent Pipeline (Source 5). Six subheaders collect the discharge from process cells into the 15 inch diameter effluent pipeline. The process cells and subheaders are as follows:

Subheader	1	2	3	4	5	6
Cells	(36 to 39)	(28 to 35)	(20 to 27)	(10 to 19)	(6 to 9)	(5)

Each of the six subheaders to the 15 inch effluent pipeline sewer has a cross-over line, with valving, to allow any subheader to be routed to the 24 inch diameter effluent pipeline. The cross-over lines allow isolation and diversion capabilities, if required. This effluent is considered a potentially or slightly contaminated, Category F, waste and is referred to as Source 5.

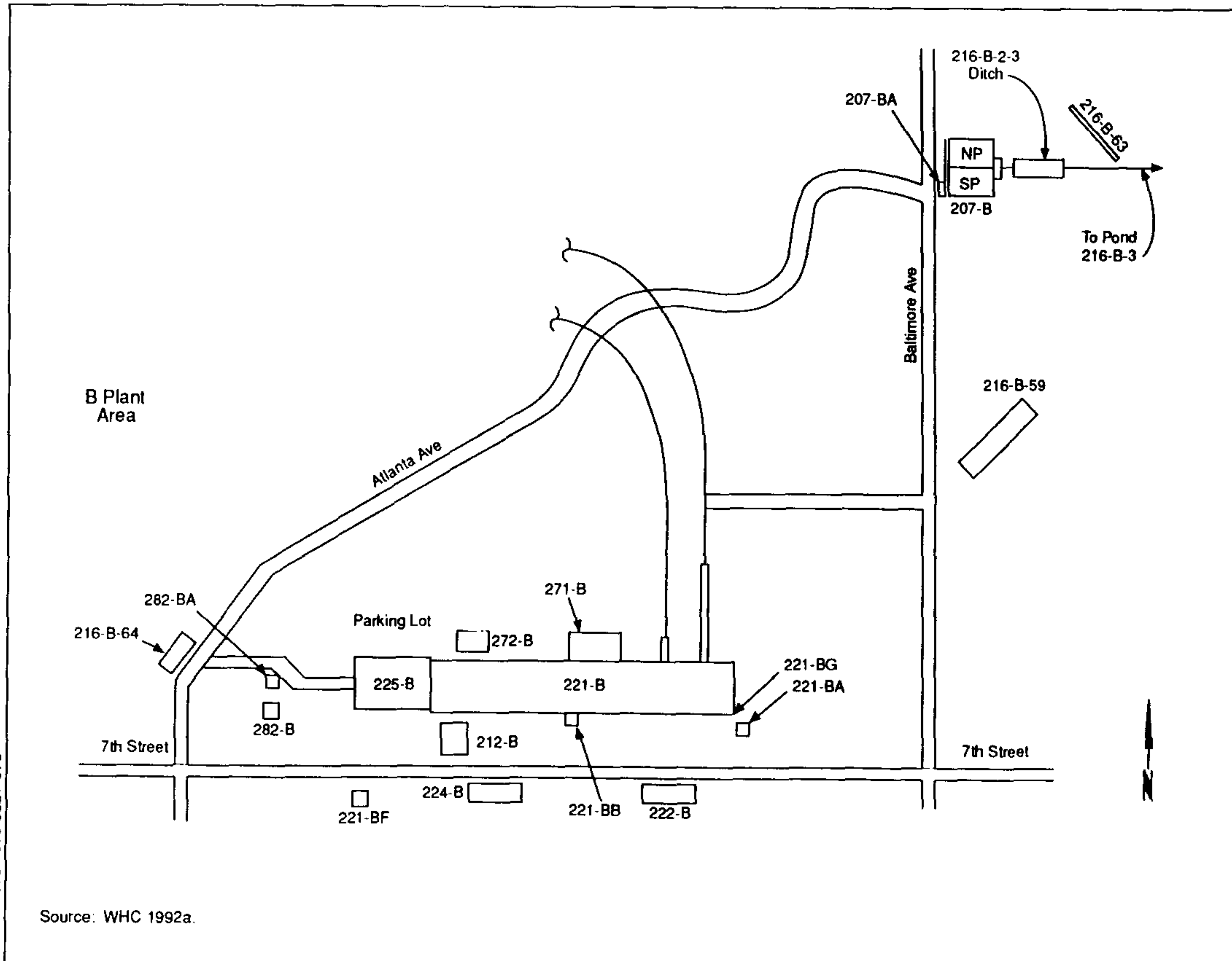
1.6.3.6 221-BB Building Steam Condensate (Sources 6 and 7). B Plant steam condensate is only evolved during the operation of the waste concentrator (E-23-3) in Cell 23. The B Plant steam condensate condenser effluent, Source 6, and the B Plant steam condensate monitor heat exchanger, effluent Source 7, are considered once-through cooling water, Category D, wastes that discharge to the 24 inch diameter effluent pipeline from the 221-BB Building.



913 1728.013/46197/11-9-93

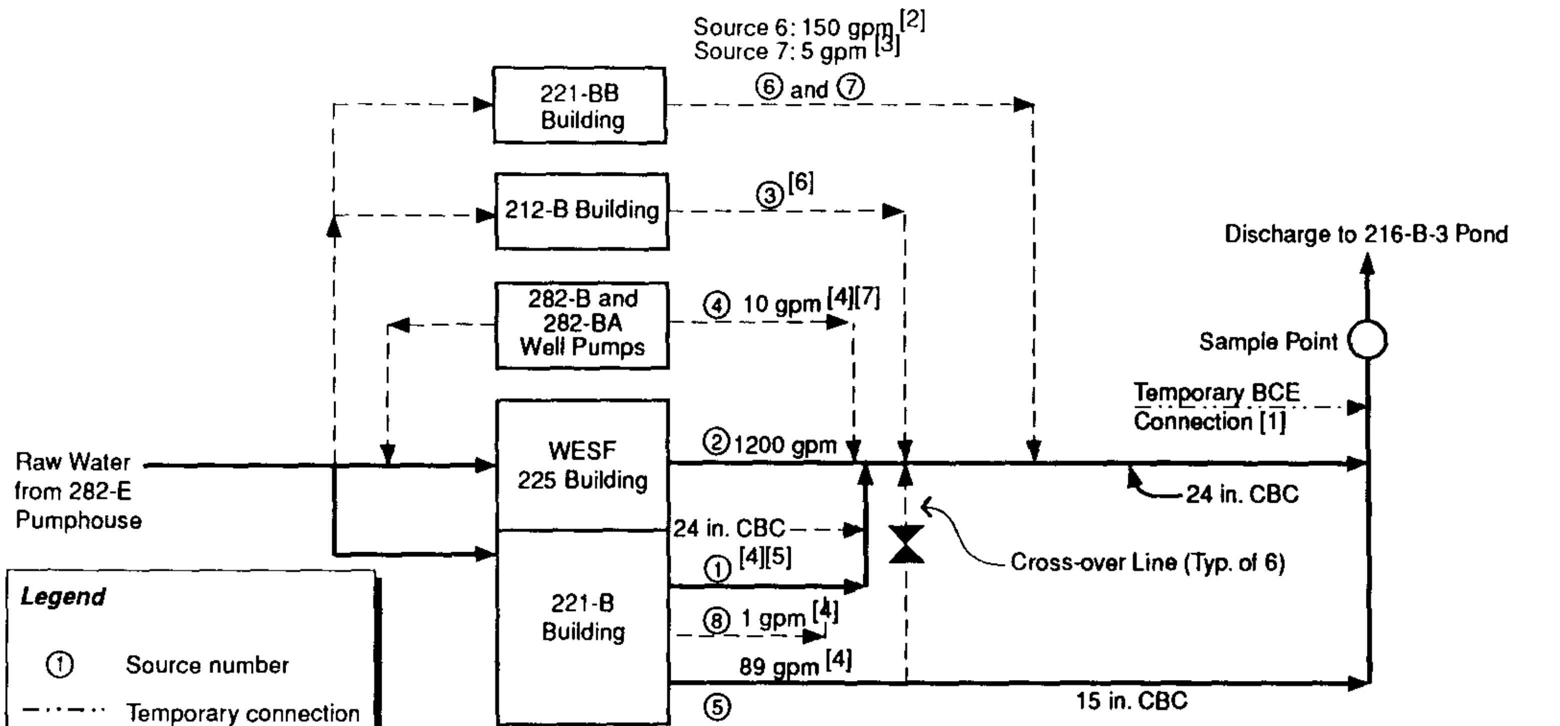
Figure B-25. Location of the B Plant Within the 200 East Area.

9413206.0106



Source: WHC 1992a.

Figure B-26. B Plant and Related Facilities.



Legend

① Source number
-·-·- Temporary connection
——— Continuous flow
- - - - Intermittent flow

WESF = waste encapsulation storage facility

CBC = B plant cooling water

BCE = B plant chemical sewer

BCS = B plant condensate system

TEDF = treated effluent disposal facility

gpm = gallons per minute

in. = inch

Notes

[1] Temporary connection until the 200 Area TEDF is operational in 1995.

[2] When the BCS condenser operates, the flow rate is 150 gpm; the BCS condenser is currently inactive.

[3] When the BCS monitor heat exchanger operates the flow rate is 5 gpm; the BCS monitor heat exchanger is currently inactive.

[4] Flow rate from telephone conversation with B Plant personnel. Sum of miscellaneous flow, including Cell 22 condenser, is estimated to be 100 gpm.

[5] When the waste concentrator in Cell 23 operates, the flow rate increases by 700 gpm.

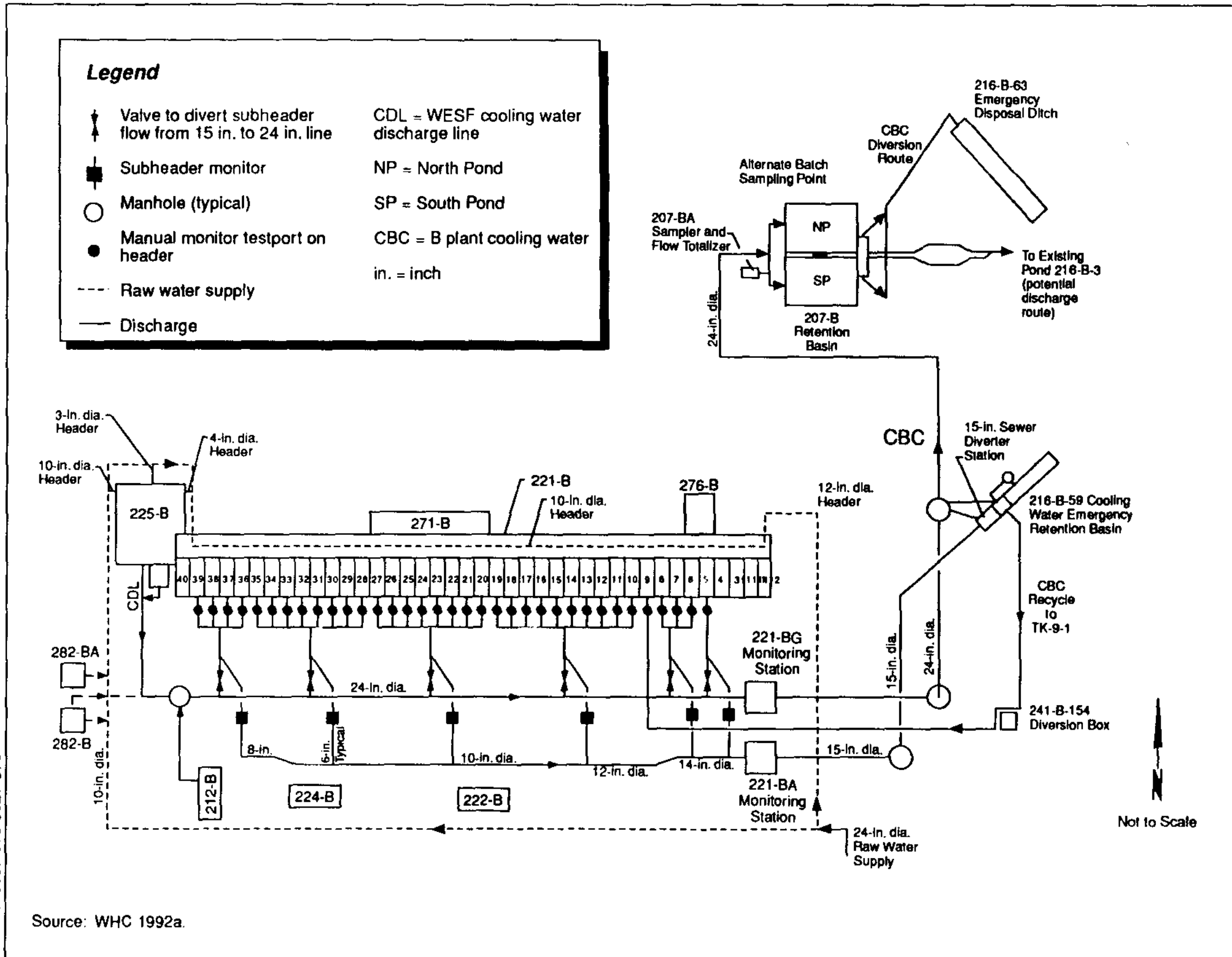
[6] Station is inactive.

[7] Flow rate is for a 4-hour period for each pump at two week intervals. Pump 282-B is 220 gpm and pump 282-BA is 700 gpm. Annualized flow rate is 10 gpm.

Source: WHC 1992a.

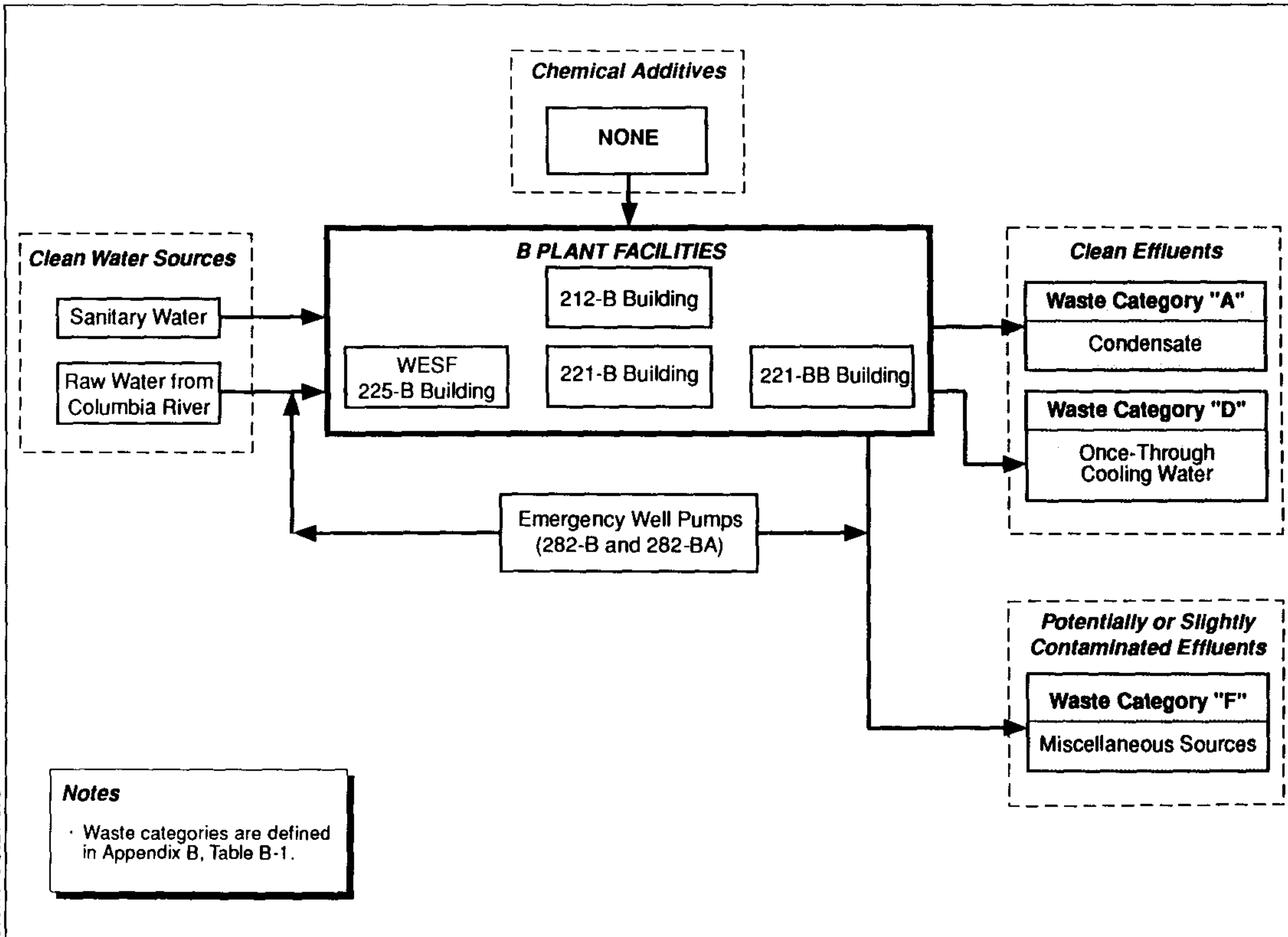
913 1728.013/46199/11-9-93

Figure B-27. Current Flow Schematic of the B Plant and Related Facilities (Yearly Average Flows).



913 1728.013/46200/11-9-93

Figure B-28. B Plant Cooling Water Plan.



Source: WHC 1992a.

913 1728.013/46201/11-9-93

Figure B-29. B-Plant Cooling Water Treatment Facilities Inputs and Outputs Water Schematic.

TABLE B-7. B-PLANT COOLING WATER EFFLUENT SOURCES

Source No.	Source Stream	Source Building	Source Category [4]	Effluent Water Type	Flow Type [5]	Estimated Flowrate gpm	Estimated Flowrate Status
1	Condensers Cells 22 & 23	221-B	F	Raw	I/C	--[6][3]	Inactive [10]
2	WESF-Pool Cell Flush & Exchangers	225-B	F	Raw	C	1,200 [1]	Active
3	Cask Station	212-B	F	Raw		–	Inactive
4	Emergency Well Pumps	282-B & 282-BA	F	Well	I	10 [2][3]	Active
5	221-B Process Cells Cooling Water (Cells 5 through 39)	221-B	F	Raw	I/C	89 [3]	Active
6	BCS Condenser	221-BB	D	Raw	I/C	– [8]	Inactive
7	BCS Monitor Heat Exchanger	221-BB	D	Raw	I/C	– [9]	Inactive
8	Stairwell 1, O.G. HVAC	221-B	A	Condenser and Sanitary Water [7]	I	1 [3]	Active
						TOTAL 1,300	

Source: WHC 1992a

NOTES:

[1] Individual sources are not measured, total flow is estimated at 1,200 gpm.
[2] Flow rate is for a 4-hour period for each pump at 2 week intervals. Pump 282-B is 220 gpm and Pump 282-BA is 700 gpm. Annualized flow rate is 10 gpm.
[3] Flow rate from telephone conversation with B Plant Personnel. Sum of miscellaneous flow, including cell 22 condenser, is estimated to be 100 gpm.
[4] Source category defined in Table B-1.
[5] I = intermittent, C = continuous, I/C = continuous when operating.
[6] When the waste concentrator in Cell 23 operates, the flow rate increases by 700 gpm.
[7] Steam condensate and sanitary water.
[8] When the BCS Condenser operates the flowrate is 150 gpm.
[9] When the BCS Monitor Heat Exchanger operates the flow rate is 5 gpm.
[10] The condenser in cell 22 is active and the condenser in cell 23 is inactive.

BCS = B Plant steam condensate
gpm = gallons per minute
HVAC = Heating, Ventilation, and Air Conditioning
O.G. = operating gallery
WESF = waste enscapulation storage facility

2.0 INCLUDE A PRODUCTION SCHEMATIC FLOW DIAGRAM OF THE PROCESS AND SERVICE ACTIVITIES DESCRIBED ABOVE ON A SEPARATE SHEET.

Schematic flow diagrams from the *Phase II Liquid Effluent Program (Project W-252) Wastewater Engineering Report and BAT/AKART Studies* (WHC 1992a) for each of the six waste streams are presented in Section 1.0. See Figures B-4, B-7, B-12, B-19, B-24 and B-29.

3.0 LIST RAW MATERIALS AND PRODUCTS.

3.1 242-A EVAPORATOR COOLING WATER

RAW MATERIALS	
Type	Quantity
Non-concentrated liquid radioactive/hazardous waste.	Approximately 120 gallons per minute when operating
PRODUCTS	
Concentrated liquid radioactive/hazardous waste	Approximately 60 gallons per minute when operating

3.2 242-A EVAPORATOR STEAM CONDENSATE

RAW MATERIALS	
Type	Quantity
Non-concentrated liquid radioactive/hazardous waste.	Approximately 120 gallons per minute when operating
PRODUCTS	
Concentrated liquid radioactive/hazardous waste	Approximately 60 gallons per minute when operating

3.3 241-A TANK FARM COOLING WATER

RAW MATERIALS	
Type	Quantity
None	None
PRODUCTS	
None	None

3.4 244-AR VAULT COOLING WATER

RAW MATERIALS	
Type	Quantity
None	None
PRODUCTS	
None	None

3.5 284-E POWER PLANT

RAW MATERIALS	
Type	Quantity
Coal	Approximately 30,000 tons per year
Sodium Chloride	Approximately 20,200 pounds per month
Alum	Approximately 4,250 pounds per month
Chlorine	Approximately 650 pounds per month
Polyquest 683	Approximately 730 pounds per month
Raw Water	Approximately 21,119,000 gallons per month
PRODUCTS	
Steam for heat and power generation	Approximately 500,000 pounds per year
Sanitary Water	Approximately 21,119,000 gallons per month

3.6 B PLANT COOLING WATER

RAW MATERIALS	
Type	Quantity
None	None
PRODUCTS	
None	None

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APPENDIX C

PLANT OPERATIONAL CHARACTERISTICS

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CONTENTS

CONTENTS (Cont.)

FIGURES

CONTENTS (Cont.)

TABLES

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<u>1.0 IDENTIFY THE WASTE STREAM FOR EACH OF THE PRODUCTION PROCESSES OR ACTIVITIES DESCRIBED IN SECTION B.1. ASSIGN AN IDENTIFICATION NUMBER.</u>

Note: These streams and respective Waste Stream ID #'s are identical to those presented in the *Phase II Liquid Effluent Program (Project W-252) Wastewater Engineering Report and BAT/AKART Studies* (WHC, 1992a).

1.1 242-A EVAPORATOR COOLING WATER

Process	Waste Stream Name	Batch or Continuous Process	Waste Stream ID#
Condenser Cooling Water	242-A Evaporator Cooling Water	Continuous	1
Air Compressor Cooling Water	242-A Evaporator Cooling Water	Continuous	2
Emergency Steam Turbine Condensate	242-A Evaporator Cooling Water	Batch/ Intermittent	3
Stream Trap Condensate	242-A Evaporator Cooling Water	Batch/ Intermittent	4
Compressed Air Dryer Discharge	242-A Evaporator Cooling Water	Batch/ Intermittent	5
Water Filter Catch Pan Drainage	242-A Evaporator Cooling Water	Batch/ Intermittent	6
HVAC Room Floor Drain	242-A Evaporator Cooling Water	Batch/ Intermittent	7
Steam System Relief Valve	242-A Evaporator Cooling Water	Batch/ Intermittent	8
Compressed Air Receiver Condensate	242-A Evaporator Cooling Water	Batch/ Intermittent	9

1.2 242-A EVAPORATOR STEAM CONDENSATE

Process	Waste Stream Name	Batch or Continuous Process	Waste Stream ID#
Condenser Cooling Water	242-A Evaporator Steam Condensate	Continuous	1
Steam Condensate from Heating Jacket	242-A Evaporator Steam Condensate	Batch/ Intermittent	2A
Raw Water from Cooling Jacket	242-A Evaporator Steam Condensate	Batch/ Intermittent	2B
Purging System Steam Trap Condensate	242-A Evaporator Steam Condensate	Continuous	3
Vacuum Pump Seal Water	242-A Evaporator Steam Condensate	Batch/ Intermittent	4
Steam Strainer Condensate	242-A Evaporator Steam Condensate	Continuous	5
Steam Separator Condensate	242-A Evaporator Steam Condensate	Continuous	6
Steam Separator Strainer Condensate	242-A Evaporator Steam Condensate	Continuous	7
Seal Water Pressure Control Valve Discharge	242-A Evaporator Steam Condensate	Batch/ Intermittent	8
Micro Filter Catch Pan Drainage	242-A Evaporator Steam Condensate	Batch/ Intermittent	9
Seal Water Pumps and Filter Catch Pan Drainage	242-A Evaporator Steam Condensate	Batch/ Intermittent	10
R-C-1 Sampler/Monitor Cooler Raw Water Discharge	242-A Evaporator Steam Condensate	Continuous	11

1.3 241-A TANK FARM COOLING WATER

Process	Waste Stream Name	Batch or Continuous Process	Waste Stream ID#
A-401 Condensers Cooling Water	241-A Tank Farm Cooling Water	Continuous	1
A-401 Building condenser-facility floor drain	241-A Tank Farm Cooling Water	Batch/ Intermittent	2
A-701 Building compressor-facility drains, including compressor Cooling Water	241-A Tank Farm Cooling Water	Continuous	3
A-701 Building compressor-facility drains, including compressor Cooling Water	241-A Tank Farm Cooling Water	Continuous (When operating)	3A
Compressor air receiver tank blowdown	241-A Tank Farm Cooling Water	Batch/ Intermittent	3B
Emergency Cooling Water System - cold water sump overflow	241-A Tank Farm Cooling Water	Batch/ Intermittent	4
Emergency Cooling Water System - deep well makeup water bypass	241-A Tank Farm Cooling Water	Batch/ Intermittent	5
Emergency Cooling Water System cooling tower blowdown	241-A Tank Farm Cooling Water	Batch/ Intermittent	6
Emergency Cooling Water System drain	241-A Tank Farm Cooling Water	Batch/ Intermittent	7

1.4 244-AR VAULT COOLING WATER

Process	Waste Stream Name	Batch or Continuous Process	Waste Stream ID#
Heating, Ventilation, and Air Conditioning System Cooler Drains	244-AR Vault Cooling Water	Continuous (when operating)	1
Heating, Ventilation, and Air Conditioning System Heater Condensate	244-AR Vault Cooling Water	Continuous (when operating)	2
Air Compressor Cooling Water	244-AR Vault Cooling Water	Continuous	3
Air Compressor Condensate	244-AR Vault Cooling Water	Continuous	4
Evaporative Cooling Blowdown	244-AR Vault Cooling Water	Continuous	5
Vessel Vent Heater Condensate	244-AR Vault Cooling Water	Continuous	6
Evaporative Cooling System Overflow	244-AR Vault Cooling Water	Batch/ Intermittent	7
Upset Vessel Cooling	244-AR Vault Cooling Water	Continuous (when operating)	8
Closed-Loop Cooling System Drain	244-AR Vault Cooling Water	Batch/ Intermittent	9
Eye Wash Station	244-AR Vault Cooling Water	Batch/ Intermittent	10
Jet Gang Valve Area Floor Drain	244-AR Vault Cooling Water	Batch/ Intermittent	11
Steam Trap Drainage	244-AR Vault Cooling Water	Continuous	12
TK-002 & 004 Heating Condensate	244-AR Vault Cooling Water	Batch/ Intermittent	13
Water Softening Regenerant	244-AR Vault Cooling Water	Batch/ Intermittent	14
Backflow Preventer Drain	244-AR Vault Cooling Water	Batch/ Intermittent	15
Air Compressor Aftercooler Cooling	244-AR Vault Cooling Water	Batch/ Intermittent	16

1.5 284-E POWER PLANT

Process	Waste Stream Name	Batch or Continuous Process	Waste Stream ID#
Reservoir Overflow	284-E Power Plant	Batch/ Intermittent	1
Filter Backwash	284-E Power Plant	Batch/ Intermittent	2
Cooling Water	284-E Power Plant	Continuous	3
Boiler Blowdown - continuous	284-E Power Plant	Continuous	4A
Boiler Blowdown - intermittent	284-E Power Plant	Batch/ Intermittent	4B
Water Softener Regenerant	284-E Power Plant	Batch/ Intermittent	5
Clearwell Overflow	284-E Power Plant	Batch/ Intermittent	6
Settling Basin Drain	284-E Power Plant	Batch/ Intermittent	7
Floor/Trench Drains	284-E Power Plant	Batch/ Intermittent	8A
Floor/Trench Drains	284-E Power Plant	Batch/ Intermittent	8B

1.6 B PLANT COOLING WATER

Process	Waste Stream Name	Batch or Continuous Process	Waste Stream ID#
Condensers Cells 22 & 23	B Plant Cooling Water	Continuous (when operating)	1
Waste Encapsulation Storage Facility - Pool Cell Flush and Exchangers	B Plant Cooling Water	Continuous	2
Cask Station	B Plant Cooling Water	Batch/ Intermittent	3
Emergency Well Pumps	B Plant Cooling Water	Batch/ Intermittent	4
221-B Process Cells Cooling Water (Cells 5 through 39)	B Plant Cooling Water	Continuous (when operating)	5
B Plant Steam Condensate Condenser	B Plant Cooling Water	Continuous (when operating)	6
B Plant Steam Condensate Monitor Heat Exchanger	B Plant Cooling Water	Continuous (when operating)	7
Stairwell 1, Operating Gallery Heating, Ventilation, and Air Conditioning	B Plant Cooling Water	Batch/ Intermittent	8

2.0 ON A SEPARATE SHEET, DESCRIBE IN DETAIL THE TREATMENT AND DISPOSAL OF ALL WASTE WATERS AS DESCRIBED ABOVE. INCLUDE A SCHEMATIC FLOW DIAGRAM FOR ALL WASTE WATER TREATMENT AND DISPOSAL SYSTEMS.

No treatment is provided for any of the six waste streams just prior to disposal, although some of the raw water is treated prior to, and during use as described in Attachment B, Section 1. All six streams are disposed in the 216-B-3 Ponds via the 216-B-3-3 ditch (Figure H3.0-1). Schematic flow diagrams for the waste water treatment and disposal systems from the *Phase II Liquid Effluent Program (Project W-252) Wastewater Engineering Report and BAT/AKART Studies* (WHC, 1992a) are presented for each of the six waste streams in Attachment B, Section 1.0. See Figures B-6, B-9, B-14, B-20, B-25, and B-28.

3.0 INDICATE TREATMENT PROVIDED TO EACH WASTE STREAM IDENTIFIED ABOVE.

No treatment is provided to any of the six waste streams.

4.0 DESCRIBE ANY PLANNED WASTE WATER TREATMENT IMPROVEMENTS OR CHANGES IN WASTE WATER DISPOSAL METHODS.

The six 200 East Area W-252 waste streams are currently disposed of in the B Pond Complex via the 216-B-3-3 ditch which discharges into the main lobe of the B Pond Complex (Figure C-1). The main lobe of the B Pond Complex currently overflows into the A-lobe which in turn overflows into the C-lobe (Figure C-1). This permit application is specifically written to address disposal of the six 200 East Area W-252 streams in the B Pond Complex.

Proposed improvements to the waste water transfer system from the facilities producing the waste streams to the disposal site at the B Pond Complex consist of closing the 216-B-3-3 ditch and temporarily routing the waste streams directly into the A-lobe of the B Pond complex through the existing contingency pond pipeline and existing unused bypass pipeline into A-lobe. The temporary routing of the streams through A-lobe is planned to occur during the staged closure of both the main and A-Lobes and the construction of project X-009 during 1994. Project X-009 proposes to reroute the existing bypass pipeline so the streams will discharge into either B- or C-lobes (Figure C-1) (WHC 1993a). Project X-009 construction is planned for the Fall of 1993 with completion in the Spring of 1994.

Proposed improvements to the ponds themselves include a staged Resource Conservation and Recovery Act closure the B Pond system during 1994. The staged closure consists of clean closure of A-, B- and C-lobes, with the A-lobe backfilled after closure. The main lobe and the 216-B-3-3 ditch will be closed under an integrated work/closure plan which involves staged backfilling of the facilities. The remaining B- and C-lobes will serve as the disposal site for the six 200 East Area W-252 Streams.

The sections that follow, which discuss the Best Available Technology/All Known and Reasonable Treatment (BAT/AKART) selected for each of the six waste streams, refer to a collection/disposal facility for routing the waste water discharge after implementation of BAT/AKART by October 1997. The six 200 East Area W-252 Streams are currently planned to be routed to the Project W-049H Treated Effluent and Disposal Facility for final disposal, but other alternatives, including continued discharge to the B- and C-lobes in the B Pond Complex, are being considered.

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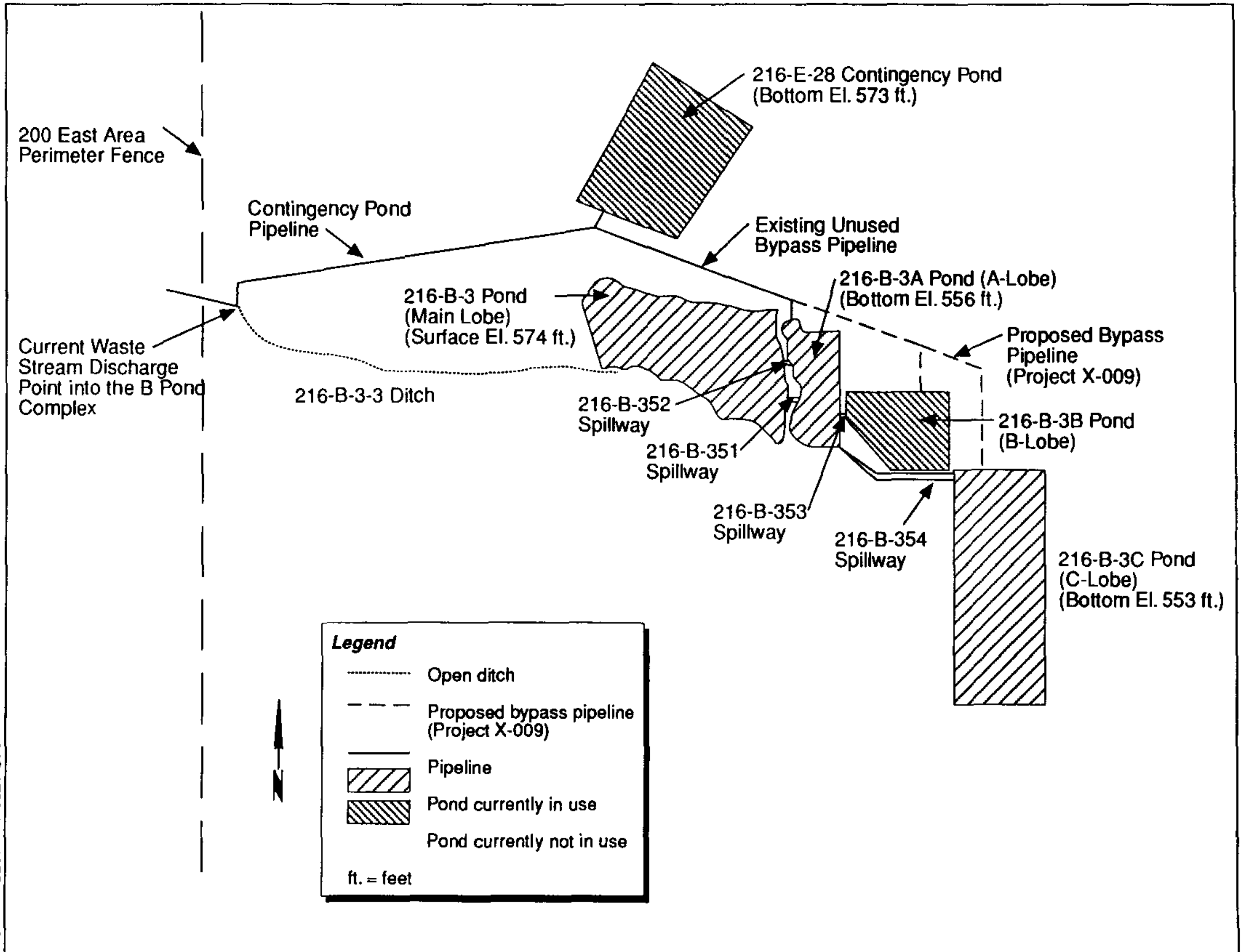

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Figure C-1. Schematic Diagram of the B Pond Complex.

4.1 242-A EVAPORATOR COOLING WATER

The following information is excerpted from WHC 1992a, Appendix B.2, Sections 4.3 and 5.3. Source controls and discharge to a treated effluent disposal facility were selected as BAT/AKART for the main flow of the 242-A Evaporator Cooling Water (WHC 1992a). Minor contributor sources will be handled in other appropriate ways. The selection process utilized a design heat load condition of 25,000,000 British Thermal Units per hour.

The BAT/AKART source controls system includes a heat exchanger to transfer waste heat from a primary closed loop to a secondary loop having a wet cooling tower to dissipate waste heat.

This selected alternative proposes to add a non-contact, closed-loop, corrosion-inhibiting cooling water system. As shown in Figure C-2, this cooling water system would use a heat exchanger to transfer waste heat from the primary closed loop to a secondary loop with a wet cooling tower to dissipate the waste heat, minimizing water usage. Blowdown will be discharged to a collection/disposal facility. To minimize the impact on the collection/disposal facility, the cooling tower cycles would be limited to two. The primary loop includes the water side of the present condenser, and will have suitable corrosion inhibitors added. The primary and secondary loop flowrates were calculated based on the waste heat design load and reasonable approach temperature assumptions.

The primary loop flowrate was assumed to be 3,650 gallons per minute (gpm), and the heat load to be 25,000,000 British Thermal Units per hour (both based on existing data); the resultant temperature rise in the primary cooling water loop is 14 degrees Fahrenheit. The operating temperatures of the primary cooling water loop are 79 degrees Fahrenheit (5 degrees Fahrenheit above the cold water temperature) and 93 degrees fahrenheit (79 degress Fahrenheit + 14 degrees Fahrenheit). The secondary cooling water loop inlet temperature (74 degrees Fahrenheit) to the shell and tube heat exchanger was based on a 7 degrees Fahrenheit temperature approach (wet bulb 67 degress Fahrenheit + 7 degress Fahrenheit) and the outlet temperature was set at 90 degrees Fahrenheit (3 degrees Fahrenheit below the primary cooling water inlet).

The circulating water flowrate in the secondary loop of the non-contact cooling water system was calculated to be 3,200 gallons per minute.

Other source controls are as follows:

1. A heat pump, or chiller, will be used to regulate the air compressor (Source 2) water jacket temperature; water flow will be closed-loop.

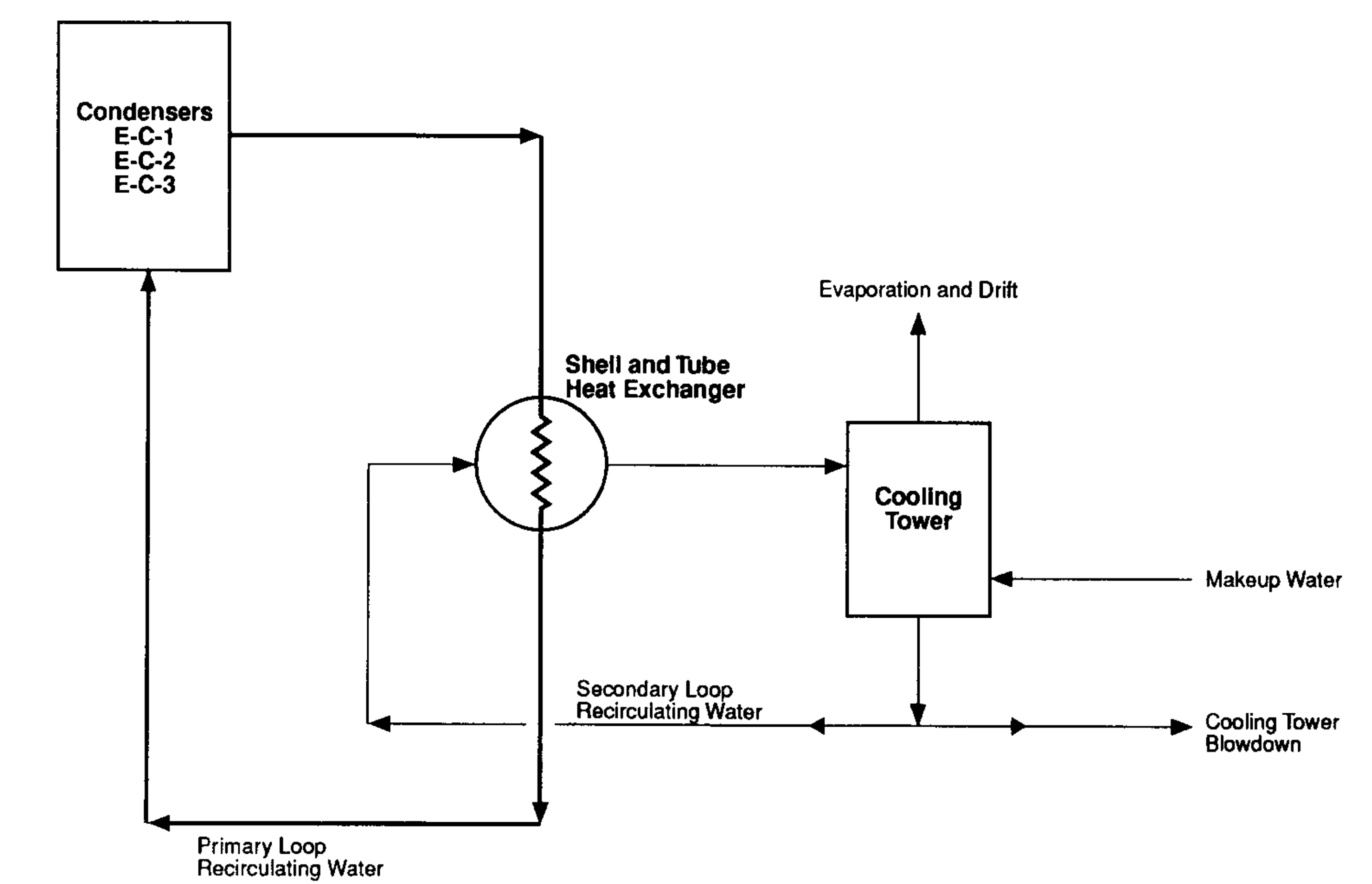
2. Steam condensate from the emergency steam turbine, steam traps, and steam relief valves (Sources 3, 4 and 8) will be collected for reuse as cooling tower make-up or returned to the steam plant.

3. The water filter catch pan (Source 6) will be sized to prevent liquid from overflowing.

4. Floor drains (Source 7) will be plugged and administratively controlled to prevent spills from entering the drain. A standpipe in the drains will permit air washer drainage but prevent floor spillage from entering.

5. Condensate from the air receiver (Source 9) will be collected and allowed to evaporate back into the atmosphere.

The source control methods are summarized in Table C-1. Figure C-3 shows the flow of effluent sources after the source control measures have been implemented.



Source: WHC 1992a.

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Figure C-2. Proposed 242-A Evaporator Cooling Water Schematic.

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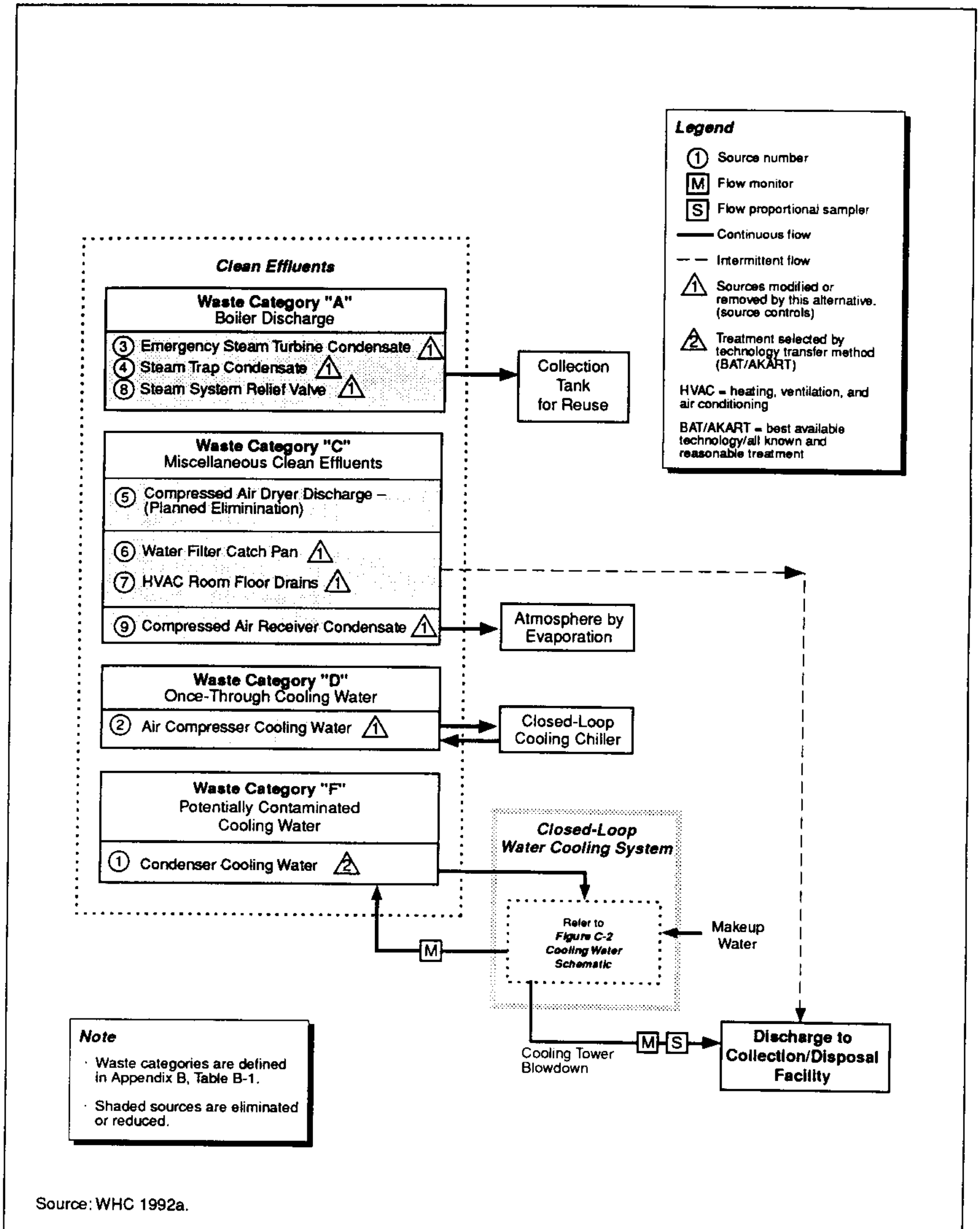

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Figure C-3. Selected Alternative: Flow Schematic for 242-A Evaporator Cooling Water Source Control and Discharge to a Collection Disposal Facility.

TABLE C-1. SELECTED ALTERNATIVE: Estimated Effects After 242-A Evaporator Cooling Water Source Control for Discharge to a Collection/Disposal Facility

Source No.	Source Stream	Source Building	Source Treatment Material	Treatment or Source Control Alternative [1]	Effluent Water Type	Estimated Annualized Flow Rate (gpm) [2]
1	Condenser Cooling Water	242-A	Technology Transfer	F-6	Raw	5.6
2	Air Compressor Cooling Water	242-A	Technology Transfer	D-2	None	0
3	Emergency Steam Turbine Condensate	242-A	Reuse	A-1	Steam Condensate	Negligible
4	Steam Trap condensate	242-A	Reuse	A-1	Steam Condensate	Negligible
5	Compressed Air Dryer Discharge [3]	242-A	Planned Elimination	C-0	Planned Elimination	0
6	Water Filter Catch Pan	242-A	Flow Regulation	C-0	Raw	Negligible
7	HVAC Room Floor Drains	242-A	Flow Regulation	C-0	Raw/ Condensate	Negligible
8	Steam System Relief Valve	242-A	Reuse	A-1	Steam Condensate	Negligible
9	Compressed Air Receiver Condensate	242-A	Flow Regulation	IC-2	Air Moisture	Negligible

Source: WHC 1992a

NOTES:

[1] Source category defined in Appendix B, Table B-1.
[2] Average flow rate based on total annual volume of cooling tower blowdown.
[3] Source planned to be eliminated with the use of an electric heater.
gpm = gallons per minute
HVAC = Heating, Ventilation, and Air Conditioning

4.2 242-A EVAPORATOR STEAM CONDENSATE

The following information is excerpted from WHC 1992a, Appendix B.7, Sections 4.2 and 5.2. Additional source control was selected as BAT/AKART for the 242-A Evaporator Steam Condensate to eliminate this stream (WHC 1992a). This alternative includes recycling the condensate streams to the 284 East Powerplant, converting once through cooling water systems to closed loop cooling water systems and discharging the remainder of the streams to a collection/disposal facility.

The waste stream is composed of several types of effluent. The selected alternative, therefore, includes a number of source controls identified as appropriate for application to individual sources or for groups of similar sources.

Specific, additional source controls include: return steam condensate streams (Sources 2A, 3, 5, 6, and 7) to the 284 East Powerplant, and discharge waste water streams (Sources 8, 9, and 10) to a collection/disposal facility. Radiation monitoring, pH monitoring, and sampling with periodic analysis would be used to ensure effluent quality. The treatment system influent would be monitored for radioactivity. If radioactivity is detected, the stream would be diverted to a double shell tank. Source 4 has already been eliminated.

Source 1 would be eliminated by adding a new secondary steam heat exchanger to heat the liquid in the existing heat exchanger. The existing heat exchanger is used to heat and evaporate the waste liquid. The spent fluid from the new secondary heat exchanger would be recycled to the 284-E Powerplant. Sources 2B and 11 would be eliminated by converting to air cooled, closed-loop cooling water systems as shown in Figure C-4.

The combined flow from all existing waste water streams would total 33.9 gpm. Alternative 2 would eliminate more than 99 percent of the waste water stream being discharged to the environment. In addition, it would produce a very small quantity of secondary waste (less than one 55 gallon drum per year).

Additional source controls are described in Table C-2, and consist of:

- Recycling all condensate streams except Source 1 to the 284 East Powerplant. This employs simple transfer of the liquids from the Evaporator to 284 East Powerplant. The condensate streams would be treated by activated carbon and ion exchange to remove trichloromethane, arsenic, and aluminum before entering the powerplant.

- Adding a steam heat exchanger to heat the fluid in the existing steam heat exchanger that is used to evaporate the liquid waste fed to Evaporator 242-A. The spent fluid from the new steam heat exchanger would be recycled to the 284 East Powerplant. This change would eliminate Source 1.

- Converting once-through cooling water systems to closed-loop cooling water systems that employ commonly used heat exchange equipment.
- Collecting and transferring Sources 8, 9, and 10 to a collection/disposal facility.

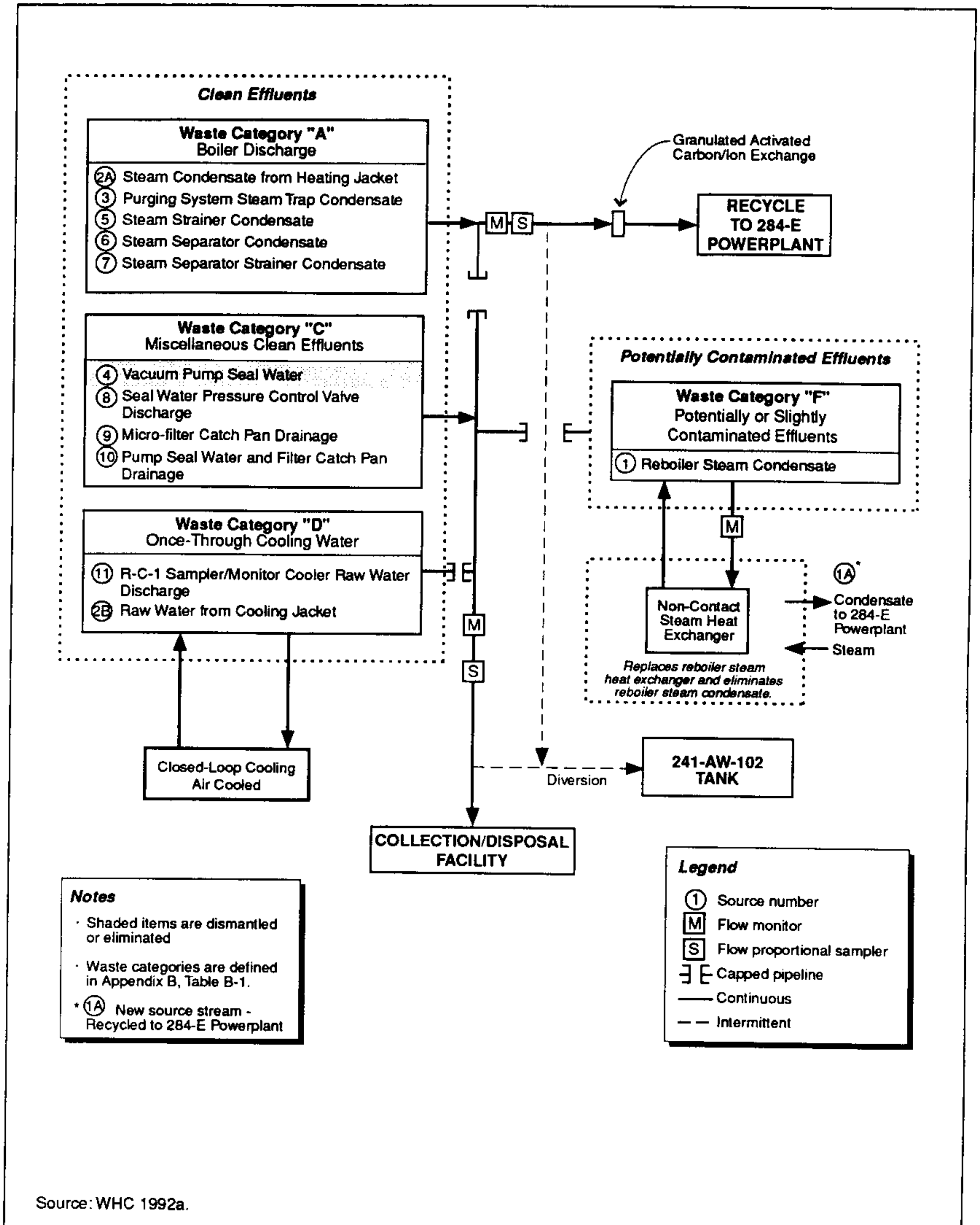

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Figure C-4. Selected Alternative: Flow Schematic for 242-A Evaporator After Planned and Additional Source Control.

TABLE C-2. Selected Alternative: Estimated Effects of Additional 242-A Evaporator Steam Condensate Source Control.

Source No.	Source	Source Building	Source Treatment Measure	Treatment or Source Control Alternative [1]	Effluent Water Type	Estimated Resulting Flowrate (GPM) [2]
1	Reboiler Steam Condensate	242-A	Switch to steam heating system with secondary heating loop (stream 1A)	F-1	Condensate	0.00E+00
1A	Secondary H/X Steam Condensate [4]	242-A	Recycle to 284-E Area Steam Plant	F-1	Condensate	6.80E+01 [5]
2A	Steam Condensate from Heating Jackets	242-A	Recycle to 284-E Area Steam Plant	A-1	Condensate	0.00E+00
2B	Raw Water from Cooling Jackets	242-A	Switch to Closed Loop Cooling Water	D-1	Raw Water	0.00E+00
3	Purging System Steam Trap Condensate	242-A	Recycle to 284-E Area Steam Plant	A-1	Condensate	0E.00+00
4	Vacuum Pump Seal Water [3]	242-A	Pump Removed from Service	C	Raw Water	0.00E+00
5	Steam Strainer Condensate	242-A	Recycle to 284-E Area Steam Plant	A-1	Condensate	0.00E+00
6	Steam Separator Condensate	242-A	Recycle to 284-E Area Steam Plant	A-1	Condensate	0.00E+00
7	Steam Water Pressure Control Valve Discharge	242-A	Recycle to 284-E Area Steam Plant	A-1	Condensate	0.00E+00
8	Seal Water Pressure Control Valve Discharge	242-A	Discharge to W-049H Type Facility	C-3	Raw Water	<2.00E-02
9	Micro Filter Catch Pan Drainage	242-A	Discharge to W-049H Type Facility	C-3	Raw Water	<2.00E-02
10	Seal Water Pumps and Filter Catch Pan Drainage	242-A	Discharge to W-049H Type Facility	C-3	Raw Water	2.00E-02
11	R-C-1 Sampler/Monitor Cooler Raw Water Discharge	242-A	Switch to Closed Loop Cooling Water	D-1	Raw Water	0.00E+00
						TOTAL <6.80E+01 [5]
						TOTAL <6.00E-02 [6]

Source: WHC 1992a

NOTES:

[1] Source categories are defined in Appendix B, Table B-1.
[2] Average flow rate is based on total annual flow divided by 526,000 minutes (1 year).
[3] This source stream has been eliminated since the completion of sampling period.
[4] Source Stream 1A condensate (new stream) comes from the secondary heating loop. (Est. at 33 gpm annualized average/68 gpm maximum). Recycled to 284-E Power Plant.
[5] The peak flow for this source steam is estimated at 68 gpm and the annualized average flow is estimated at 34 gpm. The flow is recycled to the 284-E Power Plant.
[6] This flow goes to the effluent collection/disposal system.
H/X = heat exchanger
gpm = gallons per minute

4.3 241-A TANK FARM COOLING WATER

The following information is excerpted from WHC 1992a, Appendix B.1, Sections 4.2 and 5.2. Planned source controls were selected as BAT/AKART for the 241-A Tank Farms cooling water and associated streams (WHC 1992a). This selection includes a closed-loop cooling system for the tank off-gas condenser cooling and a closed-loop liquid cooling system for instrument air compressors. The closed-loop cooling water systems replace the once-through cooling water system.

Cooling water will be recirculating from condenser to the evaporative cooling towers, which requires make-up from sanitary water. The blowdown from the cooling tower will be the major (99.92 percent) effluent discharging to a collection/disposal facility. The instrument air compressor once-through cooling water will be eliminated by applying a liquid closed-loop cooling system with air cooler. Other contributors in the current status will be eliminated.

The following are brief descriptions of the recommended actions:

Source Stream 1. Replace the A-401 condenser cooling with a closed loop cooling water system with wet cooling towers and glycol chillers. There would be two cooling-water loops using sanitary water.

Replace the A-701 Building compressor once-through cooling water system with an air-cooled chiller. No waste water would be generated by this system, except blowdown from the compressor air dryer receiver tank. This blowdown will be intermittent and negligible, reducing Source 3.

The following six streams will be eliminated:

- Compressor and after cooler cooling water (Sources 3 and 3A)
- Emergency cooling water system cold water sump overflow (Source 4)
- Emergency cooling water system - deep well makeup water bypass (Source 5)
- Emergency cooling water system blowdown (Source 6)
- Emergency cooling water system drain (Source 7).

Since the potential radioactive sources would be eliminated and the flowrate greatly reduced from this wastestream, the treated 241-A Tank Farm cooling water wastestream would be discharged to a collection/disposal facility. The active sources at the 241-A Tank Farm Cooling Water system after implementation of the source control measures are summarized in Table C-3. Figure C-5 shows the flow of effluent sources after these source control measures have been implemented.

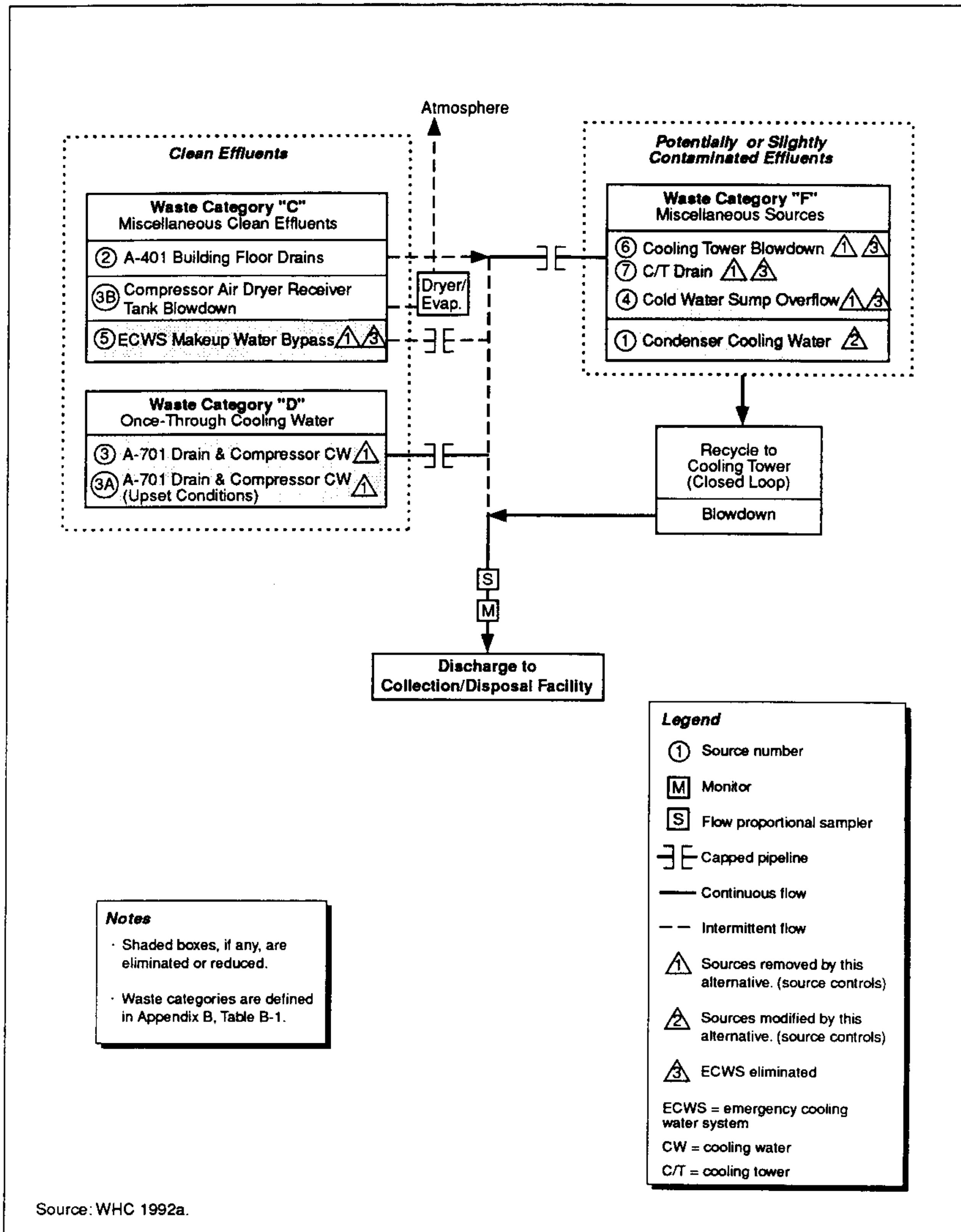

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Figure C-5. Selected Alternative: Flow Schematic of 241-A Tank Farm Cooling Water After Planned Source Control.

TABLE C-3. Selected Alternative: Estimated Effects of Planned 241-A Tank Farm Cooling Water Source Controls

Source No.	Source Stream [1]	Source Treatment Measure	BAT Option [2]	Effluent Water Type	Estimated Resulting Flowrate (gpm) [3]
1	A-401 Condensors Cooling Water Blowdown	Closed-loop cooling water system	E	2X Sanitary Water	20 [4]
2	A-401 Building Condensor-Facility Floor Drain	None	N/A	Sanitary Water	Negligible (<0.016)
3	A-701 Building Compressor-Facility Drains, Including Compressor Cooling Water	Closed-loop cooling system	D-3	None	0
3A	A-701 Building Compressor-Facility Drains, Including Compressor Cooling Water (upset)	Eliminated	N/A	N/A	0
3B	Compressor Air Receiver Tank Blowdown	None	C-2	Raw Water [5]	Negligible
4	ECWS Cold Water Sump Overflow [2]	Eliminated	N/A	N/A	0
5	ECWS Deep Well Makeup Water Bypass [2]	Eliminated	N/A	N/A	0
6	ECWS Cooling Tower Blowdown [2]	Eliminated	N/A	N/A	0
7	ECWS Drain [2]	Eliminated	N/A	N/A	0
					TOTAL 20

Source: WHC 1992a

NOTES:
[1] All sources are in 241-A Tank Farms area.
[2] Source control options from Appendix B, Table B-1.
[3] Average flow rate based on total annual flow divided by 526,000 minutes (1 year).
[4] Estimated 40 gpm cooling tower makeup with equal evaporation rate, and blowdown rate 10 MM Btu/hr cooling requirement.
[5] Assumed air moisture is similar to raw water quality.
BAT = best available technology
ECWS = emergency cooling water system
gpm = gallons per minute
N/A = not applicable
Btu/hr = British thermal units per hour

4.4 244-AR VAULT COOLING WATER

The following information is excerpted from WHC 1992a, Appendix B.4, Sections 4.2 and 5.2. The additional source controls alternative was selected as BAT/AKART for the 244-AR Vault Cooling Water effluent stream (WHC 1992a). This selection includes replacing the air compressor and after cooler cooling water system with a closed-loop system and replacing the vessel vent steam heater with electric heaters.

The 244-AR Vault will serve as an interim holding and transfer facility for neutralized current acid waste received from the tank farms prior to transfering waste to a pre-treatment facility for processing. In the selected alternative, the 244-AR vault cooling water would continue to discharge to B Pond and several additional source control measures would be applied to reduce both the potential for inadvertent discharge of radioactive constituents and the quantity of water discharged by the wastestream.

Facility modifications are required to reduce the potential for radioactive contributions to the cooling water wastestream. The vessel vent steam heater (Source 6) would be replaced with an electric heater. Using this approach, vessel vent steam condensate would no longer exist. Although the flowrate associated with this source is small, a potential source of radioactive contamination would be eliminated. Prior to closed-cooling water loop drainage, the contents, as required by procedure, would be sampled and verified to be acceptable (e.g. free of radioactive contamination) before discharge to the 244-AR Vault cooling water wastestream.

Additional source control measures to be taken to reduce discharge volume include: modification of the raw water-cooled compressor (Source 3) and aftercooler (Source 16) to allow use of closed-loop cooling water with heat rejection to an air-cooled heat exchanger. The source streams 3 and 16 will be eliminated.

With the elimination of the potentially radioactive sources and the continuous clean sources, the 244-AR Vault cooling water wastestream would consist of cooling tower blowdown and intermittent sources such as equipment drainages, water-softener regenerant, and eye-wash station discharges. The wastestream flow would be discharged to a collection/disposal facility.

The additional source control measures for the active wastestream sources at the 244-AR Vault are summarized in Table C-4. Figure C-6 shows the flow of effluent sources after the existing and additional source control measures have been implemented.

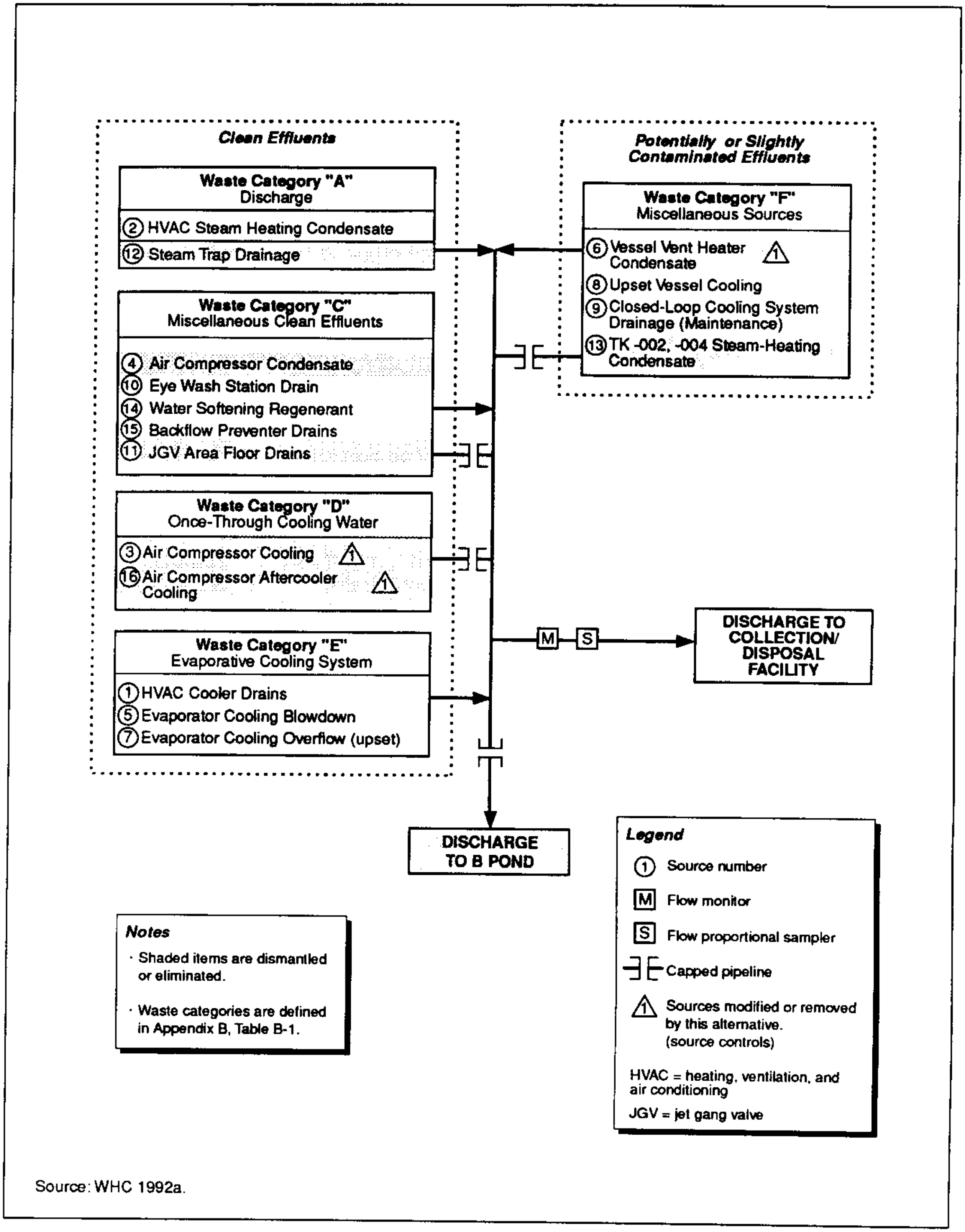

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Figure C-6. Selected Alternative: Flow Schematic After Additional 244-AR Vault Cooling Water Source Controls.

TABLE C-4. Selected Alternative: Estimated Effects of Additional 244-AR Vault Cooling Water Source Controls

Source No.	Source Stream	Source Building	Additional Measure	BAT Source Control [1]	Estimated Effluent Option Type	Resulting Water Flow (gpm) [2]
1	HVAC System Cooler Drains	244-AR	None	E-1	Sanitary	5.0E+00
2	HVAC System Heater Condensate	244-AR	None	A-2	Condensate	2.0E+00
3	Air Compressor Cooling Water	244-AR	Replace once-through cooling with closed-loop	D-1	Raw Water	0
4	Air Compressor Condensate	244-AR		C-1	Raw Water	7.5E-02
5	Evaporative Cooling Blowdown	244-AR	None	E-2	2X Softened Raw	4.0E+00
6	Vessel Vent Heater Condensate	244-AR	Replace steam heater with electric heater	F-6	Condensate	0
7	Evaporative Cooling System Overflow	244-AR	None	E-0	2X Softened Raw	0
8	Upset Vessel Cooling	244-AR	None	F-1	Raw	2.0E-02
9	Closed-Loop Cooling System Drain	244-AR	None	F-3	Softened Raw	1.0E-01
10	Eye Wash Station	244-AR	None	C-3	Sanitary	1.0E-03
11	JGV Area Floor Drain	244-AR	N/A		Condensate	Terminated
12	Steam Trap Drainage	244-AR		A-4	Condensate	1.0E+00
13	TK-002 & 004 Heating Condensate	244-AR	N/A		Condensate	Terminated
14	Water Softening Regenerant	244-AR	None	C-3	Raw [3]	1.6E-01
15	Backflow Preventer Drain	244-AR	None	C-3	Raw	2.0E-04
16	Air Compressor Aftercooler Cooling	244-AR	Replace once-through cooling with closed-loop	D-1	Raw	0
						TOTAL 1.24E+01

Source: WHC 1992a

NOTES:

[1] Source control options from Appendix B, Table B-1.
[2] Average flow rate based on total annual flow divided by 526,000 minutes (1 year).
[3] Calcium, Magnesium, and chloride concentrations are increased to reflect anticipated concentrations resulting from the water softeneing resin bed regeneration process.

gpm = gallons per minute
HVAC = Heating, Ventilation, and Air Conditioning
JGV = Jet Gang Valve
N/A = not applicable

4.5 284-E POWER PLANT

The following information is excerpted from WHC 1992a, Appendix B.3, Sections 4.3 and 5.3. Additional source controls plus in-plant treatment were selected as BAT/AKART for 284-E Powerplant Wastewater (WHC 1992a). This BAT/AKART determination includes installing flow and turbidity meters, two thickeners and sludge drying beds to treat the filter backwash, dual level control systems to prevent overflows, plugs or standpipes for the floor and trench drains and additional instrumentation to optimize backwashing. Clarified water will be recycled to the raw water reservoir.

All remaining sources will be discharged to the collection/disposal facility. Secondary waste sludge from the filter backwash will be disposed on the Hanford Site.

This selected alternative proposes to install automated level control to replace existing manual level control for the 282-E Reservoir and 283-E Clearwell. Depending on filter solid loading, the backwash frequency cycle would be adjusted. The only water potentially discharging to the 216-B Ditch under this alternative would be raw water. This would occur only in the unlikely event that the 282-E Reservoir level controls failed.

The floor and trench drains would continue to be administratively controlled to prevent spills from entering the sewer system. The 284-E Powerplant cooling water, boiler blowdown, water softener regenerant and floor/trench drains shall be discharged to a collection/disposal facility.

The source control measures identified for the remaining waste water source are summarized in Table C-5. Figure C-7 shows the flow of effluent sources after the existing and additional source control measures have been implemented and technology transfer applied to the filter backwash source stream. The flow rates and concentrations will change as a consequence of implementing the source control measures.

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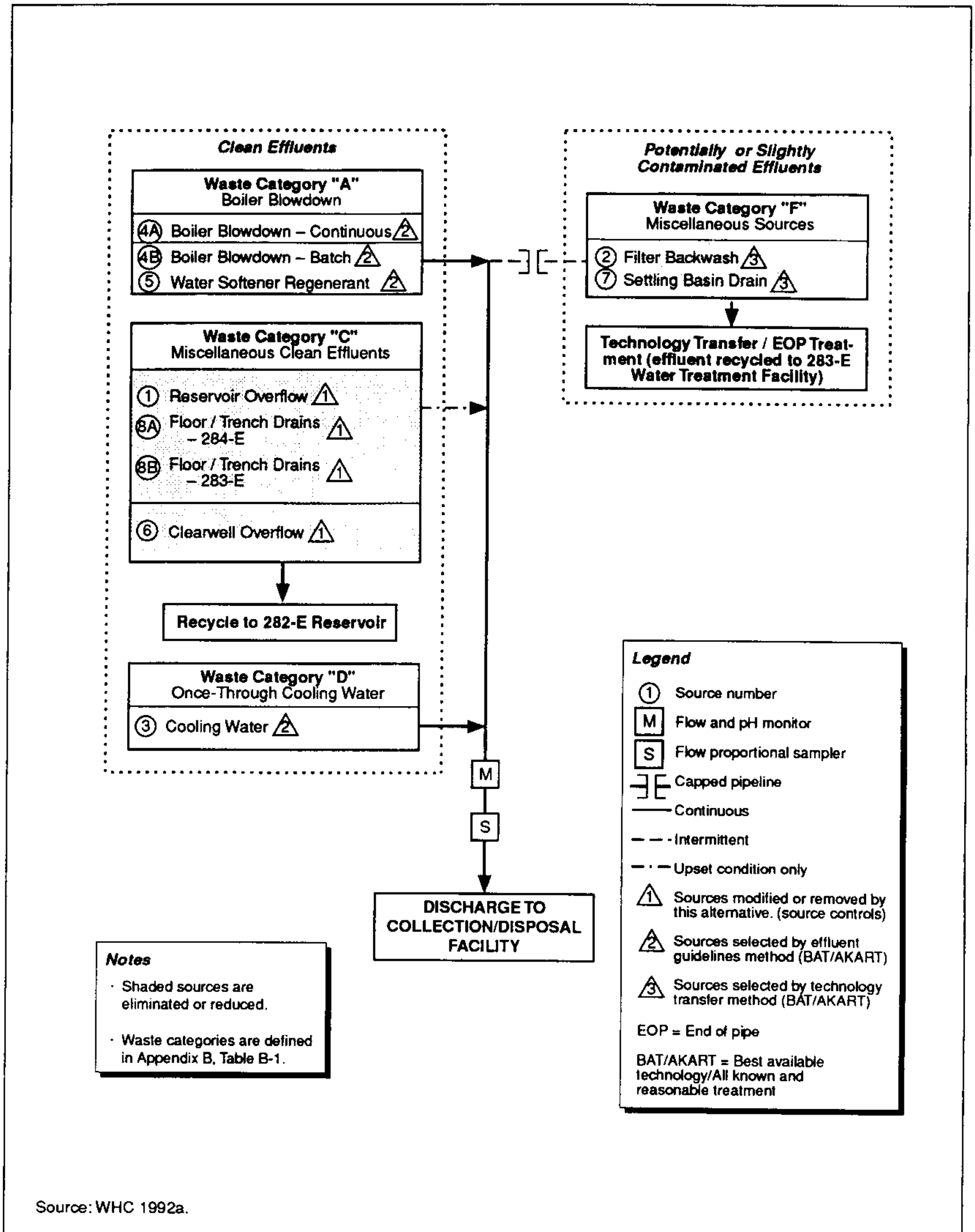

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Figure C-7. Selected Alternative: Flow Schematic for 284-E Powerplant After Applying Effluent Guidelines, Transfer Technology, Additional Source Controls With Discharge to Collection/Disposal Facility.

TABLE C-5. Selected Alternatives - Estimated Effects of Technology Transfer, Source Controls at 284-E Power Plant.

Source No.	Source Stream	Source Building	Source Treatment Measure	Treatment or Soruce Control Alternate [1]	Effluent Water Type	Estimated Resulting Flow Rate (gpm) [2]
1	Reservoir Overflow	282-E	Auto Level Control	C-0	Raw	0.0E-1
2	Filter Backwash	283-E	Tech. Transfer Treatment	F-3 [3]	Sanitary	0.00E+1
3	Cooling Water	284-E	None	A-4 [4]	Sanitary	5.00E+1
4A	Boiler Blowdown - continuous	284-E	None	A-4 [4]	6X Sanitary	2.41E+1
4B	Boiler Blowdown - intermittent	284-E	None	A-4 [4]	6X Sanitary	2.3E+0
5	Water Softener Regenerant	284-E	None	A-4 [4]	36X Sanitary	6.8E+0
6	Clearwell Overflow	283-E	Auto Level Control	C-0	Sanitary	Negligible [5]
7	Settling Basin Drain	283-E	Tech. Transfer Treatment	F-3 [3]	Raw	Negligible [5]
8A	Floor/Trench Drains	284-E	Flow Regulation	C-0	Raw	Negligible [5]
8B	Floor/Trench Drains	283-E	Flow Regulation	C-0	Sanitary	Negligible [5]
						TOTAL 8.32E+1

Source: WHC 1992a

NOTES:
[1] Source control options from Appendix B, Table B-1.
[2] Average flow rate based on total annual flow divided by 526,000 minutes (1 year).
[3] Technology transfer.
[4] Effluent guidelines.
[5] Flow rate is less than 0.02 gpm.
gpm = gallons per minute

4.6 B PLANT COOLING WATER

The following information is excerpted from WHC 1992a, Appendix B.8, Sections 4.3 and 5.3. Source controls (non-contact, closed-loop cooling water system) were selected as BAT/AKART for the B Plant Cooling Water (WHC 1992a). The selection process evaluated two design heat load conditions, either 7,000,000 British Thermal Units per hour (Case A) or 25,000,000 British Thermal Units per hour (Case B). The only difference between the two cases is operation of the E-23-3 concentrator. The BAT/AKART selection was the same for both design heat loads. Based on current program information, the Case A operating condition was used for the anticipated design parameters and discussion in WHC 1992a.

The BAT/AKART source controls system includes a heat exchanger to transfer waste heat from a primary closed loop to a secondary loop with a wet cooling tower to dissipate waste heat. The cooling tower blowdown would be pumped to a collection/disposal facility for final disposal.

This selected alternative proposes to add a non-contact, closed-loop cooling water system to minimize water usage and to discharge the blowdown to a collection/disposal facility. A non-contact, closed-loop cooling water system would be provided by this alternative. As shown in Figure C-8, this cooling water system would use a heat exchanger to transfer waste heat from the primary closed loop to a secondary loop with a wet cooling tower to dissipate the waste heat. The blowdown from the cooling tower would be discharged to a collection/disposal facility. To minimize the impact on the collection/disposal facility, the cooling tower cycles would be limited to two. The amount of both the cooling tower makeup and blowdown are increased by reducing the cycles of concentration.

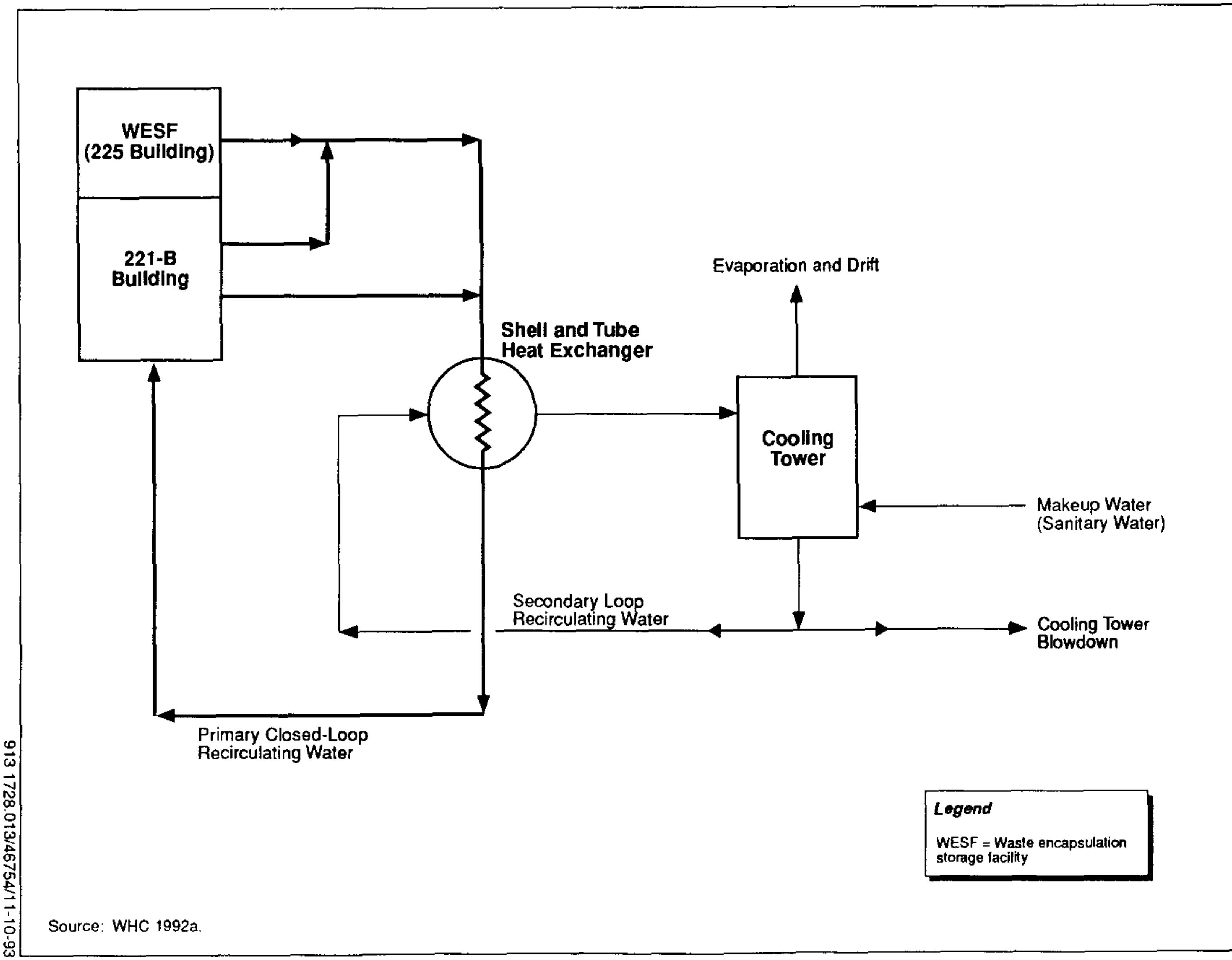
The primary and secondary loop flowrates were calculated based on the waste heat design loads for Cases A and B. All eight source streams, if active, could be handled by the closed-loop cooling water system, so that the B Plant effluent would only consist of cooling tower blowdown which would be a category E stream.

In Case A, the primary closed-loop flowrate was assumed to be 1,300 gallons per minute with a heat load of 7,000,000 British Thermal Units per hour (both based on existing data); the resultant temperature rise in the primary cooling water loop is 11 degrees Fahrenheit. The operating temperatures of the primary cooling water loop are 79 degrees Fahrenheit (5 degrees Fahrenheit above the cold water temperature) and 90 degrees Fahrenheit (79 degrees Fahrenheit plus 11 degrees Fahrenheit). The secondary cooling water loop inlet temperature (74 degrees Fahrenheit) to the shell-and-tube heat exchanger was based on a 7 degrees Fahrenheit temperature approach (wet bulb 67 degrees Fahrenheit plus 7 degrees Fahrenheit) and the outlet temperature was set at 87 degrees Fahrenheit (3 degrees Fahrenheit below the primary cooling water inlet). The circulating water flowrate in the secondary loop of the non-contact cooling water system for Case A was then calculated to be 1,100 gallons per minute.

In Case B, the primary closed-loop maximum circulating water temperature was assumed at 95 degrees Fahrenheit (WHC 1992a) with a heat load of 25,000,000 British Thermal Units per hour. The maximum temperature rise of the primary cooling water loop was limited to 16 degrees Fahrenheit (95 degrees Fahrenheit to 79 degrees Fahrenheit). The primary loop circulating water flowrate was then calculated to be 3,200 gallons per minute. The inlet temperature of the secondary cooling water loop to the shell and tube heat exchanger was 74 degrees Fahrenheit, and the outlet temperature was set at 92 degrees Fahrenheit (3 degrees Fahrenheit below the primary cooling water inlet). The circulating water flowrate in the secondary loop of the non-contact cooling water system for Case B was then calculated to be 2,800 gallons per minute.

The source control measures identified for the effluent B Plant cooling water sources are summarized in Tables C-6 and C-7. Figure C-9 shows the flow of effluent sources after the source control measure (a non-contact, closed-loop cooling tower) has been implemented. The non-contact, closed-loop cooling tower (see Figure C-8) would reduce the amount of cooling water, a desired goal, and the blowdown would be discharged to a collection/disposal facility. A new cooling tower would likely use sanitary water to reduce the concentration of suspended solids in the cooling tower. Sanitary water constituent concentrations will be multiplied by the cycles of concentration and used for water quality comparisons.

9413206.0149



913 1728.013/46754/11-10-93

Figure C-8. Non-Contact Closed-Loop Designs Schematic for B Plant Cooling Water.

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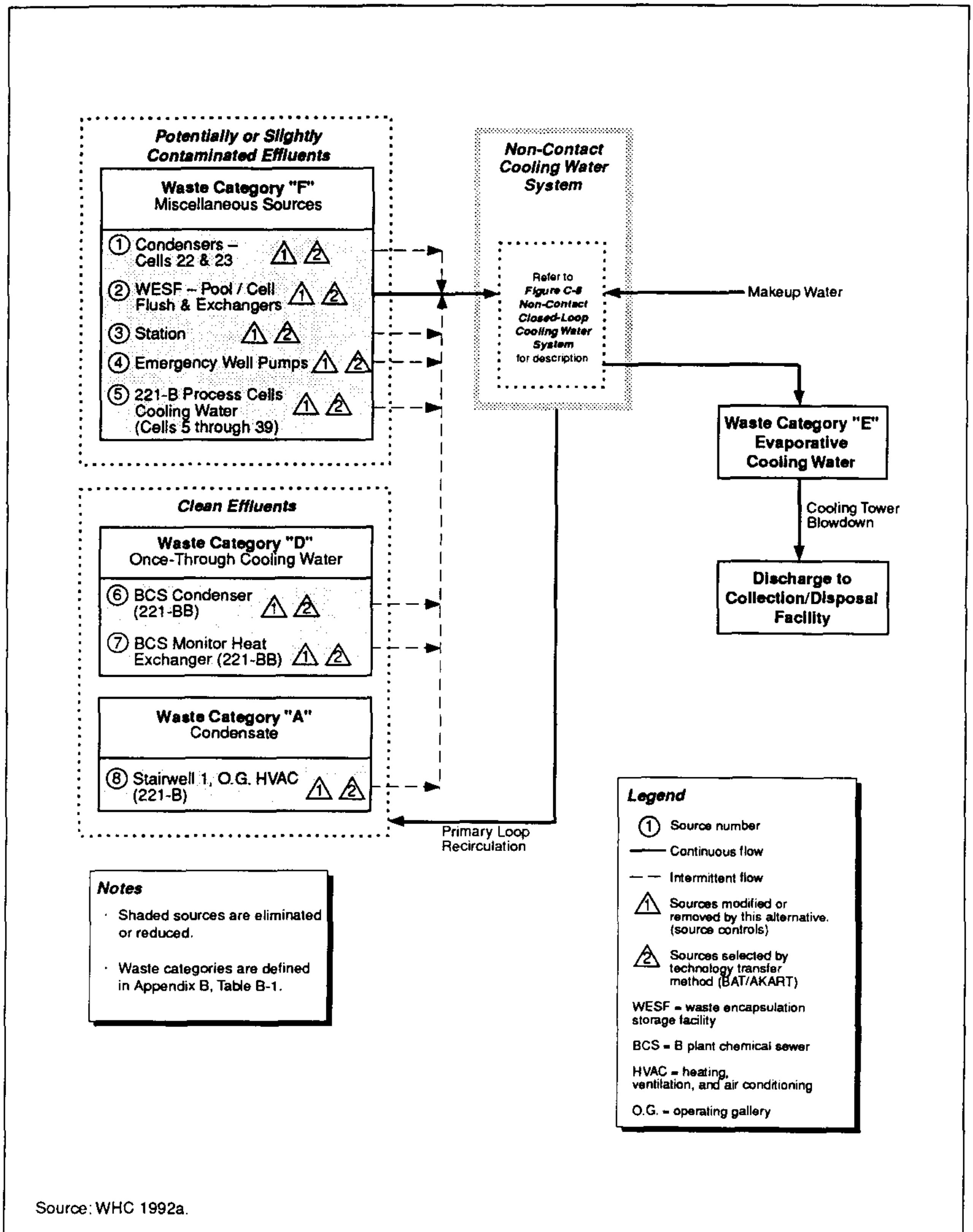

913 1728.013/46207/11-10-93

Figure C-9. Selected Alternative: Flow Schematic of B Plant Cooling Water After Source Controls - Collection/Disposal Facility Discharge.

TABLE C-6. Selected Alternative: Estimated Effects of B Plant Cooling Water Source Controls - Collection/Disposal Facility Discharge - Case A

Source No.	Source Stream	Source Building	Source Treatment Material	Treatment or Source Control Alternative [1]	Effluent Type	Estimated Resulting Wastewater Flow Rate (gpm)
1	Condensers Cesll 22 & 23	221-B	Source Control [2]	E-2	Sanitary	---
2	WESF-Pool Cell Flush & Exchangers	225-B	Source Control [2]	E-2	Sanitary	12.92
3	Cask Station	212-B	Source Control [2]	E-2	Sanitary	---
4	Emergency Well Pumps	282-B & 282-BA	Source Control [2]	E-2	Sanitary	0.11
5	221-B-Process Cells Cooling Water (Cells 5 through 39)	221-B	Source Control [2]	E-2	Sanitary	0.96
6	BCS Condenser Catch Pan	221-BB	Source Control [2]	E-2	Sanitary	---
7	BCS Monitor Heat Exchanger	221-BB	Source Control [2]	E-2	Sanitary	---
8	Stairwell 1, O.G. HVAC	221-B	Source Control [2]	E-2	Sanitary	0.01
					TOTAL	TOTAL 14.00

Source: WHC 1992a

NOTES:

[1] Source control is non-contact closed-loop cooling water.
[2] Technology transfer.
gpm = gallons per minute
WESF = Waste encapsulation Storage Facility
BCS = B Plant steam condensate
O.G. = Operating gallery
HVAC = Heating, Ventilation, and Air Conditioning

TABLE C-7. Selected Alternative: Estimated Effects of B Plant Cooling Water Source Controls - Collection/Disposal Facility Discharge - Case B

Source No.	Source Stream	Source Building	Source Treatment Material	Treatment or Source Control Alternative [1]	Effluent Type	Estimated Resulting Wastewater Flow Rate (gpm)
1	Condensers Cells 22 and 23	221-B	Source Control [2]	E-2	Sanitary	35.00 [3]
2	WESF-Pool Cell Flush and Exchangers	225-B	Source Control [2]	E-2	Sanitary	12.92
3	Cask Station	212-B	Source Control [2]	E-2	Sanitary	---
4	Emergency Well Pumps	282-B & 282-BA	Source Control [2]	E-2	Sanitary	0.11
5	221-B-Process Cells Cooling Water (Cells 5 through 39)	221-B	Source Control [2]	E-2	Sanitary	0.96
6	BCS Condenser	221-BB	Source Control [2]	E-2	Sanitary	--- [3]
7	BCS Monitor Heat Exchanger	221-BB	Source Control [2]	E-2	Sanitary	--- [3]
8	Stairwell 1, O.G. HVAC	221-B	Source Control [2]	E-2	Sanitary	0.01
						TOTAL 49.00

Source: WHC 1992a

NOTES:

[1] Source control is non-contact closed-loop cooling water.
[2] Technology transfer.
[3] Combined flow from Sources 1, 6, and 7.
gpm = gallons per minute
WESF = Waste Encapsulation Storage Facility

5.0 IF PRODUCTION PROCESSES ARE SUBJECT TO SEASONAL VARIATIONS, PROVIDE THE FOLLOWING INFORMATION. WRITE "YES" FOR EACH MONTH WASTE STREAM IS PRODUCED.

None of the six streams are subject to seasonal variations, but some of the waste streams that form the six streams are subject to operational variations, which are described in Attachment B, Section 1.

6.0 SHIFT INFORMATION

6.1 242-A EVAPORATOR COOLING WATER

a. Number of shifts per work day: 3
b. Number of work days per week: 7
c. Average number of work days per year: 365
d. Maximum number of work days per year: 365
e. Number of employees per shift:

Shift	Employees	Shift	Shift start times
1st	2	1st	7:30 am
2nd	2	2nd	3:30 pm
3rd	2	3rd	11:30 pm

6.2 242-A EVAPORATOR STEAM CONDENSATE

a. Number of shifts per work day: 3
b. Number of work days per week: 7
c. Average number of work days per year: 365
d. Maximum number of work days per year: 365
e. Number of employees per shift:

Shift	Employees	Shift	Shift start times
1st	2	1st	7:30 am
2nd	2	2nd	3:30 pm
3rd	2	3rd	11:30 pm

6.3 241-A TANK FARM COOLING WATER

a. Number of shifts per work day: 3
b. Number of work days per week: 7
c. Average number of work days per year: 365
d. Maximum number of work days per year: 365
e. Number of employees per shift:

Shift	Employees	Shift	Shift start times
1st	50	1st	7:30 am
2nd	15	2nd	3:30 pm
3rd	15	3rd	11:30 pm

Note: The first shift has 50 employees Monday through Friday and 15 employees on weekends and holidays.

6.4 244-AR VAULT COOLING WATER

a. Number of shifts per work day: 3
b. Number of work days per week: 7
c. Average number of work days per year: 365
d. Maximum number of work days per year: 365
e. Number of employees per shift: Shift start times

1st	1	1st	7:30 am
2nd	1	2nd	3:30 pm
3rd	1	3rd	11:30 pm

6.5 284-E POWER PLANT

a. Number of shifts per work day: 3
b. Number of work days per week: 7
c. Average number of work days per year: 365
d. Maximum number of work days per year: 365
e. Number of employees per shift: Shift start times

1st	7	1st	7:30 am
2nd	7	2nd	3:30 pm
3rd	7	3rd	11:30 pm

Note: Monday through Friday, excluding holidays, 11 additional employees are present in the first shift.

6.6 B PLANT COOLING WATER

a. Number of shifts per work day: 3
b. Number of work days per week: 7
c. Average number of work days per year: 365
d. Maximum number of work days per year: 365
e. Number of employees per shift: Shift start times

1st	7	1st	7:30 am
2nd	7	2nd	3:30 pm
3rd	7	3rd	11:30 pm

Note: Monday through Friday, excluding holidays, 102 additional employees are present in the first shift.

7.0 LIST ALL INCIDENTAL MATERIALS LIKE OIL, PAINT, GREASE, SOLVENTS, SOAPS, CLEANERS, THAT ARE USED OR STORED ON-SITE. (USE ADDITIONAL SHEETS IF NECESSARY)

Data for incidental materials is compiled from those items listed on the Hazardous Material Inventory Database maintained by WHC. Additionally, site checks of all material storage areas in the six facilities were conducted and any materials in containers 5 gallons or greater in size were included in the incidental materials list. Material/ Quantity stored for each waste stream area are listed below.

7.1 242-A EVAPORATOR COOLING WATER

Diesel Fuel/ 1000 gallons
Gas Mix, ARCH 4 90/10 (P-10)/470 cubic feet
Antifoam C-1/*
Antifoam B(R) Silicone Emulsion/*
Antifoam 10/*
Unspecified corrosion inhibitor/*
*Indicates none currently on site, but planned for use when facility is restarted.

7.2 242-A EVAPORATOR STEAM CONDENSATE

Diesel Fuel/ 1000 gallons
Gas Mix, ARCH 4 90/10 (P-10)/ 470 cubic feet
Antifoam C-1/*
Antifoam B(R) Silicone Emulsion/*
Antifoam 10/*
Unspecified corrosion inhibitor/*
*Indicates none currently on site, but planned for use when facility is restarted.

7.3 241-A TANK FARM COOLING WATER

Rubinate/ 55 gallons
Gas Mix, ARCH 4 90/10 (P-10)/ 470 cubic feet
Aerospray 70A Binder, American Cyanamid/ <1 gallon
Amercoat 187/ <1 gallon
BWE 3000/ 55 gallons
Dow Corning 3-5000/ 220 gallons
Isocyanate/ <1 gallon
Methynol/ 110 gallons
Polyol Resin Component B/ <1 gallon
Super Stripe Traffic Paint, Yellow TY13/ 1788 ounces
Turco Decon 4521/ 110 gallons.

7.4 244-AR VAULT COOLING WATER

Diesel Fuel/ 530 gallons
Glycol/*
*Glycol is not stored at the 244-AR Vault facility, but glycol is stored in a nearby material shed for makeup to the primary compressor glycol cooling system.

7.5 284-E POWER PLANT

Dearborn Code 267/ 2 ounces
Dearborn Code 516/ 8 ounces
Dearborn Code 519/ 40 ounces
Dearborn Code 529/ 37 ounces
Dearborn Code 533/ 1 ounce
Dearborn Code 535/ 58 ounces
Dearborn Code 552/ 32 ounces
Dearborn Code 555/ 192 ounces
Dearborn Code 567/ 117 ounces
Dearborn Code 570/ 100 ounces
Dearborn Code 571/ 16 ounces
Dearborn Code 572/ 32 ounces
Dearborn Code 575/ 184 ounces
Dearborn Code 597/ 128 ounces
Dearborn Code 602/ 1 ounce
Dearborn Code 610/ <1 ounce
Chlorine/ 1549 liters
Acetylene/ 390 cubic feet
Air/ 233 cubic feet
Argon/ 1695 cubic feet
Nitrogen/ <1 cubic foot
Oxygen/ 1410 cubic feet
Propane/ 239 cubic feet
Sodium Chloride/ 77968 liters

7.6 B PLANT COOLING WATER

See the attached list from the Hazardous Material Inventory Database operated by Westinghouse Hanford Company (WHC).

HAZARDOUS MATERIAL INVENTORY DATABASE

Report : GENERATE DATA COLLECTION FORMS

Filename : HMID222A.lis

Run by : OPS$WB1481

Report Date : 05/25/93 09:17am

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|                          |
| Parameter values         |
|                          |
| Reporting Rep Id : 122   |
|                          |
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05/25/93

HAZARDOUS MATERIAL INVENTORY DATABASE
Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: BOB GRAY

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
2728	ESHP		11236	GSI-112 ALL PURPOSE CLEANER	GSI 112 ALL PURPOSE	1	QT	PLASTIC BOTTLES OR JUGS	3773	0	QT			
			1449	PROPANE	PROPANE - TURNER	14.1	WTOZ	CYLINDER	3774	0	WTOZ			
			1449	PROPANE	PROPANE FUEL	14.1	WTOZ	CYLINDER	3772	0	WTOZ			

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HAZARDOUS MATERIAL INVENTORY DATABASE

Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: HERBERT SMITH

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
271B	ITSHP	INSTRUMENT SHOP	11621	ANTI-STATIC QUIK-FREEZE, MS-240AS	ANTI-STATIC QUICK-FR	1	LBS	CAN	323	0	LBS	____	____	____

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05/25/93

HAZARDOUS MATERIAL INVENTORY DATABASE
Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: J. WABAUNSEE

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
225B	2AHU	225B	1329	METHANOL	METHANOL	5	GAL	CAN	276	5	GAL			
			2039	PETROLEUM ETHER	PETROLEUM ETHER	5	GAL	CAN	279	.25	GAL			
			1105	SODIUM HYDROXIDE, 100%	SODIUM HYDROXIDE	5.5	LBS	BAG	281	10	LBS			
			1506	SODIUM NITRATE	SODIUM - NITRATE	32	LBS	BAG	283	15	LBS			
			20039	TAR-GON	TAR-GON	20	GAL	STEEL DRUM	293	20	GAL			
			3679	TRISODIUM PHOSPHATE DODECAHYDRATE	TRISODIUM PHOSPHATE	100	LBS	BAG	296	200	LBS			
			16360	ZERACOL	SOLVENT ALCOHOL	5	GAL	CAN	298	10	GAL			

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05/25/93

HAZARDOUS MATERIAL INVENTORY DATABASE

Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: JIM DAVIS

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
221B	SWPL	221B DECON CABINET	1445	POTASSIUM PERMANGANATE	POTASSIUM PERMANGANA	548	GRAM	GLASS BOTTLES OR JUGS	310	501	GRAM			
			2296	SODIUM BISULFITE	SODIUM BISULFITE	423	GRAM	GLASS BOTTLES OR JUGS	313	380	GRAM			
			1485	SODIUM CHLORIDE	SODIUM CHLORIDE	52	WTOZ	GLASS BOTTLES OR JUGS	318	128	WTOZ			
225B	SWPL	225B DECON CABINET	2786	EDTA DISODIUM SALT	EDTA DISODIUM SALT	159	GRAM	GLASS BOTTLES OR JUGS	308	124	GRAM			
			2786	EDTA DISODIUM SALT	EDTA DISODIUM SALT	570	GRAM	GLASS BOTTLES OR JUGS	301	510	GRAM			
			1445	POTASSIUM PERMANGANATE	POTASSIUM PERMANGATE	496	GRAM	GLASS BOTTLES OR JUGS	303	450	GRAM			
			2296	SODIUM BISULFITE	SODIUM BISULFITE	527	GRAM	GLASS BOTTLES OR JUGS	305	527	GRAM			
			1485	SODIUM CHLORIDE	SODIUM CHLORIDE	64	WTOZ	PLASTIC BOTTLES OR JUGS	3775	128	WTOZ			

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05/25/93

HAZARDOUS MATERIAL INVENTORY DATABASE
Data Collection Form

Rep Id: 122, DUPAQUIER, JAMES C.

Contact: R. BROWN

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
212B	RACK3	212B RACK	1043	ARGON	ARGON	225	CUFT	CYLINDER	289	450	CUFT			
225B	HFCTR	225B GAS HAND & FOOT	16030	GAS MIX, P-10 (ARCH4)	P-10 GAS	225	CUFT	CYLINDER	299	1800	CUFT			
225B	OPSGL	225B GAS OPER. GAL.	1390	NITROGEN	NITROGEN	225	CUFT	CYLINDER	297	225	CUFT			
225B	RACK1	225B GAS RACK	1043	ARGON	ARGON	225	CUFT	CYLINDER	291	0	CUFT			
				GAS MIX, ARH 95/5	ARGON/HYDROGEN MIX	225	CUFT	CYLINDER	292	0	CUFT			
			16030	GAS MIX, P-10 (ARCH4)	P-10 GAS	225	CUFT	CYLINDER	295	3600	CUFT			
			1390	NITROGEN	NITROGEN	225	CUFT	CYLINDER	294	2600	CUFT			
225B	RACK1	225B RACK	1608	AIR	AIR (BREATHING)	225	CUFT	CYLINDER	290	1575	CUFT			
225BC	GSIR	225B GAS BC		CHLORODIFLUOROMETHANE	FREON 22	30	LBS	CYLINDER	302	30	LBS			
				CHLORODIFLUOROMETHANE	FREON 22	125	LBS	CYLINDER	304	125	LBS			
225BC	UST1	225BC UST		DIESEL FUEL	DIESEL FUEL	1000	GAL	ABOVE GROUND TANK	306	0	GAL			
225BE	MTSHP	225B GAS SHOP	1007	ACETYLENE	ACETYLENE	10	CUFT	CYLINDER	300	0	CUFT			
271B	1AMU	271B GAS CARTS	1608	AIR	AIR (BREATHING)	225	CUFT	CYLINDER	178	900	CUFT			
271B	FRKLT	271B GAS FORK LIFT	1449	PROPANE	PROPANE	10	GAL	ABOVE GROUND TANK	175	40.9	LBS			
271B	HFCTR	271B HAND & FOOT CRT	16030	GAS MIX, P-10 (ARCH4)	P-10 GAS	225	CUFT	CYLINDER	176	3825	CUFT			

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05/25/93

HAZARDOUS MATERIAL INVENTORY DATABASE
Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: R. BROWN

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size UOM	Container Type	Base Inv Id	Previous Quantity UOM	Qty	UOM	Qty Used
2718	PSHP	2718 GAS SHOP		CHLORODIFLUOROMETHANE	FREON 22	30 LBS	CYLINDER	274	0 LBS	____	____	____
			1236	DICHLORODIFLUOROMETHANE	FREON 12	14 WTOZ	CAN	278	168 WTOZ	____	____	____
			1236	DICHLORODIFLUOROMETHANE	FREON 12	30 LBS	CYLINDER	277	60 LBS	____	____	____
			16030	GAS MIX, P-10 (ARCH4)	P-10 GAS	225 CUFT	CYLINDER	275	450 CUFT	____	____	____
2718	PSHP	2718 WIRE WELDER	1043	ARGON	ARGON	225 CUFT	CYLINDER	288	0 CUFT	____	____	____
			16034	GAS MIX, ARCO2 75/25	ARGON/CO2 MIX 75/25	225 CUFT	CYLINDER	287	0 CUFT	____	____	____
2718	PSHP	PORT. WELDER - ELECT	1043	ARGON	ARGON	225 CUFT	CYLINDER	179	0 CUFT	____	____	____
2718	PSHP	PORT. WELDER - GAS	1007	ACETYLENE	ACETYLENE	230 CUFT	CYLINDER	180	230 CUFT	____	____	____
			1043	ARGON	ARGON	225 CUFT	CYLINDER	182	225 CUFT	____	____	____
2718	PSHP	PORT. WELDER-GAS	1406	OXYGEN	OXYGEN	225 CUFT	CYLINDER	183	225 CUFT	____	____	____
2718	R13	2718 GAS R-13	1449	PROPANE	PROPANE (LARGE TNK)	500 GAL	ABOVE GROUND TANK	284	602.5 LBS	____	____	____
			1449	PROPANE	PROPANE (SMALL TNK)	5 GAL	ABOVE GROUND TANK	282	5 GAL	____	____	____
			1449	PROPANE	PROPANE (SMALL TNK)	10 GAL	ABOVE GROUND TANK	280	10 GAL	____	____	____

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HAZARDOUS MATERIAL INVENTORY DATABASE

Data Collection Form

Rep Id: 122, DUPAQUIER, JAMES C.

Contact: R. BROWN

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
2718	RACK2	2718 GAS RACK	1007	ACETYLENE	ACETYLENE	10	CUFT	CYLINDER	189	30	CUFT	___	___	___
									270	10	CUFT	___	___	___
			1007	ACETYLENE	ACETYLENE	40	CUFT	CYLINDER	188	200	CUFT	___	___	___
			1007	ACETYLENE	ACETYLENE	230	CUFT	CYLINDER	185	690	CUFT	___	___	___
			1608	AIR	AIR (BREATHING)	225	CUFT	CYLINDER	186	1800	CUFT	___	___	___
			1043	ARGON	ARGON	225	CUFT	CYLINDER	187	1350	CUFT	___	___	___
			1095	CARBON DIOXIDE	CARBON DIOXIDE	225	CUFT	CYLINDER	191	450	CUFT	___	___	___
			16034	GAS MIX, ARCO2 75/25	ARGON/CO2-MIX ARCO	225	CUFT	CYLINDER	190	450	CUFT	___	___	___
			16030	GAS MIX, P-10 (ARCH4)	P-10 GAS	225	CUFT	CYLINDER	194	1575	CUFT	___	___	___
			1390	NITROGEN	NITROGEN	225	CUFT	CYLINDER	192	225	CUFT	___	___	___
			1406	OXYGEN	OXYGEN	225	CUFT	CYLINDER	193	2025	CUFT	___	___	___
			1449	PROPANE	PROPANE	5	GAL	CYLINDER	197	10	GAL	___	___	___
			1449	PROPANE	PROPANE	10	GAL	CYLINDER	196	10	GAL	___	___	___
			1449	PROPANE	PROPANE	14	WTOZ	CYLINDER	198	336	WTOZ	___	___	___
2718	RACK4	GAS BURNING CART	1007	ACETYLENE		230	CUFT	CYLINDER	173	230	CUFT	___	___	___
			1406	OXYGEN		225	CUFT	CYLINDER	174	225	CUFT	___	___	___
282B	T282B	225B TANK 282B		DIESEL FUEL	DIESEL FUEL	200	GAL	ABOVE GROUND TANK	309	150	GAL	___	___	___
282BA	T828A	225 B TANK 282 BA		DIESEL FUEL	DIESEL FUEL	250	GAL	ABOVE GROUND TANK	307	187.5	GAL	___	___	___

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HAZARDOUS MATERIAL INVENTORY DATABASE
Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: S. J. VERMEULEN

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
211B	CCMIF	TANK 101	1384	NITRIC ACID, 57%	NITRIC ACID 57%		GAL	ABOVE GROUND TANK	404	0	GAL			
211B	CCMIF	TANK 102	1384	NITRIC ACID, 57%	NITRIC ACID 57%		GAL	ABOVE GROUND TANK	406	200	GAL			
211B	CCMIF	TANK 103	1384	NITRIC ACID, 57%	NITRIC ACID 57%		GAL	ABOVE GROUND TANK	407	0	GAL			
211B	CCMIF	TANK 121	2881	ALUMINUM NITRATE NONAHYDRATE, 50%			GAL	ABOVE GROUND TANK	387	7600	GAL			
211B	CCMIF	TANK 122	2881	ALUMINUM NITRATE NONAHYDRATE, 50%			GAL	ABOVE GROUND TANK	389	7600	GAL			
211B	CCMIF	TANK 125	1206	EDTA, 39%	EDTA 39%		GAL	ABOVE GROUND TANK	396	4000	GAL			
211B	CCMIF	TANK 126	2881	ALUMINUM NITRATE NONAHYDRATE, 50%			GAL	ABOVE GROUND TANK	391	0	GAL			
211B	CCMIF	TANK 127	3342	HEDTA, 41%	HEDTA 41%		GAL	ABOVE GROUND TANK	398	350	GAL			
211B	CCMIF	TANK 128	2881	ALUMINUM NITRATE NONAHYDRATE, 50%			GAL	ABOVE GROUND TANK	393	0	GAL			
211B	CCMIF	TANK 131	3342	HEDTA, 41%	HEDTA 41%		GAL	ABOVE GROUND TANK	399	0	GAL			
211B	CCMIF	TANK 132	3342	HEDTA, 41%	HEDTA 41%		GAL	ABOVE GROUND TANK	400	560	GAL			

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HAZARDOUS MATERIAL INVENTORY DATABASE

Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: S. J. VERMEULEN

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
211B	CCMTF	TANK 133	3342	HEDTA, 41%	HEDTA 41%		GAL	ABOVE GROUND TANK	401	3400	GAL			
211B	CCMTF	TANK 141	1105	SODIUM HYDROXIDE, 50%	SODIUM HYDROXIDE 50%		GAL	ABOVE GROUND TANK	412	250	GAL			
211B	CCMTF	TANK 142	1105	SODIUM HYDROXIDE, 50%	SODIUM HYDROXIDE 50%		GAL	ABOVE GROUND TANK	415	250	GAL			
211B	CCMTF	TANK 143	1105	SODIUM HYDROXIDE, 50%	SODIUM HYDROXIDE 50%		GAL	ABOVE GROUND TANK	417	13000	GAL			
212B	GSTR	212B	18237	CLEAN UP IV	CLEANUP IV		LBS	BAG	371	400	LBS			
217B	GSTR	DEMINERALIZER	1529	SULFURIC ACID, 93%	SULFURIC ACID, 93%	55	GAL	NON METALLIC DRUM	370	220	GAL			
2258E	NS	NORTHSIDE/FLAM CABS	18237	CLEAN UP IV	CLEANUP IV	5	GAL	CAN	445	25	GAL			
2715B	PTSTR	PAINT STORAGE	18237	CLEAN UP IV	CLEANUP IV	5	GAL	BAG	443	25	GAL			
271B	1AMU	SW CORNER	18237	CLEAN UP IV	CLEANUP IV	5	GAL	CAN	439	25	GAL			

HMID222A

HAZARDOUS MATERIAL INVENTORY DATABASE
Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: S. J. VERMEULEN

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
2718	3AMU	3RD FLOOR AMU	13446	ND-165, NATIONAL CHEMSEARCH	ND 165	35	GAL	STEEL DRUM	447	35	GAL			
			1384	NITRIC ACID, 57%	NITRIC ACIT 57%	55	GAL	NON METALLIC DRUM	448	55	GAL			
			2147	SILICA	SILICA/CELITE	100	LBS	BAG	449	100	LBS			
			1484	SODA ASH	SODA ASH	100	LBS	BAG	451	4200	LBS			
			1480	SODIUM BICARBONATE	SODIUM BICARBONATE	100	LBS	BAG	452	2100	LBS			
				SODIUM BIPHOSPHATE	MONOSODIUM PHOSPHATE	100	LBS	BAG	453	100	LBS			
			1105	SODIUM HYDROXIDE, 100%	SODIUM HYDROXIDE 100	100	LBS	NON METALLIC DRUM	455	100	LBS			
			1105	SODIUM HYDROXIDE, 100%	SODIUM HYDROXIDE 100	50	LBS	BAG	456	2150	LBS			
			1495	SODIUM NITRITE	SODIUM NITRATE	100	LBS	BAG	459	1000	LBS			
			1495	SODIUM NITRITE	SODIUM NITRATE	100	LBS	OTHER	458	55	GAL			
			12327	SS-25 DEGREASER	SS - 25	35	GAL	NON METALLIC DRUM	460	0	GAL			
			1623	SULFAMIC ACID	SCALE CLEAN	300	LBS	NON METALLIC DRUM	462	900	LBS			
			3679	TRISODIUM PHOSPHATE DODECAHYDRATE	TRISODIUM PHOSPHATE	55	GAL	NON METALLIC DRUM	464	55	GAL			
			13365	WEDAC	WEDAC	55	GAL	STEEL DRUM	465	55	GAL			
2718	CONEX	2268 CONEX BOX	18237	CLEAN UP IV	CLEANUP IV		LBS	BAG	437	2050	LBS			
2718	DOOR9	OUTSIDE DOOR 9	18237	CLEAN UP IV	CLEANUP IV	5	GAL	CAN	441	25	GAL			
2718	OPSGL	CELL 24	1105	SODIUM HYDROXIDE, 50%	SODIUM HYDROXIDE 50%	400	GAL	ABOVE GROUND TANK	377	0	GAL			

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HAZARDOUS MATERIAL INVENTORY DATABASE
Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: S. VERMEULEN

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
2118A	GSTR	2118A	1480	SODIUM BICARBONATE	SODIUM BICARBONATE	5	GAL	PLASTIC BOTTLES OR JUGS	355	5	GAL	____	____	____
				SODIUM BIPHOSPHATE	SODIUM BIPHOSPHATE	5	GAL	BAG	360	5	GAL	____	____	____
			1105	SODIUM HYDROXIDE, 50%	SULFURIC ACID,50%	200	GAL	ABOVE GROUND TANK	350	73.7	GAL	____	____	____
			1529	SULFURIC ACID, 93%	SULFURIC ACID,93%	200	GAL	NON METALLIC DRUM	345	123.1	GAL	____	____	____

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HAZARDOUS MATERIAL INVENTORY DATABASE
Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: SHAARON VERMEULEN

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
2718	1AMU	2718 CAGE AREA	23942	CHEMSEARCH OV-CARE AEROSOL	OV-CARE	16	WTOZ	CAN	312	1968	WTOZ			
2718	3AMU	2718 3RD FLOOR AMU	1019	ALUMINA	ALUMINA ACTIVATED	60	LBS	STEEL DRUM	3760	60	LBS			
			1019	ALUMINA	ALUMINA ACTIVATED	100	LBS	STEEL DRUM	3759	500	LBS			
			1019	ALUMINA	SLUMINA ACTIVATED	200	LBS	STEEL DRUM	3757	400	LBS			
			14175	DOWFROST HEAT TRANSFER FLUID	DOWFORST TRANSFER FD	55	GAL	STEEL DRUM	3758	55	GAL			
			1105	SODIUM HYDROXIDE, 100%	SODIUM HYDROXIDE	55	GAL	STEEL DRUM	3754	110	GAL			
2718	3AMU	2718 THIRD FLOOR AMU	1019	ALUMINA	ALUMINA ACTIVATED	160	LBS	STEEL DRUM	3801	160	LBS			

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HAZARDOUS MATERIAL INVENTORY DATABASE
Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: SHAARON VERMUELEN

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
2718	1AMU	2718 CAGE	13456	CHEMSEARCH SS-80	SS-80	20	WTOZ	CAN	324	0	WTOZ			
			14606	FLASH AEROSOL	FLASH FOAM CLEANSER	18	WTOZ	CAN	317	378	WTOZ			
			14954	GLISTEN AEROSOL	GLISTEN GLASS CLNR	18	WTOZ	CAN	319	216	WTOZ			
			16280	HANG TUFF	HANG TUFF CLEANER	32	WTOZ	CAN	320	1600	WTOZ			
			14305	NU-CONCEPT	NU CONCEPT BOWL CLNR	32	WTOZ	CAN	322	2496	WTOZ			
			14506	RADCON SURFACE CLEANER	RAD CON	18	WTOZ	CAN	315	108	WTOZ			
2718	1AMU	2718 CAGE FLAM.CAB.	2960	UNLEADED GASOLINE	UNLEADED GAS	3	GAL	CAN	326	3	GAL			
2718	1AMU	2718 FLAMMABLE CAB.	1005	ACETONE	ACETONE	1	QT	CAN	331	0	QT			
			1146	CYCLOHEXANONE	RETARDER/ THINNER	1	GAL	PLASTIC BOTTLES OR JUGS	335	0	GAL			
			13373	WIPE OUT	WIPE OUT	24	WTOZ	CAN	334	48	WTOZ			

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HAZARDOUS MATERIAL INVENTORY DATABASE
Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: SHAARON VERMUELEN

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
2718	3AMU	2718 3RD FLOOR AMU	2881	ALUMINUM NITRATE NONAHYDRATE, 50%	ANN	55	GAL	NON METALLIC DRUM	339	55	GAL			
			14608	CHEMSEARCH CONCENTRATE 0060		2.5	GAL	PLASTIC BOTTLES OR JUGS	340	27.5	GAL			
			2884	CITRIC ACID	CITRIC ACID	100	LBS	BAG	342	2500	LBS			
			18237	CLEAN UP IV	CLEANUP IV	35	GAL	STEEL DRUM	3752	35	GAL			
			18237	CLEAN UP IV	CLEAN UP IV	50	LBS	BAG	3753	1000	LBS			
			10770	DEARCIDE 730 (14-730)	DEARCIDE 730	45	LBS	OTHER	348	90	LBS			
			13567	FC-206CE LIGHT WATER AQUEOUS FILM	LIGHT WATER	55	GAL	NON METALLIC DRUM	351	110	GAL			
			17179	GRENADIER	GRENADIER	2.5	GAL	PLASTIC BOTTLES OR JUGS	346	45	GAL			
			11702	ND-150 CLEANER	ND-150	2.5	GAL	PLASTIC BOTTLES OR JUGS	356	45	GAL			
			11702	ND-150 CLEANER	ND-150	35	GAL	PLASTIC BOTTLES OR JUGS	354	0	GAL			

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HAZARDOUS MATERIAL INVENTORY DATABASE
Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: TOM WOOD

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
2718	ITSHP	INSTRUMENT SHOP	10801	DETSOL RTU	DETSOL TRU	32	WTOZ	PLASTIC BOTTLES OR JUGS	3765	32	WTOZ	___	___	___
			1078	N-BUTYL ALCOHOL	BUTYL-ALCOHOL		WTOZ	GLASS BOTTLES OR JUGS	3762	0	WTOZ	___	___	___
2718	ITSHP		16280	HANG TUFF	HANG TUFF	32	WTOZ	CAN	3771	32	WTOZ	___	___	___
			11717	NEVER-SEEZ (AEROSOL)	NEVER SEEZ	8	WTOZ	AEROSOL CAN	3766	8	WTOZ	___	___	___
			1790	POTASSIUM CHLORIDE	POTASSIUM CHLORIDE	6	WTOZ	GLASS BOTTLES OR JUGS	3764	6	WTOZ	___	___	___
			1790	POTASSIUM CHLORIDE	POTASSIUM CHLORIDE	16	WTOZ	GLASS BOTTLES OR JUGS	3763	16	WTOZ	___	___	___
			14369	SSS GLASS CLEANER	SSS GLASS CLEANER	19	WTOZ	AEROSOL CAN	3770	38	WTOZ	___	___	___
				STATICIDE	STATICIDE - REGULAR	1	GAL	PLASTIC BOTTLES OR JUGS	3769	1	GAL	___	___	___
			12696	WISSN CONTACT CLEANER	WISSN CONTACT CLEANR	6	WTOZ	AEROSOL CAN	3767	6	WTOZ	___	___	___
			12749	ZEP RUST REMOVER	ZEP RUST REMOVER	1	GAL	PLASTIC BOTTLES OR JUGS	3768	0	GAL	___	___	___

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HAZARDOUS MATERIAL INVENTORY DATABASE

Data Collection Form

Rep Id: 122 , DUPAQUIER, JAMES C.

Contact: STAN JONES

Facility	Rep Loc	Detailed Location	MSDS	Name	Local Name	Cntnr Size	UOM	Container Type	Base Inv Id	Previous Quantity	UOM	Qty	UOM	Qty Used
271B	TCRIB	TOOL CRIB 1 AMU	1279	ISOPROPYL ALCOHOL		1	GAL	PLASTIC BOTTLES OR JUGS	3781	1	GAL	____	____	____
			12674	WELD-ON P-70 PRIMER	WELD ON P70	16	WTOZ	CAN	3780	48	WTOZ	____	____	____
272BB	INSHP	INSULATORS		ARABOL EMULSION ADHESIVE	ARABOL	5	GAL	CAN	328	75	GAL	____	____	____
			21930	SEALFAS G-P-M MASTIC	FOSTER 35-00	5	GAL	CAN	333	10	GAL	____	____	____
			1784	SODIUM SILICATE	SODIUM SILICATE	5	GAL	CAN	330	3	GAL	____	____	____

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HAZARDOUS MATERIAL INVENTORY DATABASE

GENERATE DATA COLLECTION FORMS

End of Report

8.0 DESCRIBE ANY WATER RECYCLING OR MATERIAL RECLAIMING PROCESSES.

There are presently no water recycling or material reclaiming processes related to any of the six facility waste streams.

9.0 DOES THIS FACILITY HAVE:

Spill Control and Containment Plan (per 40 CFR 112)	_ Yes	X No
Emergency Response Plan (per WAC 173-303-350)	X Yes	_ No
Runoff, spillage, or leak control plan (per WAC 173-216-110(f))	X Yes	_ No

Notes:

- This response applies to all six facilities.
- A Spill Control and Containment Plan (per 40 CFR 112) is being developed for the 200 Areas at this time by WHC.

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APPENDIX D

WATER CONSUMPTION AND WATER LOSS

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CONTENTS

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1.0 WATER SOURCE(S)

1.1 242-A EVAPORATOR COOLING WATER

__ Public System (Specify) ________________________________

__ Private Well _X_ Surface Water

a. Water Right Permit Number:

None ______________________

b. Legal Description:
_SW_ 1/4S, _SW_ 1/4S, _2_ Section, _13N_ TWN, _25E_ R

1.2 242-A EVAPORATOR STEAM CONDENSATE

__ Public System (Specify) ________________________________

__ Private Well _X_ Surface Water

a. Water Right Permit Number:

None ______________________

b. Legal Description:
_SW_ 1/4S, _SW_ 1/4S, _2_ Section, _13N_ TWN, _25E_ R

1.3 241-A TANK FARM COOLING WATER

__ Public System (Specify) ________________________________

_X_ Private Well _X_ Surface Water

a. Water Right Permit Number:

None ______________________

b. Legal Description: Surface Water
_SW_ 1/4S, _SW_ 1/4S, _2_ Section, _13N_ TWN, _25E_ R

Legal Description: Private Well
_SE_ 1/4S, _NE_ 1/4S, _2_ Section, _12N_ TWN, _26E_ R

1.4 244-AR VAULT COOLING WATER

__ Public System (Specify) ______________________________

__ Private Well   X Surface Water

a. Water Right Permit Number:

None

b. Legal Description: Surface Water
SW 1/4S, SW 1/4S, 2 Section, 13N TWN, 25E R

1.5 284-E POWER PLANT

__ Public System (Specify) ______________________________

__ Private Well   X Surface Water

a. Water Right Permit Number:

None

b. Legal Description:
SW 1/4S, SW 1/4S, 2 Section, 13N TWN, 25E R

1.6 B PLANT COOLING WATER

__ Public System (Specify) ______________________________

X Private Well   X Surface Water

a. Water Right Permit Number:

None

b. Legal Description: Surface Water
SW 1/4S, SW 1/4S, 2 Section, 13N TWN, 25E R

Legal Description: Private Well
SE 1/4S, NE 1/4S, 3 Section, 12N TWN, 26E R

2.0 WATER USE:

The water use calculations are based on data extracted from WHC 1992a. The maximum water usage was calculated by summing all of the flows described in Sections 1.1 through 1.6 in Appendix B. Average flows were calculated using the flow data presented in Tables B-2 through B-7 in Sections 1.1 through 1.6 of Appendix B. All water usage quantities are rounded to the nearest 100 gallons per day. Maximum water usage for the 284-E Power Plant is calculated by summing the maximum flows from substreams 2 through 8B and adding 3,000,000 gallons of flow per day for the reservoir overflow (Source 1) which represents the total capacity of the reservoir.

2.1 242-A EVAPORATOR COOLING WATER

a. Indicate total water use: Gallons per day (average): 590,400
Gallons per day (maximum): 5,282,000

b. Is water metered? X Yes __ No

Note: Water is metered on outflow waste stream not inflow of raw water.

2.2 242-A EVAPORATOR STEAM CONDENSATE

a. Indicate total water use: Gallons per day (average): 51,000
Gallons per day (maximum): 101,000

b. Is water metered? X Yes __ No

Note: Water is metered on outflow waste stream not inflow of raw water.

2.3 241-A TANK FARM COOLING WATER

a. Indicate total water use: Gallons per day (average): 878,400
Gallons per day (maximum): 892,800

b. Is water metered? X Yes __ No

Note: Water is metered on outflow waste stream not inflow of raw water.

2.4 244-AR VAULT COOLING WATER

a. Indicate total water use: Gallons per day (average): 23,400
Gallons per day (maximum): 126,800

b. Is water metered? _X_ Yes ___ No

Note: Water is metered on outflow waste stream not inflow of raw water.

2.5 284-E POWER PLANT

a. Indicate total water use: Gallons per day (average): 158,400
Gallons per day (maximum): 6,605,700

b. Is water metered? ___ Yes _X_ No

2.6 B PLANT COOLING WATER

a. Indicate total water use: Gallons per day (average): 1,872,000
Gallons per day (maximum): 4,413,600

b. Is water metered? _X_ Yes ___ No

Note: Water is metered on outflow waste stream not inflow of raw water.

3.0 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 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.

Schematic flow diagrams from the *Phase II Liquid Effluent Program (Project W-252) Waste water Engineering Report and BAT/AKART Studies* (WHC 1992a) for each of the six waste streams are presented in Appendix B, Section 1.0. Because inflow water to the six waste stream facilities is not metered, a complete water balance cannot be determined. Outflow rates for each component of the six waste streams are presented on the schematic flow diagrams and the on tables in Appendix B, Section 1.0. The schematic flow diagrams and tables, with corresponding page numbers, that relate to each waste stream are listed below:

WASTE STREAM CONTAINING	SCHEMATIC FLOW DIAGRAM	TABLE OUTFLOW RATES
242-A Evaporator Cooling Water	Figure B-3, page B-9	Table B-2, page B-12
242-A Evaporator Steam Condensate	Figure B-6, page B-16	Table B-3, page B-19
241-A Tank Farm Cooling Water	Figure B-11, page B-26	Table B-4, page B-29
244-AR Vault Cooling Water	Figure B-17, page B-40	Table B-5, page B-43
284-E Power Plant	Figure B-22, page B-52	Table B-6, page B-55
B Plant Cooling Water	Figure B-27, page B-63	Table B-7, page B-66

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APPENDIX E

WASTEWATER INFORMATION

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CONTENTS

TABLES

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1.0 PROVIDE MEASUREMENTS 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 CODE OF FEDERAL REGULATIONS (CFR) PART 136.

Waste water analytical data summaries for the 241-A Tank Farm Cooling Water and the 244-AR Vault Cooling Water are included from the validated round one sampling results, which were obtained in accordance with the approved sampling and analysis plans for these waste water streams (WHC 1992b and WHC 1992c). For the remaining four streams, validated data from implementation of the approved sampling and analysis plans was not available at the time this document was prepared, so data from the *Phase II Liquid Effluent Program (Project W-252) Waste Water Engineering Report and BAT/AKART Studies* (WHC 1992a) is included for the 242-A Evaporator Cooling Water, 242-A Evaporator Steam Condensate, 284-E Power Plant Waste Water, and B Plant Cooling Water Streams.

Table E-1. Summary of Analytical Results for 242-A Evaporator Cooling Water

Parameter/CAS No.	Concentrations Measured (μg/L)(1)	Analytical Method	Detection Limit (μg/L)
pH (pH units)	6.2 and 8.04	pH-Fld	NP
Conductivity (μmhos)	165	COND-Fld	NP
Total Dissolved Solids	76,000	SM-208B	5,000
Total Suspended Solids	NA	NA	NA
BOD (5 day)	NA	NA	NA
COD	NA	NA	NA
Ammonia-N	63	ASTM (1986)	50
TKN-N	NA	NA	NA
Nitrate-N	1,190	IC	500
Ortho-phosphate-P	NA	NA	NA
Total-phosphate-P	1,000	IC	1,000
Total Oil & Grease	NA	NA	NA
Calcium/7440-70-2	19,300	ICP	50
Magnesium/7439-95-4	4,540	ICP	50
Sodium/7440-23-5	2,350	ICP	200
Potassium/7440-09-7	801	ICP	100
Chloride	1,100	IC	500
Sulfate	10,500	IC	500
Fluoride	450	IC	NR
Cadmium/7440-43-9	ND	ICP	2
Chromium/7440-49-3	10.4	ICP	10
Lead/7439-92-1	12.6	USEPA, #7421	5
Mercury/7439-97-6	0.105	USEPA, #7470	0.1
Selenium/7782-49-2	5	USEPA, #7740	5
Silver/7440-22-4	10	ICP	10
Copper/7440-50-8	73.6	ICP	10
Iron/7439-89-6	104	ICP	30
Manganese	14.2	ICP	5
Zinc/7440-66-6	47.8	ICP	5
Barium/7440-39-3	31.2	ICP	6
Total Coliform	NA	NA	NA

Source - WHC 1992a

NA - Not Analyzed
ND - Not detected at the reported detection limit
NP - Not Provided
NR - Not Reported
ICP - Inductively coupled plasma, USEPA-6010
IC - Ion Chromatography, EPA-600/4-84-01
Fld - Field Measurement

(1)Three sets of data are provided in (WHC 1992a) since there are three different sampling sites associated with the 242-A Evaporator Cooling Water Stream. The value reported in the "Concentrations Measured" column is the highest value reported of the three respective sampling sites, with the exception of the value for pH. The pH results for two of the three sampling sites was 6.02 and the pH for the third sampling site was 8.02.

Table E-2. Summary of Analytical Results for 242-A Evaporator Steam Condensate

Parameter/CAS No.	Concentrations Measured (μg/L)(3)	Analytical Method	Detection Limit (μg/L)
pH (pH units)	8.04	pH-Fld	NP
Conductivity (μmhos)	165	COND-Fld	NP
Total Dissolved Solids	76,000	SM-208B	5,000
Total Suspended Solids	NA	NA	NA
BOD (5 day)	NA	NA	NA
COD	NA	NA	NA
Ammonia-N	63	ASTM (1986)	50
TKN-N	NA	NA	NA
Nitrate-N	550	IC	500
Ortho-phosphate-P	NA	NA	NA
Total-phosphate-P	ND	IC	330
Total Oil & Grease	NA	NA	NA
Calcium/7440-70-2	19,300	ICP	50
Magnesium/7439-95-4	4,540	ICP	50
Sodium/7440-23-5	2200	ICP	200
Potassium/7440-09-7	750	ICP	100
Chloride	1,100	IC	500
Sulfate	10,500	IC	500
Fluoride(2)	129	ISE	NR
Cadmium/7440-43-9(1)	0.17	ICP	5
Chromium/7440-49-3	ND	ICP	10
Lead/7439-92-1	5.5	USEPA, #7421	2
Mercury/7439-97-6	0.105	USEPA, #7470	0.1
Selenium/7782-49-2(2)	1.7	USEPA, #7740	2
Silver/7440-22-4(2)	3.3	ICP	10
Copper/7440-50-8	11	ICP	10
Iron/7439-89-6	84	ICP	30
Manganese	14.2	ICP	5
Zinc/7440-66-6	18.7	ICP	5
Barium/7440-39-3	31.2	ICP	6
Total Coliform	NA	NA	NA

Source - WHC 1992a

NA - Not Analyzed
ND - Not detected at the reported detection limit
NP - Not Provided
NR - Not Reported
ICP - Inductively coupled plasma, USEPA-6010
IC - Ion Chromatography, EPA-600/4-84-01
ISE - Fluoride-Low Detection Limit, ASTM-D1179-80-B
Fld - Field Measurement

(1)The reported result for cadmium, 0.17 μg/L, is significantly below the method detection limit of 5 μg/L. An explanation is not provided for this discrepancy in (WHC 1992a).

(2)The reported results for fluoride, selenium, and silver are also below the associated method detection limits. Therefore, the results for these three analytes may be considered estimated, and are most likely usable results.

(3)The values reported in the "Concentrations Measured" column in the table above were obtained from the baseline characteristics of this stream provided in (WHC 1992a), Appendix B.7, Table 2-2.

Table E-3. Summary of Analytical Results for 241-A Tank Farm Cooling Water.

Parameter/CAS No.	Concentrations Measured [1]	Analytical Method	Detection Limit
pH (pH units)	8	SW-846[2], 9040	0.1
Conductivity (µmhos/cm)	139	SW-846[2], 9050	6
Total Dissolved Solids (mg/L)	93	EPA[3], 160.1	5
Total Suspended Solids (mg/L)	ND	EPA[3], 160.2	5
BOD (5 day)	NA	NA	NA
COD (mg/L)	ND	EPA[3], 410.1	5
Ammonia-N (mg/L)	ND	EPA[3], 350.2	0.1
TKN-N	NA	NA	NA
Nitrate+Nitrite-N[4] (mg-N/L)	0.25	EPA, 353.3	0.1
Ortho-phosphate-P	NA	NA	NA
Total-phosphate-P (mg/L)	0.052	EPA[3], 365.2	0.020
Total Oil & Grease (mg/L)	ND	EPA[3], 413.2	5
Calcium/7440-70-2 (µg/L)	21300	SW-846[2], 6010	50
Magnesium/7439-95-4 (µg/L)	5145	SW-846[2], 6010	50
Sodium/7440-23-5 (µg/L)	2090	SW-846[2], 6010	200
Potassium/7440-09-7 (µg/L)	ND	SW-846[2], 6010	877
Chloride (mg/L)	1.15	EPA[3], 300.0	0.25
Sulfate	NA	NA	NA
Fluoride (mg/L)	ND	EPA[3], 300.0	0.5
Cadmium/7440-43-9 (µg/L)	ND	SW-846[2], 6010	4
Chromium/7440-49-3 (µg/L)	ND	SW-846[2], 6010	7
Lead/7439-92-1 (µg/L)	4.1	SW-846[2], 7421	2
Mercury/7439-97-6 (µg/L)	ND	SW-846[2], 7470	0.1
Selenium/7782-49-2 (µg/L)	ND	SW-846[2], 7740	2
Silver/7440-22-4 (µg/L)	ND	SW-846[2], 6010	7
Copper/7440-50-8 (µg/L)	ND	SW-846[2], 6010	9
Iron/7439-89-6 (µg/L)	ND	SW-846[2], 6010	10
Manganese (µg/L)	3.4	SW-846[2], 6010	2
Zinc/7440-66-6 (µg/L)	ND	SW-846[2], 6010	8
Barium/7440-39-3 (µg/L)	ND	SW-846[2], 6010	5
Total Coliform	NA	NA	NA

Source - Validate results from Round 1 Sampling in accordance with WHC 1992b.

NA - Not Analyzed
ND - Not detected at the reported detection limit

[1]The value reported in the Concentration Measured column is the mean of the associated concentrations in samples B08777 and B08778 which were collected from the 241-A Tank Farm Warm Water Sump.

[2]EPA 1986, *Test Methods for Evaluating Solid Waste (SW-846)*, Third Edition, United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.

[3]EPA 1979, *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020, United States Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.

[4]Nitrate + nitrite-N was reported in place of nitrate-N since the nitrate-N analysis was not performed by the laboratory.

Table E-4. Positive Sample Results for 241-A Tank Farm Cooling Water.

HEIS NO:		B08778	B08777
DATE COLLECTED:		03/03/93	03/03/93
LOCATION:		241-A Tank Farm Warm Water Sump	241-A Tank Farm Warm Water Sump
ANALYSIS	COMPOUND OR ANALYTE	RESULT	RESULT
METALS	Calcium (µg/L)	20900	21700
	Lead (µg/L)	4.4	3.8
	Magnesium (µg/L)	5040	5250
	Manganese (µg/L)	3.2	3.6
	Sodium (µg/L)	2040	2140
GENERAL CHEMISTRY	Chloride (mg/L)	1.2	1.1
	Nitrate+Nitrite-N (mg-N/L)	0.25	0.24
	Total Organic Carbon (mg/L)	0.89	0.89
	pH (pH units)	7.9	8
	Phosphate, as P (mg/L)	0.058	0.046
	Specific Conductance (µmhos/cm)	146	131
	Total Dissolved Solids (mg/L)	86	99
	Total Organic Halides (µg/L)	ND[1]	29
ORGANOPHOSPHATE PESTICIDES	Monocrotophos (µg/L)	ND[2]	4.8
RADIOCHEMISTRY	Gross Beta (pCi/L)	2.5	2.2
	Americium-241 (pCi/L)	ND[3]	0.089

Source - Validated results from Round 1 Sampling in Accordance with WHC 1992b.

ND[1] - Not Detected at a detection limit of 20 µg/L
ND[2] - Not Detected at a detection limit of 1 µg/L
ND[3] - Not Detected at a detection limit of 0.07 pCi/L

Stream Sample Evaluation

A total of four samples per year are scheduled to be collected from the 241-A Tank Farm Cooling Stream for two consecutive years (WHC 1992b). According to the *241-A Tank Farm Cooling Water Sampling and Analysis Plan*, (WHC 1992b), the four samples collected each year consist of two samples collected under normal operation (raw cooling water), and two collected during emergency cooling water system operation.

The samples collected to date, HEIS Nos. B08777, B08778, and B08779 (raw water), were analyzed and validated results reported for all of the parameters required by the associated Sampling and Analysis Plan, as listed below.

- Volatile Organics
- Semivolatile Organics
- Pesticides/PCBs
- Orthophosphate Pesticides
- Herbicides
- Metals
- General Chemistry (not required for sample B08779)
- Radiochemistry (not required for sample B08779)

All associated sample results for samples B08777 and B08778 were undetected with the exception of the compounds or analytes included in Table E-4 (stream samples only).

Table E-5. Summary of Analytical Results for 244-AR Vault Cooling Water.

Parameter/CAS No.	Concentrations Measured[1]	Analytical Method	Detection Limit
pH (pH units)	8	SW-846[2], 9040	0.1
Conductivity (µmhos/cm)	146	SW-846[2], 9050	6
Total Dissolved Solids (mg/L)	90	EPA[3], 160.1	5
Total Suspended Solids (mg/L)	ND	EPA[3], 160.2	5
BOD (5 day)	NA	NA	NA
COD (mg/L)	ND	EPA[3], 410.1	5
Ammonia-N (mg/L)	ND	EPA[3], 350.2	0.1
TKN-N	NA	NA	NA
Nitrate+Nitrate-N[4] (mg-N/L)	0.23	EPA[3], 353.3	0.1
Ortho-phosphate-P	NA	NA	NA
Total-phosphate-P (mg/L)	0.033	EPA[3], 365.2	0.020
Total Oil & Grease (mg/L)	ND	EPA[3], 413.2	5
Calcium/7440-70-2 (µg/L)	22100	SW-846[2], 6010	50
Magnesium/7439-95-4 (µg/L)	2900	SW-846[2], 6010	50
Sodium/7440-23-5 (µg/L)	2720	SW-846[2], 6010	200
Potassium/7440-09-7 (µg/L)	ND	SW-846[2], 6010	877
Chloride (mg/L)	1.9	EPA[3], 300.0	0.25
Sulfate	NA	NA	NA
Fluoride (mg/L)	ND	EPA[3], 300.0	0.5
Cadmium/7440-43-9 (µg/L)	ND	EPA[3], 300.0	4
Chromium/7440-49-3 (µg/L)	ND	SW-846[2], 6010	7
Lead/7439-92-1 (µg/L)	ND	SW-846[2], 7421	2
Mercury/7439-97-6 (µg/L)	ND	SW-846[2], 7470	0.1
Selenium/7782-49-2 (µg/L)	ND	SW-846[2], 7740	2
Silver/7440-22-4 (µg/L)	ND	SW-846[2], 6010	7
Copper/7440-50-8 (µg/L)	19.2	SW-846[2], 6010	10
Iron/7439-89-6 (µg/L)	ND	SW-846[2], 6010	10
Manganese (µg/L)	7.1	SW-846[2], 6010	2
Zinc/7440-66-6 (µg/L)	55	SW-846[2], 6010	8
Barium/7440-39-3 (µg/L)	ND	SW-846[2], 6010	5
Total Coliform	NA	NA	NA

Source - Validated results from Round 1 sampling in accordance with WHC 1992c.
NA - Not Analyzed
ND - Not detected at the reported detection limit
[1]The value reported in the Concentration Measured column is the concentration in sample B08776 which was collected from the 244-AR Tank Farm Manhole number 1.
[2]EPA 1986, *Test Methods for Evaluating Solid Waste (SW-846)*, Third Edition, United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
[3]EPA 1979, *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020, United States Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.
[4]Nitrate + nitrite-N was reported in place of nitrate-N since the nitrate-N analysis was not performed by the laboratory.

Table E-6. Positive Sample Results for 244-AR Vault Cooling Water

HEIS NO:		B08776
DATE COLLECTED:		03/03/93
LOCATION:		244-AR Tank Farm Manhole Number 1
ANALYSIS	COMPOUND OR ANALYTE	Result (μg/L)
METALS	Calcium	22,100
	Copper	19.2
	Magnesium	2,900
	Manganese	7.1
	Sodium	2,720
	Zinc	55
GENERAL CHEMISTRY	Chloride	1,900
	Nitrate+Nitrite-N (μg-N/L)	230
	Total Organic Carbon	1,200
	pH (pH units)	8
	Phosphate, as P	33
	Specific Conductance (μmhos/cm)	146
	Total Dissolved Solids	90,000
	Total Organic Halides	30.8
ORGANOPHOSPHATE PESTICIDES	Tetraethyldithiopyrophosphate (TEPP)	0.23

Source - Validated from Round 1 sampling in accordance with WHC 1992c.

Stream Sample Evaluation

Sample No. B08776 was collected from the 244-AR Tank Farm Manhole number 1, and was analyzed for the following parameters in accordance with the *244-AR Vault Cooling Water Sampling and Analysis Plan*, (WHC 1992c).

- Volatile Organics
- Semivolatile Organics
- Pesticides/PCBs
- Orthophosphate Pesticides
- Herbicides
- Metals
- General Chemistry
- Radiochemistry

The Sampling and Analysis plan requires a total of four samples to be collected and analyzed over a two year time period. However, the validated results from Round 1 sampling evaluated consisted of only one sample in which all sample results were undetected, with the exception of the compounds or analytes included in Table E-6.

Table E-7. Summary of Analytical Results for the 284-E Powerplant Waste Water Stream.

Parameter/CAS No. (Units)	Concentrations Measured[1]	Analytical Method	Detection Limit
pH (pH units)	9.3	SW-846[2], 9040	0.1
Conductivity (µmho/cm)	8460	SW-846[2], 9050	6
Total Dissolved Solids (mg/L)	NA	NA	NA
Total Suspended Solids (mg/L)	NA	NA	NA
5 Day BOD (mg/L)	NA	NA	NA
COD (mg/L)	78	EPA[3],410.1	30
Ammonia-N (mg/L)	0.09	EPA[3], 350.3	0.05
TKN-N	NA	NA	NA
Nitrate-N (mg/L)	ND	EPA[3], 300.0	0.2
Ortho-phosphate-P	NA	NA	NA
Total-phosphate-P	NA	NA	NA
Total Oil & Grease	NA	NA	NA
Calcium/7440-70-2	NA	NA	NA
Magnesium/7439-95-4	NA	NA	NA
Sodium/7440-23-5	NA	NA	NA
Potassium/7440-09-7	NA	NA	NA
Chloride (mg/L)	2028	EPA[3], 300.0	0.2
Sulfate (mg/L)	174	EPA[3], 300.0	1
Fluoride (mg/L)	1.04	EPA[3], 300.0	0.1
Cadmium/7440-43-9 (µg/L)	ND	SW-846[2], 6010	1.4
Chromium/7440-49-3 (µg/L)	5.94	SW-846[2], 6010	3.3
Lead/7439-92-1 (µg/L)	8.2	SW-846[2], 7421	1.5
Mercury/7439-97-6 (µg/L)	ND	SW-846[2], 7470	0.10
Selenium/7782-49-2 (µg/L)	ND	SW-846[2], 7740	2.3
Silver/7440-22-4 (µg/L)	ND	SW-846[2], 6010	3.4
Copper/7440-50-8 (µg/L)	56	SW-846[2], 6010	2.9
Iron/7439-89-6	NA	NA	NA
Manganese	NA	NA	NA
Zinc/7440-66-6 (µg/L)	53	SW-846[2], 6010	NR
Barium/7440-39-3 (µg/L)	297	SW-846[2], 6010	NR
Total Coliform	NA	NA	NA

Source - Validated results from Round 1 sampling in accordance with WHC 1992 .
NA - Not Analyzed ND - Not detected at the reported detection limit NR - Not Reported
[1]The value reported in the "Concentration Measured" column is the mean of the associated concentrations in the samples which were collected from the 284-E Powerplant Waste Water Streams.
[2]EPA 1986, *Test Methods for Evaluating Solid Waste (SW-846)*, Third Edition, United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
[3]EPA 1979, *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020, United States Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.

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Table E-8. Postive Results for 284-E Power Plant Waste Water Samples (Page 1 of 5)

HEIS NO.		B09019	B09023	B09024	B09027	B09028	B09030	B09031
Date Collected:		8/16/93	8/16/93	8/16/93	8/16/93	8/16/93	8/16/93	8/16/93
Location:		282-E Reservoir	283-E Water Treatment Plant Manhole	282-E Reservoir	284-E Powerhouse Combined Effluent	282-E Reservoir	284-E Powerhouse Continuous Blowdown	282-E Reservoir
Analysis	Compound or Analyte	Result	Result	Result	Result	Result	Result	Result
Volatiles[1]	Chloroform (µg/L)	ND	45	NA	ND	NA	ND	NA
	Bromodichloromethane (µg/L)	ND	ND	NA	ND	NA	ND	NA
Semivolatiles	Benzoic Acid (µg/L)	ND	ND	NA	ND	NA	530	NA
	Bis-(2-ethylhexyl)phthlate (µg/L)	ND	ND	NA	ND	NA	19	NA
	Diethylphthalate (µg/L)	ND	ND	NA	ND	NA	ND	NA
Metals	Arsenic (µg/L)	ND	12.1	NA	ND	NA	ND	NA
	Barium (µg/L)	32.6	41.5	NA	53.7	NA	2.1	NA
	Cadmium (µg/L)	ND	ND	NA	ND	NA	ND	NA
	Chromium(µg/L)	1.8	18.9	NA	4.6	NA	ND	NA
	Cobalt (µg/L)	ND	2	NA	2.3	NA	3.4	NA
	Copper (µg/L)	4.3	32.7	NA	23.5	NA	31.3	NA
	Lead (µg/L)	1.7	5	NA	6.1	NA	2.3	NA
	Mercury (µg/L)	ND	ND	NA	ND	NA	ND	NA
	Nickel (µg/L)	ND	6.8	NA	3.8	NA	ND	NA
	Thallium (µg/L)	3	2.8	NA	3	NA	3.2	NA
	Vanadium (µg/L)	ND	11	NA	ND	NA	3.9	NA
	Zinc (µg/L)	ND	59.5	NA	19.7	NA	10.8	NA
	Tin (µg/L)	ND	700	NA	800	NA	1100	NA
General Chemistry	Chloride (mg/L)	1	3.1	NA	7.1	NA	69.8	NA
	Fluoride (mg/L)	0.1	0.1	NA	0.2	NA	2.6	NA
	pH (pH units)	8.3	7.6	NA	10	NA	12	NA
	Sulfate (mg/L)	8	19	NA	39	NA	430	NA
	Ammonia-N (mg-N/L)	ND	ND	NA	ND	NA	ND	NA
	COD (mg/L)	ND	ND	NA	ND	NA	60	NA
	Alkalinity (mg/L)	58	66	NA	80	NA	576	NA
	Electric Conductivity (µmho/cm)	131	136	NA	270	NA	3660	NA
	Total Organic Halides (µg/L)	NA	NA	1170	NA	79.3	NA	43.4
Radiochemistry	Gross Alpha (pCi/L)	ND	ND	NA	ND	NA	ND	NA
	Gross Beta (pCi/L)	ND	ND	NA	ND	NA	ND	NA

Source - Validated results from Round 1 sampling in accordance with WHC 1992d.
ND - Not Detected.
NA - Not Analyzed.
1 Chloroform and bromodichloromethane were also detected in the associated trip Blank, B09025, at concentrations of 44 µg/L and 1 µg/L, respectively.

Table E-8. Postive Results for 284-E Power Plant Waste Water Samples (Page 2 of 5)

HEIS NO:		B09033	B09034	B09036	B09037	B09039	B09040	B09042
Date Collected:		8/16/93	8/16/93	8/16/93	8/16/93	8/16/93	8/16/93	8/16/93
Location:		284-E Powerhouse Water Softener Blowdown	282-E Reservoir	284-E Powerhouse Mud Drum Blowdown	282-E Reservoir	216-B Ditch Manhole	282-E Reservoir	216-B Ditch Manhole Routine-B
Analysis	Compound or Analyte	Result	Result	Result	Result	Result	Result	Result
Volatiles¹	Chloroform (µg/L)	41	NA	ND	NA	43	NA	NA
	Bromodichloromethane (µg/L)	1	NA	ND	NA	1	NA	NA
Semivolatiles	Benzoic Acid (µg/L)	ND	NA	400	NA	ND	NA	NA
	Bis-(2-ethylhexyl)phthlate (µg/L)	ND	NA	ND	NA	25	NA	NA
	Diethylphthalate (µg/L)	ND	NA	ND	NA	7	NA	NA
Metals	Arsenic (µg/L)	ND	NA	3.1	NA	9.4	NA	NA
	Barium (µg/L)	2170	NA	2.3	NA	72.5	NA	NA
	Cadmium (µg/L)	2.2	NA	ND	NA	ND	NA	NA
	Chromium(µg/L)	5.8	NA	ND	NA	16.4	NA	NA
	Cobalt (µg/L)	282	NA	3.7	NA	3	NA	NA
	Copper (µg/L)	231	NA	40	NA	50	NA	NA
	Lead (µg/L)	22.5	NA	18.6	NA	9.1	NA	NA
	Mercury (µg/L)	ND	NA	ND	NA	0.16	NA	NA
	Nickel (µg/L)	35.7	NA	ND	NA	6.3	NA	NA
	Thallium (µg/L)	13.5	NA	3.1	NA	1.3	NA	NA
	Vanadium (µg/L)	ND	NA	3.3	NA	8.6	NA	NA
	Zinc (µg/L)	194	NA	51.5	NA	78.3	NA	NA
	Tin (µg/L)	1100	NA	1100	NA	1000	NA	NA
General Chemistry	Chloride (mg/L)	16000	NA	71.4	NA	3.7	NA	NA
	Fluoride (mg/L)	ND	NA	2.7	NA	0.1	NA	NA
	pH (pH units)	4.8	NA	12	NA	7.9	NA	NA
	Sulfate (mg/L)	39	NA	420	NA	22	NA	NA
	Ammonia-N (mg-N/L)	0.75	NA	ND	NA	ND	NA	NA
	COD (mg/L)	397	NA	63	NA	40	NA	NA
	Alkalinity (mg/L)	ND	NA	579	NA	53	NA	NA
	Electric Conductivity (µmho/cm)	55900	NA	3710	NA	152	NA	NA
	Total Organic Halides (µg/L)	NA	998	NA	61.8	NA	176	NA
Radiochemistry	Gross Alpha (pCi/L)	ND	NA	ND	NA	ND	NA	2.2
	Gross Beta (pCi/L)	ND	NA	ND	NA	ND	NA	ND

Source - Validated results from Round 1 sampling in accordance with WHC 1992d.
ND - Not Detected.
NA - Not Analyzed.
1 Chloroform and bromodichloromethane were also detected in the associated trip Blank, B09025, at concentrations of 44 µg/L and 1 µg/L, respectively.

Table E-8. Postive Results for 284-E Power Plant Waste Water Samples (Page 3 of 5)

HEIS NO:		B09044	B09046	B09047	B09049	B09052	B09053	B09057
Date Collected:		8/16/93	8/16/93	8/16/93	8/18/93	8/18/93	8/18/93	8/18/93
Location:		284-E Powerhouse Equipment Blank	284-E Powerhouse Continuous Blowdown 2	282-E Reservoir	282-E Reservoir	283-E Reservoir Treatment Plant Manhole	282-E Reservoir	282-E Reservoir
Analysis	Compound or Analyte	Result	Result	Result	Result	Result	Result	Result
Volatiles1	Chloroform (µg/L)	ND	ND	NA	NA	NA	NA	NA
	Bromodichloromethane (µg/L)	ND	ND	NA	NA	NA	NA	NA
Semivolatiles	Benzoic Acid (µg/L)	ND	450	NA	NA	NA	NA	NA
	Bis-(2-ethylhexyl)phthlate (µg/L)	ND	ND	NA	NA	NA	NA	NA
	Diethylphthalate (µg/L)	ND	ND	NA	NA	NA	NA	NA
Metals	Arsenic (µg/L)	ND	ND	NA	NA	NA	NA	NA
	Barium (µg/L)	1.2	2.3	NA	NA	NA	NA	NA
	Cadmium (µg/L)	ND	ND	NA	NA	NA	NA	NA
	Chromium(µg/L)	ND	ND	NA	NA	NA	NA	NA
	Cobalt (µg/L)	ND	ND	NA	NA	NA	NA	NA
	Copper (µg/L)	ND	31.3	NA	NA	NA	NA	NA
	Lead (µg/L)	5.3	ND	NA	NA	NA	NA	NA
	Mercury (µg/L)	ND	ND	NA	NA	NA	NA	NA
	Nickel (µg/L)	ND	ND	NA	NA	NA	NA	NA
	Thallium (µg/L)	2.1	3.5	NA	NA	NA	NA	NA
	Vanadium (µg/L)	ND	6.4	NA	NA	NA	NA	NA
	Zinc (µg/L)	ND	10.5	NA	NA	NA	NA	NA
	Tin (µg/L)	900	700	NA	NA	NA	NA	NA
General Chemistry	Chloride (mg/L)	ND	70	NA	NA	NA	NA	NA
	Fluoride (mg/L)	ND	2.5	NA	NA	NA	NA	NA
	pH (pH units)	6.2	12	NA	NA	NA	NA	NA
	Sulfate (mg/L)	ND	418	NA	NA	NA	NA	NA
	Ammonia-N (mg-N/L)	ND	ND	NA	NA	NA	NA	NA
	COD (mg/L)	ND	63	NA	NA	NA	NA	NA
	Alkalinity (mg/L)	ND	572	NA	NA	NA	NA	NA
	Electric Conductivity (µmho/cm)	ND	3720	NA	NA	NA	NA	NA
	Total Organic Halides (µg/L)	NA	NA	27.9	36.9	NA	333	100
Radiochemistry	Gross Alpha (pCi/L)	ND	ND	NA	NA	3.8	NA	NA
	Gross Beta (pCi/L)	ND	ND	NA	NA	2.9	NA	NA

Source - Validated results from Round 1 sampling in accordance with WHC 1992d.
ND - Not Detected.
NA - Not Analyzed.
1 Chloroform and bromodichloromethane were also detected in the associated trip Blank, B09025, at concentrations of 44 µg/L and 1 µg/L, respectively.

Table E-8. Postive Results for 284-E Power Plant Waste Water Samples (Page 4 of 5)

HEIS NO:		B09060	B09063	B09066	B09068	B09069	B09072	B09074
Date Collected:		8/18/93	8/18/93	8/18/93	8/18/93	8/18/93	8/18/93	8/18/93
Location:		282-E Reservoir	282-E Reservoir	282-E Reservoir	216-B Ditch Manhole	282-E Reservoir	282-E Reservoir	282-E Reservoir
Analysis	Compound or Analyte	Result	Result	Result	Result	Result	Result	Result
Volatiles‡	Chloroform (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Bromodichloromethane (µg/L)	NA	NA	NA	NA	NA	NA	NA
Semivolatiles	Benzoic Acid (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Bis-(2-ethylhexyl)phthlate (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Diethylphthalate (µg/L)	NA	NA	NA	NA	NA	NA	NA
Metals	Arsenic (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Barium (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Cadmium (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Chromium(µg/L)	NA	NA	NA	NA	NA	NA	NA
	Cobalt (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Copper (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Lead (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Mercury (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Nickel (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Thallium (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Vanadium (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Zinc (µg/L)	NA	NA	NA	NA	NA	NA	NA
	Tin (µg/L)	NA	NA	NA	NA	NA	NA	NA
General Chemistry	Chloride (mg/L)	NA	NA	NA	NA	NA	NA	NA
	Fluoride (mg/L)	NA	NA	NA	NA	NA	NA	NA
	pH (pH units)	NA	NA	NA	NA	NA	NA	NA
	Sulfate (mg/L)	NA	NA	NA	NA	NA	NA	NA
	Ammonia-N (mg-N/L)	NA	NA	NA	NA	NA	NA	NA
	COD (mg/L)	NA	NA	NA	NA	NA	NA	NA
	Alkalinity (mg/L)	NA	NA	NA	NA	NA	NA	NA
	Electric Conductivity (µmho/cm)	NA	NA	NA	NA	NA	NA	NA
	Total Organic Halides (µg/L)	68.8	1110	13.7	NA	335	24.5	15.8
Radiochemistry	Gross Alpha (pCi/L)	NA	NA	NA	2.4	NA	NA	NA
	Gross Beta (pCi/L)	NA	NA	NA	2.5	NA	NA	NA

Source - Validated results from Round 1 sampling in accordance with WHC 1992d.
ND - Not Detected.
NA - Not Analyzed.
‡ Chloroform and bromodichloromethane were also detected in the associated trip Blank, B09025, at concentrations of 44 µg/L and 1 µg/L, respectively.

Table E-8. Positive Results for 284-E Powerplant Waste Water Samples (Page 5 of 5)

Stream Sample Evaluation

A total of eight samples and one equipment blank (HEIS number B09044) were collected and analyzed for the full set of parameters, as listed below, in accordance with the 284-E Area Powerplant Process Waste Water Streams Sampling and Analysis Plan (WHC 1992d).

- Volatile Organics
- Semivolatile Organics
- Pesticidies/ PCBs
- Organophosphorus Pesticidies
- Herbicidies
- Metals
- General Chemistry
- Radiochemistry

In addition to the required nine samples as referenced above, several samples were collected and analyzed for total organic halides (TOX) and radiochemistry parameters.

Ten trip blank samples were analyzed for volitile organics, of which sample B09025 contained chloroform and bromodichloromethane at concentrations of 44 µg/L, and 1 µg/L, respectively. Also, trip blank samples B09032, B09035, and B09077 contained methylene chloride at concentrations of 2 µg/L, 3 µg/L, and 3 µg/L respectively.

The samples were analyzed for all of the parameters required by the associated sampling and analysis plan (WHC 1992d), with the exception of the additional metals: aluminum, calcium, iron, magnesium, manganese, potassium, and sodium. The validated results for the round 1 sampling in accordance with WHC 1992d were reported as undetected with the exception of the results summarized in Table E-8.

Table E-9. Summary of Analytical Results for the B Plant Cooling Water Stream.

Parameter/CAS No.	Concentrations Measured[1]	Analytical Method	Detection Limit
pH (pH units)	8.2	SW-846[2], 9040	0.1
Conductivity (μmho/cm)	154	EPA[3], 120.1	6
Total Dissolved Solids (mg/L)	106	EPA[3], 160.1	5
Total Suspended Solids (mg/L)	ND	EPA[3], 160.2	5
5 Day BOD (mg/L)	ND	EPA[3], 405.1	2
COD (mg/L)	ND	EPA[3], 410.1	30
Ammonia-N (mg-N/L)	0.07	EPA[3], 350.2	0.05
TKN-N	NA	NA	NA
Nitrate+Nitrite-N[4] (mg-N/L)	ND	EPA[3], 353.3	0.25
Ortho-phosphate-P	NA	NA	NA
Total-phosphate-P (mg/L)	ND	EPA[3], 365.2	0.05
Total Oil & Grease (mg/L)	ND	SW-846[2], 9070	5
Calcium/7440-70-2	NA	NA	NA
Magnesium/7439-95-4	NA	NA	NA
Sodium/7440-23-5	NA	NA	NA
Potassium/7440-09-7	NA	NA	NA
Chloride (mg/L)	1.4	EPA[3], 300.0	0.2
Sulfate (mg/L)	10.8	EPA[3], 375.4	1
Fluoride (mg/L)	0.2	EPA[3], 300.0	0.1
Cadmium/7440-43-9 (μg/L)	ND	SW-846[2], 6010	1.4
Chromium/7440-49-3 (μg/L)	ND	SW-846[2], 6010	3.3
Lead/7439-92-1 (μg/L)	27	SW-846[2], 7421	1.5
Mercury/7439-97-6 (μg/L)	ND	SW-846[2], 7470	0.10
Selenium/7782-49-2 (μg/L)	ND	SW-846[2], 7740	3.3
Silver/7440-22-4 (μg/L)	ND	SW-846[2], 6010	3.3
Copper/7440-50-8 (μg/L)	75	SW-846[2], 6010	2.9
Iron/7439-89-6	NA	NA	NA
Manganese	NA	NA	NA
Zinc/7440-66-6 (μg/L)	14.2	SW-846[2], 6010	NR
Barium/7440-39-3 (μg/L)	37.3	SW-846[2], 6010	NR
Total Coliform	NA	NA	NA

Source - Validated results from Round 1 sampling in accordance with WHC 1992e.
NA - Not Analyzed ND - Not detected at the reported detection limit R - Not Recorded
[1]The value reported in the "Concentration Measured" column is the mean of the associated concentration in the samples collected from the B-Plant Cooling Water Stream.
[2]EPA 1986, *Test Methods for Evaluating Solid Waste (SW-846)*, Third Edition, United States Environmental Protection Agency, Office of Solid Waste and Emergency Response, Washington, D.C.
[3]EPA 1979, *Methods for Chemical Analysis of Water and Wastes*, EPA-600/4-79-020, United States Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.
[4]Nitrate + nitrite-N was reported in place of nitrate-N since the nitrate-N analysis was not performed by the laboratory.

Table E-10. Positive Sample Results for B Plant Cooling Water. (Page 1 of 2)

HEIS NO:		B08795	B08799	B087B3	B087B7	B087C1	B087F1
Date Collected:		04/21/93	04/20/93	04/20/93	04/20/93	04/20/93	04/21/93
Location:		207B Combined CBC and BCE Streams	294B Raw Water Supply to B Plant	221-BG 15 inch diameter effluent	221-BA 24 inch diameter effluent	Stairwell No. 1 Steam Condensate	207B Combined CBC and BCE - Duplicate
Analysis	Compound or Analyte	Result	Result	Result	Result	Result	Result
Volatiles[1]	Toluene (μg/L)	ND	1[2]	ND	ND	NA	ND
	Acetone (μg/L)	ND	ND	ND	14	NA	ND
Metals	Barium (μg/L)	33.6	30.6	32.3	32	63.2	32.2
	Copper (μg/L)	5.2	6	4.4	4.2	426	6.4
	Lead (μg/L)	3	6.8	1.6	2.3	144	4.2
	Nickel (μg/L)	ND	ND	ND	ND	6.4	ND
	Vanadium (μg/L)	ND	ND	ND	ND	ND	2.2
	Zinc (μg/L)	11.4	11.4	6.6	8.2	38.9	8.7
	Tin (μg/L)	ND	ND	ND	7.2	6.9	ND
General Chemistry	Sulfate (mg/L)	10	9	14	12	NA	9
	Chloride (mg/L)	1.5	1.4	1.4	1.4	NA	1.5
	Fluoride (mg/L)	ND	0.2	0.2	0.2	NA	0.3
	Phosphorus (mg/L)	ND	ND	0.05	ND	NA	ND
	Ammonia-N (mg-N/L)	0.11	0.07	0.07	0.05	NA	0.06
	Alkalinity (mg/L)	68	69	68	68	NA	68
	Total Dissolved Solids (mg/L)	93	120	113	107	NA	98
	Total Suspended Solids (mg/L)	ND	ND	ND	ND	NA	7
	pH	8.1	8.2	8.2	8.2	NA	8.1
	Electric Conductivity (μmho/cm)	160	151	151	150	NA	160
	Nitrate-N (mg-N/L)	0.3	0.2	0.4	0.2	NA	0.3

Table E-10. Positive Sample Results for B Plant Cooling Water. (Page 2 of 2)

HEIS NO:		B08795	B08799	B087B3	B087B7	B087C1	B087F1
Date Collected:		04/21/93	04/20/93	04/20/93	04/20/93	04/20/93	04/21/93
Location:		207B Combined CBC and BCE Streams	294B Raw Water Supply to B Plant	221-BG 15 inch diameter effluent	221-BA 24 inch diameter effluent	Stairwell No. 1 Steam Condensate	207B Combined CBC and BCE - Duplicate
Analysis	Compound or Analyte	Result	Result	Result	Result	Result	Result
Radiochemistry	Gross Beta (pCi/L)	ND	2	2.7	2.3	NA	ND
	Uranium 233/234 (pCi/L)	0.42	0.24	0.23	0.4	NA	0.28
	Uranium 238 (pCi/L)	0.23	0.2	0.21	0.31	NA	0.28
	Total Uranium (µg/L)	0.85	0.77	0.68	0.68	NA	0.86
	Stronium-89 (pCi/L)	ND	ND	ND	0.35	NA	ND
	Tritium (pCi/L)	330	ND	ND	ND	NA	ND

Source - Validated results from Round 1 sampling in accordance with WHC 1992e.

ND - Not Detected
NA - Not Analyzed

[1] The positive results for toluene and acetone should be evaluated with uncertainty since they are common laboratory contaminants.
[2] Toluene was also detected in the associated trip blanks (HEIS Nos. B087B2 and B087F3) both at a concentration of 1 ug/L.

Stream Sample Evaluation

A total of five samples were collected, analyzed, and validated results reported for all of the parameter in accordance with the *B Plant Cooling Water Sampling and Analysis Plan*, (WHC 1992e) as listed below:

- Volatile Organics
- Semivolatile Organics
- Pesticides/PCBs
- Organophosphorus Pesticides
- Herbicides
- Metals
- General Chemistry
- Radiochemistry

In addition to the required five samples, one sample was also collected from the Stairwell number 1 Steam Condensate, B087C1, and analyzed for metals only. Also, three trip blank samples, HEIS Nos. B087B2, B087F3, B098F4, were analyzed for volatile organics and contained low levels of toluene at a concentration of 1 µg/L in samples B087B2 and B087F3, and methylene chloride was detected in sample B098F4 at a concentration of 3 µg/L. All associated results for the six samples were reported as undetected with the exception of the results summarized in Table E-10.

2.0 WASTE WATER CHARACTERISTICS FOR TOXIC POLLUTANTS

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

a. Use the letter *A* in the ABST column if the chemical is not likely to be present because *it is not used* in the production process *or used on site.*

b. Use the letter *S* in the ABST column if the chemical may be present because it is used on site, but the chemical *is not used* in the production process.

c. Use the letter *P* in the PRST column if the chemical is likely to be present because it is used in the production process, *but the effluent has not been tested.*

d. Use the letter *K* in the PRST column *if the effluent has been tested and found to be present.*

Attach the analytical results.

Tables detailing the waste water characteristics for toxic pollutants for each of the six facilities are included as follows:

Waste Stream	Table Number
242-A Evaporator Cooling Water	E-11
242-A Evaporator Steam Condensate	E-12
241-A Tank Farm Cooling Water	E-13
244-AR Vault Cooling Water	E-14
284-E Power Plant Waste Water	E-15
B Plant Cooling Water	E-16

Analytical results used in completing the following Waste Water Characteristics for Toxic Pollutants tables are available for the 242-A Evaporator Cooling Water, 242-A Evaporator Steam Condensate, 284-E Power Plant Waste Water, and the B Plant Cooling Water Streams in WHC 1992a. Analytical results for the 241-A Tank Farm Cooling Water Stream and the 244-AR Vault Cooling Water Stream in accordance with the approved SAPs (WHC 1992b and WHC 1992c, respectively), are available on request.

Table E-11. 242-A Evaporator Cooling Water Waste Water Characterization
Analytical Results
Waste Water Characterization for Toxic Pollutants (Page 1 of 2)

ABST	PRST	CONSTITUENT/CAS No.	ABST	PRST	CONSTITUENT/CAS No.
A		Acrylamide/79-06-1	A		1,2 Dichloropropane/78-87-5
A		Acrylonitrile/107-13-1	A		1,3 Dichloropropene/542-75-6
A		Aldrin/309-00-2	A		Dichlorvos/62-73-7
A		Aniline/62-53-3	A		Dieldrin/60-57-1
A		Aramite/140-57-8	A		3,3' Dimethoxybenzidine/119-90-4
*		Arsenic/7440-38-2	A		3,3 Dimethylbenzidine/119-93-7
A		Azobenzene/103-33-3	A		1,2 Dimethylhydrazine/540-73-8
A		Benzene/71-43-2	A		2,4 Dinitrotoluene/121-14-2
A		Benzidine/92-87-5	A		2,6 Dinitrotoluene/606-20-2
A		Benzo(a)pyrene/50-32-8	A		1,4 Dioxane/123-91-1
A		Benzotrichloride/98-07-7	A		1,2 Diphenylhydrazine/122-66-7
A		Benzyl chloride/100-44-7	A		Endrin/72-20-8
A		Bis(chloroethyl)ether/111-44-4	A		Epichlorohydrin/106-89-8
A		Bis(chloromethyl)ether/542-88-1	A		Ethyl acrylate/140-88-5
A		Bis(2-ethylhexyl)phthalate/ 117-81-7	A		Ethylene dibromide/106-93-4
A		Bromodichloromethane/75-27-4	A		Ethylene thioureae/96-45-7
A		Bromoform/75-25-2	A		Folpet/133-07-3
A		Carbazole/86-74-8	A		Furmecyclox/60568-05-0
A		Carbon tetrachloride/56-23-5	A		Heptachlor/76-44-8
A		Chlordane/57-74-9	A		Heptachlor epoxide/1024-57-3
A		Chlorodibromomethane/124-48-1	A		Hexachlorobenzene/118-74-1
	K (1)	Chloroform/67-66-3	A		Hexachlorocyclohexane (alpha)/ 319-84-6
A		Chlorthalonil/1897-45-6	A		Hexachlorocyclohexane (tech.)/ 608-73-1
A		2,4-D/94-75-7	A		Hexachlorodibenzo-p-dioxin, mix/ 19408-74-3
A		DDT/50-29-3	A		Hydrazine/hydrazine sulfate/ 302-01-2

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Table E-11. 242-A Evaporator Cooling Water Waste Water Characterization
Analytical Results
Waste Water Characterization for Toxic Pollutants (Page 2 of 2)

ABST	PRST	CONSTITUENT/CAS No.	ABST	PRST	CONSTITUENT/CAS No.
A		Diallate/2303-16-4	A		Lindane/58-89-9
A		1,2 Dibromoethane/106-93-4	A		2 Methylaniline/100-61-8
A		1,4 Dichlorobenzene/106-46-7	A		2 Methylaniline hydrochloride/ 636-21-5
A		3,3 Dichlorobenzidine/91-94-1	A		4,4' Methylene bis(N,N-dimethyl)aniline/101-61-1
A		1,1 Dichloroethane/75-34-3	A		Methylene chloride (dichloromethane)/75-09-2
A		1,2 Dichloroethane/107-06-2	A		Mirex/2385-85-5
A		Nitrofurazone/59-87-0	A		O-phenylenediamine/106-50-3
A		N-nitrosodiethanolamine/ 1116-54-7	A		Propylene oxide/75-56-9
A		N-nitrosodiethylamine/55-18-5	A		2,3,7,8-Tetrachlorodibenzo-p-dioxin/ 1746-01-6
A		N-nitrosodimethylamine/62-75-9	A		Tetrachloroethylene/127-18-4
A		N-nitrosodiphenylamine/86-30-6	A		2,4 Toluenediamine/95-80-7
A		N-nitroso-di-n-propylamine/ 621-64-7	A		o-Toluidine/95-53-4
A		N-nitrosopyrrolidine/930-55-2	A		Toxaphene/8001-35-2
A		N-nitroso-di-n-butylamine/ 924-16-3	A		Trichloroethylene/79-01-6
A		N-nitroso-n-methylethylamine/ 10595-95-6	A		2,4,6-Trichlorophenol/88-06-2
A		PAH/NA	A		Trimethyl phosphate/512-56-1
A		PBBs/NA	A		Vinyl chloride/75-01-4
A		PCBs/1336-36-3			

Source - WHC 1992a

(1) Chloroform was detected at a concentration of 11.8 parts per billion (ppb) with a detection limit of 5 ppb.

Note: Tested and not Found. (*) in the ABST column.

Table E-12. 242-A Evaporator Steam Condensate Waste Water Characterization
Analytical Results
Waste Water Characterization for Toxic Pollutants (Page 1 of 2)

ABST	PRST	CONSTITUENT/CAS No.	ABST	PRST	CONSTITUENT/CAS No.
A		Acrylamide/79-06-1	A		1,2 Dichloropropane/78-87-5
A		Acrylonitrile/107-13-1	A		1,3 Dichloropropene/542-75-6
A		Aldrin/309-00-2	A		Dichlorvos/62-73-7
A		Aniline/62-53-3	A		Dieldrin/60-57-1
		Aramite/140-57-8	A		3,3' Dimethoxybenzidine/119-90-
		Arsenic/7440-38-2	A		3,3 Dimethylbenzidine/119-93-7
		Azobenzene/103-33-3	A		1,2 Dimethylhydrazine/540-73-8
A		Benzene/71-43-2	A		2,4 Dinitrotoluene/121-14-2
A		Benzidine/92-87-5	A		2,6 Dinitrotoluene/606-20-2
A		Benzo(a)pyrene/50-32-8	A		1,4 Dioxane/123-91-1
		Benzotrichloride/98-07-7	A		1,2 Diphenylhydrazine/122-66-7
A		Benzyl chloride/100-44-7	A		Endrin/72-20-8
A		Bis(chloroethyl)ether/111-44-4	A		Epichlorohydrin/106-89-8
A		Bis(chloromethyl)ether/542-88-1	A		Ethyl acrylate/140-88-5
A		Bis(2-ethylhexyl)phthalate/ 117-81-7	A		Ethylene dibromide/106-93-4
A		Bromodichloromethane/75-27-4	A		Ethylene thioureae/96-45-7
A		Bromoform/75-25-2	A		Folpet/133-07-3
A		Carbazole/86-74-8	A		Furmecyclox/60568-05-0
A		Carbon tetrachloride/56-23-5	A		Heptachlor/76-44-8
A		Chlordane/57-74-9	A		Heptachlor epoxide/1024-57-3
A		Chlorodibromomethane/124	A		Hexachlorobenzene/118-74-1
	K (2)	Chloroform/67-66-3	A		Hexachlorocyclohexane (alpha)/ 319-84-6
A		Chlorthalonil/1897-45-6	A		Hexachlorocyclohexane (tech.)/ 608-73-1
A		2,4-D/94-75-7	A		Hexachlorodibenzo-p-dioxin, mix/ 19408-74-3
A		DDT/50-29-3	A		Hydrazine/hydrazine sulfate/ 302-01-2
A		Diallate/2303-16-4	A		Lindane/58-89-9

Table E-12. 242-A Evaporator Steam Condensate Waste Water Characterization
Analytical Results
Waste Water Characterization for Toxic Pollutants (Page 2 of 2)

ABST / PRST		CONSTITUENT/CAS No.	ABST / PRST		CONSTITUENT/CAS No.
A		1,2 Dibromoethane/106-93-4	A		2 Methylaniline/100-61-8
A		1,4 Dichlorobenzene/106-46-7	A		2 Methylaniline hydrochloride/ 636-21-5
A		3,3' Dichlorobenzidine/91-94-1	A		4,4' Methylene bis(N,N-dimethyl)aniline/101-61-1
A		1,1 Dichloroethane/75-34-3	A		Methylene chloride (dichloromethane)/75-09-2
A		1,2 Dichloroethane/107-06-2	A		Mirex/2385-85-5
A		Nitrofurazone/59-87-0	A		O-phenylenediamine/106-50-3
A		N-nitrosodiethanolamine/ 1116-54-7	A		Propylene oxide/75-56-9
A		N-nitrosodiethylamine/55-18-5	A		2,3,7,8-Tetrachlorodibenzo-p-dioxin/ 1746-01-6
A		N-nitrosodimethylamine/62-75-9	A		Tetrachloroethylene/127-18-4
A		N-nitrosodiphenylamine/86-30-6	A		2,4 Toluenediamine/95-80-7
A		N-nitroso-di-n-propylamine/ 621-64-7	A		o-Toluidine/95-53-4
A		N-nitrosopyrrolidine/930-55-2	A		Toxaphene/8001-35-2
A		N-nitroso-di-n-butylamine/ 924-16-3	A		Trichloroethylene/79-01-6
A		N-nitroso-n-methylethylamine/ 10595-95-6	A		2,4,6-Trichlorophenol/88-06-2
A		PAH/NA	A		Trimethyl phosphate/512-56-1
A		PBBs/NA	A		Vinyl chloride/75-01-4
A		PCBs/1336-36-3			

Source - WHC 1992a

(1) Two tables were provided in the Best Available Technology/All Known and Reasonable Treatment (BAT/AKART) for the 242-A Evaporator Steam Condensate (WHC 1992a). Table 2-2 provides information concerning the baseline characteristics of the stream and Table 2-3 provides the estimated current status characteristics of the stream. Arsenic is reported as undetected at 1.70 parts per billion (ppb) in Table 2-2, however, is reported as detected at 1.72 ppb in Table 2-3. Therefore, the actual presence or absence of arsenic in the waste water could not clearly be determined.

(2) Chloroform was detected at a concentration of 28 ppb with a detection limit of 5 ppb.

Note: Tested and not Found. (*) in the ABST column.

9413206.0211

Table E-13. 241-A Tank Farm Cooling Water Waste Water Characterization
Analytical Results
Waste Water Characterization for Toxic Pollutants (Page 1 of 2)

ABST	PRST	CONSTITUENT/CAS No.	ABST	PRST	CONSTITUENT/CAS No.
A		Acrylamide/79-06-1	*		1,2 Dichloropropane/78-87-5
*		Acrylonitrile/107-13-1	*		1,3 Dichloropropene/542-75-6 (1)
*		Aldrin/309-00-2	*		Dichlorvos/62-73-7
*		Aniline/62-53-3	*		Dieldrin/60-57-1
*		Aramite/140-57-8	A		3,3' Dimethoxybenzidine/119-90-4
*		Arsenic/7440-38-2	*		3,3 Dimethylbenzidine/119-93-7
A		Azobenzene/103-33-3	A		1,2 Dimethylhydrazine/540-73-8
*		Benzene/71-43-2	*		2,4 Dinitrotoluene/121-14-2
A		Benzidine/92-87-5	*		2,6 Dinitrotoluene/606-20-2
*		Benzo(a)pyrene/50-32-8	*		1,4 Dioxane/123-91-1
A		Benzotrichloride/98-07-7	A		1,2 Diphenylhydrazine/122-66-7
A		Benzyl chloride/100-44-7	*		Endrin/72-20-8
*		Bis(chloroethyl)ether/111-44-4	A		Epichlorohydrin/106-89-8
A		Bis(chloromethyl)ether/542-88-1	A		Ethyl acrylate/140-88-5
*		Bis(2-ethylhexyl)phthalate/ 117-81-7	*		Ethylene dibromide/106-93-4
*		Bromodichloromethane/75-27-4	A		Ethylene thioureae/96-45-7
*		Bromoform/75-25-2	A		Folpet/133-07-3
A		Carbazole/86-74-8	A		Furmecyclox/60568-05-0
*		Carbon tetrachloride/56-23-5	*		Heptachlor/76-44-8
*		Chlordane/57-74-9 (2)	*		Heptachlor epoxide/1024-57-3
*		Chlorodibromomethane/124-48-1	*		Hexachlorobenzene/118-74-1
*		Chloroform/67-66-3	*		Hexachlorocyclohexane (alpha)/ 319-84-6
A		Chlorthalonil/1897-45-6	A		Hexachlorocyclohexane (tech.)/ 608-73-1
*		2,4-D/94-75-7	A		Hexachlorodibenzo-p-dioxin, mix/ 19408-74-3
*		DDT/50-29-3	A		Hydrazine/hydrazine sulfate/ 302-01-2
*		Diallate/2303-16-4	*		Lindane/58-89-9

Table E-13. 241-A Tank Farm Cooling Water Waste Water Characterization
Analytical Results
Waste Water Characterization for Toxic Pollutants (Page 2 of 2)

ABST / PRST	CONSTITUENT/CAS No.	ABST / PRST	CONSTITUENT/CAS No.
*	1,2 Dibromoethane/106-93-4	A	2 Methylaniline/100-61-8
*	1,4 Dichlorobenzene/106-46-7	A	2 Methylaniline hydrochloride/ 636-21-5
*	3,3' Dichlorobenzidine/91-94-1	A	4,4' Methylene bis(N,N-dimethyl)aniline/101-61-1
*	1,1 Dichloroethane/75-34-3	*	Methylene chloride (dichloromethane)/75-09-2
*	1,2 Dichloroethane/107-06-2	A	Mirex/2385-85-5
A	Nitrofurazone/59-87-0	*	O-phenylenediamine/106-50-3
A	N-nitrosodiethanolamine/ 1116-54-7	A	Propylene oxide/75-56-9
*	N-nitrosodiethylamine/55-18-5	A	2,3,7,8-Tetrachlorodibenzo-p-dioxin/ 1746-01-6
*	N-nitrosodimethylamine/62-75-9	*	Tetrachloroethylene/127-18-4
*	N-nitrosodiphenylamine/86-30-6	A	2,4 Toluenediamine/95-80-7
*	N-nitroso-di-n-propylamine/ 621-64-7	*	o-Toluidine/95-53-4
*	N-nitrosopyrrolidine/930-55-2	*	Toxaphene/8001-35-2
*	N-nitroso-di-n-butylamine/ 924-16-3	*	Trichloroethylene/79-01-6
*	N-nitroso-n-methylethylamine/ 10595-95-6	*	2,4,6-Trichlorophenol/88-06-2
*	PAH/NA	A	Trimethyl phosphate/512-56-1
A	PBBs/NA	*	Vinyl chloride/75-01-4
*	PCBs/1336-36-3 (3)		

Source - Validated results from Round 1 sampling in accordance with WHC 1992b.

(1) cis-1,3-Dichloropropene (CAS No. 10061-01-5)
(2) alpha-Chlordane and gamma-Chlordane (CAS No. 5103-71-9 and 5103-74-2, respectively)
(3) The PCBs were analyzed according to the Environmental Protection Agency (EPA) Statement of Work (SOW) 1988, in which the PCBs are identified as seven different arochlor compounds as defined below:

- Arochlor-1016 (CAS No. 12674-11-2)
- Arochlor-1221 (CAS No. 11104-28-2)
- Arochlor-1232 (CAS No. 11141-16-5)
- Arochlor-1242 (CAS No. 53469-21-9)
- Arochlor-1248 (CAS No. 12672-29-6)
- Arochlor-1254 (CAS No. 11097-69-1)
- Arochlor-1260 (CAS No. 11096-82-5)

Note: Tested and not found. (*) in the ABST column.

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Table E-14. 244-AR Vault Cooling Water Waste Water Characterization
Analytical Results
Waste Water Characterization for Toxic Pollutants (Page 1 of 2)

ABST	PRST	CONSTITUENT/CAS No.	ABST	PRST	CONSTITUENT/CAS No.
A		Acrylamide/79-06-1	*		1,2 Dichloropropane/78-87-5
*		Acrylonitrile/107-13-1	*		1,3 Dichloropropene/542-75-6 (1)
*		Aldrin/309-00-2	*		Dichlorvos/62-73-7
*		Aniline/62-53-3	*		Dieldrin/60-57-1
*		Aramite/140-57-8	A		3,3' Dimethoxybenzidine/119-90-4
*		Arsenic/7440-38-2	*		3,3 Dimethylbenzidine/119-93-7
A		Azobenzene/103-33-3	A		1,2 Dimethylhydrazine/540-73-8
*		Benzene/71-43-2	*		2,4 Dinitrotoluene/121-14-2
A		Benzidine/92-87-5	*		2,6 Dinitrotoluene/606-20-2
*		Benzo(a)pyrene/50-32-8	*		1,4 Dioxane/123-91-1
A		Benzotrichloride/98-07-7	A		1,2 Diphenylhydrazine/122-66-7
A		Benzyl chloride/100-44-7	*		Endrin/72-20-8
*		Bis(chloroethyl)ether/111-44-4	A		Epichlorohydrin/106-89-8
A		Bis(chloromethyl)ether/542-88-1	A		Ethyl acrylate/140-88-5
*		Bis(2-ethylhexyl)phthalate/ 117-81-7	*		Ethylene dibromide/106-93-4
*		Bromodichloromethane/75-27-4	A		Ethylene thioureae/96-45-7
*		Bromoform/75-25-2	A		Folpet/133-07-3
A		Carbazole/86-74-8	A		Furmecyclox/60568-05-0
*		Carbon tetrachloride/56-23-5	*		Heptachlor/76-44-8
*		Chlordane/57-74-9 (2)	*		Heptachlor epoxide/1024-57-3
*		Chlorodibromomethane/124-48-1	*		Hexachlorobenzene/118-74-1
*		Chloroform/67-66-3	*		Hexachlorocyclohexane (alpha)/ 319-84-6
A		Chlorthalonil/1897-45-6	A		Hexachlorocyclohexane (tech.)/ 608-73-1
*		2,4-D/94-75-7	A		Hexachlorodibenzo-p-dioxin, mix/ 19408-74-3
*		DDT/50-29-3	A		Hydrazine/hydrazine sulfate/ 302-01-2
*		Diallate/2303-16-4	*		Lindane/58-89-9
*		1,2 Dibromoethane/106-93-4	A		2 Methylaniline/100-61-8

Table E-14. 244-AR Vault Cooling Water Waste Water Characterization
Analytical Results
Waste Water Characterization for Toxic Pollutants (Page 2 of 2)

ABST	PRST	CONSTITUENT/CAS No.	ABST	PRST	CONSTITUENT/CAS No.
*		1,4 Dichlorobenzene/106-46-7	A		2 Methylaniline hydrochloride/ 636-21-5
*		3,3' Dichlorobenzidine/91-94-1	A		4,4' Methylene bis(N,N-dimethyl)aniline/101-61-1
*		1,1 Dichloroethane/75-34-3	*		Methylene chloride (dichloromethane)/75-09-2
*		1,2 Dichloroethane/107-06-2	A		Mirex/2385-85-5
A		Nitrofurazone/59-87-0	*		O-phenylenediamine/106-50-3
A		N-nitrosodiethanolamine/ 1116-54-7	A		Propylene oxide/75-56-9
*		N-nitrosodiethylamine/55-18-5	A		2,3,7,8-Tetrachlorodibenzo-p-dioxin/ 1746-01-6
*		N-nitrosodimethylamine/62-75-9	*		Tetrachloroethylene/127-18-4
*		N-nitrosodiphenylamine/86-30-6	A		2,4 Toluenediamine/95-80-7
*		N-nitroso-di-n-propylamine/ 621-64-7	*		o-Toluidine/95-53-4
*		N-nitrosopyrrolidine/930-55-2	*		Toxaphene/8001-35-2
*		N-nitroso-di-n-butylamine/ 924-16-3	*		Trichloroethylene/79-01-6
*		N-nitroso-n-methylethylamine/ 10595-95-6	*		2,4,6-Trichlorophenol/88-06-2
*		PAH/NA	A		Trimethyl phosphate/512-56-1
A		PBBs/NA	*		Vinyl chloride/75-01-4
*		PCBs/1336-36-3 (3)			

Source - Validated results from Round 1 sampling in accordance with WHC 1992c.

(1) cis-1,3-Dichloropropene (CAS No. 10061-01-5).
(2) alpha-Chlordane and gamma-Chlordane (CAS No. 5103-71-9 and 5103-74-2, respectively).
(3) The PCBs were analyzed according to the EPA Statement of Work (SOW) 1988, in which the PCBs are identified as seven different arochlor compounds as defined below:

- Arocior-1016 (CAS No. 12674-11-2)
- Aroclor-1221 (CAS No. 11104-28-2)
- Aroclor-1232 (CAS No. 11141-16-5)
- Aroclor-1242 (CAS No. 53469-21-9)
- Aroclor-1248 (CAS No. 12672-29-6)
- Aroclor-1254 (CAS No. 11097-69-1)
- Aroclor-1260 (CAS No. 11096-82-5)

Note: Tested and not found. (*) in the ABST column.

Table E-15. 284-E Power Plant Waste Water Characterization
Analytical Results
Waste Water Characterization for Toxic Pollutants (Page 1 of 2)

ABST / PRST	CONSTITUENT/CAS No.	ABST / PRST	CONSTITUENT/CAS No.
A	Acrylamide/79-06-1	*	1,2 Dichloropropane/78-87-5
*	Acrylonitrile/107-13-1	*	1,3 Dichloropropene/(2)
*	Aldrin/309-00-2	*	Dichlorvos/62-73-7
*	Aniline/62-53-3	*	Dieldrin/60-57-1
*	Aramite/140-57-8	A	3,3 Dimethoxybenzidine/119-90-4
A	Arsenic/7440-38-2	*	3,3 Dimethylbenzidine/119-93-7
A	Azobenzene/103-33-3	A	1,2 Dimethylhydrazine/540-73-8
*	Benzene/71-43-2	*	2,4 Dinitrotoluene/121-14-2
*	Benzidine/92-87-5	*	2,6 Dinitrotoluene/606-20-2
*	Benzo(a)pyrene/50-32-8	*	1,4 Dioxane/123-91-1
A	Benzotrichloride/98-07-7	A	1,2 Diphenylhydrazine/122-66-7
A	Benzyl chloride/100-44-7	*	Endrin/72-20-8
*	Bis(chloroethyl)ether/111-44-4	*	Epichlorohydrin/106-89-8
A	Bis(chloromethyl)ether/542-88-1	*	Ethyl acrylate/140-88-5
K (1)	Bis(2-ethylhexyl)phthalate/ 117-81-7	*	Ethylene dibromide/106-93-4
*	Bromodichloromethane/75-27-4	A	Ethylene thioureae/96-45-7
*	Bromoform/75-25-2	*	Folpet/133-07-3
*	Carbazole/86-74-8	A	Furmecyclox/60568-05-0
*	Carbon tetrachloride/56-23-5	*	Heptachlor/76-44-8
*	Chlordane/57-74-9	*	Heptachlor epoxide/1024-57-3
*	Chlorodibromomethane/124-48-1	*	Hexachlorobenzene/118-74-1
K (2)	Chloroform/67-66-3	*	Hexachlorocyclohexane (alpha)/ 319-84-6
*	Chlorthalonil/1897-45-6	A	Hexachlorocyclohexane (tech.)/ 608-73-1
*	2,4-D/94-75-7	A	Hexachlorodibenzo-p-dioxin, mix/ 19408-74-3
*	DDT/50-29-3	A	Hydrazine/hydrazine sulfate/ 302-01-2

Table E-15. 284-E Power Plant Waste Water Characterization
Analytical Results
Waste Water Characterization for Toxic Pollutants (Page 2 of 2)

ABST / PRST	CONSTITUENT/CAS No.	ABST / PRST	CONSTITUENT/CAS No.
*	Diallate/2303-16-4	*	Lindane/58-89-9
*	1,2 Dibromoethane/106-93-4	A	2 Methylaniline/100-61-8
*	1,4 Dichlorobenzene/106-46-7	A	2 Methylaniline hydrochloride/ 636-21-5
*	3,3' Dichlorobenzidine/91-94-1	A	4,4' Methylene bis(N,N-dimethyl)aniline/101-61-1
*	1,1 Dichloroethane/75-34-3	*	Methylene chloride (dichloromethane)/75-09-2
*	1,2 Dichloroethane/107-06-2	*	Mirex/2385-85-5
A	Nitrofurazone/59-87-0	A	O-phenylenediamine/106-50-3
A	N-nitrosodiethanolamine/ 1116-54-7	*	Propylene oxide/75-56-9
*	N-nitrosodiethylamine/55-18-5	A	2,3,7,8-Tetrachlorodibenzo-p-dioxin/ 1746-01-6
*	N-nitrosodimethylamine/62-75-9	*	Tetrachloroethylene/127-18-4
*	N-nitrosodiphenylamine/86-30-6	A	2,4 Toluenediamine/95-80-7
*	N-nitroso-di-n-propylamine/ 621-64-7	*	o-Toluidine/95-53-4
*	N-nitrosopyrrolidine/930-55-2	*	Toxaphene/8001-35-2
*	N-nitroso-di-n-butylamine/ 924-16-3	*	Trichloroethylene/79-01-6
*	N-nitroso-n-methylethylamine/ 10595-95-6	*	2,4,6-Trichlorophenol/88-06-2
*	PAH/NA	A	Trimethyl phosphate/512-56-1
*	PBBs/NA	*	Vinyl chloride/75-01-4
*	PCBs/(3)		

Source - WHC 1992d

[1] The presence of bis(2-ethylhexyl)phthalate should be evaluated with uncertainty since only low levels (19 µg/L and 25 µg/L) were detected, and bis(2-ethylhexyl)phthalate is a known common laboratory contaminant.

[2] cis-1,3-Dichloropropene (CAS No. 10061-01-5) and trans-1,3-Dichloropropene (CAS No. 10061-02-6).

[3] The PCBs were identified as seven different arochlor compounds as defined below:

- Arochlor-1016 (CAS No. 12674-11-2)
- Arochlor-1221 (CAS No. 11104-28-2)
- Arochlor-1232 (CAS No. 11141-16-5)
- Arochlor-1242 (CAS No. 53469-21-9)
- Arochlor-1248 (CAS No. 12672-29-6)
- Arochlor-1254 (CAS No. 11097-69-1)
- Arochlor-1260 (CAS No. 11096-82-5)

NOTE: Tested and not found. (*) in the ABST column.

Table E-16. B-Plant Cooling Water Waste Water Characterization
Analytical Results
Waste Water Characterization for Toxic Pollutants (Page 1 of 2)

ABST	PRST	CONSTITUENT/CAS No.	ABST	PRST	CONSTITUENT/CAS No.
A		Acrylamide/79-06-1	*		1,2 Dichloropropane/78-87-5
*		Acrylonitrile/107-13-1	*		1,3 Dichloropropene/542-75-6
*		Aldrin/309-00-2	*		Dichlorvos/62-73-7
*		Aniline/62-53-3	*		Dieldrin/60-57-1
*		Aramite/140-57-8	A		3,3' Dimethoxybenzidine/119-90-4
A		Arsenic/7440-38-2	*		3,3 Dimethylbenzidine/119-93-7
A		Azobenzene/103-33-3	A		1,2 Dimethylhydrazine/540-73-8
*		Benzene/71-43-2	*		2,4 Dinitrotoluene/121-14-2
*		Benzidine/92-87-5	*		2,6 Dinitrotoluene/606-20-2
*		Benzo(a)pyrene/50-32-8	*		1,4 Dioxane/123-91-1
A		Benzotrichloride/98-07-7	A		1,2 Diphenylhydrazine/122-66-7
A		Benzyl chloride/100-44-7	*		Endrin/72-20-8
*		Bis(chloroethyl)ether/111-44-4	*		Epichlorohydrin/106-89-8
A		Bis(chloromethyl)ether/542-88-1	*		Ethyl acrylate/140-88-5
*		Bis(2-ethylhexyl)phthalate/ 117-81-7	*		Ethylene dibromide/106-93-4
*		Bromodichloromethane/75-27-4	A		Ethylene thioureae/96-45-7
*		Bromoform/75-25-2	*		Folpet/133-07-3
*		Carbazole/86-74-8	A		Furmecyclox/60568-05-0
*		Carbon tetrachloride/56-23-5	*		Heptachlor/76-44-8
*		Chlordane/57-74-9	*		Heptachlor epoxide/1024-57-3
*		Chlorodibromomethane/124-48-1	*		Hexachlorobenzene/118-74-1
*		Chloroform/67-66-3	*		Hexachlorocyclohexane (alpha)/ 319-84-6
*		Chlorthalonil/1897-45-6	A		Hexachlorocyclohexane (tech.)/ 608-73-1
*		2,4-D/94-75-7	A		Hexachlorodibenzo-p-dioxin, mix/ 19408-74-3
*		DDT/50-29-3	A		Hydrazine/hydrazine sulfate/ 302-01-2
*		Diallate/2303-16-4	*		Lindane/58-89-9

Table E-16. B-Plant Cooling Water Waste Water Characterization
Analytical Results
Waste Water Characterization for Toxic Pollutants (Page 2 of 2)

ABST	PRST	CONSTITUENT/CAS No.	ABST	PRST	CONSTITUENT/CAS No.
*		1,2 Dibromoethane/106-93-4	A		2 Methylaniline/100-61-8
*		1,4 Dichlorobenzene/106-46-7	A		2 Methylaniline hydrochloride/ 636-21-5
*		3,3' Dichlorobenzidine/91-94-1	A		4,4' Methylene bis(N,N-dimethyl)aniline/101-61-1
*		1,1 Dichloroethane/75-34-3	*		Methylene chloride (dichloromethane)/75-09-2
*		1,2 Dichloroethane/107-06-2	*		Mirex/2385-85-5
A		Nitrofurazone/59-87-0	A		O-phenylenediamine/106-50-3
*		N-nitrosodiethanolamine/ 1116-54-7	*		Propylene oxide/75-56-9
*		N-nitrosodiethylamine/55-18-5	A		2,3,7,8-Tetrachlorodibenzo-p-dioxin/ 1746-01-6
*		N-nitrosodimethylamine/62-75-9	*		Tetrachloroethylene/127-18-4
*		N-nitrosodiphenylamine/86-30-6	A		2,4 Toluenediamine/95-80-7
*		N-nitroso-di-n-propylamine/ 621-64-7	*		o-Toluidine/95-53-4
*		N-nitrosopyrrolidine/930-55-2	*		Toxaphene/8001-35-2
*		N-nitroso-di-n-butylamine/ 924-16-3	*		Trichloroethylene/79-01-6
*		N-nitroso-n-methylethylamine/ 10595-95-6	*		2,4,6-Trichlorophenol/88-06-2
*		PAH/NA	A		Trimethyl phosphate/512-56-1
*		PBBs/NA	*		Vinyl chloride/75-01-4
*		PCBs/1336-36-3			

Source - WHC 1992a
(1) Cis 1,3-Dichloropropene (CAS No. 10061-01-5) and trans-1,3 Dichloropropene (CAS No. 10061-02-6).
(2) The PCBs were identified as seven different arochlor compounds as defined below:

- Arochlor-1016 (CAS No. 12674-11-2)
- Arochlor-1221 (CAS No. 11104-28-2)
- Arochlor-1232 (CAS No. 11141-16-5)
- Arochlor-1242 (CAS No. 53469-21-9)
- Arochlor-1248 (CAS No. 12672-29-6)
- Arochlor-12547(CAS No. 11097-69-1)
- Arochlor-1260 (CAS No. 11096-82-5)

Note: Tested and not found. (*) in the ABST column.

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APPENDIX F

STORMWATER

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CONTENTS

FIGURES

CONTENTS (CONT.)

FIGURES

1.0 DO YOU HAVE A STORMWATER NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT?

Note: This answer applies to all six facilities.

__Yes _X_No

2.0 HAVE YOU APPLIED FOR A STORMWATER NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT?

Note: This answer applies to all six facilities.

__Yes _X_No

3.0 ARE YOU COVERED OR HAVE YOU APPLIED FOR COVERAGE UNDER A GENERAL OR GROUP STORMWATER PERMIT?

Note: This answer applies to all six facilities.

_X_Yes __No

4.0 DESCRIBE THE SIZE OF THE STORMWATER COLLECTION AREA.

4.1 242-A EVAPORATOR COOLING WATER

a. Unpaved Area — approximately 37,674 square feet
a. Paved Area — approximately 38,018 square feet
a. Other Collection Areas (Roofs) — approximately 11,324 square feet

4.2 242-A EVAPORATOR STEAM CONDENSATE

a. Unpaved Area — approximately 37,674 square feet
a. Paved Area — approximately 38,018 square feet
a. Other Collection Areas (Roofs) — approximately 11,324 square feet

4.3 241-A TANK FARM COOLING WATER

a. Unpaved Area — approximately 32,787 square feet
a. Paved Area — approximately 10,872 square feet
a. Other Collection Areas (Roofs) — approximately 7,029 square feet

4.4 244-AR VAULT COOLING WATER

a. Unpaved Area — approximately 35,521 square feet
a. Paved Area — approximately 12,034 square feet
a. Other Collection Areas (Roofs) — approximately 12,981 square feet

4.5 284-E POWER PLANT

a. Unpaved Area — approximately 467,158 square feet
a. Paved Area — approximately 107,720 square feet
a. Other Collection Areas (Roofs) — approximately 94,562 square feet

4.6 B PLANT COOLING WATER

a. Unpaved Area — approximately 1,084,107 square feet
a. Paved Area — approximately 1,668,420 square feet
a. Other Collection Areas (Roofs) — approximately 180,512 square feet

5.0 DESCRIBE THE STORMWATER MANAGEMENT SYSTEMS.

Note: The Hanford Site is implementing a stormwater pollution prevention program as described in WHC 1993b.

5.1 242-A EVAPORATOR COOLING WATER

STORMWATER is discharged to the ground via two downspouts, directly from the buildings, and from the paved areas.

5.2 242-A EVAPORATOR STEAM CONDENSATE

STORMWATER is discharged to the ground via two downspouts, directly from the buildings, and from the paved areas.

5.3 241-A TANK FARM COOLING WATER

STORMWATER is discharged directly to the ground from roof areas and paved areas.

5.4 244-AR VAULT COOLING WATER

STORMWATER is discharged to the ground via three downspouts, paved areas, and directly from roof areas.

5.5 284-E POWER PLANT

Stormwater is discharged to the ground via downspouts, directly from roof areas, and from paved areas.

5.6 B PLANT COOLING WATER

Three street drains and one yard drain are connected to the B Plant Chemical Sewer which is combined with the B Plant Cooling Water and disposed of in the 216-B-3 Ponds. The B Plant chemical sewer is temporarily combined with the B Plant cooling water until the 200 Area Treated Effluent Disposal Facility is operational.

One street drain is connected to a small french drain which discharges directly to the ground.

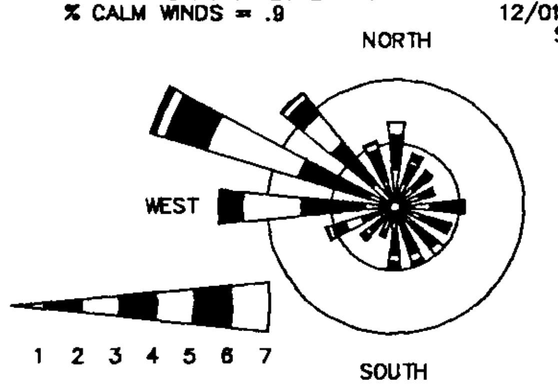
Downspouts from the roof areas discharge water to paved areas which route the water to the street and yard drains mentioned above. Limited amounts of stormwater may discharge directly from the paved areas to the ground.

6.0 ATTACH A MAP SHOWING STORMWATER DRAINAGE/COLLECTION AREAS, DISPOSAL AREAS AND DISCHARGE POINTS.

See Figure F-1 for the legend to the facility figures, Figure F-2 for the 242-A Evaporator Cooling Water and 242-A Evaporator Steam Condensate area, Figure F-3 for the 241-A Tank Farm Cooling Water area, Figure F-4 for the 244-AR Vault Cooling Water area, Figure F-5 for the 284-E Power Plant area, and Figure F-6 for the B Plant Cooling Water area. The figures depict stormwater boundaries that were selected to allow calculation of the stormwater collection areas (Section 4.0) for each facility. With the exception of B Plant, the only drainage/collection areas consist of roofs and downspouts shown on the figures. B Plant has additional street and yard drains that are collection area and are shown of Figure F-6. For all facilities but B Plant, no specific disposal areas and discharge points are shown because the stormwater is discharged directly to the ground in all of the unpaved areas. The B Plant Facility, in addition to directly discharging stormwater to the ground, also has one street drain that is connected to a french drain for disposal of the stormwater (Figure F-5), three street drains, and one yard drain which are connected into the B Plant Chemical Sewer B Plant chemical sewer for disposal currently in the B Pond Complex.

WIND ROSE FOR: 200E AREA
% CALM WINDS = .9

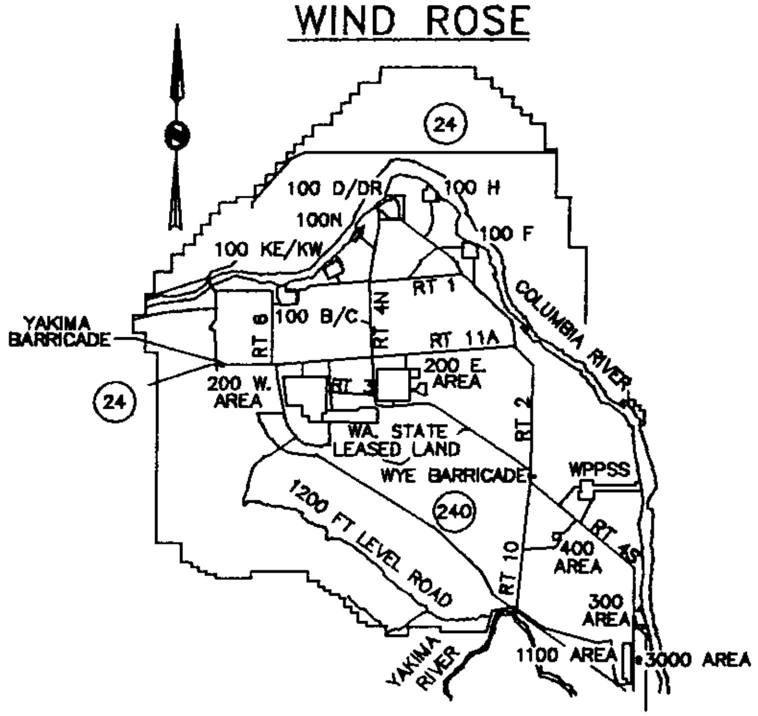
PERIOD COVERED
12/01/85 – 12/31/87
STATION NO. 6



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



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
2-E25-25	WELL 299-E25-25
	SECURITY,WARNING,MISC FENCES
	POST & CHAIN (CRIB,BURIAL GROUND FENCES)
	PERIMETER FENCES
216-A-42	CRIB
218-E-10	BURIAL GROUND
	BUILDINGS/STRUCTURES/TOWERS
242-A	BUILDING NUMBER
	MOBIL OFFICES
	TANKS
	CHEMICAL\RADIOACTIVE STORAGE FACILITIES
	RADIOACTIVE MATERIAL STAGING AREA
	SEPTIC TILE FIELD
	STORM DRAIN AND TILE FIELD (FRENCH DRAIN)
	WASTE OIL
	FLAMMABLE MATERIAL STORAGE LOCKER
	DOWNSPOUTS
	STORM DRAINS

GENERAL NOTES

1. THIS MAP IS BASED ON AERIAL PHOTOGRAPHY FLOWN ON 6-24-89. THE 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. THE NAMES OF PHYSICAL FEATURES AND THE TITLE BLOCK OF THE H-13-000201 THROUGH H-13-000237 MAPS WERE ADDED BY WESTINGHOUSE HANFORD COMPANY.

2. WASHINGTON COORDINATE SYSTEM: THE OFFICIAL STATE PLANE 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 PROJECTIONS

   VERTICAL DATUM: NATIONAL GEODETIC SURVEY DATUM AS PROVIDED BY KAISER ENGINEERS HANFORD.

   COORDINATES ARE SHOWN AS METERS.
   CONTOURS ARE SHOWN AS 0.5 METERS.

3. 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. COORDINATES ARE SHOWN AS FEET.

Figure F-1

REF NUMBER	TITLE
H-13-000178	242-A EVAPORATOR STORMWATER DRAINAGE SYS & MATL STORAGE AREAS
H-13-000179	241-A TANK FARM STORMWATER DRAINAGE SYS & MATL STORAGE AREAS
H-13-000180	244-AR VAULT STORMWATER DRAINAGE SYS & MATL STORAGE AREAS
H-13-000181	284-E POWER PLANT STORMWATER DRAINAGE SYS & MATL STOR AREAS
H-13-000182	B-PLANT STORMWATER DRAINAGE SYSTEMS & MATERIAL STORAGE AREAS

REFERENCE

NEXT USED ON H-13-000200

MFG	REV NO	DESCRIPTION	REV BY DATE	CHK BY DATE	DFTG APRVD DATE	COG ENGR	OTHER	OTHER
						APPROVALS BY/DATE		

REVISIONS

CADFILE N000084A | CADCODE DOS:6.0:ACD2:12.0:SS

		DATE
DRAWN	RAFAEL TORRES	11/6/93
CHECKED		
DFTG APVD		
COG ENGR		
APPVD		
APPVD		
APPVD		

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

GENL NOTES & LEGEND STORMWATER DRAINAGE SYS & MATL STOR AREAS

SIZE	BLDG NO	INDEX NO	DWG NO	REV
B	2000	0110	H-13-000084	0

SCALE AS NOTED | EDT 602486 | SHEET 1 OF 1

DWG NO H-13-000084 | SH 1 OF 1 | REV 0

ZDJB0006

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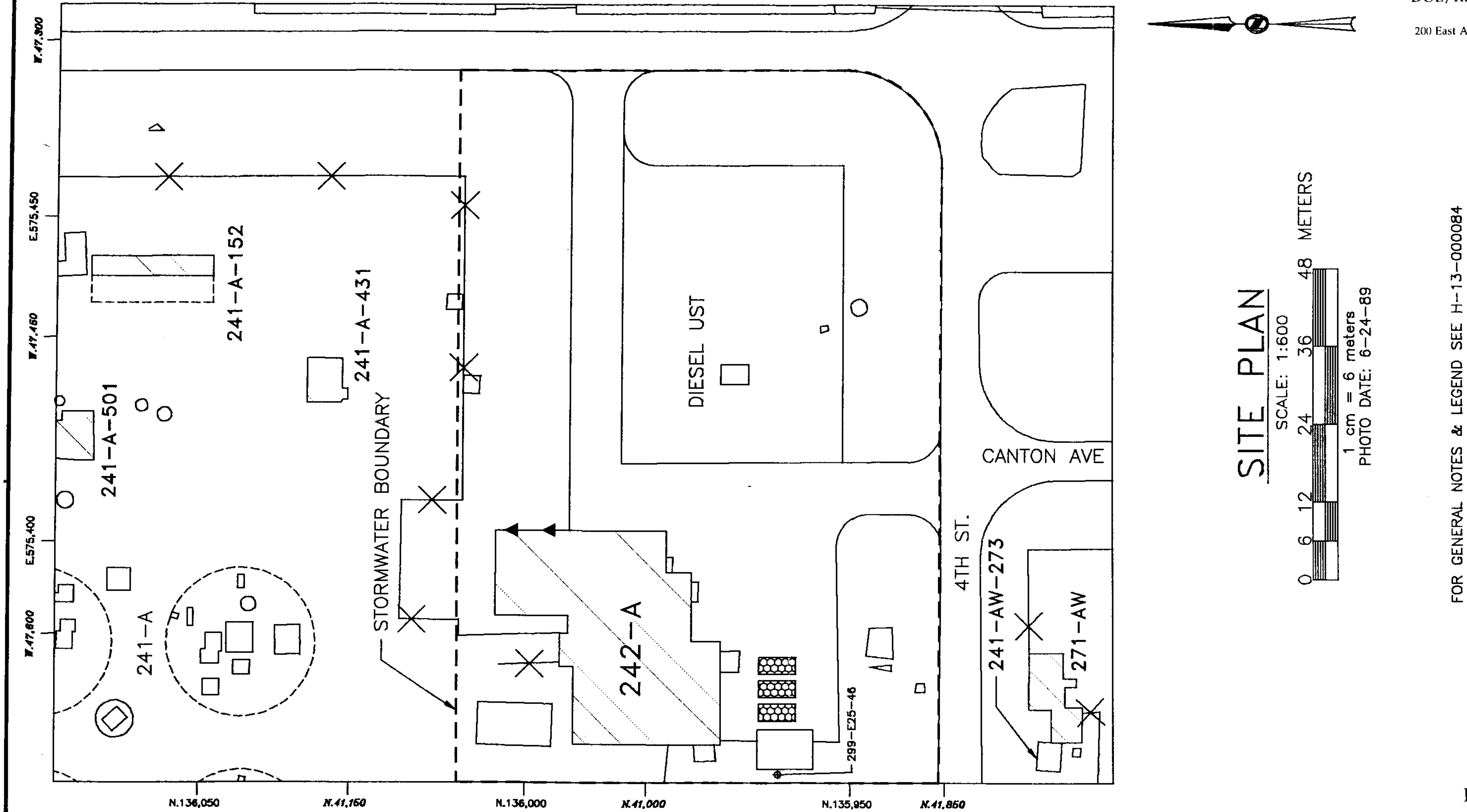

Figure F-2

REF NUMBER	TITLE
H-13-000084	GENL NOTES & LEGEND STORMWATER DRAINAGE SYS & MATL STOR AREAS
H-13-000215	200E AREA TOPOGRAPHIC MAP
H-13-000223	200E AREA TOPOGRAPHIC MAP

REFERENCE

NEXT USED ON: H-13-000200

MFG	REV NO	DESCRIPTION	REV BY DATE	CHK BY DATE	DFTG APRVD DATE	COG ENGR	OTHER	OTHER

REVISIONS — APPROVALS BY/DATE

CADFILE N000178A — CADCODE DOS:6.0:ACD2:12.0:SS

		DATE
DRAWN	RAFAEL TORRES	11/4/93
CHECKED		
DFTG APVD		
COG ENGR		
APPVD		
APPVD		
APPVD		

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

EVAPORATOR STORMWATER DRAINAGE SYS & MATL STORAGE AREAS

SIZE	BLDG NO	INDEX NO	DWG NO	REV
B	242-A	0110	H-13-000178	0

SCALE AS NOTED — EDT 602487 — SHEET 1 OF 1

DWG NO H-13-000178 SH 1 OF 1 REV 0

ZDJB0006

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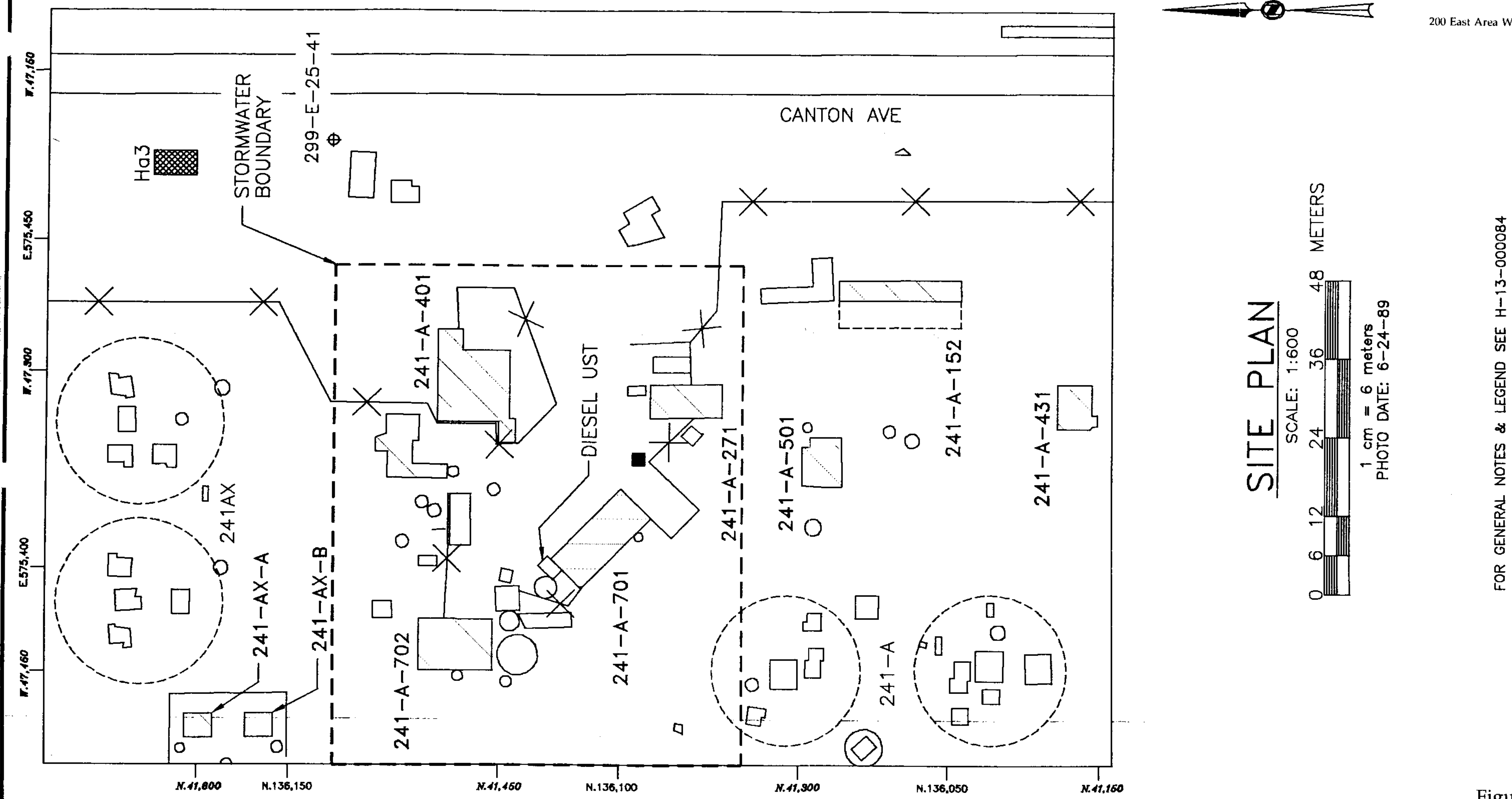

Figure F-3

9413206.0231

H-13-000084 GENL NOTES & LEGEND STORMWATER DRAINAGE SYS & MATL STOR AREAS
H-13-000215 200E AREA TOPOGRAPHIC MAP
H-13-000200 200E AREA TOPOGRAPHIC MAP
REF NUMBER — TITLE
REFERENCE
NEXT USED ON H-13-000200

MFG | REV NO | DESCRIPTION | REV BY DATE | CHK BY DATE | DFTG APRVD DATE | COG ENGR | OTHER | OTHER
APPROVALS BY/DATE
REV REL — REVISIONS
CADFILE N000179A — CADCODE DOS:6.0:ACD2:12.0:SS

DRAWN RAFAEL TORRES — DATE 11/5/93
CHECKED
DFTG APVD
COG ENGR
APPVD
APPVD
APPVD

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

TANK FARM STORMWATER
DRAINAGE SYS & MATL STORAGE AREAS

SIZE B | BLDG NO 241-A | INDEX NO 0110 | DWG NO H-13-000179 | REV 0
SCALE AS NOTED | EDT 602487 | SHEET 1 OF 1

DWG NO H-13-000179 SH 1 OF 1 REV 0

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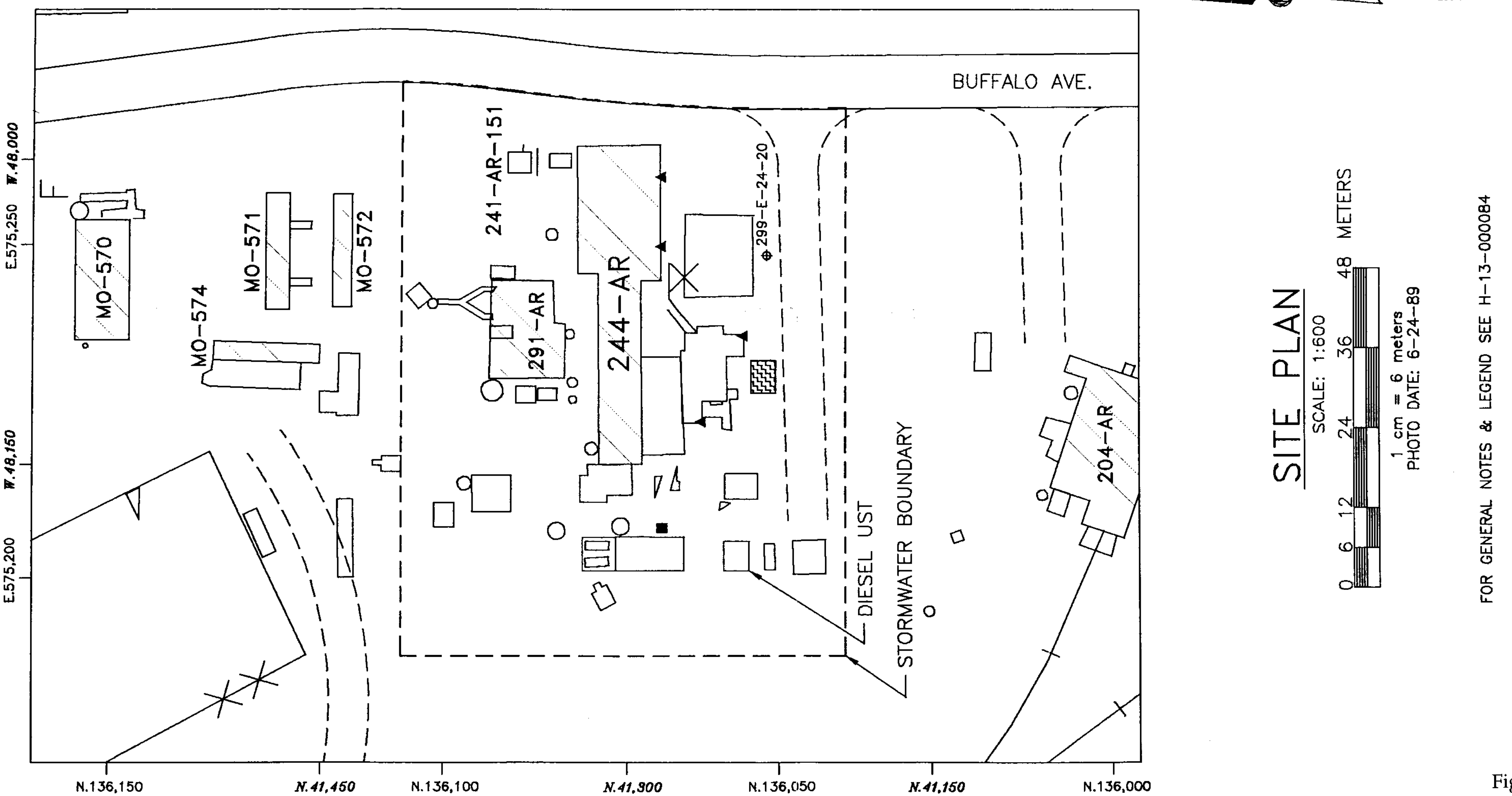

Figure F-4

REF NUMBER	TITLE
H-13-000084	GENL NOTES & LEGEND STORMWATER DRAINAGE SYS & MATL STOR AREAS
H-13-000215	200E AREA TOPOGRAPHIC MAP
H-13-000200	200E AREA TOPOGRAPHIC MAP

REFERENCE

NEXT USED ON H-13-000200

MFG	REV NO	DESCRIPTION	REV BY DATE	CHK BY DATE	DFTG APRVD DATE	COG ENGR	OTHER	OTHER
						APPROVALS BY/DATE		

REV REL — REVISIONS

CADFILE N000180A — CADCODE DOS:6.0:ACD2:12.0:SS

		DATE
DRAWN	RAFAEL TORRES	11/5/93
CHECKED		
DFTG APVD		
COG ENGR		
APPVD		
APPVD		
APPVD		

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

VAULT STORMWATER
DRAINAGE SYS & MATL STORAGE AREAS

SIZE	BLDG NO	INDEX NO	DWG NO	REV
B	244-AR	0110	H-13-000180	0

SCALE AS NOTED — EDT 602487 — SHEET 1 OF 1

REV 0 — 1 OF 1 — SH 1 — DWG NO H-13-000180

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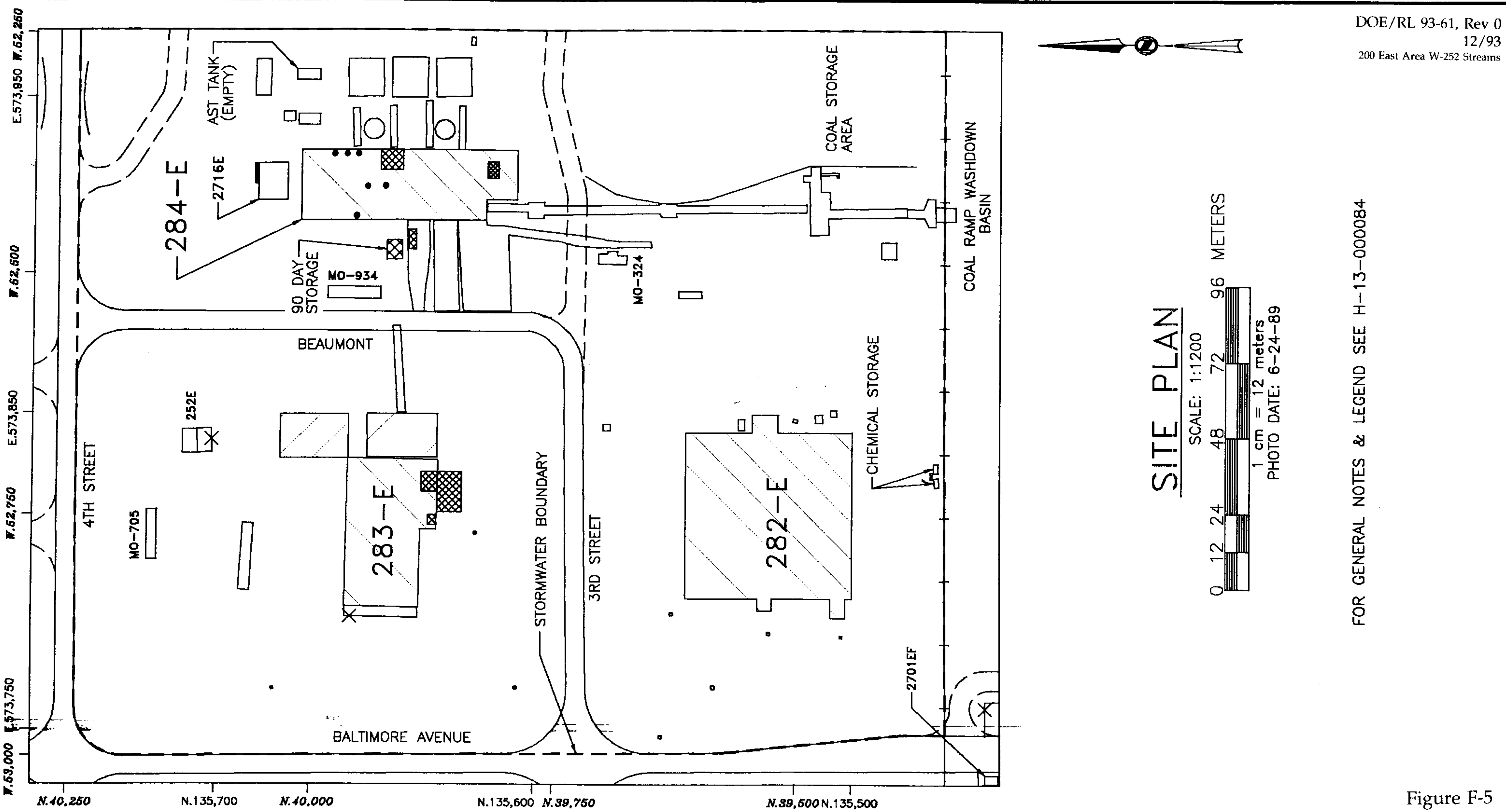

Figure F-5

REF NUMBER	TITLE
H-13-000084	GENL NOTES & LEGEND STORMWATER DRAINAGE SYS & MATL STOR AREAS
H-13-000222	200E AREA TOPOGRAPHIC MAP
H-13-000200	200E AREA TOPOGRAPHIC MAP

REFERENCE

NEXT USED ON H-13-000200

MFG	REV NO	DESCRIPTION	REV BY DATE	CHK BY DATE	DFTG APRVD DATE	COG ENGR	OTHER	OTHER

REVISIONS — APPROVALS BY/DATE

CADFILE N000181A — CADCODE DOS:6.0:ACD2:12.0:SS

		DATE
DRAWN	RAFAEL TORRES	11/6/93
CHECKED		
DFTG APVD		
COG ENGR		
APPVD		
APPVD		
APPVD		

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

POWER PLANT STORMWATER
DRAINAGE SYS & MATL STOR AREAS

SIZE	BLDG NO	INDEX NO	DWG NO	REV
B	284-E	0110	H-13-000181	0

SCALE AS NOTED — EDT 602487 — SHEET 1 OF 1

DWG NO H-13-000181 SH 1 OF 1 REV 0

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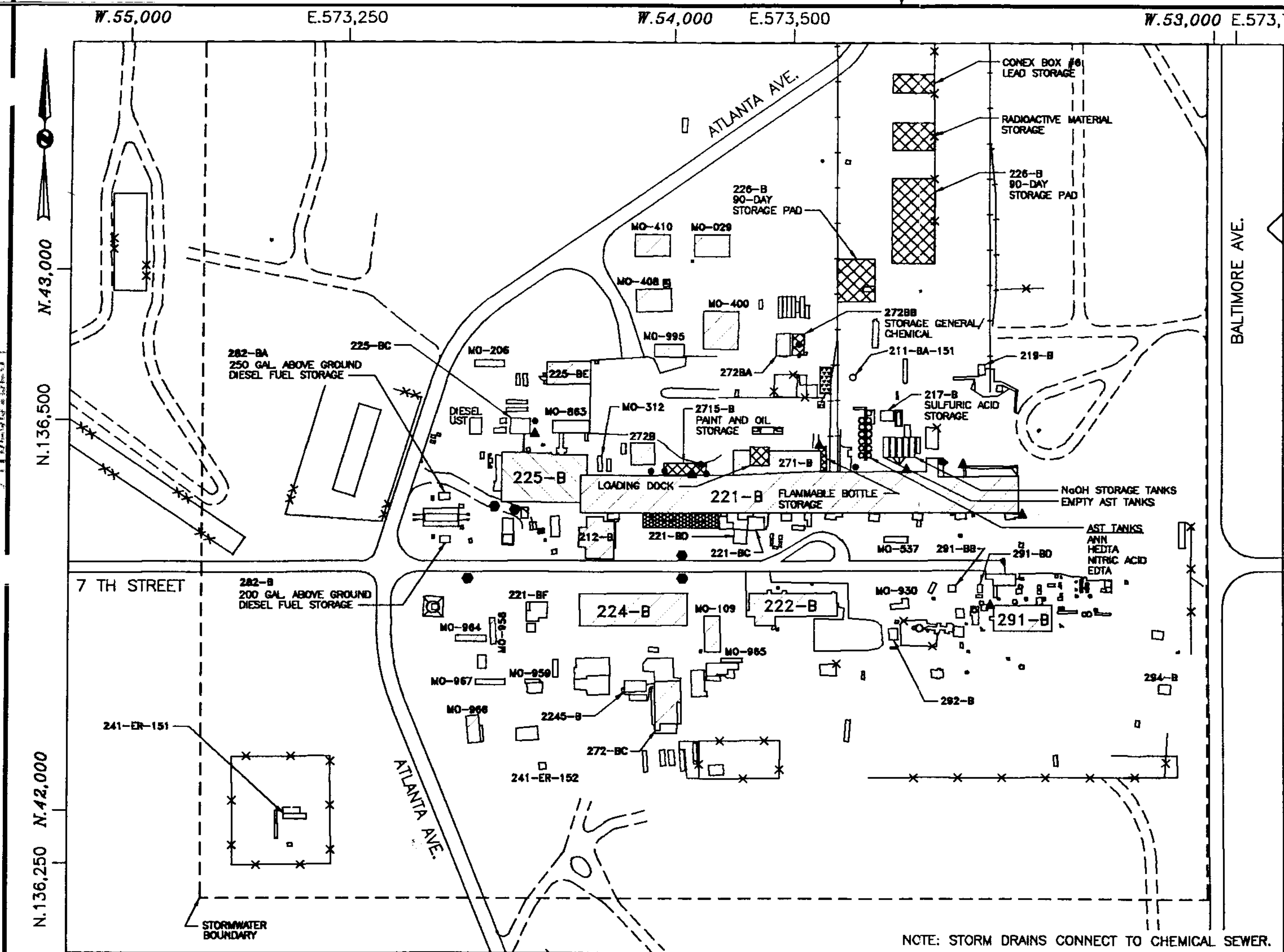
FOR GENERAL NOTES & LEGEND SEE H-13-000084



SITE PLAN

SCALE: 1:2500

0 25 50 100 150 200 METERS

1 cm = 25 meters
PHOTO DATE: 6-24-89

Figure F-6

REF NUMBER	TITLE
H-13-000084	GENL NOTES & LEGEND STORMWATER DRAINAGE SYS & MATL STOR AREAS
H-13-000214	200E AREA TOPOGRAPHIC MAP
H-13-000200	200E AREA TOPOGRAPHIC MAP

REFERENCE

NEXT USED ON H-13-000200

MFG	REV NO	DESCRIPTION	REV BY DATE	CHK BY DATE	DFTG APRVD DATE	COG ENGR	OTHER	OTHER

REV REL — REVISIONS — APPROVALS BY/DATE

CADFILE N000182A — CADCODE DOS:6.0:ACD2:12.0:SS

		DATE
DRAWN	RAFAEL TORRES	11/4/93
CHECKED		
DFTG APVD		
COG ENGR		
APPVD		
APPVD		
APPVD		

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

B-PLANT STORMWATER DRAINAGE SYSTEMS & MATERIAL STORAGE AREAS

SIZE	BLDG NO	INDEX NO	DWG NO	REV
B	200G	0110	H-13-000182	0

SCALE AS NOTED — EDT 602487 — SHEET 1 OF 1

DWG NO H-13-000182 SH 1 OF 1 REV 0

ZDJB0006

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APPENDIX G

OTHER INFORMATION

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CONTENTS

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1.0 DESCRIBE LIQUID WASTES OR SLUDGES BEING GENERATED THAT ARE NOT DISPOSED OF IN THE WASTE STREAM(S).

1.1 242-A EVAPORATOR COOLING WATER

- The sanitary sewer from the facility is disposed of to a septic tank and drain field system.
- The Radioactive/Hazardous waste lines that flow through the facility are disposed of in the 241-AW Tank Farm. These Radioactive/Hazardous wastes are not generated at this facility, but are piped through the facility to evaporate water from the waste stream and concentrate the waste for disposal in the tank farm listed above.
- Process condensate from the evaporation and concentration of the radioactive/hazardous wastes is directed to the Liquid Effluent Retention Facility and will be subsequently directed to the 200 Area Effluent Treatment Facility for disposal, when the Effluent Treatment Facility is operational.

1.2 242-A EVAPORATOR STEAM CONDENSATE

- The sanitary sewer from the facility is disposed of to a septic tank and drain field system.
- The Radioactive/Hazardous waste lines that flow through the facility are disposed of in the 241-AW Tank Farm. These Radioactive/Hazardous wastes are not generated at this facility, but are piped through the facility to evaporate water from the waste stream and concentrate the waste for disposal in the tank farm listed above.
- Process condensate from the evaporation and concentration of the radioactive/hazardous wastes is directed to the Liquid Effluent Retention Facility and subsequently directed to the 200 Area Effluent Treatment Facility for disposal.

1.3 241-A TANK FARM COOLING WATER

- The sanitary sewer from the facility is disposed of to a septic tank and drain field system.
- Waste oil is disposed of in a 55 gallon drum stored outside in an uncovered area.

1.4 244-AR VAULT COOLING WATER

- The sanitary sewer from the facility is disposed of to a septic tank and drain field system.

- The 244-AR Vault is currently inactive, but when it did operate, radioactive/hazardous waste from B Plant was sent to the 244-AR Vault, prior to disposal in the AY Tank Farm (102 AY Tank).

- Waste oil is disposed of in a 55 gallon drum stored outside in an uncovered area.

1.5 284-E POWER PLANT

- The 284-E Power Plant ash waste water is disposed of in the ash disposal basin.

- The coal ramp is washed with raw water and the waste water is discharged to a basin.

1.6 B PLANT COOLING WATER

- B Plant Chemical Sewer temporarily is combined with the B Plant Cooling Water and is discharged to the B Ponds. The B Plant chemical sewer is temporarily combined with the B Plant cooling water until the 200 Area Treated Effluent Disposal Facility is operational.

- Low Level Radioactive Liquid is generated in maintaining the radioactive waste stored in B Plant and is temporarily stored in a 900 gallon tank in B Plant, prior to transfer to the double shell underground storage tanks in the 242-AW Tank Farm.

2.0 DESCRIBE THE STORAGE AREAS FOR RAW MATERIALS, PRODUCTS, AND WASTES.

2.1 242-A EVAPORATOR COOLING WATER

Raw Materials: Dilute Radioactive/Hazardous wastes are stored in double shell tanks in the 241-AW Tank Farm prior to processing by the 242-A Evaporator.

Products: Concentrated Radioactive/Hazardous wastes are stored in double shell tanks in the 241-AW Tank Farm after the waste are concentrated by evaporation in the 242-A Evaporator.

Wastes: The sanitary sewer from the facility is disposed of to a septic tank and drain field system. The solids are retained in the septic tank prior to periodic pumping and disposal off site. Radioactive/hazardous wastes are stored in double shell tanks in the 241-AW Tank Farm. Process condensate is stored at the Liquid Effluent Retention Facility prior to disposal at the 200 Area Effluent Treatment Facility.

2.2 242-A EVAPORATOR STEAM CONDENSATE

Raw Materials: Dilute Radioactive/Hazardous wastes are stored in double shell tanks in the 241-AW Tank Farm prior to processing by the 242-A Evaporator.

Products: Concentrated Radioactive/Hazardous wastes are stored in double shell tanks in the 241-AW Tank Farm after the wastes are concentrated by evaporation in the 242-A Evaporator.

Wastes: The sanitary sewer from the facility is disposed of to a septic tank and drain field system. The solids are retained in the septic tank prior to periodic pumping and disposal off site. Radioactive/hazardous wastes are stored in double shell tanks in the 241-AW Tank Farm. Process condensate is stored at the Liquid Effluent Retention Facility prior to disposal at the 200 Area Effluent Treatment Facility.

2.3 241-A TANK FARM COOLING WATER

Raw Materials: None

Products: None

Wastes: The sanitary sewer from the facility is disposed of to a septic tank and drain field system. The solids are retained in the septic tank prior to periodic pumping and disposal off site. Waste oil is disposed of in a 55 gallon drum stored outside on an uncovered asphalt surface.

2.4 244-AR VAULT COOLING WATER

Raw Materials: None

Products: None

Wastes: The sanitary sewer from the facility is disposed of to a septic tank and drain field system. The solids are retained in the septic tank prior to periodic pumping and disposal off site. Waste oil is disposed of in a 55 gallon drum stored outside on an uncovered gravel surface. When the facility was operating, radioactive/hazardous waste from B Plant was sent to the 244-AR Vault and stored in the vault facility, prior to disposal in the AY Tank Farm (102 AY Tank).

2.5 284-E POWER PLANT

Raw Materials: Coal is stored outside in a pile on a gravel surface.

Products: Steam is used to generate electricity and is distributed through steam lines to other facilities for heating.

Wastes: The 284-E Power Plant ash waste water is disposed of in the ash disposal basin. The coal ramp waste water is discharged to a basin.

2.6 B PLANT COOLING WATER

Raw Materials: None

Products: None

Wastes: Low Level Radioactive Liquid is generated in maintaining the radioactive waste stored in B Plant and is temporarily stored in a 900 gallon tank in B Plant, prior to transfer to the double shell underground storage tanks in the 242-AW Tank Farm.

3.0 HAVE YOU DESIGNATED YOUR WASTES ACCORDING TO THE PROCEDURES OF DANGEROUS WASTE REGULATIONS, CHAPTER 173-303 WAC?

_X_ Yes __No

Note: This answer applies for all six streams.

4.0 WASTE HAULED OFF-SITE BY:

Note: This information applies to all six facilities.

_X_Wastehauler _X_Self __Other (identify) ____________________

Name: WHC Sanitary Systems Maintenance
Address: P.O. Box 1970, MSIN # S4-61
City/State: Richland, WA 99352
Telephone: (509) 373-5786

Name: Super Pump
Address: Route 2, Box 2911-B
City/State: Kennewick, WA 99337
Telephone: (509) 582-6529

5.0 HAVE YOU FILED A SARA TITLE 313 DISCLOSURE?

_X_ Yes   __ No

Note: This answer applies for all six streams.

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APPENDIX H

SITE ASSESSMENT

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CONTENTS

CONTENTS (CONT.)

FIGURES

PLATES

1.0 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 THE LAND FOR TREATMENT.

Legal Description:

The land treatment sites have the following acreages:

216-B-3 Pond: approximately 35 acres;
216-B-3A Pond: approximately 11 acres;
216-B-3B Pond: approximately 11 acres;
216-B-3C Pond: approximately 41 acres;
216-B-3-3 Trench: approximately 2.5 acres;
284-E Powerhouse Ditch: approximately 1.6 acres.

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

2.0 LIST ALL ENVIRONMENTAL CONTROL PERMITS OR APPROVALS NEEDED FOR THIS PROJECT; FOR EXAMPLE, SEPTIC TANK PERMITS, SLUDGE APPLICATION PERMITS, OR AIR EMISSIONS PERMITS.

The following apply to this project:

- Hanford Site Radioactive Air Emissions Permit: Number FF-01;
- Hanford Site Dangerous Waste Permit: Number WA7890008967;
- Resource Conservation and Recovery Act interim status for B Pond System (to B Pond units).

Additional permits specific to each facility are listed below.

2.1 242-A EVAPORATOR COOLING WATER

- Underground Storage Tank Permit, Tank Number 242-A-1;
- Dangerous Waste Permit, interim status.

2.2 242-A EVAPORATOR STEAM CONDENSATE

- Underground Storage Tank Permit, Tank Number 242-A-1.

2.3 241-A TANK FARM COOLING WATER

- Underground Storage Tank Permit, Tank Number 241-A-701;

- Underground Storage Tank Permit, Tank Number 241-A-701-2;
- Dangerous Waste Permit, interim status.

2.4 244-AR VAULT COOLING WATER

- Underground Storage Tank Permit, Tank Number 244-AR.

2.5 284-E POWER PLANT

- No facility specific environmental control permits.

2.6 B PLANT COOLING WATER

- Underground Storage Tank Permit, Tank Number TK-101;
- Dangerous Waste Permit, interim status.

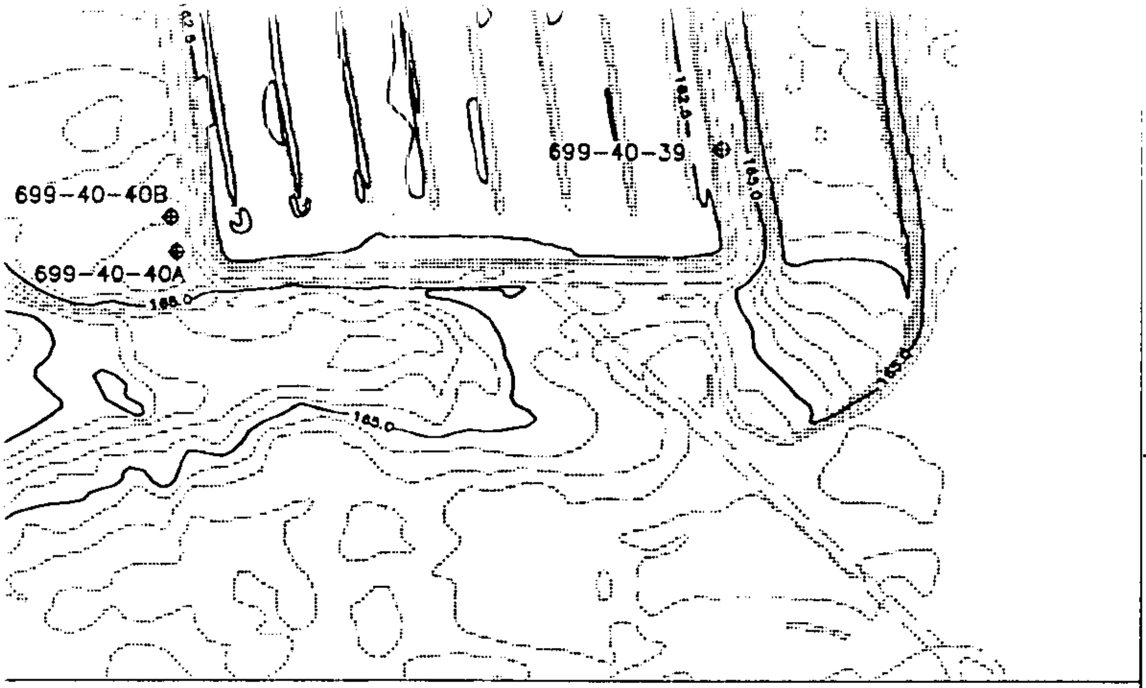
<u>3.0 ATTACH A TOPOGRAPHIC MAP WITH CONTOUR INTERVALS USED BY USGS. SHOW THE FOLLOWING ON THIS MAP:</u>

a. Location and name of internal and adjacent streets,
b. Surface water drainage systems,
c. Water supply and other wells within 500 feet of the site,
d. Surface water diversions within 500 feet of the site,
e. Chemical and product handling and storage facilities,
f. Infiltration sources, such as drainfields, lagoons, dry wells, and abandoned wells within 500 feet of the site,
g. Waste water and cooling water discharge points with ID numbers (See Section C.1),
h. Other activities and land uses within 1/4 mile of the site.

Plate H-1 shows the above listed items with the exception of item e (chemical and product handling and storage areas). Figure H-1 serves as a location map for the facilities in relation to B Pond and the Powerhouse Waste Water Ditch. The chemical and product handling and storage areas are shown on the facility maps in Appendix F, Section 6, because the disposal site is not located adjacent to any of the six facilities that are producing waste streams and have chemical and product handling and storage areas.

Waste water and cooling water discharge points are shown for each of the six waste streams, which include all component substreams prior to discharge.

N.40,000



N.135,500

ST B-PONDS
S-B DITCH

WN RAFAEL TORRES	DATE 11-4-93	
CKED L.J. Robinson	11-4-93	
APVD	11-5-93	
ENGR B.P. Alencar	11-5-93	
'D		
'D		
'D		
'D		
'D		
'D		

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

B-POND DISPOSAL COMPLEX

SIZE	BLDG NO	INDEX NO	DWG NO	REV
F	2006	0110	H-13-000176	0
SCALE AS NOTED		EDT 602483	SHEET 1 OF 1	

A

2 CHK PRINT DATE COMMENT PRINT DATE 1

DWG NO H-13-000176 SH 1 OF 1 REV 0

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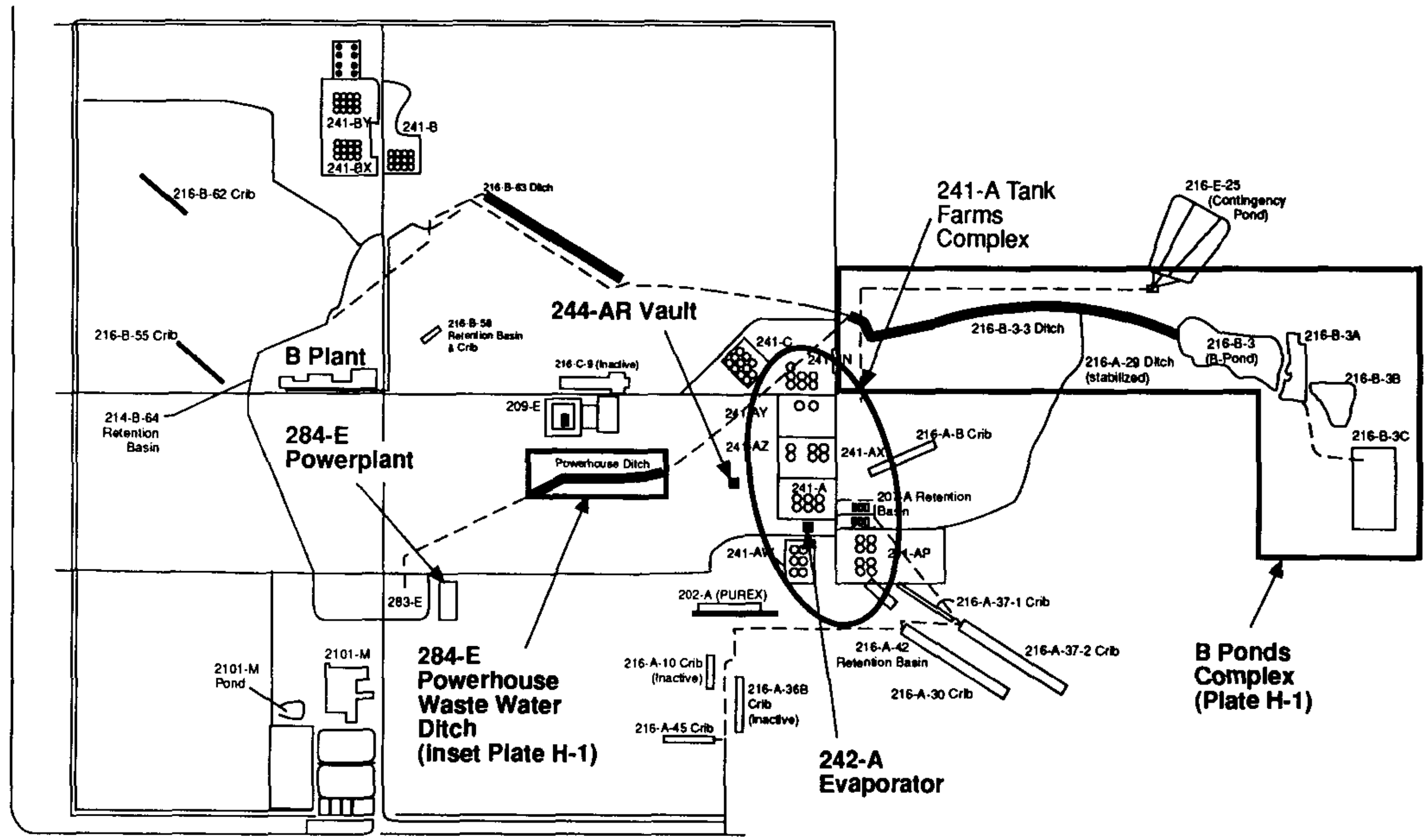


Source: WHC 1992a.

913 1728.013/47607/11-10-93

Figure H-1. 200 East Area W-252 Facilities Location Map.

4.0 IDENTIFY ALL WELLS WITHIN 500 FEET OF THE SITE. ATTACH WELL LOGS WHEN AVAILABLE AND ANY AVAILABLE WATER QUALITY DATA.

Monitoring wells within 500 feet of the B Pond Complex and the 216-B-3-3 Ditch which transmits the waste water from the six streams to the B Pond Complex include:

699-40-39	699-43-41DP
699-40-40A	699-43-42
699-40-40B	699-43-42J
699-41-40	699-43-42K
699-42-39A	699-43-42AP
699-42-40A	699-43-42BP
699-42-40B	699-43-42CP
699-42-40C	699-43-42DP
699-42-41	699-43-42EP
699-42-42	699-43-42FP
699-42-42A	699-43-42GP
699-42-42B	699-43-42HP
699-43-40	699-43-43
699-43-41A	699-43-45
699-43-41B	699-44-41
699-43-41E	699-44-42
699-43-41F	699-44-43B
699-43-41G	
699-43-41CP	

The following well logs from the *216-B-3 Pond System Closure/Postclosure Plan*, (DOE-RL 1990) are attached.

699-40-39	699-41-40
699-42-40A	699-42-42B
699-43-41E	699-43-41F
699-43-42J	699-43-43
699-43-45	699-44-42
699-44-43B	

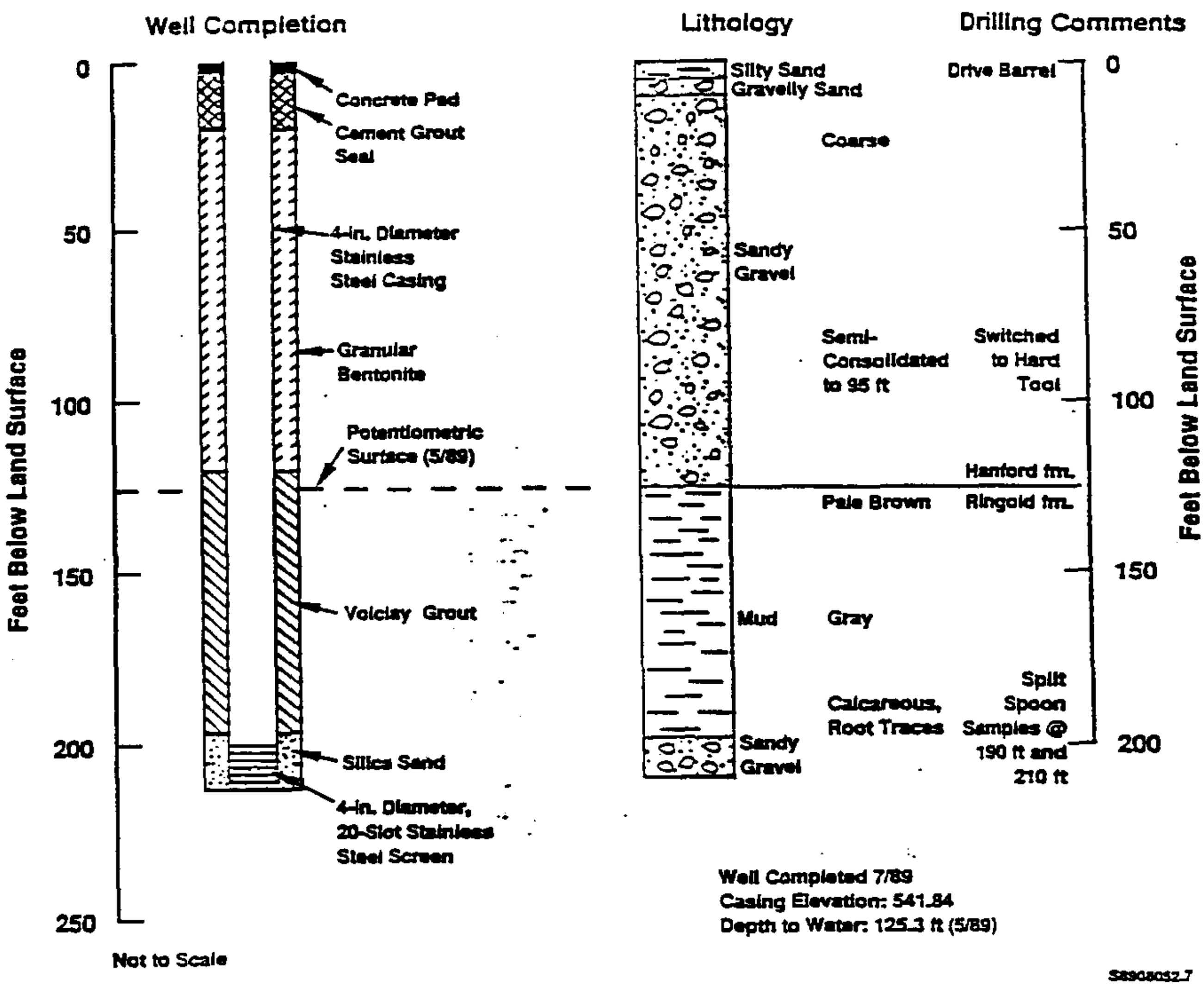
The following well logs obtained from the WHC Geosciences Department project files, are also attached.

699-40-40A	699-40-40B
699-42-39A	699-42-40C
699-42-41	699-43-40
699-43-41G	299-E26-13

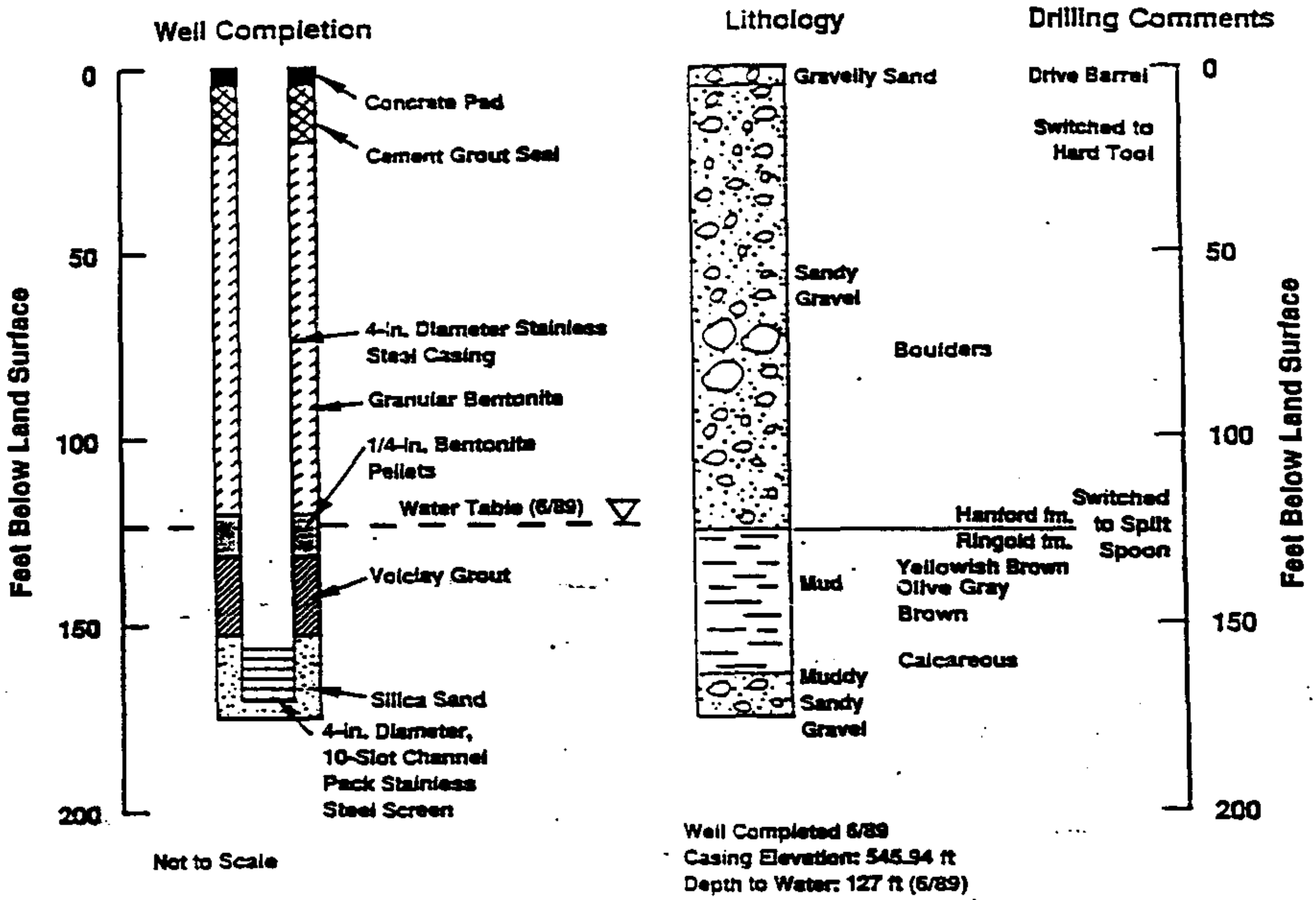
No wells are present within 500 feet of the powerhouse waste water ditch shown in the inset on Plate H-1.

9413206.0254

699-40-39 (BP-5)

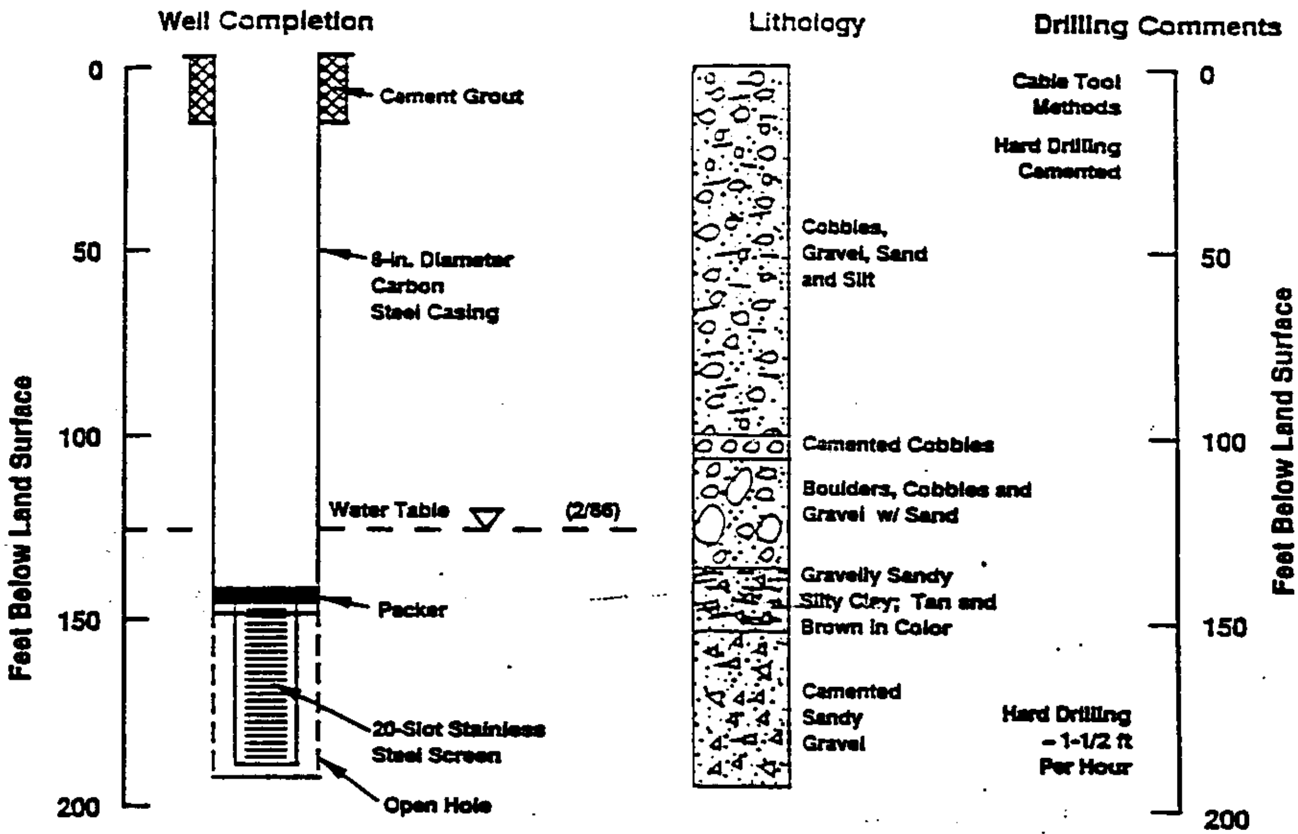


699-41-40 (BP-6)



S8908052.9

699-42-40A

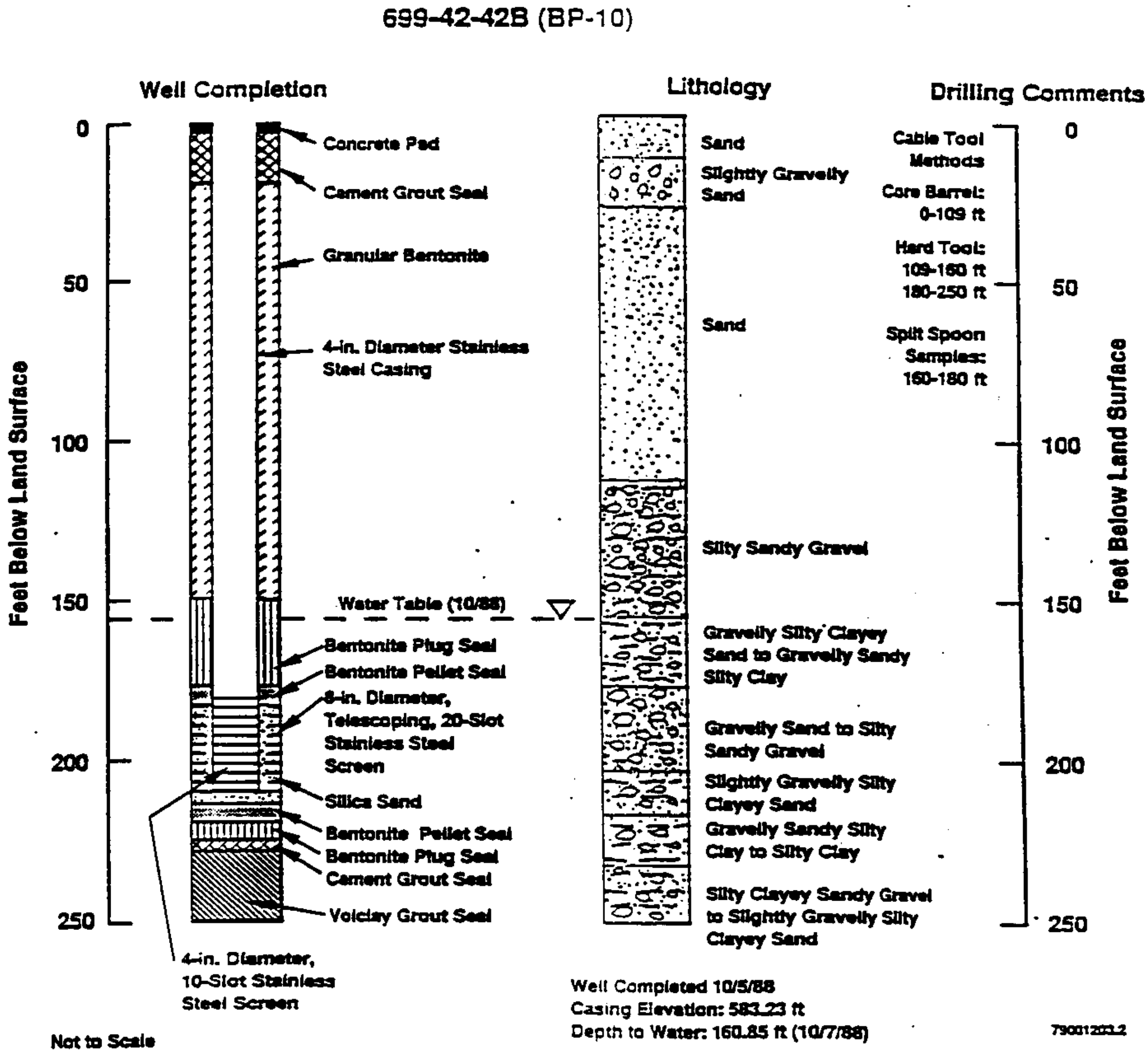


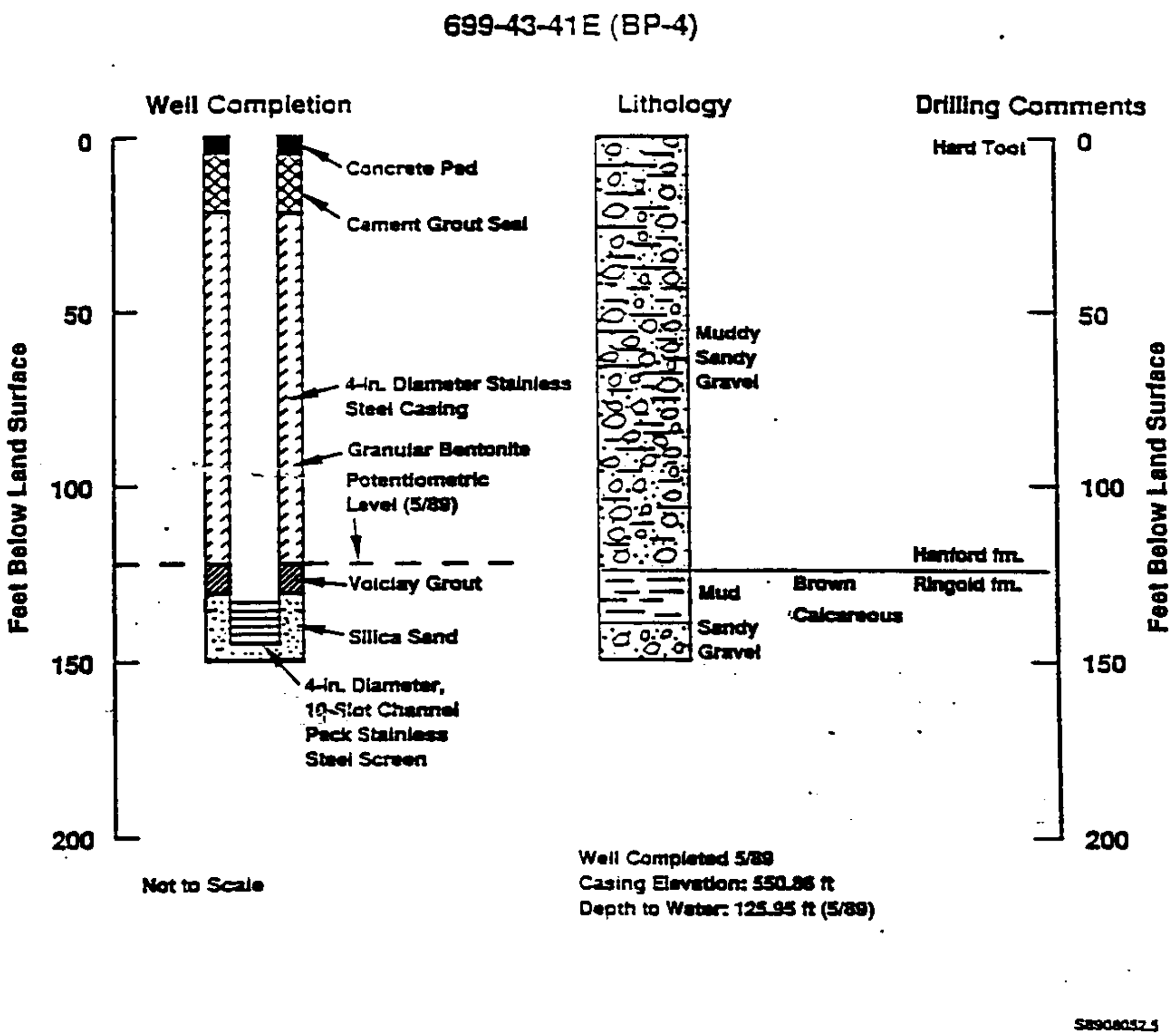
Not to Scale

Well Completed 7/81
Casing Elevation: 545.53 ft
Depth to Water: 124.50 ft (12/86)

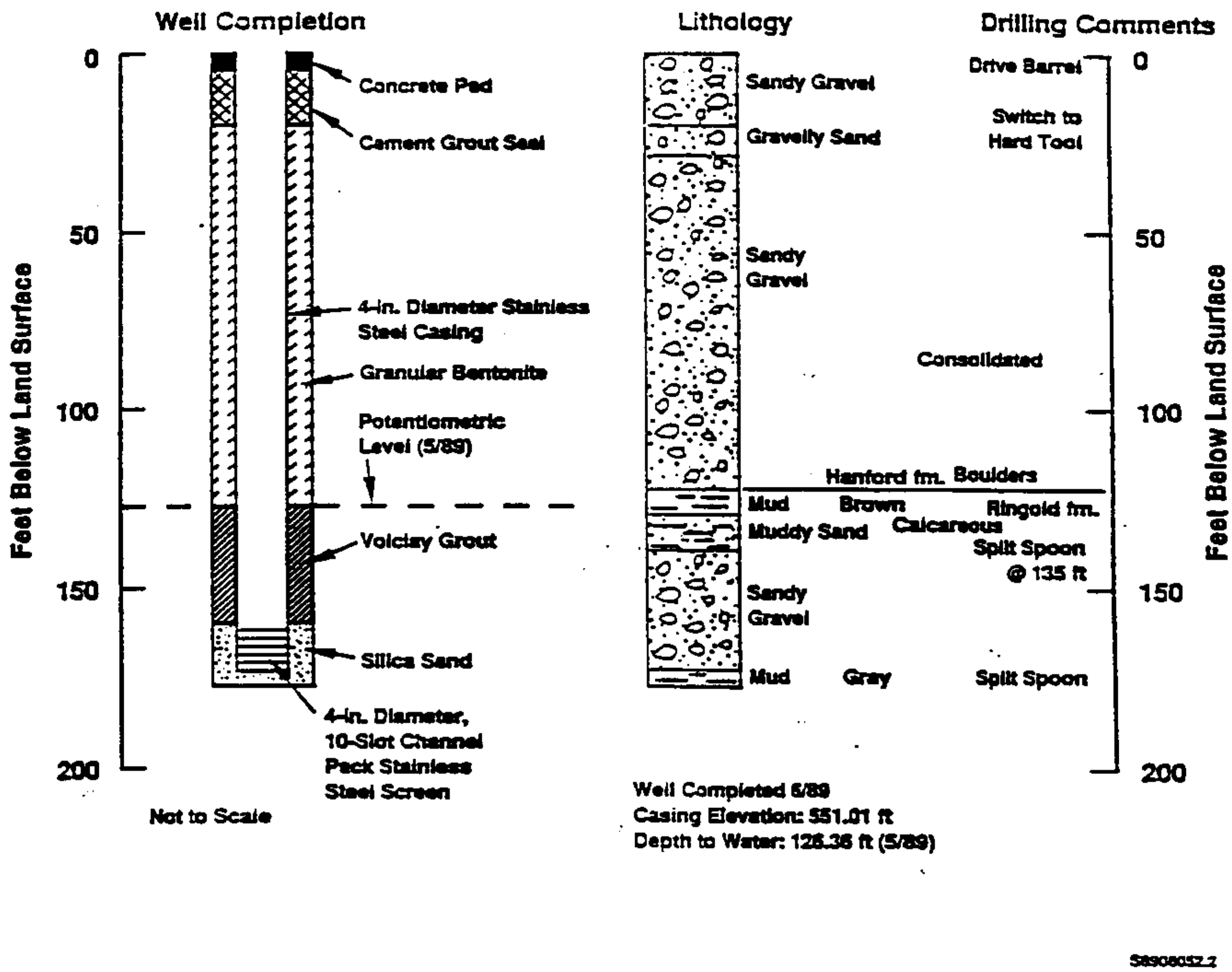
79001203.8

9413206.0257

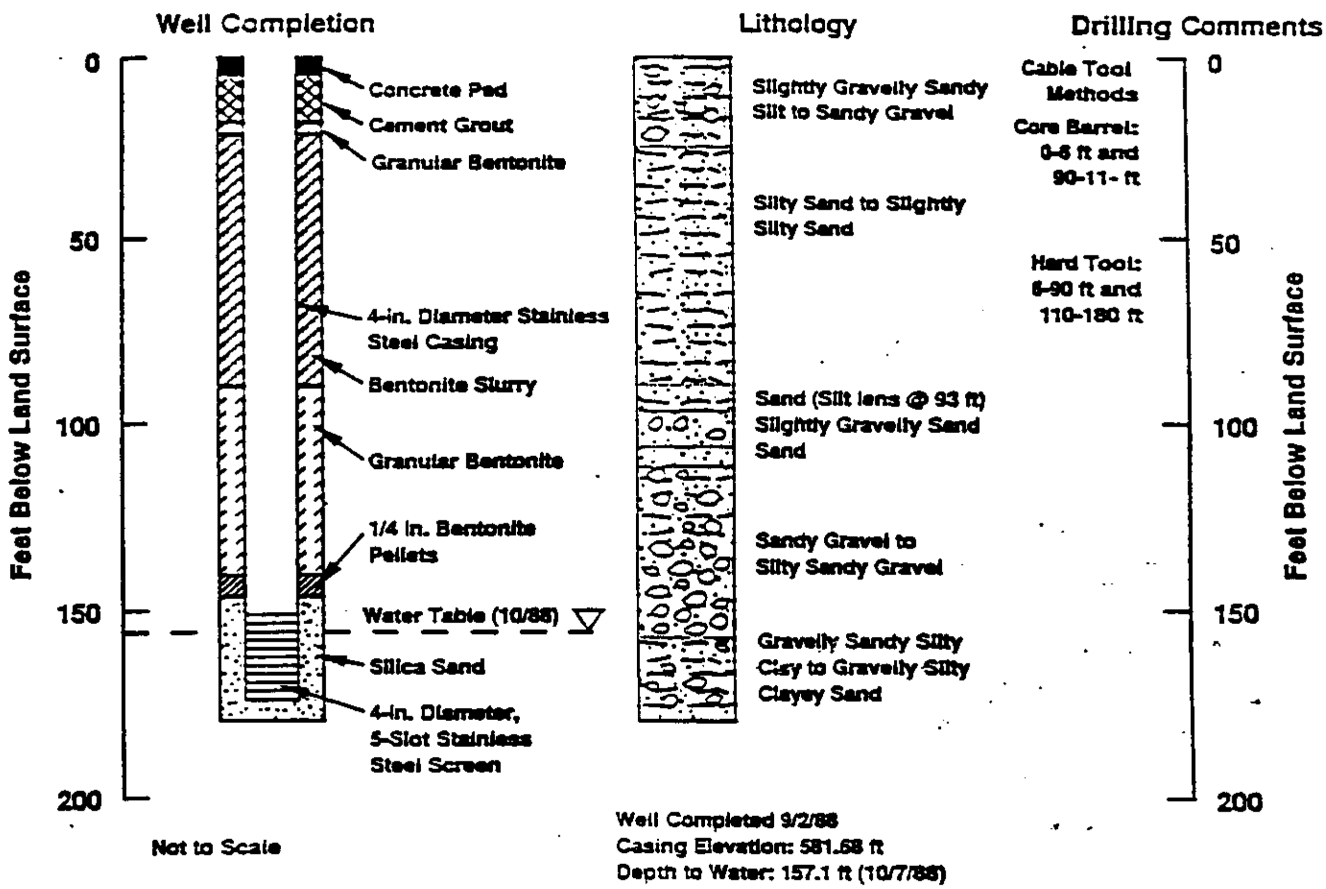



699-43-41E (BP-4)
Well Completion
Lithology
Drilling Comments
Feet Below Land Surface
0
50
100
150
200
Concrete Pad
Cement Grout Seal
4-in. Diameter Stainless Steel Casing
Granular Bentonite
Potentiometric Level (5/89)
Volclay Grout
Silica Sand
4-in. Diameter, 10-Slot Channel Pack Stainless Steel Screen
Muddy Sandy Gravel
Mud
Sandy Gravel
Brown
Calcareous
Hard Tool
Hanford fm.
Ringold fm.
Not to Scale
Well Completed 5/89
Casing Elevation: 550.86 ft
Depth to Water: 125.95 ft (5/89)
S8908052.5

699-43-41F (BP-9)

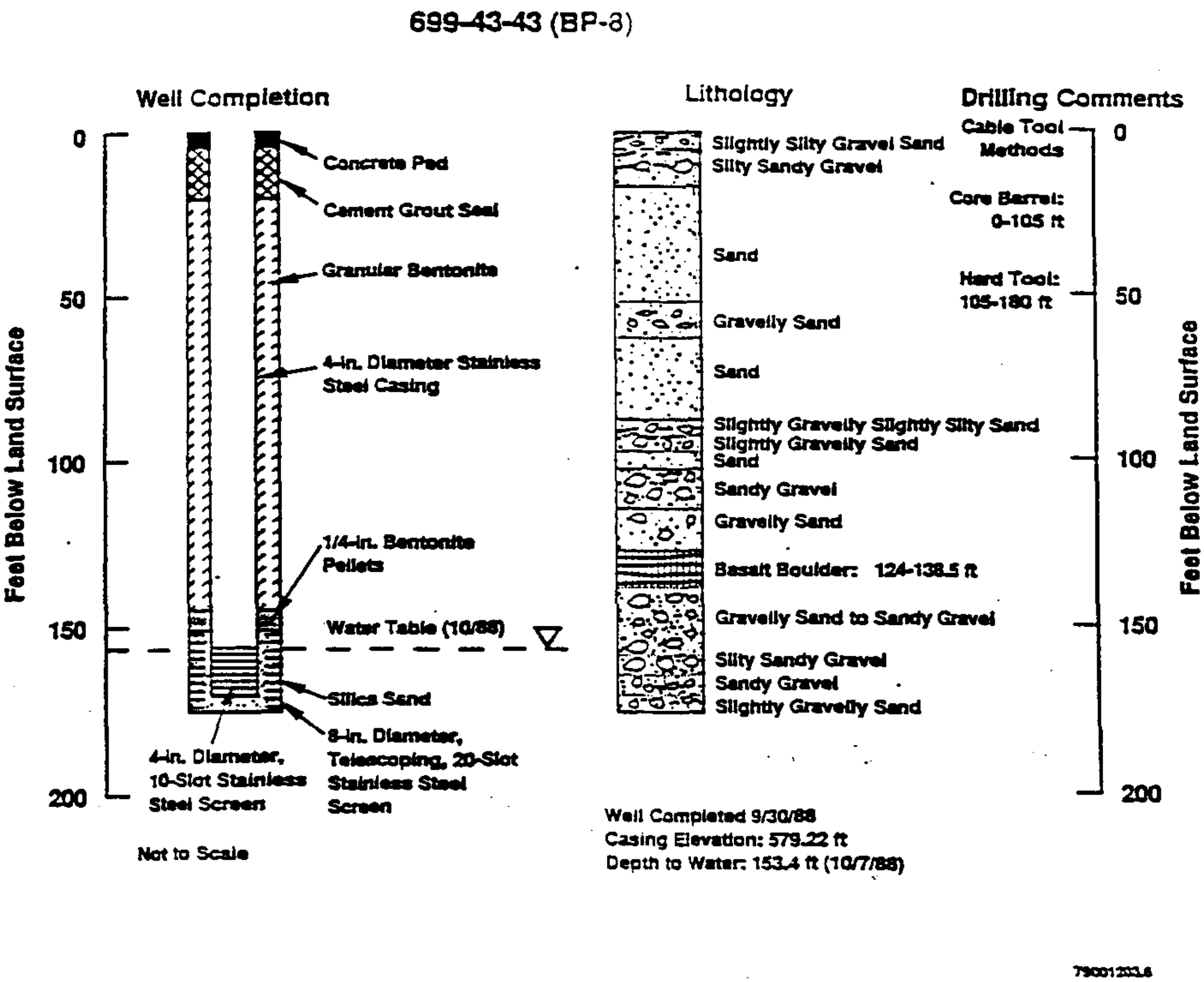


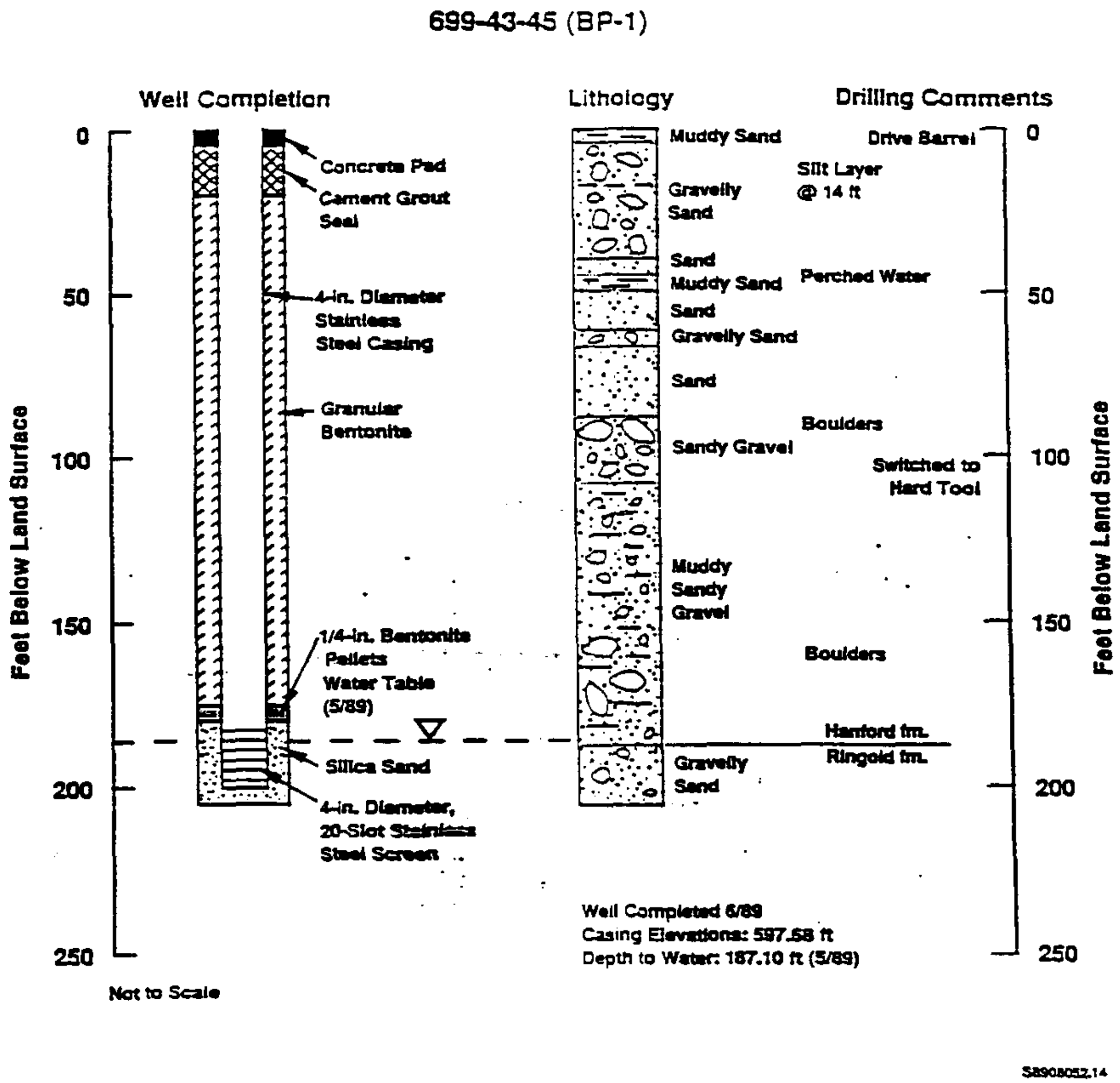
699-43-42J (BP-7)



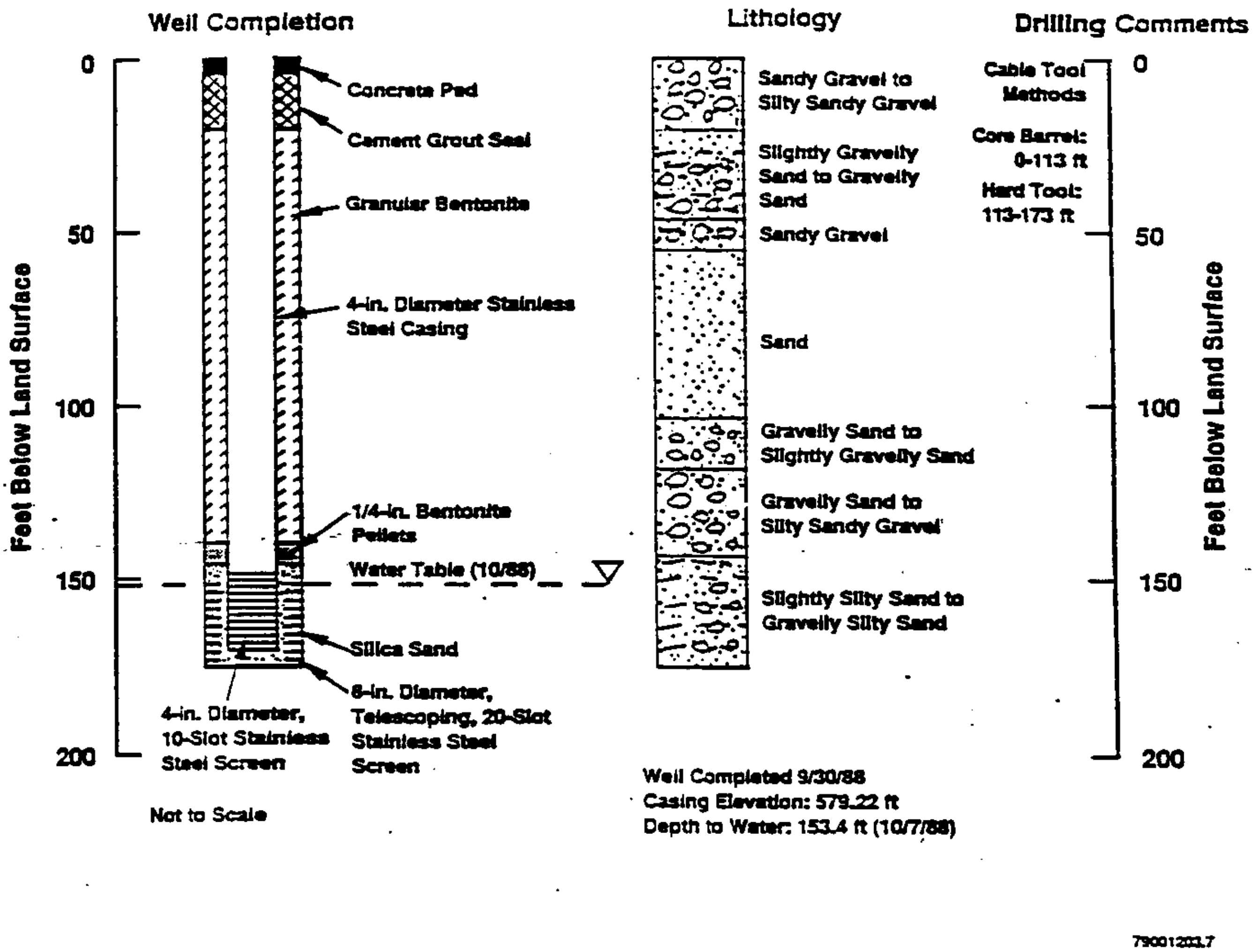
79001203.1

9413206.0261

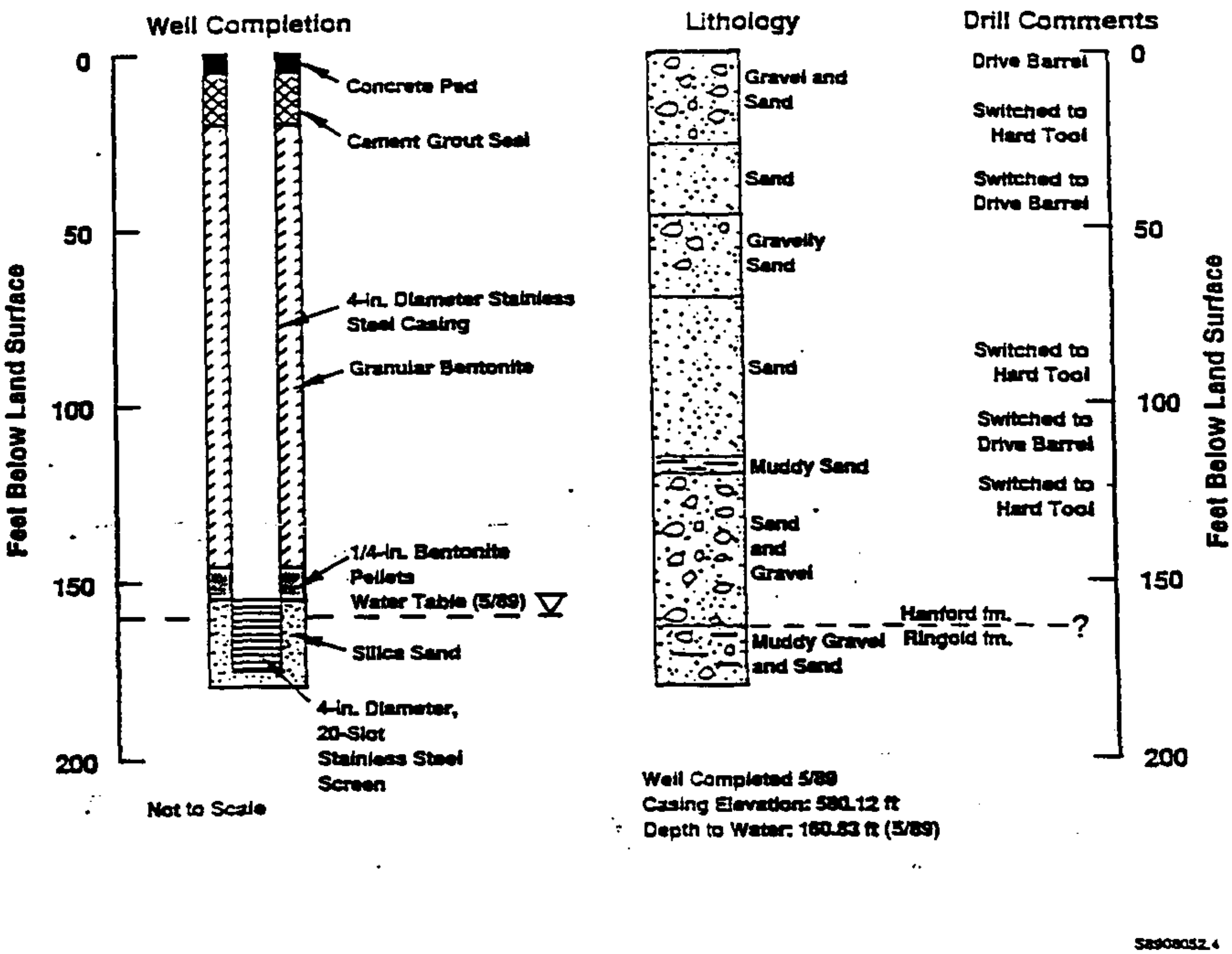



699-43-45 (BP-1)
Well Completion
Lithology
Drilling Comments
Feet Below Land Surface
0
50
100
150
200
250
Concrete Pad
Cement Grout Seal
4-in. Diameter Stainless Steel Casing
Granular Bentonite
1/4-in. Bentonite Pellets
Water Table (5/89)
Silica Sand
4-in. Diameter, 20-Slot Stainless Steel Screen
Muddy Sand
Gravelly Sand
Sand
Muddy Sand
Sand
Gravelly Sand
Sand
Sandy Gravel
Muddy Sandy Gravel
Gravelly Sand
Drive Barrel
Silt Layer @ 14 ft
Perched Water
Boulders
Switched to Hard Tool
Boulders
Hanford fm.
Ringold fm.
Well Completed 6/89
Casing Elevations: 597.58 ft
Depth to Water: 187.10 ft (5/89)
Not to Scale
S8908052.14

699-44-42 (BP-3)


Well Completion
Lithology
Drilling Comments
Feet Below Land Surface
0
50
100
150
200
Concrete Pad
Cement Grout Seal
Granular Bentonite
4-in. Diameter Stainless Steel Casing
1/4-in. Bentonite Pellets
Water Table (10/88)
Silica Sand
8-in. Diameter, Telescoping, 20-Slot Stainless Steel Screen
4-in. Diameter, 10-Slot Stainless Steel Screen
Not to Scale
Sandy Gravel to Silty Sandy Gravel
Slightly Gravelly Sand to Gravelly Sand
Sandy Gravel
Sand
Gravelly Sand to Slightly Gravelly Sand
Gravelly Sand to Silty Sandy Gravel
Slightly Silty Sand to Gravelly Silty Sand
Cable Tool Methods
Core Barrel: 0-113 ft
Hard Tool: 113-173 ft
Well Completed 9/30/88
Casing Elevation: 579.22 ft
Depth to Water: 153.4 ft (10/7/88)
79001203.7

699-44-43B (BP-2)



375 699-42-39A (Temp)

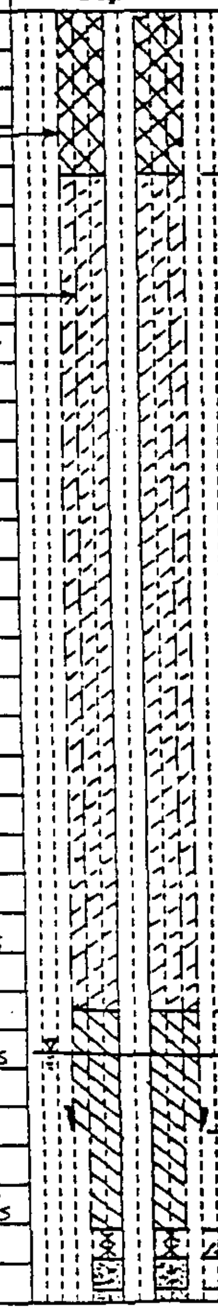
WELL SUMMARY SHEET

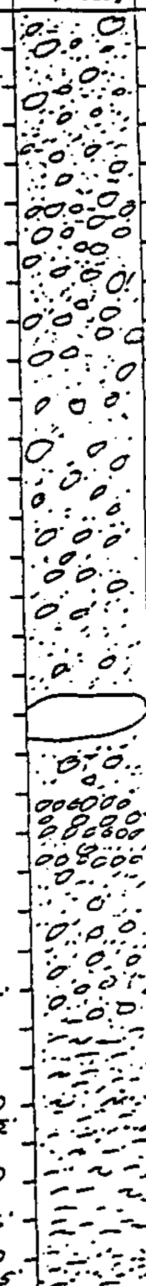
Boring or Well No. 699-BP91-2 (Temp)

Sheet 1 of 2

Location B-Pond Lobe 3C
Project W-017 / B-Pond
Elevation 554.61'
Drilling Contractor Kaiser Engineers Hanford
Driller Moe Wcaspir, Jim Smith, Jody Carpenter
Drilling Method and Equipment Cable Tool
Prepared By SW Callison / SW Callison (Sign/Print Name) Date 8/1/91
Reviewed By Edward C. [illegible] (Sign/Print Name) Date 8/[illegible]/91

CONSTRUCTION DATA: Description	Depth in Feet	GEOLOGIC/HYDROLOGIC DATA: Lithologic Description
12" OD carbon steel		sandy GRAVEL
temporary casing	10	sandy GRAVEL
set @ 143.5' bls		sandy GRAVEL
	20 / 20.3	gravelly SAND
10" carbon steel		sandy GRAVEL
temporary casing	30	slightly sandy GRAVEL
set @ 180.1' bls		sandy GRAVEL
	40	sandy GRAVEL
bottom of cement grout		sandy GRAVEL
and top of bentonite	50	sandy GRAVEL
crumbles @ 20.3' bls		sandy GRAVEL
	60	sandy GRAVEL
bottom of bentonite		sandy GRAVEL
crumbles @ 128.5' bls	70	sandy GRAVEL
		slightly silty sandy GRAVEL
"Pure Gold" bentonite	80	sandy GRAVEL
grout from 128.5 to		gravelly SAND
159.6' bls	90	slightly sandy GRAVEL (boulder)
		slightly sandy GRAVEL
3/8" bentonite pellets	100	sandy GRAVEL
from 159.6' to 162.6' bls		slightly sandy GRAVEL
	110	slightly sandy GRAVEL
40-100 silica sand		sandy GRAVEL
from 162.6' to 165.5' bls	120	slightly gravelly SAND
		sandy clayey GRAVEL
20-40 silica sand	128.5 / 130	slightly clayey sandy GRAVEL
from 165.5' to 180.1' bls	134	sandy GRAVEL
	140	silty SAND
10 slot 4" SS wire	143.5	sandy SILT
wrap T-304 screen	150	clayey SILT
from 169.4' to 180.1' bls	157.6	clayey SILT
	159.6 / 160	clayey SILT
	162.6 / 165.5	silty SAND





A-6000-384 (04/9[illegible])

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699-42-39 A (Perm)

WELL SUMMARY SHEET

Boring or Well No. 699-BP91-2 (Temp)

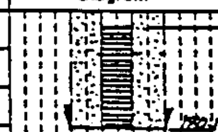
Sheet 2 of 2

Location B-Pond Lobe 3C | Project W-017 / B-Pond

Elevation 554.61' | Drilling Contractor Kaiser Engineers Hanford

Driller Moe Wrzspic, Jim Smith, Jody Carpenter | Drilling Method and Equipment Cable Tool

Prepared By SW Callison / SW Callison (Sign/Print Name) Date 9/4/91 | Reviewed By Edward C. Lefevre / Edward C. Lefevre (Sign/Print Name) Date 10/4/91

CONSTRUCTION DATA: Description	Diagram	Depth in Feet	GEOLOGIC/HYDROLOGIC DATA: Graphic Log	Lithologic Description
water level @ 134' bls		165.0		sandy silty GRAVEL
		170		sandy GRAVEL
bottom of 12" cs				sandy GRAVEL
casing @ 143.5' bls		180		
bottom of 10" cs				
casing @ 180.1' bls				
TD of borehole				
@ 180.1' bls				

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WELL SUMMARY SHEET

200

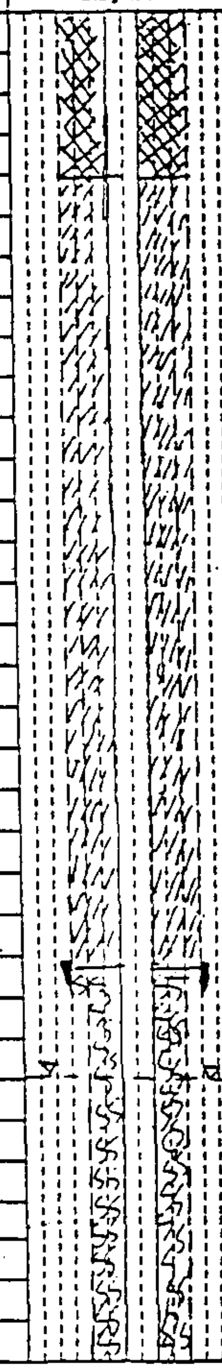
Boring or Well No.	699-40-40A
Sheet 1 of 2	

Location	216-B3-Pond · C lobe	Project	W-17-B pond
Elevation	Mission Sm... 537.75'	Drilling Contractor	KEH
Driller	D. Lattle	Drilling Method and Equipment	Cable tool, BE 22 W
Prepared By (Sign/Print Name)	Dale Drury / Dale Drown, Date 9/17/91	Reviewed By (Sign/Print Name)	Edward C Mitchel, Date 1/28/92

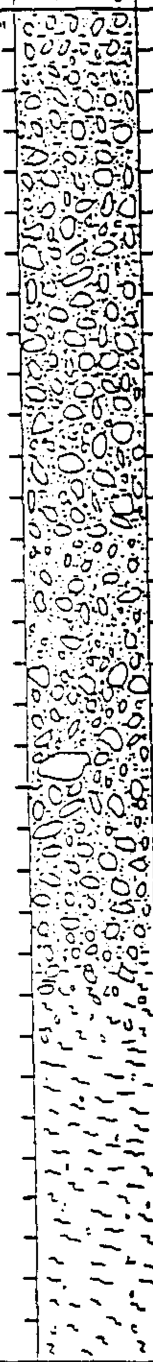
CONSTRUCTION DATA — Description

- bottom of 12" casing @ 120.0' bls ↓
- Cement Grout 19'-21.0'
- E-Z C Bent Crumbles 21.0' - 118.9'
- Bentonite Slurry 205.3 - 118.9
- 12" csg set @ 120.0 bls.
- 12" drive shoe = 120 ft 8/30/91
- water level 10-10-91 130'

Diagram



GEOLOGIC/HYDROLOGIC DATA — Graphic Log



Depth in Feet	Lithologic Description
0–10	SILTY-SANDY GRAVEL
	" " "
10	" " "
20	SANDY - GRAVEL
	" "
30	" "
	" "
40	" "
	" "
50	" "
	" "
60	" "
	" "
70	" "
80	SLIGHTLY-SANDY GRAVEL
	" " "
90	" " "
	" " "
100	" " "
	SANDY - GRAVEL
110	" "
	SILTY-SANDY GRAVEL Hanford
119 / 120	SILTY-CLAY Ringold
	SILTY-CLAY
130	SLIGHTLY-SILTY CLAY
	" " "
140	" " "
	slightly muddy silty clay
150	" " "
	slightly muddy silty clay
160	slightly-silty clay
	" " "

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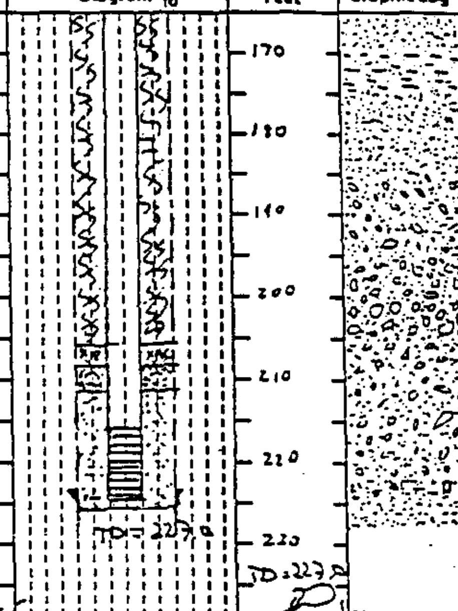
WELL SUMMARY SHEET

Boring or Well No. 699-40-40A

Sheet 2 of 2

Location: 216-S3-pond - C-lobe
Project: W-017 1C-pond
Elevation: 537.75'
Drilling Contractor: KEH
Driller: D. Ludtke
Drilling Method and Equipment: Cable Tool / BE-22W
Prepared By (Sign/Print Name): Dale Denny / Dale Denny Date: 9/17/91
Reviewed By (Sign/Print Name): Edward C. Hagen Date: 1/28/92



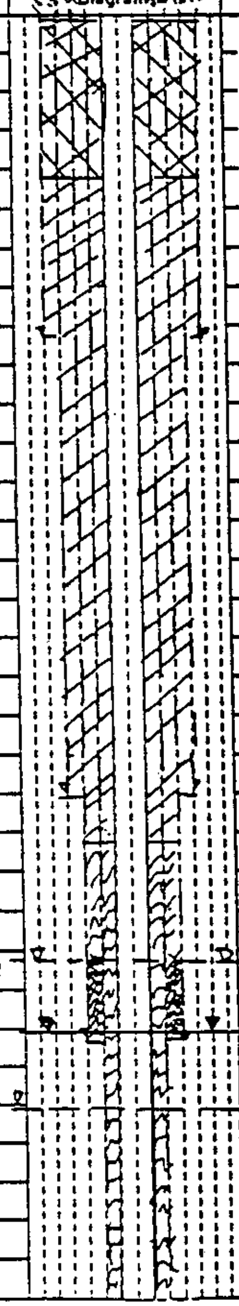
CONSTRUCTION DATA Description	Depth in Feet	GEOLOGIC/HYDROLOGIC DATA Lithologic Description
bottom of 10" casing	170	slightly silty SAND
@ 225 ft bls		sandy SILT
	180	slightly silty SAND
		" " "
	190	slightly silty, slightly gravelly SAND
3/8" bentonite pellets 208.5 - 205.3		" " " " "
1/20 sand 211.6 - 208.5	200	silty sandy GRAVEL
20-40 SS sand 226.1 - 211.6		sandy GRAVEL
	210	" "
10" set @ 225' bls		" "
10" drive shoe = 0.86'	220	" "
9/17/91		silty SAND @ 224' bls
4" stainless set @ 215.1'	230	silty SAND @ 227' bls = T.D.
10 SLOT GRAVEL PACK SCREEN	TD = 227.0	
PULLED FROM 225.87' to 215.1'	2/4/92	
2/4/92		

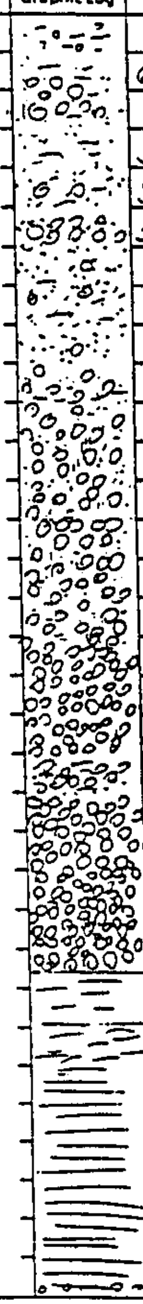
3 7 5

WELL SUMMARY SHEET

Boring or Well No. 699-40-40B,
Sheet 1 of 2

Location 216 B3 Pond
Elevation Wetland Surface 538.69
Driller Darrel Lutke
Prepared By Chris [illegible] (Sign/Print Name) Date
Project W017/B-Pond
Drilling Contractor KEH
Drilling Method and Equipment Cable Tool BE22L
Reviewed By [signature] (Sign/Print Name) Date 12/27/91





CONSTRUCTION DATA Description	Depth in Feet	GEOLOGIC/HYDROLOGIC DATA Lithologic Description
16" Drive Shoe 1.43'Ø		
Top portland cement at 1.5 BLS	10	Gravelley Silty Sand
		" "
	20	Slightly Silty Sand
Top 8-20 granules at 22.6' BS		Slightly Gravelly Slightly Silty Sand
	30	Sandy Gravel
		Slightly Silty Slightly Coarse Sand
16" CS Casing Set at 40.20	40	" "
12" Drive Shoe 1.37Ø		Gravelley Sand
	50	Silty Sandy Gravel
		Sandy Gravel
	60	Sandy Gravel
		Sandy Gravel
	70	" "
		" "
	80	" "
		Gravel
	90	"
		"
12" CS Casing Set at 98.30	100	Silty Sandy Gravel
10" Drive Shoe .95Ø		Gravel
Top Slurry 107.75' BLS	110	"
		"
	120	"
Perched Water at 121.25 07/26/91		120 Gravel 123 Slightly Gravelley Sandy Silt
10" CS Casing Set at 132.20	130	Silt
Bentonite Plug Set 08/05/91		Clay
8" Drive Shoe .78Ø	140	"
Static Water Level 140.6 BLS		"
8/6/91 From Inner Casing	150	"
Boring Unit (160-165)		"
SWL 130.2' BLS 10/10/91	160	"

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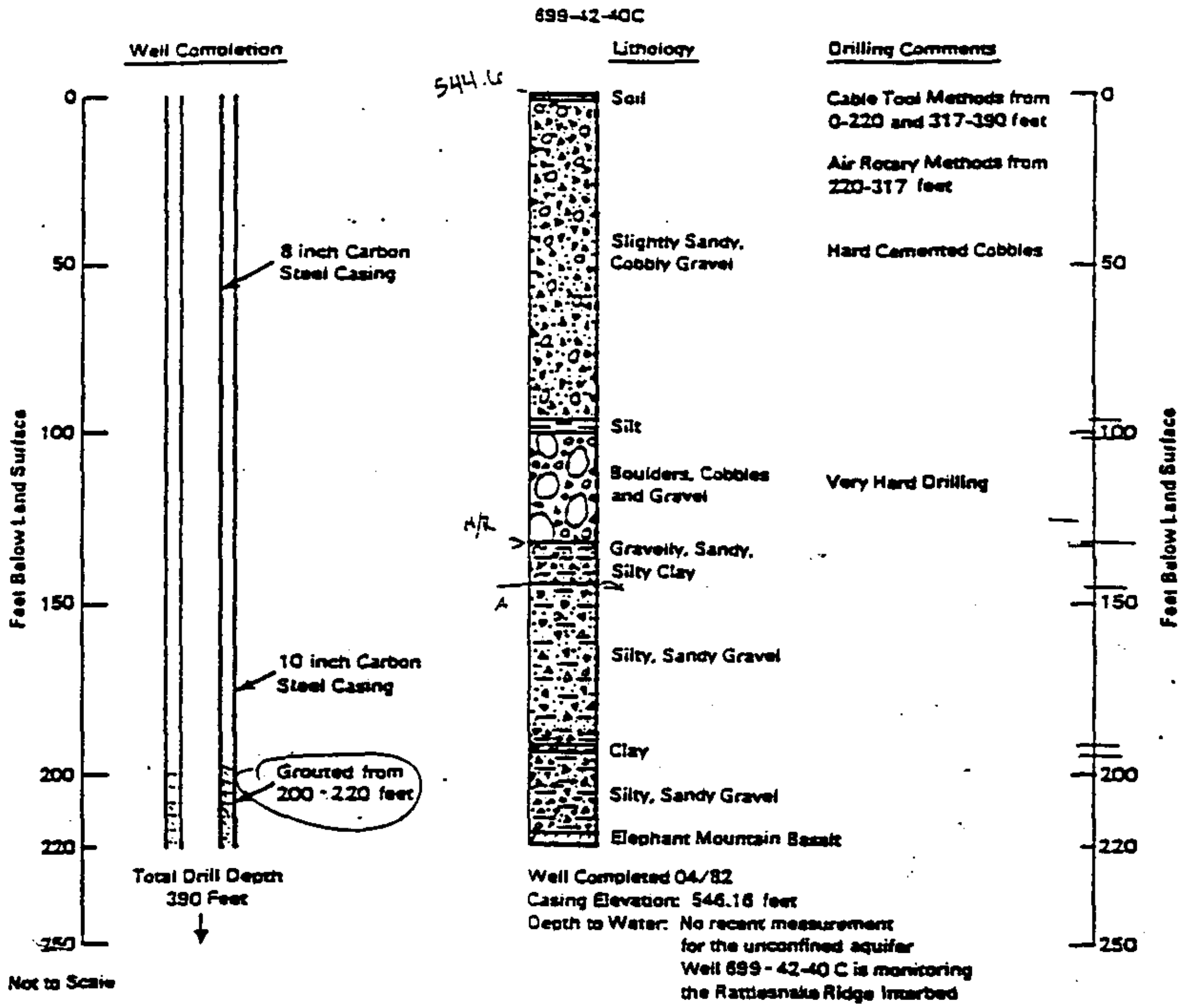
9413206.0269

4 9 5

WELL SUMMARY SHEET	Boring or Well No. 699 40-40B Sheet 2 of 2

Location 216 B3 Pond
Elevation LS = Land Surface
Driller Darrel Lutke
Prepared By Chris Vincent (Sign/Print Name) Date
Project W017/B-Pond
Drilling Contractor KEH
Drilling Method and Equipment BEZZ
Reviewed By [illegible] (Sign/Print Name) Date 12/27/91

CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description
Top Pellets 190' BLS 100 Upper Sand 183.0' BLS		170'		Slightly Gravelly SANDY Clay
Top 20-40 Sand 184.9' BLS				" "
8" casing set at 180.55		180'		" "
8/12/91 184' TD				" "
8" Drive Shoe = .78'				SILTY Sand ± 184
Top Screen at 187.8' BLS		190'		Sandy Gravel
9/20/91 8" casing set		200		Sandy Gravel
@ 201.1' bls		201.1		Sandy Gravel
Bottom Screen at 198.6' BLS				
TD of hole @ 202.0' bls				
Screen is 10 Slot Channel Pack				
Bottom Sand at 199.6' BLS				



8 in dia.
perf interval 306-390
Bailer

3 of 4

WELL SUMMARY SHEET

Boring or Well No. 699-42-41
Sheet 1 of 1

Location 216-B-3 POND
Project W-017 B-POND
Elevation 564.03' BRASS CAP
Drilling Contractor KAISER ENGINEERS
Driller KEN BLACKMAN
Drilling Method and Equipment CABLE TOOL WALKER-NEFF
Prepared By SW Collison / SW Collison (Sign/Print Name) Date 8/10/92
Reviewed By Edward C. Rotert (Sign/Print Name) Date 8/13/92

9413206.0277

CONSTRUCTION DATA

Description:

12" ø TEMPORARY CARBON STEEL CASING TO 49.11' BLS

10" ø TEMPORARY CARBON STEEL CASING TO 154.91' BLS

bottom of type I+II cement grout and top of 8-20 bentonite crumbles @ 20.4' bls

3/8" bentonite pellets from 125.6' to 130.3' bls

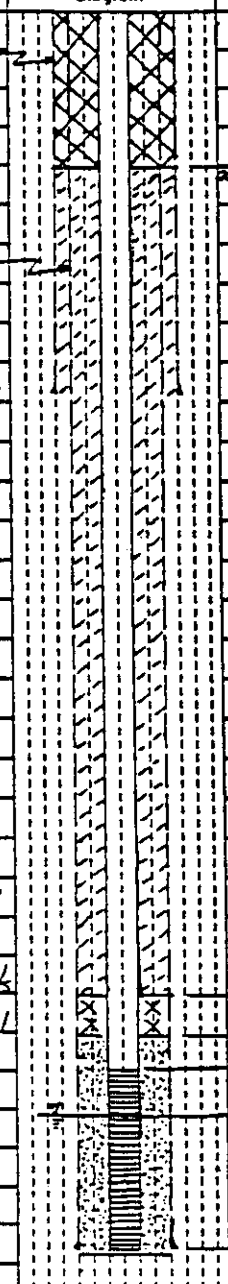
20-40 silica sand from 130.3' to 155.2' bls

10 slot 4" stainless steel T-304 wire wrap screen from 134.2' to 155.2'

water level @ 142.0' bls as measured on 7/25/91

Note: There is only 13.2' of water.

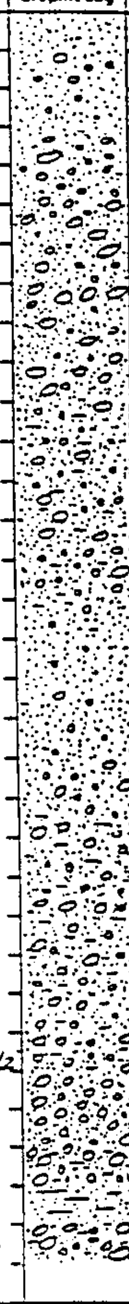
Diagram:



Depth in Feet: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 154, 156

GEOLOGIC/HYDROLOGIC DATA

Graphic Log:



Lithologic Description:

Lithologic Description
SAND
SANDY GRAVEL
GRAVELLY SAND
SANDY GRAVEL
" "
" "
" "
" "
" "
" "
SILTY ~~MUDDY~~ SANDY GRAVEL
" " "
" " "
" " "
" " "
SL. SILTY GRAVELLY SAND
SL. GRAVELLY SAND
GRAVELLY SAND
" "
SANDY GRAVEL
SILTY SANDY GRAVEL
" " "
" " "
" " "
" " "
" " "
" " "
SANDY GRAVEL
" "
SILTY ~~MUDDY~~ SANDY GRAVEL
SILTY SAND - RINGOLD FM. @ 154'
SILTY SANDY GRAVEL
T.D. = 156.72'

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9413206.0273

3 2 4

WELL SUMMARY SHEET 538.76

Boring or Well No. BP 699-43-40

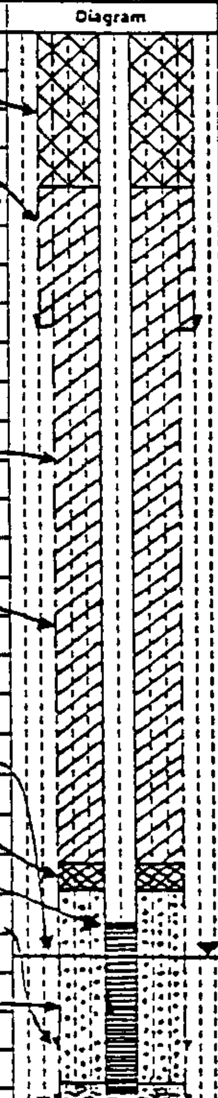
Sheet 1 of 1

Location 216-B-3-Pond System
Project RCRA W-017-B POND
Elevation 538.76 ft
Drilling Contractor KEH
Driller Ron Thomas
Drilling Method and Equipment Cable Tool - Walker Neer
Prepared By Dennes Anderson / Key Lane Date 9/9/91 (Sign/Print Name)
Reviewed By Edward C. Karagh Date 12/28/91 (Sign/Print Name)

CONSTRUCTION DATA

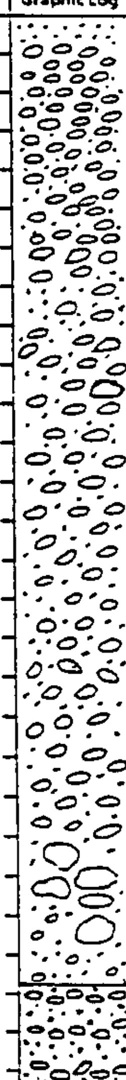
Description
Cement grout to 20.0'
12" I.D. temporary C.S. casing w/forged steel shoe set ~37.6'
Bentonite crumbles 20.0-106.9'
10" I.D. temporary C.S. casing w/forged steel shoe set ~136.3'
Static water table ~117.3' bls
Bentonite pellets 106.9'-109.5'
Top of screen ~114.3' bls
* 10" forged steel shoe stripped at depth ~129.5' bls
Sand filter (20-40) 109.5-134.4
Bottom of screen 135.0'
Bottom of well sump 135.3'
Native soils/slough 134.4'-136.3'
* Bottom of casing 136.3'
Bottom of hole 136.7'
* ~95% of original forged steel shoe sheared & left in well hole

Diagram



GEOLOGIC/HYDROLOGIC DATA

Graphic Log



Depth in Feet	Lithologic Description
5	Silty sandy GRAVEL
10	Sandy GRAVEL
15	Slightly sandy GRAVEL
20	Slightly sandy GRAVEL
25	GRAVEL
30	GRAVEL
35	Gravelly SAND
40	Sandy GRAVEL
45	Sandy GRAVEL
50	GRAVEL
55	GRAVEL w/trace sand
60	Sandy GRAVEL
65	Sandy GRAVEL
70	Sandy GRAVEL
75	Sandy GRAVEL
80	Sandy GRAVEL
85	Sandy GRAVEL
90	Sandy GRAVEL
95	Sandy GRAVEL
100	Sandy GRAVEL
105	Sandy GRAVEL
110	Sandy GRAVEL
115	Sandy GRAVEL
120	Sandy GRAVEL
125	Slightly gravelly silty SAND
130	Interbedded SAND and GRAVEL
135	Interbedded SAND and GRAVEL
137	

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9413206.0274

WELL SUMMARY SHEET

Boring or Well No.	699-43-41G
Sheet	1 of 2

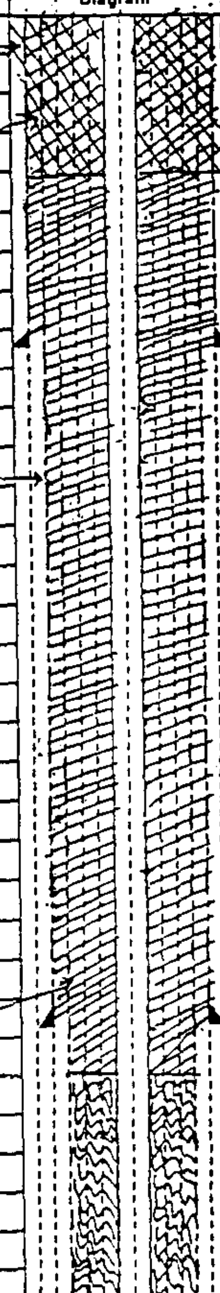
Location	2G-B3-Pond	Project	W-017 / B-Pond
Elevation	547.96' Brass Cap	Drilling Contractor	Kaiser
Driller	Kelly Olson	Drilling Method and Equipment	B.E. Cable Tool
Prepared By (Sign/Print Name)	S J Havens	Date	8/23/91
Reviewed By (Sign/Print Name)	[illegible]	Date	12/?/91

CONSTRUCTION DATA

Description

- 16" ID Temporary C.S. casing to 41.86' BLS
- Type I-II Cement Grout 200-2.1'
- 12" ID Temporary C.S. Casing to 127.89' BLS
- 8-20 mesh Bent Crumble 1355-20'

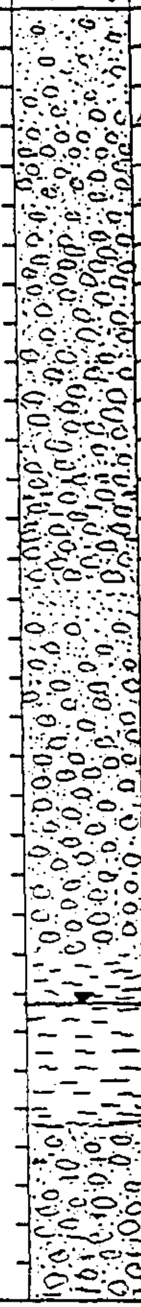
Diagram



Depth in Feet: 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, 150, 160

GEOLOGIC/HYDROLOGIC DATA

Graphic Log



Lithologic Description

- 5' Gravelly SAND (DB)
- 15' Sandy GRAVEL
- 25' Gravelly SAND
- 30' Sandy GRAVEL
- 60' Silty Sandy GRAVEL
- 75' SAND
- 80' Gravelly SAND
- 90' Sandy GRAVEL
- Hanford / Ringold contact
- 122' Clayey SILT
- 127.8-129.8 (ST)
- DTW = 129.6 ... 1/4/92
- 142' Silty Sandy GRAVEL (HT)
- 146.7-148.1 (ST) cemented

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WELL SUMMARY SHEET

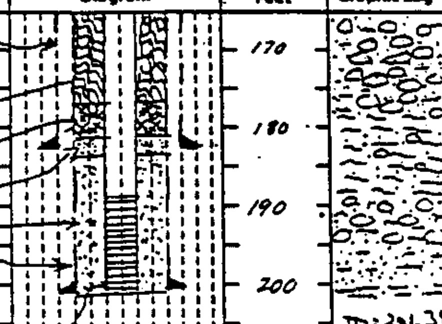
Boring or Well No. 299-42-41 G

Sheet 2 of 2

Location 216-B3-Pond
Elevation 547.76 Brass Cap
Driller Kelly Olson
Prepared By [signature] / SJ Havens (Sign/Print Name) Date 9/11/91

Project W-017/B-Pond
Drilling Contractor Kaiser Engineers
Drilling Method and Equipment B.E. Cable Tool
Reviewed By Edward C. Ryan [signature] (Sign/Print Name) Date [illegible]/91

CONSTRUCTION DATA — Description	Depth in Feet	GEOLOGIC/HYDROLOGIC DATA — Lithologic Description
10" ID Temporary C.S. casing	170	Silty Sandy GRAVEL
to 181.25' BGS		
Bent Slurry - 176.5 - 135.5		179' CLAY (Gravelly Sandy CLAY)
3/8" Bent Pellets 181.8 - 176.5	180	
10-20 sand 183.9 - 181.8		188' Clayey Sandy GRAVEL (H_2O)
20-40 Sand 198.7 - 183.9	190	195' Silty SAND
8" ID Temporary C.S. Casing		201' Sandy SILT
to 201.34'	200	
4" ID Perm SS. T-304		
Casing - set at 198.7		
w/ 10.01' 10 slot screen		
@ (198.6' to 188.3') [initials] 2/9/92		



A-6000-384 (04/90)

9413206.0275

BOREHOLE LOG

VALIDATED KDR 7/19/92 SIGNATURE/DATE

Boring or Well No. 299-E26-

Sheet 1 of 12

Location 216-A-29 0.66 | Project W-017/SST

Elevation 601.57 Brass Cap | Drilling Contractor Kaiser Engineers Hanford

Driller K. Blackman | Drilling Method and Equipment Cable Tool - Walker

Prepared By M. Havens (Sign/Print Name) Date 6/6/91 | Reviewed By R.D.M. (Sign/Print Name) Date

Depth (ft)	Sample: Type and No.	Sample: Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCL	Comments: Depth of Casing, Drilling Size & Type, Bit Size, etc.
0.0–5.0	2 Lith 1 Rad 1 Moist	DB			8 inch drive barrel; 12 inch casing
5.0–10.0	2 Lith 1 Rad 1 Moist	DB		Slightly silty gravelly SAND (2% gravel 3% silt 95% sand) 2% pb 2% vcs 3% cs 10% ms 30% fs 60% vfs 3% silt; wet color - pale brown (10YR 6/3); Dry color - v. pale brown (10YR 7/3); light moist to dry poorly sorted subrounded 25% mafic 75% felsic slight HCL react	5 ft sample @ barrel at 1054 Cleared by rad HPS
10.0–15.0	2 Lith 1 Rad 1 Moist	DB		Slightly silty gravelly SAND (5% gravel 2% silt 93% sand) 2% cobbles 3% gravel, 23% cs 20% ms 30% fs, 20% vfs, dry color - grey brown (10YR 5/2) wet color - light brown grey (10YR 4/2), mod sort subang 65% mafic, 35% felsic No HCl react	10 ft sample drive barrel at 6-4-91, cleared. Gravels note
15.0–20.0	2 Lith 1 Rad 1 Moist	DB		Slightly silty SAND with trace pebbles (<1% pebbles <2% silt 97% sand) 30% cs 30% ms 19% fs 18% vfs, wet color - light brown grey (10YR 6/2) dry color - light grey (10YR 7/2) poorly sorted subangular to angular 75% mafic 25% felsic No HCl react no mois	15 ft sample drive barrel 6-4-91 cleared

BOREHOLE LOG

Boring or Well No. 299-E26-13
Sheet 2 of 12

Location: 216-A-29 ditch
Project: W-017/SST
Elevation: 601.57' Brass Cap
Drilling Contractor: KEH
Driller: K. Blackmon
Drilling Method and Equipment: Cable Tool W-N-WS31
Prepared By: M. Havers (Sign/Print Name) Date 6-5-91
Reviewed By: R.D. ... (Sign/Print Name) Date 6/7/91

Depth (ft)	Sample Type and No.	Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
20	2 Lith, 1 Rad, 1 Moist	DB		SAND with trace silt (2% silt 98% sand) 40% cs 40% fs 18% vfs. Wet color - lt brown (10YR 6/2) dry color - lt gy brn (10YR 7/2) poorly sorted subangular to ... and 80% mafic 20% felsic, No HCl react, no mag	20 ft sample from drive barrel at 1305. 6-4-91 cleared by rod. Switching to 10 inch casing. 5 gallons of water added to help remove cuttings at 22.4 ft, 0955 6-5-91
25	2 Lith, 1 Rad, 1 Moist	DB		Gravelly SAND with trace silt (15% gravel 3% silt 82% sand) 2% vcs, 15% cs 30% ms 25% fs 10% vfs. Dry color - lt gy (2.5Y N7/1), wet color - olive (5Y 4/3) Dry, poorly sorted, subrounded. ~~60% felsic, 40% A~~ 60% mafic 40% felsic, No HCl reaction, no mag	25 ft sample from DB at 1122, 6-5-91. Cleared by rod. Becoming increasingly coarse from 22 ft, and dry. HSC checks hole at 1230, all readings BDL
30	2 Lith, 1 Rad, 1 Moist	DB		Gravelly SAND with trace silt (20% gravel, 1% silt 79% sand) 20% vcs 25% cs 15% ms 10% fs, 9% vfs, Wet color - dk gy (5Y 4/1) dry color - lt gy (5Y 7/1) "Pepper and salt" appearance, lt moist, mod sorting, subangular, 60% mafic 40% felsic, no HCl react, 10% mag	30 ft sample from DB at 1258, 6-5-91. Cleared by rod. Becoming moist at 27.0 ft, solids are coarser and more angular - "salt & pepper" look
35	2 Lith, 1 Rad, 1 Moist	DB		Gravelly SAND (15% gravel, 85% sand) 15% peb 15% vcs 40% cs 20% ms 8% fs 2% vfs, Wet color - dk gy (5Y 4/1), dry color - lt gy (5Y 7/1) "Pepper and Salt" appearance lt moist, poor sorting, angular 50% mafic 50% felsic, No HCl react, 10% mag	35 ft sample from DB at 1520, 6-5-91. Cleared by rod. Becoming siltier and finer grained at 38.0 ft, silt lenses noted, moisture increasing

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BOREHOLE LOG

Boring or Well No 299-E26-1
Sheet 3 of 12

Location 216-A-24 Ditch
Elevation 101.57 Brass cap
Driller K. Blackman
Prepared By M. Hauens (Sign/Print Name) Date 6-6-91

Project W-017/SST
Drilling Contractor KEH
Drilling Method and Equipment Cable Tool w/ ...
Reviewed By R.D. McW... (Sign/Print Name) Date 6/...

Depth (ft)	Sample Type and No.	Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl	Comments: Depth of Casing, Drilling Rate, Size & Type, Bit Size, Water
40.0	2 Lith 1 Moist 1 Rad	DB		Silty SAND with silt lenses (5% silt 95% sand) 5% ms, 65% fs 25% vfs wet color - light olive brown (2.5Y5/4), dry color - gy brn (2.5Y...) moist poorly sorted, rounded 20% mafic, 80% felsic slight HCl reaction, 1% magnetic.	C803 40 ft sample taken 6-6-91 by rad. / Becoming coarser grained at 43 ft. still silt lenses
45.0	2 Lith 1 Moist 1 Rad	DB		Silty SAND with gravel (15% grvl 85% sand 40% silt) 70% vcs 15% cs 30% ms ~~...~~ 15% fs 10% vfs, wet color - lt ol brn (2.5Y5/4) dry color - lt yel brn (2.5Y6/4), moist subrounded poorly sorted 30% mafic, 70% felsic, slight HCl react ~~...~~ 5% ... Silt lenses noted	45 ft sample 1036 6-6-91 by rad / Increasing silt at 46½ ft silt, less moist
	2 Lith 1 Moist 1 Rad				
50.0		DB		Gravelly SAND with trace silt (20% grav 75% sand, 5% silt) 10% vcs 25% cs 25% ms ~~15% ...~~ 10% fs 5% vfs wet color - gy brn (2.5Y5/2) Dry color - lt brn gy (2.5Y6/2) slight moist poorly sorted, subangular 30% mafic 70% felsic, no HCl react, 5% mag	50 ft sample 1122 6-6-91 by rad
	2 Lith 1 Moist 1 Rad				
55.0	2 Lith 1 Moist 1 Rad	DB		Gravelly SAND with trace silt. (25% gravel, 73% sand 2% silt) 5% cobb 20% peb 15% vcs 15% cs 20% ms 13% fs 10% vfs wet color - gy brn (2.5Y5/2) dry color - lt gy (2.5Y7/2), lt moist med sorting, subrounded, 40% mafic 60% felsic, slight HCl react 5% mag "Salt and Pepper appearance"	55 ft sample 1425 6-6-91 by rad
60.0					

6-6-12-91 A-6000

BOREHOLE LOG

Boring or Well No. 299-E26-15
Sheet 4 of 12

Location: 216-A-29 Ditch
Project: W-017 / A-29 Ditch
Elevation: 601.57 Brass Cap
Drilling Contractor: Kaiser Engineering Hanford
Driller: K. Blackman
Drilling Method and Equipment: Cable Tool
Prepared By (Sign/Print Name) — Date 6/6/91
Reviewed By (Sign/Print Name) — Date 6/8/91

Depth	Sample Type and No.	Blows or Recovery	Graphic Log	Sample Description (Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl)	Comments (Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level)
60.0	2 Lith, 1 Moist, 1 Rad	DB		Gravelly SAND with trace silt (15% gravel 83% sand 2% silt) 15% gravel, 20% vcs 20% cs 20% ms 13% fs 10% vfs. Wet color — gy brn (2.5Y5/2), dry color — lt gy (2.5Y7/2) "Pepper and salt" appearance, lt moist, med sorting, subrounded, 40% mafic 60% felsic, no HCl rxn, 5% mica	60 ft sample taken 1450, 6-6-91 Cleaned by rod
65	2 Lith, 1 Moist, 1 Rad	DB		SAND — 30% cs 40% ms 20% vs 10% vfs 2.5Y 4/2 lt brown wet 2.5Y 7.2 lt gray dry, dry–moist, mod-well sorted, predom ang fragments dom. Qtz w/ other trace basalt, muscovite. No Rxn to 10% HCl. No mm rel. fragments 80% felsic 20% mafic "Clean sand"	65 ft sample taken 1518 6-6-91
70	2 Lith, 1 Moist, 1 Rad	DB			70 ft sample taken @0830 6-7-91
	2 Lith, 1 Moist, 1 Rad	DB		Gravelly SAND (25% gravel 75% sand) 10% vcp 25% cp 25% mp 20% fp 20% vfp, 40% vcs 30% cs 10% fs 10% ms 10% vfs, 10YR 7/1 lt gray dry, 10YR 6/1 gray wet, dry to slightly moist, good sort. ang to sub ang, gravel tends to be more rnd. Sand predom Qtz, pebbles tend to be Qtz. No mm or Rxn to 10% HCl. 40% mafic 60% felsic. Non-plast	75.0' sample @10:15 6-7-91
75	2 Lith, 1 Moist, 1 Rad	DB		Same as above	

BOREHOLE LOG

Boring or Well No 299-E[illegible]
Sheet 5 of 12

Location 216-A-29 Ditch
Project W-017/A-29
Elevation [illegible] Brass cap
Drilling Contractor KEH
Driller K. Blackmon
Drilling Method and Equipment Cable Tool - [illegible]
Prepared By Mike Havens (Sign/Print Name) Date 6-10-91
Reviewed By [illegible] (Sign/Print Name) Date [illegible]

Depth (ft)	Sample Type and No.	Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCL	Comments: Depth of Casing, Drilling Size & Type, Bit Size, etc.
80.0	2 Lith, 1 Moist, 1 Rad	DB		Gravelly SAND with trace silt (30% Grav, 68% Sand, 2% silt) 5% cob, 25% peb, 15% vcs, 15% cs, 20% ms, 15% fs, 8% vfs, brn-wet (10YR 4/3) lt gy-dry (10YR 7/1) light moist, Poorly sort, subangular, 40% mafic, 60% felsic, no HCl react, 5% mag, nonplastic.	80 ft sample [illegible] Cleaned [illegible]
	2 Lith, 1 Moist, 1 Rad	DB			MTH 6-10-91
85.0				Gravelly SAND with trace silt (20% Grav, 78% Sand, 2% silt) 30% vcs, 20% cs, 15% ms, 10% fs, 3% vfs, gy-brn wet (10YR 5/2) lt gy dry (10YR 7/2) lt moist, poorly sorted, subangular, 40% mafic, 60% felsic, no HCl react, 5% magnetic, nonplastic	85 ft [illegible] @ 0922 6-10-91 by HPT. Turning [illegible] on [illegible] MTH 6-10-91
	2 Lith, 1 Moist, 1 Rad	DB			
90.0				Sandy GRAVEL (70% Gravel, 30% sand) 5% sm cob, 25% vcp, 20% cp, 10% mp, 5% [illegible] 10% fp, 5% vfp, dk gy brn wet (10YR 4/2) lt brn gy dry (10YR 6/2) lt moist, poorly sorted, rounded, basalt gravel, no HCl react, nonplastic; 2% magnetic	90 ft sample 1026 6-10-91 by HPT
	2 Lith, 1 Moist, 1 Rad	DB			
95.0	2 Lith, 1 Moist, 1 Rad	DB		Sandy GRAVEL (85% grav, 15% sand) 5% lg cob, 15% sm cob, 20% vcp, 20% cp, 10% mp, 10% fp, 5% vfp, brn wet (10YR 5/3) lt gy dry (10YR 6/1) lt moist, poor sort, rounded, basalt gravel, no HCl react, nonplastic, 2% mag	95 ft sample 6-10-91 [illegible]

BOREHOLE LOG

Boring or Well No 299-E26-13
Sheet 6 of 12

Location 216 A-29 Ditch | Project W-017/A-29
Elevation 601.57' Brass Cap | Drilling Contractor KEH
Driller Ken Blackman | Drilling Method and Equipment Cable Tool - W.N. US-31
Prepared By M. Havens (Sign/Print Name) Date 6-10-91 | Reviewed By (Sign/Print Name) Date 6/11/91

Depth (ft)	Sample Type and No.	Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
100.0	2 Lith, 1 moist, 1 rad	DB		Sandy GRAVEL (60% grav 40% sand) 3% sm cob 12% vcp 15% cp 15% mp 10% fp 5% vfp 10% vcs 10% cs 10% ms 5% fs 5% vfs brn-wet (10YR 5/3) lt brn ux-dry (10YR 6/2) lt moist, med sort, rounded basalt gravel predom, no HCl react, nonplastic, 7% mud	100 ft sample @ 1422 6-10-91, cleared by HPT
105.0	2 Lith, 1 moist, 1 rad	DB		Sandy GRAVEL (70% grav, 30% sand) 10% lg cob, 10% sm cob, 15% vcp 15% cp 10% mp 5% fp 5% vfp, gy brn-wet (10YR 5/2) lt gy-dry (10YR 7/1) lt moist poor sort rounded basalt grav predom some quartzite no HCl react nonplastic, 3% mud	105 ft sample @ 1457 6-10-91 cleared by HPT
110.0	2 Lith, 1 Moist, 1 Rad	DB		Sandy GRAVEL (55% grav 45% sand) 5% cob 5% vcp 20% cp 15% mp 5% fp 5% vfp 10% vcs 15% cs 10% ms 5% fs 5% vfs gy brn-wet (10YR 5/2) pale brn-dry (10YR 6/3) lt moist, poor sort, sub rnd, basalt with some quartzite, no HCl react, 5% mud, nonplastic	110 ft sample @ 0922 6-11-91, cleared by HPT
115.0	2 Lith, 1 Moist, 1 Rad	DB		Sandy GRAVEL (55% gravel 45% sand) 10% cob 5% vcp 15% cp 15% mp 5% fp 5% vfp 10% vcs 15% cs 10% ms 5% fs 5% vfs, gy brn-wet (10YR 5/2) pale brn-dry (10YR 6/3) lt moist, poor sort, sub rnd basalt w/ some qtzte, no HCl react, 5% mud, nonplastic	115 ft sample @ 12[illegible] 6-11-91, cleared by HPT

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BOREHOLE LOG

Boring or Well No. 299-E2[illegible]
Sheet 7 of 12[illegible]

Location 216-A-29 Ditch
Project W-017/A-29
Elevation 601.57' Brass Cap
Drilling Contractor KEH
Driller Ken Blackman
Drilling Method and Equipment Cable Tool - W[illegible]
Prepared By M. Havens/[signature] (Sign/Print Name) Date 6-11-91
Reviewed By (Sign/Print Name) Date

Depth (ft)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling [illegible] Size & Type, Bit Size, [illegible]
120.0	2 Lith 1 Moist 1 Rad	DB		Sandy GRAVEL (55% Grav, 45% Sand) Same as above	120 ft Sampl[e] 6-11-91 Cleare[d]
	2 Lith 1 Moist 1 Rad	DB			
125.0				Sandy GRAVEL (70% Grav, 30% Sand) 5% sm bold 5% lg cob 15% sm cob 10% vcp 5% cp 15% mp 10% fp 5% vfp dk-brn wet (10YR 5/2) pale brn-dry (10YR 6/3) lt moist, poor sort, rounded, basalt w/ some quartzite, no HCl react, 5% mud, nonplastic	125 ft sample 6-12-91 Becoming [hard] to drill with boulders a[...]
	2 Lith 1 Moist 1 Rad	DB			
130.0				Same as above	130 ft sam[ple] 1117, 6-12-91 by HPT Becoming gradually boulder/[...]
	2 Lith 1 Moist 1 Rad	DB			
135.0	2 Lith 1 Moist 1 Rad	DB		Sandy GRAVEL (80% Grav, 20% Sand) 15% sm bold, [illegible] 10% lg cob, 15% sm cob, 10% vcp, 10% cp, 5% mp, 10% fp, 5% vfp dk brn-wet (10YR 5/3), pale brn-dry (10YR 6/3) lt moist, poor sort, rounded, basalt w/ some quartzite, no HCl react, 5% mud, nonplastic	135 ft sam[ple] 1319, 6-12-91 Clays note[d] ft, increasin[g]

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BOREHOLE LOG

Boring or Well No 299-E26-13

Sheet 8 of 12 & 8-5-91

Location 216-A-29 Ditch

Elevation 601.57' Brass Cap

Driller Ken Blackman

Prepared By M. Havens (Sign/Print Name) Date 6-12-91

Project W-017/A-29

Drilling Contractor KEH

Drilling Method and Equipment Cable Tool - W.N. WS-31

Reviewed By R.D. Miller (Sign/Print Name) Date 6/10/91

Depth (ft)	Sample: Type and No.	Sample: Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
140.0	2 Lith, 1 Moist, 1 Rad	OB		Sandy Clayey GRAVEL (80% Gravel, 15% Sand, 5% Clay) 15% sm bould 10% lg cob 15% sm cob 10% vcp 10% cp 5% mp 10% fp 5% vfp, gy brn-wet (10YR 5/2) pale brn-dry (10YR 6/3) moist, poor sort rounded basalt w/ some qtz, no HCl react 5% mad, plastic	140 ft sample @ 0916, 6-13-91. Clay decreasing from 144.0
145.0	2 Lith, 1 Moist, 1 Rad	OB		Sandy GRAVEL w/ tr Clay (70% Grav, 28% Sand, 2% Clay) 10% sm bould, 15% lg cob, 5% sm cob, 10% vcp, 10% cp, 10% mp, 5% fp, 5% vfp, gy brn-wet (10YR 5/2), pale brn-dry (10YR 6/3), moist, poor sort, rounded to subrounded, basalt w/ some qtz, no HCl react, 5% mad, slightly plastic	145 ft sample @ 1039, 6-13-91. Clay increasing from 147.0
150.0	2 Lith, 1 Moist, 1 Rad	OB		Sandy Clayey Gravel (80% grav, 15% sand, 5% clay) 15% sm bould, 10% lg cob, 15% sm cob, 10% vcp, 10% cp, 5% mp, 10% fp, 5% vfp, gy brn-wet (10YR 5/2), pale brn-dry (10YR 6/3), v. moist, poor sort, rounded basalt w/ some qtz, no HCl react, 5% mad, plastic	150 ft sample @ 1328, 6-13-91. Becoming drier & less clay at 151.0 ft
155.0	2 Lith, 1 Moist, 1 Rad	OB		Same as above.	155 ft sample @ 1436, 6-13-91

A-6000-382 (04/90)

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BOREHOLE LOG

Boring or Well No 299-E26
Sheet 9 of 12

Location 216-A-29 Ditch
Project W-017/A-29
Elevation 601.57' Brass Cap
Drilling Contractor KEH
Driller — NA — D.H. Smith
Drilling Method and Equipment Cable Tool - W.
Prepared By M. Havens (Sign/Print Name) Date 6-17-91
Reviewed By (Sign/Print Name) Date

Depth (ft)	Sample Type and No.	Sample Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCL	Comments: Depth of Casing, Drilling Size & Type, Bit Size, etc.
160.0	2 Lith, 1 Moist, 1 Rad	DB		Sandy GRAVEL w/ tr Clay 70% gravel, 25% sand, 5% clay; 5% sm bould, 5% lg cob, 5% sm cob, 15% vcp, 20% cp, 10% mp, 5% fp, 5% vfp; gy-wet (10YR 5/1), lt gy-dry (10YR 7/1), dry, poorly sorted, subangular to subrounded (Angular frags from drilling) Basalt w/ some quartzite, no HCl react, Slightly low plastic	160 ft sample 1428, 6-17-91
165.0	2 Lith, 1 Moist, 1 Rad	DB		Same as above	165 ft sample 1501, 6-17-91
170.0	2 Lith, 1 Moist, 1 Rad	DB		Same as above becoming light moist to moist,	170 ft sample 0928, 6-18-91
175.0	2 Lith, 1 Moist, 1 Rad	DB		Same as above, becoming moist to very moist	175 ft sample 6-18-91

BOREHOLE LOG	Boring or Well No 299-E26-13
	Sheet 10 of 12 [initials] 8-5-91

Location 216-A-29 Ditch | Project W-017/A-29
Elevation 601.57' Brass Cap | Drilling Contractor KEH
Geologist Buck Smith/Ken Blackman | Drilling Method and Equipment Cable Tool - W.N. WS-31
Prepared By M. Hovens [signature] (Sign/Print Name) Date 6-19-91 | Reviewed By [signature] (Sign/Print Name) Date [illegible]

Sample: Type and No.	Sample: Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
2 Lith, 1 Moist, 1 Rad	DB		Sandy Clayey GRAVEL (60% grav, 35% sand, 5% clay) 5% sm cob, 15% vcp, 15% cp, 15% mp, 10% fp, 5% vfp, 10% vcs, 10% cs, 5% ms, 5% fs, 5% vfs, v. dk brn-wet (10YR 3/2), lt gy-dry (10YR 6/1), med sort, sub rnd, 50% basalt, 30% mafic, 20% felsic, no HCl react, low plastic, 5% mag, lt moist	180 ft sample @ 0758 6-19-91. Checked by SSO w/ PID = < Bkgd. Becoming lt moist
2 Lith, 1 moist, 1 Rad	DB		Same as above	185 ft sample @ 0853 6-19-91
2 Lith, 1 Moist, 1 Rad	DB		Same as above	190 ft sample @ 1100 6-19-91
2 Lith, 1 Moist, 1 Rad	DB		Same as above	195 ft sample @ 1155 6-19-91
				Water @ 199.0 ft

BOREHOLE LOG

Boring or Well No 299-E26-
Sheet 11 of 12

Location 216-A-29 Ditch
Project U-017/A-29
Elevation 601.57' Brass Cap
Drilling Contractor KEH
Driller Ken Blackmon
Drilling Method and Equipment Cable Tool - W.N.
Prepared By M. Havens (Sign/Print Name) Date 6-19-91
Reviewed By (Sign/Print Name) Date

Depth (ft)	Sample Type and No.	Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl.	Comments: Depth of Casing, Drilling Size & Type, Bit Size
~~120~~ 200.0	2 Lith, 1 rad, 1 CaCO3	DB		Sandy Clayey GRAVEL (Same as above, saturated)	200 ft sample 6-19-91. Becoming GRAVEL at 202.0 ft
205.0	2 Lith, 1 rad, 1 CaCO3	ST		Sandy GRAVEL (70% grav, 30% sand) 10% sm cob, 25% vcp, 20% cp, 5% mp, 5% fp, 5% vfp, v. dk gy-wet (10YR 3/1), poor sort, rounded lg fraction, subangular fine fraction, 40% basalt, 30% granites, 15% felsic, 15% mafic, no HCl react, 1% mag, nonplastic, saturated	205 ft sample 0841 - 6/20. Becoming at 207.0
210.0	2 Lith, 1 Rad, 1 CaCO3	DB		Sandy Clayey GRAVEL (70% grav, 25% sand, 5% clay) 10% sm cob, 20% vcp, 15% cp, 10% mp, 5% fp, 5% vfp, dk gy-wet (10YR 4/1), poor sort, lg fraction rounded, sm fraction subangular, 40% basalt, 30% granites, 15% felsic, 15% mafic, no HCl react, 1% mag, low plastic, saturated	210 ft sample 6-20-91
211.0	2 Lith, 1 Rad, 1 CaCO3	ST			211-213 ft s. @ 1348 6-20. Becoming at 211 ft
213.0					
215.0'	2 Lith, 1 Rad, 1 CaCO3	BR		at 211-213: Sandy GRAVEL w/ tr clay (80% Grav, 18% sand, 2% clay), 15% sm cob, 25% vcp, 15% cp, 10% mp, 5% fp, 5% vfp, dk gy-wet (10YR 4/1), poor sort, lg fraction rounded, sm fraction subangular, 40% basalt, 30% granites, 15% felsic, 15% mafic, No HCl react, 10% mag, low plastic to nonplastic, saturated	215 ft sample 0950 6-21
				215 ft Description on next page	

BOREHOLE LOG

Boring or Well No 299-E26-13

Sheet 12 ~~13~~ of ~~15~~ 12

216-A29 Ditch

601.57 Brass Cap

Ken BLACKMAN

Project W017-A29

Drilling Contractor KEH

Drilling Method and Equipment CABLE TOOL - WALKER NEER

Logged By Dennis Anderson Dennis Anderson Date

(Sign/Print Name)

Reviewed By [signature] Date 6/25/91

(Sign/Print Name)

Sample: Type and No.	Sample: Blows or Recovery	Graphic Log	Sample Description: Soil Classification, Particle Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Reaction to HCl	Comments: Depth of Casing, Drilling Rate, Casing Size & Type, Bit Size, Water Level
		4/4/91	215 ft Description	
			sand GRAVEL (25% sand 75% GRAVEL)	clean sand
			30% vcs 25% cs 15% ms 15% fs	will form BAILING
			15% vfs 25% vcp 20% cp 20% mp,	
			15% fp 20% vfp 5Y 3/1 vy dk grey	
			WET, 5/4 5/1 grey Dry, saturated,	
			poor sorting, sub rnd - to rnd, Basalt	
			Qtz, Misc Dacite, No Rx to 10% HCl	
			vry slight magnetics 80% mafic -	
			20% felsic	
			TD - 215.0'	

A-6000-382 (04/90)

9413206.0287

B Pond System water quality data from the latest published quarterly monitoring report entitled *Quarterly Report of RCRA Groundwater Monitoring Data for Period October 1, 1992 through December 31, 1992* (DOE-RL 1993) are attached. The following sections, tables and figures from DOE-RL (1993) are not reformatted for this permit application. An explanation of the tables and figures enclosed is discussed in Section 1.4 on page 1-13 of DOE-RL 1993. Quarterly groundwater monitoring data for previous quarters is also available.

9413206.0289

6.1 INTRODUCTION

The 216-B-3 Pond System is located east of the 200 East Area and consists of a main pond, three interconnected lobes for waste water disposal, and several ditches leading to the ponds (Figures 1-1 and 6-1). These surface impoundments cover approximately 41.3 hectares (102 acres). Table 6-1 lists the groundwater wells and their monitoring status.

The 216-B-3 Pond System groundwater monitoring well locations are shown in Figure 6-1. Detection monitoring began at the B Pond System in November 1988 and continued through June 1990, when assessment monitoring was scheduled to begin because of elevated levels of TOX in two downgradient monitoring wells (699-43-41E and 699-43-41F). Assessment monitoring actually began in June 1991 when groundwater sampling on the Hanford Site resumed, following a hiatus, as described in the *Groundwater Quality Assessment Plan for the 216-B-3 Pond System* (Harris 1990).

Three new downgradient wells; 699-40-36, 699-41-35, and 699-42-37 were added to the 216-B-3 Pond groundwater monitoring network since the last quarterly reporting period. These wells were drilled specifically to evaluate stratigraphy and groundwater quality for the planning stages of the W-049H Treated Effluent Disposal Facility (TEDF) (Davis 1992; Delaney 1993).

6.2 WATER LEVEL DATA

Water levels were measured in all wells during the October through December period, as shown in Table 6-2. Some of these measurements are suspected of error because they depart from historical trends or differ significantly from contemporaneous measurements taken in other nearby wells. These measurements were taken as follows: December 15, 1992 and December 16, 1992 in well 299-E18-1; December 15, 1992 in well 699-42-40A; and, December 15, 1992 in well 699-42-42J.

6.3 WATER CHEMISTRY DATA

Groundwater samples were scheduled for collection at all B Pond System wells during the October through December 1992 period for analysis of CIPs, drinking water parameters, groundwater quality parameters, site-specific parameters, and assessment monitoring parameters in accordance with Harris (1990). All wells scheduled for this quarter's sampling were sampled in October, except the new wells in the W-049H Facility (699-40-36, 699-41-35, and 699-42-37) and well 299-E18-1, all of which were sampled in December. Analytical results from B Pond wells unavailable as of the writing of this report will be reported in future quarterly reports.

Figure 6-1. 216-B-3 Pond Groundwater Monitoring Network.

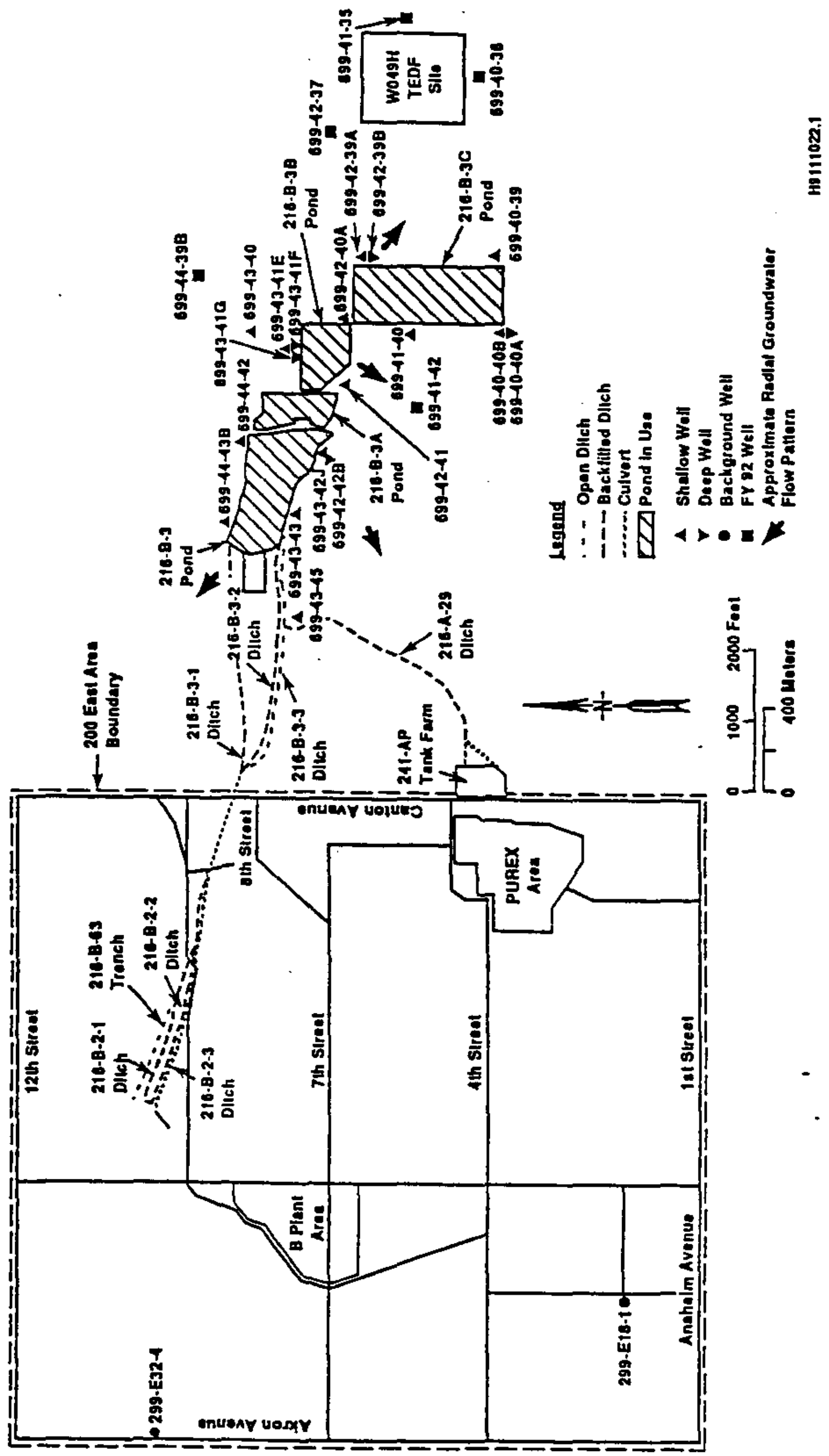

Table 6-1. Monitoring Well Purpose and Sampling Schedule for the 216-B-3 Pond System Network. (sheet 1 of 2)

Well no.	Relative position	Hydrogeologic unit	Sampling frequency	Sample date: 4th Qtr 1992
299-E18-1	Upgradient	Hanford: Water Table	Semiannually	12/16/92
299-E32-4	Upgradient	Hanford: Water Table	Semiannually	not scheduled
699-40-39	Downgradient	Ringold: Upper Semiconfined	Quarterly	10/20/92
699-40-40A	Downgradient	Ringold: Lower Semiconfined	Quarterly	10/21/92
699-40-40B	Downgradient	Ringold: Upper Semiconfined	Quarterly	10/21/92
699-41-40	Downgradient	Ringold: Upper Semiconfined	Quarterly	10/20/92
699-42-39A	Downgradient	Ringold: Upper Semiconfined	Quarterly	10/21/92
699-42-39B	Downgradient	Ringold: Lower Semiconfined	Quarterly	10/20/92
699-42-40A	Downgradient	Ringold: Upper Semiconfined	Semiannually	not scheduled
699-42-41	Downgradient	Ringold: Water Table	Quarterly	10/22/92
699-42-42B	Downgradient	Ringold: Lower Unconfined	Semiannually	10/20/92
699-43-40	Downgradient	Ringold: Water Table	Quarterly	10/22/92
699-43-41E	Downgradient	Ringold: Upper Semiconfined	Quarterly	10/20/92
699-43-41F	Downgradient	Ringold: Lower Semiconfined	Quarterly	10/21/92
699-43-41G	Downgradient	Ringold: Bottom of Semiconfined	Quarterly	10/28/92
699-43-42J	Downgradient	Ringold: Water Table	Semiannually	10/22/92
699-43-43	Downgradient	Ringold: Water Table	Semiannually	10/26/92
699-43-45	Downgradient	Ringold: Water Table	Quarterly	10/26/92
699-44-42	Downgradient	Ringold: Water Table	Semiannually	10/22/92
699-40-36[1]	Downgradient	Ringold: Top of Confined	Quarterly	12/21/92

Table 6-1. Monitoring Well Purpose and Sampling Schedule for the 216-B-3 Pond System Network. (sheet 2 of 2)

Well no.	Relative position	Hydrogeologic unit	Sampling frequency	Sample date: 4th Qtr 1992
699-41-35[1]	Downgradient	Ringold: Top of Confined	Quarterly	12/21/92
699-42-37[1]	Downgradient	Ringold: Top of Confined	Quarterly	12/22/92
699-44-43B	Downgradient	Ringold: Water Table	Quarterly	10/22/92

[1]Wells shared with the W-049H Treated Effluent Disposal Facility.

The constituent list and summary of results available are provided in Table 6-3. The results of the available analyses, for constituents with at least one detected value, are reported in Table 6-4. Results of analyses for CIPs are reported in Table 6-5.

Wells 699-40-39, 699-41-40, 699-42-41, 699-42-42B, 699-43-41E, 699-43-42J, 699-44-42, and 699-44-43B were scheduled only for analyses of CIP during the October through December 1992 sampling period. All TOX data are flagged "A" because of an ongoing laboratory audit (see Section 1.2.5).

Potential problems with chemistry data exists in samples collected from wells 699-42-41 and 699-42-39A. Contamination to groundwater from stencil paint used on temporary casing may be possibly affecting analytical results in these wells. Data from these wells will be tracked to identify any anomalous results. A potential problem with chemistry data also exists in samples collected for well 699-43-40. This well does not comply with WAC 173-160-520 because a portion of the temporary casing shoe was accidently detached from the temporary 8-in. casing during well construction. The shoe is lodged adjacent to the stainless steel screen interval. Data from this well will be tracked indefinitely to identify any anomalous results. All data with potential problems are flagged with a "P" in the data tables.

Chromium values in unfiltered samples exceeded the DWS in wells 699-40-40A, 699-40-40B, 699-42-39A, 699-42-39B, 699-43-43, and 699-43-45. The value for coliform bacteria apparently exceeded the DWS in well 699-40-40B. All wells in the network analyzed for iron in unfiltered samples exceeded the DWS for this constituent except wells 699-41-35 and 699-43-41G. The DWS for iron in filtered samples was exceeded in well 699-42-39B. Manganese in unfiltered samples exceeded the DWS in all wells in the network analyzed for this constituent except in wells 699-43-43 and 699-43-45. The DWS for manganese in filtered samples was exceeded in wells 699-40-36, 699-40-40A, 699-40-40B, 699-41-35, 699-42-37, 699-42-39B (two samples), and 699-43-41G. The nitrate DWS was exceeded by results from well 699-43-43. Because this is an exceptionally high value for nitrate in this well, as compared to historical analyses, a RADE has been submitted for this result. Tritium exceeded DWS in wells 699-42-39A, 699-42-39B, and 699-43-41G. Turbidity exceeded the DWS in upgradient well 299-E18-1 and downgradient wells 699-40-40A, 699-40-40B, and 699-42-39A. The standard for the upper limit of pH was exceeded in wells 699-40-39, 699-41-40, 699-43-41E, and 699-43-41G.

A RADE was also submitted for each of the following results shown in Table 6-4: iron, in a filtered sample from well 699-42-39B (taken 10/28/92); coliform, from well 699-40-40B (taken 10/21/92); and zinc, in a filtered sample from well 699-40-40B (taken 10/21/92). These data would normally be flagged "R", but were submitted after the deadline for the attachment of flags.

Table 6-2. RCRA Water Level Measurement Report 216-B-3 Pond System - Fourth Quarter. (sheet 1 of 3)

Well	Date	Depth to water (ft)	Water level elevation above msl (ft)
Wells Monitoring the Unconfined Aquifer at the Water Table			
299-E18-1	10/19/92	317.65	402.65
	11/03/92	317.98	402.32*
	11/11/92	317.83	402.47
	12/15/92	317.97	402.33
	12/15/92	317.22	403.08*+
	12/16/92	317.22	403.08*+
299-E32-4	12/18/92	284.05	401.83
699-42-40A	10/21/92	124.72	420.81
	10/22/92	124.77	420.76*
	11/11/92	124.59	420.94
	12/15/92	123.13	422.40+
	12/28/92	126.23	419.30*
699-42-41	10/21/92	147.14	419.93
	10/22/92	146.96	420.11*
	11/11/92	146.99	420.08
	12/15/92	146.25	420.82
699-43-40	10/20/92	123.19	418.80
	10/22/92	123.39	418.60*
	11/11/92	123.35	418.64
	12/15/92	122.73	419.26
699-43-42J	10/20/92	163.24	418.44
	10/22/92	163.20	418.48*
	11/11/92	163.23	418.45
	12/15/92	162.73	418.95+
	12/28/92	163.22	418.46*
699-43-43	10/21/92	164.55	414.82
	10/26/92	164.46	414.91*
	11/11/92	164.53	414.84
	12/15/92	164.42	414.95
699-43-45	10/20/92	194.09	403.59
	10/26/92	194.05	403.63*
	11/11/92	194.17	403.51
699-43-45	12/15/92	194.26	403.42

Table 6-2. RCRA Water Level Measurement Report 216-B-3 Pond System - Fourth Quarter. (sheet 2 of 3)

Well	Date	Depth to water (ft)	Water level elevation above msl (ft)
Wells Monitoring the Unconfined Aquifer at the Water Table			
699-44-42	10/20/92	158.80	420.42
	10/22/92	158.73	420.49*
	11/11/92	158.77	420.45
	12/15/92	158.56	420.66
699-44-43B	10/21/92	164.64	415.48
	10/22/92	164.64	415.48*
	11/11/92	164.71	415.41
	12/15/92	164.74	415.38
Wells Monitoring Confined or Semi-Confined Aquifer			
699-40-36	12/21/92	117.84	*6
699-40-39	10/20/92	129.47	412.37*
	10/21/92	129.49	412.35
	11/11/92	129.65	412.19
	12/15/92	129.38	412.46
699-40-40A	10/20/92	129.96	411.04
	10/21/92	129.86	411.14*
	11/11/92	130.08	410.92
	12/15/92	129.73	411.27
699-40-40B	10/20/92	130.64	411.33
	10/21/92	130.67	411.30*
	11/11/92	130.75	411.22
	12/15/92	130.40	411.57
699-41-35	12/21/92	108.24	*6
699-41-40	10/21/92	130.85	415.09
	11/11/92	131.06	414.88
	12/15/92	130.49	415.45
699-42-37	12/22/92	104.68	*6
699-42-39A	10/20/92	139.77	418.16
	10/21/92	139.82	418.11*
	11/11/92	139.98	417.95
	12/15/92	139.22	418.71

Table 6-2. RCRA Water Level Measurement Report 216-B-3 Pond System - Fourth Quarter. (sheet 3 of 3)

Well	Date	Depth to water (ft)	Water level elevation above msl (ft)
Wells Monitoring Confined or Semi-Confined Aquifer			
699-42-39B	10/20/92	140.15	417.96
	10/21/92	139.82	418.29*
	10/28/92	140.08	418.03*
	11/11/92	140.38	417.73
	12/15/92	139.64	418.47
699-43-41E	10/20/92	130.57	420.29
	10/20/92	130.56	420.30*
	11/11/92	130.82	420.04
	12/15/92	130.19	420.67
699-43-41F	10/20/92	130.72	420.29
	10/21/92	130.67	420.34*
	11/11/92	130.86	420.15
	12/15/92	130.23	420.78
699-43-41G	10/20/92	135.68	415.45
	10/28/92	135.40	415.73*
	11/11/92	135.80	415.33
	12/15/92	135.21	415.92
Well Monitoring the Unconfined Aquifer Below the Water Table			
699-42-42B	10/20/92	166.46	416.77
	10/20/92	166.40	416.83*
	11/11/92	166.47	416.76
	12/15/92	166.18	417.05

NOTES:
1. Water level elevations are calculated by subtracting the measured depth to water from the surveyed elevation for the well.
2. Depth-to-water values are transcribed from field records.
3. Elevations marked with an "*" were measured at the time of sampling.
4. Elevations marked with a "+" are outside of the expected range, and are suspected of error.
5. To convert feet to meters multiply by 0.3048.
6. Final surveyed elevations not yet available.

Table 6-3. Constituent List and Summary of Results for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992.
(sheet 1 of 6)

CONTAMINATION INDICATOR PARAMETERS

Constituent Name Short	(Method)	Full	Units	Lab CRQL	DWS Limit	DWS Agency	Number of Samples Total	>CRQL	>DWS
CONDUCT	94	Conductivity, field	umhos	1	700	WDOE	100	100	0
CONDUCT	73	Conductivity, lab	umhos	1	700	WDOE	1	1	0
TOC		Total Organic Carbon	ppb	1000			88	0	
TOXLDL		Total Organic Halogen	ppb	10			99	27	
PH	93	pH, field		.1	6.5-8.5	EPAS	100	100	16
PH	125	pH, lab			6.5-8.5	EPAS	1	1	0

DRINKING WATER PARAMETERS

Constituent Name Short	(Method)	Full	Units	Lab CRQL	DWS Limit	DWS Agency	Number of Samples Total	>CRQL	>DWS
2,4,5TP		2,4,5-TP	ppb	2	10	EPA	9	0	0
2,4-D		2,4-D	ppb	10	100	EPA	9	0	0
a-BHC		Alpha-BHC	ppb	.05	4	EPA	12	0	0
ARSENIC		Arsenic	ppb	5	50	EPA	12	2	0
FARSENI		Arsenic, Filtered	ppb	5	50	EPA	12	3	0
BARIUM		Barium	ppb	20	1000	EPA	11	10	0
FBARIUM		Barium, Filtered	ppb	20	1000	EPA	11	10	0
b-BHC		Beta-BHC	ppb	.05	4	EPA	12	0	0
CADMIUM		Cadmium	ppb	10	10	EPA	11	0	0
FCADMIU		Cadmium, Filtered	ppb	10	10	EPA	11	0	0
CHROMUM		Chromium	ppb	20	50	EPA	11	10	7
FCHROMI		Chromium, Filtered	ppb	20	50	EPA	11	1	0
d-BHC		Delta-BHC	ppb	.1	4	EPA	12	0	0
ENDRIN		Endrin	ppb	.1	.2	EPA	12	0	0
FLUORID		Fluoride	ppb	100	4000	EPA	12	12	0
ALPHA		Gross alpha	pCi/L	4	15	EPA	12	9	0
BETA		Gross beta	pCi/L	8	50	EPA	12	12	0
LEAD		Lead	ppb	5	50	EPA	12	0	0
FLEAD		Lead, filtered	ppb	5	50	EPA	12	0	0
MERCURY		Mercury	ppb	.2	2	EPA	12	0	0
FMERCUR		Mercury, filtered	ppb	.2	2	EPA	12	0	0
METHLOR		Methoxychlor	ppb	2	100	EPA	12	0	0
RADIUM		Radium	pCi/L	1	5	EPA	9	0	0
SELENUM		Selenium	ppb	10	10	EPA	12	0	0
FSELENI		Selenium, Filtered	ppb	10	10	EPA	12	0	0
SILVER		Silver	ppb	20	50	EPA	11	0	0
FSILVER		Silver, Filtered	ppb	20	50	EPA	11	0	0
TOXAENE		Toxaphene	ppb	2	5	EPA	12	0	0
TURBID		Turbidity	NTU	.1	1	EPA	9	9	4
g-BHC		gamma-BHC (Lindane)	ppb	.05	4	EPA	12	0	0

GROUNDWATER QUALITY PARAMETERS

Constituent Name Short	(Method)	Full	Units	Lab CRQL	DWS Limit	DWS Agency	Number of Samples Total	>CRQL	>DWS
CHLORID		Chloride	ppb	200	250000	EPAS	12	12	0
IRON		Iron	ppb	20	300	EPAS	11	11	9
FIRON		Iron, Filtered	ppb	20	300	EPAS	11	7	1
MANGESE		Manganese	ppb	10	50	EPAS	11	10	9
FMANGAN		Manganese, Filtered	ppb	10	50	EPAS	11	9	8
LPHENOL	19	Phenol	ppb	10			9	0	
LPHENOL	30	Phenol	ppb	1			9	0	

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Table 6-3. Constituent List and Summary of Results for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992.
(sheet 2 of 6)

GROUNDWATER QUALITY PARAMETERS

Constituent Name Short	(Method)	Full	Units	Lab CRQL	DWS Limit	DWS Agency	Number of Samples Total	>CRQL	>DWS
SODIUM		Sodium	ppb	300			11	11	
FSODIUM		Sodium, Filtered	ppb	300			11	11	
SULFATE		Sulfate	ppb	500	250000	EPAS	12	12	0

SITE SPECIFIC AND OTHER CONSTITUENTS

Constituent Name Short	(Method)	Full	Units	Lab CRQL	DWS Limit	DWS Agency	Number of Samples Total	>CRQL	>DWS
1112-tc		1,1,1,2-Tetrachloroethane	ppb	5			6	0	
1,1,1-T		1,1,1-Trichloroethane	ppb	5	200	EPA	7	0	0
1122-tc		1,1,2,2-Tetrachloroethane	ppb	5			6	0	
1,1,2-T		1,1,2-Trichloroethane	ppb	5			7	0	
1,1-DIC		1,1-Dichloroethane	ppb	5			7	0	
DICETHY		1,1-Dichloroethene	ppb	5	7	EPA	6	0	0
123-trp		1,2,3-Trichloropropane	ppb	5			6	0	
TETRCHB		1,2,4,5-Tetrachlorobenzene	ppb	10			6	0	
TRICHLB		1,2,4-Trichlorobenzene	ppb	10			6	0	
DIBRCHL		1,2-Dibromo-3-chloropropane	ppb	5	.2	EPAP	6	0	6*
DIBRETH		1,2-Dibromoethane	ppb	5			6	0	
12-dben		1,2-Dichlorobenzene	ppb	10			6	0	
1,2-DIC		1,2-Dichloroethane	ppb	5	5	EPA	7	0	0
DICPANE		1,2-Dichloropropane	ppb	5	5	EPAP	6	0	0
13-dben		1,3-Dichlorobenzene	ppb	10			6	0	
DIBUTEN		1,4-Dichloro-2-butene	ppb	5			6	0	
14-dben	16	1,4-Dichlorobenzene	ppb	5	750	EPA	7	0	0
14-dben	19	1,4-Dichlorobenzene	ppb	5	750	EPA	6	0	0
DIOXANE		1,4-Dioxane	ppb	200			6	0	
NAPHQUI		1,4-Naphtoquinone	ppb	10			6	0	
1BUTYN		1-Butanol	ppm	1			1	0	
1-napha		1-Naphthylamine	ppb	10			6	0	
TETRCHP		2,3,4,6-Tetrachlorophenol	ppb	10			6	0	
2,4,5-T		2,4,5-T	ppb	2			9	0	
245-trp		2,4,5-Trichlorophenol	ppb	10			6	0	
246-trp	19	2,4,6-Trichlorophenol	ppb	10			6	0	
246-trp	30	2,4,6-Trichlorophenol	ppb	5			9	0	
24-dchp	19	2,4-Dichlorophenol	ppb	10			6	0	
24-dchp	30	2,4-Dichlorophenol	ppb	5			9	0	
DIMPHEN	19	2,4-Dimethylphenol	ppb	10			6	0	
DIMPHEN	30	2,4-Dimethylphenol	ppb	5			9	0	
DINPHEN	19	2,4-Dinitrophenol	ppb	50			6	0	
DINPHEN	30	2,4-Dinitrophenol	ppb	150			9	0	
24-dint		2,4-Dinitrotoluene	ppb	10			6	0	
26-dchp	19	2,6-Dichlorophenol	ppb	10			6	0	
26-dchp	30	2,6-Dichlorophenol	ppb	5			9	0	
26-dint		2,6-Dinitrotoluene	ppb	10			6	0	
ACEFENE		2-Acetylaminofluorene	ppb	10			6	0	
CHLNAPH		2-Chloronaphthalene	ppb	10			6	0	
CHLPHEN	19	2-Chlorophenol	ppb	10			6	0	
CHLPHEN	30	2-Chlorophenol	ppb	5			9	0	
2HEXANO		2-Hexanone	ppb	50			6	0	
2MENAPH		2-Methylnaphthalene	ppb	10			6	0	
2METHPH		2-Methylphenol	ppb	10			9	0	
2-napha		2-Naphthylamine	ppb	10			6	0	
ONITANI		2-Nitroaniline	ppb	50			6	0	
2NITPH	19	2-Nitrophenol	ppb	10			6	0	

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Table 6-3. Constituent List and Summary of Results for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992. (sheet 3 of 6)

SITE SPECIFIC AND OTHER CONSTITUENTS

Constituent Name Short	(Method)	Full	Units	Lab CRQL	DWS Limit	DWS Agency	Number of Samples Total	>CRQL	>DWS
2NITPH	30	2-Nitrophenol	ppb	5			9	0	
PICOLIN		2-Picoline	ppb	5			6	0	
BUTDINP	30	2-sec-Butyl-4,6-dinitrophenol(DN	ppb	5			9	0	
BUTDINP	49	2-sec-Butyl-4,6-dinitrophenol(DN	ppb	1			9	0	
DICHBEN		3,3'-Dichlorobenzidine	ppb	20			6	0	
DIMEYLB		3,3'-Dimethylbenzidine	ppb	10			6	0	
METCHAN		3-Methylcholanthrene	ppb	10			6	0	
MNITANI		3-Nitroaniline	ppb	50			6	0	
DDD		4,4'-DDD	ppb	.1			12	0	
DDE		4,4'-DDE	ppb	.05			12	0	
DDT		4,4'-DDT	ppb	.1			12	0	
46DN2MP	19	4,6-Dinitro-2-methylphenol	ppb	50			6	0	
46DN2MP	30	4,6-Dinitro-2-methylphenol	ppb	200			9	0	
AMINOYL		4-Aminobiphenyl	ppb	10			6	0	
BROPHEN		4-Bromophenylphenyl ether	ppb	10			14	0	
CHLCRES	19	4-Chloro-3-methylphenol	ppb	20			6	0	
CHLCRES	30	4-Chloro-3-methylphenol	ppb	5			9	0	
CHLANIL		4-Chloroaniline	ppb	20			6	0	
4CPPETH		4-Chlorophenylphenyl ether	ppb	10			6	0	
MIBK		4-Methyl-2-pentanone	ppb	50			7	0	
4METHPH		4-Methylphenol	ppb	10			9	0	
NITRANI		4-Nitroaniline	ppb	50			6	0	
NITPHEN	19	4-Nitrophenol	ppb	50			6	0	
NITPHEN	30	4-Nitrophenol	ppb	30			9	0	
4NITQUI		4-Nitroquinoline-1-oxide	ppb	10			6	0	
NITRTOL		5-Nitro-o-toluidine	ppb	10			6	0	
DIMBENZ		7,12-Dimethylbenz[a]anthracene	ppb	10			6	0	
ACENAPH		Acenaphthene	ppb	10			6	0	
ACENATL		Acenaphthylene	ppb	10			6	0	
ACETONE		Acetone	ppb	100			7	0	
ACETOPH		Acetophenone	ppb	10			6	0	
ACROLIN		Acrolein	ppb	5			6	0	
ACRYILE		Acrylonitrile	ppb	5			6	0	
ALDRIN		Aldrin	ppb	.05			12	0	
DIMPHAM		Alpha,alpha-Dimethylphenethylami	ppb	10			6	0	
AMMONIU		Ammonium ion	ppb	100			12	2	
ANILINE		Aniline	ppb	10			6	0	
ANTHRA		Anthracene	ppb	10			6	0	
ANTIONY		Antimony	ppb	200			11	0	
FANTIMO		Antimony, Filtered	ppb	200			11	0	
ARAMITE		Aramite	ppb	10			6	0	
AR1016		Aroclor-1016	ppb	1	.5	EPAP	6	0	6*
AR1221		Aroclor-1221	ppb	1	.5	EPAP	6	0	6*
AR1232		Aroclor-1232	ppb	1	.5	EPAP	6	0	6*
AR1242		Aroclor-1242	ppb	1	.5	EPAP	6	0	6*
AR1248		Aroclor-1248	ppb	1	.5	EPAP	6	0	6*
AR1254		Aroclor-1254	ppb	1	.5	EPAP	6	0	6*
AR1260		Aroclor-1260	ppb	1	.5	EPAP	6	0	6*
BENZENE		Benzene	ppb	5	5	EPA	7	0	0
BENZAAN		Benzo(a)anthracene	ppb	10			6	0	
BENZOPY		Benzo(a)pyrene	ppb	10			6	0	
BENZBFL		Benzo(b)fluoranthene	ppb	10			6	0	
BGHIPER		Benzo(ghi)perylene	ppb	10			6	0	
BNZKFLU		Benzo(k)fluoranthene	ppb	10			6	0	
BENZALC		Benzyl alcohol	ppb	20			6	0	
BERYLUM		Beryllium	ppb	3			11	0	
FBERYLL		Beryllium, Filtered	ppb	3			11	0	

Table 6-3. Constituent List and Summary of Results for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992. (sheet 4 of 6)

SITE SPECIFIC AND OTHER CONSTITUENTS

Constituent Name Short	(Method)	Full	Units	Lab CRQL	DWS Limit	Agency	Number of Samples Total	>CRQL	>DWS
BIS2CHM		Bis(2-Choroethoxy)methane	ppb	10			6	0	
BIS2CHE		Bis(2-chloroethyl) ether	ppb	10			6	0	
BIS2ETH		Bis(2-chloroisopropyl) ether	ppb	10			6	0	
BIS2EPH		Bis(2-ethylhexyl) phthalate	ppb	10			6	0	
BROMIDE		Bromide	ppb	500			12	0	
BDCM		Bromodichloromethane	ppb	5	100	EPA	6	0	0
BROMORM		Bromoform	ppb	5	100	EPA	6	0	0
BUTBENP		Butylbenzylphthalate	ppb	10			14	0	
CALCIUM		Calcium	ppb	100			11	11	
FCALCIU		Calcium, Filtered	ppb	100			11	11	
CARBIDE		Carbon disulfide	ppb	5			6	0	
TETRANE		Carbon tetrachloride	ppb	5	5	EPA	7	0	0
CHLOANE		Chlordane	ppb	.1	2	EPAP	12	0	0
CHLROB		Chlorobenzene	ppb	5	100	EPAP	6	0	0
CHLLATE		Chlorobenzilate	ppb	10			6	0	
CLETHAN		Chloroethane	ppb	10			6	0	
CHLFORM		Chloroform	ppb	5	100	EPA	7	0	0
CHLPRENE		Chloroprene	ppb	5			6	0	
CHRYSEN		Chrysene	ppb	10			6	0	
COBALT		Cobalt	ppb	20			11	0	
FCOBALT		Cobalt, filtered	ppb	20			11	0	
COLIFORM		Coliforms	COL	1	1	EPA	9	1	1
COPPER		Copper	ppb	20	1000	EPAS	11	1	0
FCOPPER		Copper, Filtered	ppb	20	1000	EPAS	11	0	0
CRESOLS		Cresols (methylphenols)	ppb	10			9	0	
CYANIDE		Cyanide	ppb	20			3	0	
CYANIDE		Cyanide	ppb	20			2	0	
DECANE		Decane	ppb	10			3	0	
DIBPHTH		Di-n-butylphthalate	ppb	10			6	0	
DIOPHTH		Di-n-octylphthalate	ppb	10			6	0	
DIALLATE		Diallate	ppb	10			6	0	
DIBAHAN		Dibenz[a,h]anthracene	ppb	10			6	0	
DIBENFR		Dibenzofuran	ppb	10			6	0	
BRCHLMET		Dibromochloromethane	ppb	5	100	EPA	6	0	0
DIBRMET		Dibromomethane	ppb	5			6	0	
DICDIFM		Dichlorodifluoromethane	ppb	5			6	0	
DIELRIN		Dieldrin	ppb	.05			12	0	
DIEPHTH		Diethyl phthalate	ppb	10			6	0	
DIMETHO		Dimethoate	ppb	10			6	0	
DIMPHTH		Dimethyl phthalate	ppb	10			6	0	
DIPHAMI		Diphenylamine	ppb	10			6	0	
DODECAN		Dodecane	ppb	10			3	0	
ENDO1		Endosulfan I	ppb	.1			12	0	
ENDO2		Endosulfan II	ppb	.05			12	0	
ENDSFAN		Endosulfan sulfate	ppb	.5			12	0	
ENDRALD		Endrin Aldehyde	ppb	.2			12	0	
ETHCYAN		Ethyl cyanide	ppb	5			6	0	
ETHMETH		Ethyl methacrylate	ppb	5			6	0	
ETHMETS		Ethyl methanesulfonate	ppb	10			6	0	
ETHBENZ		Ethylbenzene	ppb	5	700	EPAP	6	0	0
FAMPHUR		Famphur	ppb	10			6	0	
FLUORAN		Fluoranthene	ppb	10			6	0	
FLRENE		Fluorene	ppb	10			6	0	
HEPTLOR		Heptachlor	ppb	.05	.4	EPAP	12	0	0
HEPTIDE		Heptachlor epoxide	ppb	1			12	0	
HEXCBEN		Hexachlorobenzene	ppb	10			6	0	
HEXCBUT		Hexachlorobutadiene	ppb	10			6	0	

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Table 6-3. Constituent List and Summary of Results for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992.
(sheet 5 of 6)

SITE SPECIFIC AND OTHER CONSTITUENTS

Constituent Name Short	(Method)	Full	Units	Lab CRQL	DWS Limit	Agency	Number of Samples Total	>CRQL	>DWS
HEXCCYC		Hexachlorocyclopentadiene	ppb	10			6	0	
HEXCETH		Hexachloroethane	ppb	10			6	0	
HEXACHL		Hexachlorophene	ppb	10			6	0	
HEXAENE		Hexachloropropene	ppb	10			6	0	
LHYDRAZ		Hydrazine	ppb	30			11	0	
INDENOP		Indeno(1,2,3-cd)pyrene	ppb	10			6	0	
I-129LD		Iodine-129, low detection	pCi/L	1	1	EPAR	3	1	0
ISOBUTY		Isobutyl alcohol	ppb	200			6	0	
ISODRIN		Isodrin	ppb	10			6	0	
ISOPHER		Isophorone	ppb	10			6	0	
ISOSOLE		Isosafrole	ppb	10			6	0	
KEPONE		Kepone	ppb	10			6	0	
KEROSEN		Kerosene	ppb	10000			6	0	
MAGNES		Magnesium	ppb	100			11	11	
FMAGNES		Magnesium, Filtered	ppb	100			11	11	
METHACR		Methacrylonitrile	ppb	5			6	0	
METHAPY		Methapyrilene	ppb	10			6	0	
IODOMET		Methyl Iodide	ppb	5			6	0	
METHBRO		Methyl bromide	ppb	10			6	0	
METHCHL		Methyl chloride	ppb	10			6	0	
METHONE		Methyl ethyl ketone	ppb	100			7	0	
METACRY		Methyl methacrylate	ppb	5			6	0	
METMSUL		Methyl methanesulfonate	ppb	10			6	0	
METNYCH		Methylene chloride	ppb	5			7	0	
DIPRNIT		N-Nitroso-di-n-dipropylamine	ppb	10			6	0	
NNIBUTY		N-Nitrosodi-n-butylamine	ppb	10			6	0	
NNIDIEY		N-Nitrosodiethylamine	ppb	10			6	0	
NNIDIME		N-Nitrosodimethylamine	ppb	10			6	0	
NNDIPHA		N-Nitrosodiphenylamine	ppb	10			6	0	
NNIMETH		N-Nitrosomethylethylamine	ppb	10			6	0	
NNIMORP		N-Nitrosomorpholine	ppb	10			6	0	
NNIPIPE		N-Nitrosopiperidine	ppb	10			6	0	
NAPHTHA		Naphthalene	ppb	10			9	0	
NICKEL		Nickel	ppb	30			11	6	
FNICKEL		Nickel, Filtered	ppb	30			11	0	
NITRATE		Nitrate	ppb	200	45000	EPA	12	11	1
NITRITE		Nitrite	ppb	200	3300	EPAP	12	0	0
NITBENZ		Nitrobenzene	ppb	10			6	0	
NITRPYR		Nitrosopyrrolidine	ppb	10			6	0	
TRIPHOS		O,O,O-Triethyl phosphorothioate	ppb	10			6	0	
DIPHOS		O,O-diethylO-2-pyrazinylphosphor	ppb	10			6	0	
PARATHI		Parathion	ppb	10			6	0	
PENTCHB		Pentachlorobenzene	ppb	10			6	0	
PENTACH		Pentachloroethane	ppb	5			6	0	
PENTCHN		Pentachloronitrobenzene (PCNB)	ppb	10			6	0	
PENTCHP	19	Pentachlorophenol	ppb	50	200	EPAP	9	0	0
PENTCHP	30	Pentachlorophenol	ppb	100	200	EPAP	9	0	0
PHENTIN		Phenacetin	ppb	10			6	0	
PHENANT		Phenanthrene	ppb	10			6	0	
PHOSPHA		Phosphate	ppb	400			12	0	
POTASUM		Potassium	ppb	300			11	11	
FPOTASS		Potassium, Filtered	ppb	300			11	11	
PRONIDE		Pronamide	ppb	10			6	0	
PYRENE		Pyrene	ppb	10			6	0	
PYRIDIN		Pyridine	ppb	5			6	0	
SAFROL		Safrol	ppb	10			6	0	
STYRENE		Styrene	ppb	5	5	EPAP	6	0	0

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Table 6-3. Constituent List and Summary of Results for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992.
(sheet 6 of 6)

SITE SPECIFIC AND OTHER CONSTITUENTS

Constituent Name Short	(Method)	Full	Units	Lab CRQL	DWS Limit	DWS Agency	Number of Samples Total	>CRQL	>DWS
PERCENE		Tetrachloroethene	ppb	5	5	EPAP	7	0	0
TETPHNL		Tetrachlorophenols	ppb	10			9	0	
TETRADE		Tetradecane	ppb	10			3	0	
PYROPHOS		Tetraethyldithiopyrophosphate	ppb	10			6	0	
TAF		Tetrahydrofuran	ppb	10			7	0	
TIN		Tin	ppb	100			11	0	
TIN		Tin, Filtered	ppb	100			11	0	
TOLUENE		Toluene	ppb	5	2000	EPAP	7	0	0
TRIBUTPH		Tributyl Phosphate	ppb	10			9	0	
TRICENE		Trichloroethene	ppb	5	5	EPA	7	0	0
TRCMFLM		Trichloromonofluoromethane	ppb	5			6	0	
TRIPHNL		Trichlorophenols	ppb	5			9	0	
TRITIUM		Tritium	pCi/L	500	20000	EPA	12	8	4
URANIUM		Uranium	ppb	.5			1	1	
VANADUM		Vanadium	ppb	30			11	2	
FVANADI		Vanadium, Filtered	ppb	30			11	2	
VINYLAC		Vinyl acetate	ppb	5			6	0	
VINYIDE		Vinyl chloride	ppb	10	2	EPA	7	0	7*
M-XYLE		Xylene(m)	ppb	5	10000	EPAP	6	0	0
XYLENEO		Xylene(o)	ppb	5			6	0	
XYLENEP		Xylene(p)	ppb	5	10000	EPAP	6	0	0
XYLENE		Xylenes (total)	ppb	5			1	0	
ZINC		Zinc	ppb	10	5000	WDOE	11	8	0
FZINC		Zinc, Filtered	ppb	10	5000	WDOE	11	2	0
ALLYLCL		allylchloride	ppb	100			6	0	
TDICPENE		cis-1,3-Dichloropropene	ppb	5			6	0	
MCRESOL		m-Cresol	ppb	10			9	0	
DINBENZ		m-dinitrobenzene	ppb	10			6	0	
OTOLHYD		o-Toluidine	ppb	10			6	0	
DIMEAMB		p-Dimethylaminoazobenzene	ppb	10			6	0	
PHENINE		p-Phenylenediamine	ppb	10			6	0	
SYMTRIN		sym-Trinitrobenzene	ppb	10			6	0	
TRANDCE		trans-1,2-Dichloroethylene	ppb	5	100	EPAP	7	0	0
DICPENE		trans-1,3-Dichloropropene	ppb	5			6	0	

For explanation of this table, see Section 1.4 of report.

Table 6-4. Constituents with at Least One Detected Value for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992.
(sheet 1 of 5)

Well Name	Collection Date	Sample Number	AMMONIU 54/ppb 100/.	ARSENIC 43/ppb 5/50	FARSENIC 43/ppb 5/50	BARIUM 34/ppb 20/1000
299-E18-1	12/16/92	B07S32		5.00 U		
299-E18-1	12/16/92	B07S36			5.00 U	
299-E18-1	12/16/92	B07SN0	100.00 U			
699-40-36	12/21/92	B07TB1	100.00 U	5.00 U		80.00
699-40-36	12/21/92	B07TB8			5.00 U	
699-40-40A	10/21/92	B07JK3	100.00 UQ	5.00 U		100.00
699-40-40A	10/21/92	B07JK7			5.00 U	
699-40-40B	10/21/92	B07JK8	100.00 UQ	5.00 U		90.00
699-40-40B	10/21/92	B07JL2			5.00 U	
699-41-35	12/21/92	B07TB9	100.00 U	5.00 U		130.00
699-41-35	12/21/92	B07TC3			5.00 U	
699-42-37	12/22/92	B07TC4	100.00 U	5.00 U		70.00
699-42-37	12/22/92	B07TC8			5.00 U	
699-42-39A	10/21/92	B07JL3	100.00 UPQ	5.00 UP		80.00 P
699-42-39A	10/21/92	B07JL7			5.00 UP	
699-42-39B	10/28/92	B07JJ2	100.00	5.00 U		80.00
699-42-39B	10/28/92	B07JJ3	100.00	5.00 U		80.00
699-42-39B	10/28/92	B07JJ6			5.00 U	
699-42-39B	10/28/92	B07JJ7			5.00 U	
699-43-41G	10/28/92	B07JL8	100.00 U	5.00 U		50.00
699-43-41G	10/28/92	B07JM2			5.70	
699-43-43	10/26/92	B07JG5	100.00 U	9.20		20.00 U
699-43-43	10/26/92	B07JG6			9.40	
699-43-45	10/26/92	B07JG7	100.00 U	11.00		40.00
699-43-45	10/26/92	B07JG8			11.00	

Well Name	Collection Date	Sample Number	FBARIUM 34/ppb 20/1000	CALCIUM 34/ppb 100/.	FCALCIUM 34/ppb 100/.	CHLORID 124/ppb 200/250000s
299-E18-1	12/16/92	B07S32				7800.00
699-40-36	12/21/92	B07TB1		15000.00		3100.00
699-40-36	12/21/92	B07TB8	80.00		15000.00	
699-40-40A	10/21/92	B07JK3		20000.00		6400.00
699-40-40A	10/21/92	B07JK7	100.00		20000.00	
699-40-40B	10/21/92	B07JK8		24000.00		4800.00
699-40-40B	10/21/92	B07JL2	90.00		24000.00	
699-41-35	12/21/92	B07TB9		18000.00		3400.00
699-41-35	12/21/92	B07TC3	120.00		18000.00	
699-42-37	12/22/92	B07TC4		23000.00		7800.00
699-42-37	12/22/92	B07TC8	60.00		23000.00	
699-42-39A	10/21/92	B07JL3		31000.00 P		8300.00 P
699-42-39A	10/21/92	B07JL7	60.00 P		30000.00 P	
699-42-39B	10/28/92	B07JJ2		28000.00		9000.00
699-42-39B	10/28/92	B07JJ3		29000.00		9700.00
699-42-39B	10/28/92	B07JJ6	80.00		28000.00	
699-42-39B	10/28/92	B07JJ7	80.00		28000.00	
699-43-41G	10/28/92	B07JL8		24000.00		6100.00
699-43-41G	10/28/92	B07JM2	50.00		24000.00	
699-43-43	10/26/92	B07JG5		29000.00		2900.00
699-43-43	10/26/92	B07JG6	20.00 U		29000.00	
699-43-45	10/26/92	B07JG7		28000.00		2900.00
699-43-45	10/26/92	B07JG8	30.00		28000.00	

Table 6-4. Constituents with at Least One Detected Value for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992.
(sheet 2 of 5)

Well Name	Collection Date	Sample Number	CHROMUM 34/ppb 20/50	FCHROMUM 34/ppb 20/50	COLIFORM 144/COL 1/1	COPPER 34/ppb 20/1000s
299-E18-1	12/16/92	B07S32			1.00 U	
699-40-36	12/21/92	B07TB1	30.00			20.00 U
699-40-36	12/21/92	B07TB8		20.00 U		
699-40-40A	10/21/92	B07JK3	60.00		1.00 U	20.00 U
699-40-40A	10/21/92	B07JK7		20.00 U		
699-40-40B	10/21/92	B07JK8	550.00		200.00	20.00
699-40-40B	10/21/92	B07JL2		20.00 U		
699-41-35	12/21/92	B07TB9	20.00 U			20.00 U
699-41-35	12/21/92	B07TC3		20.00 U		
699-42-37	12/22/92	B07TC4	30.00			20.00 U
699-42-37	12/22/92	B07TC8		20.00 U		
699-42-39A	10/21/92	B07JL3	240.00 P		1.00 UP	20.00 UP
699-42-39A	10/21/92	B07JL7		20.00 UP		
699-42-39B	10/28/92	B07JJ2	100.00		1.00 U	20.00 U
699-42-39B	10/28/92	B07JJ3	90.00		1.00 U	20.00 U
699-42-39B	10/28/92	B07JJ6		20.00 UQ		
699-42-39B	10/28/92	B07JJ7		50.00 Q		
699-43-41G	10/28/92	B07JL8	50.00		1.00 U	20.00 U
699-43-41G	10/28/92	B07JM2		20.00 U		
699-43-43	10/26/92	B07JG5	90.00		1.00 U	20.00 U
699-43-43	10/26/92	B07JG6		20.00 U		
699-43-45	10/26/92	B07JG7	110.00		1.00 U	20.00 U
699-43-45	10/26/92	B07JG8		20.00 U		

Well Name	Collection Date	Sample Number	FCOPPER 34/PPB 20/1000s	FLUORID 124/ppb 100/4000	ALPHA 135/pCi/L ./15	BETA 136/pCi/L ./50
299-E18-1	12/16/92	B07S32		500.00	4.71	8.46
699-40-36	12/21/92	B07TB1		900.00	4.44	8.24
699-40-36	12/21/92	B07TB8	20.00 U			
699-40-40A	10/21/92	B07JK3		900.00	1.07 U	5.61
699-40-40A	10/21/92	B07JK7	20.00 U			
699-40-40B	10/21/92	B07JK8		500.00	1.02 U	2.30
699-40-40B	10/21/92	B07JL2	20.00 U			
699-41-35	12/21/92	B07TB9		800.00	7.40	8.37
699-41-35	12/21/92	B07TC3	20.00 U			
699-42-37	12/22/92	B07TC4		700.00	6.09	4.32
699-42-37	12/22/92	B07TC8	20.00 U			
699-42-39A	10/21/92	B07JL3		700.00 P	3.35 P	6.35 P
699-42-39A	10/21/92	B07JL7	20.00 UP			
699-42-39B	10/28/92	B07JJ2		800.00	2.77	6.80 Q
699-42-39B	10/28/92	B07JJ3		800.00	2.87	4.35 Q
699-42-39B	10/28/92	B07JJ6	20.00 U			
699-42-39B	10/28/92	B07JJ7	20.00 U			
699-43-41G	10/28/92	B07JL8		700.00	.96 U	4.60
699-43-41G	10/28/92	B07JM2	20.00 U			
699-43-43	10/26/92	B07JG5		200.00	1.66	8.02
699-43-43	10/26/92	B07JG6	20.00 U			
699-43-45	10/26/92	B07JG7		300.00	1.70	4.48
699-43-45	10/26/92	B07JG8	20.00 U			

Table 6-4. Constituents with at Least One Detected Value for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992. (sheet 3 of 5)

Well Name	Collection Date	Sample Number	I-129LD 139/pCi/L 1/1r	IRON 34/ppb 20/300s	FIRON 34/ppb 20/300s	MAGNES 34/ppb 100/.
699-40-36	12/21/92	B07TB1	.01 U	550.00		5300.00
699-40-36	12/21/92	B07TB8			80.00	
699-40-40A	10/21/92	B07JK3		500.00		7100.00
699-40-40A	10/21/92	B07JK7			120.00	
699-40-40B	10/21/92	B07JK8		2600.00		6200.00
699-40-40B	10/21/92	B07JL2			20.00 U	
699-41-35	12/21/92	B07TB9	-.03 U	300.00		6900.00
699-41-35	12/21/92	B07TC3			20.00 U	
699-42-37	12/22/92	B07TC4	.43	1200.00		9800.00
699-42-37	12/22/92	B07TC8			60.00	
699-42-39A	10/21/92	B07JL3		4300.00 P		12000.00 P
699-42-39A	10/21/92	B07JL7			80.00 P	
699-42-39B	10/28/92	B07JJ2		560.00		11000.00
699-42-39B	10/28/92	B07JJ3		580.00		11000.00
699-42-39B	10/28/92	B07JJ6			30.00 Q	
699-42-39B	10/28/92	B07JJ7			310.00 Q	
699-43-41G	10/28/92	B07JL8		250.00		9500.00
699-43-41G	10/28/92	B07JM2			30.00	
699-43-43	10/26/92	B07JG5		390.00		6800.00
699-43-43	10/26/92	B07JG6			20.00 U	
699-43-45	10/26/92	B07JG7		500.00		6800.00
699-43-45	10/26/92	B07JG8			20.00 U	

Well Name	Collection Date	Sample Number	FMAGNES 34/ppb 100/.	MANGESE 34/ppb 10/50s	FMANGESE 34/ppb 10/50s	NICKEL 34/ppb 30/.
699-40-36	12/21/92	B07TB1		120.00		30.00 U
699-40-36	12/21/92	B07TB8	5300.00		110.00	
699-40-40A	10/21/92	B07JK3		200.00		30.00 U
699-40-40A	10/21/92	B07JK7	7100.00		160.00	
699-40-40B	10/21/92	B07JK8		340.00		260.00
699-40-40B	10/21/92	B07JL2	6300.00		290.00	
699-41-35	12/21/92	B07TB9		180.00		30.00 U
699-41-35	12/21/92	B07TC3	6400.00		170.00	
699-42-37	12/22/92	B07TC4		140.00		30.00
699-42-37	12/22/92	B07TC8	9400.00		120.00	
699-42-39A	10/21/92	B07JL3		140.00 P		110.00 P
699-42-39A	10/21/92	B07JL7	11000.00 P		10.00 P	
699-42-39B	10/28/92	B07JJ2		320.00		40.00 Q
699-42-39B	10/28/92	B07JJ3		320.00		30.00 UQ
699-42-39B	10/28/92	B07JJ6	10000.00		280.00	
699-42-39B	10/28/92	B07JJ7	11000.00		310.00	
699-43-41G	10/28/92	B07JL8		130.00		30.00 U
699-43-41G	10/28/92	B07JM2	9600.00		130.00	
699-43-43	10/26/92	B07JG5		10.00 U		40.00
699-43-43	10/26/92	B07JG6	6800.00		10.00 U	
699-43-45	10/26/92	B07JG7		10.00		40.00
699-43-45	10/26/92	B07JG8	6800.00		10.00 U	

Table 6-4. Constituents with at Least One Detected Value for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992. (sheet 4 of 5)

Well Name	Collection Date	Sample Number	FNICKEL 34/ppb 30/.	NITRATE 124/ppb 200/45000	POTASUM 34/ppb 300/.	FPOTASUM 34/ppb 300/.
299-E18-1	12/16/92	B07S32		13000.00		
699-40-36	12/21/92	B07TB1		200.00 U	7100.00	
699-40-36	12/21/92	B07TB8	30.00 U			7400.00
699-40-40A	10/21/92	B07JK3		1900.00	6500.00	
699-40-40A	10/21/92	B07JK7	30.00 U			6900.00
699-40-40B	10/21/92	B07JK8		600.00	4800.00	
699-40-40B	10/21/92	B07JL2	30.00 U			5300.00
699-41-35	12/21/92	B07TB9		500.00	6500.00	
699-41-35	12/21/92	B07TC3	30.00 U			5100.00
699-42-37	12/22/92	B07TC4		4300.00	4600.00	
699-42-37	12/22/92	B07TC8	30.00 U			4800.00
699-42-39A	10/21/92	B07JL3		12000.00 P	4900.00 P	
699-42-39A	10/21/92	B07JL7	30.00 UP			4500.00 P
699-42-39B	10/28/92	B07JJ2		12000.00	5500.00	
699-42-39B	10/28/92	B07JJ3		12000.00	5900.00	
699-42-39B	10/28/92	B07JJ6	30.00 U			5700.00
699-42-39B	10/28/92	B07JJ7	30.00 U			5700.00
699-43-41G	10/28/92	B07JL8		5100.00	5600.00	
699-43-41G	10/28/92	B07JM2	30.00 U			5400.00
699-43-43	10/26/92	B07JG5		61000.00 R	5500.00	
699-43-43	10/26/92	B07JG6	30.00 U			5600.00
699-43-45	10/26/92	B07JG7		1100.00	4900.00	
699-43-45	10/26/92	B07JG8	30.00 U			4900.00

Well Name	Collection Date	Sample Number	SODIUM 34/ppb 300/.	FSODIUM 34/ppb 300/.	SULFATE 124/ppb 500/250000s	TRITIUM 142/pCi/L 500/20000
299-E18-1	12/16/92	B07S32			130000.00	
299-E18-1	12/16/92	B07SN0				483.00
699-40-36	12/21/92	B07TB1	45000.00		7300.00	26.80 U
699-40-36	12/21/92	B07TB8		48000.00		
699-40-40A	10/21/92	B07JK3	39000.00		13000.00	635.00
699-40-40A	10/21/92	B07JK7		40000.00		
699-40-40B	10/21/92	B07JK8	36000.00		16000.00	255.00
699-40-40B	10/21/92	B07JL2		36000.00		
699-41-35	12/21/92	B07TB9	47000.00		8500.00	-15.70 U
699-41-35	12/21/92	B07TC3		39000.00		
699-42-37	12/22/92	B07TC4	35000.00		25000.00	186.00 U
699-42-37	12/22/92	B07TC8		35000.00		
699-42-39A	10/21/92	B07JL3	27000.00 P		38000.00 P	103000.00 P
699-42-39A	10/21/92	B07JL7		27000.00 P		
699-42-39B	10/28/92	B07JJ2	30000.00		40000.00	111000.00
699-42-39B	10/28/92	B07JJ3	31000.00		40000.00	111000.00
699-42-39B	10/28/92	B07JJ6		30000.00		
699-42-39B	10/28/92	B07JJ7		30000.00		
699-43-41G	10/28/92	B07JL8	21000.00		31000.00	67500.00
699-43-41G	10/28/92	B07JM2		21000.00		
699-43-43	10/26/92	B07JG5	8300.00		7600.00	138.00 U
699-43-43	10/26/92	B07JG6		8300.00		
699-43-45	10/26/92	B07JG7	9700.00		11000.00	402.00
699-43-45	10/26/92	B07JG8		9600.00		

Table 6-4. Constituents with at Least One Detected Value for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992. (sheet 5 of 5)

Well Name	Collection Date	Sample Number	TURBID 126/NTU .1/1	URANIUM 145/ppb .5/.	VANADUM 34/ppb 30/.	FVANADUM 34/ppb 30/.
299-E18-1	12/16/92	B07S32	1.80	6.78		
699-40-36	12/21/92	B07TB1			30.00 U	
699-40-36	12/21/92	B07TB8				30.00 U
699-40-40A	10/21/92	B07JK3	1.50		30.00 U	
699-40-40A	10/21/92	B07JK7				30.00 U
699-40-40B	10/21/92	B07JK8	2.30		30.00 U	
699-40-40B	10/21/92	B07JL2				30.00 U
699-41-35	12/21/92	B07TB9			30.00 U	
699-41-35	12/21/92	B07TC3				30.00 U
699-42-37	12/22/92	B07TC4			30.00 U	
699-42-37	12/22/92	B07TC8				30.00 U
699-42-39A	10/21/92	B07JL3	12.00 P		30.00 UP	
699-42-39A	10/21/92	B07JL7				30.00 UP
699-42-39B	10/28/92	B07JJ2	.90		30.00 U	
699-42-39B	10/28/92	B07JJ3	1.00		30.00 U	
699-42-39B	10/28/92	B07JJ6				30.00 U
699-42-39B	10/28/92	B07JJ7				30.00 U
699-43-41G	10/28/92	B07JL8	.40		30.00 U	
699-43-41G	10/28/92	B07JM2				30.00 U
699-43-43	10/26/92	B07JG5	.20		40.00	
699-43-43	10/26/92	B07JG6				40.00
699-43-45	10/26/92	B07JG7	.30		30.00	
699-43-45	10/26/92	B07JG8				30.00

Well Name	Collection Date	Sample Number	ZINC 34/ppb 10/5000w	FZINC 34/ppb 10/5000w
699-40-36	12/21/92	B07TB1	100.00	
699-40-36	12/21/92	B07TB8		10.00
699-40-40A	10/21/92	B07JK3	20.00	
699-40-40A	10/21/92	B07JK7		10.00 U
699-40-40B	10/21/92	B07JK8	380.00	
699-40-40B	10/21/92	B07JL2		220.00
699-41-35	12/21/92	B07TB9	20.00	
699-41-35	12/21/92	B07TC3		10.00 U
699-42-37	12/22/92	B07TC4	60.00	
699-42-37	12/22/92	B07TC8		10.00 U
699-42-39A	10/21/92	B07JL3	40.00 P	
699-42-39A	10/21/92	B07JL7		10.00 UP
699-42-39B	10/28/92	B07JJ2	10.00 Q	
699-42-39B	10/28/92	B07JJ3	40.00 Q	
699-42-39B	10/28/92	B07JJ6		10.00 U
699-42-39B	10/28/92	B07JJ7		10.00 U
699-43-41G	10/28/92	B07JL8	10.00 U	
699-43-41G	10/28/92	B07JM2		10.00 U
699-43-43	10/26/92	B07JG5	10.00 U	
699-43-43	10/26/92	B07JG6		10.00 U
699-43-45	10/26/92	B07JG7	10.00 U	
699-43-45	10/26/92	B07JG8		10.00 U

For explanation of this table, see Section 1.4 of report.

Table 6-5. Contamination Indicator Parameters for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992.
(sheet 1 of 2)

Well Name	Collection Date	Sample Number	COND FIELD uMho 1/700w	COND LAB uMho ./700w	pH FIELD .01/6.5-8.5s	pH LAB .01/6.5-8.5s	TOC ppb 1000/.	TOX ppb 10/.
299-E18-1	11/03/92	B07LN1	553		8.22			10.0 UA
		B07LN2	554		8.22			10.0 UA
		B07LN3	556		8.21			10.0 UA
		B07LN4	555		8.22			10.0 UA
	12/16/92	B07S32	510	520	8.12	8.20	1000 U	10.0 UA
		B07S33	506		8.19		1000 U	10.0 UA
		B07S34	516		8.18		1000 U	10.0 UA
		B07S35	513		8.17		1000 U	10.0 UA
699-40-36	12/21/92	B07TB1	310		7.92		1000 U	180.0 A
		B07TB3	310		7.92		1000 U	180.0 A
		B07TB5	309		7.92		1000 U	100.0 A
		B07TB7	308		7.92		1000 U	130.0 A
699-40-39	10/20/92	B07JM3	370		8.61		1000 U	10.0 UA
		B07JM4	350		8.59		1000 U	10.0 UA
		B07JM5	345		8.57		1000 U	10.0 UA
		B07JM6	330		8.54		1000 U	10.0 UA
699-40-40A	10/21/92	B07JK3	335		8.32		1000 U	50.0 A
		B07JK4	333		8.31		1000 U	10.0 UA
		B07JK5	333		8.30		1000 U	10.0 UA
		B07JK6	333		8.28		1000 U	70.0 A
699-40-40B	10/21/92	B07JK8	281		7.49		1000 U	30.0 A
		B07JK9	283		7.49		1000 U	30.0 A
		B07JL0	282		7.49		1000 U	30.0 A
		B07JL1	281		7.48		1000 U	30.0 A
699-41-35	12/21/92	B07TB9	325		7.95		1000 U	150.0 A
		B07TC0	323		7.94		1000 U	110.0 A
		B07TC1	323		7.94		1000 U	110.0 A
		B07TC2	322		7.94		1000 U	100.0 A
699-41-40	10/20/92	B07JM7	392		8.74		1000 U	10.0 UA
		B07JM8	390		8.75		1000 U	10.0 UA
		B07JM9	388		8.75		1000 U	10.0 UA
		B07JN0	388		8.75		1000 U	10.0 UA
699-42-37	12/22/92	B07TC4	361		8.11		1000 U	10.0 UA
		B07TC5	360		8.10		1000 U	40.0 A
		B07TC6	359		8.08		1000 U	20.0 A
		B07TC7	356		8.09		1000 U	20.0 BA
699-42-39A	10/21/92	B07JL3	312		7.77		1000 UP	10.0 UA
		B07JL4	312		7.76		1000 UP	10.0 UA
		B07JL5	312		7.70		1000 UP	10.0 UA
		B07JL6	312		7.71		1000 UP	10.0 UA
699-42-39B	10/28/92	B07JJ2	366		7.99		1000 U	10.0 UA
		B07JJ3	364		7.99		1000 U	10.0 UA
699-42-39B	10/28/92	B07JJ4	364		7.98		1000 U	10.0 UA
		B07JJ5	364		7.99		1000 U	10.0 UA
699-42-40A	10/22/92	B07JN1	141		8.10		1000 U	
		B07JN3	141		8.09		1000 U	10.0 UA
		B07JN5	141		8.08		1000 U	10.0 UA
		B07JN7	141		8.07		1000 U	10.0 UA
	12/28/92	B07TG4	177		8.14			10.0 UA
		B07TG6	175		8.13			10.0 UA
		B07TG8	176		8.12			10.0 UA
		B07TG9	176		8.12			10.0 UA
699-42-41	10/22/92	B07JN9	176		7.85		1000 UP	10.0 UA
		B07JP0	175		7.87		1000 UP	10.0 UA
		B07JP1	174		7.88		1000 UP	10.0 UA
		B07JP2	175		7.89		1000 UP	10.0 UA

Table 6-5. Contamination Indicator Parameters for the 216-B-3 Pond Data for Reporting Period October 1, 1992, through December 31, 1992. (sheet 2 of 2)

Well Name	Collection Date	Sample Number	COND FIELD uMho 1/700w	COND LAB uMho ./700w	pH FIELD .01/6.5-8.5s	pH LAB .01/6.5-8.5s	TOC ppb 1000/.	TOX ppb 10/.
699-42-42B	10/20/92	B07JP3	259		7.96		1000 U	10.0 UA
		B07JP4	257		7.95		1000 U	10.0 UA
		B07JP5	256		7.96		1000 U	10.0 UA
		B07JP6	253		7.96		1000 U	10.0 UA
699-43-40	10/22/92	B07JP7	324		7.14		1000 UP	10.0 UA
		B07JP8	332		7.27		1000 UP	10.0 UA
		B07JP9	330		7.29		1000 UP	10.0 UA
		B07JQ0	317		7.39		1000 UP	10.0 UA
699-43-41E	10/20/92	B07JQ1	318		8.74		1000 U	10.0 A
		B07JQ2	317		8.74		1000 U	20.0 A
		B07JQ3	318		8.74		1000 U	20.0 A
		B07JQ4	316		8.75		1000 U	30.0 A
699-43-41F	10/21/92	B07JQ5	304		8.05		1000 U	10.0 A
		B07JQ6	301		8.03		1000 U	10.0 UA
		B07JQ7	302		8.04		1000 U	10.0 A
		B07JQ8	302		8.03		1000 U	10.0 UA
699-43-41G	10/28/92	B07JL8	295		8.71		1000 U	20.0 A
		B07JL9	292		8.71		1000 U	
		B07JM0	292		8.69		1000 U	
		B07JM1	291		8.70		1000 U	20.0 A
699-43-42J	10/22/92	B07JQ9	256		8.22		1000 U	10.0 UA
		B07JR0	259		8.22		1000 U	
		B07JR1	259		8.22		1000 U	
		B07JR2	259		8.21		1000 U	10.0 UA
	12/28/92	B07TH0	292		8.23			10.0 UA
		B07TH1	295		8.23			10.0 UA
		B07TH2	293		8.22			10.0 UA
		B07TH3	293		8.21			10.0 UA
699-43-42J	12/28/92	B07TH4						10.0 UA
		B07TH5						10.0 UA
		B07TH6						10.0 UA
		B07TH7						10.0 UA
699-43-43	10/26/92	B07JG5	254		8.14		1000 U	10.0 UA
		B07JR3	253		8.13		1000 U	10.0 UA
		B07JR4	251		8.13		1000 U	10.0 UA
		B07JR5	252		8.12		1000 U	10.0 UA
699-43-45	10/26/92	B07JG7	243		7.99		1000 U	10.0 UA
		B07JR6	244		7.99		1000 U	10.0 UA
		B07JR7	242		7.98		1000 U	10.0 UA
		B07JR8	243		7.98		1000 U	10.0 UA
699-44-42	10/22/92	B07JR9	227		8.25		1000 U	10.0 UA
		B07JS0	228		8.25		1000 U	20.0 A
		B07JS1	227		8.29		1000 U	10.0 UA
		B07JS2	228		8.28		1000 U	10.0 A
699-44-43B	10/22/92	B07JS3	259		8.18		1000 U	10.0 UA
		B07JS4	358		8.19		1000 U	10.0 UA
		B07JS5	258		8.19		1000 U	10.0 UA
		B07JS6	257		8.19		1000 U	10.0 UA

For explanation of this table, see Section 1.4 of report.

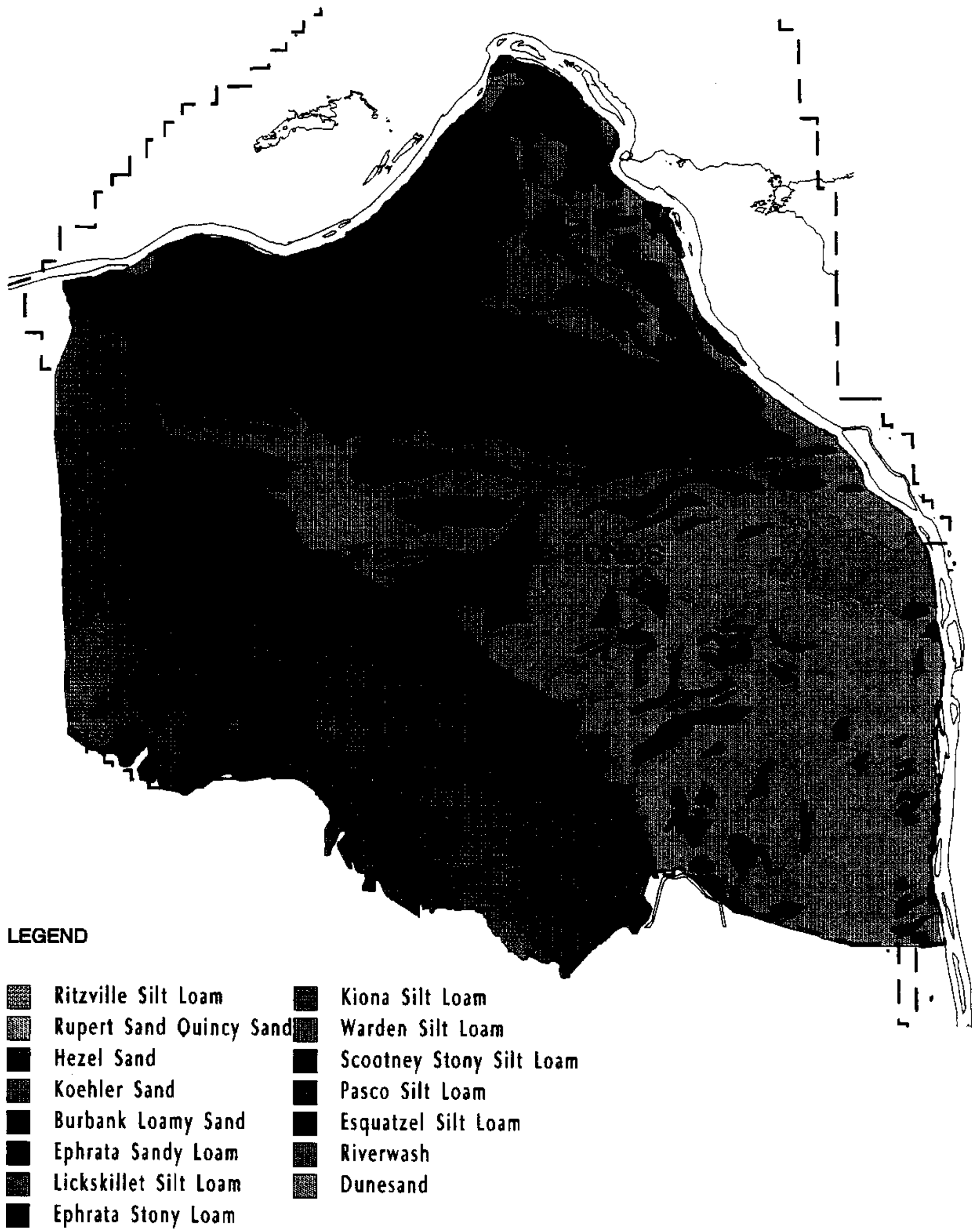
5.0 DESCRIBE SOILS ON THE SITE USING INFORMATION FROM LOCAL SOIL SURVEY REPORTS. (SUBMIT ON SEPARATE SHEET.)

The most recent study of the soil on the Hanford site was done by Hajek (1966). Hajek (1966) 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 soils around B Pond and much of the 200 East Area predominately consists of the two soil types: the Burbank loamy sand and the Rupert sand. Smaller amounts of the Ephrata sandy loam are also present in parts of 200 East. The soil types mapped on the Hanford Site are shown on Figure H-2. The following sections describe the soil present at the B Ponds and 200 East.

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

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

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) are fine-grained soils composed of silts and clays with little or no plasticity.



Source: Hajek 1966.

Figure H-2. Hanford Site Soils Map.

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6.0 DESCRIBE THE REGIONAL GEOLOGY AND HYDROGEOLOGY WITHIN ONE MILE OF THE SITE. (SUBMIT ON SEPARATE SHEET.)

6.1 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. Regional conditions of the area are described in WHC (1991a) and WHC (1992f), which maybe consulted for additional detail.

6.2 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 probable 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 below from oldest to youngest, in the order of their deposition.

6.2.1 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 accumulated thickness in excess of 10,000 feet within the Pasco Basin. These flows cover an area of more than 63,000 square miles in Washington, Oregon, and Idaho and have an estimated volume of about 40,800 square miles. The majority of the flows were erupted 14.5 to 17 Ma (DOE 1988).

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, divided into the Ice Harbor, Elephant Mountain, Pomona, Esquatzel, Asotin, Wilbur Creek, and Umatilla Members, 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 1991a). The Elephant Mountain Member has also been locally eroded down to the Rattlesnake Ridge interbed, approximately one mile north of the 200 East Area and in the vicinity of the northeast corner of the 200 East Area. On anticlinal ridges bounding the Pasco Basin, erosion has removed the Saddle Mountains Basalt, exposing the Wanapum and Grande Ronde basalts.

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 terrain 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 Levey 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 1992f).

6.2.2 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. 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.

6.2.2.1 **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 thicknesses of up to 1,200 feet in the Pasco Basin. 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. 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 1991a; WHC 1992f). The Recent studies of the Ringold Formation (WHC 1991b) 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 gravels units are separated by basin -wide overbank and lacustrine deposits (WHC 1992f). A more detailed discussion of the Ringold Formation stratigraphy can be found in WHC (1991b).

6.2.2.2 **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: (1) the Plio-Pleistocene unit; (2) the early "Palouse" soil; and (3) 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. Because of the absence of these units from the site area, they will not be discussed further. The Plio-Pleistocene unit and early "Palouse" soil are described in detail in WHC (1991b). The pre-Missoula gravels are discussed in PSPL (1982) and Fecht et al. (1987).

6.2.2.3 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 gravel, fine- to coarse-grained sand, and silt. These sediments are divided into three facies: (1) gravel dominated, (2) sand-dominated, and (3) silt-dominated (WHC 1992f). 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 1992f). 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 1991a).

6.2.2.4 Holocene Surficial Deposits. Holocene surficial deposits consist of silt, sand, and gravel that form a less than 33 feet veneer across much of the Hanford Site. These sediments were deposited by eolian and alluvial processes.

6.3 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.

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.

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 to the west-southwest of the 200 West Area, respectively.

6.4 LOCAL GEOLOGY

The depth to the top of the Elephant Mountain Member basalt in the vicinity of the B Ponds is approximately 200 feet. Overlying the basalt are the sediments of the Ringold Formation, Hanford formations, and Holocene surfical deposits. The Plio-Pliestocene unit, early "Palouse" soil and the Pre-Missoula gravels are absent in the vicinity of the B Ponds (WHC 1992f; DOE-RL 1990). The following discussion emphasizes the suprabasalt sediments in the vicinity of the B Ponds. Figure H-3 presents a schematic view of the suprabasalt sediments in the vicinity of the B Ponds.

6.4.1 Ringold Formation

The thickness of the Ringold Formation in the vicinity of B Ponds varies from approximately 50 feet to 125 feet (Figure H-3). Overlying the basalt in the vicinity of B Ponds is the fluvial gravels of unit A. Unit A thickens and dips to the south, southwest and southeast, pinches out in the vicinity of the B Ponds. The thickness of unit A around B Pond is between 0 to 100 feet (Figure H-3). Unit A 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 percent to 25 percent (WHC 1992f).

Overlying unit A is the lower mud sequence. The lower mud sequence overlies basalt in the vicinity of the B Ponds where unit A pinches out, and is the uppermost Ringold unit between the B Ponds and Gable Mountain. The sequence thickens and dips to the south and southwest, similar to unit A. The thickness of the lower mud sequence is approximately 25 feet to 50 feet (Figure H-3). The lower mud sequence is composed of overbank and lacustrine deposits which consist of laminated to massive silt, silty fine-grained sand, and paleosols containing variable amounts of pedogenic calcium carbonate. Plane laminated to massive clay with thin silt and sand interbeds characterize the lacustrine deposits. The lacustrine deposits contain some soft-sediment deformation (WHC 1992f).

6.4.2 Hanford formation

In the vicinity of the B Ponds, the sequences comprising the Hanford formation consist mostly of the gravel-dominated and sand-dominated facies. Informally, the Hanford formation can be divided into the upper gravel unit, middle sandy unit, and lower gravel unit (WHC 1992f). Because of variability of the Hanford formation sediments, contacts between these sediments can be difficult to distinguish, especially where the sandy sequence is missing and the upper gravel directly overlies the lower gravel.

The lower gravel sequence consists of coarse-grained basaltic sand and granule to boulder gravel. Other clast types include Ringold and Plio-Pleistocene rip-ups, granite, quartzite and gneiss (WHC 1992g). Discontinuous intervals dominated by the sand-dominated facies and localized horizons of silt-dominated deposits also are encountered. Beneath the B Pond, the lower gravel sequence ranges in thickness from approximately 75 to 100 feet (Figure H-3).

The middle sand sequence consists of fine- to coarse-grained sand and granule gravel displaying.plane lamination and bedding. Intercalated horizons typical of both the gravel-dominated and sand-dominated facies also occur within the sequence. The middle sand sequence around B Pond ranges in thickness from 0 to 150 feet (Figure H-3). This unit thins and pinches out north of the B Ponds.

Deposits comprising the upper gravel sequence are typical of the gravel-dominated facies. Lenticular horizons of sand-dominated and silt-dominated facies are common in the upper gravel sequence. The thickness of the upper gravel ranges from 25 to 50 feet (Figure H-3).

6.4.3 Holocene Surficial Deposits

Holocene surficial deposits consist of silt, sand and gravel that form a less than 33 feet veneer across much of the Hanford site. These sediments were deposited by a combination of eolian and alluvial processes. Eolian activity in the vicinity of the B Ponds has done little but to locally rework and redistribute surficial deposits. This has produced sheet sands which blanket the surface (WHC 1991a).

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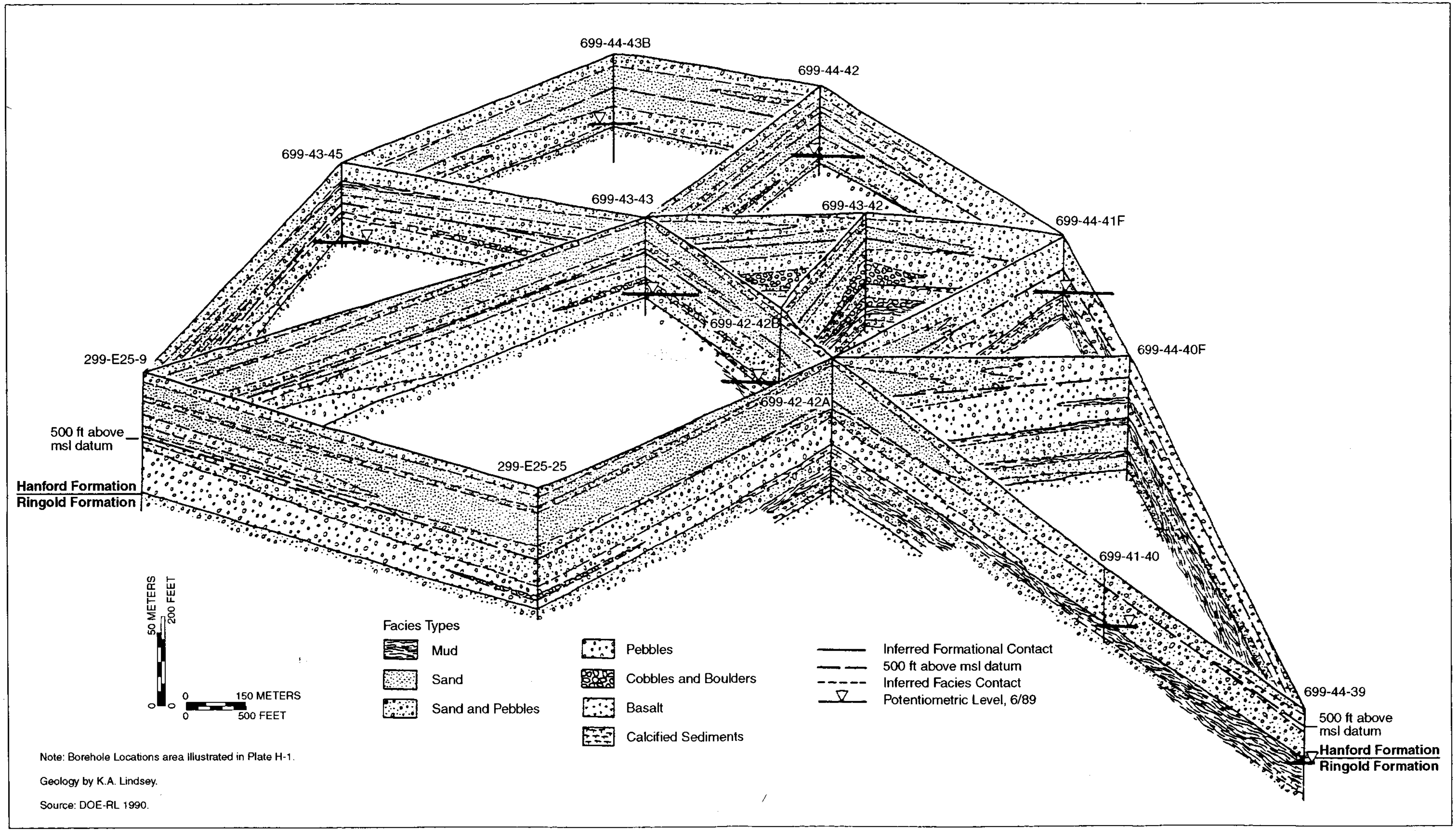

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Figure H-3. Geologic Interpretation of the Suprabasalt Sediments, Based on Boreholes in the Vicinity of 216-B-3 Pond.

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6.5 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 sedimentary overburden. 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 flow bottoms (DOE 1988). The suprabasalt sediment, or uppermost aquifer system, consists of fluvial, lacustrine, and glaciofluvial sediments. This aquifer is regionally unconfined and is contained largely within the Ringold Formation and Hanford formation.

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). Groundwater in these aquifer systems is probably 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). 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.

6.6 LOCAL HYDROGEOLOGY

The principal hydraulic units around the B Ponds are the unsaturated (vadose) zone, the Hanford formation, coarse- and fine-grained facies of the Ringold Formation and the uppermost aquifers within the basalt and interflow aquifer system (DOE-RL 1990). The following discussion focuses on the vadose zone, Hanford formation and the Ringold Formation.

The vadose zone beneath the B Ponds ranges in thickness from 124 to 160 feet. This zone is composed primarily of Hanford formation sediments, consisting of the units described above in Section 2.2. The vadose zone includes some of the fine-grained Ringold Formation where the water table is below the Hanford-Ringold contact. The average moisture content of the unsaturated sediments is between 3 percent and 7 percent (DOE-RL 1990).

The uppermost aquifer in the vicinity of the B Ponds includes a portion of the Hanford formation and the Ringold Formation. The aquifer is approximately 50 to 100 feet thick. The majority of this aquifer is unconfined, but parts of the aquifer are confined or semiconfined by the local presence of fine-grained deposits. The aquifer is unconfined to the west and north of the 216-B-3 Pond, and is confined to the southeast part of the ponds, beneath 216-B-3C pond. There is no marked differences in the hydraulic head measured in the unconfined and the confined portions of the aquifer (DOE-RL 1990).

The confined aquifer system beneath the B Ponds is found in the Ringold Formation Unit A, which is confied by the fine- grained silt and clay lower mud sequence (DOE-RL 1990).

Effluent discharge to the B Ponds has created a groundwater mound (Figure H-4). The water table in the vicinity of the B ponds has a concentric radial pattern centered on the B Ponds. Movement of the groundwater in the vicinity of the B Pond is radially away from them. Additional discussion of the hydrogeology in the vicinity of the B Ponds can be found in the *216-B-3 Pond system Closure/Postclosure Plan* (DOE-RL 1990).

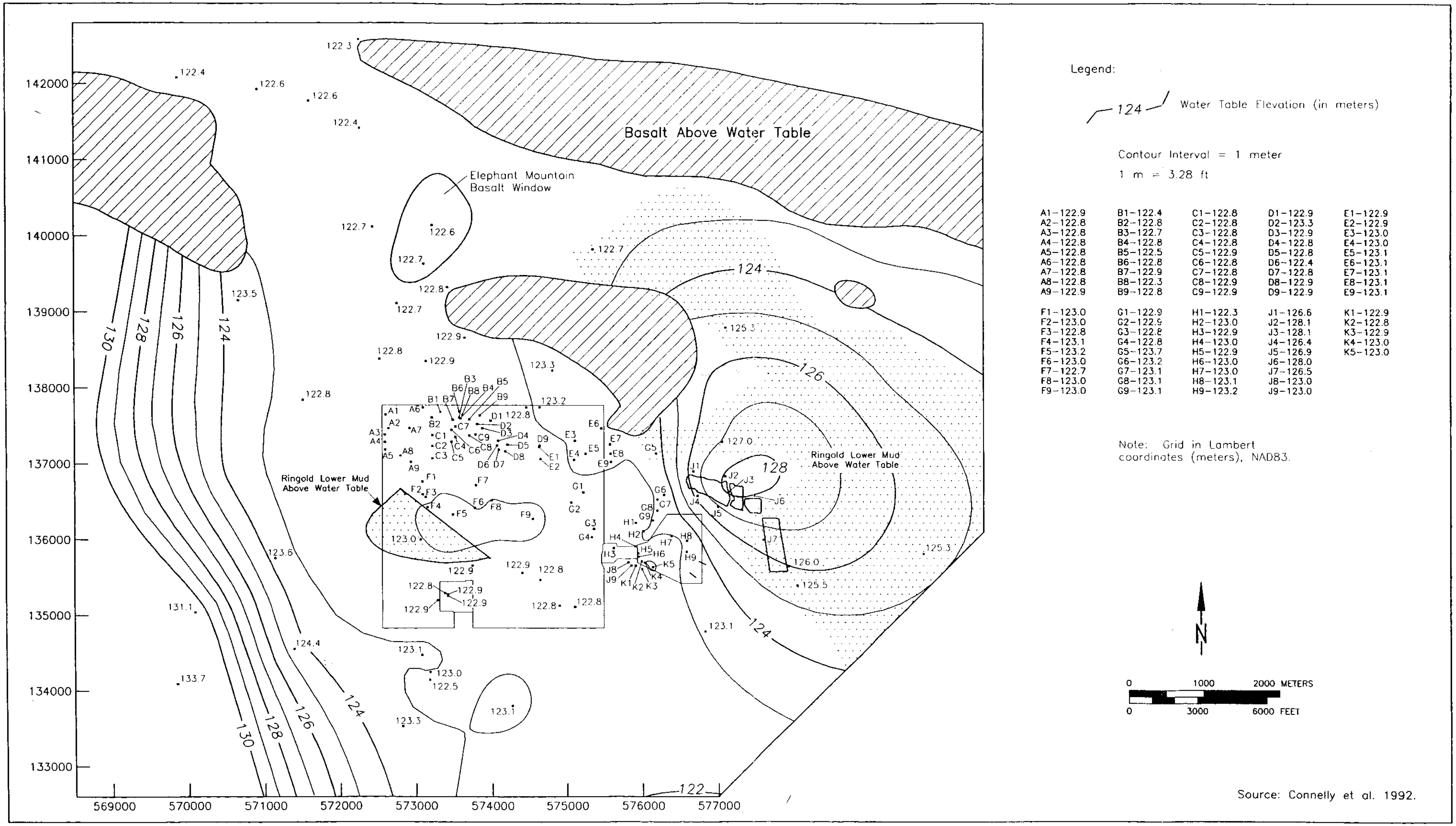

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Figure H-4. December 1991 Water Table Elevations in the Vicinity of the 200 East Area and the B-Pond Complex.

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7.0 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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A reference list is included in Section 2.0 of the document for all references cited in this permit application.

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