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**RCRA Ground-Water Monitoring
Projects for Hanford Facilities:
Progress Report for the Period
July 1 to September 30, 1989**

Volume 1 - Text

**R. M. Smith
D. J. Bates
R. E. Lundgren**

December 1989

**Prepared for the U.S. Department of Energy
under Contract DE-AC06-76RLO 1830**

**Pacific Northwest Laboratory
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RESOURCE CONSERVATION AND RECOVERY ACT
GROUND-WATER MONITORING PROJECTS FOR
HANFORD FACILITIES: PROGRESS REPORT FOR
THE PERIOD JULY 1 TO SEPTEMBER 30, 1989

Volume 1 - Text

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Pacific Northwest Laboratory
Richland, Washington 99352

PREFACE

This is Volume 1 of a two-volume document that describes the progress of 14 Hanford Site ground-water monitoring projects for the period July 1 to September 30, 1989. This volume discusses the projects; Volume 2 provides as-built diagrams, completion/inspection reports, drilling logs, and geophysical logs for wells drilled, completed, or logged during this period. Volume 2 can be found on microfiche in the back pocket of Volume 1.

The work described in this document is conducted by the Pacific Northwest Laboratory under the management of Westinghouse Hanford Company for the U.S. Department of Energy.

Concentrations of ground-water constituents are compared to federal drinking water standards throughout this document for reference purposes. All drinking water supplied from the sampled aquifer meets regulatory standards for drinking water quality.

SUMMARY

This report describes the progress of 14 Hanford ground-water monitoring projects for the period July 1 to September 30, 1989. These projects are for the

- 300 Area Process Trenches (300 Area)
- 183-H Solar Evaporation Basins (100-H Area)
- 200 Areas Low-Level Burial Grounds, composed of
 - Waste Management Area 1
 - Waste Management Area 2
 - Waste Management Area 3
 - Waste Management Area 4
 - Waste Management Area 5
- Nonradioactive Dangerous Waste Landfill (southeast of the 200 Areas)
- 1301-N Liquid Waste Disposal Facility (100-N Area)
- 1324-N Surface Impoundment and 1324-NA Percolation Pond (100-N Area)
- 1325-N Liquid Waste Disposal Facility (100-N Area)
- 216-A-10 Crib (200-East Area)
- 216-A-29 Ditch (200-East Area)
- 216-A-36B Crib (200-East Area)
- 216-B-3 Pond (east of the 200-East Area)
- 2101-M Pond (200-East Area)
- Grout Treatment Facility (200-East Area).
- Single Shell Tanks, composed of
 - Waste Management Area A-AX
 - Waste Management Area B-BX-BY
 - Waste Management Area C
 - Waste Management Area S-SX
 - Waste Management Area TX-TY
 - Waste Management U.

This report is the thirteenth in a series of quarterly status reports; the first 12 cover the period from May 1, 1986, through June 30, 1989

(PNL 1986; 1987a, 1987b, 1987c, 1987d; 1988b, 1988c, 1988d; Fruland, Bates, and Lundgren 1989a, 1989b; Smith, Bates, and Lundgren 1989a, 1989b).

The 14 projects discussed in this report were designed according to applicable interim-status ground-water monitoring requirements specified in the Resource Conservation and Recovery Act of 1976 (RCRA) as amended; in 40 CFR 265, Subpart F; and in WAC 173-303-400.

During this quarter, field activities primarily consisted of drilling and well installation, ground-water sampling and analyses, and water-level monitoring.

ABBREVIATIONS AND ACRONYMS

The following abbreviations and acronyms are used in this report.

1,2-DIC - 1,2-dichloroethane

ASTM - American Society for Testing and Materials

CFR - U.S. Code of Federal Regulations

Cis-1,2-DCE - Cis-1,2-dichloroethene

DOE - U.S. Department of Energy

DOE-RL - U.S. Department of Energy-Richland Operations Office

Ecology - Washington State Department of Ecology

EPA - U.S. Environmental Protection Agency

ft - feet

ft/mi - feet per mile

FY - fiscal year (i.e., October through September)

gal - gallon

gal/d - gallons per day

gal/yr - gallons per year

gpm - gallons per minute

GTF - Grout Treatment Facility

LLBGs - Low-Level Burial Grounds

LWDF - Liquid Waste Disposal Facility

MCL - maximum contaminant level

mg/L - milligrams per liter

NRDW - Nonradioactive Dangerous Waste Landfill

PCE - perchloroethylene

pCi/L - picocuries per liter

PNL - Pacific Northwest Laboratory

ppb - parts per billion

ppm - parts per million

PUREX - plutonium-uranium extraction

RCRA - Resource Conservation and Recovery Act

SST - Single-Shell Tanks

SWL - Solid Waste Landfill

SWS - surface water station

TCE - trichloroethene
TEGD - Technical Enforcement Guidance Document (EPA 1986a)
TOC - total organic carbon
TOX - total organic halogen
TOXLDL - total organic halogen, lower detection limit

UST - United States Testing Company, Incorporated

VOA - volatile organic analyses
VOC - volatile organic compounds, constituents, or chemicals

WAC - Washington Administrative Code
WMA - Waste Management Area

 $\mu\text{g/L}$ - micrograms per liter
 μmho - micromho per centimeter (measure of specific conductivity)

CONTENTS

PREFACE	iii
SUMMARY	v
ABBREVIATIONS AND ACRONYMS	vii
1.0 INTRODUCTION.	1.1
PURGE WATER	1.3
QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM	1.3
ANALYTICAL ANOMALIES.	1.4
Acetone in Blanks.	1.4
Fluoride Matrix Interference	1.5
Other Topics	1.5
2.0 300 AREA PROCESS TRENCHES (R. Schalla, Pacific Northwest Laboratory)	2.1
DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	2.2
WATER LEVELS.	2.2
WATER CHEMISTRY DATA.	2.2
3.0 183-H SOLAR EVAPORATION BASINS (S. H. Hall, Pacific Northwest Laboratory)	3.1
DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	3.2
WATER LEVELS	3.2
WATER CHEMISTRY DATA	3.2
4.0 200 AREAS LOW-LEVEL BURIAL GROUNDS (G. V. Last, Pacific Northwest Laboratory)	4.1
DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	4.2
WATER LEVELS	4.3
WATER CHEMISTRY DATA	4.3

5.0	NONRADIOACTIVE DANGEROUS WASTE LANDFILL (R. M. Fruland, Pacific Northwest Laboratory)	5.1
	DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	5.2
	WATER LEVELS	5.2
	WATER CHEMISTRY DATA	5.2
6.0	I301-N LIQUID WASTE DISPOSAL FACILITY (M. J. Hartman, Westinghouse Hanford Company)	6.1
	DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	6.2
	WATER LEVELS	6.2
	WATER CHEMISTRY DATA	6.2
	GROUND-WATER QUALITY ASSESSMENT PROGRAM	6.4
7.0	I324-N SURFACE IMPOUNDMENT AND I324-NA PERCOLATION POND (M. J. Hartman, Westinghouse Hanford Company)	7.1
	DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	7.2
	WATER LEVELS	7.2
	WATER CHEMISTRY DATA	7.2
	GROUND-WATER QUALITY ASSESSMENT PROGRAM	7.3
8.0	I325-N LIQUID WASTE DISPOSAL FACILITY (M. J. Hartman, Westinghouse Hanford Company)	8.1
	DRILLING AND HYDRDGEOLOGIC CHARACTERIZATION	8.1
	WATER LEVELS	8.1
	BACKGROUND STATISTICAL DATA	8.2
	WATER CHEMISTRY DATA	8.2
9.0	216-A-10 CRIB (S. P. Luttrell, Pacific Northwest Laboratory)	9.1
	DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	9.1
	WATER LEVELS	9.2
	WATER CHEMISTRY DATA	9.2

10.0	216-A-29 DITCH (S. P. Luttrell, Pacific Northwest Laboratory)	10.1
	DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	10.1
	WATER LEVELS	10.1
	WATER CHEMISTRY DATA	10.2
11.0	216-A-36B CRIB (S. P. Luttrell, Pacific Northwest Laboratory)	11.1
	DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	11.2
	WATER LEVELS	11.2
	WATER CHEMISTRY DATA	11.2
12.0	216-B-3 POND (S. P. Luttrell, Pacific Northwest Laboratory)	12.1
	DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	12.1
	Well Drilling, Completion, Development, and Pump Installation	12.2
	Hydrogeologic Characterization	12.2
	WATER LEVELS	12.2
	WATER CHEMISTRY DATA.	12.3
13.0	2101-M POND (M. A. Chamness, Pacific Northwest Laboratory)	13.1
	DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	13.1
	WATER LEVELS.	13.1
	WATER CHEMISTRY DATA	13.2
14.0	GROUT TREATMENT FACILITY (S. S. Teel, Pacific Northwest Laboratory)	14.1
	DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	14.1
	Drilling	14.1
	Hydrogeologic Characterization	14.2
	WATER LEVELS	14.3

WATER CHEMISTRY DATA	14.3
Sample Collection	14.3
Discussion of Analytical Results	14.4
15.0 SINGLE-SHELL TANKS (E. J. Jensen, Pacific Northwest Laboratory)	15.1
DRILLING AND HYDROGEOLOGIC CHARACTERIZATION	15.1
WATER LEVELS	15.2
WATER CHEMISTRY DATA	15.2
16.0 REFERENCES.	16.1
Volume 2 contains	
APPENDIX A - AS-BUILT DIAGRAMS, WELL COMPLETION/INSPECTION REPORTS, DRILLING LOGS, AND GEOPHYSICAL LOGS FOR WELLS COMPLETED THIS QUARTER NEAR THE 216-B-3 POND	A.1
APPENDIX B - AS-BUILT DIAGRAMS, WELL COMPLETION/INSPECTION REPORTS, DRILLING LOGS, AND GEOPHYSICAL LOGS FOR WELLS DRILLED THIS QUARTER NEAR THE GROUT TREATMENT FACILITY	B.1

FIGURES

1.1	Locations of the 17 RCRA Ground-Water Monitoring Projects and Landmarks on the Hanford Site, 1989	1.6
2.1	Ground-Water Monitoring Wells Near the 300 Area Process Trenches.	2.5
2.2	Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer, July 1989	2.6
2.3	Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer, August 1989	2.7
2.4	Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer, September 1989	2.8
2.5	Water Levels in Two 300 Area Wells and River Station SWS-2 During April, May, and June 1989	2.9
2.6	Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer, June 1989	2.10
2.7	Concentration Distribution of Chloroform in the 300 Area During the First Two Weeks of June 1989	2.11
3.1	Monitoring Well Locations Near the 183-H Solar Evaporation Basins	3.4
3.2	Columbia River Elevation at the 100-H Area, June 29 to September 27, 1989.	3.5
4.1	Ground-Water Monitoring Wells Near Waste Management Area 1, 200-East Area	4.6
4.2	Ground-Water Monitoring Wells Near Waste Management Area 2, 200-East Area	4.7
4.3	Ground-Water Monitoring Wells Near Waste Management Area 3, 200-West Area	4.8
4.4	Ground-Water Monitoring Wells Near Waste Management Area 4, 200-West Area	4.9
4.5	Ground-Water Monitoring Wells Near Waste Management Area 5, 200-West Area	4.10
5.1	Monitoring Well Locations for the Solid Waste Landfill and the Nonradioactive Dangerous Waste Landfill	5.4

6.1	Ground-Water Monitoring Wells Near the 1301-N Liquid Waste Disposal Facility	6.5
6.2	Water Levels for the 100-N Area, July 1989	6.6
6.3	Water Levels for the 100-N Area, August 1989	6.7
6.4	Water Levels for the 100-N Area, September 1989	6.8
7.1	Ground-Water Monitoring Wells Near the 1324-N and 1324-NA Facilities.	7.5
8.1	Ground-Water Monitoring Wells Near the 1325-N Liquid Waste Disposal Facility	8.5
9.1	Monitoring Well Locations for the 216-A-10 Crib	9.4
10.1	Monitoring Well Locations for the 216-A-29 Ditch.	10.3
11.1	Monitoring Well Locations for the 216-A-36B Crib.	11.4
12.1	Monitoring Well Locations for the 216-B-3 Pond.	12.4
13.1	Monitoring Well Locations for the 2101-M Pond	13.4
14.1	Ground-Water Monitoring Wells Near the Grout Treatment Facility	14.8
14.2	Plot of Total Organic Halogens Concentrations from July 1988 to August 1989 for the Five RCRA Monitoring Wells	14.9
15.1	Monitoring Well Locations for Waste Management Area A-AX	15.3
15.2	Monitoring Well Locations for Waste Management Area B-BX-BY	15.4
15.3	Monitoring Well Locations for Waste Management Area C	15.5
15.4	Monitoring Well Locations for Waste Management Area S-SX	15.6
15.5	Monitoring Well Locations for Waste Management Area T	15.7
15.6	Monitoring Well Locations for Waste Management Area TX-TY	15.8
15.7	Monitoring Well Locations for Waste Management Area U	15.9

TABLES

1.1	Status of Hanford Site Resource Conservation and Recovery Act Interim-Status Ground-Water Monitoring Projects as of September 30, 1989.	1.7
2.1	Ground-Water Monitoring Wells for the 300 Area Process Trenches	2.12
2.2	Sampling Schedule for the 300 Area Process Trenches	2.13
2.3	Water-Level Data for 300 Area Wells, July Through September 1989	2.14
2.4	Constituent List and Summary of Sampling Results for the 300 Area Process Trenches June through August 1989.	2.17
2.5	Constituents with at Least One Detected Value for the 300 Area Process Trenches June through August 1989.	2.26
3.1	Sampling Schedule for the 183-H Solar Evaporation Basins	3.6
3.2	Water-Level Data for the 183-H Solar Evaporation Basins, July Through September 1989	3.7
3.3	Constituent List and Summary of Sampling Results for the 183-H Solar Evaporation Basins August 1989	3.13
3.4	Constituents with at Least One Detected Value for the 183-H Solar Evaporation Basins August 1989	3.16
4.1	Ground-Water Monitoring Wells for the 200 Areas Low-Level Burial Grounds	4.11
4.2	Sampling Schedule for the 200 Areas Low-Level Burial Grounds	4.12
4.3	1989 Drilling Summary for Low-Level Burial Ground Wells	4.13
4.4	Water-Level Data for Monitoring Wells Near the 200 Areas Low-Level Burial Grounds	4.14
4.5	Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-1 July through August 1989	4.17
4.6	Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-1 July through August 1989	4.21

4.7	Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-2 July through August 1989 . . .	4.24
4.8	Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-2 July through August 1989	4.28
4.9	Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-3 July 1989	4.31
4.10	Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-3 July 1989	4.35
4.11	Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-4 July 1989	4.39
4.12	Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-4 July 1989	4.43
5.1	Sampling and Analyses Performed at the Nonradioactive Dangerous Waste Landfill for FY 1989	5.5
5.2	Water-Level Data for Wells Monitoring the Nonradioactive Dangerous Waste Landfill and the Solid Waste Landfill, July, August, and September 1989.	5.6
5.3	Constituent List and Summary of Sampling Results for the Nonradioactive Dangerous Waste Landfill August 1989 . . .	5.8
5.4	Constituents with at Least One Detected Value for the Nonradioactive Dangerous Waste Landfill August 1989	5.9
5.5	Contamination Indicator Parameter Replicate Averages for the Nonradioactive Dangerous Waste Landfill August 1989	5.11
6.1	Water-Level Data for the 100-N Area, July, August, and September 1989	6.9
6.2	Sampling Schedule for the 1301-N Liquid Waste Disposal Facility	6.13
6.3	The Regular Sampling List for the 1301-N Ground-Water Quality Assessment Monitoring Network	6.14
6.4	Short List for the 1301-N Ground-Water Quality Assessment Monitoring Network	6.14
6.5	Constituent List and Summary of Sampling Results for the 1301-N Liquid Waste Disposal Facility, June through August 1989	6.15

6.6	Constituents with at Least One Detected Value for the 1301-N Liquid Waste Disposal Facility, June through August 1989	6.20
7.1	Sampling Schedule for the 1324-N/NA Project	7.6
7.2	The Regular Sampling List for the 1324-N/NA Ground-Water Quality Assessment Monitoring Network	7.7
7.3	Short List for the 1324-N/NA Ground-Water Quality Assessment Monitoring Network	7.7
7.4	Constituent List and Summary of Sampling Results for the 1324-N Surface Impoundment and 1324-NA Percolation Pond, July through August 1989	7.8
7.5	Constituents with at Least One Detected Value for the 1324-N Surface Impoundment and 1324-NA Percolation Pond, July through August 1989	7.17
8.1	Critical Means Values for the 1325-N Liquid Waste Disposal Facility for June Through August 1989	8.6
8.2	Sampling Schedule for the 1325-N Liquid Waste Disposal Facility	8.6
8.3	The Regular Sampling List for the 1325-N Ground-Water Quality Assessment Monitoring Network	8.7
8.4	Contamination Indicator Parameter Replicate Averages for the 1325-N Liquid Waste Disposal Facility, June through August 1989	8.8
8.5	Constituent List and Summary of Sampling Results for the 1325-N Liquid Waste Disposal Facility, June through August 1989	8.10
8.6	Constituents with at Least One Detected Value for the 1325-N Liquid Waste Disposal Facility, June through August 1989	8.14
9.1	Sampling Schedule for the 216-A-10 Crib	9.5
9.2	Water-Level Data for Wells Near the 216-A-10 Crib	9.6
9.3	Constituent List and Summary of Sampling Results for the 216-A10 Crib for June through August 1989	9.7
9.4	Constituents with at Least One Detected Value for the 216-A10 Crib for June through August 1989	9.11

10.1	Sampling Schedule for the 216-A-29 Ditch	10.4
10.2	Water-Level Data for Wells Near the 216-A-29 Ditch	10.5
10.3	Constituent List and Summary of Sampling Results for the 216-A-29 Ditch July through August 1989	10.6
10.4	Constituents with at Least One Detected Value for the 216-A-29 Ditch July through August 1989	10.11
11.1	Sampling Schedule for the 216-A-36B Crib	11.5
11.2	Water-Level Data for Wells Near the 216-A-36B Crib	11.6
11.3	Constituent List and Summary of Sampling Results for the 216-A-36B Crib for June through August 1989	11.7
11.4	Constituents with at Least One Detected Value for the 216-A-36B Crib, December 1988	11.10
11.5	Critical Mean Values for the 216-A-36B Crib for June through August 1989	11.14
11.6	Contamination Indicator Parameter Replicate Averages for the 216-A-36B Crib for June through August 1989	11.15
12.1	Sampling Schedule for the 216-B-3 Pond	12.5
12.2	Drilling, Completion, and Development Information for 216-B-3 Pond Wells	12.6
12.3	Water-Level Data for Wells Near the 216-B-3 Pond	12.7
12.4	Constituent List and Summary of Sampling results for the 216-B-3 Pond for May through August 1989	12.9
12.5	Constituents with at Least One Detected Value for the 216-B-3 Pond for May through August 1989	12.14
13.1	Sampling Schedule for the 2101-M Pond	13.5
13.2	Water-Level Elevation Data for Wells Near the 2101-M Pond	13.6
13.3	Constituent List and Summary of Sampling Results for the 2101-M Pond for August 1989	13.7
13.4	Constituents with at Least One Detected Value for the 2101-M Pond for August 1989	13.10

13.5	Critical Mean Values for the 2101-M Pond for August 1989	13.12
13.6	Contamination Indicator Parameter Replicate Averages for the 2101-M Pond for August 1989	13.13
14.1	Sampling Schedule for the Grout Treatment Facility	14.10
14.2	Drilling, Completion, and Development Information for 1989 Grout Treatment Facility Wells	14.11
14.3	Water-Level Data Taken Before Sample Collection at the Grout Treatment Facility, July/August 1989	14.12
14.4	Monthly Water-Level Data Collected During the Third Quarter of 1989 for the Grout Treatment Facility Ground-Water Monitoring Wells	14.13
14.5	Constituent List and Summary of Sampling Results for the Grout Treatment Facility June through August 1989	14.15
14.6	Constituents with at Least One Detected Value for the Grout Treatment Facility June through August 1989	14.20
14.7	Contamination Indicator Parameters Replicate Averages for the Grout Treatment Facility for June through August 1989	14.37
14.8	Statistical Comparisons of Grout Facility Ground-Water Monitoring Data, June Through July 1989 and August 1989	14.39
15.1	Sample Analysis Schedule for the Single-Shell Tanks	15.10

1.0 INTRODUCTION

The U.S. Department of Energy-Richland Operations Office (DOE-RL) administers and Westinghouse Hanford Company currently operates the Hanford facilities included in this report. The Hanford Site in southeastern Washington (Figure 1.1) is one of many DOE installations across the United States involved in a variety of activities related to energy research and development, nuclear weapons, and national security. A number of Hanford facilities use and generate hazardous materials and wastes, which must be managed so that public health and the environment are protected. The Resource Conservation and Recovery Act (RCRA) was enacted in 1976, providing a regulatory structure for the management of solid wastes, which includes hazardous wastes. The Pacific Northwest Laboratory (PNL) initiated RCRA site characterization and ground-water monitoring activities in 1985 for UNC Nuclear Industries, Westinghouse Hanford Company, and Rockwell Hanford Operations, which were Hanford operating contractors at the time. Pacific Northwest Laboratory designed ground-water monitoring programs to meet the requirements contained in RCRA; 40 CFR 265, Subpart F; and in WAC 173-303-400. The analytical results of the RCRA ground-water monitoring programs, which consist of data from the unconfined aquifer, are compared to drinking water standards. However, the unconfined aquifer is not used as a source of drinking water at any of the facilities included in this report.

A RCRA Part A application for the Hanford Site has been submitted to the U.S. Environmental Protection Agency (EPA) Region 10 and the Washington State Department of Ecology (hereafter called Ecology). Currently, the Hanford Site is operating under RCRA interim status. Interim-status standards applicable to ground-water monitoring activities are discussed in 40 CFR 265.90 to 265.94 and WAC 173-303-400, and are applicable to Hanford Site facilities until final administrative disposition of Part B permit or closure application(s).

Hanford interim-status ground-water monitoring projects are conducted as background, indicator parameter evaluation, or ground-water quality assessment monitoring programs (40 CFR 265). A background monitoring program involves quarterly monitoring for the first year to obtain background data to

characterize the quality of the ground water, followed in subsequent years by a minimum of semiannual monitoring of indicator parameters and annual monitoring of ground-water quality parameters. Data obtained during indicator parameter evaluation monitoring are compared with the background levels established during the first year of ground-water monitoring. If a statistically significant change occurs, a ground-water quality assessment program is implemented, which among other requirements, may reinstitute quarterly monitoring as necessary.

This report describes progress from July 1 to September 30, 1989, for 14 RCRA ground-water monitoring projects at the following Hanford Site hazardous waste disposal facilities: 300 Area Process Trenches, 183-H Solar Evaporation Basins, five Waste Management Areas (WMAs) in the 200 Areas Low-Level Burial Grounds (LLBGs), Nonradioactive Dangerous Waste Landfill (NRDW), 1301-N Liquid Waste Disposal Facility (LWDF), 1324-N Surface Impoundment and 1324-NA Percolation Pond, 1325-N LWDF, 216-A-10 Crib, 216-A-29 Ditch, 216-A-36B Crib, 216-B-3 Pond, 2101-M Pond, Grout Treatment Facility, and seven WMAs in the Single-Shell Tanks (SST). The location of each facility is shown in Figure 1.1.

Table 1.1 presents the status of each ground-water monitoring project. Ground-water quality assessment projects are in progress for the 1301-N LWDF, 1324-N and 1324-NA facilities, 300 Area Process Trenches, and the 183-H Solar Evaporation Basins. Of the other projects listed in Table 1.1, the Nonradioactive Dangerous Waste Landfill, 2101-M Pond, the 1325-N LWDF, and the Grout Treatment Facility are in the indicator evaluation phase, and the remaining projects are in the final quarter of background monitoring.

Twelve previous quarterly reports (PNL 1986; 1987a, 1987b, 1987c, 1987d; 1988b, 1988c, 1988d; Fruland, Bates, and Lundgren 1989a, 1989b; Smith, Bates, and Lundgren 1989a, 1989b) have been issued in this series and cover the period from May 1, 1986, to June 30, 1989. This report includes activities conducted during the third calendar quarter of 1989 (July 1 to September 30, 1989). For most facilities, analytical results from sampling activities accomplished during the last month of this quarter were not available in time

for inclusion in this report and will be reported in the next quarterly report (October 1 to December 30, 1989).

PURGE WATER

Throughout this report, changes in ground-water sampling schedules will be reported. Many of these changes resulted from decisions concerning the handling and disposition of purge water (water pumped from a well before and during sample collection). On March 23, 1989, sampling was ceased at all RCRA facilities included in this report until a decision on purge water handling could be made. Between March 23 and May 4, no water samples were collected from the affected monitoring systems. On May 5, 1989, ground-water sampling activities were restarted at the RCRA facilities, but only in those wells where purge water containment vessels were available. This policy was in effect throughout the quarter.

QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM

The RCRA ground-water monitoring projects are covered by a quality assurance plan designed in accordance with QAMS-005/80, Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans (Stanley and Verner 1983).

The quality control program to assess the analytical results reported includes 1) submission of blind standard, blank, and replicate samples to the primary analytical laboratory; 2) submission of duplicate samples to alternate laboratories; and 3) participation of the analytical laboratory in interlaboratory and intralaboratory comparison programs. The quality control program has been designed based on draft guidance from EPA Region 10 and EPA RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (TEGO) (EPA 1986a). Analyses are performed by the primary analytical laboratory (United States Testing Company, Incorporated) in accordance with the current edition of EPA's Test Methods for Evaluating Solid Waste: Physical/Chemical Methods (EPA 1986b) and are updated as necessary. For blind standard samples where a true concentration is known, 2.0 standard deviations is the target range. If results fall outside the 99% confidence interval, a request for

data verification is warranted (ASTM 1987). Values from interlaboratory comparisons of field samples must fall within 2.8 standard deviations based on EPA Water Supply or Water Pollution Laboratory Performance Evaluations to be considered equivalent analyses. This calculation takes into account the uncertainties associated with these analyses.

In general, for the period from July 1 to September 30, 1989, analytical results were acceptable. For example, for the blind sample data, 94% of the analyses were within acceptable limits for 223 analyses. The other 6% outside acceptable limits can be attributed to a method still under development and an analytical problem not associated with sample analysis. Of the replicate analyses between laboratories, 97% of 364 analyses were within acceptable limits. The remaining 3% are attributable to analytical technique differences between laboratories.

ANALYTICAL ANOMALIES

In the past, methylene chloride, iron, manganese, and chromium have been reported intermittently as probable anomalies (Smith, Bates, and Lundgren 1989a, 1989b). This quarter, two constituents, acetone in blanks and matrix interference in fluoride analyses, were persistent problems.

Acetone in Blanks

Acetone ranging from 8 to 74 ppb has been found in field blanks for volatile organic analysis (VOA). In July, one of two field blanks was found to contain acetone; in August, two of seven were found with acetone; and in September, four of twelve contained acetone. This is an improvement from the previous quarter.

A change in the type of container used to transport the water for the field blanks was instituted in August when a low level of acetone (~5 ppb) was found in one of the previously used transport bottles. This previously used container may not have been appropriate for VOAs. The change has apparently helped, but more conclusive evidence has yet to be obtained. This problem will continue to be investigated.

Fluoride Matrix Interference

Matrix interferences have been reported for most of the fluoride analyses during the quarter. Specifically, five results during July, 22 results during August, and 46 results during September are considered suspect (too high). This problem, however, is not new and is primarily an inadequacy of the analytical technique.

Fluoride is analyzed by ion chromatography, a separation technique. Unfortunately, the separation for fluoride and other ions (humic acids, organic ions found normally in soils and ground water) is sometimes poor. The result is a peak on the chromatogram that is not defined and difficult to quantify, hence the "matrix interference." The technology does exist to separate fluoride from these humic acids successfully; however, the equipment is fairly expensive, and the analysis time is considerably longer than that for the current analysis. Ways to improve this analysis will be investigated.

Other Topics

United States Testing Company, Incorporated (UST), was involved in performance evaluation by the EPA. A letter issued by EPA on June 30, 1989, states that the results of Water Pollution Performance Evaluation, Study Number 22, revealed that UST scored an overall 132 out of 134 samples reviewed, or a 99% acceptance level. The report also commended UST on the excellent nature of the laboratory's analytical performance exhibited in the study.

It was decided to lower matrix spike levels from 50 ppb to 20 ppb for two constituents (1,1-dichloroethylene and 1,1,2-trichloroethylene) in the VOA to better accommodate lower levels of these constituents.

FIGURE 1.1. Locations of the 14 RCRA Ground-Water Monitoring Projects and Landmarks on the Hanford Site, 1989

TABLE 1.1. Status of Hanford Site Resource Conservation and Recovery Act Interim-Status Ground-Water Monitoring Projects as of September 30, 1989

<u>Project</u>	<u>Background (quarters monitored)</u>	<u>Indicator Parameter Evaluation</u>	<u>Ground-Water Quality Assessment Monitoring</u>
300 Area Process Trenches			X
183-H Solar Evaporation Basins			X
200 Areas LLBG			
WMA-1	4(a)		
WMA-2	4(a)		
WMA-3	4(a)		
WMA-4	4(a)		
WMA-5	0		
Nonradioactive Dangerous Waste Landfill		X	
1301-N LWDF			X
1324-N/NA Facilities			X
1325-N LWDF		X	
216-A-10 Crib	4		
216-A-29 Ditch	4		
216-A-36B Crib		X	
216-B-3 Pond	4		
2101-M Pond		X	
Grout Treatment Facility		X	
Single-Shell Tanks	x(b)		

(a) Five sets of quarterly samples have been collected; however, complete analyses have not been received for the fifth set, thus, background has not yet been defined.

(b) Wells are currently being drilled at the Single-Shell Tanks. When all wells are completed, background monitoring will begin.

2.0 300 AREA PROCESS TRENCHES

R. Schalla

Pacific Northwest Laboratory

The ground water near the 300 Area Process Trenches has been monitored by a RCRA interim-status well network since June 1985. This project is currently in the ground-water quality assessment stage of monitoring. A revised ground-water monitoring plan has been prepared for this facility (Schalla et al. 1988a).

The 300 Area Process Trenches are located in the northern portion of the 300 Area. The two trenches are each 1500 ft long, 10 ft wide at the bottom, and about 34 ft wide at the top. They are unlined trenches, excavated about 12 ft into the subsurface and separated by an earthen berm. The trench bottoms are about 20 ft above the water table. Since 1975, the trenches have been used for disposal of most liquid wastes generated in the 300 Area. Discharge volumes gradually increased to about 3 million gal/d of waste water in 1987. This waste water consisted primarily of cooling water with small quantities of nonhazardous maintenance and process wastes. Following shutdown of fuel fabrication and some other operations in the 300 Area in 1988, the volume of process water has declined to approximately 1.5 million gal/d of waste water. This waste water is derived from a wide variety of 300 Area operations and typically contains small quantities of nonhazardous maintenance and process waste. The liquid wastes also contained hazardous constituents usually in very low concentrations; however, higher concentrations of hazardous constituents such as perchloroethylene (PCE) have been reported (Cline et al. 1985). Administrative controls to prevent disposal of dangerous wastes to the process trenches were instituted by Westinghouse Hanford Company on February 1, 1985. Perchloroethylene and its degradation isomers (i.e., trichloroethene and dichloroethene) continue to be present in a few monitoring wells downgradient of the process trenches, but no large spills affecting the process trenches have occurred since administrative controls were implemented.

There are 27 wells in the monitoring network for the process trenches. The purposes of these wells are shown in Table 2.1. The locations of these

wells are shown in Figure 2.1. The locations of the wells used for water-level measurements in July, August, and September are shown in Figures 2.2, 2.3 and 2.4, respectively. Table 2.2 shows the sampling schedule for the 27-well network.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

There were no drilling activities during this quarter. Hydrogeologic characterization efforts (other than water levels) have been suspended. Pertinent site characterization information can be found in Schalla et al. (1988b).

WATER LEVELS

Routine data collection has continued and includes the collection of continuous surface-water and ground-water levels using data loggers, in addition to monthly measurement of water levels in a network of 49 wells in the 300 Area. Table 2.3 presents the routinely collected water-level elevation data. Continuous water-level monitoring is continuing at seven locations: SWS-1 and SWS-2, the two surface-water monitoring stations on the Columbia River (shown in Figure 2.1), and in monitoring wells 399-1-10, 399-1-13, 399-1-16A, 399-1-16C, and 399-1-18A.

The southeasterly flow of ground water from the vicinity of the process trenches and the moderate hydraulic gradient in Figures 2.2, 2.3, and 2.4 represent flow patterns that are typical much of the year, particularly during the summer. Following a moderately steep 10-day rise in river stage in the Columbia River in late July, the ground-water flow from the process trenches was more southerly in July than in August or September as ground water from the unconfined aquifer was diverted southward before discharging into the river.

WATER CHEMISTRY DATA

The ground water near the 300 Area Process Trenches was sampled biweekly during August from two adjacent wells (399-1-11 and 399-1-17A), and one upgradient well (399-1-18A). Biweekly sampling did not include well 399-1-19

because an accessible purge water storage container was unavailable. A purge water storage tank has not been placed at well 399-1-19 because the tank would have to be located on a narrow road dividing the two trenches. The storage tank could not be safely approached with a tanker truck to pick up the water for disposal.

The results for anions, uranium, and volatile organic compounds (VOCs) for the biweekly samplings in August and the one sampling in June indicate that neither anion nor VOC concentrations have changed significantly. As expected, well 399-1-17A continued to show a decline in uranium, to approximately 83 pCi/L by August; however, it is difficult to meaningfully interpret these results without data from well 399-1-19. There was a sharp peak in chloride of about 50,000 ppb in well 399-1-11 for August 3, which returned to its prior concentration of about 5000 ppb by August 17. Sharp peaks of chloride are to be expected in wells near the process trenches because of the introduction of sodium chloride used in the filter backwash operations. Chloroform concentrations in the two sampled wells near the trenches are exhibiting typical seasonal patterns in their concentrations, with both wells having 20 to 25 ppb by August. Acetone was reported at 7 ppb in well 399-1-17A for August 3; however, acetone was also reported in the sample blank. Methylene chloride was reported at 4 ppb in well 399-1-11 for August 3, but this constituent is reported occasionally for many other wells. Methylene chloride is believed to represent equipment or laboratory contamination rather than true ground-water conditions in this area:

Volatile organic constituents detected in samples collected from the 27 well network in June include 1,2-dichloroethane (1,2-DIC) and trans-1,2-dichloroethene. The results for 1,2-dichloroethene are reported as trans but consist primarily of cis-1,2-dichloroethene (cis-1,2-DCE). Most of the concentrations for VOCs were below drinking water standards. For example, trichloroethene (TCE) was detected in 10 wells, but was only above drinking water standards in 2 wells. The only VOCs present in concentrations greater than the drinking water standards were TCE [maximum contaminant level (MCL) is 5 ppb] in wells 399-1-16B and 399-2-2 with concentrations of 21 and 11; cis-1,2-DCE (MCL is 70 ppb) in well 399-1-16B with a concentration of 79 ppb; and 1,2-DIC (MCL is 5 ppb) in well 399-1-11

with a concentration of 8 ppb. The presence of 1,2-DIC in well 399-1-11 indicates that the contaminant probably originated from the process trenches.

The concentrations of TCE and cis-1,2-DCE in wells 399-1-16B and 399-1-17B, which are screened in the bottom of the unconfined aquifer, were similar to previously reported concentrations. In the top of the unconfined aquifer, TCE was detected at 3 ppb in water samples from wells 399-4-7, 399-4-11, 399-8-3, and 399-2-1, and at 11 ppb in well 399-2-2 (Figure 2.1). Wells 399-2-1 and 399-2-2 are immediately downgradient of the sanitary sewer system (Figure 2.1); therefore, it would seem that it is the likely source of the TCE. However, well 399-4-7 is very far south and 399-4-11 is typically upgradient of the sanitary sewer system. For the sanitary sewer system to be the source of contamination found in these two wells would require sustained high river stages from about late April to early June. Continuous water-level data (Figure 2.5), June water-level contours (Figure 2.6), and chloroform concentration distribution in the top of the unconfined aquifer during June (Figure 2.7) indicate that southerly flow predominated and may have resulted in transport of TCE from the sanitary sewer system to these wells. Well 399-8-3 is generally considered to be upgradient of the process and sanitary sewer trenches, yet it also had a concentration of 3 ppb. Wells 399-3-7 and 399-4-1, sampled in July and August, showed that TCE was still present south of the 300 Area process and sanitary sewer trenches.

Chloroform concentrations remained similar to those reported in previous years for the summer quarter.

In addition to the standard laboratory quality control program, duplicate field samples have been analyzed by PNL to confirm the results from UST, the contracted analytical laboratory.

A summary of all results from June through August 1989 are presented in Table 2.4. Analytical data for detected constituents are presented in Table 2.5 for the biweekly network and the semiannual network sampling.

FIGURE 2.1. Ground-Water Monitoring Wells Near the 300 Area Process Trenches

FIGURE 2.2. Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer, July 1989

FIGURE 2.4. Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer, September 1989

Elevation in feet above MSL

FIGURE 2.5. Water Levels in Two 300 Area Wells and River Station SWS-2 During April, May, and June 1989

FIGURE 2.6. Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer, June 1989

FIGURE 2.7. Concentration Distribution of Chloroform in the 300 Area During the First Two Weeks of June 1989

TABLE 2.1. Ground-Water Monitoring Wells for the 300 Area Process Trenches

Wells for Point of Compliance

399-1-11
399-1-17A
399-1-19

Background Wells

399-1-18A
399-1-18B
399-8-2

Wells to Define the Horizontal Extent of Contamination

399-1-7
399-1-10
399-1-12
399-1-13
399-1-14
399-1-15
399-1-16A
399-2-1
399-2-2
399-3-7
399-3-9
399-3-10
399-4-1
399-4-7
399-4-11
399-8-1
399-8-3

Wells to Define the Vertical Extent of Contamination

399-1-16B
399-1-16C
399-1-17B
399-1-17C

TABLE 2.2. Sampling Schedule for the 300 Area Process Trenches

Well	1988(a)			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
399-1-7			XRV						L			
399-1-10			X						L			
399-1-11	BW	BW	XBW	BW	BW	BW			L		BW	BW
399-1-12			X						L			
399-1-13			X						L			
399-1-14			X						L			
399-1-15			X						LRV			
399-1-16A		A	XA	AA					L			
399-1-16B		A	XA	AA					L			
399-1-16C		A	XA	AA					L			
399-1-17A	BW	BW	XBWRV	BW	BW	BW			L		BW	BW
399-1-17B			X						L			
399-1-17C			X						L			
399-1-18A	BW	BW	XBW	BW	BW	BW			L		BW	BW
399-1-18B			X						L			
399-1-19	BW	BW	XBW	BW	BW	BW						
399-2-1			X						L			
399-2-2			X						L			
399-3-7			X								L	
399-3-9			X						L			
399-3-10			X						L			
399-4-1			X							L		
399-4-7			X						L			
399-4-11			X						L			
399-8-1			X						L			
399-8-2			X						L			
399-8-3			X						L			

(a) The following abbreviations are used in this table:

A = sampled in the well abandonment study.

AA = sampled twice for the well abandonment study.

BW = sampled biweekly.

L = sampled for the long list of constituents (WAC 173-303-9905).

R = quality control replicates were collected.

V = volatile organic analyses blanks were collected.

X = sampled for the regular list of constituents.

TABLE 2.3. Water-Level Data for 300 Area Wells, July Through September 1989

JULY

Well	Date	Depth to Water, ft	Casing Elevation, ft above MSL (a)	Water-Level Elevation, ft above MSL
399-1-1	7/26/89	33.74	375.90	342.16
399-1-2	7/26/89	42.98	384.52	341.54
399-1-3	7/26/89	43.17	384.73	341.56
399-1-4	7/26/89	38.19	381.11	342.92
399-1-5	7/26/89	38.08	379.82	341.74
399-1-6	7/26/89	31.27	373.81	342.54
399-1-7	7/26/89	44.06	385.63	341.57
399-1-8	7/26/89	43.34	384.91	341.57
399-1-9	7/26/89	19.81	384.80	364.99
399-1-10	7/26/89	31.35	373.65	342.30
399-1-11	7/26/89	35.34	377.79	342.45
399-1-12	7/26/89	42.74	384.45	341.71
399-1-13	7/26/89	46.86	388.62	341.76
399-1-14	7/26/89	40.88	383.23	342.35
399-1-15	7/26/89	37.06	379.59	342.53
399-1-16A	7/26/89	39.91	381.51	341.60
399-1-16B	7/26/89	39.34	381.14	341.80
399-1-16C	7/26/89	40.28	382.29	342.01
399-1-17A	7/26/89	35.91	377.47	341.56
399-1-17B	7/26/89	36.15	377.87	341.72
399-1-17C	7/26/89	2.26	378.13	375.87
399-1-18A	7/26/89	48.00	390.83	342.83
399-1-18B	7/26/89	46.83	389.94	343.11
399-1-18C	7/26/89	44.46	388.05	343.59
399-1-19	7/26/89	33.01	374.64	341.63
399-2-1	7/26/89	33.59	375.26	341.67
399-2-2	7/26/89	33.89	375.53	341.64
399-2-3	7/26/89	33.83	375.44	341.61
399-3-1	7/26/89	42.88	384.43	341.55
399-3-2	7/26/89	51.00	392.36	341.36
399-3-6	7/26/89	51.41	392.85	341.44
399-3-7	7/26/89	52.76	394.22	341.46
399-3-9	7/26/89	45.82	387.31	341.49
399-3-10	7/26/89	43.95	385.40	341.45
399-3-12	7/26/89	44.92	386.38	341.46
399-4-1	7/26/89	53.68	395.00	341.32
399-4-7	7/26/89	35.59	376.99	341.40
399-4-9	7/26/89	39.96	381.40	341.44
399-4-10	7/26/89	36.15	377.59	341.44
399-4-11	7/26/89	63.13	404.53	341.40
399-5-1	7/26/89	54.17	395.60	341.43
399-6-1	7/26/89	45.29	386.93	341.64
399-8-1	7/26/89	53.14	394.88	341.74
399-8-2	7/26/89	53.70	396.06	342.36
399-8-3	7/26/89	51.04	393.11	342.07
699-S19-E13	7/26/89	51.18	394.51	343.33
699-S27-E14	7/26/89	58.51	399.76	341.25
699-S29-E12	7/26/89	42.20	387.95	345.75
699-S30-E15A	7/26/89	58.62	400.14	341.52

TABLE 2.3. (contd)

AUGUST				
Well	Date	Depth to Water, ft	Casing Elevation ft above MSL (a)	Water-Level Elevation, ft above MSL
399-1-1	8/24/89	35.25	375.90	340.65
399-1-2	8/24/89	43.96	384.52	340.56
399-1-3	8/24/89	44.38	384.73	340.35
399-1-4	8/24/89	38.77	381.11	342.34
399-1-5	8/24/89	38.89	379.82	340.93
399-1-6	8/24/89	32.28	373.81	341.53
399-1-7	8/24/89	45.28	385.63	340.35
399-1-8	8/24/89	44.52	384.91	340.39
399-1-9	8/24/89	20.85	384.80	363.95
399-1-10	8/24/89	32.96	373.65	340.69
399-1-11	8/24/89	35.90	377.79	341.89
399-1-12	8/24/89	43.57	384.45	340.88
399-1-13	8/24/89	47.54	388.62	341.08
399-1-14	8/24/89	41.43	383.23	341.80
399-1-15	8/24/89	37.69	379.59	341.90
399-1-16A	8/24/89	41.26	381.51	340.25
399-1-16B	8/24/89	40.68	381.14	340.46
399-1-16C	8/24/89	41.66	382.29	340.63
399-1-17A	8/24/89	36.85	377.47	340.62
399-1-17B	8/24/89	37.07	377.87	340.80
399-1-17C	8/24/89	3.52	378.13	374.61
399-1-18A	8/24/89	48.68	390.83	342.15
399-1-18B	8/24/89	47.62	389.94	342.32
399-1-18C	8/24/89	45.11	388.05	342.94
399-1-19	8/24/89	33.85	374.64	340.79
399-2-1	8/24/89	35.23	375.26	340.03
399-2-2	8/24/89	35.34	375.53	340.19
399-2-3	8/24/89	35.30	375.44	340.14
399-3-1	8/24/89	44.44	384.43	339.99
399-3-2	8/24/89	52.03	392.36	340.33
399-3-6	8/24/89	52.33	392.85	340.52
399-3-7	8/24/89	53.81	394.22	340.41
399-3-9	8/24/89	47.39	387.31	339.92
399-3-10	8/24/89	45.61	385.40	339.79
399-3-12	8/24/89	46.29	386.38	340.09
399-4-1	8/24/89	55.11	395.00	339.89
399-4-7	8/24/89	37.44	376.99	339.55
399-4-9	8/24/89	41.66	381.40	339.74
399-4-10	8/24/89	38.03	377.59	339.56
399-4-11	8/24/89	64.41	404.53	340.12
399-5-1	8/24/89	54.79	395.60	340.81
399-6-1	8/24/89	45.61	386.93	341.32
399-8-1	8/24/89	53.59	394.88	341.29
399-8-2	8/24/89	53.85	396.06	342.21
399-8-3	8/24/89	51.39	393.11	341.72
699-S19-E13	8/24/89	51.82	394.51	342.69
699-S27-E14	8/24/89	59.90	399.76	339.86
699-S29-E12	8/24/89	42.06	387.95	345.89
699-S30-E15A	8/24/89	59.72	400.14	340.42

TABLE 2.3. (contd)

SEPTEMBER

Well	Date	Depth to Water, ft	Casing Elevation ft above MSL (a)	Water-Level Elevation, ft above MSL
399-1-1	9/25/89	34.95	375.90	340.95
399-1-2	9/25/89	43.40	384.52	341.12
399-1-3	9/25/89	43.86	384.73	340.87
399-1-4	9/25/89	38.49	381.11	342.62
399-1-5	9/25/89	38.35	379.82	341.47
399-1-6	9/25/89	32.02	373.81	341.79
399-1-7	9/25/89	44.76	385.63	340.87
399-1-8	9/25/89	43.98	384.91	340.93
399-1-9	9/25/89	21.21	384.80	363.59
399-1-10	9/25/89	32.70	373.65	340.95
399-1-11	9/25/89	35.58	377.79	342.21
399-1-12	9/25/89	43.04	384.45	341.41
399-1-13	9/25/89	47.07	388.62	341.55
399-1-14	9/25/89	41.15	383.23	342.08
399-1-15	9/25/89	37.43	379.59	342.16
399-1-16A	9/25/89	40.76	381.51	340.75
399-1-16B	9/25/89	40.25	381.14	340.89
399-1-16C	9/25/89	41.12	382.29	341.17
399-1-17A	9/25/89	36.27	377.47	341.20
399-1-17B	9/25/89	36.53	377.87	341.34
399-1-17C	9/25/89	4.09	378.13	374.04
399-1-18A	9/25/89	48.47	390.83	342.36
399-1-18B	9/25/89	47.44	389.94	342.50
399-1-18C	9/25/89	44.93	388.05	343.12
399-1-19	9/25/89	33.29	374.64	341.35
399-2-1	9/25/89	34.77	375.26	340.49
399-2-2	9/25/89	34.86	375.53	340.67
399-2-3	9/25/89	34.83	375.44	340.61
399-3-1	9/25/89	43.96	384.43	340.47
399-3-2	9/25/89	51.41	392.36	340.95
399-3-6	9/25/89	51.76	392.85	341.09
399-3-7	9/25/89	53.24	394.22	340.98
399-3-9	9/25/89	46.87	387.31	340.44
399-3-10	9/25/89	45.10	385.40	340.30
399-3-12	9/25/89	45.71	386.38	340.67
399-4-1	9/25/89	54.45	395.00	340.55
399-4-7	9/25/89	36.96	376.99	340.03
399-4-9	9/25/89	41.16	381.40	340.24
399-4-10	9/25/89	37.58	377.59	340.01
399-4-11	9/25/89	63.79	404.53	340.74
399-5-1	9/25/89	54.31	395.60	341.29
399-6-1	9/25/89	45.32	386.93	341.61
399-8-2	9/25/89	53.83	396.06	342.23
399-8-3	9/25/89	51.15	393.11	341.96
699-S19-E13	9/25/89	51.70	394.51	342.81
699-S27-E14	9/25/89	59.19	399.76	340.57
699-S29-E12	9/25/89	42.05	387.95	345.90
699-S30-E15A	9/25/89	59.10	400.14	341.04

(a) MSL = mean sea level.

TABLE 2.4. Constituent List and Summary of Sampling Results for the 300 Area Process Trenches
June through August 1989

----- Constituent List=Contamination Indicator Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded		Full name
191 CONDFLD	umho	1	35	0	700 WDOE		Specific conductance, field
199 PHFIELD		0.1	35	0	6.5-8.5 EPAS		pH, field
C89 TOC	ppb	2000	98	7	.		Total organic carbon
H42 TOXLDL	ppb	10	98	0	.		Total organic halogens, low DL
----- Constituent List=Interim Primary Drinking Water Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded		Full name
109 COLIFRM	MPN	2.2	25	23	1 EPA	xxx	Coliform bacteria
111 BETA	pCi/L	8	28	0	50 EPA		Gross beta
112 ALPHAHI	pCi/L	4	28	0	15 EPA	xxx	Gross alpha, high DL
181 RADIUM	pCi/L	1	28	0	5 EPA		Radium, total
A06 BARIUM	ppb	8	28	0	1000 EPA		Barium
A07 CADMIUM	ppb	2	28	27	10 EPA		Cadmium
A08 CHROMIUM	ppb	10	28	26	50 EPA		Chromium
A10 SILVER	ppb	10	28	28 ***	50 EPA		Silver
A20 ARSENIC	ppb	5	28	23	50 EPA		Arsenic
A21 MERCURY	ppb	0.1	28	28 ***	2 EPA		Mercury
A22 SELENIUM	ppb	5	28	28 ***	10 EPA		Selenium
A33 ENDRIN	ppb	0.1	28	28 ***	0.2 EPA		Endrin
A34 METHLOR	ppb	3	28	28 ***	100 EPA		Methoxychlor
A35 TOXAENE	ppb	1	28	28 ***	5 EPA		Toxaphene
A36 a-BHC	ppb	0.1	28	28 ***	4 EPA		Lindane, alpha-BHC
A37 b-BHC	ppb	0.1	28	28 ***	4 EPA		Lindane, beta-BHC
A38 g-BHC	ppb	0.1	28	28 ***	4 EPA		Lindane, gamma-BHC
A39 d-BHC	ppb	0.1	28	28 ***	4 EPA		Lindane, delta-BHC
A61 LEADGF	ppb	5	28	28 ***	50 EPA		Lead (graphite furnace)
C72 NITRATE	ppb	500	37	4	45000 EPA		Nitrate
C74 FLUORID	ppb	500	37	31	4000 EPA		Fluoride
H13 2,4-D	ppb	2	28	28 ***	100 EPA		2,4-D [2,4-Dichlorophenoxyacetic acid]
H14 2,4,5TP	ppb	2	28	28 ***	10 EPA		2,4,5-TP allvex
H20 FBARIUM	ppb	8	28	0	1000 EPA		Barium, filtered
H21 FCADMIU	ppb	2	28	26	10 EPA		Cadmium, filtered
H22 FCHROMI	ppb	10	28	28 ***	50 EPA		Chromium, filtered
H28 FSILVER	ppb	10	28	28 ***	50 EPA		Silver, filtered
H37 FARSENI	ppb	5	28	24	50 EPA		Arsenic, filtered
H38 FMERCUR	ppb	0.1	28	28 ***	2 EPA		Mercury, filtered
H39 FSELENI	ppb	5	28	28 ***	10 EPA		Selenium, filtered
H41 FLEAD	ppb	5	28	28 ***	50 EPA		Lead, filtered
H60 TURBID	ntu	0.1	28	8	1 EPA	xxx	Turbidity, nephelometric
P19 COLIMF	100mL	1	3	3 ***	1 EPA		Coliform (Membrane Filter)

TABLE 2.4. (contd)

----- Constituent List=Water Quality Parameters -----								
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded			Full name
A11 SODIUM	ppb	200	28	0	.			Sodium
A17 MANGESE	ppb	5	28	20	50 EPAS	xxx		Manganese
A19 IRON	ppb	30	28	8	800 EPAS	xxx		Iron
C67 PHENOL	ppb	10	28	28 ***	.			Phenol
C73 SULFATE	ppb	500	37	2	250000 EPAS			Sulfate
C75 CHLORID	ppb	500	37	0	250000 EPAS			Chloride
H24 FSODIUM	ppb	200	28	0	.			Sodium, filtered
H29 FMANGAN	ppb	5	28	22	50 EPAS	xxx		Manganese, filtered
H31 FIRON	ppb	30	28	21	. EPAS			Iron, filtered
----- Constituent List=Site Specific and Other Constituents -----								
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded			Full name
104 U	pCi/L	0.5	37	0	600 DOE			Uranium
108 TRITIUM	pCi/L	500	1	0	20000 EPA			Tritium (H-3)
A01 BERYLUM	ppb	5	28	27	.			Beryllium
A03 STRONTIUM	ppb	10	28	0	.			Strontium
A04 ZINC	ppb	5	28	19	5000 EPAS			Zinc
A06 CALCIUM	ppb	50	28	0	.			Calcium
A12 NICKEL	ppb	10	28	27	.			Nickel
A13 COPPER	ppb	10	28	24	1300 EPAP			Copper
A14 VANADIUM	ppb	5	28	23	.			Vanadium
A15 ANTIMONY	ppb	100	28	28 ***	.			Antimony
A16 ALUMINUM	ppb	150	28	28 ***	.			Aluminum
A18 POTASSIUM	ppb	100	28	0	.			Potassium
A50 MAGNES	ppb	50	28	0	.			Magnesium
C78 PHOSPHA	ppb	1000	37	37 ***	.			Phosphate
H18 TC	ppb	1000	28	0	.			Total carbon
H17 TDS	ppb	5000	28	0	500000 EPAS			Total dissolved solids
H18 FZINC	ppb	5	28	19	5000 EPAS			Zinc, filtered
H19 FCALCIU	ppb	50	28	0	.			Calcium, filtered
H25 FNICKEL	ppb	10	28	25	.			Nickel, filtered
H26 FCOPPER	ppb	10	28	22	1300 EPAP			Copper, filtered
H27 FVANADI	ppb	5	28	13	.			Vanadium, filtered
H28 FALUMIN	ppb	150	28	27	.			Aluminum, filtered
H30 FPOTASS	ppb	100	28	0	.			Potassium, filtered
H32 FMAGNES	ppb	50	28	0	.			Magnesium, filtered
H33 FBERYLL	ppb	5	28	26	.			Beryllium, filtered
H35 FSTRONT	ppb	10	28	0	.			Strontium, filtered
H36 FANTIMO	ppb	100	28	28 ***	.			Antimony, filtered
H58 ALKALIN	ppb	20000	28	0	.			Total alkalinity, as CaCO3 (Method B)
H86 BROWIDE	ppb	1000	37	37 ***	.			Bromide
H87 NITRITE	ppb	1000	37	37 ***	.			Nitrite
H88 FBORON	ppb	10	28	1	.			Boron, filtered

TABLE 2.4. (contd)

----- Constituent List=Site Specific and Other Constituents -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
H87 FCOBALT	ppb	20	28	28 ***	.	Cobalt, filtered	
H88 FLITHIU	ppb	10	28	21	.	Lithium, filtered	
H89 FMOLY	ppb	40	28	28 ***	.	Molybdenum, filtered	
H90 FSILICO	ppb	60	28	0	.	Silicon, filtered	
H91 FTIN	ppb	30	28	28 ***	.	Tin, filtered	
H92 FTITAN	ppb	60	28	28 ***	.	Titanium, filtered	
H93 FZIRCON	ppb	60	28	28 ***	.	Zirconium, filtered	
P01 BORON	ppb	10	28	2	.	Boron	
P02 COBALT	ppb	20	28	28 ***	.	Cobalt	
P03 LITHIUM	ppb	10	28	21	.	Lithium	
P04 MOLY	ppb	40	28	28 ***	.	Molybdenum	
P06 SILICON	ppb	60	28	0	.	Silicon	
P06 TIN	ppb	30	28	28 ***	.	Tin	
P07 TITAN	ppb	60	28	28 ***	.	Titanium	
P08 ZIRCON	ppb	60	28	28 ***	.	Zirconium	

----- Constituent List=WAC 173-303-8906 Constituents -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A23 THALIUM	ppb	5	28	28 ***	.	Thallium
A24 THIOURA	ppb	200	28	28 ***	.	Thiourea
A25 ACETREA	ppb	200	28	28 ***	.	1-Acetyl-2-thiourea
A26 CHLOREA	ppb	200	28	28 ***	.	1-(o-Chlorophenyl) thiourea
A27 DIETROL	ppb	200	28	28 ***	.	Diethylstilbestrol
A28 ETHYREA	ppb	200	28	28 ***	.	Ethylenethiourea
A29 NAPHREA	ppb	200	28	28 ***	.	1-Naphthyl-2-thiourea
A32 PHENREA	ppb	500	28	28 ***	.	n-Phenylthiourea
A40 DDD	ppb	0.1	28	28 ***	.	DDD
A41 DDE	ppb	0.1	28	28 ***	.	DDE
A42 DDT	ppb	0.1	28	28 ***	.	DDT
A43 HEPTLOR	ppb	0.1	28	28 ***	0 EPAP	Heptachlor
A44 HEPTIDE	ppb	0.1	28	28 ***	0 EPAP	Heptachlor epoxide
A45 KEPONE	ppb	1	28	28 ***	.	Kepona (discontinued)
A46 DIELRIN	ppb	0.1	28	28 ***	.	Dieldrin
A47 ALDRIN	ppb	0.1	28	28 ***	.	Aldrin
A48 CHLOANE	ppb	1	28	28 ***	0 EPAP	Chlordane
A49 END01	ppb	0.1	28	28 ***	.	Endosulfan I (alpha)
A52 END02	ppb	0.1	28	28 ***	.	Endosulfan II (beta)
A54 AR1010	ppb	1	28	28 ***	0 EPAP	Arochlor 1010
A56 AR1221	ppb	1	28	28 ***	0 EPAP	Arochlor 1221
A58 AR1232	ppb	1	28	28 ***	0 EPAP	Arochlor 1232
A57 AR1242	ppb	1	28	28 ***	0 EPAP	Arochlor 1242
A58 AR1248	ppb	1	28	28 ***	0 EPAP	Arochlor 1248
A59 AR1254	ppb	1	28	28 ***	0 EPAP	Arochlor 1254
A60 AR1260	ppb	1	28	28 ***	0 EPAP	Arochlor 1260

TABLE 2.4. (contd)

----- Constituent List-WAC 173-303-9906 Constituents -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
A61	TETRANE	ppb	5	37	37 ***	5 EPA	Tetrachloromethane [Carbon Tetrachloride]
A62	BENZENE	ppb	5	37	37 ***	5 EPA	Benzene
A63	DIOXANE	ppb	500	28	28 ***	.	Dioxane
A64	METHONE	ppb	10	37	37 ***	.	Methyl ethyl ketone
A65	PYRIDIN	ppb	500	28	28 ***	.	Pyridine
A66	TOLUENE	ppb	5	37	37 ***	2000 EPAP	Toluene
A67	1,1,1-T	ppb	5	37	37 ***	200 EPA	1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	37	37 ***	.	1,1,2-Trichloroethane
A69	TRICENE	ppb	5	37	27	5 EPA	Trichloroethylene [1,1,2-Trichloroethane]
A70	PERCENE	ppb	5	37	37 ***	xxx	Perchloroethylene [Tetrachloroethane]
A71	OPXYLE	ppb	5	37	37 ***	440 EPAP	Xylene-o,p
A72	ACROLIN	ppb	10	28	28 ***	.	Acrolein
A73	ACRYILE	ppb	10	28	28 ***	.	Acrylonitrile
A74	BISTHER	ppb	5	28	28 ***	.	bis(Chloromethyl) ether
A75	BROMONE	ppb	5	28	28 ***	.	Bromacetone
A76	METHBRO	ppb	10	28	28 ***	.	Bromomethane [Methyl bromide]
A77	CARBIDE	ppb	10	28	28 ***	.	Carbon disulfide
A78	CHLBENZ	ppb	5	28	28 ***	60 EPAP	Chlorobenzene
A79	CHLTHER	ppb	5	28	28 ***	.	2-Chloroethyl vinyl ether
A80	CHLFORM	ppb	5	37	12	100 EPA	Chloroform [Trichloromethane]
A81	METHCHL	ppb	10	28	28 ***	.	Methyl chloride [Chloromethane]
A82	CHMTHER	ppb	10	28	28 ***	.	Chloromethyl methyl ether
A83	CROTONA	ppb	10	28	28 ***	.	Crotonaldehyde
A84	DIBRCHL	ppb	10	28	28 ***	0 EPAP	1,2-Dibromo-3-chloropropane
A85	DIBRETH	ppb	10	28	28 ***	.	1,2-Dibromoethane
A86	DIBRMET	ppb	10	28	28 ***	.	Dibromomethane
A87	DIBUTEN	ppb	10	28	28 ***	.	1,4-Dichloro-2-butene
A88	DICDIFM	ppb	10	28	28 ***	.	Dichlorodifluoromethane
A89	1,1-DIC	ppb	5	37	37 ***	.	1,1-Dichloroethane
A90	1,2-DIC	ppb	5	37	36	5 EPA	1,2-Dichloroethane
A91	TRANDEC	ppb	5	37	35	70 EPAP	trans-1,2-Dichloroethane
A92	DICETHY	ppb	10	28	28 ***	7 EPA	1,1-Dichloroethylene
A93	METHYCH	ppb	5	37	36	.	Methylene chloride [Dichloromethane]
A94	DICPANE	ppb	5	28	28 ***	6 EPAP	1,2-Dichloropropane
A95	DICPENE	ppb	5	28	28 ***	.	1,3-Dichloropropane
A96	NNOIEHY	ppb	10	28	28 ***	.	N,N-diethylhydrazine
A97	1,1-DIM	ppb	10	28	28 ***	.	1,1-Dimethylhydrazine
A98	1,2-DIM	ppb	10	28	28 ***	.	1,2-Dimethylhydrazine
B01	IODOMET	ppb	10	28	28 ***	.	Iodomethane
B02	METHACR	ppb	10	28	28 ***	.	Methacrylonitrile
B03	METHYTHI	ppb	10	28	28 ***	.	Methanethiol
B04	PENTACH	ppb	10	28	28 ***	.	Pentachloroethane
B05	1112-tc	ppb	10	28	28 ***	.	1,1,1,2-Tetrachloroethane
B06	1122-tc	ppb	5	28	28 ***	.	1,1,2,2-Tetrachloroethane
B08	BROMORM	ppb	5	28	28 ***	100 EPA	Bromoform [Tribromomethane]
B09	TRCMEOL	ppb	10	28	28 ***	.	Trichloromethanethiol
B10	TRCMFLM	ppb	10	28	28 ***	.	Trichloromonofluoromethane

TABLE 2.4. (contd)

Constituent List=WAC 173-303-9905 Constituents							Full name	
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded		
B12	123-trp	ppb	10	28	28 ***	.	1,2,3-Trichloropropane	
B13	VINYIDE	ppb	10	37	37 ***	2 EPA	Vinyl chloride	
B14	M-XYLE	ppb	5	37	37 ***	440 EPAP	Xylene-m	
B19	ACETILE	ppb	10	28	28 ***	.	Acetonitrile	
B20	ACETOPH	ppb	10	28	28 ***	.	Acetophenone	
B21	WARFRIN	ppb	10	28	28 ***	.	Warfarin	
B22	ACEFENE	ppb	10	28	28 ***	.	2-Acetylaminofluorene	
B23	AMINOYL	ppb	10	28	28 ***	.	4-Aminobiphenyl	
B24	AMISOX	ppb	10	28	28 ***	.	5-(Aminomethyl)-3-isoxazole	
B25	AMITROL	ppb	10	28	28 ***	.	Amitrole	
B26	ANILINE	ppb	10	28	28 ***	.	Aniline	
B27	ARAMITE	ppb	10	28	28 ***	.	Aramite	
B28	AURAMIN	ppb	10	28	28 ***	.	Auramine	
B29	BENZCAC	ppb	10	28	28 ***	.	Benz[c]acridine	
B30	BENZAAM	ppb	10	28	28 ***	.	Benz[a]anthracene	
B31	BENDICM	ppb	10	28	28 ***	.	Benzene, dichloromethyl	
B32	BENTHOL	ppb	10	28	28 ***	.	Benzenethiol	
B33	BENDINE	ppb	10	28	28 ***	.	Benzidine	
B34	BENZBFL	ppb	10	28	28 ***	.	Benzo[b]fluoranthene	
B35	BENZJFL	ppb	10	28	28 ***	.	Benzo[j]fluoranthene	
B36	PBENZQU	ppb	10	28	28 ***	.	p-Benzoquinone	
B37	BENZCHL	ppb	10	28	28 ***	.	Benzyl chloride	
B38	BIS2CHM	ppb	10	28	28 ***	.	bis(2-Chloroethoxy) methane	
B39	BIS2CHE	ppb	10	28	28 ***	.	bis(2-Chloroethyl) ether	
B40	BIS2EPH	ppb	10	28	28 ***	.	bis(2-Ethylhexyl) phthalate	
B41	BROPHEN	ppb	10	28	28 ***	.	4-Bromophenyl phenyl ether	
B42	BUTBENP	ppb	10	28	28 ***	.	Butyl benzyl phthalate	
B43	BUTOINP	ppb	10	28	28 ***	.	2-sec-Butyl-4,6-dinitrophenol [Dinoseb]	
B44	CHALETH	ppb	10	28	28 ***	.	Chloroalkyl ethers	
B45	CHLANIL	ppb	10	28	28 ***	.	p-Chloroaniline [4-Chloroaniline]	
B46	CHLCRES	ppb	10	28	28 ***	.	p-Chloro-m-cresol	
B47	CHLEPOX	ppb	10	28	28 ***	0 EPAP	1-Chloro-2,3-epoxypropane	
B48	CHLNAPH	ppb	10	28	28 ***	.	2-Chloronaphthalene	
B49	CHLPHEN	ppb	10	28	28 ***	.	2-Chlorophenol	
B50	CHRYSEN	ppb	10	28	28 ***	.	Chrysene	
B51	CRESOLS	ppb	10	28	28 ***	.	Cresols	
B52	CYCHOIN	ppb	10	28	28 ***	.	2-Cyclohexyl-4,6-dinitrophenol	
B53	DIBAHAC	ppb	10	28	28 ***	.	Dibenz[a,h]acridine	
B54	DIBAJAC	ppb	10	28	28 ***	.	Dibenz[a,j]acridine	
B55	DIBAHAN	ppb	10	28	28 ***	.	Dibenz[a,h]anthracene	
B56	DIBCGCA	ppb	10	28	28 ***	.	7H-Dibenzo[c,g]carbazole	
B57	DIBAEPY	ppb	10	28	28 ***	.	Dibenzo[a,e]pyrene	
B58	DIBAHPY	ppb	10	28	28 ***	.	Dibenzo[a,h]pyrene	
B59	DIBAIKY	ppb	10	28	28 ***	.	Dibenzo[a,i]pyrene	
B60	DIBPHTH	ppb	10	28	28 ***	.	Di-n-butyl phthalate	
B61	12-dben	ppb	10	28	28 ***	.	1,2-Dichlorobenzene [o-Dichlorobenzene]	
B62	13-dben	ppb	10	28	28 ***	.	1,3-Dichlorobenzene [m-Dichlorobenzene]	
B63	14-dben	ppb	10	28	28 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]	

TABLE 2.4. (contd)

----- Constituent List-WAC 173-303-9905 Constituents -----						
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded Full name
B64	DICHBEN	ppb	10	28	28 ***	3,3'-Dichlorobenzidine
B65	24-dchp	ppb	10	28	28 ***	2,4-Dichlorophenol
B66	26-dchp	ppb	10	28	28 ***	2,6-Dichlorophenol
B67	DIEPTH	ppb	10	28	28 ***	Diethyl phthalate
B68	DIHYSAF	ppb	10	28	28 ***	Dihydroxafrole
B69	DIMETHB	ppb	10	28	28 ***	3,3'-Dimethoxybenzidine
B70	DIMEAMB	ppb	10	28	28 ***	p-Dimethylaminooxobenzene
B71	DIMBENZ	ppb	10	28	28 ***	7,12-Dimethylbenz[a]anthracene
B72	DIMEYLB	ppb	10	28	28 ***	3,3'-Dimethylbenzidine
B73	THIONOX	ppb	10	28	28 ***	Thiofanox
B74	DIMPHAM	ppb	10	28	28 ***	alpha,alpha-Dimethylphenethylamine
B76	DIMPHTH	ppb	10	28	28 ***	Dimethyl phthalate
B77	DINBENZ	ppb	10	28	28 ***	Dinitrobenzene
B78	DINCREB	ppb	10	28	28 ***	4,6-Dinitro-o-cresol and salts
B79	DINPHEN	ppb	10	28	28 ***	2,4-Dinitrophenol
B80	24-dint	ppb	10	28	28 ***	2,4-Dinitrotoluene
B81	26-dint	ppb	10	28	28 ***	2,6-Dinitrotoluene
B82	DIOPHTH	ppb	10	28	28 ***	Di-n-octyl phthalate
B83	DIPHAMI	ppb	10	28	28 ***	Diphenylamine
B84	DIPHNYD	ppb	10	28	28 ***	1,2-Diphenylhydrazine
B85	DIPRNT	ppb	10	28	28 ***	Di-n-propylnitrosamine
B86	ETHMINE	ppb	10	28	28 ***	Ethyleneimine
B87	ETHMETS	ppb	10	28	28 ***	Ethyl methanesulfonate
B88	FLUORAN	ppb	10	28	28 ***	Fluoranthene
B89	HEXCBEN	ppb	10	28	28 ***	Hexachlorobenzene
B90	HEXCBUT	ppb	10	28	28 ***	Hexachlorobutadiene
B91	HEXCCYC	ppb	10	28	28 ***	Hexachlorocyclopentadiene
B92	HEXCETH	ppb	10	28	28 ***	Hexachloroethane
B93	INDENOP	ppb	10	28	28 ***	Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	ppb	10	28	28 ***	Isooxafrole
B95	MALOILE	ppb	10	28	28 ***	Malononitrile
B96	MELPHAL	ppb	10	28	28 ***	Melphalan
B97	METHAPY	ppb	10	28	28 ***	Methapyrilene
B98	METHNYL	ppb	10	28	28 ***	Metholonyl
B99	METAZIR	ppb	10	28	28 ***	2-Methylaziridine
C01	METCHAN	ppb	10	28	28 ***	3-Methylcholanthrene
C02	METBISC	ppb	10	28	28 ***	4,4'-Methylenebis(2-chloroaniline)
C03	METACTO	ppb	10	28	28 ***	2-Methylactonitrile
C04	METACRY	ppb	10	28	28 ***	Methyl methacrylate
C05	METMSUL	ppb	10	28	28 ***	Methyl methanesulfonate
C06	METPROP	ppb	10	28	28 ***	2-Methyl-2-(methylthio) propionaldehyde
C07	METHIOU	ppb	10	28	28 ***	Methylthiouracil
C08	NAPHQUI	ppb	10	28	28 ***	1,4-Naphthoquinone
C09	1-napha	ppb	10	28	28 ***	1-Naphthylamine
C10	2-napha	ppb	10	28	28 ***	2-Naphthylamine
C11	NITRANI	ppb	10	28	28 ***	p-Nitroaniline [4-Nitroaniline]
C12	NITBENZ	ppb	10	28	28 ***	Nitrobenzene

TABLE 2.4. (contd)

----- Constituent List=WAC 173-303-9906 Constituents -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C13 NITPHEN	ppb	10	28	28 ***	.	4-Nitrophenol (p-Nitrophenol)
C14 NNIBUTY	ppb	10	28	28 ***	.	n-Nitrosodi-n-butylamine
C15 NNIDIEA	ppb	10	28	28 ***	.	n-Nitrosodiethanolamine
C16 NNIDIEY	ppb	10	28	28 ***	.	n-Nitrosodiethylamine
C17 NNIDIME	ppb	10	28	28 ***	.	n-Nitrosodimethylamine
C18 NNIMETH	ppb	10	28	28 ***	.	n-Nitrosomethylethylamine
C19 NNIUURET	ppb	10	28	28 ***	.	n-Nitroso-n-methylurethane
C20 NNIVINY	ppb	10	28	28 ***	.	n-Nitrosomethylvinylamine
C21 NNIMORP	ppb	10	28	28 ***	.	n-Nitrosomorpholine
C22 NNINICO	ppb	10	28	28 ***	.	n-Nitrososornicotine
C23 NNIPPE	ppb	10	28	28 ***	.	n-Nitrosopiperidine
C24 NITRPYR	ppb	10	28	28 ***	.	Nitrosopyrrolidine
C25 NITRTOL	ppb	10	28	28 ***	.	5-Nitro-o-toluidine
C26 PENTCHB	ppb	10	28	28 ***	.	Pentachlorobenzene
C27 PENTCHN	ppb	10	28	28 ***	.	Pentachloronitrobenzene
C28 PENTCHP	ppb	50	28	28 ***	220 EPAP	Pentachlorophenol
C29 PHENTIN	ppb	10	28	28 ***	.	Phenacetin
C30 PHENINE	ppb	10	28	28 ***	.	Phenylenediamine
C31 PHTNEST	ppb	10	28	28 ***	.	Phthalic acid esters
C32 PICOLIN	ppb	10	28	28 ***	.	2-Picoline
C33 PRONIDE	ppb	10	28	28 ***	.	Pronamide
C34 RESERPI	ppb	10	28	28 ***	.	Reserpine
C35 RESORCI	ppb	10	28	28 ***	.	Resorcinol
C36 SAFROL	ppb	10	28	28 ***	.	Safrol
C37 TETRCHB	ppb	10	28	28 ***	.	1,2,4,6-Tetrachlorobenzene
C39 TETRCHP	ppb	10	28	28 ***	.	2,3,4,6-Tetrachlorophenol
C40 THIURAM	ppb	10	28	28 ***	.	Thiuram
C41 TOLUDIA	ppb	10	28	28 ***	.	Toluenediamine
C42 OTOLHYD	ppb	10	28	28 ***	.	o-Toluidine hydrochloride
C43 TRICHLB	ppb	10	28	28 ***	.	1,2,4-Trichlorobenzene
C44 245-trp	ppb	10	28	28 ***	.	2,4,5-Trichlorophenol
C45 246-trp	ppb	10	28	28 ***	.	2,4,6-Trichlorophenol
C46 TRIPHOS	ppb	10	28	28 ***	.	O,o,o-triethyl phosphorothioate
C47 SYMTRIN	ppb	10	28	28 ***	.	Sym-trinitrobenzene
C48 TRISPHO	ppb	10	28	28 ***	.	Tris(2,3-dibromopropyl) phosphate
C49 BENZOPY	ppb	10	28	28 ***	.	Benzo[a]pyrene
C50 CHLNAPZ	ppb	10	28	28 ***	.	Chlornaphazine
C51 BIS2ETH	ppb	10	28	28 ***	.	bis(2-Chloroisopropyl) ether
C52 HEXAENE	ppb	10	28	28 ***	.	Hexachloropropene
C54 HEXACHL	ppb	10	28	28 ***	.	Hexachlorophene
C55 NAPMTHA	ppb	10	28	28 ***	.	Naphthalene
C56 123TRI	ppb	10	28	28 ***	.	1,2,3-Trichlorobenzene
C58 136TRI	ppb	10	28	28 ***	.	1,3,5-Trichlorobenzene
C59 1234TE	ppb	10	28	28 ***	.	1,2,3,4-Tetrachlorobenzene
C60 1236TE	ppb	10	28	28 ***	.	1,2,3,6-Tetrachlorobenzene
C61 TETEPYR	ppb	2	13	13 ***	.	Tetraethylpyrophosphate
C62 CHLLATE	ppb	300	28	28 ***	.	Chlorobenzilate

TABLE 2.4. (contd)

Constituent List=WAC 173-303-9905 Constituents							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C63	CARBPH	ppb	2	28	28 ***	.	Carbophenothion
C64	DISULFO	ppb	2	28	28 ***	.	Disulfoton
C65	DIMETHO	ppb	2	28	28 ***	.	Dimethoate
C66	METHPAR	ppb	2	28	28 ***	.	Methyl parathion
C67	PARATHI	ppb	2	28	28 ***	.	Parathion
C70	CYANIDE	ppb	10	28	28 ***	.	Cyanide
C71	FORMALN	ppb	500	28	28 ***	.	Formalin
C78	SULFIDE	ppb	1000	28	28 ***	.	Sulfide
C79	KEROSEN	ppb	10000	28	28 ***	.	Kerosene
C80	AMMONIU	ppb	50	28	22	.	Ammonium ion
C87	CITRUSR	ppb	1000	28	28 ***	.	Citrus red
C90	PARALDE	ppb	10000	28	26 ***	.	Paraldehyde
C91	STRYCHN	ppb	50	28	28 ***	.	Strychnine
C92	WALHYDR	ppb	500	28	28 ***	.	Maleic hydrazide
C93	NICOTIN	ppb	100	28	28 ***	.	Nicotinic acid
C94	ACRYIDE	ppb	10000	28	26 ***	0 EPAP	Acrylamide
C95	ALLYLAL	ppb	10000	28	26 ***	.	Allyl alcohol
C98	CHLPROP	ppb	10000	28	26 ***	.	3-Chloropropionitrile
D01	PCDDs	ppb	0.01	28	26 ***	.	PCDDs
D02	PCDFs	ppb	0.01	28	26 ***	.	PCDFs
D03	2378TC	ppb	0.01	28	26 ***	.	2,3,7,8-TCDD [Dioxin]
H03	ETHCARB	ppb	10000	28	26 ***	.	Ethyl carbamate
H04	ETHCYAN	ppb	10000	28	26 ***	.	Ethyl cyanide
H05	ETHOXID	ppb	10	28	28 ***	.	Ethylene oxide
H08	ETHMETH	ppb	10	28	28 ***	.	Ethyl methacrylate
H09	ISOBUTY	ppb	10000	28	28 ***	.	Isobutyl alcohol
H11	PROPYLA	ppb	10000	28	28 ***	.	n-Propylamine
H12	PROPYNO	ppb	10000	28	26 ***	.	2-Propyn-1-ol
H16	2,4,6-T	ppb	2	28	28 ***	.	2,4,6-T
H40	THALLI	ppb	5	28	28 ***	.	Thallium, filtered
H62	LHYDRAZ	ppb	80	28	28 ***	.	Hydrazine, low DL
H68	HEXONE	ppb	10	37	37 ***	.	Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	37	36	.	Acetone by VOA
I08	ISOPHER	ppb	10	28	28 ***	.	Isophorone
I09	BUTANOL	ppb	10000	28	26 ***	.	1-Butanol
I21	TRIBUPH	ppb	10	28	28 ***	.	Tributylphosphoric acid
I28	TAF	ppb	10	37	37 ***	.	Tetrahydrofuran
I29	ACENAPH	ppb	10	28	28 ***	.	Acenaphthene
I30	FLRENE	ppb	10	28	28 ***	.	Fluorene
I31	ANTHRA	ppb	10	28	28 ***	.	Anthracene
I32	PYRENE	ppb	10	28	28 ***	.	Pyrene
I33	ETHBENZ	ppb	5	28	28 ***	680 EPAP	Ethylbenzene
I34	STYRENE	ppb	5	28	28 ***	140 EPAP	Styrene
I42	BDCM	ppb	5	28	28 ***	100 EPA	Bromodichloromethane
I43	CDBM	ppb	5	28	28 ***	100 EPA	Chlorodibromomethane
I64	2NITPH	ppb	10	28	28 ***	.	2-Nitrophenol [o-Nitrophenol]
I67	ETHANOL	ppb	10000	28	26 ***	.	Ethanol

TABLE 2.4. (contd)

----- Constituent List=WAC 173-303-9905 Constituents -----						
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
I75	2MENAPH	ppb	10	28	28 ***	. 2-Methylnaphthalene
I82	PHENANT	ppb	10	28	28 ***	. Phenanthrene
I98	UNKALI	ppb	0	1	0	. Unknown aliphatic HC
I99	UNKNOWN	ppb	0	2	0	. Unknown
J43	BENZALC	ppb	10	28	28 ***	. Benzyl alcohol
J69	2HEXANO	ppb	50	28	28 ***	. 2-Hexanone
J71	BNZKFLU	ppb	10	28	28 ***	. Benzo[k]fluoranthene
J83	BGHIPER	ppb	10	28	28 ***	. Benzo (ghi) perylene
J89	DINOSEB	ppb	10	28	28 ***	. Dinoseb
J91	DIALLAT	ppb	10	28	28 ***	. Diallate
K52	MNDIPHA	ppb	10	28	28 ***	. n-Nitrosodiphenylamine
K56	DIBENFR	ppb	10	28	28 ***	. Dibenzofuran
K58	ACENATL	ppb	10	28	28 ***	. Acenaphthylene
L20	MBP	ppb	10000	28	28 ***	. Monobutylphosphate
L21	DBP	ppb	10000	28	28 ***	. Dibutylphosphate
L45	ALLYLCL	ppb	100	28	28 ***	. Allyl chloride
L46	CLETHAN	ppb	10	28	28 ***	. Chloroethane
L48	PROPCN	ppb	5	28	28 ***	. Propionitrile
L49	VINYLAC	ppb	5	28	28 ***	. Vinyl acetate
L50	B2CLMEE	ppb	10	28	28 ***	. bis(2-Chloro-1-methylethyl)ether
L62	OIPHOS	ppb	10	28	28 ***	. 0,0-Diethyl-0,2-pyrazinyl phosphorothion
L63	ISODRIN	ppb	10	28	28 ***	. Isodrin
L64	ONITANI	ppb	10	28	28 ***	. o-Nitroaniline [2-Nitroaniline]
L66	MNITANI	ppb	10	28	28 ***	. m-Nitroaniline [3-Nitroaniline]
L68	4NITQUI	ppb	10	28	28 ***	. 4-Nitroquinoline 1-oxide
L67	ETHGLYC	ppb	10000	28	28 ***	. Ethylene glycol
L69	1PROPAN	ppb	10000	28	28 ***	. 1-Propanol
L80	1BUTYN	ppb	10000	28	28 ***	. 1-Butynol
L82	ACETON	ppb	10	28	28 ***	. Acetone by ABN
L83	14DBEN	ppb	5	37	37 ***	76 EPA 1,4-Dichlorobenzene [p-Dichlorobenzene]
L84	CHLROB	ppb	10	28	28 ***	60 EPAP Chlorobenzene (by ABN)
P12	ENDSFAN	ppb	0.5	28	28 ***	. Endosulfan
P13	PHORATE	ppb	2	28	28 ***	. Phorate

*** - Indicates all samples were reported as below contractual detection limits

xxx - Indicates that Drinking Water standards were exceeded

EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936

EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx

WDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

TABLE 2.5. Constituents with at Least the One Detected Value for the 300 Area Process Trenches
June Through August 1989

Bi-weekly Samples

Well name	Collection Date	Duplicate sample number	1,2-DIC ppb 5/5	ACETONE ppb 10/.	CHLFORM ppb 5/100	CHLORID ppb 500/250000a	CONDFO umho 1/700w	FLUORID ppb 500/4000	METHYCH ppb 5/.
3-1-11	03AUG89		<5	<10	20	50,000	312	<500	#4
	17AUG89		<5	<10	23	5,300	151	<500	<5
	28AUG89		<5	<10	25	5,300	169	<500	<5
3-1-17A	03AUG89		<5	#7 (a)	20	18,000	222	<500	<5
	17AUG89		<5	<10	21	7,000	175	<500	<5
	28AUG89		<5	<10	23	10,000	189	<500	<5
3-1-18A	03AUG89		<5	<10	<5	17,000	434	<500	<5
	17AUG89		<5	<10	<5	18,000	430	<500	<5
	28AUG89		<5	<10	<5	19,000	454	<500	<5

2.26

Well name	Collection Date	Duplicate sample number	NITRATE ppb 500/45000	PHFIELD 0.1/8.5a	SULFATE ppb 500/250000a	TRANDC ppb 5/70p	TRICENE ppb 5/5	U pCi/L 0.5/500d
3-1-11	03AUG89		1,100	7.32	20,400	<5	<5	21.90
	17AUG89		500	7.16	19,200	<5	<5	14.90
	28AUG89		1,200	7.83	19,600	<5	<5	10.60
3-1-17A	03AUG89		1,500	6.84	27,000	<5	<5	83.70
	17AUG89		1,800	7.11	20,200	<5	<5	88.20
	28AUG89		1,200	7.20	19,700	<5	<5	83.70
3-1-18A	03AUG89		22,000	7.79	49,000	<5	<5	2.86
	17AUG89		22,300	7.83	50,000	<5	<5	3.27
	28AUG89		22,700	7.81	52,000	<5	<5	4.05

TABLE 2.5. (contd)

Semi-annual Samples
Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
3-1-7	02JUN89		206	7.11	#700	43
		1	.	.	#700	60
		2	.	.	#600	39
		3	.	.	#600	40
3-1-10	07JUN89		172	6.75	#600	35
		1	.	.	#700	44
		2	.	.	#600	33
		3	.	.	#700	35
3-1-11	14JUN89		157	7.01	#1,300	74
		1	.	.	#1,200	81
		2	.	.	#1,100	76
		3	.	.	#1,200	69
3-1-12	02JUN89		180	7.27	#1,000	66
		1	.	.	#1,000	58
		2	.	.	#1,100	66
		3	.	.	#1,000	62
3-1-13	06JUN89		139	7.20	#900	37
		1	.	.	#800	39
		2	.	.	#800	47
		3	.	.	#800	38
3-1-14	06JUN89		139	6.93	#900	46
		1	.	.	#1,200	46
		2	.	.	#1,000	54
		3	.	.	#2,000	51
3-1-15	09JUN89		170	7.43	#1,000	31
		1	.	.	#800	31
		2	.	.	#800	28
		3	.	.	#700	29
3-1-16A	07JUN89		215	7.30	#700	30
		1	.	.	#500	42
		2	.	.	#600	38
		3	.	.	#700	52
3-1-16B	07JUN89		293	7.35	#300	63
		1	.	.	#300	68
		2	.	.	#300	65
		3	.	.	#300	61

TABLE 2.5. (contd)

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	PHFIELD 0.1/0.5w	TOC ppb 2000/.	TOXLDL ppb 10/.
3-1-16C	07JUN89		368	7.84	400	45
		1	.	.	400	32
		2	.	.	400	31
		3	.	.	300	20
3-1-17A	06JUN89		187	8.94	1,100	88
		1	.	.	1,100	70
		2	.	.	1,100	87
		3	.	.	1,100	80
3-1-17B	05JUN89		310	7.80	300	21
		1	.	.	200	18
		2	.	.	400	13
		3	.	.	400	28
3-1-17C	05JUN89		272	7.79	300	12
		1	.	.	300	18
		2	.	.	300	14
		3	.	.	300	7
3-1-18A	08JUN89		351	7.56	300	8
		1	.	.	500	4
		2	.	.	400	3
		3	.	.	400	3
3-1-18B	08JUN89		278	7.49	300	29
		1	.	.	300	6
		2	.	.	300	4
		3	.	.	300	8
3-2-1	09JUN89		416	6.62	700	15
		1	.	.	800	14
		2	.	.	800	12
		3	.	.	700	18
3-2-2	09JUN89		464	8.93	500	33
		1	.	.	500	31
		2	.	.	500	30
		3	.	.	500	27
3-3-7	16AUG89		355	7.49	400	10
3-3-9	12JUN89		175	5.83	700	35
		1	.	.	700	43
		2	.	.	700	39
		3	.	.	500	31

TABLE 2.5. (contd)

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	PHFIELD 0.1/8.5a	TOC ppb 2000/.	TOXLDL ppb 10/.
3-3-10	02 JUN 89		173	6.65	#900	54
		1	.	.	#700	52
		2	.	.	#800	48
		3	.	.	#1,000	47
3-4-1	12 JUL 89		354	7.80	#700	20
3-4-7	13 JUN 89		285	7.32	#400	20
		1	.	.	#400	19
		2	.	.	#800	21
		3	.	.	#500	19
3-4-11	06 JUN 89		237	7.18	#500	28
		1	.	.	#500	33
		2	.	.	#500	21
		3	.	.	#900	28
3-8-1	05 JUN 89		320	7.11	#300	16
		1	.	.	#300	14
		2	.	.	#400	10
		3	.	.	#400	18
3-8-2	13 JUN 89		335	7.30	#800	11
		1	.	.	#800	19
		2	.	.	#500	17
		3	.	.	#800	19
3-8-3	14 JUN 89		361	7.40	#400	19
		1	.	.	#500	18
		2	.	.	#500	22
		3	.	.	#500	17

TABLE 2.5- (contd)

Semi-annual Samples
Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	1,2-DIC ppb 5/5	ACETONE ppb 10/.	ALKALIN ppb 20000/.	ALPHAHI pCl/L 4/15	FALUMIN ppb 150/.	AMMONIU ppb 50/.	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 5/1000
3-1-7	02JUN89		<5	<10	54,400	100.000	<150	<50	<5	<5	22
3-1-10	07JUN89		<5	<10	52,400	25.000	<150	<50	<5	<5	22
3-1-11	14JUN89		5	<10	50,100	10.100	<150	<50	<5	<5	11
3-1-12	02JUN89		<5	<10	55,800	35.100	<150	<50	<5	<5	17
3-1-13	06JUN89		<5	<10	53,400	3.250	<150	<50	<5	<5	18
3-1-14	06JUN89		<5	<10	59,400	10.400	<150	<50	<5	<5	14
3-1-15	09JUN89		<5	<10	58,100	12.600	<150	<50	<5	<5	22
3-1-16A	09JUN89	1	<5	<10	58,100	8.750	<150	<50	<5	<5	20
3-1-16A	07JUN89		<5	<10	58,300	17.800	<150	<50	<5	<5	26
3-1-16B	07JUN89		<5	<10	149,000	1.970	<150	95	<5	<5	51
3-1-16C	07JUN89		<5	<10	143,000	3.120	<150	120	<5	<5	55
3-1-17A	05JUN89		<5	<10	54,300	120.000	<150	<50	<5	<5	17
3-1-17B	05JUN89		<5	<10	177,000	*-0.400	<150	113	<5	<5	59
3-1-17C	05JUN89		<5	<10	181,000	*-0.043	<150	98	<5	<5	77
3-1-18A	08JUN89		<5	<10	126,000	2.620	<150	<50	5	5	42
3-1-18B	08JUN89		<5	<10	185,000	*0.448	<150	129	<5	<5	40
3-2-1	09JUN89		<5	<10	52,500	13.200	<150	<50	<5	<5	41
3-2-2	09JUN89		<5	<10	52,100	47.800	<150	<50	<5	<5	29
3-3-7	16AUG89		<5	<10	120,000	5.220	<150	<50	<5	<5	37
3-3-9	16AUG89	1	<5	<10	120,000	9.900	<150	<50	<5	<5	37
3-3-9	12JUN89		<5	<10	52,100	13.500	<150	<50	<5	<5	49
3-3-10	02JUN89		<5	<10	52,400	5.450	325	<50	<5	<5	34
3-4-1	12JUL89		<5	<10	139,000	12.800	<150	<50	<5	<5	35
3-4-7	13JUN89		<5	<10	90,100	29.200	<150	<50	<5	<5	35
3-4-11	06JUN89		<5	<10	110,000	5.150	<150	<50	5	<5	30
3-5-1	05JUN89		<5	<10	120,000	2.890	<150	<50	5	5	38
3-5-2	13JUN89		<5	<10	129,000	1.870	<150	<50	5	5	38
3-5-3	14JUN89		<5	<10	126,000	*0.598	<150	50	5	5	37

TABLE 2.5. (contd)

Well name	Collection Date	Duplicate sample number	FBARIUM ppb 6/1000	FBERYLL ppb 5/.	BERYLUM ppb 5/.	BETA pCi/L 8/50	BORON ppb 10/.	FBORON ppb 10/.	FCADMIU ppb 2/10	CADMIUM ppb 2/10	FCALCIU ppb 50/.
3-1-7	02JUN89		23	8	<5	26.90	16	74	<2	<2	25,000
3-1-10	07JUN89		23	<5	<5	5.81	24	24	<2	<2	22,100
3-1-11	14JUN89		13	<5	<5	5.74	14	13	<2	<2	16,200
3-1-12	02JUN89		17	<5	<5	8.22	<10	28	<2	<2	19,100
3-1-13	06JUN89		18	<5	<5	*1.45	16	14	<2	<2	19,900
3-1-14	06JUN89		18	5	<5	2.39	<10	20	<2	<2	21,700
3-1-15	09JUN89		21	<5	9	8.69	15	11	<2	<2	23,800
	09JUN89	1	18	<5	<5	2.95	10	12	<2	<2	21,100
3-1-16A	07JUN89		27	<5	<5	7.09	12	<10	<2	3	21,500
3-1-16B	07JUN89		49	<5	<5	5.95	51	47	<2	<2	18,400
3-1-16C	07JUN89		49	<5	<5	7.72	41	36	<2	<2	18,200
3-1-17A	06JUN89		22	<5	<5	27.70	20	26	<2	<2	20,200
3-1-17B	06JUN89		69	<5	<5	6.77	41	42	<2	<2	19,000
3-1-17C	06JUN89		79	<5	<5	9.75	52	57	<2	<2	10,200
3-1-18A	08JUN89		43	<5	<5	8.92	38	23	<2	<2	42,800
3-1-18B	08JUN89		36	<5	<5	5.69	77	59	3	<2	14,100
3-2-1	09JUN89		43	<5	<5	7.18	10	15	<2	<2	20,800
3-2-2	09JUN89		28	<5	<5	10.00	15	17	<2	<2	26,000
3-3-7	18AUG89		44	<5	<5	6.71	30	49	2	<2	46,000
	18AUG89	1	39	<5	<5	6.78	38	32	<2	<2	38,800
3-3-9	12JUN89		43	<5	<5	4.49	273	265	<2	<2	24,100
3-3-10	02JUN89		36	<5	<5	*1.20	101	185	<2	<2	23,400
3-4-1	12JUL89		39	<5	<5	13.90	39	36	<2	<2	43,100
3-4-7	13JUN89		32	<5	<5	12.60	140	141	<2	<2	31,700
3-4-11	06JUN89		38	<5	<5	7.13	22	29	<2	<2	39,200
3-8-1	05JUN89		39	<5	<5	4.85	30	32	<2	<2	42,800
3-8-2	13JUN89		37	<5	<5	5.60	20	25	<2	<2	38,400
3-8-3	14JUN89		38	<5	<5	6.03	37	36	<2	<2	41,200

TABLE 2.5. (contd)

Well name	Collection Date	Duplicate sample number	CALCIUM ppb 50/.	CHLFORM ppb 5/100	CHLORID ppb 500/250000s	CHROMIUM ppb 10/50	COLIFRM MPN 2.2/1	COPPER ppb 10/1300p	FCOPPER ppb 10/1300p	FLUORID ppb 500/4000
3-1-7	02 JUN 89		26,000	20	20,100	<10	<2.2	<10	18	<500
3-1-10	07 JUN 89		20,800	20	7,500	<10	<2.2	<10	<10	<500
3-1-11	14 JUN 89		18,200	31	5,800	<10	<2.2	23	26	<500
3-1-12	02 JUN 89		19,800	33	75,100	12	<2.2	12	15	<500
3-1-13	06 JUN 89		22,000	22	6,800	<10	<2.2	<10	<10	<500
3-1-14	06 JUN 89		19,600	28	8,200	<10	<2.2	<10	11	<500
3-1-15	09 JUN 89		23,000	18	8,100	<10	<2.2	<10	11	<500
	09 JUN 89	1	21,500	14	8,100	<10	<2.2	<10	<10	<500
3-1-16A	07 JUN 89		21,000	14	14,800	<10	<2.2	<10	<10	<500
3-1-16B	07 JUN 89		18,800	<5	12,000	<10	<2.2	<10	<10	1,200
3-1-16C	07 JUN 89		18,600	<5	12,100	<10	<2.2	<10	<10	1,100
3-1-17A	05 JUN 89		19,200	27	14,000	<10	<2.2	13	19	<500
3-1-17B	05 JUN 89		19,800	<5	10,900	<10	<2.2	<10	<10	1,000
3-1-17C	05 JUN 89		10,300	<5	11,300	<10	<2.2	<10	<10	1,700
3-1-18A	06 JUN 89		40,700	<5	16,600	<10	<2.2	<10	<10	<500
3-1-18B	08 JUN 89		13,700	<5	11,200	<10	<2.2	<10	<10	1,500
3-2-1	09 JUN 89		21,700	8	11,700	<10	79.0	<10	<10	500
3-2-2	09 JUN 89		26,800	18	21,800	<10	83.0	13	<10	<500
3-3-7	18 AUG 89		41,300	6	13,000	<10	.	<10	<10	<500
	18 AUG 89	1	41,100	6	13,000	<10	.	<10	<10	<500
3-3-9	12 JUN 89		25,300	22	8,800	<10	<2.2	<10	<10	<500
3-3-10	02 JUN 89		22,200	31	4,900	<10	<2.2	<10	<10	<500
3-4-1	12 JUL 89		42,000	7	14,400	<10	.	<10	<10	<500
3-4-7	13 JUN 89		34,100	12	9,900	<10	<2.2	<10	<10	<500
3-4-11	06 JUN 89		36,800	15	11,000	10	<2.2	<10	<10	<500
3-8-1	05 JUN 89		43,400	<5	13,300	<10	<2.2	<10	<10	<500
3-8-2	13 JUN 89		41,900	<5	9,900	<10	<2.2	<10	<10	<500
3-8-3	14 JUN 89		41,800	<5	14,900	<10	<2.2	<10	<10	<500

TABLE 2.5. (contd)

Well name	Collection Date	Duplicate sample number	IRON ppb 30/300s	FIRON ppb 30/.s	FLITHIU ppb 10/.	LITHIUM ppb 10/.	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	METHYCH ppb 5/.
3-1-7	02JUN89		132	<30	12	14	4,790	4,820	<5	<5	<5
3-1-10	07JUN89		<30	<30	<10	<10	4,290	4,480	<5	<5	<5
3-1-11	14JUN89		32	<30	<10	<10	3,550	3,520	<5	<5	<5
3-1-12	02JUN89		50	<30	<10	<10	4,100	4,000	<5	5	<5
3-1-13	06JUN89		76	<30	<10	<10	4,500	4,090	<5	<5	<5
3-1-14	06JUN89		<30	<30	<10	<10	3,740	4,170	<5	<5	<5
3-1-15	09JUN89		<30	<30	<10	<10	5,370	5,600	<5	<5	<5
	09JUN89	1	<30	<30	<10	<10	5,030	4,980	<5	<5	<5
3-1-16A	07JUN89		41	<30	<10	<10	3,890	3,980	<5	<5	<5
3-1-16B	07JUN89		115	98	11	12	6,230	6,000	85	87	<5
3-1-16C	07JUN89		89	<30	11	15	5,990	5,570	37	45	<5
3-1-17A	05JUN89		<30	<30	20	19	3,950	4,180	<5	<5	<5
3-1-17B	05JUN89		191	178	13	13	8,940	6,690	68	73	<5
3-1-17C	05JUN89		92	77	20	18	4,390	4,440	22	24	<5
3-1-18A	08JUN89		<30	<30	<10	<10	11,200	11,700	<5	<5	<5
3-1-18B	08JUN89		239	202	18	18	5,280	5,050	43	45	<5
3-2-1	09JUN89		64	<30	<10	<10	4,510	4,270	<5	<5	<5
3-2-2	09JUN89		656	192	<10	<10	4,790	4,810	<5	<5	<5
3-3-7	16AUG89		<30	<30	<10	<10	8,640	9,500	8	<5	<5
	16AUG89	1	32	<30	<10	<10	8,630	7,970	<5	<5	<5
3-3-9	12JUN89		144	<30	<10	<10	5,660	5,370	<5	<5	<5
3-3-10	02JUN89		2,230	102	<10	<10	4,780	4,990	<5	8	<5
3-4-1	12JUL89		<30	<30	<10	<10	7,970	8,180	<5	<5	<5
3-4-7	13JUN89		124	<30	<10	<10	6,560	6,080	<5	15	<5
3-4-11	06JUN89		37	<30	<10	<10	7,360	7,940	<5	<5	<5
3-8-1	05JUN89		57	34	<10	<10	9,090	9,280	<5	<5	<5
3-8-2	13JUN89		77	<30	<10	<10	8,620	7,860	<5	<5	<5
3-8-3	14JUN89		265	<30	<10	<10	8,890	8,870	<5	<5	<5

TABLE 2.5. (contd)

Well name	Collection Date	Duplicate sample number	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 600/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.
3-1-7	02 JUN 89		<10	<10	4,200	2,270	2,330	*-0.0121	6,340	6,440	14,000
3-1-10	07 JUN 89		<10	<10	2,300	2,120	2,040	*-0.0305	6,080	4,790	8,060
3-1-11	14 JUN 89		<10	<10	1,200	1,440	1,440	*0.0924	3,880	3,900	9,990
3-1-12	02 JUN 89		<10	14	1,200	1,720	1,750	*0.0198	3,880	4,080	13,000
3-1-13	06 JUN 89		<10	<10	1,400	2,630	2,920	*0.5010	6,700	6,340	7,530
3-1-14	06 JUN 89		<10	<10	1,100	2,310	2,130	*0.0646	4,980	4,510	8,060
3-1-15	09 JUN 89		<10	<10	2,700	3,710	3,580	*0.0587	8,760	8,470	9,580
	09 JUN 89	1	<10	<10	2,800	3,310	3,350	*0.0816	7,740	7,920	9,020
3-1-16A	07 JUN 89		40	37	3,800	2,350	2,320	*0.0585	6,180	6,040	11,500
3-1-16B	07 JUN 89		<10	<10	<500	6,270	6,510	0.2840	20,400	21,100	53,100
3-1-16C	07 JUN 89		<10	<10	800	6,280	6,130	0.2420	18,900	21,600	48,700
3-1-17A	06 JUN 89		<10	18	1,100	1,870	1,840	*0.0386	3,990	3,840	10,500
3-1-17B	06 JUN 89		<10	<10	<500	8,060	8,430	0.1900	20,600	21,300	53,600
3-1-17C	06 JUN 89		<10	<10	<500	10,100	9,930	*0.1250	27,700	28,100	66,900
3-1-18A	08 JUN 89		<10	<10	23,600	6,110	6,820	*0.0254	16,900	16,300	21,800
3-1-18B	08 JUN 89		<10	<10	<500	6,320	6,670	0.1880	23,900	24,600	66,500
3-2-1	09 JUN 89		<10	<10	9,400	2,840	3,050	*0.0818	8,350	8,540	11,700
3-2-2	09 JUN 89		<10	<10	4,100	2,580	2,580	*-0.0193	6,970	6,930	14,500
3-3-7	18 AUG 89		<10	<10	14,900	6,930	4,940	*0.0606	16,400	14,900	19,900
	18 AUG 89	1	<10	<10	14,700	4,980	4,980	*0.1140	14,200	14,900	20,200
3-3-9	12 JUN 89		<10	<10	9,900	2,750	2,800	0.3570	7,150	7,470	9,400
3-3-10	02 JUN 89		<10	<10	6,900	2,380	2,330	*0.0104	8,020	8,020	7,810
3-4-1	12 JUL 89		<10	<10	16,000	4,430	4,340	*0.0749	18,100	12,700	16,400
3-4-7	13 JUN 89		<10	<10	11,000	3,750	4,080	0.2720	10,500	11,300	16,100
3-4-11	06 JUN 89		<10	<10	13,100	4,420	4,120	*0.0380	13,100	12,600	14,800
3-8-1	06 JUN 89		<10	<10	15,600	5,320	5,260	*0.0823	16,500	16,500	16,400
3-8-2	13 JUN 89		<10	<10	21,800	4,700	5,210	0.1550	16,000	16,300	18,400
3-8-3	14 JUN 89		<10	<10	14,300	5,340	5,420	0.2120	16,800	16,600	21,200

TABLE 2.5. (contd)

Well name	Collection Date	Duplicate sample number	FSODIUM ppb 200/.	FSTRONT ppb 10/.	STRONIUM ppb 10/.	SULFATE ppb 500/250000s	TC ppb 1000/.	TDS ppb 5000/500000s	TRANDCE ppb 5/70p	TRICENE ppb 5/5
3-1-7	02JUN89		14,200	112	118	22,000	18,500	136,000	<5	#3
3-1-10	07JUN89		8,320	102	97	22,300	18,400	102,000	<5	<5
3-1-11	14JUN89		9,960	79	82	18,500	13,500	82,500	<5	<5
3-1-12	02JUN89		12,800	89	98	19,100	15,100	105,000	<5	<5
3-1-13	06JUN89		8,790	88	97	21,000	18,000	101,000	<5	<5
3-1-14	06JUN89		8,910	93	85	19,800	14,900	95,500	<5	<5
3-1-16	09JUN89		10,000	109	106	23,100	18,800	132,000	<5	<5
	09JUN89	1	8,840	98	100	23,200	18,900	.	<5	<5
3-1-18A	07JUN89		11,700	100	97	21,300	15,300	104,000	<5	<5
3-1-18B	07JUN89		51,000	108	113	15,400	36,400	211,000	79	21
3-1-18C	07JUN89		41,300	108	114	18,000	41,200	227,000	<5	<5
3-1-17A	05JUN89		11,400	99	96	19,500	15,000	89,500	<5	<5
3-1-17B	05JUN89		51,300	113	121	700	42,400	222,000	8	<5
3-1-17C	05JUN89		88,900	74	78	<500	43,100	247,000	<5	<5
3-1-18A	08JUN89		22,600	221	218	51,500	29,800	287,000	<5	<5
3-1-18B	08JUN89		84,600	85	89	<500	43,500	253,000	<5	<5
3-2-1	09JUN89		11,100	94	101	14,800	19,800	123,000	<5	#3
3-2-2	09JUN89		14,600	112	112	22,200	18,000	136,000	<5	11
3-3-7	16AUG89		24,300	192	171	36,000	29,100	231,000	<5	#3
	16AUG89	1	20,400	159	171	37,000	29,100	.	<5	#3
3-3-9	12JUN89		8,880	108	113	22,800	18,700	133,000	<5	<5
3-3-10	02JUN89		8,070	118	114	23,200	18,800	110,000	<5	<5
3-4-1	12JUL89		18,000	146	141	34,400	27,200	198,000	<5	5
3-4-7	13JUN89		14,900	143	156	30,800	22,700	187,000	<5	#3
3-4-11	08JUN89		15,900	161	154	30,900	28,400	213,000	<5	#3
3-8-1	05JUN89		15,900	191	191	32,800	28,800	233,000	<5	<5
3-8-2	13JUN89		18,800	173	189	29,700	31,400	243,000	<5	<5
3-8-3	14JUN89		21,000	177	181	38,600	30,200	238,000	<5	#3

TABLE 2.5. (contd)

Well name	Collection Date	Duplicate sample number	TRITIUM pCi/L 500/20000	TURBIDITY ntu 0.1/1	U pCi/L 0.5/500d	UNKALI ppb 0/.	UNKNOWN ppb 0/.	FLUORIDE ppb 5/.	VANADIUM ppb 5/.	ZINC ppb 5/5000*	FE ppb 5/5000*
3-1-7	02 JUN 89		.	0.7	61.800	.	.	8	<5	<5	5
3-1-10	07 JUN 89		.	0.1	27.700	90	.	<5	<5	<5	<5
3-1-11	14 JUN 89		.	0.1	13.600	.	.	6	<5	<5	<5
3-1-12	02 JUN 89		.	0.3	34.900	.	.	10	<5	<5	<5
3-1-13	08 JUN 89		.	0.3	8.200	.	.	<5	<5	8	6
3-1-14	06 JUN 89		.	<0.1	12.400	.	.	9	<5	<5	<5
3-1-15	09 JUN 89		.	0.1	9.050	.	.	7	<5	<5	<5
	09 JUN 89	1	.	.	9.090	.	.	9	10	<5	<5
3-1-16A	07 JUN 89		.	0.2	12.200	.	.	<5	<5	8	<5
3-1-16B	07 JUN 89		.	0.1	2.110	.	.	<5	<5	<5	<5
3-1-16C	07 JUN 89		.	0.4	3.830	.	81	<5	<5	15	7
3-1-17A	05 JUN 89		.	0.2	105.000	.	.	<5	<5	<5	<5
3-1-17B	05 JUN 89		.	0.1	*-0.033	.	.	6	<5	<5	<5
3-1-17C	05 JUN 89		.	<0.1	0.182	.	.	<5	<5	<5	<5
3-1-18A	08 JUN 89		8,450	<0.1	8.740	.	.	<5	<5	<5	<5
3-1-18B	08 JUN 89		.	<0.1	*-0.006	.	.	<5	<5	9	27
3-2-1	09 JUN 89		.	0.3	13.500	.	.	<5	<5	7	6
3-2-2	09 JUN 89		.	0.7	39.500	.	.	<5	<5	<5	<5
3-3-7	18 AUG 89		.	0.2	10.200	.	.	15	9	<5	<5
	18 AUG 89	1	.	.	8.380	.	.	10	9	<5	<5
3-3-9	12 JUN 89		.	0.3	17.900	.	.	<5	<5	12	10
3-3-10	02 JUN 89		.	9.0	6.580	.	.	8	<5	35	35
3-4-1	12 JUL 89		.	0.2	15.100	.	.	9	5	7	6
3-4-7	13 JUN 89		.	0.4	12.500	.	29	7	<5	<5	<5
3-4-11	06 JUN 89		.	<0.1	8.750	.	.	14	<5	5	9
3-8-1	05 JUN 89		.	<0.1	4.080	.	.	13	<5	<5	<5
3-8-2	13 JUN 89		.	0.1	2.320	.	.	10	<5	<5	<5
3-8-3	14 JUN 89		.	0.3	3.780	.	.	<5	10	<5	<5

TABLE 2.5. (contd)

The column headers consist of : Constituent Name
Analysis Units
Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

none < based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r < based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
p < based on proposed Maximum Contaminant Level Goals in 50 FR 46936
s < based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides in draft DOE Order 5400.xx
w - based on additional Secondary Maximum Contaminant Levels in WAC 245-54, Public Water Supplies

Data flags

< < Less than Contractual Detection Limit, reported as Limit
< Less than Contractual Detection Limit, measured value reported
* < For radioactive constituents, reported value is less than 2-sigma error

(n) Suspect data. The reagent blank for this group showed contamination for this constituent.

3.0 183-H SOLAR EVAPORATION BASINS

S. H. Hall

Pacific Northwest Laboratory

The ground water near the 183-H Solar Evaporation Basins has been monitored by a RCRA interim-status well network since June 1985. This project is in the ground-water quality assessment stage of monitoring. A Final Status Post-Closure Permit Application for this facility was submitted to the Washington State Department of Ecology in June 1988 (DOE 1988a).

The 183-H Solar Evaporation Basins consist of four concrete basins located in the 100-H Area (see Figures 1.1 and 3.1) that were used for solar evaporation and storage of aqueous chemical wastes from Hanford Site nuclear fuel processing operations (Liikala et al. 1988). The wastes discharged to the basins consisted primarily of nitric, sulfuric, and hydrofluoric acids, which were contaminated by heavy metals and radionuclides, and neutralized by sodium hydroxide. Originally, the basins were used for water treatment for the 100-H plutonium production reactor, which was retired in 1965. Each basin has a capacity of approximately 450,000 gal. Until August 1978, only basin #1 was used for waste storage. In 1973, basin #1 received 8000 gal of waste; from January 1975 to August 1978, basin #1 received wastes at the rate of approximately 145,000 gal/yr. Elevated nitrate concentrations were detected in nearby well 199-H4-3 in mid-1977, indicating that the basin was leaking. Basins #2 and #3 were coated with urethane before receiving wastes and were ready for service by August 1978. At that time, the waste stream was redirected to basins #2 and #3, and the liquid fraction of the waste remaining in basin #1 was pumped to the newly prepared basins, leaving a slurry. The slurry remained in basin #1 until July 1985. No evidence exists of leakage from basin #2 or #3 [or from basin #4, later put into service with a butyl and Hypalone^(a) coating].

There are 23 wells in the monitoring network for the 183-H Solar Evaporation Basins (see Figure 3.1). Wells 199-H3-1, 199-H3-2A, 199-H3-2B,

(a) Hypalon is a registered tradename of E. I. du Pont de Nemours and Company, Wilmington, Delaware.

199-H3-2C, 199-H4-6, 199-H4-7, 199-H4-8, 199-H4-14, and 199-H4-17 are considered to be upgradient from the basins. Wells 199-H4-3, 199-H4-4, 199-H4-5, 199-H4-9, 199-H4-10, 199-H4-11, 199-H4-12A, 199-H4-12B, 199-H4-12C, 199-H4-13, 199-H4-15A, 199-H4-15B, 199-H4-16, and 199-H4-18 are considered to be downgradient. Well 199-H4-2 was used only for hydrogeologic characterization and is capped. Table 3.1 shows the sampling schedule for wells in this monitoring network.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or aquifer testing was conducted during the report period. Pertinent site characterization information can be found in Liikala et al. (1988).

WATER LEVELS

Water-table measurements made during the period are listed in Table 3.2. Figure 3.2 represents river-stage data collected from June 29 to September 27, 1989.

WATER CHEMISTRY DATA

Ground water in the vicinity of the 183-H Solar Evaporation Basins has been routinely sampled and analyzed since 1985. Ten wells were scheduled for July sampling; eight of those were sampled in early August (wells 199-H4-5 and 199-H4-9 could not be sampled because of low water levels). The results of analyses are summarized in Tables 3.3 and 3.4. Table 3.3 summarizes analytical data for each of the sampled wells. Well 199-H4-3 was also sampled in September, but the results of analysis are not yet available.

Table 3.3 shows the constituents whose concentrations in 183-H monitoring wells exceed drinking water standards. These include one contamination indicator (specific conductance), five interim primary drinking water parameters (gross beta, gross alpha, chromium, nitrate, and turbidity), two water quality parameters (manganese and iron), and one site-specific constituent (technetium-99). Both gross beta and technetium-99 exceeded the standards in EPA (1976) of 50 pCi/L and 900 pCi/L, respectively. Gross alpha

concentrations also exceeded the EPA standard of 15 pCi/L, but this alpha concentration is predominantly caused by the presence of uranium, which is excluded from the gross alpha standard.

On August 29, 1989, during the low river stage, springs were sought upstream, adjacent to, and downstream from the basins. No active springs were found. The river was sampled near the shore at the same locations sampled during high river stage (May 29, 1989). Samples were analyzed for nitrate and chromium. No chromium was detected above 10 ppb in any of the samples, and nitrate concentrations were less than 2 mg/L in all samples.

FIGURE 3.1. Monitoring Well Locations Near the 183-H Solar Evaporation Basins

FIGURE 3.2. Columbia River Elevation (in feet above mean sea level) at the 100-H Area, June 29 to September 27, 1989

TABLE 3.1. Sampling Schedule for the 183-H Solar Evaporation Basins

Well	1988(a)			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
199-H3-1								L				
199-H3-2A	X			X				L		X		
199-H3-2B								LRV				
199-H3-2C								L				
199-H4-3	XR			X				L		X	X	X
199-H4-4	X			X				L		X		
199-H4-5	X			XR				L		X		
199-H4-6	X			X				L		XR		
199-H4-7								L				
199-H4-8								L				
199-H4-9	X			X				L		X	X	X
199-H4-10								L				
199-H4-11								L				
199-H4-12A	X			X				L		X		
199-H4-12B	X			X				L		X		
199-H4-12C	X			X				L		X		
199-H4-13								LRV				
199-H4-14								L				
199-H4-15A								L				
199-H4-15B								L				
199-H4-16								L				
199-H4-17								L				
199-H4-18	X			X				L		X		

(a) The following abbreviations are used in this table:

L = sampled for the long list of constituents (WAC 173-303-9905).

R = quality control replicates were collected.

V = volatile organic analyses blanks were collected.

X = sampled for the regular list of constituents.

**TABLE 3.2. Water-Level Data for the 183-H Solar Evaporation Basins,
July Through September 1989**

<u>Well</u>	<u>Date</u>	<u>Surveyed Casing Elevation, ft above MSL (a)</u>	<u>Water-Level Depth to Water, ft</u>	<u>Elevation, ft above MSL</u>
199-H3-1	7/14/89	421.48	45.29	376.19
199-H3-1	7/31/89	421.48	45.46	376.02
199-H3-1	8/15/89	421.48	45.62	375.86
199-H3-1	8/30/89	421.48	45.75	375.73
199-H3-1	9/15/89	421.48	45.86	375.62
199-H3-1	9/28/89	421.48	45.99	375.49
199-H3-2A	7/14/89	417.83	42.04	375.79
199-H3-2A	7/31/89	417.83	42.31	375.52
199-H3-2A	8/15/89	417.83	42.53	375.30
199-H3-2A	8/30/89	417.83	42.70	375.13
199-H3-2A	9/15/89	417.83	42.83	375.00
199-H3-2A	9/28/89	417.83	42.92	374.91
199-H3-2B	7/14/89	418.42	42.62	375.80
199-H3-2B	7/31/89	418.42	42.90	375.52
199-H3-2B	8/15/89	418.42	43.13	375.29
199-H3-2B	8/30/89	418.42	43.28	375.14
199-H3-2B	9/15/89	418.42	43.42	375.00
199-H3-2B	9/28/89	418.42	43.51	374.91
199-H3-2C	7/14/89	418.22	42.62	375.60
199-H3-2C	7/31/89	418.22	42.99	375.23
199-H3-2C	8/15/89	418.22	43.16	375.06
199-H3-2C	8/30/89	418.22	43.35	374.87
199-H3-2C	9/15/89	418.22	43.43	374.79
199-H3-2C	9/28/89	418.22	43.48	374.74
199-H4-3	7/14/89	420.29	46.29	374.00
199-H4-3	7/31/89	420.29	46.96	373.33
199-H4-3	8/15/89	420.29	47.22	373.07
199-H4-3	8/30/89	420.29	47.49	372.80
199-H4-3	9/15/89	420.29	47.48	372.81
199-H4-3	9/28/89	420.29	47.44	372.85
199-H4-4	7/14/89	413.70	40.70	373.00
199-H4-4	7/31/89	413.70	41.96	371.74
199-H4-4	8/15/89	413.70	41.51	372.19
199-H4-4	8/30/89	413.70	42.18	371.52
199-H4-4	9/15/89	413.70	41.85	371.85
199-H4-4	9/28/89	413.70	41.55	372.15
199-H4-5	7/14/89	416.21	42.78	373.43
199-H4-5	7/31/89	416.21	43.70	372.51

TABLE 3.2. (contd)

<u>Well</u>	<u>Date</u>	<u>Surveyed Casing Elevation, ft above MSL (a)</u>	<u>Water-Level Depth to Water, ft</u>	<u>Elevation, ft above MSL</u>
199-H4-5	8/15/89	416.21	43.79	372.42
199-H4-5	8/30/89	416.21	44.19	372.02
199-H4-5	9/15/89	416.21	44.06	372.15
199-H4-5	9/28/89	416.21	43.89	372.32
199-H4-6	7/14/89	419.58	43.78	375.80
199-H4-6	7/31/89	419.58	44.06	375.52
199-H4-6	8/15/89	419.58	44.29	375.29
199-H4-6	8/30/89	419.58	44.45	375.13
199-H4-6	9/15/89	419.58	44.57	375.01
199-H4-6	9/28/89	419.58	44.68	374.90
199-H4-7	7/14/89	420.59	45.74	374.85
199-H4-7	7/31/89	420.59	46.19	374.40
199-H4-7	8/15/89	420.59	46.45	374.14
199-H4-7	8/30/89	420.59	46.64	373.95
199-H4-7	9/15/89	420.59	46.72	373.87
199-H4-7	9/28/89	420.59	46.75	373.84
199-H4-8	7/14/89	420.00	45.68	374.32
199-H4-8	7/31/89	420.00	46.22	373.78
199-H4-8	8/15/89	420.00	46.51	373.49
199-H4-8	8/30/89	420.00	46.72	373.28
199-H4-8	9/15/89	420.00	46.76	373.24
199-H4-8	9/28/89	420.00	46.76	373.24
199-H4-9	7/14/89	418.08	44.18	373.90
199-H4-9	7/31/89	418.08	44.92	373.16
199-H4-9	8/15/89	418.08	45.21	372.87
199-H4-9	8/30/89	418.08	45.45	372.63
199-H4-9	9/15/89	418.08	45.43	372.65
199-H4-9	9/28/89	418.08	45.36	372.72
199-H4-10	7/14/89	404.44	31.02	373.42
199-H4-10	7/31/89	404.44	31.99	372.45
199-H4-10	8/15/89	404.44	31.96	372.48
199-H4-10	8/30/89	404.44	32.36	372.08
199-H4-10	9/15/89	404.44	32.30	372.14
199-H4-10	9/28/89	404.44	32.03	372.41
199-H4-5	8/15/89	416.21	43.79	372.42
199-H4-11	7/14/89	416.84	44.14	372.70
199-H4-11	7/31/89	416.84	45.72	371.12
199-H4-11	8/15/89	416.84	45.03	371.81
199-H4-11	8/30/89	416.84	45.82	371.02

TABLE 3.2. (contd)

<u>Well</u>	<u>Date</u>	<u>Surveyed Casing Elevation, ft above MSL (a)</u>	<u>Water-Level Depth to Water, ft</u>	<u>Elevation, ft above MSL</u>
199-H4-11	9/15/89	416.84	45.33	371.51
199-H4-11	9/28/89	416.84	44.97	371.87
199-H4-12A	7/14/89	413.50	40.29	373.21
199-H4-12A	7/31/89	413.50	41.36	372.14
199-H4-12A	8/15/89	413.50	41.14	372.36
199-H4-12A	8/30/89	413.50	41.68	371.82
199-H4-12A	9/15/89	413.50	41.47	372.03
199-H4-12A	9/28/89	413.50	41.21	372.29
199-H4-12B	7/14/89	413.52	40.30	373.22
199-H4-12B	7/31/89	413.52	41.36	372.16
199-H4-12B	8/15/89	413.52	41.16	372.36
199-H4-12B	8/30/89	413.52	41.69	371.83
199-H4-12B	9/15/89	413.52	41.48	372.04
199-H4-12B	9/28/89	413.52	41.23	372.29
199-H4-12C	7/14/89	413.52	40.71	372.81
199-H4-12C	7/31/89	413.52	41.61	371.91
199-H4-12C	8/15/89	413.52	41.37	372.15
199-H4-12C	8/30/89	413.52	41.83	371.69
199-H4-12C	9/15/89	413.52	41.41	372.11
199-H4-12C	9/28/89	413.52	41.29	372.23
199-H4-13	7/14/89	418.20	45.76	372.44
199-H4-13	7/31/89	418.20	47.48	370.72
199-H4-13	8/15/89	418.20	46.65	371.55
199-H4-13	8/30/89	418.20	47.49	370.71
199-H4-13	9/15/89	418.20	46.97	371.23
199-H4-13	9/28/89	418.20	46.59	371.61
199-H4-14	7/14/89	420.59	45.14	375.45
199-H4-14	7/31/89	420.59	45.46	375.13
199-H4-14	8/15/89	420.59	45.71	374.88
199-H4-14	8/30/89	420.59	45.89	374.70
199-H4-14	9/15/89	420.59	46.01	374.58
199-H4-14	9/28/89	420.59	46.09	374.50
199-H4-15A	7/14/89	407.21	33.85	373.36
199-H4-15A	7/31/89	407.21	34.81	372.40
199-H4-15A	8/15/89	407.21	34.73	372.48
199-H4-15A	8/30/89	407.21	35.16	372.05
199-H4-15A	9/15/89	407.21	35.07	372.14
199-H4-15A	9/28/89	407.21	34.80	372.41

TABLE 3.2. (contd)

<u>Well</u>	<u>Date</u>	<u>Surveyed Casing Elevation, ft above MSL (a)</u>	<u>Water-Level Depth to Water, ft</u>	<u>Elevation, ft above MSL</u>
199-H4-15B	7/14/89	406.92	33.57	373.35
199-H4-15B	7/31/89	406.92	34.52	372.40
199-H4-15B	8/15/89	406.92	34.44	372.48
199-H4-15B	8/30/89	406.92	34.87	372.05
199-H4-15B	9/15/89	406.92	34.78	372.14
199-H4-15B	9/28/89	406.92	34.52	372.40
199-H4-15CQ	7/14/89	407.27	20.76	386.51
199-H4-15CQ	7/31/89	407.27	18.55	388.72
199-H4-15CQ	8/15/89	407.27	18.21	389.06
199-H4-15CQ	8/30/89	407.27	18.85	388.42
199-H4-15CQ	9/15/89	407.27	18.75	388.52
199-H4-15CQ	9/28/89	407.27	18.59	388.68
199-H4-15CR	7/14/89	407.37	33.32	374.05
199-H4-15CR	7/31/89	407.37	33.70	373.67
199-H4-15CR	8/15/89	407.37	34.00	373.37
199-H4-15CR	8/30/89	407.37	34.23	373.14
199-H4-15CR	9/15/89	407.37	34.43	372.94
199-H4-15CR	9/28/89	407.37	34.55	372.82
199-H4-15CS	7/14/89	407.44	34.32	373.12
199-H4-15CS	7/31/89	407.44	35.22	372.22
199-H4-15CS	8/15/89	407.44	35.02	372.42
199-H4-15CS	8/30/89	407.44	35.41	372.03
199-H4-15CS	9/15/89	407.44	35.18	372.26
199-H4-15CS	9/28/89	407.44	34.97	372.47
199-H4-16	7/14/89	424.23	49.30	374.93
199-H4-16	7/31/89	424.23	49.70	374.53
199-H4-16	8/15/89	424.23	49.98	374.25
199-H4-16	8/30/89	424.23	50.19	374.04
199-H4-16	9/15/89	424.23	50.31	373.92
199-H4-16	9/28/89	424.23	50.39	373.84
199-H4-17	7/14/89	419.09	45.04	374.05
199-H4-17	7/31/89	419.09	45.57	373.52
199-H4-17	8/15/89	419.09	45.81	373.28
199-H4-17	8/30/89	419.09	45.98	373.11
199-H4-17	9/15/89	419.09	46.00	373.09
199-H4-17	9/28/89	419.09	45.97	373.12
199-H4-18	7/14/89	421.82	47.61	374.21
199-H4-18	7/31/89	421.82	48.28	373.54
199-H4-18	8/15/89	421.82	48.48	373.34

TABLE 3.2. (contd)

<u>Well</u>	<u>Date</u>	<u>Surveyed Casing Elevation, ft above MSL (a)</u>	<u>Water-Level Depth to Water, ft</u>	<u>Elevation, ft above MSL</u>
199-H4-18	8/30/89	421.82	48.77	373.05
199-H4-18	9/15/89	421.82	48.75	373.07
199-H4-18	9/28/89	421.82	48.71	373.11
699-88-41	7/14/89	416.04	33.75	382.29
699-88-41	7/31/89	416.04	33.76	382.28
699-88-41	8/15/89	416.04	33.76	382.28
699-88-41	8/30/89	416.04	33.76	382.28
699-88-41	9/15/89	416.04	33.76	382.28
699-88-41	9/28/89	416.04	33.76	382.28
699-89-35	7/14/89	397.46	26.70	370.76
699-89-35	7/31/89	397.46	27.20	370.26
699-89-35	8/15/89	397.46	27.26	370.20
699-89-35	8/30/89	397.46	27.54	369.92
699-89-35	9/15/89	397.46	27.60	369.86
699-89-35	9/28/89	397.46	27.59	369.87
699-90-34	7/14/89	392.39	Dry	--
699-90-34	7/31/89	392.39	Dry	--
699-90-34	8/15/89	392.39	Dry	--
699-90-34	8/30/89	392.39	Dry	--
699-90-34	9/15/89	392.39	Dry	--
699-90-34	9/28/89	392.39	Dry	--
699-90-45	7/14/89	422.15	37.45	384.70
699-90-45	7/31/89	422.15	37.45	384.70
699-90-45	8/15/89	422.15	37.45	384.70
699-90-45	8/30/89	422.15	37.45	384.70
699-90-45	9/15/89	422.15	37.47	384.68
699-90-45	9/28/89	422.15	37.47	384.68
699-91-37	7/14/89	422.93	49.13	373.80
699-91-37	7/31/89	422.93	49.49	373.44
699-91-37	8/15/89	422.93	49.79	373.14
699-91-37	8/30/89	422.93	50.00	372.93
699-91-37	9/15/89	422.93	50.21	372.72
699-91-37	9/28/89	422.93	50.32	372.61
699-97-43	7/14/89	421.81	42.72	379.09
699-97-43	7/31/89	421.81	42.77	379.04
699-97-43	8/15/89	421.81	42.85	378.96

TABLE 3.2. (contd)

<u>Well</u>	<u>Date</u>	<u>Surveyed Casing Elevation, ft above MSL (a)</u>	<u>Water-Level Depth to Water, ft</u>	<u>Elevation, ft above MSL</u>
699-97-43	8/30/89	421.81	42.93	378.88
699-97-43	9/15/89	421.81	43.02	378.79
699-97-43	9/28/89	421.81	43.09	378.72
699-99-42	7/14/89	412.88	Dry	--
699-99-42	7/31/89	412.88	Dry	--
699-99-42	8/15/89	412.88	Dry	--
699-99-42	8/30/89	412.88	Dry	--
699-99-42	9/15/89	412.88	Dry	--
699-99-42	9/28/89	412.88	Dry	--

(a) MSL = mean sea level.

TABLE 3.3. Constituent List and Summary of Sampling Results for the 183-H Solar Evaporation Basins
August 1989

----- Constituent List=Contamination Indicator Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
191 CONDFO	umho	1	8	0	700 WDOE	xxx	Specific conductance, field
199 PHFIELD		0.1	8	0	6.5-8.5 EPAS		pH, field
207 PH-LAB		0.01	8	0	6.5-8.5 EPAS		pH, laboratory
H42 TOXL0L	ppb	10	9	0			Total organic halogens, low DL
----- Constituent List=Interim Primary Drinking Water Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
111 BETA	pCi/L	8	9	0	50 EPA	xxx	Gross beta
112 ALPHAHI	pCi/L	4	9	0	15 EPA	xxx	Gross alpha, high DL
A06 BARIUM	ppb	8	9	0	1000 EPA		Barium
A07 CADMIUM	ppb	2	9	9 ***	10 EPA		Cadmium
A08 CHROMIUM	ppb	10	9	0	50 EPA	xxx	Chromium
A10 SILVER	ppb	10	9	9 ***	50 EPA		Silver
C72 NITRATE	ppb	500	9	0	45000 EPA	xxx	Nitrate
C74 FLUORID	ppb	500	9	7	4000 EPA		Fluoride
H20 FBARIUM	ppb	8	9	0	1000 EPA		Barium, filtered
H21 FCADMIU	ppb	2	9	8	10 EPA		Cadmium, filtered
H22 FCHROMI	ppb	10	9	0	50 EPA	xxx	Chromium, filtered
H23 FSILVER	ppb	10	9	9 ***	50 EPA		Silver, filtered
H80 TURBID	ntu	0.1	8	0	1 EPA	xxx	Turbidity, nephelometric
----- Constituent List=Water Quality Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
A11 SODIUM	ppb	200	9	0			Sodium
A17 MANGESE	ppb	5	9	5	50 EPAS	xxx	Manganese
A19 IRON	ppb	30	9	4	300 EPAS	xxx	Iron
C73 SULFATE	ppb	500	9	0	250000 EPAS		Sulfate
C75 CHLORID	ppb	500	9	0	250000 EPAS		Chloride
H24 FSODIUM	ppb	200	9	0			Sodium, filtered
H29 FMANGAN	ppb	5	9	8	50 EPAS	xxx	Manganese, filtered
H31 FIRON	ppb	30	9	8	EPAS		Iron, filtered

TABLE 3.3. (contd)

----- Constituent List=Site Specific and Other Constituents -----									
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency	Exceeded	Full name	
104	U	pCi/L	0.6	9	0	600 DOE		Uranium	
197	TC-99	pCi/L	15	9	0	900 EPAR	xxx	Technetium-99	
A01	BERYLLIUM	ppb	5	9	9 ***	.		Beryllium	
A03	STRONTIUM	ppb	10	9	0	.		Strontium	
A04	ZINC	ppb	5	9	3	5000 EPAS		Zinc	
A05	CALCIUM	ppb	50	9	0	.		Calcium	
A12	NICKEL	ppb	10	9	6	.		Nickel	
A13	COPPER	ppb	10	9	8	1300 EPAP		Copper	
A14	VANADIUM	ppb	5	9	1	.		Vanadium	
A15	ANTIMONY	ppb	100	9	9 ***	.		Antimony	
A16	ALUMINUM	ppb	150	9	8	.		Aluminum	
A18	POTASSIUM	ppb	100	9	0	.		Potassium	
A60	MAGNESIUM	ppb	50	9	0	.		Magnesium	
C76	PHOSPHATE	ppb	1000	9	9 ***	.		Phosphate	
H18	FZINC	ppb	5	9	4	5000 EPAS		Zinc, filtered	
H19	FCALCIUM	ppb	50	9	0	.		Calcium, filtered	
H25	FNICKEL	ppb	10	9	8	.		Nickel, filtered	
H26	FCOPPER	ppb	10	9	8	1300 EPAP		Copper, filtered	
H27	FVANADIUM	ppb	5	9	2	.		Vanadium, filtered	
H29	FALUMINUM	ppb	150	9	9 ***	.		Aluminum, filtered	
H30	FPOTASSIUM	ppb	100	9	0	.		Potassium, filtered	
H32	FMAGNESIUM	ppb	50	9	0	.		Magnesium, filtered	
H33	FBERYLLIUM	ppb	5	9	8	.		Beryllium, filtered	
H35	FSTRONTIUM	ppb	10	9	0	.		Strontium, filtered	
H36	FANTIMONY	ppb	100	9	9 ***	.		Antimony, filtered	
H58	ALKALINITY	ppb	20000	9	0	.		Total alkalinity, as CaCO3 (Method B)	
H66	BROMIDE	ppb	1000	9	9 ***	.		Bromide	
H87	NITRITE	ppb	1000	9	9 ***	.		Nitrite	
H88	FBORON	ppb	10	9	0	.		Boron, filtered	
H87	FCOBALT	ppb	20	9	9 ***	.		Cobalt, filtered	
H88	FLITHIUM	ppb	10	9	9 ***	.		Lithium, filtered	
H89	FMOLYBDENUM	ppb	40	9	9 ***	.		Molybdenum, filtered	
H90	FSILICON	ppb	50	9	0	.		Silicon, filtered	
H91	FTIN	ppb	30	9	9 ***	.		Tin, filtered	
H92	FTITANIUM	ppb	80	9	9 ***	.		Titanium, filtered	
H93	FZIRCONIUM	ppb	50	9	9 ***	.		Zirconium, filtered	
P01	BORON	ppb	10	9	1	.		Boron	
P02	COBALT	ppb	20	9	9 ***	.		Cobalt	
P03	LITHIUM	ppb	10	9	9 ***	.		Lithium	
P04	MOLYBDENUM	ppb	40	9	9 ***	.		Molybdenum	
P05	SILICON	ppb	50	9	0	.		Silicon	
P06	TIN	ppb	30	9	9 ***	.		Tin	
P07	TITANIUM	ppb	80	9	9 ***	.		Titanium	
P08	ZIRCONIUM	ppb	50	9	9 ***	.		Zirconium	

TABLE 3.3. (contd)

- *** - Indicates all samples were reported as below contractual detection limits
- xxx - Indicates that Drinking Water standards were exceeded
- EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
- EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
- EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- DOE - based on Derived Concentration Guides in draft DOE Order 5600.xx
- WDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

TABLE 3.4- Constituents with at Least One Detected Value for the 183-H Solar Evaporation Basins
August 1989

Regular Monitoring Data										
Well name	Collection Date	Duplicate sample number	ALKALIN ppb 20000/.	ALPHANI pCi/L 4/16	ALUMINUM ppb 150/.	BARIUM ppb 8/1000	FBARIUM ppb 8/1000	FBERYLL ppb 5/.	BETA pCi/L 8/50	BORON ppb 10/.
1-H3-2A	02AUG89		121,000	2.890	<150	30	30	<5	8.87	32
1-H4-3	03AUG89		161,000	61.500	<150	57	59	<5	207.00	67
1-H4-4	03AUG89		136,000	33.400	<150	76	87	<5	168.00	34
1-H4-6	04AUG89		146,000	3.250	<150	54	62	<5	8.97	43
	04AUG89	1	146,000	2.150	<150	48	51	<5	7.80	62
1-H4-12A	02AUG89		147,000	21.700	<150	79	80	<5	32.80	33
1-H4-12B	02AUG89		144,000	8.600	<150	113	120	8	33.30	46
1-H4-12C	02AUG89		100,000	40.497	<150	7	7	<5	5.70	<10
1-H4-18	02AUG89		119,000	4.020	243	34	38	<5	10.40	28
Well name	Collection Date	Duplic sampl numbe	FBORON ppb 10/.	FCADMIU ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000*	FCROMI ppb 10/50	CHROMIUM ppb 10/50	CONDFLD umho 1/700*
1-H3-2A	02AUG89		24	<2	52,800	52,900	8,000	75	72	400
1-H4-3	03AUG89		82	<2	47,700	42,700	11,000	172	264	1200
1-H4-4	03AUG89		48	<2	57,400	50,400	8,000	198	199	995
1-H4-6	04AUG89		88	<2	74,500	76,300	12,000	101	78	535
	04AUG89	1	59	<2	68,800	71,200	12,500	95	103	.
1-H4-12A	02AUG89		42	<2	83,800	81,400	9,000	98	98	590
1-H4-12B	02AUG89		55	<2	79,200	74,200	9,000	90	85	284
1-H4-12C	02AUG89		12	<2	34,900	29,700	2,500	249	299	150
1-H4-18	02AUG89		29	2	56,400	51,800	5,900	201	186	380
Well name	Collection Date	Duplic sampl numbe	COPPER ppb 10/1300*	FCOPPER ppb 10/1300*	FLUORID ppb 500/4000	IRON ppb 30/300*	FIRON ppb 30/.	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50*
1-H3-2A	02AUG89		<10	<10	<500	<30	<30	11,100	11,700	<5
1-H4-3	03AUG89		19	20	1,100	2,580	38	7,160	8,170	8
1-H4-4	03AUG89		<10	<10	900	1,140	<30	7,560	8,760	<5
1-H4-6	04AUG89		<10	<10	<500	204	<30	17,500	18,000	70
	04AUG89	1	<10	<10	<500	128	<30	15,800	15,100	85
1-H4-12A	02AUG89		<10	<10	<500	<30	<30	11,800	12,800	<5
1-H4-12B	02AUG89		<10	<10	<500	<30	<30	11,400	12,800	<5
1-H4-12C	02AUG89		<10	<10	<500	<30	<30	10,100	12,400	<5
1-H4-18	02AUG89		<10	<10	<500	357	<30	8,840	9,760	<5

TABLE 3.4. (contd)

Well name	Collection Date	Duplic sampl numbe	MANGESE ppb 5/50a	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	PH-LAB 0.01/8.5a	PHFIELD 0.1/8.5a	FPOTASS ppb 100/.	POTASUM ppb 100/.
1-H3-2A	02AUG89		<5	<10	<10	26,300	7.9	7.85	5,280	5,100
1-H4-3	03AUG89		18	18	22	474,000	7.9	7.88	7,240	6,450
1-H4-4	03AUG89		<5	12	15	392,000	7.8	7.85	6,780	6,900
1-H4-8	04AUG89		77	<10	<10	38,000	7.9	7.85	7,180	8,380
	04AUG89	1	70	<10	<10	38,000	.	.	6,710	7,700
1-H4-12A	02AUG89		<5	<10	<10	82,000	7.9	7.85	6,210	5,840
1-H4-12B	02AUG89		<5	<10	<10	49,000	7.9	7.89	6,020	5,490
1-H4-12C	02AUG89		<5	18	20	6,800	8.0	8.01	5,380	4,310
1-H4-18	02AUG89		7	<10	<10	27,000	7.8	7.75	4,980	4,210

Well name	Collection Date	Duplic sampl numbe	FSILICO ppb 50/.	SILICON ppb 60/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	FSTRONT ppb 10/.	STRONTIUM ppb 10/.	SULFATE ppb 500/25000a	TC-99 pCi/L 15/900r
1-H3-2A	02AUG89		15,000	14,800	15,700	16,200	291	279	51,000	271.00
1-H4-3	03AUG89		17,500	15,700	258,000	291,000	287	234	108,000	3,250.00
1-H4-4	03AUG89		15,700	13,700	167,000	191,000	317	274	78,000	2,270.00
1-H4-8	04AUG89		18,100	385	32,400	27,900	396	427	89,000	*-0.47
	04AUG89	1	15,300	14,400	30,100	26,200	376	399	89,000	*0.68
1-H4-12A	02AUG89		14,600	14,400	28,300	29,300	397	376	70,000	*-1.54
1-H4-12B	02AUG89		15,300	14,300	18,700	18,300	385	351	56,000	87.40
1-H4-12C	02AUG89		34,100	29,000	4,040	5,050	254	208	24,400	*-0.57
1-H4-18	02AUG89		15,200	14,300	10,700	12,400	278	244	44,000	22.70

Well name	Collection Date	Duplicate sample number	TOXLDL ppb 10/.	TURBID ntu 0.1/1	U pCi/L 0.5/800d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000a	FZINC ppb 5/5000a
1-H3-2A	02AUG89		15	0.1	3.08	8	9	<5	<5
1-H4-3	03AUG89		15	20.5	145.00	7	9	5	10
1-H4-4	03AUG89		12	1.0	88.80	5	8	179	75
1-H4-8	04AUG89		85	3.1	3.82	18	8	218	217
	04AUG89	1	88	.	5.91	7	5	195	219
1-H4-12A	02AUG89		12	0.7	20.80	<5	<5	<5	7
1-H4-12B	02AUG89		12	0.2	5.60	8	7	<5	<5
1-H4-12C	02AUG89		88	0.1	1.08	29	26	7	<5
1-H4-18	02AUG89		24	4.8	3.27	<5	8	20	<5

TABLE 3.4. (contd)

The column headers consist of : Constituent Name
Analysis Units
Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-670/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
- s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- d - based on Derived Concentration Guides in draft DOE Order 5400.xx
- u - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- @ - Less than Contractual Detection Limit, measured value reported
- * - For radioactive constituents, reported value is less than 2-sigma error

4.0 200 AREAS LOW-LEVEL BURIAL GROUNDS

G. V. Last

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Ground water near the 200 Areas Low-Level Burial Grounds (LLBGs) has been monitored via four RCRA interim-status monitoring well networks since September 1988. This project is nearing the completion of the background stage of monitoring. Five complete sample sets have been collected for each network; however, complete analyses are still not available from the fifth set.

A revised ground-water monitoring plan has been prepared that discusses the expansion of the ground-water monitoring program for the LLBGs. The expansion is from four waste management areas (WMAs) to five WMAs, covering all or portions of eight burial grounds. Each of these LLBGs is located in either the 200-East Area or the 200-West Area of the Hanford Site (see Figure 1.1).

The LLBGs contain a diverse range of mixed radioactive/hazardous waste types from Hanford operations (e.g., miscellaneous dry waste, failed equipment, vehicles, contaminated soil, 183-H cleanup wastes) and other offsite wastes (e.g., submarine reactor compartments, Three-Mile Island Reactor cleanup wastes) that are buried in unlined trenches and pits from 15 to 60 ft deep. Disposal to these LLBGs has been ongoing since 1960.

There are at this time 35 wells in the monitoring networks for the LLBGs (Figures 4.1, 4.2, 4.3, 4.4, and 4.5). Table 4.1 lists the monitoring wells at each WMA. Table 4.2 gives the sampling schedule for the wells in the monitoring network. Table 4.3 provides a cross-reference for old and new well numbers. The monitoring network is being expanded to include 16 new wells: 11 to be installed during 1989 and 5 to be installed during 1990. This will bring the total number of monitoring wells to 51 by the end of 1990.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Drilling and monitoring well installation continued this quarter. To date, three wells [299-E27-11, 299-E34-7, and 299-E35-1 (formerly 299-E34-8)] have been completed, except for the surface concrete pad, protective posts, etc. All three completed wells were visually inspected with a downhole video camera, and no problems were observed. However, mud (6 in. to 1 ft) was observed in the bottom of wells 299-E34-7 and 299-E35-1. This mud will be removed during development. Well 299-E27-11 was slug tested and developed.

Five other wells are in progress and their status is listed below:

- Well 299-W15-19 has been drilled to total depth and is waiting completion.
- Well 299-W18-26 is in the process of being completed.
- Drilling on well 299-W15-21 has been discontinued until additional temporary casing is available.
- Drilling on wells 299-E32-5 and 299-W15-20 was initiated on September 27, 1989.

Table 4.3 summarizes the drilling progress of all wells planned for 1989.

Three of the wells discussed above (299-E32-5, 299-E35-1, and 299-W15-21) are for enhanced characterization purposes and are being sampled using 4-in.-dia split-barrel samplers. This type of sampling was used at well 299-E35-1, but met with only limited success because of the high percentage of large pebble and cobble encountered. Split-barrel sampling at well 299-W15-21 was more effective and yielded good sediment samples, with little or no increase in drilling time. Drilling of the third characterization well (299-E32-5) is just starting and is expected to encounter very coarse materials similar to those found in well 299-E35-1; thus, only limited success is expected.

The interim characterization report (Last et al. 1989) was printed and distributed.

WATER LEVELS

Water levels at each well were measured three times during this quarter; results are listed in Table 4.4.

WATER CHEMISTRY DATA

The fourth and fifth sets of quarterly ground-water samples were collected this quarter. The fourth set, originally scheduled for June 1989, was collected in July and August (July 10 to August 1, 1989). This delay resulted from the need to install purge water holding tanks at each well. Three of the 34 scheduled wells were not sampled. Well 299-W15-17 was not sampled because the sampling pump had been removed to aid retrieval of a block of wood that had fallen during collection of water-level measurements on January 20, 1988. Well 299-W18-21 will not be sampled until the purge water holding tank has been made leak proof or is replaced. Well 299-E32-3 was not sampled because the pump was not operational.

The fifth sampling set was collected as scheduled in September (September 6 to 28, 1989). Well 299-W15-17 was sampled via bailer because the sampling pump had not been reinstalled. A sanding problem was discovered in the well during retrieval of the block of wood. Investigation of the cause of this sanding problem and on possible corrective measures is still in progress.

Analytical results are available for only the fourth set (July samples) of quarterly samples and are summarized in Tables 4.5, 4.7, 4.9, and 4.11 for WMA-1, WMA-2, WMA-3, and WMA-4, respectively. The results for constituents with at least one detected value are provided in Tables 4.6, 4.8, 4.10, and 4.12 for WMA-1, WMA-2, WMA-3, and WMA-4, respectively. Major observations of the analyses from each WMA are discussed below. Analytical results from the fifth set (September samples) of quarterly samples will be discussed next quarter.

- Waste Management Area 1

Note: Ground-water samples were not collected from well 299-E32-3.

- Gross alpha exceeded the 15-pCi/L standard (40 CFR 141) in the samples from well 299-E28-26 (21.4 pCi/L).
- Unfiltered chromium exceeded its 40 CFR 141 standard of 50 ppb in wells 299-E32-2 and 299-E33-30. Both results were below the standard in filtered samples.
- Iron exceeded its 40 CFR 143 standard in wells 299-E28-26, 299-E32-2, 299-E32-4, 299-E33-28, and 299-E33-30.
- Tritium exceeded the 20,000-pCi/L standard (40 CFR 141) in samples from wells 299-E28-26 (134,000 pCi/L), 299-E28-27 (400,000 and 396,000 pCi/L), 299-E32-2 (216,000 pCi/L), and 299-E34 (41,700 pCi/L).
- Nitrate exceeded the standard (40 CFR 141) in samples from well 299-E28-26, and ammonium continues to be found at slightly less than 1 ppm in this well.
- Coliform (membrane filter) exceeded the standard (40 CFR 141) in samples from well 299-E33-30.

- Waste Management Area 2

Note: Ground-water samples were not collected from well 299-E34-4.

- Chromium exceeded the standard (40 CFR 141) in unfiltered samples from wells 299-E34-2, 299-E34-3, 299-E34-5, and 299-E34-6. Filtered chromium exceeded the standard only in well 299-E34-2.
- Iron exceeded the standard (40 CFR 143) in samples from all wells except 299-E27-8.

- Waste Management Area 3

Note: Well 299-W7-6 yields turbid water samples, which may not be totally representative of the ground water. This well is scheduled for further development.

- Field pH exceeded the standard (40 CFR 143) in samples from well 299-W7-6.

- Unfiltered chromium exceeded the 50-ppb standard (40 CFR 141) in samples from wells 299-W6-2 (55 ppb; duplicate sample contained only 44 ppb), 299-W7-3 (83 ppb), 299-W8-1 (54 ppb), and 299-W9-1 (186 ppb). Filtered chromium was below the standard in all cases.
- Nitrate exceed the 45-ppm standard (40 CFR 141) in samples from wells 299-W6-2 (74.9 and 73.2 ppm), 299-W7-1 (45.1 ppm), and 299-W7-4 (77 ppm).
- Coliform (membrane filter) exceeded the standard (40 CFR 141) in samples from well 299-W6-2.
- Both filtered and unfiltered manganese exceeded the 50-ppb standard (40 CFR 143) in samples from well 299-W7-3 (164 and 159 ppb, respectively). Unfiltered manganese exceeded the standard in samples from wells 299-W7-6 (226 ppb) and 299-W9-1 (62 ppb).
- Iron exceeded the 300-ppb standard (40 CFR 143) in samples from wells 299-W7-3, 299-W7-6, 299-W8-1, and 299-W9-1.
- Tetrachloromethane (carbon tetrachloride) exceeded the 5-ppb standard (40 CFR 141) in samples from wells 299-W6-2 (99 and 102 ppb), 299-W7-4 (220 ppb), 299-W7-5 (27 ppb), and 299-W10-13 (18 ppb).

- Waste Management Area 4

Note: Ground-water samples were not collected from well 299-W15-17 or 299-W18-21.

- Chromium exceeded the 50-ppb standard (40 CFR 141) in unfiltered samples from wells 299-W15-15 (108 ppb), 299-W15-18 (129 ppb), and 299-W18-22 (100 ppb). All filtered samples were below the standard.
- Iron exceeded the 300-ppb standard (40 CFR 143) in samples from wells 299-W15-15, 299-W15-18, 299-W18-22, and 299-W18-23.
- Nitrate exceeded the 45-ppm standard (40 CFR 141) in samples from wells 299-W15-16 (69.8 ppm) and 299-W15-18 (73.5 ppm).
- Tetrachloromethane (carbon tetrachloride) exceeded the 5-ppb standard (40 CFR 141) in samples from wells 299-W15-15 (380 ppb), 299-W15-16 (8,250 ppb), 299-W15-18 (1,580 ppb), and 299-W18-24 (650 ppb).
- 1,1,2-Trichloroethene exceeded the 5-ppb standard (40 CFR 141) in samples from well 299-W15-16 (6 ppb).

FIGURE 4.1. Ground-Water Monitoring Wells Near Waste Management Area 1, 200-East Area

FIGURE 4.2. Ground-Water Monitoring Wells Near Waste Management Area 2, 200-East Area

FIGURE 4.3. Ground-Water Monitoring Wells Near Waste Management Area 3, 200-West Area

FIGURE 4.4. Ground-Water Monitoring Wells Near Waste Management Area 4, 200-West Area

FIGURE 4.5. Ground-Water Monitoring Wells Near Waste Management Area 5, 200-West Area

**TABLE 4.1. Ground-Water Monitoring Wells for the 200 Areas
Low-Level Burial Grounds**

<u>Upgradient Wells</u>	<u>UMA-1</u>	<u>UMA-2</u>	<u>UMA-3</u>	<u>UMA-4</u>	<u>UMA-5</u>
Shallow Wells (Top of Aquifer)	299-E28-27 299-E33-28 299-E33-29	299-E27-10 299-E34-3	299-W9-1 299-W10-13	299-W15-16 299-W15-18 299-W18-24	299-W6-2 ^(a)
Deep Wells (Bottom of Aquifer)	None	None	299-W10-14	299-W15-17	None
<u>Downgradient Wells</u>					
Shallow Wells (Top of Aquifer)	299-E28-26 299-E32-2 299-E32-3 299-E32-4 299-E33-30	299-E27-8 299-E27-9 299-E34-2 299-E34-4 ^(b) 299-E34-5 299-E34-6	299-W6-2 ^(a) 299-W7-1 299-W7-2 299-W7-4 299-W7-5 299-W7-6 299-W8-1	299-W15-15 299-W18-21 299-W18-23	None
Deep Wells (Bottom of Aquifer)	None	None	299-W7-3	299-W18-22	None
<hr/>					
(a) Common well.					
(b) Well is dry.					

TABLE 4.2. Sampling Schedule for the 200 Areas Low-Level Burial Grounds

Well	1988 ^(a)			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun ^(b)	Jul	Aug	Sep
299-E27- 8			X			X				X		X
299-E27- 9			X			XRV				X		X
299-E27-10			X			X				X		X
299-E28-26			X			X				X		X
299-E28-27			X			X				XRV		X
299-E32- 2			X			X				X		X
299-E32- 3			X				x(c)			X		X
299-E32- 4			X			X				X		X
299-E33-28			X			X				X		XRV
299-E33-29			X			X				X		X
299-E33-30			XRV			X				X		X
299-E34- 2			X			X				X		X
299-E34- 3			X			X				X		X
299-E34- 4(d)												
299-E34- 5			X			X				X		X
299-E34- 6			X			X				X		X
299-W 6- 2	L		X				X			XRV		X
299-W 7- 1	L		X				X			X		X
299-W 7- 2	L		X			X				X		X
299-W 7- 3	L		X			X				X		X
299-W 7- 4	L		XRV			X				X		X
299-W 7- 5	L		X			X				X		X
299-W 7- 6	L		X			X				X		X
299-W 8- 1	L		X				X			X		X
299-W 9- 1	L		X				X			X		X
299-W10-13	L		X			X				X		XRV
299-W10-14	L		X			X				X		X
299-W15-15	LR		X				X			X		X
299-W15-16	L		X				X			X		X
299-W15-17	L		X				X			X		X
299-W15-18	L		X				x(e)			X		X
299-W18-21	L		X				XRV			X		X
299-W18-22	L		X			X				X		X
299-W18-23	L		X				X			X		X
299-W18-24	L		X				X			X		X

(a) The following abbreviations are used in this table:

L = sampled for the long list (WAC 173-303-9905).

R = quality control replicates were collected.

V = volatile organic analyses blanks collected.

X = sampled for the regular list of constituents (Tables 4.5, 4.7, 4.9, and 4.11).

(b) June sampling delayed because of purge water disposal issue.

(c) Pump failed during March sampling.

(d) Well is dry.

(e) Pump was removed from well to clear obstruction; March sampling not possible.

TABLE 4.3. 1989 Drilling Summary for the 200 Areas Low-Level Burial Ground Wells^(a)

Well Number	Former Number	Drilling Information			Completion Information			Screen ^(b) Type	Comments
		Start Date	End Date	Total Depth, ft	Screened Interval, ft	Screen Slot Size, in.			
UMA-1									
299-E32-5	E10-MW2	09/27/89	--(c)	--	--	--	--	--	--
UMA-2									
299-E27-11	E12-MW8	06/27/89	07/21/89	265	232-252	10	S	Basalt at 262'	
299-E34-7	E12-MW9	08/04/89	08/21/89	206	194-204	10	S	Basalt at 205'	
299-E35-1	E12-MW10	08/07/89	08/25/89	195	182-192	20	S	Basalt at 192'	
UMA-4									
299-W15-19	W4-MW1	08/09/89	09/01/89	245	--	--	--	--	--
299-W15-20	W4-MW2	09/27/89	--	--	--	--	--	--	--
299-W15-21	W4-MW4	09/05/89	--	--	--	--	--	--	--
299-W18-26	W4-MW5	09/11/89	09/26/89	245	--	--	--	--	Casing stuck

(a) Only well 299-27-11 was developed this quarter. Development information will be reported in future quarterly reports.

(b) S = standard pipe size.

(c) No data available this quarter.

TABLE 4.4. Water-Level Data for Monitoring Wells Near the 200 Areas Low-Level Burial Grounds

<u>Well</u>	<u>Date</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Depth to Water, ft</u>	<u>Water-Level Elevation, ft above MSL</u>
299-E27-8	7/20/89	637.83	232.79	405.04
299-E27-8	8/18/89	637.83	232.89	404.94
299-E27-8	9/19/89	637.83	232.92	404.91
299-E27-9	7/20/89	629.21	224.05	405.16
299-E27-9	8/18/89	629.21	224.15	405.06
299-E27-9	9/19/89	629.21	224.17	405.04
299-E27-10	7/20/89	624.47	218.95	405.52
299-E27-10	8/18/89	624.47	219.02	405.45
299-E27-10	9/19/89	624.47	219.00	405.47
299-E28-26	7/20/89	687.26	282.46	404.80
299-E28-26	8/18/89	687.26	282.57	404.69
299-E28-26	9/19/89	687.26	282.60	404.66
299-E28-27	7/20/89	680.37	275.61	404.76
299-E28-27	8/18/89	680.37	275.68	404.69
299-E28-27	9/19/89	680.37	275.71	404.66
299-E32-2	7/20/89	670.06	265.49	404.57
299-E32-2	8/18/89	670.06	265.55	404.51
299-E32-2	9/19/89	670.06	265.61	404.45
299-E32-3	7/20/89	676.51	271.87	404.64
299-E32-3	8/18/89	676.51	271.93	404.58
299-E32-3	9/19/89	676.51	271.98	404.53
299-E32-4	7/20/89	685.88	281.35	404.53
299-E32-4	8/18/89	685.88	281.44	404.44
299-E32-4	9/19/89	685.88	281.48	404.40
299-E33-28	7/20/89	664.23	259.43	404.80
299-E33-28	8/18/89	664.23	259.49	404.74
299-E33-28	9/19/89	664.23	259.54	404.69
299-E33-29	7/20/89	673.77	268.99	404.78
299-E33-29	8/18/89	673.77	269.06	404.71
299-E33-29	9/19/89	673.77	269.10	404.67
299-E33-30	7/20/89	663.70	258.94	404.76
299-E33-30	8/18/89	663.70	259.03	404.67
299-E33-30	9/19/89	663.70	259.07	404.63
299-E34-2	7/20/89	630.80	225.76	405.04
299-E34-2	8/18/89	630.80	225.88	404.92
299-E34-2	9/19/89	630.80	225.91	404.89
299-E34-3	7/20/89	611.52	205.98	405.54
299-E34-3	8/18/89	611.52	206.02	405.50
299-E34-3	9/19/89	611.52	206.00	405.52
299-E34-3	7/20/89	587.56	Dry	--
299-E34-4	8/18/89	587.56	Dry	--
299-E34-4	9/19/89	587.56	Dry	--
299-E34-5	7/20/89	590.79	184.93	405.86

TABLE 4.4. (contd)

<u>Well</u>	<u>Date</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Depth to Water, ft</u>	<u>Water-Level Elevation, ft above MSL</u>
299-E34-5	8/18/89	590.79	185.02	405.77
299-E34-5	9/19/89	590.79	185.06	405.73
299-E34-6	7/20/89	597.83	192.84	404.99
299-E34-6	8/18/89	597.83	192.97	404.86
299-E34-6	9/19/89	597.83	193.00	404.83
299-W10-13	7/20/89	699.04	232.74	466.30
299-W10-13	8/18/89	699.04	232.87	466.17
299-W10-13	9/19/89	699.04	232.91	466.13
299-W10-14	7/20/89	699.43	233.52	465.91
299-W10-14	8/18/89	699.43	233.65	465.78
299-W10-14	9/19/89	699.43	233.71	465.72
299-W15-15	7/20/89	697.96	229.14	468.82
299-W15-15	8/18/89	697.96	229.26	468.70
299-W15-15	9/19/89	697.96	229.34	468.62
299-W15-16	7/20/89	684.89	215.20	469.69
299-W15-16	8/18/89	684.89	215.28	469.61
299-W15-16	9/19/89	684.89	215.35	469.54
299-W15-17	7/20/89	684.64	215.38	469.26
299-W15-17	8/18/89	684.64	215.46	469.18
299-W15-17	9/19/89	684.64	215.55	469.09
299-W15-18	7/20/89	685.71	215.70	470.01
299-W15-18	8/18/89	685.71	215.78	469.93
299-W15-18	9/19/89	685.71	215.86	469.85
299-W18-21	7/20/89	668.62	199.50	469.12
299-W18-21	8/18/89	668.62	199.66	468.96
299-W18-21	9/19/89	668.62	199.74	468.88
299-W18-22	7/20/89	668.49	200.21	468.28
299-W18-22	8/18/89	668.49	200.34	468.15
299-W18-22	9/19/89	668.49	200.45	468.04
299-W18-23	7/20/89	696.81	227.68	469.13
299-W18-23	8/18/89	696.81	227.82	468.99
299-W18-23	9/19/89	696.81	227.91	468.90
299-W18-24	7/20/89	684.35	214.08	470.27
299-W18-24	8/18/89	684.35	214.15	470.20
299-W18-24	9/19/89	684.35	214.24	470.11
299-W6-2	7/20/89	692.45	230.86	461.59
299-W6-2	8/18/89	692.45	230.95	461.50
299-W6-2	9/19/89	692.45	230.98	461.47
299-W7-1	7/20/89	690.71	229.26	461.45
299-W7-1	8/18/89	690.71	229.38	461.33
299-W7-1	9/19/89	690.71	229.40	461.31
299-W7-2	7/20/89	675.59	215.17	460.42
299-W7-2	8/18/89	675.59	215.18	460.41
299-W7-2	9/19/89	675.59	215.21	460.38

TABLE 4.4. (contd)

<u>Well</u>	<u>Date</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Depth to Water, ft</u>	<u>Water-Level Elevation, ft above MSL</u>
299-W7-3	7/20/89	676.14	216.87	459.27
299-W7-3	8/18/89	676.14	216.99	459.15
299-W7-3	9/19/89	676.14	216.99	459.15
299-W7-4	7/20/89	671.69	208.91	462.78
299-W7-4	8/18/89	671.69	209.01	462.68
299-W7-4	9/19/89	671.69	209.02	462.67
299-W7-5	7/20/89	673.03	212.95	460.08
299-W7-5	8/18/89	673.03	213.06	459.97
299-W7-5	9/19/89	673.03	213.06	459.97
299-W7-6	7/20/89	678.64	218.65	459.99
299-W7-6	8/18/89	678.64	218.75	459.89
299-W7-6	9/19/89	678.64	218.76	459.88
299-W8-1	7/20/89	701.33	239.48	461.85
299-W8-1	8/18/89	701.33	239.63	461.70
299-W8-1	9/12/89	701.33	239.70	461.63
299-W8-1	9/19/89	701.33	239.68	461.65
299-W9-1	7/20/89	737.73	272.85	464.88
299-W9-1	8/18/89	737.73	273.00	464.73
299-W9-1	9/19/89	737.73	273.05	464.68

(a) MSL = mean sea level.

TABLE 4.5. Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-1
July through August 1989

----- Constituent List=Contamination Indicator Parameters -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088 CONDLAS	umho	.	28	0	700 WDOE	Specific conductance, laboratory
191 CONDFLD	umho	1	32	0	700 WDOE	Specific conductance, field
199 PHFIELD		0.1	32	0	6.5-8.5 EPAS	pH, field
207 PH-LAB		0.01	28	0	6.5-8.5 EPAS	pH, laboratory
C89 TOC	ppb	2000	28	0	.	Total organic carbon
H42 TOXLDL	ppb	10	28	0	.	Total organic halogens, low DL
----- Constituent List=Interim Primary Drinking Water Parameters -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109 COLIFRM	MPN	2.2	1	1 ***	1 EPA	Coliform bacteria
111 BETA	pCi/L	8	8	0	50 EPA	Gross beta
112 ALPHAHI	pCi/L	4	8	0	15 EPA	Gross alpha, high DL
181 RADIUM	pCi/L	1	8	0	5 EPA	Radium, total
A06 BARIUM	ppb	8	8	0	1000 EPA	Barium
A07 CADMIUM	ppb	2	8	8 ***	10 EPA	Cadmium
A08 CHROMIUM	ppb	10	8	0	50 EPA	Chromium
A10 SILVER	ppb	10	8	8 ***	50 EPA	Silver
A20 ARSENIC	ppb	5	8	1	50 EPA	Arsenic
A21 MERCURY	ppb	0.1	8	8 ***	2 EPA	Mercury
A22 SELENIUM	ppb	5	8	7	10 EPA	Selenium
A33 ENDRIN	ppb	0.1	8	8 ***	0.2 EPA	Endrin
A34 METHLOR	ppb	3	8	8 ***	100 EPA	Methoxychlor
A35 TOXAENE	ppb	1	8	8 ***	5 EPA	Toxaphene
A36 a-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, alpha-BHC
A37 b-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, beta-BHC
A38 g-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, gamma-BHC
A39 d-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, delta-BHC
A51 LEADGF	ppb	5	8	7	50 EPA	Lead (graphite furnace)
C72 NITRATE	ppb	500	8	0	45000 EPA	Nitrate
C74 FLUORID	ppb	500	8	1	4000 EPA	Fluoride
H13 2,4-D	ppb	2	8	8 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14 2,4,5TP	ppb	2	8	8 ***	10 EPA	2,4,5-TP silvex
H20 FBARIUM	ppb	8	8	0	1000 EPA	Barium, filtered
H21 FCADMIU	ppb	2	8	8 ***	10 EPA	Cadmium, filtered
H22 FCHROMI	ppb	10	8	7	50 EPA	Chromium, filtered
H23 FSILVER	ppb	10	8	8 ***	50 EPA	Silver, filtered
H37 FARSENI	ppb	5	8	2	50 EPA	Arsenic, filtered
H38 FMERCUR	ppb	0.1	8	8 ***	2 EPA	Mercury, filtered
H39 FSELENI	ppb	5	8	8 ***	10 EPA	Selenium, filtered
H41 FLEAD	ppb	5	8	8 ***	50 EPA	Lead, filtered
P19 COLINF	100mL	1	7	5	1 EPA	Coliform (Membrane Filter)

TABLE 4.5. (contd)

----- Constituent List=Water Quality Parameters -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard Agency Exceeded	Full name
A11	SODIUM	ppb	200	8	0	.	Sodium
A17	MANGESE	ppb	5	8	3	50 EPAS	Manganese
A19	IRON	ppb	30	8	0	300 EPAS	Iron
C73	SULFATE	ppb	500	8	0	250000 EPAS	Sulfate
C75	CHLORID	ppb	500	8	0	250000 EPAS	Chloride
H24	FSODIUM	ppb	200	8	0	.	Sodium, filtered
H29	FMANGAN	ppb	5	8	8 ***	50 EPAS	Manganese, filtered
H31	FIRON	ppb	30	8	1	. EPAS	Iron, filtered
H57	LPHENOL	ppb	10	8	8 ***	.	Phenol, low DL
----- Constituent List=Site Specific and Other Constituents -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard Agency Exceeded	Full name
010	CO-60	pCi/L	22.5	8	0	100 EPAR	Cobalt-60
024	CS-137	pCi/L	20	8	0	200 EPAR	Cesium-137
034	RU-106	pCi/L	172.5	8	0	30 EPAR	Ruthenium-106
104	U	pCi/L	0.5	8	0	800 DOE	Uranium
108	TRITIUM	pCi/L	500	8	0	20000 EPA	Tritium (H-3)
121	SR-90	pCi/L	5	8	0	8 EPA	Strontium-90
197	TC-99	pCi/L	15	8	0	800 EPAR	Technetium-99
A01	BERYLIUM	ppb	5	8	8 ***	.	Beryllium
A03	STRONTIUM	ppb	10	8	0	.	Strontium
A04	ZINC	ppb	5	8	5	5000 EPAS	Zinc
A05	CALCIUM	ppb	50	8	0	.	Calcium
A12	NICKEL	ppb	10	8	0	.	Nickel
A13	COPPER	ppb	10	8	5	1300 EPAP	Copper
A14	VANADIUM	ppb	5	8	0	.	Vanadium
A15	ANTIMONY	ppb	100	8	8 ***	.	Antimony
A16	ALUMINUM	ppb	150	8	8 ***	.	Aluminum
A18	POTASSIUM	ppb	100	8	0	.	Potassium
A50	MAGNESIUM	ppb	50	8	0	.	Magnesium
C78	PHOSPHATE	ppb	1000	8	8 ***	.	Phosphate
H18	FZINC	ppb	5	8	5	5000 EPAS	Zinc, filtered
H19	FCALCIUM	ppb	50	8	0	.	Calcium, filtered
H25	FNICKEL	ppb	10	8	8 ***	.	Nickel, filtered
H26	FCOPPER	ppb	10	8	8 ***	1300 EPAP	Copper, filtered
H27	FVANADIUM	ppb	5	8	0	.	Vanadium, filtered
H28	FALUMINUM	ppb	150	8	8 ***	.	Aluminum, filtered
H30	FPOTASSIUM	ppb	100	8	0	.	Potassium, filtered
H32	FMAGNESIUM	ppb	50	8	0	.	Magnesium, filtered
H33	FBERYLLIUM	ppb	5	8	8 ***	.	Beryllium, filtered
H35	FSTRONTIUM	ppb	10	8	0	.	Strontium, filtered
H36	FANTIMONY	ppb	100	8	8 ***	.	Antimony, filtered
H66	BROMIDE	ppb	1000	8	8 ***	.	Bromide
H67	NITRITE	ppb	1000	8	8 ***	.	Nitrite

TABLE 4.5. (contd)

----- Constituent List=Site Specific and Other Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
H86 FBORON	ppb	10	8	0	.	Boron, filtered
H87 FCOBALT	ppb	20	8	8 ***	.	Cobalt, filtered
H88 FLITHIU	ppb	10	8	8 ***	.	Lithium, filtered
H89 FMOLY	ppb	40	8	8 ***	.	Molybdenum, filtered
H90 FSILICO	ppb	50	8	0	.	Silicon, filtered
H91 FTIN	ppb	30	8	8 ***	.	Tin, filtered
H92 FTITAN	ppb	80	8	8 ***	.	Titanium, filtered
H93 FZIRCON	ppb	60	8	8 ***	.	Zirconium, filtered
P01 BORON	ppb	10	8	1	.	Boron
P02 COBALT	ppb	20	8	8 ***	.	Cobalt
P03 LITHIUM	ppb	10	8	8 ***	.	Lithium
P04 MOLY	ppb	40	8	8 ***	.	Molybdenum
P05 SILICON	ppb	50	8	0	.	Silicon
P06 TIN	ppb	30	8	8 ***	.	Tin
P07 TITAN	ppb	80	8	8 ***	.	Titanium
P08 ZIRCON	ppb	60	8	8 ***	.	Zirconium

----- Constituent List=WAC 173-303-9906 Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
A81 TETRANE	ppb	5	8	8 ***	5 EPA	Tetrachloromethane [Carbon Tetrachloride]
A82 BENZENE	ppb	5	8	8 ***	5 EPA	Benzene
A84 METHONE	ppb	10	8	8 ***	.	Methyl ethyl ketone
A86 TOLUENE	ppb	5	8	8 ***	2000 EPAP	Toluene
A87 1,1,1-T	ppb	5	8	8 ***	200 EPA	1,1,1-Trichloroethane
A88 1,1,2-T	ppb	5	8	8 ***	.	1,1,2-Trichloroethane
A89 TRICENE	ppb	5	8	8 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethene]
A70 PERCENE	ppb	5	8	8 ***	.	Perchloroethylene [Tetrachloroethene]
A71 OPXYLE	ppb	5	8	8 ***	440 EPAP	Xylene-o,p
A80 CHLFORM	ppb	5	8	8 ***	100 EPA	Chloroform [Trichloromethane]
A89 1,1-DIC	ppb	5	8	8 ***	.	1,1-Dichloroethane
A90 1,2-DIC	ppb	5	8	8 ***	5 EPA	1,2-Dichloroethane
A91 TRANDC	ppb	5	8	8 ***	70 EPAP	trans-1,2-Dichloroethane
A93 METHYCH	ppb	5	8	8 ***	.	Methylene chloride [Dichloromethane]
B13 VINYLIDE	ppb	10	8	8 ***	2 EPA	Vinyl chloride
B14 M-XYLE	ppb	5	8	8 ***	440 EPAP	Xylene-m
C70 CYANIDE	ppb	10	8	8 ***	.	Cyanide
C80 AMMONIU	ppb	50	8	7	.	Ammonium ion
H15 2,4,6-T	ppb	2	8	8 ***	.	2,4,6-T
H82 LHYORAZ	ppb	30	1	1 ***	.	Hydrazine, low DL
H88 HEXONE	ppb	10	8	8 ***	.	Hexone [Methyl isobutyl ketone]
I01 ACETONE	ppb	10	8	8 ***	.	Acetone by VOA
I28 TAF	ppb	10	8	8 ***	.	Tetrahydrofuran
L83 14DBEN	ppb	5	8	8 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]

TABLE 4.5. (contd)

- ***** - Indicates all samples were reported as below contractual detection limits
- xxx** - Indicates that Drinking Water standards were exceeded
- EPA** - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- EPAR** - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
- EPAP** - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
- EPAS** - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- DOE** - based on Derived Concentration Guides in draft DOE Order 5400.xx
- WDOE** - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

**TABLE 4.6. Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-1
July through August 1989**

Quadruplicate Contamination Indicator Parameters								
Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5w	PHFIELD 0.1/8.5w	TOC ppb 2000/.	TOXLDL ppb 10/.
2-E28-26	27JUL89	1	502	435	7.70	7.68	#500	#2
		2	502	432	7.70	7.67	#500	#3
		3	504	429	7.80	7.68	#500	#4
		3	504	429	7.70	7.56	#500	#6
2-E28-27	28JUL89	1	321	287	8.00	7.99	#700	#2
		2	321	287	8.10	7.99	#1,300	#1
		3	322	286	8.10	8.01	#600	14
		3	322	286	8.10	8.02	#619	10
2-E32-2	01AUG89	1	293	296	8.20	7.82	#600	#2
		2	292	295	8.10	7.84	#600	#1
		3	292	294	8.20	7.86	#600	#3
		3	292	295	8.20	7.87	#600	#3
2-E32-4	19JUL89	1	348	433	7.90	7.90	#400	#7
		2	347	434	7.90	7.90	#300	#3
		3	346	435	7.90	7.89	#300	#2
		3	343	435	7.90	7.89	#300	#5
2-E32-4	10AUG89	1	426	.	.	7.86	.	.
		2	427	.	.	7.85	.	.
		3	426	.	.	7.86	.	.
		3	427	.	.	7.85	.	.
2-E33-29	01AUG89	1	270	259	8.10	8.00	#500	#9
		2	266	259	8.10	8.00	#500	#5
		3	270	259	8.10	8.00	#500	#6
		3	270	259	8.10	8.00	#600	#2
2-E33-29	01AUG89	1	310	298	8.10	8.00	#500	#3
		2	310	297	8.20	8.00	#500	#0
		3	310	295	8.10	8.00	#600	#2
		3	310	298	8.10	8.00	#600	#1
2-E33-30	01AUG89	1	297	303	8.20	8.00	#600	#5
		2	297	302	8.20	7.99	#600	#5
		3	297	301	8.20	7.99	#600	#3
		3	297	301	8.20	7.99	#400	#6

TABLE 4.6. (contd)

Regular Monitoring Data										
Well name	Collection Date	Duplicate sample number	ALPHAHI pCi/L 4/15	AMMONIU ppb 50/.	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 6/1000	FBARIUM ppb 6/1000	BETA pCi/L 8/50	BORON ppb 10/.
2-E28-28	27 JUL 89		21.400	116	7	<5	39	35	7.25	131
2-E28-27	28 JUL 89		3.550	<50	8	5	39	40	17.30	32
	28 JUL 89	1	4.100	<50	5	5	37	38	18.70	31
2-E32-2	01 AUG 89		+1.140	<50	7	8	28	30	18.70	23
2-E32-4	19 JUL 89		7.930	<50	<5	<5	73	69	10.00	81
2-E33-28	01 AUG 89		+0.586	<50	9	9	31	34	7.22	<10
2-E33-29	01 AUG 89		2.850	<50	10	9	38	39	11.00	19
2-E33-30	01 AUG 89		2.270	<50	9	7	22	25	10.90	13

Well name	Collection Date	Duplic sample number	FBORON ppb 10/.	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s	FCHROMI ppb 10/50	CHROMUM ppb 10/50	CO-60 pCi/L 22.5/100r	COLIMF 100mL 1/1
2-E28-28	27 JUL 89		124	58,500	57,000	9,400	<10	35	+0.355	<1
2-E28-27	28 JUL 89		33	26,400	27,000	5,700	<10	27	+0.945	<1
	28 JUL 89	1	34	26,000	26,300	5,700	<10	26	+0.470	<1
2-E32-2	01 AUG 89		16	26,300	24,500	7,000	<10	123	+3.030	1
2-E32-4	19 JUL 89		82	43,000	44,200	9,220	<10	46	+0.378	.
2-E33-28	01 AUG 89		11	27,600	24,900	7,000	<10	49	+0.414	<1
2-E33-29	01 AUG 89		33	29,600	28,700	18,000	14	27	+2.650	<1
2-E33-30	01 AUG 89		24	31,600	27,300	17,000	<10	78	+1.010	8

Well name	Collection Date	Duplic sample number	COPPER ppb 10/1300p	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000	IRON ppb 30/300s	FIRON ppb 30/.	LEADGF ppb 5/50	MAGNES ppb 50/.	FMAGNES ppb 50/.
2-E28-28	27 JUL 89		11	+1.54	800	430	48	<5	14,200	13,500
2-E28-27	28 JUL 89		<10	+1.41	700	155	31	<5	8,200	8,120
	28 JUL 89	1	<10	+0.00	800	159	<30	<5	7,970	8,030
2-E32-2	01 AUG 89		13	+3.64	800	604	38	<5	7,310	8,220
2-E32-4	19 JUL 89		<10	+1.77	580	388	32	8	13,000	12,600
2-E33-28	01 AUG 89		<10	+0.00	<500	432	42	<5	7,280	8,350
2-E33-29	01 AUG 89		<10	+1.77	800	157	34	<5	8,690	9,390
2-E33-30	01 AUG 89		10	9.02	500	455	36	<5	8,250	9,910

Well name	Collection Date	Duplic sample number	MANGESE ppb 5/50s	NICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	RU-106 pCi/L 172.5/30r	SELENIUM ppb 5/10
2-E28-28	27 JUL 89		7	17	48,500	4,730	4,940	+0.1570	+4.61	5
2-E28-27	28 JUL 89		<5	10	30,700	5,140	5,200	+0.1180	+8.87	<5
	28 JUL 89	1	<5	13	31,000	5,160	5,050	0.1510	+14.60	<5
2-E32-2	01 AUG 89		17	64	20,900	5,540	4,840	0.2430	+40.90	<5
2-E32-4	19 JUL 89		7	25	29,600	5,990	6,130	0.4120	+32.50	<5
2-E33-28	01 AUG 89		8	24	4,000	5,110	4,420	+0.0166	+47.20	<5
2-E33-29	01 AUG 89		<5	15	7,100	5,740	5,320	+0.0434	+2.98	<5
2-E33-30	01 AUG 89		8	42	7,100	5,920	5,050	0.2180	+6.31	<5

TABLE 4.6. (contd)

Well name	Collection Date	Duplic sampl numbe	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 10/.	STRONTIUM ppb 10/.	SULFATE ppb 500/250000*
2-E28-26	27 JUL 89		17,700	18,000	26,800	24,900	1.110	232	243	69,700
2-E28-27	28 JUL 89		18,400	18,600	24,100	23,700	*-0.184	142	145	36,800
	28 JUL 89	1	18,200	18,100	23,100	23,600	*0.188	142	140	37,100
2-E32-2	01 AUG 89		19,100	17,700	21,400	24,700	*-0.359	142	126	32,000
2-E32-4	19 JUL 89		18,200	17,000	26,900	24,700	*-0.170	217	228	70,300
2-E33-28	01 AUG 89		18,600	18,700	13,100	14,900	*-0.209	142	128	25,300
2-E33-29	01 AUG 89		19,700	18,900	19,900	21,700	*0.163	166	160	29,100
2-E33-30	01 AUG 89		20,400	17,800	17,900	21,800	*-0.219	189	134	30,000

Well name	Collection Date	Duplicate sample number	TC-99 pCi/L 15/900r	TRITIUM pCi/L 500/20000	U pCi/L 0.5/800d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000*	FZINC ppb 5/5000*
2-E28-26	27 JUL 89		13.60	134,000	17.10	17	18	12	<5
2-E28-27	28 JUL 89		113.00	400,000	3.68	21	22	10	7
	28 JUL 89	1	111.00	396,000	3.48	23	23	<5	<5
2-E32-2	01 AUG 89		116.00	216,000	2.11	17	18	8	<5
2-E32-4	19 JUL 89		*8.22	41,700	9.32	16	17	<5	<5
2-E33-28	01 AUG 89		75.70	3,440	1.63	23	19	<5	<5
2-E33-29	01 AUG 89		45.30	7,140	1.48	21	21	<5	<5
2-E33-30	01 AUG 89		68.50	8,790	1.54	27	17	<5	7

The column headers consist of : Constituent Name
Analysis Units
Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 48938
- s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- d - based on Derived Concentration Guides in draft DOE Order 5400.xx
- m - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- # - Less than Contractual Detection Limit, measured value reported
- * - For radioactive constituents, reported value is less than 2-sigma error

TABLE 4.7. Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-2
July through August 1989

----- Constituent List=Contamination Indicator Parameters -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088 CONDLAB	umho	.	28	0	700 WDOE	Specific conductance, laboratory
191 CONDFLO	umho	1	28	0	700 WDOE	Specific conductance, field
199 PHFIELD		0.1	28	0	6.5-8.6 EPA5	pH, field
207 PH-LAB		0.01	28	0	6.5-8.6 EPA5	pH, laboratory
C69 TOC	ppb	2000	28	0	.	Total organic carbon
H42 TOXLDL	ppb	10	28	0	.	Total organic halogens, low DL

----- Constituent List=Interim Primary Drinking Water Parameters -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109 COLIFRM	MPN	2.2	4	4 ***	1 EPA	Coliform bacteria
111 BETA	pCi/L	8	7	0	50 EPA	Gross beta
112 ALPHAH1	pCi/L	4	7	0	15 EPA	Gross alpha, high DL
181 RADIUM	pCi/L	1	7	0	5 EPA	Radium, total
A08 BARIUM	ppb	6	7	0	1000 EPA	Barium
A07 CADMIUM	ppb	2	7	7 ***	10 EPA	Cadmium
A08 CHROMIUM	ppb	10	7	0	50 EPA	Chromium
A10 SILVER	ppb	10	7	7 ***	50 EPA	Silver
A20 ARSENIC	ppb	5	7	0	50 EPA	Arsenic
A21 MERCURY	ppb	0.1	7	7 ***	2 EPA	Mercury
A22 SELENIUM	ppb	5	7	5	10 EPA	Selenium
A33 ENDRIN	ppb	0.1	7	7 ***	0.2 EPA	Endrin
A34 METHLOR	ppb	3	7	7 ***	100 EPA	Methoxychlor
A35 TOXAENE	ppb	1	7	7 ***	5 EPA	Toxaphene
A36 a-BHC	ppb	0.1	7	7 ***	4 EPA	Lindane, alpha-BHC
A37 b-BHC	ppb	0.1	7	7 ***	4 EPA	Lindane, beta-BHC
A38 g-BHC	ppb	0.1	7	7 ***	4 EPA	Lindane, gamma-BHC
A39 d-BHC	ppb	0.1	7	7 ***	4 EPA	Lindane, delta-BHC
A51 LEADGF	ppb	6	7	7 ***	50 EPA	Lead (graphite furnace)
C72 NITRATE	ppb	500	7	0	45000 EPA	Nitrate
C74 FLUORID	ppb	500	7	5	4000 EPA	Fluoride
H13 2,4-D	ppb	2	7	7 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14 2,4,5TP	ppb	2	7	7 ***	10 EPA	2,4,5-TP silvex
H20 FBARIUM	ppb	6	7	0	1000 EPA	Barium, filtered
H21 FCADMIU	ppb	2	7	7 ***	10 EPA	Cadmium, filtered
H22 FCHROMI	ppb	10	7	5	50 EPA	Chromium, filtered
H23 FSILVER	ppb	10	7	7 ***	50 EPA	Silver, filtered
H37 FARSENI	ppb	5	7	1	50 EPA	Arsenic, filtered
H38 FMERCUR	ppb	0.1	7	7 ***	2 EPA	Mercury, filtered
H39 FSELENI	ppb	5	7	5	10 EPA	Selenium, filtered
H41 FLEAD	ppb	5	7	7 ***	50 EPA	Lead, filtered
P19 COLIMF	100mL	1	3	3 ***	1 EPA	Coliform (Membrane Filter)

TABLE 4.7. (contd)

----- Constituent List=Water Quality Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
A11 SODIUM	ppb	200	7	0	.	Sodium	
A17 MANGNESE	ppb	5	7	1	50 EPAS	Manganese	
A19 IRON	ppb	30	7	0	300 EPAS xxx	Iron	
C73 SULFATE	ppb	500	7	0	250000 EPAS	Sulfate	
C75 CHLORID	ppb	500	7	0	250000 EPAS	Chloride	
H24 FSODIUM	ppb	200	7	0	.	Sodium, filtered	
H29 FMANGAN	ppb	5	7	4	50 EPAS	Manganese, filtered	
H31 FIRON	ppb	30	7	2	. EPAS	Iron, filtered	
H57 LPHENOL	ppb	10	7	7 ***	.	Phenol, low DL	
----- Constituent List=Site Specific and Other Constituents -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
010 CO-60	pCi/L	22.5	7	0	100 EPAR	Cobalt-60	
024 CS-137	pCi/L	20	7	0	200 EPAR	Cesium-137	
034 RU-106	pCi/L	172.5	7	0	30 EPAR xxx	Ruthenium-106	
104 U	pCi/L	0.5	7	0	500 DOE	Uranium	
106 TRITIUM	pCi/L	500	7	0	20000 EPA	Tritium (H-3)	
121 SR-90	pCi/L	5	7	0	8 EPA	Strontium-90	
197 TC-99	pCi/L	15	7	0	900 EPAR	Technetium-99	
A01 BERYLUM	ppb	5	7	7 ***	.	Beryllium	
A03 STRONTIUM	ppb	10	7	0	.	Strontium	
A04 ZINC	ppb	5	7	0	5000 EPAS	Zinc	
A05 CALCIUM	ppb	50	7	0	.	Calcium	
A12 NICKEL	ppb	10	7	0	.	Nickel	
A19 COPPER	ppb	10	7	5	1300 EPAP	Copper	
A14 VANADIUM	ppb	5	7	0	.	Vanadium	
A15 ANTIMONY	ppb	100	7	7 ***	.	Antimony	
A16 ALUMINUM	ppb	150	7	4	.	Aluminum	
A18 POTASSIUM	ppb	100	7	0	.	Potassium	
A50 MAGNESIUM	ppb	50	7	0	.	Magnesium	
C76 PHOSPHA	ppb	1000	7	7 ***	.	Phosphate	
H18 FZINC	ppb	5	7	5	5000 EPAS	Zinc, filtered	
H19 FCALCIU	ppb	50	7	0	.	Calcium, filtered	
H25 FNICKEL	ppb	10	7	5	.	Nickel, filtered	
H26 FCOPPER	ppb	10	7	7 ***	1300 EPAP	Copper, filtered	
H27 FVANADI	ppb	5	7	0	.	Vanadium, filtered	
H28 FALUMIN	ppb	150	7	5	.	Aluminum, filtered	
H30 FPOTASS	ppb	100	7	0	.	Potassium, filtered	
H32 FMAGNES	ppb	50	7	0	.	Magnesium, filtered	
H33 FBERYLL	ppb	5	7	7 ***	.	Beryllium, filtered	
H35 FSTRONT	ppb	10	7	0	.	Strontium, filtered	
H36 FANTIMO	ppb	100	7	7 ***	.	Antimony, filtered	
H55 BROMIDE	ppb	1000	7	7 ***	.	Bromide	
H57 NITRITE	ppb	1000	7	7 ***	.	Nitrite	

TABLE 4.7. (contd)

Constituent List=Site Specific and Other Constituents						
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded Full name
H85	FBORON	ppb	10	7	0	. Boron, filtered
H87	FCOBALT	ppb	20	7	7 ***	. Cobalt, filtered
H88	FLITHIU	ppb	10	7	7 ***	. Lithium, filtered
H89	FMOLY	ppb	40	7	7 ***	. Molybdenum, filtered
H90	FSILICO	ppb	50	7	0	. Silicon, filtered
H91	FTIN	ppb	30	7	7 ***	. Tin, filtered
H92	FTITAN	ppb	50	7	7 ***	. Titanium, filtered
H93	FZIRCON	ppb	50	7	7 ***	. Zirconium, filtered
P01	BORON	ppb	10	7	1	. Boron
P02	COBALT	ppb	20	7	7 ***	. Cobalt
P03	LITHIUM	ppb	10	7	7 ***	. Lithium
P04	MOLY	ppb	40	7	7 ***	. Molybdenum
P05	SILICON	ppb	50	7	0	. Silicon
P06	TIN	ppb	30	7	7 ***	. Tin
P07	TITAN	ppb	50	7	8	. Titanium
P08	ZIRCON	ppb	50	7	7 ***	. Zirconium

Constituent List=WAC 173-303-9905 Constituents						
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded Full name
A81	TETRANE	ppb	5	7	5	5 EPA Tetrachloromethane [Carbon Tetrachloride]
A82	BENZENE	ppb	5	7	7 ***	5 EPA Benzene
A84	METHONE	ppb	10	7	7 ***	. Methyl ethyl ketone
A86	TOLUENE	ppb	5	7	7 ***	2000 EPAP Toluene
A87	1,1,1-T	ppb	5	7	7 ***	200 EPA 1,1,1-Trichloroethane
A88	1,1,2-T	ppb	5	7	7 ***	. 1,1,2-Trichloroethane
A89	TRICENE	ppb	5	7	7 ***	5 EPA Trichloroethylene [1,1,2-Trichloroethane]
A70	PERCENE	ppb	5	7	7 ***	. Perchloroethylene [Tetrachloroethane]
A71	OPXYLE	ppb	5	7	7 ***	440 EPAP Xylene-o,p
A80	CHLFORM	ppb	5	7	7 ***	100 EPA Chloroform [Trichloromethane]
A89	1,1-DIC	ppb	5	7	7 ***	. 1,1-Dichloroethane
A90	1,2-DIC	ppb	5	7	7 ***	5 EPA 1,2-Dichloroethane
A91	TRANOCE	ppb	5	7	7 ***	70 EPAP trans-1,2-Dichloroethane
A93	METHYCH	ppb	5	7	5	. Methylene chloride [Dichloromethane]
B13	VINYIDE	ppb	10	7	7 ***	2 EPA Vinyl chloride
B14	M-XYLE	ppb	5	7	7 ***	440 EPAP Xylene-m
C70	CYANIDE	ppb	10	7	7 ***	. Cyanide
C80	AMMONIU	ppb	50	7	7 ***	. Ammonium ion
H15	2,4,6-T	ppb	2	7	7 ***	. 2,4,6-T
H88	HEXONE	ppb	10	7	7 ***	. Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	7	5	. Acetone by VDA
I28	TAF	ppb	10	7	7 ***	. Tetrahydrofuran
L63	14DBEN	ppb	5	7	7 ***	75 EPA 1,4-Dichlorobenzene [p-Dichlorobenzene]

TABLE 4.7. (contd)

- *** - Indicates all samples were reported as below contractual detection limits
- xxx - Indicates that Drinking Water standards were exceeded
- EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- EPAN - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
- EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
- EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx
- WDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

**TABLE 4.5. Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-2
July through August 1989**

Quadruplicate Contamination Indicator Parameters								
Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
2-E27-8	27 JUL 89		333	287	8.00	8.00	#500	#1
		1	332	288	8.00	7.99	#600	#1
		2	332	288	8.00	7.99	#600	#3
		3	332	288	8.00	7.98	#500	#3
2-E27-9	27 JUL 89		341	298	8.00	7.97	#600	#8
		1	343	298	8.00	7.98	#500	#2
		2	342	298	8.00	7.98	#500	#3
		3	342	297	8.00	7.98	#400	#3
2-E27-10	21 JUL 89		208	245	8.10	8.08	#500	#8
		1	208	242	8.10	8.08	#500	#5
		2	208	241	8.10	8.09	#500	#5
		3	208	243	8.10	8.10	#600	#3
2-E34-2	01 AUG 89		483	459	8.00	7.89	#400	#1
		1	484	457	8.00	7.88	#500	#1
		2	483	459	8.00	7.89	#600	#2
		3	483	459	8.00	7.87	#700	#-1
2-E34-3	31 JUL 89		286	287	8.00	7.98	#700	#2
		1	287	287	8.10	7.96	#500	#3
		2	286	288	8.10	7.94	#800	#3
		3	286	287	8.10	7.94	#500	#2
2-E34-5	31 JUL 89		487	484	8.00	8.01	#600	#3
		1	487	483	8.00	8.00	#400	#-1
		2	486	485	8.00	7.99	#900	#1
		3	487	485	8.00	7.99	#500	#1
2-E34-6	31 JUL 89		418	431	8.10	7.71	#600	#7
		1	401	429	8.10	7.75	#400	#3
		2	424	430	8.10	7.89	#400	#9
		3	423	430	8.10	7.70	#400	#7

TABLE 4-8. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALPHAHT pCi/L 4/15	FALUMIN ppb 150/.	ALUMINUM ppb 150/.	ARSENIC ppb 5/50	FARSENIT ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000
2-E27-8	27 JUL 89		<10	*1.480	<150	<150	8	7.0	33	33
2-E27-9	27 JUL 89		<10	*0.802	<150	298	9	7.0	42	34
2-E27-10	21 JUL 89		<10	2.410	<150	837	7	8.6	37	32
2-E34-2	01 AUG 89		<10	*1.170	313	339	8	8.0	39	39
2-E34-3	31 JUL 89		<10	1.620	<150	<150	7	11.0	45	49
2-E34-5	31 JUL 89		<10	2.990	<150	<150	7	10.0	30	30
2-E34-6	31 JUL 89		#9(a)	*1.040	<150	<150	5	.	32	.
	01 AUG 89		.	.	<150	.	.	<5.0	.	38

Well name	Collection Date	Duplicate sample number	BETA pCi/L 5/50	BORON ppb 10/.	FBORON ppb 10/.	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000*	FCHROMI ppb 10/50	CHROMIUM ppb 10/50
2-E27-8	27 JUL 89		5.88	<10	17	38,500	38,000	7,500	<10	31
2-E27-9	27 JUL 89		8.22	16	15	36,300	39,100	7,800	<10	50
2-E27-10	21 JUL 89		7.18	17	13	30,800	29,900	4,440	<10	39
2-E34-2	01 AUG 89		7.12	11	17	51,000	46,300	12,000	76	182
2-E34-3	31 JUL 89		7.49	14	17	37,200	33,700	8,500	<10	89
2-E34-5	31 JUL 89		8.28	27	22	54,100	50,700	22,000	<10	74
2-E34-6	31 JUL 89		18.00	26	.	.	41,900	19,000	.	117
	01 AUG 89		.	.	26	44,100	.	.	<10	.

Well name	Collection Date	Duplicate sample number	CD-60 pCi/L 22.5/100r	COPPER ppb 10/1300p	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000	IRON ppb 30/300*	FIRON ppb 30/.	MAGNES ppb 50/.
2-E27-8	27 JUL 89		*0.202	<10	*-3.280	<500	188	32	9,770
2-E27-9	27 JUL 89		*-9.420	<10	*0.441	<500	813	35	11,000
2-E27-10	21 JUL 89		*-8.500	<10	*5.300	<500	1,370	33	7,640
2-E34-2	01 AUG 89		*2.230	<10	*3.760	800	1,380	863	12,800
2-E34-3	31 JUL 89		*1.140	<10	*-2.470	<500	381	<30	9,070
2-E34-5	31 JUL 89		*-1.860	<10	*-2.230	<500	378	51	14,300
2-E34-6	31 JUL 89		*0.534	11	*-0.993	600	580	.	11,300
	01 AUG 89		.	.	.	.	.	<30	.

Well name	Collection Date	Duplicate sample number	FMAGNES ppb 50/.	FMANGAN ppb 5/50*	MANGESE ppb 5/50*	METHYCH ppb 5/.	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.
2-E27-8	27 JUL 89		10,200	<5	<5	<5	16	<10	7,600	7,010
2-E27-9	27 JUL 89		9,980	<5	17	<5	24	<10	8,200	8,480
2-E27-10	21 JUL 89		7,570	<5	26	<5	21	<10	3,150	5,830
2-E34-2	01 AUG 89		14,300	27	38	<5	91	40	13,700	7,880
2-E34-3	31 JUL 89		10,400	<5	8	<5	42	<10	4,800	7,010
2-E34-5	31 JUL 89		15,800	5	12	<5	54	21	13,400	8,370
2-E34-6	31 JUL 89		.	.	41	#3	58	.	8,400	.
	01 AUG 89		12,300	15	.	.	.	<10	.	8,040

TABLE 4.5. (contd)

Well name	Collection Date	Duplicate sample number	POTASUM ppb 100/.	RADIUM pCi/L 1/5	RU-106 pCi/L 172.5/30r	FSELENI ppb 5/10	SELENIUM ppb 5/10	FSILICO ppb 60/.	SILICON ppb 50/.	SODIUM ppb 200/.
2-E27-8	27 JUL 89		6,640	*0.0292	*24.00	<5	<5	20,900	19,500	16,000
2-E27-9	27 JUL 89		7,030	*0.0973	*23.10	<5	<5	20,500	20,900	18,300
2-E27-10	21 JUL 89		5,620	*0.1210	*69.10	<5	<5	17,600	18,100	12,600
2-E34-2	01 AUG 89		7,020	0.5180	*34.70	7	5	21,300	19,400	25,200
2-E34-3	31 JUL 89		6,200	0.1980	*12.00	<5	<5	20,900	19,400	13,800
2-E34-5	31 JUL 89		8,000	0.2100	*25.20	<5	5	20,000	19,000	31,500
2-E34-6	31 JUL 89		7,810	*0.0784	*7.46	<5	<5		18,100	33,200
	01 AUG 89					<5		17,600		

Well name	Collection Date	Duplicate sample number	FSODIUM ppb 200/.	SR-90 pCi/L 5/5	FSTROMT ppb 10/.	STRONIUM ppb 10/.	SULFATE ppb 500/250000*	TC-99 pCi/L 15/900r	TETRANE ppb 5/5	TITAN ppb 50/.
2-E27-8	27 JUL 89		15,500	*-0.2890	187	177	49,100	*-0.4930	<5	<60
2-E27-9	27 JUL 89		10,600	*-0.0822	175	192	53,100	*0.0253	<5	<60
2-E27-10	21 JUL 89		12,600	*-0.1770	151	149	18,000	*0.9280	<5	75
2-E34-2	01 AUG 89		28,700	*0.1700	251	222	118,000	*-0.5170	<5	<60
2-E34-3	31 JUL 89		15,600	*0.1240	199	175	34,000	*-1.3800	<5	<60
2-E34-5	31 JUL 89		33,400	*-0.3230	274	248	107,000	*-0.8830	53	<60
2-E34-6	31 JUL 89			*-0.2120		220	91,000	*0.1320	<5	<60
	01 AUG 89		35,400		245					

Well name	Collection Date	Duplicate sample number	TRITIUM pCi/L 500/20000	U pCi/L 0.5/800d	FVANADI ppb 5/.	YANADUM ppb 5/.	ZINC ppb 5/5000*	FZINC ppb 5/5000*
2-E27-8	27 JUL 89		12,200	2.52	27	27	10	<5
2-E27-9	27 JUL 89		14,200	1.74	27	33	22	<5
2-E27-10	21 JUL 89		7,700	2.31	25	27	23	<5
2-E34-2	01 AUG 89		3,470	1.57	21	19	19	9
2-E34-3	31 JUL 89		8,310	1.88	29	22	8	<5
2-E34-5	31 JUL 89		*99	3.18	20	21	18	354
2-E34-6	31 JUL 89		389	2.93		15	10	
	01 AUG 89				9			<5

The column headers consist of : Constituent Name

Analysis Units

Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 46938
- s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- d - based on Derived Concentration Guides in draft DOE Order 5400.xx
- * - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- # - Less than Contractual Detection Limit, measured value reported
- * - For radioactive constituents, reported value is less than 2-sigma error

(a) Suspect data. The reagent blank for this group showed contamination for this constituent.

TABLE 4.9. Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-3
July 1989

----- Constituent List=Contamination Indicator Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded		Full name
088 CONDLAB	umho	.	44	0	700 WDOE		Specific conductance, laboratory
191 CONDFLD	umho	1	44	0	700 WDOE		Specific conductance, field
199 PHFIELD		0.1	44	0	6.5-8.5 EPAS	xxx	pH, field
207 PH-LAB		0.01	44	0	6.5-8.5 EPAS		pH, laboratory
C89 TOC	ppb	2000	44	0	.		Total organic carbon
H42 TOXLDL	ppb	10	42	0	.		Total organic halogens, low DL

----- Constituent List=Interim Primary Drinking Water Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded		Full name
109 COLIFRM	MPN	2.2	8	5 ***	1 EPA		Coliform bacteria
111 BETA	pCi/L	8	12	0	50 EPA		Gross beta
112 ALPHAHI	pCi/L	4	12	0	15 EPA		Gross alpha, high DL
181 RADIUM	pCi/L	1	12	0	5 EPA		Radium, total
A06 BARIUM	ppb	8	12	0	1000 EPA		Barium
A07 CADMIUM	ppb	2	12	11	10 EPA		Cadmium
A08 CHROMIUM	ppb	10	12	0	50 EPA	xxx	Chromium
A10 SILVER	ppb	10	12	12 ***	50 EPA		Silver
A20 ARSENIC	ppb	5	12	12 ***	50 EPA		Arsenic
A21 MERCURY	ppb	0.1	12	12 ***	2 EPA		Mercury
A22 SELENIUM	ppb	5	12	12 ***	10 EPA		Selenium
A33 ENDRIIN	ppb	0.1	12	12 ***	0.2 EPA		Endrin
A34 METHLOR	ppb	3	12	12 ***	100 EPA		Methoxychlor
A36 TOXAENE	ppb	1	12	12 ***	5 EPA		Toxaphene
A36 a-BHC	ppb	0.1	12	12 ***	4 EPA		Lindene, alpha-BHC
A37 b-BHC	ppb	0.1	12	12 ***	4 EPA		Lindene, beta-BHC
A38 g-BHC	ppb	0.1	12	12 ***	4 EPA		Lindene, gamma-BHC
A39 d-BHC	ppb	0.1	12	12 ***	4 EPA		Lindene, delta-BHC
A61 LEADGF	ppb	5	12	11	50 EPA		Lead (graphite furnace)
C72 NITRATE	ppb	500	12	0	45000 EPA	xxx	Nitrate
C74 FLUORID	ppb	500	12	12 ***	4000 EPA		Fluoride
H13 2,4-D	ppb	2	12	12 ***	100 EPA		2,4-D [2,4-Dichlorophenoxyacetic acid]
H14 2,4,5TP	ppb	2	12	12 ***	10 EPA		2,4,5-TP silvex
H20 FBARIUM	ppb	8	12	0	1000 EPA		Barium, filtered
H21 FCADMIU	ppb	2	12	12 ***	10 EPA		Cadmium, filtered
H22 FCHROMI	ppb	10	12	5	50 EPA		Chromium, filtered
H23 FSILVER	ppb	10	12	12 ***	50 EPA		Silver, filtered
H37 FARSENI	ppb	5	12	12 ***	50 EPA		Arsenic, filtered
H38 FMERCUR	ppb	0.1	12	12 ***	2 EPA		Mercury, filtered
H39 FSELENI	ppb	5	12	12 ***	10 EPA		Selenium, filtered
H41 FLEAD	ppb	5	12	12 ***	50 EPA		Lead, filtered
H80 TURBID	ntu	0.1	10	0	1 EPA	xxx	Turbidity, nephelometric
P19 COLIMF	100mL	1	8	4	1 EPA	xxx	Coliform (Membrane Filter)

TABLE 4-9. (contd)

----- Constituent List=Water Quality Parameters -----								
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded			Full name
A11 SODIUM	ppb	200	12	0	.			Sodium
A17 MANGESE	ppb	5	12	5	60 EPAS	xxx		Manganese
A19 IRON	ppb	30	12	0	300 EPAS	xxx		Iron
C73 SULFATE	ppb	500	12	0	250000 EPAS			Sulfate
C76 CHLORID	ppb	500	12	0	250000 EPAS			Chloride
H24 FSODIUM	ppb	200	12	0	.			Sodium, filtered
H29 FMANGAN	ppb	5	12	7	50 EPAS	xxx		Manganese, filtered
H31 FIRON	ppb	30	12	5	. EPAS			Iron, filtered
H67 LPHENOL	ppb	10	12	12 ***	.			Phenol, low DL
----- Constituent List=Site Specific and Other Constituents -----								
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded			Full name
D10 CO-60	pCi/L	22.6	12	0	100 EPAR			Cobalt-60
D24 CS-137	pCi/L	20	12	0	200 EPAR			Cesium-137
D34 RU-106	pCi/L	172.5	12	0	30 EPAR	xxx		Ruthenium-106
100 PU39-40	pCi/L	17	12	0	30 DOE			Plutonium-239,240
102 PU-238	pCi/L	17	12	0	40 DOE			Plutonium-238
104 U	pCi/L	0.5	12	0	600 DOE			Uranium
106 AM-241	pCi/L	0.1	12	0	30 DOE			Americium-241
108 TRITIUM	pCi/L	500	12	0	20000 EPA			Tritium (H-3)
121 SR-90	pCi/L	5	12	0	8 EPA			Strontium-90
197 TC-99	pCi/L	15	12	0	900 EPAR			Technetium-99
A01 BERYLIUM	ppb	5	12	11	.			Beryllium
A03 STRONTIUM	ppb	10	12	0	.			Strontium
A04 ZINC	ppb	5	12	4	5000 EPAS			Zinc
A05 CALCIUM	ppb	50	12	0	.			Calcium
A12 NICKEL	ppb	10	12	1	.			Nickel
A13 COPPER	ppb	10	12	9	1300 EPAP			Copper
A14 VANADIUM	ppb	5	12	0	.			Vanadium
A16 ANTIMONY	ppb	100	12	12 ***	.			Antimony
A18 ALUMINUM	ppb	150	12	10	.			Aluminum
A19 POTASSIUM	ppb	100	12	0	.			Potassium
A60 MAGNESIUM	ppb	50	12	0	.			Magnesium
C76 PHOSPHATE	ppb	1000	12	12 ***	.			Phosphate
H18 FZINC	ppb	5	12	5	5000 EPAS			Zinc, filtered
H19 FCALCIUM	ppb	50	12	0	.			Calcium, filtered
H25 FNICKEL	ppb	10	12	10	.			Nickel, filtered
H26 FCOPPER	ppb	10	12	12 ***	1300 EPAP			Copper, filtered
H27 FVANADIUM	ppb	5	12	0	.			Vanadium, filtered
H28 FALUMINUM	ppb	150	12	12 ***	.			Aluminum, filtered
H30 FPOTASSIUM	ppb	100	12	0	.			Potassium, filtered
H32 FMAGNESIUM	ppb	50	12	0	.			Magnesium, filtered
H33 FBERYLLIUM	ppb	5	12	12 ***	.			Beryllium, filtered

TABLE 4.9. (contd)

----- Constituent List=Site Specific and Other Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H36 FSTRONT	ppb	10	12	0	.	Strontium, filtered
H38 FANTIOM	ppb	100	12	12 ***	.	Antimony, filtered
H68 BROMIDE	ppb	1000	12	12 ***	.	Bromide
H87 NITRITE	ppb	1000	12	12 ***	.	Nitrite
H88 FBORON	ppb	10	12	0	.	Boron, filtered
H87 FCOBALT	ppb	20	12	12 ***	.	Cobalt, filtered
H88 FLITHIU	ppb	10	12	12 ***	.	Lithium, filtered
H89 FMOLY	ppb	40	12	12 ***	.	Molybdenum, filtered
H90 FSILICO	ppb	50	12	0	.	Silicon, filtered
H91 FTIN	ppb	30	12	12 ***	.	Tin, filtered
H92 FTITAN	ppb	60	12	12 ***	.	Titanium, filtered
H93 FZIRCON	ppb	50	12	12 ***	.	Zirconium, filtered
P01 BORON	ppb	10	12	1	.	Boron
P02 COBALT	ppb	20	12	12 ***	.	Cobalt
P03 LITHIUM	ppb	10	12	11	.	Lithium
P04 MOLY	ppb	40	12	12 ***	.	Molybdenum
P05 SILICON	ppb	50	12	0	.	Silicon
P06 TIN	ppb	30	12	12 ***	.	Tin
P07 TITAN	ppb	60	12	12 ***	.	Titanium
P08 ZIRCON	ppb	50	12	12 ***	.	Zirconium

----- Constituent List=WAC 173-303-8906 Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A81 TETRANE	ppb	5	12	7	5 EPA xxx	Tetrachloromethane [Carbon Tetrachloride]
A82 BENZENE	ppb	5	12	12 ***	5 EPA	Benzene
A84 METHONE	ppb	10	12	12 ***	.	Methyl ethyl ketone
A86 TOLUENE	ppb	5	12	12 ***	2000 EPAP	Toluene
A87 1,1,1-T	ppb	5	12	12 ***	200 EPA	1,1,1-Trichloroethane
A88 1,1,2-T	ppb	5	12	12 ***	.	1,1,2-Trichloroethane
A89 TRICENE	ppb	5	12	12 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethene]
A70 PERCENE	ppb	5	12	12 ***	.	Perchloroethylene [Tetrachloroethene]
A71 OPXYLE	ppb	5	12	12 ***	440 EPAP	Xylene-o,p
A80 CHLFORM	ppb	5	12	11	100 EPA	Chloroform [Trichloromethane]
A89 1,1-DIC	ppb	5	12	12 ***	.	1,1-Dichloroethane
A90 1,2-DIC	ppb	5	12	12 ***	5 EPA	1,2-Dichloroethane
A91 TRANOCE	ppb	5	12	12 ***	70 EPAP	trans-1,2-Dichloroethene
A93 METHYCH	ppb	5	12	12 ***	.	Methylene chloride [Dichloromethane]
B13 VINYLOE	ppb	10	12	12 ***	2 EPA	Vinyl chloride
B14 M-XYLE	ppb	5	12	12 ***	440 EPAP	Xylene-m
C70 CYANIDE	ppb	10	12	12 ***	.	Cyanide
C80 AMMONIU	ppb	50	12	12 ***	.	Ammonium ion
H15 2,4,6-T	ppb	2	12	12 ***	.	2,4,6-T
H68 HEXONE	ppb	10	12	12 ***	.	Hexone [Methyl isobutyl ketone]
I01 ACETONE	ppb	10	12	10	.	Acetone by VOA
I28 TAF	ppb	10	12	12 ***	.	Tetrahydrofuran
L63 14DBEN	ppb	5	12	12 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]

TABLE 4.9. (contd)

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx
WDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

**TABLE 4.10. Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-3
July 1989**

Quadruplicate Contamination Indicator Parameters								
Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
2-W6-2	21 JUL 89		395	378	8.00	7.65	#800	87
		1	393	375	8.00	7.66	#400	76
		2	391	375	8.00	7.66	#700	81
		3	392	380	8.00	7.67	#600	81
2-W7-1	10 JUL 89		354	362	7.90	7.26	#500	#1
		1	354	358	8.00	7.26	#500	#1
		2	354	354	8.00	7.23	#400	#4
		3	354	359	8.00	7.24	#600	#6
2-W7-2	20 JUL 89		279	277	8.00	8.00	#300	146
		1	274	274	8.00	7.99	#300	#4
		2	275	274	8.00	7.98	#300	#1
		3	274	276	8.00	7.97	#400	#5
2-W7-3	28 JUL 89		245	276	8.10	8.00	#400	197
		1	245	275	8.20	8.00	#400	M
		2	245	275	8.10	8.00	#400	M
		3	245	276	8.10	8.00	#400	253
2-W7-4	24 JUL 89		510	405	8.00	7.80	#800	855
		1	505	405	8.00	7.80	#1,100	1,040
		2	505	408	8.00	7.80	#700	1,540
		3	505	407	8.00	7.80	#600	856
2-W7-5	25 JUL 89		348	328	8.10	7.84	#400	32
		1	348	327	8.00	7.83	#700	32
		2	351	329	8.00	7.81	#400	30
		3	349	331	8.00	7.81	#500	29
2-W7-6	26 JUL 89		355	296	8.40	9.00	#800	#6
		1	355	301	8.40	9.00	#700	#4
		2	350	301	8.40	9.00	#700	#5
		3	340	301	8.40	9.00	#800	#0
2-W8-1	10 JUL 89		371	363	8.00	7.43	#500	#9
		1	370	364	8.00	7.41	#500	#3
		2	371	364	7.90	7.43	#500	#3
		3	370	364	8.00	7.43	#600	#4
2-W9-1	10 JUL 89		352	360	8.10	7.63	#400	#9
		1	352	353	8.20	7.69	#400	#4
		2	352	362	8.10	7.66	#800	#8
		3	352	361	8.20	7.69	#400	#9

TABLE 4.10. (contd)

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho /700w	PH-LAB 0.01/8.5w	PHFIELD 0.1/8.5w	TOC ppb 2000/.	TOXLDL ppb 10/.
2-W10-13	25JUL89		324	313	8.00	7.80	#400	26
		1	328	310	8.00	7.79	#400	20
		2	328	309	8.00	7.79	#400	18
		3	328	310	8.00	7.79	#400	23
2-W10-14	27JUL89		300	293	7.90	7.80	#300	#2
		1	300	288	7.90	7.85	#300	#2
		2	305	289	7.90	7.85	#300	#0
		3	300	288	7.90	7.80	#300	#4

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALPHAHI pCi/L 4/15	ALUMINUM ppb 150/.	AM-241 pCi/L 0.1/30d	BARIUM ppb 6/1000	FBARIUM ppb 6/1000	BERYLUM ppb 5/.	BETA pCi/L 8/50
2-W6-2	21JUL89	1	<10	2.4100	<150	*-0.007530	39	39	<5	12.30
	21JUL89		<10	2.5000	<150	*-0.001280	36	36	<5	15.80
2-W7-1	10JUL89		<10	*0.3500	<150	*-0.002090	32	31	<5	3.11
2-W7-2	20JUL89		<10	*0.4320	<150	*-0.011300	32	35	<5	3.80
2-W7-3	28JUL89		<10	2.4800	<150	*-0.004420	39	40	<5	8.89
2-W7-4	24JUL89		#9(a)	2.6500	<150	*-0.007140	35	34	<5	15.70
2-W7-5	25JUL89		<10	3.6000	<150	*-0.004160	34	33	<5	7.57
2-W7-6	26JUL89		<10	14.1000	17800	*-0.007140	209	37	<5	10.10
2-W8-1	10JUL89		<10	*-0.0901	<150	*-0.016500	36	34	<5	7.53
2-W9-1	10JUL89		<10	*0.7580	518	*-0.000733	44	44	8	5.07
2-W10-13	25JUL89		#9(a)	*0.2490	<150	*-0.007140	30	31	<5	7.24
2-W10-14	27JUL89		<10	*0.8200	<150	*-0.000904	64	64	<5	4.07

Well name	Collection Date	Duplicate sample number	BORON ppb 10/.	FBORON ppb 10/.	CADMIUM ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLFORM ppb 5/100	CHLORID ppb 500/250000w	FCHROMI ppb 10/50
2-W6-2	21JUL89	1	13	15	<2	45,700	45,100	<5	5,680	38
	21JUL89		15	12	<2	42,700	41,200	<5	5,570	32
2-W7-1	10JUL89		19	19	<2	48,400	49,200	<5	9,820	<10
2-W7-2	20JUL89		14	13	<2	33,900	29,700	<5	3,750	12
2-W7-3	28JUL89		16	21	<2	30,500	29,300	<5	4,500	<10
2-W7-4	24JUL89		14	12	<2	53,400	55,600	8	18,700	11
2-W7-5	25JUL89		<10	12	<2	43,000	39,000	<5	13,900	10
2-W7-6	26JUL89		28	21	4	18,400	29,000	<5	6,200	<10
2-W8-1	10JUL89		16	16	<2	43,500	42,900	<5	15,900	12
2-W9-1	10JUL89		16	24	<2	42,200	39,200	<5	19,400	11
2-W10-13	25JUL89		11	21	<2	39,900	37,900	<5	22,800	<10
2-W10-14	27JUL89		10	15	<2	33,800	32,300	<5	9,300	<10

TABLE 4.10. (contd)

Well name	Collection Date	Duplicate sample number	CHROMIUM ppb 10/50	CO-60 pCi/L 22.5/100r	COLIMF 100mL 1/1	COPPER ppb 10/1300p	CS-137 pCi/L 20/200r	IRON ppb 30/300s	FIROM ppb 30/.s	LEADGF ppb 5/50
2-W6-2	21 JUL 89	1	55	*2.850	30	<10	*1.410	99	<30	<5
21 JUL 89			44	*3.020	25	<10	*2.470	68	<30	<5
2-W7-1	10 JUL 89		37	*5.850	.	<10	*-3.010	171	39	<5
2-W7-2	20 JUL 89		34	*-1.780	.	<10	*-0.221	220	72	<5
2-W7-3	28 JUL 89		83	*2.270	.	<10	*-1.120	898	248	<5
2-W7-4	24 JUL 89		23	*-0.588	<1	<10	4.590	89	<30	<5
2-W7-5	25 JUL 89		23	*2.220	<1	<10	*-2.250	92	<30	<5
2-W7-6	28 JUL 89		19	*-4.450	.	12	*0.000	14,200	<30	34
2-W8-1	10 JUL 89		54	*-3.090	.	<10	*-4.970	302	38	<5
2-W9-1	10 JUL 89		186	8.280	.	17	*1.130	4,520	108	<5
2-W10-13	25 JUL 89		24	7.290	<1	25	*0.552	133	38	<5
2-W10-14	27 JUL 89		43	8.200	<1	<10	*0.745	217	38	<5
Well name	Collection Date	Duplicate sample number	LITHIUM ppb 10/.	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000
2-W6-2	21 JUL 89	1	<10	18,000	18,000	<5	<5	12	<10	74,500
21 JUL 89			<10	16,400	17,000	<5	<5	<10	<10	73,200
2-W7-1	10 JUL 89		<10	14,900	14,800	13	15	19	<10	45,100
2-W7-2	20 JUL 89		<10	13,300	15,100	<5	<5	13	<10	25,800
2-W7-3	28 JUL 89		<10	11,300	12,200	164	159	42	<10	3,300
2-W7-4	24 JUL 89		<10	16,800	16,000	<5	<5	12	<10	77,000
2-W7-5	25 JUL 89		<10	13,600	13,900	<5	<5	15	<10	44,800
2-W7-6	28 JUL 89		20	12,900	5,590	6	228	15	<10	5,600
2-W8-1	10 JUL 89		<10	13,000	13,300	<5	9	24	<10	30,400
2-W9-1	10 JUL 89		<10	14,800	14,800	8	62	112	15	18,500
2-W10-13	25 JUL 89		<10	11,800	11,900	7	7	27	21	8,000
2-W10-14	27 JUL 89		<10	11,800	11,900	<5	8	24	<10	22,200
Well name	Collection Date	Duplicate sample number	FPOTASS ppb 100/.	POTASUM ppb 100/.	PU-238 pCi/L 17/40d	PU38-40 pCi/L 17/30d	RADIUM pCi/L 1/5	RU-106 pCi/L 172.5/30r	FSILICO ppb 50/.	SILICON ppb 50/.
2-W6-2	21 JUL 89	1	3,480	3,410	*-0.001440	*-0.001870	0.1690	*5.92	19,900	19,900
21 JUL 89			3,240	3,110	*-0.001440	*0.001770	*0.0895	*-8.87	18,700	18,100
2-W7-1	10 JUL 89		3,900	3,940	*0.000501	*-0.002100	0.3280	*-21.80	14,600	20,700
2-W7-2	20 JUL 89		2,750	2,420	*-0.001440	*-0.004270	0.1910	*-2.78	20,800	18,500
2-W7-3	28 JUL 89		5,130	4,870	*0.001600	*-0.000185	*0.1370	*21.80	19,900	19,800
2-W7-4	24 JUL 89		3,340	3,510	*-0.001440	*-0.000185	0.3240	*-11.80	18,200	17,000
2-W7-5	25 JUL 89		3,360	3,370	*-0.001440	*0.002140	0.2710	53.20	17,800	17,300
2-W7-6	28 JUL 89		3,010	4,290	*-0.003240	*-0.000185	4.1300	*-9.37	17,600	14,800
2-W8-1	10 JUL 89		3,550	3,540	*-0.001440	*-0.000185	0.5740	*-35.10	18,600	18,200
2-W9-1	10 JUL 89		4,540	4,490	*0.003240	*0.002170	*0.1290	*24.90	17,400	17,300
2-W10-13	25 JUL 89		3,940	3,870	*-0.001440	*0.004110	*0.0221	*-11.10	22,900	21,700
2-W10-14	27 JUL 89		4,850	4,550	*-0.001440	*0.004850	0.2880	*12.50	22,200	20,900

TABLE 4.10. (contd)

Well name	Collection Date	Duplicate sample number	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 10/.	STRONTIUM ppb 10/.	SULFATE ppb 500/250000*	TC-99 pCi/L 15/900r	TETRANE ppb 5/6
2-W6-2	21JUL89	1	10,900	10,900	*0.12900	256	255	27,200	82.000	99
	21JUL89		9,920	10,300	*0.31500	241	234	27,000	83.300	102
2-W7-1	10JUL89		9,610	9,500	*-0.38000	181	186	51,700	8.900	<5
2-W7-2	20JUL89		8,870	9,520	*-0.30600	174	151	26,400	*2.960	<5
2-W7-3	28JUL89		19,100	20,000	*-0.12700	163	154	25,500	*-0.648	<5
2-W7-4	24JUL89		8,570	8,080	*-0.25400	234	243	32,200	88.700	220
2-W7-5	25JUL89		9,830	9,610	*0.06200	177	171	28,300	19.800	27
2-W7-6	26JUL89		51,400	44,600	*0.80000	133	289	32,400	*-0.378	<5
2-W8-1	10JUL89		9,420	9,680	*0.12700	165	150	49,000	18.300	<5
2-W9-1	10JUL89		10,800	10,800	*-0.00471	168	168	49,400	17.700	<5
2-W10-13	25JUL89		11,300	11,200	*-0.79300	170	164	23,600	19.000	18
2-W10-14	27JUL89		16,700	16,600	*0.19300	180	174	28,400	*-1.160	<5

Well name	Collection Date	Duplicate sample number	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/1	U pCi/L 0.5/800d	FVANADI ppb 5/.	VANADIUM ppb 5/.	ZINC ppb 5/5000*	FZINC ppb 5/5000*
2-W6-2	21JUL89	1	14,000	0.54	1.390	31	30	<5	5
	21JUL89		14,500	0.82	1.500	27	24	<5	<5
2-W7-1	10JUL89		*187	1.10	0.821	29	32	8	12
2-W7-2	20JUL89		*57	1.40	0.683	27	28	<5	<5
2-W7-3	28JUL89		*-61	1.30	1.520	18	21	25	10
2-W7-4	24JUL89		384	0.60	1.170	23	19	<5	<5
2-W7-5	25JUL89		371	0.60	1.190	28	20	18	10
2-W7-6	26JUL89		918	.	3.850	28	31	117	<5
2-W8-1	10JUL89		*57	1.80	0.846	24	24	9	10
2-W9-1	10JUL89		*120	19.30	0.845	15	17	33	7
2-W10-13	25JUL89		421	.	0.679	29	28	7	<5
2-W10-14	27JUL89		*-1	0.60	0.788	28	31	14	7

The column headers consist of : Constituent Name

Analysis Units

Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 48938
- s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- d - based on draft DOE Derived Concentration Guides, DOE Order 5480.xx
- w - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- # - Less than Contractual Detection Limit, measured value reported
- * - For radioactive constituents, reported value is less than 2-sigma error

TABLE 4.11. Constituent List and Summary of Sampling Results for the Low Level Burial Grounds, WMA-4
July and August 1988

----- Constituent List=Contamination Indicator Parameters -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088 CONDLAB	umho	.	24	0	700 WDOE	Specific conductance, laboratory
191 CONDFLD	umho	1	24	0	700 WDOE	Specific conductance, field
199 PHFIELD		0.1	24	0	8.5 EPAS	pH, field
207 PH-LAB		0.01	24	0	8.5 EPAS	pH, laboratory
C69 TOC	ppb	2000	24	0	.	Total organic carbon
H42 TOXLDL	ppb	10	24	0	.	Total organic halogens, low DL
----- Constituent List=Interim Primary Drinking Water Parameters -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109 COLIFRM	MPN	2.2	3	3 ***	1 EPA	Coliform bacteria
111 BETA	pCi/L	8	8	0	50 EPA	Gross beta
112 ALPHAHI	pCi/L	4	8	0	15 EPA	Gross alpha, high DL
181 RADIUM	pCi/L	1	8	0	5 EPA	Radium, total
A06 BARIUM	ppb	8	8	0	1000 EPA	Barium
A07 CADMIUM	ppb	2	8	8 ***	10 EPA	Cadmium
A08 CHROMIUM	ppb	10	8	0	50 EPA	Chromium
A10 SILVER	ppb	10	8	8 ***	50 EPA	Silver
A20 ARSENIC	ppb	5	8	8 ***	50 EPA	Arsenic
A21 MERCURY	ppb	0.1	8	8 ***	2 EPA	Mercury
A22 SELENIUM	ppb	8	8	8 ***	10 EPA	Selenium
A33 ENDRIIN	ppb	0.1	8	8 ***	0.2 EPA	Endrin
A34 METHLOR	ppb	3	8	8 ***	100 EPA	Methoxychlor
A35 TOXAENE	ppb	1	8	8 ***	5 EPA	Toxaphene
A36 a-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, alpha-BHC
A37 b-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, beta-BHC
A38 g-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, gamma-BHC
A39 d-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, delta-BHC
A51 LEADGF	ppb	5	8	8 ***	50 EPA	Lead (graphite furnace)
C72 NITRATE	ppb	500	8	0	45000 EPA	Nitrate
C74 FLUORID	ppb	500	8	4	4000 EPA	Fluoride
H13 2,4-D	ppb	2	8	8 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14 2,4,5TP	ppb	2	8	8 ***	10 EPA	2,4,5-TP silvex
H20 FBARIUM	ppb	8	8	0	1000 EPA	Barium, filtered
H21 FCADMIU	ppb	2	8	8 ***	10 EPA	Cadmium, filtered
H22 FCHROMI	ppb	10	8	8	50 EPA	Chromium, filtered
H23 FSILVER	ppb	10	8	8 ***	50 EPA	Silver, filtered
H37 FARSENI	ppb	5	8	8 ***	50 EPA	Arsenic, filtered
H38 FMERCUR	ppb	0.1	8	8 ***	2 EPA	Mercury, filtered
H39 FSELENI	ppb	5	8	8 ***	10 EPA	Selenium, filtered
H41 FLEAD	ppb	5	8	8 ***	50 EPA	Lead, filtered
H80 TURBID	ntu	0.1	8	0	1 EPA	Turbidity, nephelometric
P19 COLIMF	100mL	1	3	3 ***	1 EPA	Coliform (Membrane Filter)

TABLE 4.11. (contd)

----- Constituent List=Water Quality Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
A11 SODIUM	ppb	200	8	0	.	Sodium	
A17 MANGESE	ppb	5	8	1	50 EPAS	Manganese	
A19 IRON	ppb	30	8	0	300 EPAS xxx	Iron	
C73 SULFATE	ppb	500	8	0	250000 EPAS	Sulfate	
C75 CHLORID	ppb	500	8	0	250000 EPAS	Chloride	
H24 FSODIUM	ppb	200	8	0	.	Sodium, filtered	
H29 FMANGAN	ppb	5	8	8 ***	50 EPAS	Manganese, filtered	
H31 FIRON	ppb	30	8	3	300 EPAS	Iron, filtered	
H67 LPHENOL	ppb	10	8	8 ***	.	Phenol, low DL	
----- Constituent List=Site Specific and Other Constituents -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
010 CO-60	pCi/L	22.5	8	0	100 EPAR	Cobalt-60	
024 CS-137	pCi/L	20	8	0	200 EPAR	Cesium-137	
034 RU-106	pCi/L	172.5	8	0	30 EPAR xxx	Ruthenium-106	
100 PU39-40	pCi/L	17	8	0	30 DOE	Plutonium-239,240	
102 PU-238	pCi/L	17	8	0	40 DOE	Plutonium-238	
104 U	pCi/L	0.5	8	0	600 DOE	Uranium	
105 AM-241	pCi/L	0.1	8	0	30 DOE	Americium-241	
108 TRITIUM	pCi/L	500	8	0	20000 EPA	Tritium (H-3)	
121 SR-90	pCi/L	5	8	0	8 EPA	Strontium-90	
197 TC-99	pCi/L	15	8	0	900 EPAR	Technetium-99	
A01 BERYLUM	ppb	5	8	8 ***	.	Beryllium	
A03 STRONIUM	ppb	10	8	0	.	Strontium	
A04 ZINC	ppb	5	8	0	5000 EPAS	Zinc	
A05 CALCIUM	ppb	50	8	0	.	Calcium	
A12 NICKEL	ppb	10	8	0	.	Nickel	
A13 COPPER	ppb	10	8	5	1300 EPAP	Copper	
A14 VANADIUM	ppb	5	8	0	.	Vanadium	
A15 ANTIMONY	ppb	100	8	8 ***	.	Antimony	
A16 ALUMNUM	ppb	150	8	8 ***	.	Aluminum	
A18 POTASSUM	ppb	100	8	0	.	Potassium	
A50 MAGNES	ppb	50	8	0	.	Magnesium	
C78 PHOSPHA	ppb	1000	8	8 ***	.	Phosphate	
H18 FZINC	ppb	5	8	2	5000 EPAS	Zinc, filtered	
H19 FCALCIU	ppb	50	8	0	.	Calcium, filtered	
H25 FNICKEL	ppb	10	8	8 ***	.	Nickel, filtered	
H26 FCOPPER	ppb	10	8	8 ***	1300 EPAP	Copper, filtered	
H27 FVANADI	ppb	5	8	0	.	Vanadium, filtered	
H28 FALUMIN	ppb	150	8	8 ***	.	Aluminum, filtered	
H30 FPOTASS	ppb	100	8	0	.	Potassium, filtered	
H32 FMAGNES	ppb	50	8	0	.	Magnesium, filtered	
H33 FBERYLL	ppb	5	8	8 ***	.	Beryllium, filtered	

TABLE 4.11. (contd)

----- Constituent List=Site Specific and Other Constituents -----						
Constituent	Detection			Below	Drinking Water Standards	
Code Name	Limit	Units	Samples	Detection	Agency Exceeded	Full name
H35 FSTRONT	10	ppb	5	0	.	Strontium, filtered
H36 FANTIMO	100	ppb	5	5 ***	.	Antimony, filtered
H66 BROWIDE	1000	ppb	5	5 ***	.	Bromide
H67 NITRITE	1000	ppb	5	5 ***	.	Nitrite
H86 FBORON	10	ppb	5	0	.	Boron, filtered
H87 FCOBALT	20	ppb	5	5 ***	.	Cobalt, filtered
H88 FLITHIU	10	ppb	5	5 ***	.	Lithium, filtered
H89 FMOLY	40	ppb	5	5 ***	.	Molybdenum, filtered
H90 FSILICO	50	ppb	5	0	.	Silicon, filtered
H91 FTIN	30	ppb	5	5 ***	.	Tin, filtered
H92 FTITAN	50	ppb	5	5 ***	.	Titanium, filtered
H93 FZIRCON	50	ppb	5	5 ***	.	Zirconium, filtered
P01 BORON	10	ppb	5	0	.	Boron
P02 COBALT	20	ppb	5	5 ***	.	Cobalt
P03 LITHIUM	10	ppb	5	5 ***	.	Lithium
P04 MOLY	40	ppb	5	5 ***	.	Molybdenum
P05 SILICON	50	ppb	5	0	.	Silicon
P06 TIN	30	ppb	5	5 ***	.	Tin
P07 TITAN	50	ppb	5	5 ***	.	Titanium
P08 ZIRCON	50	ppb	5	5 ***	.	Zirconium

----- Constituent List=WAC 173-303-9905 Constituents -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
A61	TETRANE	ppb	5	5	1	5 EPA	xxx Tetrachloromethane [Carbon Tetrachloride]
A62	BENZENE	ppb	5	5	5 ***	5 EPA	Benzene
A64	METHONE	ppb	10	5	5 ***	.	Methyl ethyl ketone
A66	TOLUENE	ppb	5	5	5 ***	2000 EPAP	Toluene
A67	1,1,1-T	ppb	5	5	5 ***	200 EPA	1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	5	5 ***	.	1,1,2-Trichloroethane
A69	TRICENE	ppb	5	5	5	5 EPA	xxx Trichloroethylene [1,1,2-Trichloroethane]
A70	PERCENE	ppb	5	5	5 ***	.	Perchloroethylene [Tetrachloroethane]
A71	OPXYLE	ppb	5	5	5 ***	440 EPAP	Xylene-o,p
A80	CHLFORM	ppb	5	5	1	100 EPA	Chloroform [Trichloromethane]
A89	1,1-DIC	ppb	5	5	5 ***	.	1,1-Dichloroethane
A90	1,2-DIC	ppb	5	5	5 ***	5 EPA	1,2-Dichloroethane
A91	TRANICE	ppb	5	5	5 ***	70 EPAP	trans-1,2-Dichloroethane
A93	METHYCH	ppb	5	5	5 ***	.	Methylene chloride [Dichloromethane]
B13	VINYIDE	ppb	10	5	5 ***	2 EPA	Vinyl chloride
B14	M-XYLE	ppb	5	5	5 ***	440 EPAP	Xylene-m
C70	CYANIDE	ppb	10	5	5 ***	.	Cyanide
C80	AMMONIU	ppb	50	5	5 ***	.	Ammonium ion
H15	2,4,5-T	ppb	2	5	5 ***	.	2,4,5-T
H88	HEXONE	ppb	10	5	5 ***	.	Hexone [Methyl isobutyl ketone]

TABLE 4.11. (contd)

----- Constituent List=WAC 173-903-9906 Constituents -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
I01 ACETONE	ppb	10	8	5	.	Acetone by VOA
I28 TAF	ppb	10	8	8 ***	.	Tetrahydrofuran
L63 1406EN	ppb	5	8	8 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]

*** - Indicates all samples were reported as below contractual detection limits

xxx - Indicates that Drinking Water standards were exceeded

EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936

EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

DOE - based on Derived Concentration Guides, Draft DDE Order 5400.xx

WDOE - based on additional Secondary Maximum Contaminant Levels in WAC 246-64, Public Water Supplies

**TABLE 4.12. Constituents with at Least One Detected Value for the Low Level Burial Grounds, WMA-4
July and August 1989**

Quadruplicate Contamination Indicator Parameters								
Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5w	PHFIELD 0.1/8.5w	TOC ppb 2000/.	TOXLDL ppb 10/.
2-W15-15	11JUL89		269	238	8.10	7.80	#800	379
		1	269	238	8.10	7.90	#800	449
		2	269	241	8.10	7.90	#500	394
		3	268	241	8.10	7.90	#800	384
2-W15-16	26JUL89		587	542	7.90	7.75	#800	6,110
		1	570	544	7.90	7.75	#800	6,390
		2	578	543	7.90	7.74	#800	5,940
		3	575	546	7.90	7.74	#800	6,860
2-W16-18	11JUL89		379	341	8.00	7.80	#800	1,100
		1	380	340	7.80	7.80	#800	1,120
		2	379	343	8.00	7.79	#500	1,080
		3	379	341	8.00	7.79	#400	1,150
2-W18-22	31JUL89		320	323	7.80	7.80	#800	#0
		1	320	323	7.80	7.80	#800	#5
		2	320	322	7.80	7.80	#400	#2
		3	320	321	7.80	7.80	#500	#1
2-W18-23	24JUL89		234	205	7.90	7.77	#700	800
		1	235	204	7.90	7.76	#1,100	570
		2	236	205	8.00	7.76	#500	562
		3	236	208	8.00	7.74	#500	525
2-W18-24	28JUL89		260	235	8.00	7.95	#800	527
		1	260	235	8.00	7.95	#900	529
		2	260	236	8.00	7.95	#700	499
		3	260	235	8.00	7.90	#800	467

TABLE 4.12. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALPHAHI pCi/L 4/15	AM-241 pCi/L 0.1/30d	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BETA pCi/L 5/50	BORON ppb 10/.	FBORON ppb 10/.	FCALCIU ppb 50/.
2-W15-15	11JUL89		<10	0.940	*-0.00513	30	29	5.14	23	35	24,600
2-W15-16	25JUL89		86(a)	5.340	*-0.00509	72	50	10.80	22	25	59,400
2-W15-18	11JUL89		<10	*0.322	*0.01140	42	38	4.52	20	19	31,800
2-W18-22	31JUL89		<10	1.710	*-0.00923	53	58	5.48	13	17	38,500
2-W18-23	24JUL89		M	1.100	*-0.00305	28	28	4.71	32	28	28,700
	31AUG89		<10								
2-W18-24	28JUL89		<10	1.040	*0.00277	28	27	2.58	17	28	23,600
Well name	Collection Date	Duplicate sample number	CALCIUM ppb 50/.	CHLFORM ppb 5/100	CHLORID ppb 500/250000s	FCHROMI ppb 10/50	CHROMIUM ppb 10/50	CO-60 pCi/L 22.5/100r	COPPER ppb 10/1300p	CS-137 pCi/L 20/200r	
2-W15-15	11JUL89		25,000	9	3,880	<10	108	*-2.31	13	*-4.740	
2-W15-16	25JUL89		54,800	52	21,900	12	45	*-1.51	<10	*0.353	
2-W15-18	11JUL89		53,900	27	4,020	<10	129	*-3.20	<10	*1.430	
2-W18-22	31JUL89		38,500	<5	9,000	<10	100	*3.24	<10	*-0.375	
2-W18-23	24JUL89		28,300	M	3,340	<10	32	*3.78	<10	*-0.589	
	31AUG89			9							
2-W18-24	28JUL89		24,400	13	4,200	<10	50	*4.09	<10	*1.210	
Well name	Collection Date	Duplicate sample number	FLUORID ppb 500/4000	IRON ppb 30/300s	FIRON ppb 30/300s	MAGNES ppb 50/.	FMAGNES ppb 50/.	MANGESE ppb 5/50s	NICKEL ppb 10/.	NITRATE ppb 500/45000	
2-W15-15	11JUL89		<500	544	33	7,310	7,120	15	55	13,400	
2-W15-16	25JUL89		708	191	<30	17,400	15,300	<5	21	89,800	
2-W15-18	11JUL89		<500	550	<30	10,100	9,450	18	81	73,500	
2-W18-22	31JUL89		<500	435	37	12,000	13,100	7	48	15,800	
2-W18-23	24JUL89		<500	323	33	7,070	7,520	7	20	5,870	
	31AUG89										
2-W18-24	28JUL89		700	195	<30	7,270	7,200	9	23	20,700	
Well name	Collection Date	Duplicate sample number	FPOTASS ppb 100/.	POTASUM ppb 100/.	PU-238 pCi/L 17/40d	PU238-40 pCi/L 17/30d	RADIUM pCi/L 1/5	RU-106 pCi/L 172.5/30r	FSILICO ppb 50/.	SILICON ppb 50/.	
2-W15-15	11JUL89		3,050	3,170	*-0.00144	*-0.000185	*0.0454	58.2	19,200	19,700	
2-W15-16	25JUL89		4,980	5,770	*-0.00536	*-0.000185	0.2280	*-25.7	21,700	24,400	
2-W15-18	11JUL89		3,640	3,930	*-0.00334	*0.009340	*0.1330	*-34.2	15,800	20,700	
2-W18-22	31JUL89		4,470	4,210	*-0.00381	*-0.000185	*-0.0030	*9.5	23,200	22,400	
2-W18-23	24JUL89		3,310	3,030	*-0.00144	*-0.000185	*0.0781	*4.9	20,900	19,300	
	31AUG89										
2-W18-24	28JUL89		3,000	3,090	*0.00104	*0.002320	*0.0506	*41.5	20,800	21,000	

TABLE 4.12. (contd)

Well name	Collection Date	Duplicate sample number	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 10/.	STRONUM ppb 10/.	SULFATE ppb 500/250000*	TC-99 pCi/L 15/900r	TETRANE ppb 5/5
2-W15-15	11JUL89		19,000	18,300	*-0.2090	84	85	15,600	*6.480	380
2-W15-16	25JUL89		50,100	40,500	*-0.0149	250	280	70,200	12.000	8,250
2-W15-18	11JUL89		24,700	22,900	*0.5850	117	125	23,000	8.060	1,580
2-W18-22	31JUL89		14,500	15,600	*-0.2610	185	171	18,800	*-0.883	<5
2-W18-23	24JUL89		13,600	14,800	*-0.3430	116	105	16,000	*1.340	M
	31AUG89									760
2-W18-24	28JUL89		16,600	16,500	*-0.2990	98	100	21,200	*-0.132	850

Well name	Collection Date	Duplicate sample number	TRICENE ppb 5/5	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/1	U pCi/L 0.5/800d	FVANADI ppb 5/.	VANADIUM ppb 5/.	ZINC ppb 5/5000*	FZINC ppb 5/5000*
2-W15-15	11JUL89		<5	476	0.8	2.330	30	32	15	11
2-W15-16	25JUL89		8	297	0.5	1.410	28	27	8	<5
2-W15-18	11JUL89		<5	472	0.5	0.575	28	29	14	7
2-W18-22	31JUL89		<5	*-1	0.4	0.512	29	33	28	17
2-W18-23	24JUL89		M	*131	1.5	1.410	29	27	13	10
	31AUG89		<5							
2-W18-24	28JUL89		<5	*84	0.4	0.868	30	32	5	<5

The column headers consist of : Constituent Name
Analysis Units
Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 46938
- s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- d - based on Derived Concentration Guides, Draft DOE Order 5400.xx
- w - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- # - Less than Contractual Detection Limit, measured value reported
- * - For radioactive constituents, reported value is less than 2-sigma error

M = Sample was lost in laboratory before analysis

(*) Suspect data. The reagent blank for this group showed contamination for this constituent.

5.0 NONRADIOACTIVE DANGEROUS WASTE LANDFILL

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Ground water at the Nonradioactive Dangerous Waste Landfill (NRDW) has been monitored by five shallow wells since October 1986 and by the seven-well network since January 1987. This project is currently in the indicator parameter evaluation stage of monitoring.

The NRDW is centrally located on the Hanford Site, approximately 6 mi west of the Columbia River (Figure 1.1). The NRDW occupies approximately 11.5 acres next to the Solid Waste Landfill (SWL), which covers about 65 acres (Figure 5.1). The only physical facilities serving these landfills are a perimeter fence and a mobile field office. The NRDW received containerized liquids and asbestos from 1975 to 1985, which were placed in unlined trenches constructed on 46-ft centers (approximately 400 ft long, 14 ft wide at the base, and 15 ft deep). The SWL is still operating and has a separate ground-water monitoring program based on WAC 173-304 (for solid waste landfills).

The NRDW interim characterization report (Weekes, Luttrell, and Fuchs 1987) describes the site hydrogeology and NRDW monitoring network, which includes three upgradient wells and four downgradient wells (Figure 5.1). Two deep wells are completed above the Low Permeability Unit (Weekes et al. 1987); five shallow wells are completed in approximately the top 15 ft of the unconfined aquifer. Wells 699-26-34, 699-26-35A, and 699-26-35C (deep) are upgradient wells; wells 699-25-33A (deep), 699-25-34A, 699-25-34B, and 699-26-33 are downgradient wells. Figure 5.1 also shows wells in the SWL monitoring network.

As shown by the sampling schedule in the preceding quarterly progress report (Table 5.1, Smith, Bates, and Lundgren 1989b), planned sampling and analysis for the fourth quarter included an extended list of constituents. Based on regulatory requirements, indicator parameters are determined semiannually. The purpose of sampling for additional constituents is in response to reported contaminants at the adjacent SWL, and to confirm that no

contaminants had entered the ground water at the NRDW. As shown by the FY 1989 sampling schedule in this report (Table 5.1), the additional parameters were not included.

Previous data have been statistically analyzed using the first year's data from upgradient wells, in accordance with 40 CFR 265.93(b), to determine if contamination indicators in upgradient and downgradient wells have changed significantly from background conditions. Thus far, no statistically significant impact to the ground water from past NRDW operations has been detected.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Currently, no additional drilling or hydrologic characterization work (other than measurement of water levels) is planned at the NRDW. Pertinent site characterization information can be found in Fruland et al. (1989).

WATER LEVELS

Because of the very low (0.0001) horizontal gradient in the immediate vicinity of the landfills, monthly water levels at the NRDW, SWL, and five nearby Hanford Site wells are being measured to augment the water levels measured just before sample collection. The water-level data indicate there has been no change in gradient from what has been previously determined. Measurements reported in Table 5.2 are statistically indistinguishable and do not indicate or support any particular flow direction. Survey data for wells installed before 1986 are considered to be of lower quality than survey data for wells installed since 1987. Because of these differences in survey data and the low ground-water gradient, the ground-water flow direction is difficult to determine. Only water level data from SWL and NRDW wells are included here.

WATER CHEMISTRY DATA

The NRDW ground-water monitoring wells were scheduled for sampling in July, and those parameters that were on the schedule are listed in Table 5.3. In addition to indicator parameters, water samples were collected and

measured for turbidity, nitrate, and tritium. Tritium concentrations exceed the drinking water standard, but these concentrations are associated with waste discharges in the 200-East Area, not with NRDW operations. Because the analytical method used for nitrate automatically includes additional related anions, these results are reported in Table 5.4 in addition to parameters already mentioned. Table 5.5 presents the statistical summary of field and laboratory results. The statistical method has been discussed in annual reports (Hall 1988; Fruland and Lundgren 1989). There continues to be no indication of ground-water contamination from the NRDW.

FIGURE 5.1. Monitoring Well Locations for the Solid Waste Landfill and the Nonradioactive Dangerous Waste Landfill

TABLE 5.1. Sampling and Analyses Performed at the Nonradioactive Dangerous Waste Landfill for FY 1989^(a)

Well Name	1988 ^(b)			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
699-25-33A	X			X							X	
699-25-34A	X			X							X	
699-25-34B	X			X							X	
699-26-33	X			X							X	
699-26-34	X			X							X	
699-26-35A	X			X							X	
699-26-35C	X			X							X	

(a) This differed from the planned schedule (Smith, Bates, and Lundgren 1989b) in that the long list of constituents was not included in the fourth quarter sampling (July) and analysis as originally planned.

(b) X = Sampled for quadruplicate indicator parameters.

TABLE 5.2. Water-Level Data for Wells Monitoring the Nonradioactive Dangerous Waste Landfill and the Solid Waste Landfill, July, August, and September 1989

<u>Well</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Date</u>	<u>Depth to Water, ft</u>	<u>Water Table, ft above MSL</u>
<u>NRDW Wells</u>				
699-25-33A	528.55	8/04/89	124.37	404.18(b)
699-25-34A	530.03	8/03/89	125.72	404.31(b)
699-25-34B	529.15	7/25/89	124.82	404.33
		8/03/89	124.83	404.32(b)
		8/30/89	124.92	404.23
		9/28/89	124.99	404.16
699-26-33	535.51	7/25/89	131.18	404.33
		8/04/89	130.03	405.48(b)
		8/30/89	131.29	404.22
		9/28/89	131.36	404.15
699-26-34	528.09	7/25/89	123.75	404.34
		8/04/89	123.90	404.19(b)
		8/30/89	123.86	404.23
		9/28/89	123.72	404.17
699-26-35A	532.37	7/25/89	128.00	404.37
		8/04/89	128.18	404.19(b)
		8/30/89	128.11	404.26
		9/28/89	128.17	404.20
699-26-35C	532.13	8/04/89	128.22	403.91(b)
<u>SWL Wells</u>				
699-23-34	532.86	7/25/89	128.55	404.31
		8/07/89	128.59	404.27(b)
		8/30/89	128.67	404.19
		9/28/89	128.73	404.13
699-24-33	524.21	7/25/89	120.00	404.21
		8/07/89	120.26	403.95(b)
		8/30/89	120.10	404.11
		9/28/89	120.17	404.04

TABLE 5.2. (contd)

<u>Well</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Date</u>	<u>Depth to Water, ft</u>	<u>Water Table, ft above MSL</u>
<u>SWL Wells (contd)</u>				
699-24-34A	533.89	7/25/89	129.58	404.31
		8/07/89	129.52	404.37(b)
		8/30/89	129.68	404.21
		9/28/89	129.75	404.14
699-24-34B	533.50	7/25/89	129.17	404.33
		8/07/89	129.30	404.20(b)
		8/30/89	129.27	404.23
		9/28/89	129.34	404.16
699-24-34C	532.58	7/25/89	128.28	404.30
		8/07/89	128.29	404.29(b)
		8/30/89	128.38	404.20
		9/28/89	128.45	404.13
699-24-35	538.81	7/25/89	134.46	404.35
		8/07/89	134.48	405.33(b)
		8/30/89	134.57	404.24
		9/28/89	134.63	404.18
699-25-34C	535.46	7/25/89	131.14	404.32
		8/07/89	130.26	405.20(b)
		8/30/89	131.25	404.21
		9/28/89	131.32	404.14

(a) MSL = mean sea level.

(b) Measurements made before ground-water sampling; other measurements were not associated with ground-water sampling.

TABLE 5.3. Constituent List and Summary of Sampling Results for the Nonradioactive Dangerous Waste Landfill
August 1989

----- Constituent List=Contamination Indicator Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
088 CONDLAB	umho	.	28	0	700 WDOE	Specific conductance, laboratory	
191 CONDFLD	umho	1	28	0	700 WDOE	Specific conductance, field	
199 PHFIELD		0.1	28	0	8.5 EPAS	pH, field	
207 PH-LAB		0.01	28	0	8.5 EPAS	pH, laboratory	
C89 TOC	ppb	2000	28	0	.	Total organic carbon	
H42 TOXLDL	ppb	10	28	0	.	Total organic halogens, low DL	
----- Constituent List=Interim Primary Drinking Water Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
C72 NITRATE	ppb	500	8	0	45000 EPA	Nitrate	
C74 FLUORID	ppb	500	8	1	4000 EPA	Fluoride	
H80 TURBID	ntu	0.1	8	4	1 EPA	Turbidity, nephelometric	
----- Constituent List=Water Quality Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
C73 SULFATE	ppb	500	8	0	250000 EPAS	Sulfate	
C75 CHLORID	ppb	500	8	0	250000 EPAS	Chloride	
----- Constituent List=Site Specific and Other Constituents -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
108 TRITIUM	pCi/L	500	8	0	20000 EPA xxx	Tritium (H-3)	
C78 PHOSPHA	ppb	1000	8	8 ***	.	Phosphate	
H68 BROMIDE	ppb	1000	8	8 ***	.	Bromide	
H67 NITRITE	ppb	1000	8	8 ***	.	Nitrite	

*** - Indicates all samples were reported as below contractual detection limits

xxx - Indicates that Drinking Water standards were exceeded

EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936

EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx

WDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

TABLE 5.4. Constituents with at Least One Detected Value for the Nonradioactive Dangerous Waste Landfill
August 1989

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho . /700w	PH-LAB 0.01/8.5w	PHFIELD 0.1/8.5w	TOC ppb 2000/.	TOXLDL ppb 10/.
6-25-33A	04AUG89	1	320	312	8.10	8.07	#600	#1
		2	324	313	8.10	8.06	#500	#4
		3	319	311	8.10	8.06	#900	#3
		3	323	314	8.10	8.06	#1300	#5
6-25-34A	03AUG89	1	221	342	7.80	7.82	#900	#8
		2	221	342	7.90	7.82	#1100	#8
		3	221	348	7.90	7.82	#700	#6
		3	221	349	7.90	7.82	#700	#4
6-25-34B	03AUG89	1	230	355	7.80	7.71	#500	#9
		2	230	353	7.80	7.72	#500	10
		3	230	351	7.80	7.72	#400	10
		3	230	351	7.80	7.72	#600	#7
6-26-33	04AUG89	1	345	328	8.10	7.38	#800	#7
		2	340	328	8.10	7.41	#500	#6
		3	342	330	8.10	7.40	#500	#5
		3	341	332	8.00	7.40	#600	#8
6-26-34	04AUG89	1	187	309	7.80	7.85	#600	#2
		2	188	318	7.90	7.87	#600	#7
		3	188	313	7.90	7.88	#700	15
		3	189	314	7.90	7.87	#700	#3
6-26-35A	04AUG89	1	207	351	7.80	7.77	#500	10
		2	207	354	7.80	7.78	#600	10
		3	205	355	7.80	7.77	#600	#9
		3	205	360	7.80	7.77	#700	#9
6-26-35C	04AUG89	1	220	379	8.00	7.96	#600	#2
		2	219	379	8.00	7.97	#500	#-2
		3	220	380	8.00	7.97	#600	#2
		3	220	381	8.00	7.97	#400	#-1

TABLE 5.4. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	CHLORID ppb 500/250000s	FLUORID ppb 500/4000	NITRATE ppb 500/45000	SULFATE ppb 500/250000s	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/1
8-25-33A	04AUG89		6,400	500	3,600	25,000	888	0.5
8-25-34A	03AUG89		5,700	500	29,900	33,000	287,000	<0.1
8-25-34B	03AUG89		5,900	600	29,000	34,000	262,000	<0.1
	03AUG89	1	5,800	600	29,000	34,000	275,000	<0.1
8-26-33	04AUG89		5,700	700	29,600	32,000	258,000	<0.1
8-26-34	04AUG89		5,600	600	28,500	32,000	264,000	0.1
8-26-35A	04AUG89		6,500	500	31,000	37,000	281,000	0.4
8-26-35C	04AUG89		8,600	<500	22,000	51,000	57,300	0.3

The column headers consist of : Constituent Name
Analysis Units
Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
- s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- d - based on Derived Concentration Guides in draft DOE Order 5400.xx
- w - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- # - Less than Contractual Detection Limit, measured value reported
- * - For radioactive constituents, reported value is less than 2-sigma error

TABLE 5.5. Contamination Indicator Parameter Replicate Averages for the Nonradioactive Dangerous Waste Landfill
August 1989

Constituent Code Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088 CONDLAB	umho	6-25-33A	04AUG89	4	313	1.29	311	314	0.4
		6-25-34A	03AUG89	4	345	3.77	342	349	1.1
		6-25-34B	03AUG89	4	353	1.91	351	355	0.5
		6-26-33	04AUG89	4	330	1.91	328	332	0.6
		6-26-34	04AUG89	4	313	2.94	309	316	0.9
		6-26-35A	04AUG89	4	355	3.74	351	360	1.1
		6-26-35C	04AUG89	4	380	0.96	379	381	0.3
191 CONDFLD	umho	6-25-33A	04AUG89	4	322	2.38	319	324	0.7
		6-25-34A	03AUG89	4	221	0.00	221	221	0.0
		6-25-34B	03AUG89	4	230	0.00	230	230	0.0
		6-26-33	04AUG89	4	342	2.16	340	345	0.6
		6-26-34	04AUG89	4	188	0.82	187	189	0.4
		6-26-35A	04AUG89	4	206	1.15	205	207	0.6
		6-26-35C	04AUG89	4	220	0.50	219	220	0.2
199 PHFIELD		6-25-33A	04AUG89	4	8.06	0.010	8.05	8.07	0.1
		6-25-34A	03AUG89	4	7.82	0.000	7.82	7.82	0.0
		6-25-34B	03AUG89	4	7.72	0.005	7.71	7.72	0.1
		6-26-33	04AUG89	4	7.40	0.013	7.38	7.41	0.2
		6-26-34	04AUG89	4	7.87	0.013	7.85	7.88	0.2
		6-26-35A	04AUG89	4	7.77	0.005	7.76	7.77	0.1
		6-26-35C	04AUG89	4	7.97	0.005	7.96	7.97	0.1
207 PH-LAB		6-25-33A	04AUG89	4	8.10	0.00	8.1	8.1	0.0
		6-25-34A	03AUG89	4	7.88	0.05	7.8	7.9	0.6
		6-25-34B	03AUG89	4	7.80	0.00	7.8	7.8	0.0
		6-26-33	04AUG89	4	8.08	0.05	8.0	8.1	0.6
		6-26-34	04AUG89	4	7.88	0.05	7.8	7.9	0.6
		6-26-35A	04AUG89	4	7.80	0.00	7.8	7.8	0.0
		6-26-35C	04AUG89	4	8.00	0.00	8.0	8.0	0.0
C69 TOC	ppb	6-25-33A	04AUG89	4	825	359.0	500	1300	43.6
		6-25-34A	03AUG89	4	850	191.0	700	1100	22.5
		6-25-34B	03AUG89	4	500	81.6	400	600	16.3
		6-26-33	04AUG89	4	800	141.0	500	800	23.6
		6-26-34	04AUG89	4	860	57.7	600	700	8.9
		6-26-35A	04AUG89	4	800	81.6	500	700	13.6
		6-26-35C	04AUG89	4	525	95.7	400	600	18.2
H42 TOXLDL	ppb	6-25-33A	04AUG89	4	3.25	1.71	1	5	52.5
		6-25-34A	03AUG89	4	8.00	1.63	4	8	27.2
		6-25-34B	03AUG89	4	9.00	1.41	7	10	15.7
		6-26-33	04AUG89	4	6.50	1.29	5	8	19.9
		6-26-34	04AUG89	4	8.75	5.91	2	15	87.5
		6-26-35A	04AUG89	4	9.50	0.58	9	10	6.1
		6-26-35C	04AUG89	4	0.25	2.06	-2	2	824.6

6.0 1301-N LIQUID WASTE DISPOSAL FACILITY

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The RCRA interim-status ground-water monitoring project at the 1301-N Liquid Waste Disposal Facility (LWDF) has been in progress since December 1987. In April 1989, the project converted to a ground-water quality assessment project as a result of confirmed high specific conductance values in well 199-N-3. The Washington State Department of Ecology was notified, and a ground-water quality assessment program (Gilmore and Jensen 1989) was developed and implemented as required by 40 CFR 265. This program outlined an expansion of the monitoring network and increased the sampling frequency for selected constituents that could affect the specific conductance in the ground water.

The 1301-N LWDF is located in the 100-N Area approximately 800 ft east of the Columbia River. It consists of a 52- by 12-ft concrete trough connected to a 125- by 250-ft rectangular basin. The basin bottom is covered with a 3-ft-thick layer of large stones. Adjacent to the basin is an excavated ditch 1600 ft long, 50 ft wide, and 12 ft deep, which extends to the north in a zigzag pattern and is intended to handle the overflow from the basin (Figure 6.1). The facility was used to dispose of waste streams that were generated in the N Reactor and related facilities from the startup of the N Reactor in 1963 until September 1985. It is currently not in use. Wastes discharged to the 1301-N LWDF were primarily radioactive fission and activation products, including cobalt-60, strontium-90, and cesium-137. Small quantities of nonradioactive hazardous wastes were also discharged to the facilities.

There are seven original monitoring wells in the 1301-N LWDF ground-water monitoring network (Figure 6.1). Wells 199-N-4 and 199-N-66 are designated as the upgradient wells, and wells 199-N-2, 199-N-3, 199-N-14, 199-N-67, and 199-N-69 are designated downgradient wells. To assess the source and extent of the elevated specific conductance in the ground water, existing wells 199-N-16, 199-N-17, 199-N-18, 199-N-21, 199-N-54, 199-N-55, 199-N-56, and 199-N-57 were added to the 1301-N network in April 1989. In

May 1989, the nearby 1324-N/NA facilities also began assessment monitoring for elevated specific conductance (see Section 7.0). Wells 199-N-23, 199-N-24, 199-N-25, 199-N-26, and 199-N-47 were added to the monitoring network for these facilities, and data from those wells will also be used in the 1301-N assessment program. All of the wells monitor the uppermost aquifer, which comprises primarily sand, gravel, and cobbles.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or hydrogeologic characterization work (other than water level measurement) was performed during this reporting period.

WATER LEVELS

Water-level measurements are taken in most of the existing 100-N Area wells in conjunction with the monitoring projects for the 1324-N/NA and 1325-N facilities. Monthly water-level measurements continued during this quarter, with measurements obtained from 48 wells in July, August, and September. Water-table maps for each month are shown in Figures 6.2, 6.3, and 6.4. The water-table elevations are presented in Table 6.1.

The elevation of the water table in the 100-N Area is affected by the release of effluent to nearby disposal facilities, river stage in the Columbia River, and ground water entering the 100-N Area from other parts of the Hanford Site. Waste discharged to the 1325-N facility this quarter was approximately 2.7 million gallons per week. This was a decrease from the previous quarter, and water levels in the 100-N Area began to drop as a result. The ground-water mound beneath the 1325-N LWDF has decreased by approximately 10 ft between June and September 1989. Ground-water levels beneath the 1301-N LWDF decreased by 3 to 4 ft in the same period.

WATER CHEMISTRY DATA

The sample collection scheduled for June 1989 was delayed because of issues related to disposal of purge water. Samples were collected between June 20 and August 2. The next sampling was conducted between August 15 and 21. Samples were also collected in September. A revised sampling

schedule for the 1301-N LWDF is presented in Table 6.2. The "regular" and "short" lists of constituents referenced in Table 6.2 are shown in Tables 6.3 and 6.4, respectively.

Analytical results for June, July, and August are reported in Tables 6.5 and 6.6. Results of the September sampling will be presented in the next quarterly report. Constituents of note in the June, July, and August samples include the following:

- Beta activity was higher than the primary drinking water standard in four of the seven wells of the core monitoring network. A concentration of 25,000 pCi/L was detected in well 199-N-67, while an adjacent well, 199-N-69, contained only 19.4 pCi/L. Similar concentrations have been observed in the past (e.g., Smith et al. 1989a and 1989b). Well 199-N-67 is screened from the water table to a depth of 76 ft, while the screen for well 199-N-69 extends from 90 to 100 ft and is located at the top of an extensive clay layer.
- Concentrations of strontium-90 were greater than the primary drinking water standard in four wells. The highest concentration was 14,000 pCi/L in well 199-N-67. An adjacent well, 199-N-69, had only 0.2 pCi/L, which is less than the contractual detection limit.
- Tritium concentrations were higher than the primary drinking water standard (20,000 pCi/L) in six of the seven wells of the core monitoring network.
- Ruthenium-106 was reported at 48.3 pCi/L in well 199-N-66. This is higher than the interim drinking water standard (30 pCi/L) but less than the 2-sigma error band (i.e., the concentration of ruthenium-106 present in the sample was too low for the analytical method to measure accurately).
- Nitrate concentration in well 199-N-55 in June was 63,600 ppb, which is higher than the drinking water standard (45,000 ppb).
- Sulfate concentrations were higher than the secondary drinking water standard in wells 199-N-16 and 199-N-21.
- Several of the samples, primarily those collected from wells 199-N-16, 199-N-17, and 199-N-18, had high turbidity. These wells were sampled by bailer. Wells sampled by the bailing technique are not normally purged before sampling, and no filtered samples were collected. High metals concentrations (e.g., iron, cadmium, and manganese) were present in the samples from these wells, and are probably associated with particulates in the water.

GROUND-WATER QUALITY ASSESSMENT PROGRAM

Gilmore and Jensen (1989) outline the first phase of the ground-water quality assessment program for the 1301-N LWDF. The first phase was scheduled to end in August 1989. As discussed above, the sampling schedule was delayed several months, and the sampling events were stretched out over several weeks, making data evaluation difficult. Therefore, the second phase of the assessment program will maintain the basic approach of phase one (see Tables 6.2, 6.3, and 6.4). Phase two will continue until there are sufficient data to assess the source, extent, and rate of migration of any hazardous constituents in the ground water.

FIGURE 6.1. Ground-Water Monitoring Wells Near the 1301-N Liquid Waste Disposal Facility

FIGURE 6.2. Water Levels for the 100-N Area, July 1989

FIGURE 6.3. Water Levels for the 100-N Area, August 1989

FIGURE 6.4. Water Levels for the 100-N Area, September 1989

TABLE 6.1. Water-Level Data for the 100-N Area, July, August, and September 1989

<u>Well</u>	<u>Date</u>	<u>Time (Pacific Standard)</u>	<u>Depth to Water, ft</u>	<u>Water Level Elevation, ft above MSL (a)</u>
199-N-2	7/28/89	0932	64.24	395.59
199-N-2	8/31/89	0943	66.96	392.87
199-N-2	9/27/89	1010	68.22	391.61
199-N-3	7/28/89	0827	65.27	394.18
199-N-3	8/31/89	0937	67.74	391.71
199-N-3	9/27/89	1004	69.01	390.44
199-N-4	7/28/89	0954	56.87	401.86
199-N-4	8/31/89	1003	61.24	397.49
199-N-4	9/27/89	1026	62.96	395.77
199-N-6	7/28/89	0959	54.88	406.09
199-N-6	8/31/89	1008	60.61	400.36
199-N-6	9/27/89	1031	62.74	400.23
199-N-8S(b)	7/28/89	1350	19.00	385.57
199-N-8S	8/31/89	1517	19.30	385.27
199-N-8S	9/27/89	1451	20.16	384.41
199-N-14	7/28/89	1359	59.38	393.77
199-N-14	8/31/89	1526	63.91	389.24
199-N-14	9/27/89	1458	65.33	387.82
199-N-16	7/28/89	0817	57.38	399.32
199-N-16	8/31/89	1152	61.22	395.48
199-N-16	9/27/89	1209	63.07	393.63
199-N-17	7/28/89	0808	66.37	394.83
199-N-17	8/31/89	1136	69.36	391.84
199-N-17	9/27/89	1156	70.82	390.38
199-N-18	7/28/89	0759	66.85	391.65
199-N-18	8/31/89	1124	69.14	389.36
199-N-18	9/27/89	1143	70.24	388.26
199-N-19	7/28/89	0803	61.65	392.26
199-N-19	8/31/89	1131	64.69	389.21
199-N-19	9/27/89	1151	66.04	387.86
199-N-20	7/28/89	0811	61.20	394.70
199-N-20	8/31/89	1141	64.21	391.69
199-N-20	9/27/89	1201	66.43	389.47
199-N-21	7/28/89	0835	63.36	393.64
199-N-21	8/31/89	1213	66.53	390.48
199-N-21	9/27/89	1233	68.08	388.92
199-N-23	7/28/89	0841	66.29	390.01
199-N-23	8/31/89	1218	68.41	387.89
199-N-23	9/27/89	1239	69.27	387.03
199-N-25	7/28/89	0824	41.91	383.89
199-N-25	8/31/89	1159	42.56	383.24
199-N-25	9/27/89	1216	42.59	383.17

TABLE 6.1. (contd)

<u>Well</u>	<u>Date</u>	<u>Time (Pacific Standard)</u>	<u>Depth to Water, ft</u>	<u>Water Level Elevation, ft above MSL (a)</u>
199-N-27	7/28/89	1147	42.73	406.36
199-N-27	8/31/89	1301	49.07	400.02
199-N-27	9/27/89	1310	51.23	397.86
199-N-28	7/28/89	1137	58.24	406.00
199-N-28	8/31/89	1253	63.43	400.81
199-N-28	9/27/89	1303	65.46	398.78
199-N-29	7/28/89	1208	58.97	406.28
199-N-29	8/31/89	1344	64.15	401.10
199-N-29	9/27/89	1333	66.31	398.94
199-N-31	7/28/89	1231	56.31	406.32
199-N-31	8/31/89	1406	62.35	400.28
199-N-31	9/27/89	1351	64.64	397.99
199-N-32	7/28/89	1240	55.58	406.50
199-N-32	8/31/89	1413	61.98	400.10
199-N-32	9/27/89	1357	64.27	397.81
199-N-33	7/28/89	1337	54.25	405.62
199-N-33	8/31/89	1504	60.24	399.63
199-N-33	9/27/89	1438	62.48	397.39
199-N-34	7/28/89	1330	53.71	405.92
199-N-34	8/31/89	1458	59.48	400.15
199-N-34	9/27/89	1433	61.68	397.95
199-N-36	7/28/89	1249	53.04	405.93
199-N-36	8/31/89	1421	59.58	399.39
199-N-36	9/27/89	1402	61.78	397.19
199-N-37	7/28/89	1300	51.02	405.10
199-N-37	8/31/89	1428	57.49	398.63
199-N-37	9/27/89	1408	59.62	396.50
199-N-39	7/28/89	1308	49.70	404.61
199-N-39	8/31/89	1435	56.44	397.87
199-N-39	9/27/89	1414	58.50	395.81
199-N-40	7/28/89	1315	52.92	403.43
199-N-40	8/31/89	1442	59.79	396.56
199-N-40	9/27/89	1419	61.90	394.45
199-N-41	7/28/89	1322	57.88	399.71
199-N-41	8/31/89	1448	64.93	392.66
199-N-41	9/27/89	1424	66.72	390.87
199-N-42	7/28/89	1159	55.76	399.38
199-N-42	8/31/89	1332	61.40	393.74
199-N-42	9/27/89	1324	63.19	391.95
199-N-44	7/28/89	1153	56.29	404.41
199-N-44	8/31/89	1324	62.72	397.98
199-N-44	9/27/89	1315	64.76	395.94
199-N-49	7/28/89	1423	49.28	401.44

TABLE 6.1. (contd)

Well	Date	Time (Pacific Standard)	Depth to Water, ft	Water Level Elevation, ft above MSL (a)
199-N-49	8/31/89	1554	56.73	393.99
199-N-49	9/27/89	1519	58.63	392.09
199-N-50	7/28/89	1414	75.88	387.48
199-N-50	8/31/89	1544	77.58	385.78
199-N-50	9/27/89	1513	78.20	385.16
199-N-51	7/28/89	1406	76.98	385.20
199-N-51	8/31/89	1536	77.95	384.23
199-N-51	9/27/89	1506	78.37	383.81
199-N-52	7/28/89	1130	59.18	404.52
199-N-52	8/31/89	1246	63.84	399.86
199-N-52	9/27/89	1257	65.67	398.03
199-N-53	7/28/89	1343	59.08	402.68
199-N-53	8/31/89	1509	65.57	396.19
199-N-53	9/27/89	1444	67.33	394.43
199-N-54	7/28/89	0751	58.49	399.02
199-N-54	8/31/89	1113	61.88	395.63
199-N-54	9/27/89	1133	63.46	394.05
199-N-55	7/28/89	0746	58.79	399.06
199-N-55	8/31/89	1109	62.31	395.54
199-N-55	9/27/89	1128	63.87	393.98
199-N-56	7/28/89	0755	60.30	397.79
199-N-56	8/31/89	1119	63.71	394.38
199-N-56	9/27/89	1138	65.25	392.84
199-N-57	7/28/89	0740	56.91	400.85
199-N-57	8/31/89	1101	60.89	396.87
199-N-57	9/27/89	1121	62.57	395.19
199-N-58	7/28/89	1451	63.44	399.44
199-N-58	8/31/89	1622	65.13	397.75
199-N-58	9/27/89	1545	66.25	396.63
199-N-59	7/28/89	1435	60.95	398.58
199-N-59	8/31/89	1608	62.09	397.44
199-N-59	9/27/89	1530	63.04	396.49
199-N-60	7/28/89	1457	63.06	398.88
199-N-60	8/31/89	1625	64.37	397.57
199-N-60	9/27/89	1548	65.31	396.63
199-N-61	7/28/89	1443	59.89	402.13
199-N-61	8/31/89	1615	62.15	399.87
199-N-61	9/27/89	1537	62.69	399.33
199-N-62	7/28/89	1220	58.83	404.76
199-N-62	8/31/89	1358	63.59	400.00
199-N-62	9/27/89	1344	65.49	398.10
199-N-63	7/28/89	1214	63.11	403.59
199-N-63	8/31/89	1351	67.70	399.00
199-N-63	9/27/89	1339	69.56	397.14

TABLE 6.1. (contd)

<u>Well</u>	<u>Date</u>	<u>Time (Pacific Standard)</u>	<u>Depth to Water, ft</u>	<u>Water Level Elevation, ft above MSL (a)</u>
199-N-64	7/28/89	1013	52.18	402.45
199-N-64	8/31/89	1027	56.77	397.86
199-N-64	9/27/89	1047	58.44	396.19
199-N-65	7/28/89	1009	54.34	402.10
199-N-65	8/31/89	1021	58.81	397.63
199-N-65	9/27/89	1041	60.56	395.88
199-N-66	7/28/89	1004	61.25	404.00
199-N-66	8/31/89	1014	66.43	398.82
199-N-66	9/27/89	1036	68.47	396.78
199-N-67	7/28/89	0945	61.92	396.54
199-N-67	8/31/89	0953	65.08	393.38
199-N-67	9/27/89	1019	66.50	391.96
199-N-69	7/28/89	0939	62.87	395.97
199-N-69	8/31/89	0949	65.81	393.03
199-N-69	9/27/89	1015	67.18	391.66
River(c)	7/28/89		N/A	380.10
River	8/31/89		N/A	379.77
River	9/27/89		N/A	380.77

(a) MSL = mean sea level.

(b) Well 199-N-8 is a nest of piezometers. Only piezometer S is sampled because it is screened in the aquifer of interest.

(c) 100-N Area gaging station. River elevation is the average of measurements made at 0800, 1200, and 1600 hours.

TABLE 6.2. Sampling Schedule for the 1301-N Liquid Waste Disposal Facility

Well	1988(a)			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
199-N-2			X			L				X	S	X
199-N-3			X			L				X	S	X
199-N-4			X			L			X	X	S	X
199-N-14			X			L				X	S	X
*199-N-16									S	S	S	S
*199-N-17									S	S	S	S
*199-N-18									S	S	S	S
*199-N-21										S	S	S
*199-N-54									S	S	S	S
*199-N-55									S	S	S	S
*199-N-56									S	S	S	S
*199-N-57									S	S	S	S
199-N-66										X	S	X
199-N-67			L			L				X	S	X
199-N-69			X			L				X	S	X
*199-N-23						L				S	S	S
*199-N-24										S	S	S
*199-N-25										S	S	S
*199-N-26										S	S	S
*199-N-47										S	S	S

(a) The following notations are used in this table:

L = sampled for the long list (WAC 173-303-9905)

S = sampled for the short list (Table 6.4)

X = sampled for regular list of constituents (Table 6.3)

* = data also used in the 1324-N/NA Project.

TABLE 6.3. The Regular Sampling List for the 1301-N Ground-Water Quality Assessment Monitoring Network

Coliform	Uranium
Total Organic Halogen	pH
Total Organic Carbon	Specific conductance
Metals Analyzed by the Inductively Coupled Argon Plasma Method, Unfiltered/Filtered	Tritium
Arsenic, Unfiltered/Filtered	Strontium-90
Selenium, Unfiltered/Filtered	Gamma Scan
Lead, Unfiltered/Filtered	Radium
Mercury, Unfiltered/Filtered	Gross Beta
Anions	Gross Alpha
Volatile Organic Analyses	Turbidity
Hydrazine	
Phenol	
Pesticides	
Herbicides	
Ammonium Ion	

TABLE 6.4. Short List for the 1301-N Ground-Water Quality Assessment Monitoring Network

Turbidity
Metals Analyzed by the Inductively Coupled Argon Plasma Method, Unfiltered/Filtered
Arsenic, Unfiltered/Filtered
Selenium, Unfiltered/Filtered
Lead, Unfiltered/Filtered
Mercury, Unfiltered/Filtered
Alkalinity
Anions
pH
Specific conductance

**TABLE 6.5. Constituent List and Summary of Sampling Results for the 1301-N Liquid Waste Disposal Facility
June through August 1989**

----- Constituent List=Contamination Indicator Parameters -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088 CONDLAB	umho	.	116	0	700 WDOE xxx	Specific conductance, laboratory
191 CONDFLD	umho	1	103	0	700 WDOE xxx	Specific conductance, field
199 PHFIELD		0.1	107	0	6.5-8.5 EPAS	pH, field
207 PH-LAB		0.01	116	0	6.5-8.5 EPAS	pH, laboratory
C69 TOC	ppb	2000	28	1	.	Total organic carbon
H42 TOXLDL	ppb	10	28	0	.	Total organic halogens, low DL

----- Constituent List=Interim Primary Drinking Water Parameters -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109 COLIFRM	MPN	2.2	4	4 ***	1 EPA	Coliform bacteria
111 BETA	pCi/L	8	7	0	50 EPA xxx	Gross beta
112 ALPHAI	pCi/L	4	7	0	15 EPA	Gross alpha, high DL
181 RADIUM	pCi/L	1	7	0	5 EPA	Radium, total
A06 BARIUM	ppb	8	30	0	1000 EPA	Barium
A07 CADMIUM	ppb	2	30	26	10 EPA xxx	Cadmium
A08 CHROMIUM	ppb	10	30	27	50 EPA	Chromium
A10 SILVER	ppb	10	30	30 ***	50 EPA	Silver
A20 ARSENIC	ppb	5	30	27	50 EPA	Arsenic
A21 MERCURY	ppb	0.1	30	30 ***	2 EPA	Mercury
A22 SELENIUM	ppb	5	30	30 ***	10 EPA	Selenium
A33 ENDRIN	ppb	0.1	7	7 ***	0.2 EPA	Endrin
A34 METHLOR	ppb	3	7	7 ***	100 EPA	Methoxychlor
A35 TOXAENE	ppb	1	7	7 ***	5 EPA	Toxaphene
A36 a-BHC	ppb	0.1	7	7 ***	4 EPA	Lindane, alpha-BHC
A37 b-BHC	ppb	0.1	7	7 ***	4 EPA	Lindane, beta-BHC
A38 g-BHC	ppb	0.1	7	7 ***	4 EPA	Lindane, gamma-BHC
A39 d-BHC	ppb	0.1	7	7 ***	4 EPA	Lindane, delta-BHC
A61 LEADGF	ppb	6	30	28	50 EPA	Lead (graphite furnace)
C72 NITRATE	ppb	500	30	4	45000 EPA xxx	Nitrate
C74 FLUORID	ppb	500	30	24	4000 EPA	Fluoride
H13 2,4-D	ppb	2	7	7 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14 2,4,5TP	ppb	2	7	7 ***	10 EPA	2,4,5-TP silvex
H20 FBARIUM	ppb	6	27	0	1000 EPA	Barium, filtered
H21 FCADMIU	ppb	2	27	24	10 EPA	Cadmium, filtered
H22 FCHROMI	ppb	10	27	27 ***	50 EPA	Chromium, filtered
H23 FSILVER	ppb	10	27	27 ***	50 EPA	Silver, filtered
H37 FARSENI	ppb	5	27	27 ***	50 EPA	Arsenic, filtered
H38 FMERCUR	ppb	0.1	27	27 ***	2 EPA	Mercury, filtered
H39 FSELENI	ppb	5	27	27 ***	10 EPA	Selenium, filtered
H41 FLEAD	ppb	6	27	27 ***	50 EPA	Lead, filtered
H60 TURBID	ntu	0.1	23	0	1 EPA xxx	Turbidity, nephelometric

TABLE 6.5. (contd)

Constituent List=Water Quality Parameters							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
A11	SODIUM	ppb	200	30	0	.	Sodium
A17	MANGESE	ppb	5	30	8	50 EPAS	Manganese
A19	IRON	ppb	30	30	1	300 EPAS	Iron
C73	SULFATE	ppb	500	30	0	250000 EPAS	Sulfate
C75	CHLORIO	ppb	500	30	0	250000 EPAS	Chloride
H24	FSODIUM	ppb	200	27	0	.	Sodium, filtered
H29	FMANGAN	ppb	5	27	20	50 EPAS	Manganese, filtered
H31	FIRON	ppb	30	27	23	. EPAS	Iron, filtered
H57	LPHENOL	ppb	10	7	7 ***	.	Phenol, low DL

Constituent List=Site Specific and Other Constituents							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
D10	CO-60	pCi/L	22.5	7	0	100 EPAR	Cobalt-60
D24	CS-137	pCi/L	20	7	0	200 EPAR	Cesium-137
034	RU-106	pCi/L	172.5	7	0	30 EPAR	Ruthenium-106
104	U	pCi/L	0.5	7	0	500 DOE	Uranium
108	TRITIUM	pCi/L	500	7	0	20000 EPA	Tritium (H-3)
121	SR-90	pCi/L	5	7	0	8 EPA	Strontium-90
A01	BERYLLUM	ppb	5	30	30 ***	.	Beryllium
A03	STRONTIUM	ppb	10	30	0	.	Strontium
A04	ZINC	ppb	5	30	11	5000 EPAS	Zinc
A05	CALCIUM	ppb	50	30	0	.	Calcium
A12	NICKEL	ppb	10	30	27	.	Nickel
A13	COPPER	ppb	10	30	28	1300 EPAP	Copper
A14	VANADIUM	ppb	5	30	12	.	Vanadium
A15	ANTIMONY	ppb	100	30	30 ***	.	Antimony
A16	ALUMINIUM	ppb	150	30	25	.	Aluminum
A18	POTASSIUM	ppb	100	30	0	.	Potassium
A50	MAGNESIUM	ppb	50	30	0	.	Magnesium
C78	PHOSPHATE	ppb	1000	30	28	.	Phosphate
H18	FZINC	ppb	5	27	21	5000 EPAS	Zinc, filtered
H19	FCALCIUM	ppb	50	27	0	.	Calcium, filtered
H25	FNICKEL	ppb	10	27	26	.	Nickel, filtered
H26	FCOPPER	ppb	10	27	25	1300 EPAP	Copper, filtered
H27	FVANADIUM	ppb	5	27	10	.	Vanadium, filtered
H28	FALUMINIUM	ppb	150	27	28	.	Aluminum, filtered
H30	FPOTASSIUM	ppb	100	27	0	.	Potassium, filtered
H32	FMAGNESIUM	ppb	50	27	0	.	Magnesium, filtered
H33	FBERYLLIUM	ppb	5	27	28	.	Beryllium, filtered
H35	FSTRONTIUM	ppb	10	27	0	.	Strontium, filtered
H36	FANTIMONY	ppb	100	27	27 ***	.	Antimony, filtered

TABLE 6.5. (contd)

----- Constituent List=Site Specific and Other Constituents -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H58 ALKALIN	ppb	20000	23	0	.	Total alkalinity, as CaCO3 (Method B)
H66 BROMIDE	ppb	1000	30	30 ***	.	Bromide
H67 NITRITE	ppb	1000	30	29	.	Nitrite
H68 FBORON	ppb	10	27	0	.	Boron, filtered
H87 FCOBALT	ppb	20	27	27 ***	.	Cobalt, filtered
H88 FLITHIU	ppb	10	27	27 ***	.	Lithium, filtered
H89 FMOLY	ppb	40	27	27 ***	.	Molybdenum, filtered
H90 FSILICO	ppb	60	27	0	.	Silicon, filtered
H91 FTIN	ppb	30	27	27 ***	.	Tin, filtered
H92 FTITAN	ppb	60	27	27 ***	.	Titanium, filtered
H93 FZIRCON	ppb	60	27	27 ***	.	Zirconium, filtered
P01 BORON	ppb	10	30	0	.	Boron
P02 COBALT	ppb	20	30	30 ***	.	Cobalt
P03 LITHIUM	ppb	10	30	27	.	Lithium
P04 MOLY	ppb	40	30	30 ***	.	Molybdenum
P05 SILICON	ppb	60	30	0	.	Silicon
P06 TIN	ppb	30	30	30 ***	.	Tin
P07 TITAN	ppb	60	30	29	.	Titanium
P08 ZIRCON	ppb	60	30	30 ***	.	Zirconium
----- Constituent List=WAC 173-303-9905 Constituents -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A40 DDD	ppb	0.1	7	7 ***	.	DDD
A41 DDE	ppb	0.1	7	7 ***	.	DDE
A42 DDT	ppb	0.1	7	7 ***	.	DDT
A43 HEPTLOR	ppb	0.1	7	7 ***	0 EPAP	Heptachlor
A44 HEPTIDE	ppb	0.1	7	7 ***	0 EPAP	Heptachlor epoxide
A45 KEPONE	ppb	1	7	7 ***	.	Kepona (discontinued)
A46 DIELRIN	ppb	0.1	7	7 ***	.	Dieldrin
A47 ALDRIN	ppb	0.1	7	7 ***	.	Aldrin
A48 CHLOANE	ppb	1	7	7 ***	0 EPAP	Chlordane
A49 END01	ppb	0.1	7	7 ***	.	Endosulfan I (alpha)
A52 END02	ppb	0.1	7	7 ***	.	Endosulfan II (beta)
A61 TETRANE	ppb	5	7	7 ***	5 EPA	Tetrachloromethane (Carbon Tetrachloride)
A62 BENZENE	ppb	5	7	7 ***	5 EPA	Benzene
A63 DIOXANE	ppb	500	7	7 ***	.	Dioxane
A64 METHONE	ppb	10	7	7 ***	.	Methyl ethyl ketone
A65 PYRIDIN	ppb	500	7	7 ***	.	Pyridine
A66 TOLUENE	ppb	5	7	7 ***	2000 EPAP	Toluene
A67 1,1,1-T	ppb	5	7	7 ***	200 EPA	1,1,1-Trichloroethane
A69 1,1,2-T	ppb	5	7	7 ***	.	1,1,2-Trichloroethane

TABLE 6.5. (contd)

----- Constituent List=WAC 173-303-9905 Constituents -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A69	TRICENE	ppb	5	7	7 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethene]
A70	PERCENE	ppb	5	7	7 ***	.	Perchloroethylene [Tetrachloroethene]
A71	OPXYLE	ppb	5	7	7 ***	440 EPAP	Xylene-o,p
A72	ACROLIN	ppb	10	7	7 ***	.	Acrolein
A73	ACRYILE	ppb	10	7	7 ***	.	Acrylonitrile
A74	BISTHER	ppb	5	7	7 ***	.	bis(Chloromethyl) ether
A75	BROMONE	ppb	5	7	7 ***	.	Bromoacetone
A76	METHBRO	ppb	10	7	7 ***	.	Bromomethane [Methyl bromide]
A77	CARBIDE	ppb	10	7	7 ***	.	Carbon disulfide
A78	CHLBENZ	ppb	5	7	7 ***	60 EPAP	Chlorobenzene
A79	CHLTHER	ppb	5	7	7 ***	.	2-Chloroethyl vinyl ether
A80	CHLFORM	ppb	5	7	3	100 EPA	Chloroform [Trichloromethane]
A81	METHCHL	ppb	10	7	7 ***	.	Methyl chloride [Chloromethane]
A82	CHMTHER	ppb	10	7	7 ***	.	Chloromethyl methyl ether
A83	CROTONA	ppb	10	7	7 ***	.	Crotonaldehyde
A84	DIBRCHL	ppb	10	7	7 ***	0 EPAP	1,2-Dibromo-3-chloropropane
A85	DIBRETH	ppb	10	7	7 ***	.	1,2-Dibromoethane
A86	DIBRMET	ppb	10	7	7 ***	.	Dibromomethane
A87	DIBUTEN	ppb	10	7	7 ***	.	1,4-Dichloro-2-butene
A88	DICDIFM	ppb	10	7	7 ***	.	Dichlorodifluoromethane
A89	1,1-DIC	ppb	5	7	7 ***	.	1,1-Dichloroethane
A90	1,2-DIC	ppb	5	7	7 ***	5 EPA	1,2-Dichloroethane
A91	TRANOCE	ppb	5	7	7 ***	70 EPAP	trans-1,2-Dichloroethene
A92	DICETHY	ppb	10	7	7 ***	7 EPA	1,1-Dichloroethylene
A93	METHYCH	ppb	5	7	7 ***	.	Methylene chloride [Dichloromethane]
A94	DICPANE	ppb	5	7	7 ***	6 EPAP	1,2-Dichloropropane
A95	DICPENE	ppb	5	7	7 ***	.	1,3-Dichloropropane
A96	NDIEHY	ppb	10	7	7 ***	.	N,N-diethylhydrazine
A97	1,1-DIM	ppb	10	7	7 ***	.	1,1-Dimethylhydrazine
A98	1,2-DIM	ppb	10	7	7 ***	.	1,2-Dimethylhydrazine
B01	IODORET	ppb	10	7	7 ***	.	Iodomethane
B02	METHACR	ppb	10	7	7 ***	.	Methacrylonitrile
B03	METHTHI	ppb	10	7	7 ***	.	Methanethiol
B04	PENTACH	ppb	10	7	7 ***	.	Pentachloroethane
B05	1112-tc	ppb	10	7	7 ***	.	1,1,1,2-Tetrachloroethane
B06	1122-tc	ppb	5	7	7 ***	.	1,1,2,2-Tetrachloroethane
B08	BROMORM	ppb	5	7	7 ***	100 EPA	Bromoform [Tribromomethane]
B09	TRCMEOL	ppb	10	7	7 ***	.	Trichloromethanethiol
B10	TRCMFLM	ppb	10	7	7 ***	.	Trichloromonofluoromethane
B12	123-trp	ppb	10	7	7 ***	.	1,2,3-Trichloropropane
B13	VINYIDE	ppb	10	7	7 ***	2 EPA	Vinyl chloride
B14	M-XYLE	ppb	5	7	7 ***	440 EPAP	Xylene-m
B19	ACETILE	ppb	10	7	7 ***	.	Acetonitrile
C62	CHLLATE	ppb	300	7	7 ***	.	Chlorobenzilate
C71	FORMALN	ppb	500	7	7 ***	.	Formalin

TABLE 6.5. (contd)

----- Constituent List=WAC 173-303-9905 Constituents -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
C80	AMMONIU	ppb	50	7	7 ***	.	Ammonium ion
H05	ETHOXID	ppb	10	7	7 ***	.	Ethylene oxide
H08	ETHMETH	ppb	10	7	7 ***	.	Ethyl methacrylate
H15	2,4,5-T	ppb	2	7	7 ***	.	2,4,5-T
H52	LHYDRAZ	ppb	30	30	30 ***	.	Hydrazine, low DL
H68	HEXONE	ppb	10	7	7 ***	.	Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	7	7 ***	.	Acetone by VOA
I28	TAF	ppb	10	7	8	.	Tetrahydrofuran
I33	ETHBENZ	ppb	5	7	7 ***	680 EPAP	Ethylbenzene
I34	STYRENE	ppb	5	7	7 ***	140 EPAP	Styrene
I42	BDCM	ppb	5	7	7 ***	100 EPA	Bromodichloromethane
I43	CDBM	ppb	5	7	7 ***	100 EPA	Chlorodibromomethane
J89	2HEXANO	ppb	50	7	7 ***	.	2-Hexanone
L45	ALLYLCL	ppb	100	7	7 ***	.	Allyl chloride
L46	CLETHAN	ppb	10	7	7 ***	.	Chlorethane
L48	PROPCN	ppb	5	7	7 ***	.	Propionitrile
L49	VINYLAC	ppb	5	7	7 ***	.	Vinyl acetate
L63	14DBEN	ppb	5	7	7 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
P12	ENDSFAN	ppb	0.5	7	7 ***	.	Endosulfan
P19	COLIMF	100mL	1	3	3 ***	1 EPA	Coliform (Membrane Filter)

*** - Indicates all samples were reported as below contractual detection limits

xxx - Indicates that Drinking Water standards were exceeded

EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936

EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx

WDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

**TABLE 6.6. Constituents with at Least One Detected Value for the 1301-N Liquid Waste Disposal Facility
June through August 1989**

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TDC ppb 2000/.	TOXLDL ppb 10/.
1-N-2	26JUL89	1	120	188	7.90	8.05	#800	#7
		2	120	188	8.00	8.06	#500	#3
		3	120	189	8.00	8.05	#800	#4
		3	120	188	8.00	8.06	#500	#4
1-N-2	15AUG89	1	194	191	8.00	8.08	.	.
		2	193	193	8.00	8.07	.	.
		3	210	196	8.10	8.08	.	.
		3	207	191	8.00	8.04	.	.
1-N-3	26JUL89	1	181	254	7.70	7.69	#700	#5
		2	181	255	7.70	7.66	#800	#3
		3	181	254	7.70	7.68	#700	#5
		3	181	255	7.70	7.69	#700	#5
1-N-3	15AUG89	1	262	236	7.70	7.72	.	.
		2	263	240	7.70	7.69	.	.
		3	262	239	7.70	7.69	.	.
		3	262	239	7.70	7.66	.	.
1-N-4	26JUN89	1	172	169	7.90	7.61	#800	#5
		2	171	188	8.00	7.63	#700	#4
		3	171	169	8.00	7.64	#600	#7
		3	171	167	8.00	7.64	#900	#3
1-N-4	15AUG89	1	182	188	8.00	7.66	.	.
		2	183	189	8.00	7.90	.	.
		3	183	171	8.00	7.69	.	.
		3	183	169	8.00	7.69	.	.
1-N-14	27JUL89	1	149	205	8.30	8.18	#800	#7
		2	149	203	8.30	8.19	#900	#6
		3	149	204	8.30	8.18	#600	#7
		3	147	204	8.30	8.20	#700	#4
1-N-14	15AUG89	1	209	191	7.20	8.23	.	.
		2	210	191	7.20	8.21	.	.
		3	210	191	7.20	8.24	.	.
		3	209	191	7.20	8.25	.	.
1-N-18	20JUN89	1	1291	1020	7.70	6.80	.	.
		2	.	1030	7.70	.	.	.
		3	.	982	7.60	.	.	.
		3	.	990	7.60	.	.	.

TABLE 6.6. (contd)

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
1-N-16	18AUG89		899	787	7.70	7.39	.	.
		1	900	834	7.70	7.39	.	.
		2	899	848	7.70	7.39	.	.
		3	897	848	7.80	7.39	.	.
1-N-17	20JUN89		821	871	7.20	6.31	.	.
		1	.	897	7.20	.	.	.
		2	.	883	7.20	.	.	.
		3	.	870	7.20	.	.	.
1-N-17	18AUG89		881	841	7.30	7.18	.	.
		1	872	845	7.30	7.17	.	.
		2	858	848	7.30	7.17	.	.
		3	860	847	7.30	7.17	.	.
1-N-18	20JUN89		1148	839	7.10	6.11	.	.
		1	.	873	7.10	.	.	.
		2	.	898	7.10	.	.	.
		3	.	884	7.10	.	.	.
1-N-21	17JUL89		955	909	7.80	7.89	.	.
		1	939	895	7.80	7.76	.	.
		2	940	902	7.80	7.87	.	.
		3	938	897	7.80	7.87	.	.
1-N-21	21AUG89		889	820	7.90	7.93	.	.
		1	888	822	7.90	7.94	.	.
		2	888	819	7.90	7.93	.	.
		3	887	842	7.90	7.93	.	.
1-N-54	21JUN89		318	330	7.40	6.82	.	.
		1	318	328	7.60	6.82	.	.
		2	317	325	7.60	6.82	.	.
		3	317	347	7.60	6.82	.	.
1-N-54	15AUG89		278	312	7.70	7.65	.	.
		1	265	312	7.70	7.60	.	.
		2	269	313	7.70	7.59	.	.
		3	268	318	7.70	7.60	.	.
1-N-55	21JUN89		459	473	7.70	7.16	.	.
		1	462	480	7.70	7.16	.	.
		2	461	488	7.70	7.16	.	.
		3	480	478	7.70	7.16	.	.
1-N-55	15AUG89		355	389	7.70	7.67	.	.
		1	359	395	7.70	7.62	.	.
		2	359	391	7.70	7.60	.	.
		3	359	391	7.70	7.59	.	.

TABLE 6.6. (contd)

Well name	Collection Date	Duplicate sample number	COND FLD umho 1/700w	COND LAB umho ./700w	PH-LAB 0.01/8.5w	PH FIELD 0.1/8.5w	TOC ppb 2000/.	TOXLDL ppb 10/.
1-N-56	21 JUN 89		809	804	7.10	8.54	.	.
		1	810	834	7.10	8.58	.	.
		2	810	827	7.10	8.58	.	.
		3	810	852	7.10	8.59	.	.
1-N-56	16 AUG 89		420	446	7.20	7.11	.	.
		1	406	450	7.20	7.12	.	.
		2	391	448	7.20	7.12	.	.
		3	393	444	7.20	7.12	.	.
1-N-57	20 JUN 89		448	339	7.80	7.34	.	.
		1	447	330	7.80	7.32	.	.
		2	446	326	7.60	7.30	.	.
		3	447	331	7.70	7.30	.	.
1-N-57	16 AUG 89		349	312	7.60	7.26	.	.
		1	343	311	7.60	7.25	.	.
		2	340	304	7.60	7.25	.	.
		3	341	309	8.30	7.25	.	.
1-N-66	02 AUG 89		190	169	8.10	8.19	#800	#4
		1	190	170	8.10	8.20	#900	#3
		2	190	171	8.20	8.20	#800	#5
		3	199	171	8.20	8.19	#1000	#6
1-N-66	16 AUG 89		164	150	8.30	8.15	.	.
		1	164	151	8.30	8.17	.	.
		2	164	151	8.30	8.19	.	.
		3	162	151	8.30	8.19	.	.
1-N-67	02 AUG 89		191	168	7.60	7.76	#500	#4
		1	191	163	7.60	7.76	#700	#4
		2	191	169	7.70	7.76	#500	#5
		3	192	168	7.70	7.75	#500	#5
1-N-67	16 AUG 89		.	205	7.70	7.77	.	.
		1	.	205	7.60	7.75	.	.
		2	.	205	7.70	7.74	.	.
		3	.	204	7.70	7.72	.	.
1-N-69	02 AUG 89		202	169	8.40	8.35	#400	#3
		1	202	170	8.40	8.35	#400	#3
		2	202	170	8.40	8.35	#400	#2
		3	202	170	8.30	8.35	#400	#4
1-N-69	16 AUG 89		201	187	8.30	8.30	.	.
		1	206	187	8.30	8.29	.	.
		2	208	188	8.30	8.29	.	.
		3	207	188	8.30	8.28	.	.

TABLE 6.6. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ALKALIN ppb 20000/.	ALPHAHI pCi/L 4/15	FALUMIN ppb 150/.	ALUMINUM ppb 150/.	ARSENIC ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	FBERYLL ppb 5/.	BETA pCi/L 5/50
1-N-2	26 JUL 89		.	*0.510	<150	<150	<5	21	17	<5	4,080.0
	15 AUG 89		85,000	.	<150	<150	<5	19	18	<5	.
1-N-3	26 JUL 89		.	*0.944	<150	<150	<5	38	38	<5	1,250.0
	15 AUG 89		77,000	.	<150	<150	<5	36	36	<5	.
1-N-4	26 JUN 89		.	*0.539	<150	<150	<5	21	17	<5	39.0
	15 AUG 89		87,000	.	<150	170	<5	21	18	<5	.
1-N-14	27 JUL 89		.	0.983	<150	<150	<5	22	19	<5	1,940.0
	15 AUG 89		84,000	.	<150	<150	<5	16	17	<5	.
1-N-16	20 JUN 89		211,000	.	.	<150	<5	183	.	.	.
	18 AUG 89		247,000	.	<150	<150	<5	98	79	<5	.
1-N-17	20 JUN 89		413,000	.	.	<150	12	58	.	.	.
	18 AUG 89		288,000	.	<150	<150	<5	128	119	<5	.
1-N-18	20 JUN 89		637,000	.	.	<150	8	244	.	.	.
1-N-21	17 JUL 89		150,000	.	<150	<150	<5	70	42	<5	.
	21 AUG 89		124,000	.	<150	372	<5	71	35	<5	.
1-N-54	21 JUN 89		101,000	.	<150	182	<5	65	42	<5	.
	15 AUG 89		82,000	.	<150	<150	<5	48	39	<5	.
1-N-55	21 JUN 89		91,400	.	<150	<150	<5	43	43	<5	.
	21 JUN 89	1	90,800	.	<150	<150	<5	44	40	<5	.
	15 AUG 89		81,000	.	<150	<150	<5	51	49	<5	.
1-N-56	21 JUN 89		311,000	.	<150	<150	8	117	113	<5	.
	15 AUG 89		178,000	.	<150	<150	<5	49	49	<5	.
1-N-57	20 JUN 89		85,400	.	<150	<150	<5	47	46	<5	.
	15 AUG 89		86,000	.	<150	<150	<5	48	49	<5	.
1-N-66	02 AUG 89		.	*0.417	<150	152	<5	22	16	8	18.8
	18 AUG 89		83,000	.	460	2790	<5	49	26	<5	.
1-N-67	02 AUG 89		.	*0.179	<150	<150	<5	26	24	<5	26,500.0
	15 AUG 89		64,000	.	<150	<150	<5	28	30	<5	.
1-N-69	02 AUG 89		.	*0.727	<150	<150	<5	21	24	<5	19.4
	15 AUG 89		61,000	.	<150	<150	<5	21	23	<5	.

TABLE 6.6. (contd)

Well name	Collection Date	Duplicate sample number	BORON ppb 10/.	FBORON ppb 10/.	FCADMIU ppb 2/10	CADMIUM ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLFORM ppb 5/100	CHLORID ppb 500/2500000
1-N-2	26 JUL 89		20	21	<2	<2	29,500	29,100	#3	1,300
	15 AUG 89		27	23	2	<2	26,500	26,800	.	1,700
1-N-3	26 JUL 89		13	23	<2	<2	35,400	33,600	#3	5,700
	15 AUG 89		26	12	<2	<2	35,400	33,500	.	4,800
1-N-4	26 JUN 89		27	22	<2	<2	24,300	25,900	#3	2,200
	15 AUG 89		21	18	2	2	24,700	24,800	.	1,800
1-N-14	27 JUL 89		22	26	<2	<2	32,700	35,400	<5	6,100
	15 AUG 89		20	25	<2	<2	31,600	28,400	.	3,700
1-N-16	20 JUN 89		26	.	.	32	.	144,000	.	54,600
	18 AUG 89		30	21	<2	<2	59,000	75,200	.	31,000
1-N-17	20 JUN 89		222	.	.	11	.	131,000	.	8,700
	18 AUG 89		41	16	<2	<2	78,600	90,400	.	8,000
1-N-18	20 JUN 89		45	.	.	19	.	212,000	.	10,800
1-N-21	17 JUL 89		22	25	<2	<2	88,200	92,400	.	16,000
	21 AUG 89		29	17	<2	<2	44,000	54,300	.	13,000
1-N-54	21 JUN 89		23	16	5	<2	55,100	57,800	.	5,900
	15 AUG 89		21	25	<2	<2	36,200	43,600	.	6,300
1-N-55	21 JUN 89		23	19	<2	<2	78,000	78,400	.	7,600
	21 JUN 89	1	23	19	<2	<2	72,300	77,800	.	7,400
	15 AUG 89		14	38	<2	<2	49,800	48,400	.	5,900
1-N-56	21 JUN 89		36	28	<2	<2	175,000	174,000	.	14,200
	15 AUG 89		21	21	<2	<2	59,300	57,800	.	7,800
1-N-57	20 JUN 89		17	19	<2	<2	55,700	51,000	.	7,500
	16 AUG 89		18	30	<2	<2	38,700	40,500	.	6,600
1-N-66	02 AUG 89		21	21	<2	<2	27,600	27,300	<5	2,500
	16 AUG 89		18	29	<2	<2	23,300	26,200	.	1,500
1-N-67	02 AUG 89		23	34	<2	<2	30,200	28,900	#3	1,900
	16 AUG 89		24	25	<2	<2	31,300	29,300	.	3,800
1-N-69	02 AUG 89		20	21	<2	<2	28,400	25,100	<5	1,000
	16 AUG 89		18	12	<2	<2	24,000	28,300	.	1,000

TABLE 6.6. (contd)

Well name	Collection Date	Duplicate sample number	CHROMIUM ppb 10/50	CO-60 pCi/L 22.5/100r	COPPER ppb 10/1300p	FCOPPER ppb 10/1300p	CS-137 pCi/L 20/200r	FLUORIDE ppb 500/4000	IRON ppb 30/300s	FIROM ppb 30/.s
1-N-2	26 JUL 89		<10	26.9	<10	<10	*-0.485	<500	<30	<30
	15 AUG 89		<10	.	<10	<10	.	<500	201	<30
1-N-3	26 JUL 89		<10	19.9	<10	<10	*2.350	<500	205	<30
	15 AUG 89		<10	.	<10	<10	.	<500	205	<30
1-N-4	26 JUN 89		<10	25.4	<10	<10	*1.120	<500	1,380	<30
	15 AUG 89		<10	.	<10	<10	.	<500	1,400	<30
1-N-14	27 JUL 89		<10	*12.0	<10	<10	*0.785	<500	233	<30
	15 AUG 89		<10	.	<10	<10	.	<500	758	<30
1-N-16	20 JUN 89		<10	.	<10	.	.	1300	3,630	.
	18 AUG 89		<10	.	<10	<10	.	500(n)	352	129
1-N-17	20 JUN 89		<10	.	<10	.	.	<500	27,700	.
	18 AUG 89		<10	.	<10	<10	.	500(n)	3,990	859
1-N-18	20 JUN 89		<10	.	20	.	.	<500	8,900	.
1-N-21	17 JUL 89		<10	.	<10	<10	.	720	608	<30
	21 AUG 89		22	.	<10	<10	.	<500	1,400	<30
1-N-54	21 JUN 89		<10	.	<10	<10	.	<500	309	<30
	15 AUG 89		<10	.	<10	<10	.	<500	189	<30
1-N-55	21 JUN 89		<10	.	<10	<10	.	500	37	<30
	21 JUN 89	1	<10	.	<10	<10	.	<500	43	<30
	15 AUG 89		10	.	<10	<10	.	<500	97	<30
1-N-56	21 JUN 89		<10	.	<10	<10	.	900	111	33
	15 AUG 89		<10	.	<10	<10	.	<500	73	<30
1-N-57	20 JUN 89		<10	.	<10	<10	.	<500	282	<30
	18 AUG 89		<10	.	<10	<10	.	<500	86	<30
1-N-66	02 AUG 89		<10	12.3	<10	<10	*-1.990	<500	316	<30
	18 AUG 89		<10	.	13	13	.	<500	5,380	776
1-N-67	02 AUG 89		10	22.0	<10	11	*1.010	<500	221	<30
	18 AUG 89		<10	.	<10	<10	.	<500	266	<30
1-N-69	02 AUG 89		<10	24.7	<10	<10	*-8.280	<500	47	<30
	18 AUG 89		<10	.	<10	<10	.	<500	36	<30

TABLE 6.6. (contd)

Well name	Collection Date	Duplicate sample number	LEADGF ppb 5/50	LITHIUM ppb 10/.	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50a	MANGESE ppb 5/50a	NICKEL ppb 10/.	FNICKEL ppb 10/.
1-N-2	26JUL89		<5	<10	4,890	4,890	<5	<5	<10	<10
	15AUG89		<5	<10	4,330	4,140	<5	6	<10	<10
1-N-3	26JUL89		<5	<10	5,880	5,850	<5	12	<10	<10
	15AUG89		<5	<10	5,880	5,890	<5	13	<10	<10
1-N-4	28JUN89		<5	<10	4,290	4,030	<5	61	<10	<10
	15AUG89		<5	<10	4,190	4,090	<5	49	<10	<10
1-N-14	27JUL89		<5	<10	5,830	5,110	<5	<5	<10	<10
	15AUG89		<5	<10	4,570	5,050	<5	15	<10	<10
1-N-16	20JUN89		6	13	18,600	.	.	1,880	<10	.
	18AUG89		<5	<10	12,000	11,600	874	1,030	<10	<10
1-N-17	20JUN89		<5	12	17,100	.	.	242	<10	.
	18AUG89		<5	<10	13,200	12,500	1,180	1,260	<10	<10
1-N-18	20JUN89		6	12	34,800	.	.	4,380	<10	.
1-N-21	17JUL89		<5	<10	15,900	15,900	<5	19	<10	<10
	21AUG89		<5	<10	10,200	8,880	6	43	12	<10
1-N-54	21JUN89		<5	<10	8,950	8,260	<5	32	<10	<10
	15AUG89		<5	<10	6,740	5,470	<5	12	<10	<10
1-N-55	21JUN89		<5	<10	13,600	13,500	<5	<5	<10	<10
	21JUN89	1	<5	<10	13,700	12,400	<5	<5	<10	<10
	15AUG89		<5	<10	8,820	8,870	<5	<5	13	<10
1-N-56	21JUN89		<5	<10	25,400	24,900	10	10	<10	<10
	15AUG89		<5	<10	8,580	8,570	49	47	<10	<10
1-N-57	20JUN89		<5	<10	8,420	9,130	<5	8	<10	<10
	18AUG89		<5	<10	7,110	8,850	<5	<5	<10	<10
1-N-66	02AUG89		<5	<10	4,310	4,530	<5	8	<10	<10
	18AUG89		<5	<10	4,910	3,750	22	109	15	<10
1-N-67	02AUG89		<5	<10	4,000	4,290	9	8	<10	<10
	18AUG89		<5	<10	4,390	4,570	<5	6	<10	<10
1-N-69	02AUG89		<5	<10	4,970	5,890	<5	<5	<10	<10
	18AUG89		<5	<10	5,770	4,830	<5	<5	<10	11

TABLE 6.6- (contd)

Well name	Collection Date	Duplicate sample number	NITRATE ppb 500/45000	NITRITE ppb 1000/.	PHOSPHA ppb 1000/.	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/6	RU-106 pCi/L 172.6/30r	FSILICO ppb 50/.
1-N-2	28 JUL 89		22,000	<1000	<1000	1,690	1,690	*0.11100	*-42.70	7,880
	16 AUG 89		20,100	<1000	<1000	1,500	1,510	.	.	6,880
1-N-3	28 JUL 89		13,500	<1000	<1000	2,230	2,180	*0.07810	*-9.83	11,100
	16 AUG 89		10,400	<1000	<1000	2,180	2,120	.	.	11,600
1-N-4	28 JUN 89		7,700	<1000	<1000	2,480	2,680	*0.11500	*18.80	9,890
	15 AUG 89		5,100	<1000	<1000	2,420	2,430	.	.	10,300
1-N-14	27 JUL 89		17,800	<1000	<1000	1,810	1,980	0.20500	*9.87	7,730
	16 AUG 89		11,800	<1000	<1000	1,970	1,830	.	.	8,850
1-N-16	20 JUN 89		<500	<1000	<1000	.	9,640	.	.	.
	18 AUG 89		<500	<1000	<1000	6,900	7,640	.	.	18,400
1-N-17	20 JUN 89		<500	<1000	<1000	.	6,490	.	.	.
	18 AUG 89		1,800	<1000	<1000	4,370	4,810	.	.	15,200
1-N-18	20 JUN 89		<500	<1000	<1000	.	5,380	.	.	.
1-N-21	17 JUL 89		24,100	<1000	<1000	8,190	6,290	.	.	13,000
	21 AUG 89		17,900	<1000	<1000	4,500	5,510	.	.	13,000
1-N-54	21 JUN 89		22,600	<1000	<1000	3,480	3,950	.	.	10,500
	16 AUG 89		15,200	<1000	<1000	2,820	3,270	.	.	9,920
1-N-55	21 JUN 89		21,400	<1000	<1000	4,700	4,830	.	.	12,400
	21 JUN 89	1	21,400	<1000	<1000	4,320	4,970	.	.	11,500
	16 AUG 89		10,200	<1000	<1000	3,760	3,510	.	.	11,700
1-N-56	21 JUN 89		63,600	4500	4800	4,890	5,270	.	.	12,700
	16 AUG 89		8,100	<1000	2600	3,130	2,860	.	.	11,400
1-N-57	20 JUN 89		24,700	<1000	<1000	4,430	4,010	.	.	12,500
	16 AUG 89		10,400	<1000	<1000	3,650	3,850	.	.	12,500
1-N-66	02 AUG 89		3,100	<1000	<1000	2,720	2,670	*0.04580	*49.30	10,400
	16 AUG 89		1,600	<1000	<1000	2,250	2,510	.	.	9,860
1-N-67	02 AUG 89		19,200	<1000	<1000	1,540	1,390	0.19800	*9.51	8,280
	16 AUG 89		23,500	<1000	<1000	1,580	1,420	.	.	6,950
1-N-69	02 AUG 89		29,300	<1000	<1000	2,300	1,890	*0.00846	*-10.20	9,150
	16 AUG 89		28,000	<1000	<1000	1,990	2,110	.	.	7,820

TABLE 6.6. (contd)

Well name	Collection Date	Duplicate sample number	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 10/.	STRONTIUM ppb 10/.	SULFATE ppb 500/250000	TAF ppb 10/.
1-N-2	26JUL89		7,710	3,020	2,950	3,800.0	117	114	13,100	<10
	16AUG89		6,920	2,520	2,520	.	101	103	14,200	.
1-N-3	26JUL89		10,400	8,030	8,220	1,100.0	140	132	34,900	<10
	16AUG89		11,100	7,460	7,650	.	133	132	31,000	.
1-N-4	26JUN89		10,600	3,590	3,380	7.9	111	119	18,400	#8
	16AUG89		10,700	3,350	3,320	.	105	110	16,300	.
1-N-14	27JUL89		8,370	3,810	3,380	1,110.0	153	169	28,600	<10
	16AUG89		7,920	3,250	3,700	.	144	131	18,600	.
1-N-16	20JUN89		16,600	176,000	.	.	.	501	463,000	.
	16AUG89		20,400	125,000	111,000	.	275	309	168,000	.
1-N-17	20JUN89		8,210	71,300	.	.	.	402	128,000	.
	16AUG89		16,100	57,100	51,400	.	328	352	69,000	.
1-N-18	20JUN89		18,200	64,500	.	.	.	804	109,000	.
1-N-21	17JUL89		13,400	105,000	98,900	.	433	435	312,000	.
	21AUG89		15,100	86,900	74,800	.	226	269	168,000	.
1-N-54	21JUN89		11,600	19,800	17,400	.	210	234	99,900	.
	16AUG89		12,100	14,000	12,100	.	142	175	56,000	.
1-N-55	21JUN89	1	12,300	38,000	35,000	.	327	335	212,000	.
	21JUN89		12,400	37,200	32,400	.	301	343	211,000	.
	16AUG89		12,000	17,900	19,200	.	223	221	106,000	.
1-N-56	21JUN89		12,600	58,300	54,500	.	560	595	227,000	.
	16AUG89		11,000	22,100	24,000	.	218	217	47,000	.
1-N-57	20JUN89		11,500	23,800	26,400	.	226	212	117,000	.
	16AUG89		12,900	14,900	15,100	.	170	179	57,000	.
1-N-66	02AUG89		10,400	3,900	4,170	*0.6	120	115	15,900	<10
	16AUG89		14,900	3,110	2,870	.	101	120	12,200	.
1-N-67	02AUG89		8,040	2,770	3,050	14,100.0	113	102	13,600	<10
	16AUG89		7,710	2,790	3,150	.	117	110	16,000	.
1-N-69	02AUG89		7,970	2,900	3,480	*0.2	176	150	11,400	<10
	16AUG89		9,270	3,210	2,910	.	146	171	11,300	.

TABLE 6.6. (contd)

Well name	Collection Date	Duplicate sample number	TITAN ppb 60/.	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/1	U pCi/L 0.5/600d	FLUORIDE ppb 5/.	VANADIUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
1-N-2	26 JUL 89		<60	66,300	.	0.214	<5	<5	<5	<5
	16 AUG 89		<60	.	0.6	.	6	<5	7	<5
1-N-3	26 JUL 89		<60	34,100	.	0.299	<5	<5	<5	<5
	16 AUG 89		<60	.	1.4	.	<5	<5	<5	<5
1-N-4	28 JUN 89		<60	35,000	.	0.280	5	14	24	<5
	16 AUG 89		<60	.	7.9	.	13	10	16	6
1-N-14	27 JUL 89		<60	43,600	.	0.231	<5	9	<5	<5
	16 AUG 89		<60	.	3.9	.	8	8	8	<5
1-N-16	20 JUN 89		<60	.	7.3	.	.	8	90	.
	18 AUG 89		<60	.	100.0	.	6	8	19	11
1-N-17	20 JUN 89		<60	.	38.6	.	.	<5	84	.
	18 AUG 89		<60	.	30.0	.	<5	<5	6	7
1-N-18	20 JUN 89		<60	.	200.0	.	.	<5	22	.
1-N-21	17 JUL 89		<60	.	2.6	.	6	6	19	13
	21 AUG 89		<60	.	8.3	.	5	11	18	10
1-N-54	21 JUN 89		<60	.	6.3	.	<5	<5	10	<5
	16 AUG 89		<60	.	2.3	.	<5	7	7	<5
1-N-55	21 JUN 89	1	<60	.	0.9	.	7	9	<5	<5
	21 JUN 89		<60	.	1.0	.	8	7	<5	<5
	16 AUG 89		<60	.	0.6	.	11	9	<5	<5
1-N-56	21 JUN 89		<60	.	0.6	.	<5	7	7	<5
	16 AUG 89		<60	.	0.6	.	<5	7	<5	<5
1-N-57	20 JUN 89		<60	.	1.8	.	7	<5	9	<5
	16 AUG 89		<60	.	0.9	.	7	9	<5	<5
1-N-66	02 AUG 89		<60	12,200	.	0.801	8	9	9	<5
	16 AUG 89		234	.	55.0	.	12	18	54	13
1-N-67	02 AUG 89		<60	71,800	.	0.236	<5	<5	6	<5
	16 AUG 89		<60	.	4.8	.	7	<5	<5	<5
1-N-69	02 AUG 89		<60	92,700	.	0.191	5	<5	5	<5
	16 AUG 89		<60	.	0.5	.	16	6	<5	<5

The column headers consist of : Constituent Name
Analysis Units
Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-78-003
p - based on proposed Maximum Contaminant Level Goals in 50 FR 48936
s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides in draft DOE Order 5400.xx
u - based on additional Secondary Maximum Contaminant Levels in MAC 248-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- Less than Contractual Detection Limit, measured value reported
* - For radioactive constituents, reported value is less than 2-sigma error

(a) A matrix effect was observed that may have caused an indeterminate recovery during analysis.

7.0 1324-N SURFACE IMPOUNDMENT AND 1324-NA PERCOLATION POND

M. J. Hartman

Westinghouse Hanford Company

The RCRA interim-status ground-water monitoring project at the 1324-N Surface Impoundment and 1324-NA Percolation Pond has been in progress since December 1987. In May 1989, the 1324-N/NA ground-water monitoring project was converted to a ground-water quality assessment project as a result of high specific conductance values in wells 199-N-58, 199-N-59, 199-N-60, and 199-N-61 (see Figure 7.1). The Washington State Department of Ecology was notified, and a ground-water quality assessment program (Gilmore 1989) was developed and implemented as required by 40 CFR 265. This program outlined an expansion of the monitoring network and increased the sampling frequency for selected constituents that could affect the specific conductance in the ground water.

The 1324-N/NA facilities are located in the 100-N Area approximately 1300 ft east of the Columbia River (see Figure 7.1). The 1324-N Surface Impoundment was a treatment facility that was in service from May 1986 to November 1988, when it was replaced with an elementary neutralization vessel. This facility is a doubly lined pond with a leachate collection system that was used to neutralize the wastes. It is currently not in use. The 1324-NA Percolation Pond is an unlined pond that was used to treat corrosive hazardous wastes from August 1977 to May 1986. These wastes contained sulfuric acid and sodium hydroxide. The 1324-NA pond is currently a disposal facility, receiving treated wastes from the elementary neutralization vessel that replaced the 1324-N facility.

There are 5 wells in the core monitoring network and an additional 13 ground-water quality assessment wells (Figure 7.1). The 13 assessment wells are also used in the assessment of the 1301-N LWDF (see Section 6.0). Well 699-81-58 is the designated upgradient well, and wells 199-N-58, 199-N-59, 199-N-60, and 199-N-61 are downgradient wells. The 13 ground-water quality assessment wells are all downgradient wells used to delineate the extent of the high specific conductance in the ground water around the

1324-N/NA facilities. All of the wells monitor the uppermost aquifer, which comprises primarily sand, gravel, and cobbles.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or hydrogeologic characterization work (other than water-level measurement) was performed during this reporting period.

WATER LEVELS

The elevation of the water table in the 100-N Area is affected by the release of effluents to disposal facilities, river stage in the nearby Columbia River, and ground water entering the 100-N Area from other parts of the Hanford Site. Water-level measurements are taken in most of the existing 100-N Area wells in conjunction with the 1301-N LWDF and the 1325-N LWDF projects. Monthly water-level measurements continued this quarter, with measurements obtained from 48 wells in July, August, and September. Water-table maps for each month are shown in Figures 6.2, 6.3, and 6.4. The water-table elevations are presented in Table 6.1. The amount of liquid discharged to the 1325-N LWDF decreased this quarter, and the associated ground-water mound has begun to shrink as a result. Water levels beneath the 1325-N LWDF decreased by approximately 10 ft between June and September 1989. As this ground-water mound dissipates, the mound beneath the 1324-NA percolation pond becomes more distinct.

WATER CHEMISTRY DATA

The sample collection scheduled for June 1989 was delayed because of issues related to disposal of purge water. Samples were collected between July 17 and August 1. The next sample collection was conducted between August 15 and 21. Samples were also collected in September. The background well, 699-81-58, could not be sampled in July or August because the purge water tank was full. Another tank was added before the September sampling.

A revised sampling schedule for the 1324-N/NA project is presented in Table 7.1. The "regular" and "short" lists of constituents referenced in Table 7.1 are shown in Tables 7.2 and 7.3, respectively.

GROUND-WATER QUALITY ASSESSMENT PROGRAM

Gilmore (1989) outlines the first phase of the ground-water quality assessment program for the 1324-N/NA facilities. The first phase was scheduled to end in September 1989. As discussed above, the sampling schedule was delayed several months, and the sampling events were stretched out over several weeks, making data evaluation difficult. Therefore, the second phase of the assessment program will maintain the basic approach of phase one (see Tables 7.1, 7.2, and 7.3). Phase two will continue until there are sufficient data to assess the source, extent, and rate of migration of any hazardous constituents in the ground water.

Analytical results for June, July, and August are reported in Tables 7.4 and 7.5. Results of the September sampling will be presented in the next quarterly report. Constituents of note in the June, July, and August samples include the following:

- Specific conductance continues to be high in the wells of the core monitoring network. The highest value was in well 199-N-61 in July, where specific conductance was 3900 $\mu\text{mho}/\text{cm}$.
- Concentrations of total organic carbon in the wells of the core monitoring network were slightly below or slightly above the critical mean value, but most were less than the contractual detection limit (2000 ppb).
- Ruthenium-106 was reported at 50.8 pCi/L in well 199-N-60. This is higher than the interim drinking water standard (30 pCi/L) but less than the 2-sigma error band (i.e., the concentration of ruthenium-106 present in the sample was too low for the analytical method to measure accurately).
- Sulfate continues to be very high in most of the wells in the 1324-N/NA network. The highest concentration was over 2,000,000 ppb in well 199-N-61. The secondary drinking water standard for sulfate is 250,000 ppb.
- Samples from assessment wells 199-N-23, 199-N-24, 199-N-25, and 199-N-26 had relatively high turbidity. These wells (and also well 199-N-47) were sampled by bailer. Wells sampled by the bailing technique are not normally purged before sampling, and no filtered samples were collected. No filtered samples were collected. High metals concentrations (e.g., iron, cadmium, and manganese) were present in the samples from these wells and are probably associated with particulates in the water.

- Acetone was detected at low concentrations in three wells. Acetone was also detected in a quality control blank associated with well 199-N-60. This indicates that the source of the acetone is not the ground water (see Section 1.0 Analytical Anomalies).

FIGURE 7.1. Ground-Water Monitoring Wells Near the 1324-N and 1324-NA Facilities

TABLE 7.1. Sampling Schedule for the 1324-N/NA Project

Well	1988 ^(a)			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
199-N-58						L				X	S	X
199-N-59						L				X	S	X
199-N-60						L				X	S	X
199-N-61						L				X	S	X
699-81-58			X			L				X	S	X
*199-N-23										S	S	S
*199-N-24										S	S	S
*199-N-25										S	S	S
*199-N-26										S	S	S
*199-N-47										S	S	S
*199-N-16									S	S	S	S
*199-N-17									S	S	S	S
*199-N-18									S	S	S	S
*199-N-21									S	S	S	S
*199-N-54									S	S	S	S
*199-N-55									S	S	S	S
*199-N-56									S	S	S	S
*199-N-57									S	S	S	S

(a) The following notations are used in this table:

L = long sample list (WAC 173-303-9905).

S = sampled for the short list (Table 7.3).

X = sampled for the regular list of constituents (Table 7.2).

* = data also used in the 1301-N Project.

TABLE 7.2. The Regular Sampling List for the 1324-N/NA Ground-Water Quality Assessment Monitoring Network

Coliform	Uranium
Total Organic Halogen	pH
Total Organic Carbon	Specific conductance
Metals Analyzed by the Inductively Coupled Argon Plasma Method, Unfiltered/Filtered	Tritium
Arsenic, Unfiltered/Filtered	Strontium-90
Selenium, Unfiltered/Filtered	Gamma Scan
Lead, Unfiltered/Filtered	Radium
Mercury, Unfiltered/Filtered	Gross Beta
Anions	Gross Alpha
Volatile Organic Analyses	Turbidity
Hydrazine	
Phenol	
Pesticides	
Herbicides	
Ammonium Ion	

TABLE 7.3. Short List for the 1324-N/NA Ground-Water Quality Assessment Monitoring Network

Turbidity
Metals Analyzed by the Inductively Coupled Argon Plasma Method, Unfiltered/Filtered
Arsenic, Unfiltered/Filtered
Selenium, Unfiltered/Filtered
Lead, Unfiltered/Filtered
Mercury, Unfiltered/Filtered
Alkalinity
Anions
pH
Specific conductance

**TABLE 7.4.- Constituent List and Summary of Sampling Results for the 1324-N Surface Impoundment and 1324-NA Percolation Pond
July through August 1989**

----- Constituent List=Contamination Indicator Parameters -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088 CONDLAB	umho	.	52	0	700 WDOE xxx	Specific conductance, laboratory
191 CONDFLD	umho	1	40	0	700 WDOE xxx	Specific conductance, field
199 PHFIELD		0.1	40	0	8.5-8.5 EPAS xxx	pH, field
207 PH-LAB		0.01	52	0	8.5-8.5 EPAS xxx	pH, laboratory
C69 TOC	ppb	2000	16	3	.	Total organic carbon
H42 TOXLDL	ppb	10	16	0	.	Total organic halogens, low DL

----- Constituent List=Interim Primary Drinking Water Parameters -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109 COLIFRM	MPN	2.2	1	1 ***	1 EPA	Coliform bacteria
111 BETA	pCi/L	6	5	0	50 EPA	Gross beta
112 ALPHAHI	pCi/L	4	5	0	15 EPA	Gross alpha, high DL
181 RADIUM	pCi/L	1	5	0	5 EPA	Radium, total
A06 BARIUM	ppb	6	14	0	1000 EPA	Barium
A07 CADMIUM	ppb	2	14	10	10 EPA xxx	Cadmium
A08 CHROMIUM	ppb	10	14	9	50 EPA	Chromium
A10 SILVER	ppb	10	14	14 ***	50 EPA	Silver
A20 ARSENIC	ppb	5	14	12	50 EPA	Arsenic
A21 MERCURY	ppb	0.1	14	14 ***	2 EPA	Mercury
A22 SELENIUM	ppb	5	14	14 ***	10 EPA	Selenium
A33 ENDRIIN	ppb	0.1	5	5 ***	0.2 EPA	Endrin
A34 METHLOR	ppb	3	5	5 ***	100 EPA	Methoxychlor
A35 TOXAENE	ppb	1	5	5 ***	6 EPA	Toxaphene
A36 a-BHC	ppb	0.1	5	5 ***	4 EPA	Lindane, alpha-BHC
A37 b-BHC	ppb	0.1	5	5 ***	4 EPA	Lindane, beta-BHC
A38 g-BHC	ppb	0.1	5	5 ***	4 EPA	Lindane, gamma-BHC
A39 d-BHC	ppb	0.1	5	5 ***	4 EPA	Lindane, delta-BHC
A51 LEADGF	ppb	5	14	11	50 EPA	Lead (graphite furnace)
C72 NITRATE	ppb	500	14	1	45000 EPA	Nitrate
C74 FLUORID	ppb	500	14	0	4000 EPA	Fluoride
H13 2,4-D	ppb	2	5	5 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14 2,4,5TP	ppb	2	5	5 ***	10 EPA	2,4,5-TP silvex
H20 FBARIUM	ppb	6	9	0	1000 EPA	Barium, filtered
H21 FCADMIU	ppb	2	9	9 ***	10 EPA	Cadmium, filtered
H22 FCHROMI	ppb	10	9	9 ***	50 EPA	Chromium, filtered
H23 FSILVER	ppb	10	9	9 ***	50 EPA	Silver, filtered
H37 FARSENI	ppb	5	9	9 ***	50 EPA	Arsenic, filtered
H38 FMERCUR	ppb	0.1	9	9 ***	2 EPA	Mercury, filtered
H39 FSELENI	ppb	5	9	9 ***	10 EPA	Selenium, filtered
H41 FLEAD	ppb	5	9	9 ***	50 EPA	Lead, filtered
H80 TURBID	ntu	0.1	9	0	1 EPA xxx	Turbidity, nephelometric
P19 COLIMF	100mL	1	4	3	1 EPA xxx	Coliform (Membrane Filter)

TABLE 7.4. (contd)

Constituent List=Water Quality Parameters								
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name
A11	SODIUM	ppb	200	14	0	.	.	Sodium
A17	MANGENE	ppb	5	14	8	50 EPAS	xxx	Manganese
A19	IRON	ppb	30	14	2	300 EPAS	xxx	Iron
C57	PHENOL	ppb	10	5	5 ***	.	.	Phenol
C73	SULFATE	ppb	500	14	0	250000 EPAS	xxx	Sulfate
C75	CHLORID	ppb	500	14	0	250000 EPAS	.	Chloride
H24	FSODIUM	ppb	200	9	0	.	.	Sodium, filtered
H29	FMANGAN	ppb	5	9	8	50 EPAS	xxx	Manganese, filtered
H31	FIRON	ppb	30	9	8	. EPAS	.	Iron, filtered

Constituent List=Site Specific and Other Constituents								
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name
010	CO-60	pCi/L	22.5	5	0	100 EPAR	.	Cobalt-60
024	CS-137	pCi/L	20	5	0	200 EPAR	.	Cesium-137
034	RU-106	pCi/L	172.5	5	0	30 EPAR	xxx	Ruthenium-106
104	U	pCi/L	0.5	5	0	500 DOE	.	Uranium
108	TRITIUM	pCi/L	500	5	0	20000 EPA	.	Tritium (H-3)
121	SR-90	pCi/L	5	5	0	8 EPA	.	Strontium-90
A01	BERYLUM	ppb	5	14	13	.	.	Beryllium
A03	STRONTIUM	ppb	10	14	0	.	.	Strontium
A04	ZINC	ppb	5	14	1	5000 EPAS	.	Zinc
A05	CALCIUM	ppb	50	14	0	.	.	Calcium
A12	NICKEL	ppb	10	14	11	.	.	Nickel
A13	COPPER	ppb	10	14	12	1300 EPAP	.	Copper
A14	VANADIUM	ppb	5	14	10	.	.	Vanadium
A15	ANTIMONY	ppb	100	14	14 ***	.	.	Antimony
A16	ALUMINUM	ppb	150	14	10	.	.	Aluminum
A18	POTASSIUM	ppb	100	14	0	.	.	Potassium
A50	MAGNESIUM	ppb	50	14	0	.	.	Magnesium
C78	PHOSPHATE	ppb	1000	14	14 ***	.	.	Phosphate
H18	FZINC	ppb	5	9	5	5000 EPAS	.	Zinc, filtered
H19	FCALCIUM	ppb	50	9	0	.	.	Calcium, filtered
H25	FNICKEL	ppb	10	9	9 ***	.	.	Nickel, filtered
H26	FCOPPER	ppb	10	9	9 ***	1300 EPAP	.	Copper, filtered
H27	FVANADIUM	ppb	5	9	7	.	.	Vanadium, filtered
H28	FALUMINUM	ppb	150	9	9 ***	.	.	Aluminum, filtered
H30	FPOTASSIUM	ppb	100	9	0	.	.	Potassium, filtered
H32	FMAGNESIUM	ppb	50	9	0	.	.	Magnesium, filtered
H33	FBERYLLIUM	ppb	5	9	9 ***	.	.	Beryllium, filtered
H35	FSTRONTIUM	ppb	10	9	0	.	.	Strontium, filtered
H36	FANTIMONY	ppb	100	9	9 ***	.	.	Antimony, filtered
H58	ALKALINITY	ppb	20000	9	0	.	.	Total alkalinity, as CaCO3 (Method B)
H66	BROMIDE	ppb	1000	14	14 ***	.	.	Bromide
H67	NITRITE	ppb	1000	14	14 ***	.	.	Nitrite

TABLE 7.4. (contd)

Constituent List=Site Specific and Other Constituents						
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
H86	FBORON	ppb	10	9	1	. Boron, filtered
H87	FCOBALT	ppb	20	9	9 ***	. Cobalt, filtered
H88	FLITHIU	ppb	10	9	7	. Lithium, filtered
H89	FMOLY	ppb	40	9	9 ***	. Molybdenum, filtered
H90	FSILICO	ppb	50	9	0	. Silicon, filtered
H91	FTIN	ppb	30	9	9 ***	. Tin, filtered
H92	FTITAN	ppb	60	9	9 ***	. Titanium, filtered
H93	FZIRCON	ppb	50	9	9 ***	. Zirconium, filtered
P01	BORON	ppb	10	14	1	. Boron
P02	COBALT	ppb	20	14	14 ***	. Cobalt
P03	LITHIUM	ppb	10	14	12	. Lithium
P04	MOLY	ppb	40	14	14 ***	. Molybdenum
P06	SILICON	ppb	50	14	0	. Silicon
P06	TIN	ppb	30	14	14 ***	. Tin
P07	TITAN	ppb	60	14	13	. Titanium
P08	ZIRCON	ppb	50	14	14 ***	. Zirconium

Constituent List=WAC 173-303-9906 Constituents						
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
A23	THALIUM	ppb	5	5	5 ***	. Thallium
A24	THIOURA	ppb	200	5	5 ***	. Thiourea
A25	ACETREA	ppb	200	5	5 ***	. 1-Acetyl-2-thiourea
A26	CHLOREA	ppb	200	5	5 ***	. 1-(o-Chlorophenyl) thiourea
A27	DIETROL	ppb	200	5	5 ***	. Diethylstilbestrol
A28	ETHYREA	ppb	200	5	5 ***	. Ethylenethiourea
A29	NAPHREA	ppb	200	5	5 ***	. 1-Naphthyl-2-thiourea
A32	PHENREA	ppb	500	5	5 ***	. n-Phenylthiourea
A40	DDD	ppb	0.1	5	5 ***	. DDD
A41	DDE	ppb	0.1	5	5 ***	. DDE
A42	DDT	ppb	0.1	5	5 ***	. DDT
A43	HEPTLOR	ppb	0.1	5	5 ***	. Heptachlor
A44	HEPTIDE	ppb	0.1	5	5 ***	. Heptachlor epoxide
A45	KEPONE	ppb	1	5	5 ***	. Kepone (discontinued)
A46	DIELRIN	ppb	0.1	5	5 ***	. Dieldrin
A47	ALDRIN	ppb	0.1	5	5 ***	. Aldrin
A48	CHLOANE	ppb	1	5	5 ***	. Chlordane
A49	END01	ppb	0.1	5	5 ***	. Endosulfan I (alpha)
A52	END02	ppb	0.1	5	5 ***	. Endosulfan II (beta)
A54	AR1016	ppb	1	5	5 ***	. Arochlor 1016
A55	AR1221	ppb	1	5	5 ***	. Arochlor 1221
A56	AR1232	ppb	1	5	5 ***	. Arochlor 1232
A57	AR1242	ppb	1	5	5 ***	. Arochlor 1242
A58	AR1248	ppb	1	5	5 ***	. Arochlor 1248
A59	AR1254	ppb	1	5	5 ***	. Arochlor 1254
A60	AR1260	ppb	1	5	5 ***	. Arochlor 1260

TABLE 7.4. (contd)

----- Constituent List=WAC 173-303-9905 Constituents -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
A61 TETRANE	ppb	5	5	5 ***	5 EPA	Tetrachloromethane [Carbon Tetrachloride]
A62 BENZENE	ppb	5	5	5 ***	5 EPA	Benzene
A63 DIOXANE	ppb	500	5	5 ***	.	Dioxane
A64 METHONE	ppb	10	5	5 ***	.	Methyl ethyl ketone
A65 PYRIDIN	ppb	500	5	5 ***	.	Pyridine
A66 TOLUENE	ppb	5	5	5 ***	2000 EPAP	Toluene
A67 1,1,1-T	ppb	5	5	5 ***	200 EPA	1,1,1-Trichloroethane
A68 1,1,2-T	ppb	5	5	5 ***	.	1,1,2-Trichloroethane
A69 TRICENE	ppb	5	5	5 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethane]
A70 PERCENE	ppb	5	5	5 ***	.	Perchloroethylene [Tetrachloroethane]
A71 OPXYLE	ppb	5	5	5 ***	440 EPAP	Xylene-o,p
A72 ACROLIN	ppb	10	5	5 ***	.	Acrolein
A73 ACRYLE	ppb	10	5	5 ***	.	Acrylonitrile
A74 BISTHER	ppb	5	5	5 ***	.	bis(Chloromethyl) ether
A75 BROMONE	ppb	5	5	5 ***	.	Bromoacetone
A76 METHBRO	ppb	10	5	5 ***	.	Bromomethane [Methyl bromide]
A77 CARBIDE	ppb	10	5	5 ***	.	Carbon disulfide
A78 CHLBENZ	ppb	5	5	5 ***	50 EPAP	Chlorobenzene
A79 CHLTER	ppb	5	5	5 ***	.	2-Chloroethyl vinyl ether
A80 CHLFORM	ppb	5	5	1	100 EPA	Chloroform [Trichloromethane]
A81 METHCHL	ppb	10	5	5 ***	.	Methyl chloride [Chloromethane]
A82 CHMTER	ppb	10	5	5 ***	.	Chloromethyl methyl ether
A83 CROTONA	ppb	10	5	5 ***	.	Crotonaldehyde
A84 DIBRCHL	ppb	10	5	5 ***	0 EPAP	1,2-Dibromo-3-chloropropane
A85 DIBRETH	ppb	10	5	5 ***	.	1,2-Dibromoethane
A86 DIBRMET	ppb	10	5	5 ***	.	Dibromomethane
A87 DIBUTEN	ppb	10	5	5 ***	.	1,4-Dichloro-2-butene
A88 DICDIFM	ppb	10	5	5 ***	.	Dichlorodifluoromethane
A89 1,1-DIC	ppb	5	5	5 ***	.	1,1-Dichloroethane
A90 1,2-DIC	ppb	5	5	5 ***	5 EPA	1,2-Dichloroethane
A91 TRANCE	ppb	5	5	5 ***	70 EPAP	trans-1,2-Dichloroethane
A92 DICETHY	ppb	10	5	5 ***	7 EPA	1,1-Dichloroethylene
A93 METHYCH	ppb	5	5	4	.	Methylene chloride [Dichloromethane]
A94 DICPANE	ppb	5	5	5 ***	5 EPAP	1,2-Dichloropropane
A95 DICPENE	ppb	5	5	5 ***	.	1,3-Dichloropropane
A96 NNDIEHY	ppb	10	5	5 ***	.	N,N-diethylhydrazine
A97 1,1-DIM	ppb	10	5	5 ***	.	1,1-Dimethylhydrazine
A98 1,2-DIM	ppb	10	5	5 ***	.	1,2-Dimethylhydrazine
B01 IODOMET	ppb	10	5	5 ***	.	Iodomethane
B02 METHACR	ppb	10	5	5 ***	.	Methacrylonitrile
B03 METHTHI	ppb	10	5	5 ***	.	Methanethiol
B04 PENTACH	ppb	10	5	5 ***	.	Pentachloroethane
B05 1112-tc	ppb	10	5	5 ***	.	1,1,1,2-Tetrachloroethane
B06 1122-tc	ppb	5	5	5 ***	.	1,1,2,2-Tetrachloroethane
B08 BROMORM	ppb	5	5	5 ***	100 EPA	Bromoform [Tribromomethane]
B09 TRCMEOI	ppb	10	5	5 ***	.	Trichloromethanethiol
B10 TRCMFLM	ppb	10	5	5 ***	.	Trichloromonofluoromethane
B12 123-trp	ppb	10	5	5 ***	.	1,2,3-Trichloropropane

TABLE 7-4. (contd)

----- Constituent List=WAC 173-303-9906 Constituents -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
B13	VINYIDE	ppb	10	5	5 ***	2 EPA	Vinyl chloride
B14	M-XYLE	ppb	5	5	5 ***	440 EPAP	Xylene-m
B19	ACETILE	ppb	10	5	5 ***	.	Acetonitrile
B20	ACETOPH	ppb	10	5	5 ***	.	Acetophenone
B21	WARFRIN	ppb	10	5	5 ***	.	Warfarin
B22	ACEFENE	ppb	10	5	5 ***	.	2-Acetylaminofluorene
B23	AMINOYL	ppb	10	5	5 ***	.	4-Aminobiphenyl
B24	AMIISOX	ppb	10	5	5 ***	.	5-(Aminomethyl)-3-isoxazolo
B25	AMITROL	ppb	10	5	5 ***	.	Amitrole
B26	ANILINE	ppb	10	5	5 ***	.	Aniline
B27	ARAMITE	ppb	10	5	5 ***	.	Aramite
B28	AURAMIN	ppb	10	5	5 ***	.	Auramine
B29	BENZCAC	ppb	10	5	5 ***	.	Benz[c]acridine
B30	BENZAAN	ppb	10	5	5 ***	.	Benz[a]anthracene
B31	BENDICM	ppb	10	5	5 ***	.	Benzene, dichloromethyl
B32	BENTHOL	ppb	10	5	5 ***	.	Benzenethiol
B33	BENDINE	ppb	10	5	5 ***	.	Benzidine
B34	BENZBFL	ppb	10	5	5 ***	.	Benzo[b]fluoranthene
B35	BENZJFL	ppb	10	5	5 ***	.	Benzo[j]fluoranthene
B36	PBENZQU	ppb	10	5	5 ***	.	p-Benzoquinone
B37	BENZCHL	ppb	10	5	5 ***	.	Benzyl chloride
B38	BIS2CHM	ppb	10	5	5 ***	.	bis(2-Chloroethoxy) methane
B39	BIS2CHE	ppb	10	5	5 ***	.	bis(2-Chloroethyl) ether
B40	BIS2EPH	ppb	10	5	4	.	bis(2-Ethylhexyl) phthalate
B41	BROPHEN	ppb	10	5	5 ***	.	4-Bromophenyl phenyl ether
B42	BUTBENP	ppb	10	5	5 ***	.	Butyl benzyl phthalate
B43	BUTDINP	ppb	10	5	5 ***	.	2-sec-Butyl-4,6-dinitrophenol [Dinoseb]
B44	CHALETH	ppb	10	5	5 ***	.	Chloroalkyl ethers
B45	CHLANIL	ppb	10	5	5 ***	.	p-Chloroaniline [4-Chloroaniline]
B46	CHLCRES	ppb	10	5	5 ***	.	p-Chloro-m-cresol
B47	CHLEPOX	ppb	10	5	5 ***	0 EPAP	1-Chloro-2,3-epoxypropane
B48	CHLNAPH	ppb	10	5	5 ***	.	2-Chloronaphthalene
B49	CHLPHEN	ppb	10	5	5 ***	.	2-Chlorophenol
B50	CHRYSEN	ppb	10	5	5 ***	.	Chrysene
B51	CRESOLS	ppb	10	5	5 ***	.	Cresols
B52	CYCHDIN	ppb	10	5	5 ***	.	2-Cyclohexyl-4,6-dinitrophenol
B53	DIBAHAC	ppb	10	5	5 ***	.	Dibenz[a,h]acridine
B54	DIBAJAC	ppb	10	5	5 ***	.	Dibenz[a,h]acridine
B55	DIBAHAN	ppb	10	5	5 ***	.	Dibenz[a,h]anthracene
B56	DIBCGCA	ppb	10	5	5 ***	.	7H-Dibenzo[c,g]carbazole
B57	DIBAEPY	ppb	10	5	5 ***	.	Dibenzo[a,e]pyrene
B58	DIBAHPY	ppb	10	5	5 ***	.	Dibenzo[a,h]pyrene
B59	DIBAIKY	ppb	10	5	5 ***	.	Dibenzo[a,i]pyrene
B60	DIBPHTH	ppb	10	5	5 ***	.	Di-n-butyl phthalate
B61	12-dben	ppb	10	5	5 ***	.	1,2-Dichlorobenzene [o-Dichlorobenzene]
B62	13-dben	ppb	10	5	5 ***	.	1,3-Dichlorobenzene [m-Dichlorobenzene]
B63	14-dben	ppb	10	5	5 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]

TABLE 7.4. (contd)

Constituent List=WAC 173-303-9905 Constituents						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
B64 DICHBEN	ppb	10	5	5 ***	.	3,3'-Dichlorobenzidine
B65 24-dchp	ppb	10	5	5 ***	.	2,4-Dichlorophenol
B66 26-dchp	ppb	10	5	5 ***	.	2,6-Dichlorophenol
B67 DIEPHTH	ppb	10	5	5 ***	.	Diethyl phthalate
B68 DIHYSAF	ppb	10	5	5 ***	.	Dihydroaafrole
B69 DIMETHB	ppb	10	5	5 ***	.	3,3'-Dimethoxybenzidine
B70 DIMEAMB	ppb	10	5	5 ***	.	p-Dimethylaminooxobenzene
B71 DIMBENZ	ppb	10	5	5 ***	.	7,12-Dimethylbenz[a]anthracene
B72 DIMEYLB	ppb	10	5	5 ***	.	3,3'-Dimethylbenzidine
B73 THIONOX	ppb	10	5	5 ***	.	Thiofanox
B74 DIMPHAM	ppb	10	5	5 ***	.	alpha,alpha-Dimethylphenethylamine
B76 DIMPHTH	ppb	10	5	5 ***	.	Dimethyl phthalate
B77 DINBENZ	ppb	10	5	5 ***	.	Dinitrobenzene
B78 DINCREB	ppb	10	5	5 ***	.	4,6-Dinitro-o-cresol and salts
B79 DINPHEN	ppb	10	5	5 ***	.	2,4-Dinitrophenol
B80 24-dint	ppb	10	5	5 ***	.	2,4-Dinitrotoluene
B81 26-dint	ppb	10	5	5 ***	.	2,6-Dinitrotoluene
B82 DIOPHTH	ppb	10	5	5 ***	.	Di-n-octyl phthalate
B83 DIPAMI	ppb	10	5	5 ***	.	Diphenylamine
B84 DIPHYD	ppb	10	5	5 ***	.	1,2-Diphenylhydrazine
B85 DIPRNT	ppb	10	5	5 ***	.	Di-n-propylnitrosamine
B86 ETHMINE	ppb	10	5	5 ***	.	Ethyleneimine
B87 ETHMETS	ppb	10	5	5 ***	.	Ethyl methanesulfonate
B88 FLUORAN	ppb	10	5	5 ***	.	Fluoranthene
B89 HEXCBEN	ppb	10	5	5 ***	.	Hexachlorobenzene
B90 HEXCBUT	ppb	10	5	5 ***	.	Hexachlorobutadiene
B91 HEXCCYC	ppb	10	5	5 ***	.	Hexachlorocyclopentadiene
B92 HEXCETH	ppb	10	5	5 ***	.	Hexachloroethane
B93 INDENOP	ppb	10	5	5 ***	.	Indeno(1,2,3-cd)pyrene
B94 ISOSOLE	ppb	10	5	5 ***	.	Isoaafrole
B95 MALOILE	ppb	10	5	5 ***	.	Malononitrile
B96 MELPHAL	ppb	10	5	5 ***	.	Malphalan
B97 METHAPY	ppb	10	5	5 ***	.	Methapyrilene
B98 METHNYL	ppb	10	5	5 ***	.	Metholonyl
B99 METAZIR	ppb	10	5	5 ***	.	2-Methylaziridine
C01 WETCHAN	ppb	10	5	5 ***	.	3-Methylcholanthrene
C02 METBISC	ppb	10	5	5 ***	.	4,4'-Methylenebis(2-chloroaniline)
C03 METACTO	ppb	10	5	5 ***	.	2-Methylactonitrile
C04 METACRY	ppb	10	5	5 ***	.	Methyl methacrylate
C05 METMSUL	ppb	10	5	5 ***	.	Methyl methanesulfonate
C06 METPROP	ppb	10	5	5 ***	.	2-Methyl-2-(methylthio) propionaldehyde
C07 METHIOU	ppb	10	5	5 ***	.	Methylthiouracil
C08 NAPHQUI	ppb	10	5	5 ***	.	1,4-Naphthoquinone
C09 1-napha	ppb	10	5	5 ***	.	1-Naphthylamine
C10 2-napha	ppb	10	5	5 ***	.	2-Naphthylamine
C11 NITRANI	ppb	10	5	5 ***	.	p-Nitroaniline [4-Nitroaniline]
C12 NITBENZ	ppb	10	5	5 ***	.	Nitrobenzene

TABLE 7.4. (contd)

----- Constituent List=WAC 173-303-9905 Constituents -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
C13	NITPHEN	ppb	10	5	5 ***	.	4-Nitrophenol [p-Nitrophenol]
C14	NNIBUTY	ppb	10	5	5 ***	.	n-Nitrosodi-n-butylamine
C15	NNIDIEA	ppb	10	5	5 ***	.	n-Nitrosodiethanolamine
C16	NNIDIEY	ppb	10	5	5 ***	.	n-Nitrosodiethylamine
C17	NNIDIME	ppb	10	5	5 ***	.	n-Nitrosodimethylamine
C18	NNIMETH	ppb	10	5	5 ***	.	n-Nitrosomethylethylamine
C19	NNIURET	ppb	10	5	5 ***	.	n-Nitroso-n-methylurethane
C20	NNIVINY	ppb	10	5	5 ***	.	n-Nitrosomethylvinylamine
C21	NNIMORP	ppb	10	5	5 ***	.	n-Nitrosomorpholine
C22	NNINICO	ppb	10	5	5 ***	.	n-Nitrosornicotine
C23	NNIPIPE	ppb	10	5	5 ***	.	n-Nitrosopiperidine
C24	NITRPPYR	ppb	10	5	5 ***	.	Nitrosopyrrolidine
C25	NITRTOL	ppb	10	5	5 ***	.	5-Nitro-o-toluidine
C26	PENTCHB	ppb	10	5	5 ***	.	Pentachlorobenzene
C27	PENTCHN	ppb	10	5	5 ***	.	Pentachloronitrobenzene
C28	PENTCHP	ppb	50	5	5 ***	220 EPAP	Pentachlorophenol
C29	PHENTIN	ppb	10	5	5 ***	.	Phenacetin
C30	PHENINE	ppb	10	5	5 ***	.	Phenylenediamine
C31	PHTHEST	ppb	10	5	5 ***	.	Phthalic acid esters
C32	PICOLIN	ppb	10	5	5 ***	.	2-Picoline
C33	PROMIDE	ppb	10	5	5 ***	.	Pronamide
C34	RESERPI	ppb	10	5	5 ***	.	Reserpine
C35	RESORCI	ppb	10	5	5 ***	.	Resorcinol
C36	SAFROL	ppb	10	5	5 ***	.	Safrol
C37	TETRCHB	ppb	10	5	5 ***	.	1,2,4,5-Tetrachlorobenzene
C38	TETRCHP	ppb	10	5	5 ***	.	2,3,4,5-Tetrachlorophenol
C40	THIURAM	ppb	10	5	5 ***	.	Thiuram
C41	TOLUDIA	ppb	10	5	5 ***	.	Toluenediamine
C42	TOLHYD	ppb	10	5	5 ***	.	o-Toluidine hydrochloride
C43	TRICHLB	ppb	10	5	5 ***	.	1,2,4-Trichlorobenzene
C44	245-trp	ppb	10	5	5 ***	.	2,4,5-Trichlorophenol
C45	246-trp	ppb	10	5	5 ***	.	2,4,6-Trichlorophenol
C46	TRIPHOS	ppb	10	5	5 ***	.	O,O,O-triethyl phosphorothioate
C47	SYMTRIN	ppb	10	5	5 ***	.	Sym-trinitrobenzene
C48	TRISPHO	ppb	10	5	5 ***	.	Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	ppb	10	5	5 ***	.	Benzo[a]pyrene
C50	CHLNAPZ	ppb	10	5	5 ***	.	Chloranphazine
C51	BISZETH	ppb	10	5	5 ***	.	bis(2-Chloroisopropyl) ether
C52	HEXAENE	ppb	10	5	5 ***	.	Hexachloropropene
C54	HEXACHL	ppb	10	5	5 ***	.	Hexachlorophene
C55	NAPHTHA	ppb	10	5	5 ***	.	Naphthalene
C58	123TRI	ppb	10	5	5 ***	.	1,2,3-Trichlorobenzene
C58	135TRI	ppb	10	5	5 ***	.	1,3,5-Trichlorobenzene
C59	1234TE	ppb	10	5	5 ***	.	1,2,3,4-Tetrachlorobenzene
C60	1235TE	ppb	10	5	5 ***	.	1,2,3,5-Tetrachlorobenzene
C61	TETEPYR	ppb	2	5	5 ***	.	Tetraethylpyrophosphate
C62	CHLLATE	ppb	300	5	5 ***	.	Chlorobenzilate

TABLE 7.4. (contd)

----- Constituent List=WAC 173-303-9905 Constituents -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C63	CARBPHT	ppb	2	5	5 ***	.	Carbophenothion
C64	DISULFO	ppb	2	5	5 ***	.	Disulfoton
C65	DIMETHO	ppb	2	5	5 ***	.	Dimethoate
C66	METHPAR	ppb	2	5	5 ***	.	Methyl parathion
C67	PARATHI	ppb	2	5	5 ***	.	Parathion
C70	CYANIDE	ppb	10	5	5 ***	.	Cyanide
C71	FORMALN	ppb	500	5	5 ***	.	Formalin
C78	SULFIDE	ppb	1000	5	5 ***	.	Sulfide
C79	KEROSENE	ppb	10000	5	5 ***	.	Kerosene
C80	AMMONIU	ppb	50	5	5 ***	.	Ammonium ion
C87	CITRUSR	ppb	1000	5	5 ***	.	Citrus red
C90	PARALDE	ppb	10000	5	5 ***	.	Paraldehyde
C91	STRYCHN	ppb	50	5	5 ***	.	Strychnine
C92	MALHYDR	ppb	500	5	5 ***	.	Maleic hydraxide
C93	NICOTIN	ppb	100	5	5 ***	.	Nicotinic acid
C94	ACRYIDE	ppb	10000	5	5 ***	0 EPAP	Acrylamide
C95	ALLYLAL	ppb	10000	5	5 ***	.	Allyl alcohol
C98	CHLPROP	ppb	10000	5	5 ***	.	3-Chloropropionitrile
D01	PCDDs	ppb	0.01	5	5 ***	.	PCDDs
D02	PCDFs	ppb	0.01	5	5 ***	.	PCDFs
D03	2378TCDD	ppb	0.01	5	5 ***	.	2,3,7,8-TCDD [Dioxin]
H03	ETHCARB	ppb	10000	5	5 ***	.	Ethyl carbamate
H04	ETHCYAN	ppb	10000	5	5 ***	.	Ethyl cyanide
H06	ETHOXID	ppb	10	5	5 ***	.	Ethylene oxide
H08	ETHMETH	ppb	10	5	5 ***	.	Ethyl methacrylate
H09	ISOBUTY	ppb	10000	5	5 ***	.	Isobutyl alcohol
H11	PROPYLA	ppb	10000	5	5 ***	.	n-Propylamine
H12	PROPYNO	ppb	10000	5	5 ***	.	2-Propyn-1-ol
H15	2,4,6-T	ppb	2	5	5 ***	.	2,4,6-T
H40	ETHALLI	ppb	5	5	5 ***	.	Thallium, filtered
H82	LHYDRAZ	ppb	30	9	9 ***	.	Hydrazine, low DL
H88	HEXONE	ppb	10	5	5 ***	.	Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	5	2	.	Acetone by VOA
I08	ISOPHER	ppb	10	5	5 ***	.	Isophorone
I09	BUTANOL	ppb	10000	5	5 ***	.	1-Butanol
I21	TRIBUPH	ppb	10	5	5 ***	.	Tributylphosphoric acid
I28	TAF	ppb	10	5	5 ***	.	Tetrahydrofuran
I28	ACENAPH	ppb	10	5	5 ***	.	Acenaphthene
I30	FLRENE	ppb	10	5	5 ***	.	Fluorene
I31	ANTHRA	ppb	10	5	5 ***	.	Anthracene
I32	PYRENE	ppb	10	5	5 ***	.	Pyrene
I33	ETHBENZ	ppb	5	5	5 ***	580 EPAP	Ethylbenzene
I34	STYRENE	ppb	5	5	5 ***	140 EPAP	Styrene
I42	BDCM	ppb	5	5	5 ***	100 EPA	Bromodichloromethane
I43	CDBM	ppb	5	5	5 ***	100 EPA	Chlorodibromomethane
I64	2NITPH	ppb	10	5	5 ***	.	2-Nitrophenol [o-Nitrophenol]
I67	ETHANOL	ppb	10000	5	5 ***	.	Ethanol

TABLE 7.4. (contd)

----- Constituent List=WAC 173-203-9905 Constituents -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
I75	2MENAPH	ppb	10	5	5 ***	.	2-Methylnaphthalene
I82	PHENANT	ppb	10	5	5 ***	.	Phenanthrene
J43	BENZALC	ppb	10	5	5 ***	.	Benzyl alcohol
J89	2HEXANO	ppb	50	5	5 ***	.	2-Hexanone
J71	BNZKFLU	ppb	10	5	5 ***	.	Benzo[k]fluoranthene
J89	BGHIPEP	ppb	10	5	5 ***	.	Benzo (ghi) perylene
J89	DINOSEB	ppb	10	5	5 ***	.	Dinoseb
J91	DIALLAT	ppb	10	5	5 ***	.	Diallate
K52	MNDIPHA	ppb	10	5	5 ***	.	n-Nitrosodiphenylamine
K58	DIBENFR	ppb	10	5	5 ***	.	Dibenzofuran
K58	ACENATL	ppb	10	5	5 ***	.	Acenaphthylene
L20	MBP	ppb	10000	5	5 ***	.	Monobutylphosphate
L21	DBP	ppb	10000	5	5 ***	.	Dibutylphosphate
L45	ALLYLCL	ppb	100	5	5 ***	.	Allyl chloride
L46	CLETHAN	ppb	10	5	5 ***	.	Chlorethane
L48	PROPCN	ppb	5	5	5 ***	.	Propionitrile
L49	VINYLCAC	ppb	5	5	5 ***	.	Vinyl acetate
L50	B2CLMEE	ppb	10	5	5 ***	.	bis(2-Chloro-1-methylethyl)ether
L52	DIPHOS	ppb	10	5	5 ***	.	O,O-Diethyl-O,2-pyrazinyl phosphorothion
L53	ISODRIN	ppb	10	5	5 ***	.	Isodrin
L54	ONITANI	ppb	10	5	5 ***	.	o-Nitroaniline [2-Nitroaniline]
L55	MNITANI	ppb	10	5	5 ***	.	m-Nitroaniline [3-Nitroaniline]
L56	4NITQUI	ppb	10	5	5 ***	.	4-Nitroquinoline 1-oxide
L67	ETHGLYC	ppb	10000	5	5 ***	.	Ethylene glycol
L59	1PROPAN	ppb	10000	5	5 ***	.	1-Propanol
L60	1BUTYN	ppb	10000	5	5 ***	.	1-Butynol
L62	ACETON	ppb	10	5	5 ***	.	Acetone by ABN
L63	14DBEN	ppb	5	5	5 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
L64	CHLRDB	ppb	10	5	5 ***	80 EPAP	Chlorobenzene (by ABN)
P12	ENDSFAM	ppb	0.5	5	5 ***	.	Endosulfen
P13	PHORATE	ppb	2	5	5 ***	.	Phorate

*** - Indicates all samples were reported as below contractual detection limits

xxx - Indicates that Drinking Water standards were exceeded

EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936

EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx

MDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

TABLE 7.5. Constituents with at Least One Detected Value for the 1324-N Surface Impoundment and 1324-NA Percolation Pond July through August 1989

Quadruplicate Contamination Indicator Parameters								
Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho /700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
1-N-23	22AUG89		831	893	7.60	7.20	.	.
		1	.	898	7.60	.	.	.
		2	.	898	7.60	.	.	.
		3	.	890	7.70	.	.	.
1-N-24	21AUG89		1,135	992	7.60	7.83	.	.
		1	.	997	7.60	.	.	.
		2	.	1,040	7.70	.	.	.
		3	.	1,000	7.60	.	.	.
1-N-25	21AUG89		790	738	8.80	9.00	.	.
		1	.	738	8.90	.	.	.
		2	.	739	8.90	.	.	.
		3	.	738	8.80	.	.	.
1-N-26	22AUG89		480	474	7.80	7.41	.	.
		1	.	477	7.80	.	.	.
		2	.	475	7.90	.	.	.
		3	.	478	7.80	.	.	.
1-N-47	21AUG89		1,541	1,410	7.50	7.43	.	.
		1	1,539	1,410	7.60	7.45	.	.
		2	1,545	1,410	7.60	7.45	.	.
		3	1,541	1,410	7.60	7.42	.	.
1-N-58	25JUL89		2,400	2,410	6.70	7.00	#1,200	17
		1	2,400	2,360	6.70	7.00	#1,600	12
		2	2,410	2,380	6.70	7.00	#1,400	14
		3	2,410	2,390	6.70	7.00	#1,100	18
1-N-58	14AUG89		2,250	2,230	7.60	7.39	.	.
		1	2,250	2,250	7.60	7.42	.	.
		2	2,280	2,230	7.60	7.42	.	.
		3	2,280	2,250	7.60	7.42	.	.
1-N-59	17JUL89		2,310	2,180	6.70	6.89	#1,200	14
		1	2,300	2,180	6.70	6.92	#1,100	10
		2	2,320	2,160	6.70	6.93	#1,200	#9
		3	2,340	2,190	6.80	6.93	#1,200	10
1-N-59	14AUG89		2,870	2,790	6.60	6.47	.	.
		1	2,840	2,780	6.50	6.46	.	.
		2	2,800	2,780	6.50	6.46	.	.
		3	2,830	2,760	6.50	6.47	.	.

TABLE 7.5. (contd)

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5a	PHFIELD 0.1/8.5a	TOC ppb 2000/.	TOXLDL ppb 10/.
1-N-60	01AUG89		1,779	2,240	7.90	7.75	1,000	14
		1	1,830	2,210	7.90	7.70	1,000	14
		2	1,791	2,220	7.90	7.72	1,000	13
		3	1,771	2,220	7.90	7.77	900	16
1-N-60	14AUG89		1,315	2,220	7.80	7.62	.	.
		1	1,290	2,240	7.80	7.63	.	.
		2	1,394	2,220	7.80	7.64	.	.
		3	1,340	2,240	7.90	7.65	.	.
1-N-61	28JUL89		3,850	3,270	7.00	7.09	2,200	33
		1	3,910	3,260	7.00	7.07	2,100	32
		2	3,900	3,290	7.00	7.07	2,200	37
		3	3,900	3,300	7.00	7.03	2,000	37
1-N-61	14AUG89		1,650	3,880	6.90	7.09	.	.
		1	1,654	3,890	6.90	7.07	.	.
		2	1,650	3,860	6.90	7.04	.	.
		3	1,646	3,880	6.90	7.03	.	.

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALKALIN ppb 20000/.	ALPHAHI pCi/L 4/15	ALUMNUM ppb 150/.	ARSENIC ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BERYLUM ppb 5/.
1-N-23	22AUG89		.	240,000	.	2920	16	873	.	<5
1-N-24	21AUG89		.	24,000	.	232	<5	176	.	<5
1-N-25	21AUG89		.	98,000	.	314	9	80	.	<5
1-N-26	22AUG89		.	159,000	.	<150	<5	76	.	<5
1-N-47	21AUG89		.	530,000	.	<150	<5	45	.	<5
1-N-58	25JUL89		#9(a)	.	*4.21	<150	<5	33	30	<5
	14AUG89		.	84,000	.	<150	<5	34	36	5
1-N-59	17JUL89		#5(a)	.	*3.85	209	<5	27	29	<5
	14AUG89		.	46,000	.	<150	<5	35	37	<5
1-N-60	01AUG89		#8(a)	.	*2.72	<150	<5	34	36	<5
	01AUG89	1	<10	.	*1.74	<150	<5	40	38	<5
	14AUG89		.	94,000	.	<150	<5	33	36	<5
1-N-61	28JUL89		<10	.	*0.36	<150	<5	49	51	<5
	14AUG89		.	52,000	.	<150	<5	53	52	<5

TABLE 7.5. (contd)

Well name	Collection Date	Duplicate sample number	BETA pCi/L 8/50	BIS2EPH ppb 10/.	BORON ppb 10/.	FBORON ppb 10/.	CADMIUM ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLFORM ppb 5/100
1-N-23	22AUG89		.	.	<10	.	45	.	79,300	.
1-N-24	21AUG89		.	.	20	.	11	.	116,000	.
1-N-25	21AUG89		.	.	20	.	27	.	35,100	.
1-N-26	22AUG89		.	.	38	.	9	.	40,000	.
1-N-47	21AUG89		.	.	44	.	<2	.	187,000	.
1-N-58	25JUL89		7.11	<10	11	17	<2	139,000	139,000	8
	14AUG89		.	.	25	13	<2	134,000	137,000	.
1-N-59	17JUL89		4.80	<10	16	21	<2	119,000	113,000	6
	14AUG89		.	.	28	20	<2	189,000	179,000	.
1-N-60	01AUG89		*3.04	<10	17	17	<2	145,000	141,000	<5
	01AUG89	1	11.70	<10	17	19	<2	152,000	143,000	9
	14AUG89		.	.	25	<10	<2	145,000	146,000	.
1-N-61	28JUL89		*4.51	15	37	27	<2	158,000	188,000	15
	14AUG89		.	.	38	28	<2	182,000	183,000	.
Well name	Collection Date	Duplicate sample number	CHLORID ppb 500/250000s	CHROMIUM ppb 10/50	CO-60 pCi/L 22.5/100r	COLIMF 100mL 1/1	COPPER ppb 10/1300p	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000	
1-N-23	22AUG89		15,000	11	.	.	88	.	800	
1-N-24	21AUG89		8,300	<10	.	.	<10	.	900	
1-N-25	21AUG89		8,000	42	.	.	24	.	600	
1-N-26	22AUG89		7,000	<10	.	.	<10	.	900	
1-N-47	21AUG89		30,000	<10	.	.	<10	.	1,300	
1-N-58	25JUL89		8,480	<10	*-2.840	<1	<10	*2.12	2,390	
	14AUG89		4,800	<10	.	.	<10	.	2,200	
1-N-59	17JUL89		5,540	<10	*0.711	.	<10	*4.85	2,110	
	14AUG89		8,400	<10	.	.	<10	.	2,800	
1-N-60	01AUG89		5,300	22	*6.000	2	<10	*0.00	2,100	
	01AUG89	1	5,300	28	*-3.030	<1	<10	*-6.01	2,100	
	14AUG89		4,800	<10	.	.	<10	.	2,100	
1-N-61	28JUL89		13,400	11	*0.378	<1	<10	*-3.18	3,400	
	14AUG89		12,000	<10	.	.	<10	.	3,600	
Well name	Collection Date	Duplicate sample number	IRON ppb 30/300s	FIRON ppb 30/.	LEADGF ppb 5/50	FLITHIU ppb 10/.	LITHIUM ppb 10/.	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s
1-N-23	22AUG89		134,000	.	12	.	<10	18,000	.	.
1-N-24	21AUG89		28,400	.	9	.	<10	21,100	.	.
1-N-25	21AUG89		37,300	.	16	.	<10	12,000	.	.
1-N-26	22AUG89		4,380	.	<5	.	<10	9,380	.	.
1-N-47	21AUG89		42	.	<5	.	<10	32,800	.	.
1-N-58	25JUL89		<30	<30	<5	<10	<10	29,800	29,000	138
	14AUG89		34	<30	<5	<10	<10	27,500	25,800	<5
1-N-59	17JUL89		33	<30	<5	<10	<10	23,100	24,200	70
	14AUG89		<30	<30	<5	<10	<10	39,800	38,800	208
1-N-60	01AUG89		103	<30	<5	<10	<10	25,800	27,600	<5
	01AUG89	1	116	<30	<5	11	11	28,400	28,900	<5
	14AUG89		34	31	<5	11	10	28,400	27,500	<5
1-N-61	28JUL89		89	<30	<5	<10	<10	39,100	37,100	<5
	14AUG89		175	<30	<5	<10	<10	45,400	38,400	<5

TABLE 7.5. (contd)

Well name	Collection Date	Duplicate sample number	MANGESE ppb 5/50*	METHYCHN ppb 5/.	NICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	RU-108 pCi/L 172.5/30r
1-N-23	22AUG89		1,070	.	58	<500	.	5,730	.	.
1-N-24	21AUG89		419	.	<10	3,700	.	7,300	.	.
1-N-25	21AUG89		148	.	10	12,700	.	5,150	.	.
1-N-28	22AUG89		154	.	<10	26,100	.	5,010	.	.
1-N-47	21AUG89		<5	.	<10	4,200	.	9,510	.	.
1-N-58	25JUL89		142	<5	<10	3,310	5,380	5,380	0.407	*44.4
	14AUG89		<5	.	<10	2,400	5,080	5,400	.	.
1-N-59	17JUL89		68	<5	<10	3,200	5,340	5,000	0.492	*-49.9
	14AUG89		212	.	13	3,000	5,570	5,140	.	.
1-N-60	01AUG89		<5	#4	<10	2,100	7,480	5,540	0.473	*12.8
	01AUG89	1	<5	<5	<10	2,100	7,900	7,470	0.821	50.8
	14AUG89		<5	.	<10	1,900	7,580	7,080	.	.
1-N-61	28JUL89		<5	<5	<10	3,000	5,000	4,830	*0.115	*-32.5
	14AUG89		13	.	<10	2,400	5,280	5,370	.	.
Well name	Collection Date	Duplicate sample number	FSILICD ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 10/.	STRONTIUM ppb 10/.	SULFATE ppb 500/250000*
1-N-23	22AUG89		.	28,000	118,000	.	.	.	414	231,000
1-N-24	21AUG89		.	11,800	102,000	.	.	.	515	345,000
1-N-25	21AUG89		.	15,000	121,000	.	.	.	270	257,000
1-N-28	22AUG89		.	19,300	47,500	.	.	.	184	59,000
1-N-47	21AUG89		.	14,900	173,000	.	.	.	521	276,000
1-N-58	25JUL89		13,700	13,400	503,000	479,000	1.350	521	537	1,350,000
	14AUG89		11,900	12,800	481,000	479,000	.	482	483	1,140,000
1-N-59	17JUL89		13,800	13,000	379,000	397,000	*0.472	485	455	1,170,000
	14AUG89		18,100	15,500	567,000	585,000	.	705	680	1,550,000
1-N-60	01AUG89		17,500	16,200	392,000	418,000	*0.431	579	529	1,180,000
	01AUG89	1	18,400	17,900	398,000	430,000	*0.358	525	585	1,170,000
	14AUG89		18,700	18,200	415,000	428,000	.	588	553	1,160,000
1-N-61	28JUL89		9,320	8,990	1,010,000	972,000	*0.480	622	598	2,030,000
	14AUG89		9,800	10,400	979,000	886,000	.	696	730	2,180,000
Well name	Collection Date	Duplicate sample number	TITAN ppb 60/.	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/1	U pCi/L 0.5/500d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000*	FZINC ppb 5/5000*
1-N-23	22AUG89		188	.	90.0(b)	.	.	90	239	.
1-N-24	21AUG89		<80	.	200.0(b)	.	.	16	16	.
1-N-25	21AUG89		<80	.	200.0	.	.	32	29	.
1-N-28	22AUG89		<80	.	31.0	.	.	<5	9	.
1-N-47	21AUG89		<80	.	0.4	.	.	<5	10	.
1-N-58	25JUL89		<80	*118	.	1.370	<5	<5	20	17
	14AUG89		<80	.	0.4	.	<5	5	7	<5
1-N-59	17JUL89		<80	*247	.	1.880	<5	<5	13	15
	14AUG89		<80	.	0.2	.	<5	<5	27	25
1-N-60	01AUG89		<80	*84	.	0.941	<5	<5	<5	<5
	01AUG89	1	<80	*51	.	0.828	8	<5	5	<5
	14AUG89		<80	.	0.4	.	8	<5	8	<5
1-N-61	28JUL89		<80	*73	.	1.090	<5	<5	9	<5
	14AUG89		<80	.	1.8	.	<5	<5	9	5

TABLE 7.5- (contd)

The column headers consist of : Constituent Name
Analysis Units
Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-670/9-76-003
- p - based on proposed Maximum Contaminant Level Goals in 60 FR 48936
- s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- d - based on Derived Concentration Guides in draft DOE Order 5408.xx
- w - based on additional Secondary Maximum Contaminant Levels in WAC 246-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- # - Less than Contractual Detection Limit, measured value reported
- * - For radioactive constituents, reported value is less than 2-sigma error
- (a) Suspect data. The reagent blank for this group showed contamination for this constituent.
- (b) Sample was cloudy and colored. Maximum measured turbidity is 200 NTU.

8.0 1325-N LIQUID WASTE DISPOSAL FACILITY

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The RCRA interim-status ground-water monitoring project at the 1325-N Liquid Waste Disposal Facility (LWDF) has been in progress since December 1987. The project is in the indicator parameter evaluation stage of monitoring.

The 1325-N LWDF was the primary liquid waste disposal system for the N Reactor. The facility began operation in 1983 and is currently in use. Wastes discharged to the 1325-N LWDF have included primarily radioactive fission and activation products, which were formerly discharged to the 1301-N LWDF (see Section 6.0). The facility is located in the 100-N Area, approximately 2200 ft east of the Columbia River. It consists of a concrete 240- by 250-ft basin with an extension trench that is approximately 3000 ft long, 55 ft wide, and 7 ft deep (Figure 8.1).

There are 11 wells in the 1325-N LWDF ground-water monitoring network (Figure 8.1). Well 699-81-58 is designated the upgradient well, and wells 199-N-27, 199-N-29, 199-N-31, 199-N-32, 199-N-33, 199-N-36, 199-N-41, 199-N-42, 199-N-52, and 199-N-70 are the designated downgradient wells. Analytical results indicate that well 199-N-52, which had been previously designated upgradient, is affected by waste discharges (because of the ground-water mound) to the 1325-N LWDF (Smith, Bates, and Lundgren 1989b) and is now considered downgradient. All of the wells monitor the uppermost aquifer, which comprises primarily sand, gravel, and cobbles.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or hydrogeologic characterization work (other than water level measurement) was performed during the period of this report.

WATER LEVELS

Water-level measurements are taken in most of the existing 100-N Area wells in conjunction with the monitoring projects for the 1324-N/NA and

1301-N facilities. Monthly water-level measurements continued this quarter, with measurements obtained from 48 wells in July, August, and September. Water-table maps for each month are shown in Figures 6.2, 6.3 and 6.4. The water-table elevations are presented in Table 6.1.

The elevation of the water table in the 100-N Area is affected by the release of effluents to disposal facilities, river stage in the nearby Columbia River, and ground water entering the 100-N Area from other parts of the Hanford Site. Discharges to the 1325-N LWDF are dependent on the operational status of the N Reactor. Discharges in July, August, and September were approximately 2.7 million gallons per week. This represents a decrease from the previous quarter. The ground-water mound beneath the 1325-N LWDF has responded to this decrease in artificial recharge, and water-level elevations have decreased approximately 10 ft between June and September 1989.

BACKGROUND STATISTICAL DATA

Table 8.1 lists the average background, standard deviation, and critical mean for the four contamination indicator parameters. The critical mean is the value to which the average of quadruplicate analytical results is compared. If a parameter is greater than (and less than, in the case of pH) its critical mean, that measurement is considered statistically different from background. These values were determined based on the recommended techniques in Appendix B of the TEGD (EPA 1986b). Some of these critical mean values, such as pH, are outside the range that would be reasonably anticipated.

WATER CHEMISTRY DATA

Sample collection scheduled for June 1989 was delayed because of issues related to disposal of purge water. Samples were collected between June 27 and August 1. Sample collection for August was conducted between August 15 and 21. Samples were also collected in September. The background well, 699-81-58, could not be sampled in July or August because the purge water tank was full. Another tank was added before the September sampling. In July, extra samples were collected from well 199-N-33 as part of an

investigation into the source of polychlorinated biphenyls (PCBs) detected in that well (see Smith, Bates, and Lundgren 1989b).

A revised sampling schedule for the 1325-N LWDF is presented in Table 8.2. The "regular" list of constituents referenced in Table 8.2 is shown in Table 8.3.

Table 8.4 lists the results of statistical analyses of indicator parameter data for samples collected in June, July, and August 1989. Replicate averages for each parameter are below the critical mean in all wells, with one exception. Specific conductance measured in the field at well 199-N-70 was approximately 1700 $\mu\text{mho}/\text{cm}$. This is an order of magnitude higher than normal for this well, and an order of magnitude higher than specific conductance measured in the laboratory. It is suspected that this anomalous value represents measurement error. Further investigation of the error is under way.

Analytical results for June, July, and August are reported in Tables 8.5 and 8.6. Results of the September sampling will be presented in the next quarterly report. Constituents of note in the June, July, and August samples include the following:

- Beta activity was greater than the primary drinking water standard in six of the ten downgradient wells. The highest value was in well 199-N-29, with 2970 pCi/L.
- Strontium-90 was greater than the primary drinking water standard in six of the ten downgradient wells. The highest concentration was in well 199-N-29 with 1750 pCi/L.
- Tritium concentrations were generally lower than the previous quarter, but were greater than the primary drinking water standard in well 199-N-42 and 199-N-70.
- Ruthenium-106 was reported at slightly over the interim drinking water standard (30 pCi/L) in several wells. However, the measured concentrations were less than the 2-sigma error band (i.e., the concentration of ruthenium-106 present in the sample was too low for the analytical method to measure accurately).
- Relatively high iron concentrations were detected in unfiltered samples from wells 199-N-36 and 199-N-42. Iron concentrations in filtered samples from these wells were less than the detection limit, indicating that the iron was particulate.

- Special samples collected and analyzed for PCBs in well 199-N-33 confirmed the presence of Arochlor 1016. Arochlor 1221 was also detected in one sample from this well. Well 199-N-33 was equipped with an oil-lubricated, submersible pump. The pump was removed from the well in August. Fluid appeared to be leaking from the pump. A sample of this fluid was analyzed, and preliminary results indicate that it may be the source of the PCBs in well 199-N-33. The investigation is still under way; results will be reported in the next quarterly.
- Low concentrations of acetone were detected in wells 199-N-33 and 199-N-36. A reagent blank associated with well 199-N-33 was found to be contaminated with acetone. This indicates that the acetone in the samples from wells 199-N-33 and 199-N-36 may be due to sample contamination.

FIGURE 8.1. Ground-Water Monitoring Wells Near the 1325-N Liquid Waste Disposal Facility (Well 699-81-58 is also part of the network and is shown in Figure 7.1.)

TABLE B.1. Critical Mean Values(a) for the 1325-N Liquid Waste Disposal Facility for June Through August 1989

Constituent Code Name, Units(b)	n	df	tc	Average	Standard Deviation	Critical Mean
Conductivity, field $\mu\text{mho/cm}$	4	3	16.326	192.4	31.9	775.3
pH, field	4	3	20.604	8.025	0.542	[-4.460, 20.510]
Total Organic Carbon, ppb	4	3	16.326	267.8	88.1	1,876.7
Total Organic Halogens, ppb	4	3	16.326	1.03	3.15	58.5

(a) Background data collected between June 1988 and March 1989.

(b) The following abbreviations are used in this table:

n = Number of background replicate averages.

df = Degrees of freedom (n-1).

ppb = Parts per billion.

tc = Bonferroni critical t-value for appropriate df and 40 comparisons (4 parameters * 10 wells, well 699-81-58 was not sampled).

$\mu\text{mho/cm}$ = Micromhos per centimeter.

TABLE 8.2. Sampling Schedule for the 1325-N Liquid Waste Disposal Facility

Well(a)	1988			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
199-N-27			X			L		V		X		X
199-N-29			X			L		V		X		X
199-N-31			X			L				X		X
199-N-32			X			L				X		X
199-N-33			X			L				X		X
199-N-36			X			L				X		X
199-N-41			X			L		V		X		X
199-N-42			X			L				X		X
199-N-52			X			L		V		X		X
199-N-70			X			L		V		X		X
6-81-58			X			L				X		X

(a) The following abbreviations are used in this table:

L = sampled for the long sample list (WAC 173-303-9905).

V = verification sampling.

X = sampled for the regular list (Table 8.3).

TABLE 8.3. The Regular Sampling List for the 1325-N Ground-Water Quality Assessment Monitoring Network

Coliform	Uranium
Total Organic Halogen	pH
Total Organic Carbon	Specific conductance
Metals Analyzed by the Inductively Coupled Argon Plasma Method, Unfiltered/Filtered	Tritium
Arsenic, Unfiltered/Filtered	Strontium-90
Selenium, Unfiltered/Filtered	Gamma Scan
Lead, Unfiltered/Filtered	Radium
Mercury, Unfiltered/Filtered	Gross Beta
Anions	Gross Alpha
Volatile Organic Analyses	Turbidity
Hydrazine	
Phenol	
Pesticides	
Herbicides	
Ammonium Ion	

**TABLE 8.4. Contamination Indicator Parameter Replicate Averages for the 1325-N Liquid Waste Disposal Facility
June through August 1989**

Constituent Code Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088 CONDLAB	umho	1-N-27	27 JUN 89	4	188	3.0	184	190	1.6
		1-N-29	27 JUN 89	4	135	3.7	131	140	2.7
		1-N-31	01 AUG 89	4	148	1.3	147	150	0.8
		1-N-32	17 JUL 89	4	128	1.0	127	129	0.7
		1-N-33	14 JUL 89	4	153	1.0	152	154	0.6
		1-N-38	27 JUN 89	4	129	2.4	128	131	1.9
		1-N-41	27 JUN 89	4	139	2.2	137	142	1.6
		1-N-42	19 JUL 89	4	254	1.2	253	255	0.6
		1-N-52	29 JUN 89	4	215	0.8	214	215	0.3
		1-N-70	18 JUL 89	4	157	0.8	156	158	0.6
191 CONDFLO	umho	1-N-27	27 JUN 89	4	123	0.0	123	123	0.0
		1-N-29	27 JUN 89	4	137	0.5	136	137	0.4
		1-N-31	01 AUG 89	4	163	25.1	130	190	15.4
		1-N-32	17 JUL 89	4	128	0.8	127	129	0.6
		1-N-33	14 JUL 89	4	153	0.5	153	154	0.3
		1-N-38	27 JUN 89	4	141	1.0	140	142	0.7
		1-N-41	27 JUN 89	4	191	0.5	190	191	0.3
		1-N-42	19 JUL 89	4	271	0.8	270	272	0.3
		1-N-52	29 JUN 89	4	204	0.5	203	204	0.2
		1-N-70	18 JUL 89	4	1,700	12.0	1,693	1,712	0.7
199 PHFIELD		1-N-27	27 JUN 89	4	7.31	0.07	7.20	7.36	1.0
		1-N-29	27 JUN 89	4	8.86	0.12	8.48	8.76	1.4
		1-N-31	01 AUG 89	4	8.43	0.02	8.41	8.46	0.3
		1-N-32	17 JUL 89	4	8.20	0.01	8.20	8.21	0.1
		1-N-33	14 JUL 89	4	8.19	0.01	8.18	8.19	0.1
		1-N-38	27 JUN 89	4	8.14	0.00	8.14	8.14	0.0
		1-N-41	27 JUN 89	4	8.04	0.00	8.04	8.04	0.0
		1-N-42	19 JUL 89	4	7.71	0.01	7.69	7.72	0.2
		1-N-52	29 JUN 89	4	7.82	0.01	7.81	7.84	0.2
		1-N-70	18 JUL 89	4	7.37	0.01	7.37	7.38	0.1
207 PH-LAB		1-N-27	27 JUN 89	4	8.25	0.06	8.2	8.3	0.7
		1-N-29	27 JUN 89	4	8.20	0.00	8.2	8.2	0.0
		1-N-31	01 AUG 89	4	8.40	0.00	8.4	8.4	0.0
		1-N-32	17 JUL 89	4	8.30	0.00	8.3	8.3	0.0
		1-N-33	14 JUL 89	4	8.20	0.00	8.2	8.2	0.0
		1-N-38	27 JUN 89	4	8.18	0.05	8.1	8.2	0.6
		1-N-41	27 JUN 89	4	8.20	0.00	8.2	8.2	0.0
		1-N-42	19 JUL 89	4	8.10	0.00	8.1	8.1	0.0
		1-N-52	29 JUN 89	4	8.18	0.05	8.1	8.2	0.6
		1-N-70	18 JUL 89	4	8.18	0.05	8.1	8.2	0.6

TABLE 8.4. (contd)

Constituent Code Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
C69 TOC	ppb	1-N-27	27 JUN 89	4	1,530	126	1,400	1,700	8.3
		1-N-29	27 JUN 89	4	1,030	126	900	1,200	12.3
		1-N-31	01 AUG 89	4	1,030	150	900	1,200	14.6
		1-N-32	17 JUL 89	3	1,370	58	1,300	1,400	4.2
		1-N-33	14 JUL 89	4	1,430	634	800	2,300	44.5
		1-N-36	27 JUN 89	4	1,280	150	1,100	1,400	11.8
		1-N-41	27 JUN 89	4	925	50	900	1,000	5.4
		1-N-42	19 JUL 89	4	700	82	600	800	11.7
		1-N-52	29 JUN 89	4	950	129	800	1,100	13.6
		1-N-70	18 JUL 89	4	550	58	500	600	10.6
H42 TOXLDL	ppb	1-N-27	27 JUN 89	4	9.75	0.50	9	10	5.1
		1-N-29	27 JUN 89	4	6.00	0.82	5	7	13.6
		1-N-31	01 AUG 89	4	4.50	1.29	3	6	28.7
		1-N-32	17 JUL 89	4	7.50	1.29	6	9	17.2
		1-N-33	14 JUL 89	4	7.50	1.91	6	10	25.6
		1-N-36	27 JUN 89	4	7.75	0.50	7	8	6.6
		1-N-41	27 JUN 89	4	11.80	2.08	10	14	17.6
		1-N-42	19 JUL 89	4	7.25	6.34	1	16	87.6
		1-N-52	29 JUN 89	4	3.75	1.50	2	5	40.0
		1-N-70	18 JUL 89	4	4.25	1.50	3	6	35.3

**TABLE 8.5. Constituent List and Summary of Sampling Results for the 1325-N Liquid Waste Disposal Facility
June through August 1989**

----- Constituent List=Contamination Indicator Parameters -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088 CONDLAB	umho	.	40	0	700 WDDE	Specific conductance, laboratory
191 CONDFLD	umho	1	40	0	700 WDDE	Specific conductance, field
199 PHFIELD		0.1	40	0	6.5-8.5 EPAS	pH, field
207 PH-LAB		0.01	40	0	6.5-8.5 EPAS	pH, laboratory
C09 TOC	ppb	2000	39	4	.	Total organic carbon
H42 TOXLDL	ppb	10	40	0	.	Total organic halogens, low DL

----- Constituent List=Interim Primary Drinking Water Parameters -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109 COLIFRM	MPN	2.2	9	9 ***	1 EPA	Coliform bacteria
111 BETA	pCi/L	8	11	0	50 EPA	Gross beta
112 ALPHAHI	pCi/L	4	11	0	15 EPA	Gross alpha, high DL
181 RADIUM	pCi/L	1	11	0	5 EPA	Radium, total
A06 BARIUM	ppb	8	11	0	1000 EPA	Barium
A07 CADMIUM	ppb	2	11	11 ***	10 EPA	Cadmium
A08 CHROMIUM	ppb	10	11	11 ***	50 EPA	Chromium
A10 SILVER	ppb	10	11	11 ***	50 EPA	Silver
A20 ARSENIC	ppb	5	11	8	50 EPA	Arsenic
A21 MERCURY	ppb	0.1	11	11 ***	2 EPA	Mercury
A22 SELENIUM	ppb	5	11	11 ***	10 EPA	Selenium
A33 ENDRIIN	ppb	0.1	11	11 ***	0.2 EPA	Endrin
A34 METHLOR	ppb	8	11	11 ***	100 EPA	Methoxychlor
A35 TOXAENE	ppb	1	11	11 ***	5 EPA	Toxaphene
A36 a-BHC	ppb	0.1	11	11 ***	4 EPA	Lindane, alpha-BHC
A37 b-BHC	ppb	0.1	11	11 ***	4 EPA	Lindane, beta-BHC
A38 g-BHC	ppb	0.1	11	11 ***	4 EPA	Lindane, gamma-BHC
A39 d-BHC	ppb	0.1	11	11 ***	4 EPA	Lindane, delta-BHC
A51 LEADGF	ppb	5	11	10	50 EPA	Lead (graphite furnace)
C72 NITRATE	ppb	500	11	0	45000 EPA	Nitrate
C74 FLUORID	ppb	500	11	11 ***	4000 EPA	Fluoride
H13 2,4-D	ppb	2	11	11 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14 2,4,5TP	ppb	2	11	11 ***	10 EPA	2,4,5-TP silvex
H20 FBARIUM	ppb	8	11	0	1000 EPA	Barium, filtered
H21 FCAOMIU	ppb	2	11	11 ***	10 EPA	Cadmium, filtered
H22 FCHROMI	ppb	10	11	11 ***	50 EPA	Chromium, filtered
H23 FSILVER	ppb	10	11	11 ***	50 EPA	Silver, filtered
H37 FARSENI	ppb	5	11	7	50 EPA	Arsenic, filtered
H38 FMERCUR	ppb	0.1	11	11 ***	2 EPA	Mercury, filtered
H39 FSELENI	ppb	5	11	11 ***	10 EPA	Selenium, filtered
H41 FLEAD	ppb	5	11	11 ***	50 EPA	Lead, filtered
H60 TURBID	ntu	0.1	11	2	1 EPA	Turbidity, nephelometric
P19 COLIMF	100mL	1	2	2 ***	1 EPA	Coliform (Membrane Filter)

TABLE B.5. (contd)

----- Constituent List=Water Quality Parameters -----								
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name		
A11 SODIUM	ppb	200	11	0	.	Sodium		
A17 MANGESE	ppb	5	11	7	50 EPAS	Manganese		
A19 IRON	ppb	30	11	2	300 EPAS	Iron		
C73 SULFATE	ppb	500	11	0	250000 EPAS	Sulfate		
C76 CHLORID	ppb	500	11	0	250000 EPAS	Chloride		
H24 FSODIUM	ppb	200	11	0	.	Sodium, filtered		
H29 FMANGAN	ppb	5	11	11 ***	50 EPAS	Manganese, filtered		
H31 FIRON	ppb	30	11	10	. EPAS	Iron, filtered		
H67 LPHENOL	ppb	10	11	11 ***	.	Phenol, low DL		
----- Constituent List=Site Specific and Other Constituents -----								
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name		
010 CO-60	pCi/L	22.5	11	0	100 EPAR	Cobalt-60		
024 CS-137	pCi/L	20	11	0	200 EPAR	Cesium-137		
034 RU-106	pCi/L	172.5	11	0	30 EPAR	Ruthenium-106		
104 U	pCi/L	0.5	11	0	800 DOE	Uranium		
108 TRITIUM	pCi/L	500	11	0	20000 EPA	Tritium (H-3)		
121 SR-90	pCi/L	5	11	0	8 EPA	Strontium-90		
A01 BERYLLUM	ppb	5	11	11 ***	.	Beryllium		
A03 STRONUM	ppb	10	11	0	.	Strontium		
A04 ZINC	ppb	5	11	8	6000 EPAS	Zinc		
A05 CALCIUM	ppb	50	11	0	.	Calcium		
A12 NICKEL	ppb	10	11	11 ***	.	Nickel		
A13 COPPER	ppb	10	11	11 ***	1300 EPAP	Copper		
A14 VANADIUM	ppb	5	11	1	.	Vanadium		
A15 ANTIMONY	ppb	100	11	11 ***	.	Antimony		
A16 ALUMINUM	ppb	150	11	10	.	Aluminum		
A18 POTASSIUM	ppb	100	11	0	.	Potassium		
A50 MAGNES	ppb	50	11	0	.	Magnesium		
C76 PHOSPHA	ppb	1000	11	11 ***	.	Phosphate		
H18 FZINC	ppb	5	11	8	5000 EPAS	Zinc, filtered		
H19 FCALCIU	ppb	50	11	0	.	Calcium, filtered		
H25 FNICKEL	ppb	10	11	11 ***	.	Nickel, filtered		
H26 FCOPPER	ppb	10	11	11 ***	1300 EPAP	Copper, filtered		
H27 FVANADI	ppb	5	11	2	.	Vanadium, filtered		
H28 FALUMIN	ppb	150	11	11 ***	.	Aluminum, filtered		
H30 FPOTASS	ppb	100	11	0	.	Potassium, filtered		
H32 FMAGNES	ppb	50	11	0	.	Magnesium, filtered		
H33 FBERYLL	ppb	5	11	11 ***	.	Beryllium, filtered		
H35 FSTRONT	ppb	10	11	0	.	Strontium, filtered		
H36 FANTIMO	ppb	100	11	11 ***	.	Antimony, filtered		
H58 BROWIDE	ppb	1000	11	11 ***	.	Bromide		
H67 NITRITE	ppb	1000	11	11 ***	.	Nitrite		

TABLE 8.5. (contd)

----- Constituent List=Site Specific and Other Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H88 FBORON	ppb	10	11	1	.	Boron, filtered
H87 FCOBALT	ppb	20	11	11 ***	.	Cobalt, filtered
H88 FLITHIU	ppb	10	11	11 ***	.	Lithium, filtered
H89 FMOLY	ppb	40	11	11 ***	.	Molybdenum, filtered
H90 FSILICD	ppb	50	11	0	.	Silicon, filtered
H91 FTIN	ppb	30	11	11 ***	.	Tin, filtered
H92 FTITAN	ppb	50	11	11 ***	.	Titanium, filtered
H93 FZIRCON	ppb	50	11	11 ***	.	Zirconium, filtered
P01 BORON	ppb	10	11	0	.	Boron
P02 COBALT	ppb	20	11	11 ***	.	Cobalt
P03 LITHIUM	ppb	10	11	11 ***	.	Lithium
P04 MOLY	ppb	40	11	11 ***	.	Molybdenum
P05 SILICON	ppb	50	11	0	.	Silicon
P06 TIN	ppb	30	11	11 ***	.	Tin
P07 TITAN	ppb	50	11	11 ***	.	Titanium
P08 ZIRCON	ppb	50	11	11 ***	.	Zirconium

----- Constituent List=WAC 179-303-9905 Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A54 AR1016	ppb	1	4	1	0 EPAP xxx	Arochlor 1016
A56 AR1221	ppb	1	4	3	0 EPAP xxx	Arochlor 1221
A58 AR1232	ppb	1	4	4 ***	0 EPAP	Arochlor 1232
A57 AR1242	ppb	1	4	4 ***	0 EPAP	Arochlor 1242
A58 AR1248	ppb	1	4	4 ***	0 EPAP	Arochlor 1248
A59 AR1254	ppb	1	4	4 ***	0 EPAP	Arochlor 1254
A80 AR1280	ppb	1	4	4 ***	0 EPAP	Arochlor 1280
A61 TETRANE	ppb	5	11	11 ***	6 EPA	Tetrachloromethane [Carbon Tetrachloride]
A62 BENZENE	ppb	5	11	11 ***	6 EPA	Benzene
A64 METHONE	ppb	10	11	11 ***	.	Methyl ethyl ketone
A66 TOLUENE	ppb	5	11	11 ***	2000 EPAP	Toluene
A67 1,1,1-T	ppb	5	11	11 ***	200 EPA	1,1,1-Trichloroethane
A68 1,1,2-T	ppb	5	11	11 ***	.	1,1,2-Trichloroethane
A69 TRICENE	ppb	5	11	11 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethane]
A70 PERCENE	ppb	5	11	11 ***	.	Perchloroethylene [Tetrachloroethane]
A71 OPXYLE	ppb	5	11	11 ***	440 EPAP	Xylene-o,p
A80 CHLFORM	ppb	5	11	9	100 EPA	Chloroform [Trichloromethane]
A89 1,1-DIC	ppb	5	11	11 ***	.	1,1-Dichloroethane
A90 1,2-DIC	ppb	5	11	11 ***	5 EPA	1,2-Dichloroethane
A91 TRANDC	ppb	5	11	11 ***	70 EPAP	trans-1,2-Dichloroethane
A93 METHYCH	ppb	5	11	11 ***	.	Methylene chloride [Dichloromethane]
B13 VINYLDE	ppb	10	11	11 ***	2 EPA	Vinyl chloride
B14 M-XYLE	ppb	5	11	11 ***	440 EPAP	Xylene-m

TABLE 8.5. (contd)

----- Constituent List=WAC 173-303-9905 Constituents -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C80 AMMONIU	ppb	60	11	10	.	Ammonium ion
H16 2,4,6-T	ppb	2	11	11 ***	.	2,4,6-T
H62 LHYDRAZ	ppb	30	11	11 ***	.	Hydrazine, low DL
H68 HEXONE	ppb	10	11	11 ***	.	Hexone [Methyl isobutyl ketone]
I01 ACETONE	ppb	10	11	9	.	Acetone by VOA
I28 TAF	ppb	10	11	10	.	Tetrahydrofuran
L63 140BEN	ppb	6	11	11 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]

*** - Indicates all samples were reported as below contractual detection limits

xxx - Indicates that Drinking Water standards were exceeded

EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936

EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx

WDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

**TABLE 8.6- Constituents with at Least One Detected Value for the 1325-N Liquid Waste Disposal Facility
June through August 1989**

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
1-N-27	27JUN89	1	123	190	8.20	7.20	#1,700	10
		2	123	184	8.20	7.34	#1,500	10
		2	123	190	8.30	7.35	#1,400	10
		3	123	186	8.30	7.35	#1,500	#9
1-N-29	27JUN89		137	135	8.20	8.48	#1,000	#6
		1	137	131	8.20	8.68	#1,200	#7
		2	136	135	8.20	8.75	#1,000	#6
		3	137	140	8.20	8.71	#900	#5
1-N-31	01AUG89		190	160	8.40	8.41	#900	#6
		1	130	148	8.40	8.42	#1,100	#5
		2	160	147	8.40	8.43	#1,200	#4
		3	171	148	8.40	8.46	#900	#3
1-N-32	17JUL89		128	129	8.30	8.20	#1,300	#9
		1	128	127	8.30	8.21	#1,400	#8
		2	127	127	8.30	8.20	#1,400	#7
		3	127	128	8.30	8.20	.	#6
1-N-33	14JUL89		153	154	8.20	8.18	#1,400	10
		1	154	152	8.20	8.18	2,300	#6
		2	153	154	8.20	8.19	#800	#8
		3	153	153	8.20	8.19	#1,200	#6
1-N-38	27JUN89		142	126	8.10	8.14	#1,100	#9
		1	142	127	8.20	8.14	#1,200	#8
		2	140	131	8.20	8.14	#1,400	#7
		3	141	130	8.20	8.14	#1,400	#8
1-N-41	27JUN89		191	139	8.20	8.04	#900	10
		1	190	142	8.20	8.04	#900	13
		2	191	137	8.20	8.04	#1,000	14
		3	191	138	8.20	8.04	#900	10
1-N-42	19JUL89		271	255	8.10	7.89	#700	#7
		1	272	253	8.10	7.71	#800	16
		2	271	255	8.10	7.72	#700	#5
		3	270	253	8.10	7.72	#800	#1
1-N-52	29JUN89		203	214	8.10	7.84	#1,000	#5
		1	204	214	8.20	7.82	#800	#3
		2	204	215	8.20	7.81	#1,100	#2
		3	204	215	8.20	7.81	#900	#5
1-N-70	18JUL89		170	157	8.20	7.37	#500	#5
		1	170	157	8.10	7.37	#600	#3
		2	188	156	8.20	7.38	#500	#6
		3	171	158	8.20	7.37	#600	#3

TABLE 8.6. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALPHAHI pCi/L 4/15	ALUMINUM ppb 150/.	AMMONIU ppb 50/.	AR1018 ppb 1/Op	AR1221 ppb 1/Op	ARSENIC ppb 5/50	FARSENI ppb 5/50
1-N-27	27 JUN 89		<10	*0.2510	<150	<50	.	.	<5.0	<5.0
1-N-29	27 JUN 89		<10	1.8800	<150	<50	.	.	<5.0	<5.0
1-N-31	01 AUG 89		<10	*0.8820	<150	<50	.	.	<5.0	<5.0
1-N-32	17 JUL 89		<10	*0.4410	<150	<50	.	.	<5.0	<5.0
1-N-33	14 JUL 89		#5 (a)	*0.5720	<150	<50	82 RDR	<1.00 RDR	<5.0	<5.0
	14 JUL 89	1	<10	*0.5870	<150	<50	148 RDR	<1.00 RDR	<5.0	<5.0
	21 JUL 89		.	.	.	.	22 RDR	<1.00 RDR	.	.
	21 JUL 89	1	.	.	.	.	<1 RDR	3.21 RDR	.	.
1-N-38	27 JUN 89		45 (a)	*1.1800	<150	86	.	.	6.0	<5.0
1-N-41	27 JUN 89		<10	*0.8670	<150	<50	.	.	6.0	6.0
1-N-42	19 JUL 89		<10	2.4900	1000	<50	.	.	7.2	6.7
1-N-52	29 JUN 89		<10	*0.7940	<150	<50	.	.	6.0	6.0
1-N-70	18 JUL 89		<10	*0.0365	<150	<50	.	.	5.8	5.4

Well name	Collection Date	Duplicate sample number	BARIUM ppb 8/1000	FBARIUM ppb 8/1000	BETA pCi/L 8/50	BORON ppb 10/.	FBORON ppb 10/.	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLFORM ppb 5/100
1-N-27	27 JUN 89		11	9	104.0	18	11	17,900	17,900	<5
1-N-29	27 JUN 89		9	8	2,970.0	20	17	22,000	22,000	<5
1-N-31	01 AUG 89		13	12	147.0	10	<10	22,900	23,700	<5
1-N-32	17 JUL 89		7	7	380.0	13	13	17,700	18,800	<5
1-N-33	14 JUL 89		11	12	420.0	18	19	23,100	23,300	#3
	14 JUL 89	1	12	13	470.0	18	20	23,200	23,100	#3
1-N-38	27 JUN 89		15	12	120.0	15	11	19,000	20,500	<5
1-N-41	27 JUN 89		18	24	15.0	22	18	25,900	24,200	<5
1-N-42	19 JUL 89		31	21	21.9	23	41	32,800	31,800	<5
1-N-52	29 JUN 89		25	27	18.2	28	17	24,700	25,000	<5
1-N-70	18 JUL 89		17	18	29.1	30	33	21,800	21,200	<5

Well name	Collection Date	Duplicate sample number	CHLORID ppb 500/250000s	CO-60 pCi/L 22.5/100r	CS-137 pCi/L 20/200r	IRON ppb 30/300s	FIROX ppb 30/.	LEADGF ppb 5/50	MAGNES ppb 50/.
1-N-27	27 JUN 89		900	29.50	*-2.250	40	<30	<5	3,570
1-N-29	27 JUN 89		1,200	24.20	*-3.340	<30	<30	<5	3,180
1-N-31	01 AUG 89		1,400	9.43	*3.310	48	<30	<5	3,880
1-N-32	17 JUL 89		1,100	20.40	*1.060	33	<30	<5	3,440
1-N-33	14 JUL 89		1,710	12.70	*-1.830	46	<30	<5	4,050
	14 JUL 89	1	1,070	13.90	*-3.290	48	<30	<5	4,000
1-N-38	27 JUN 89		1,500	*8.88	*-0.772	2,240	<30	<5	4,030
1-N-41	27 JUN 89		4,200	20.60	*0.000	318	<30	<5	5,190
1-N-42	19 JUL 89		10,300	22.80	*-1.880	2,070	<30	9	7,050
1-N-52	29 JUN 89		3,900	15.50	*-2.120	<30	<30	<5	8,080
1-N-70	18 JUL 89		1,290	20.50	*-5.330	104	39	<5	5,640

TABLE B.6. (contd)

Well name	Collection Date	Duplicate sample number	FMAGNES ppb 50/.	MANGESE ppb 5/50*	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	RU-108 pCi/L 172.5/30r	FSILICO ppb 50/.
1-N-27	27JUN89		3,480	<5	600	2,710	2,750	*0.0198	*15.60	5,210
1-N-29	27JUN89		3,190	<5	2,200	1,320	1,330	*-0.0280	*-3.48	5,150
1-N-31	01AUG89		3,720	<5	1,500	2,180	2,050	*-0.0808	*-5.58	7,130
1-N-32	17JUL89		3,280	<5	607	2,080	2,140	*0.0717	*38.80	4,540
1-N-33	14JUL89		3,770	8	1,960	1,850	2,120	*-0.0322	*3.93	8,790
	14JUL89	1	3,840	<5	2,130	1,860	2,030	*0.1450	*-55.20	8,540
1-N-36	27JUN89		3,540	11	1,300	2,040	2,580	*-0.0377	*48.80	7,880
1-N-41	27JUN89		5,540	14	4,800	3,640	3,390	*0.1470	*-89.10	15,600
1-N-42	19JUL89		8,850	57	14,600	3,920	3,790	*0.0238	*34.40	15,500
1-N-52	29JUN89		8,050	<5	9,100	3,920	3,950	*0.0891	*-18.00	15,000
1-N-70	18JUL89		5,710	<5	12,800	2,780	2,810	0.2640	*34.30	12,800
Well name	Collection Date	Duplicate sample number	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 10/.	STRONTIUM ppb 10/.	SULFATE ppb 500/250000s	TAF ppb 10/.
1-N-27	27JUN89		5,370	4,830	4,740	38.40	70	72	11,900	#8
1-N-29	27JUN89		5,130	2,030	2,060	1,750.00	88	85	10,600	<10
1-N-31	01AUG89		7,440	2,340	2,440	80.90	100	98	12,800	<10
1-N-32	17JUL89		4,800	2,910	2,830	195.00	72	77	10,700	<10
1-N-33	14JUL89		6,990	2,230	1,910	232.00	102	112	15,500	<10
	14JUL89	1	7,000	2,170	1,940	220.00	104	110	15,700	<10
1-N-36	27JUN89		10,700	5,410	3,790	85.50	98	102	13,400	<10
1-N-41	27JUN89		14,500	7,500	8,080	*-0.01	151	140	24,300	<10
1-N-42	19JUL89		16,900	8,050	8,320	*-0.27	194	189	37,600	<10
1-N-52	29JUN89		15,200	9,980	9,910	*0.07	143	144	32,000	<10
1-N-70	18JUL89		12,200	5,190	5,160	*-0.49	148	144	14,000	<10
Well name	Collection Date	Duplicate sample number	TITAN ppb 50/.	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/1	U pCi/L 0.5/500d	FVANADI ppb 5/.	VANADIUM ppb 5/.	ZINC ppb 5/5000*	FZINC ppb 5/5000*
1-N-27	27JUN89		<80	7,890	<0.1	0.586	8	7	<5	8
1-N-29	27JUN89		<80	4,890	<0.1	0.595	9	7	<5	<5
1-N-31	01AUG89		<80	10,500	0.2	0.758	<5	7	<5	<5
1-N-32	17JUL89		<80	7,800	0.3	0.351	<5	<5	<5	<5
1-N-33	14JUL89		<80	11,500	0.4	0.781	9	8	<5	8
	14JUL89	1	<80	11,300	2.6	0.879	7	10	8	<5
1-N-36	27JUN89		<80	8,440	1.5	0.778	14	20	9	<5
1-N-41	27JUN89		<80	13,100	2.7	0.477	22	27	7	<5
1-N-42	19JUL89		87	25,900	200.0	0.852	28	33	8	<5
1-N-52	29JUN89		<80	17,300	0.2	0.860	29	28	<5	<5
1-N-70	18JUL89		<80	47,900	0.4	0.490	22	22	10	<5

TABLE 8.6. (contd)

The column headers consist of : Constituent Name
Analysis Units
Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-670/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 60 FR 48938
- s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- d - based on Derived Concentration Guides in draft DOE Order 5400.xx
- u - based on additional Secondary Maximum Contaminant Levels in MAC 248-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- # - Less than Contractual Detection Limit, measured value reported
- * - For radioactive constituents, reported value is less than 2-sigma error

(a) Suspect data. The reagent blank for this group showed contamination by this constituent.

9.0 216-A-10 CRIB

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The ground water beneath the 216-A-10 Crib has been monitored by a Resource Conservation and Recovery Act (RCRA) interim-status well network since November 1988. The background stage of monitoring has been completed for this project; four sample sets were collected and analyzed. Indicator evaluation monitoring and statistical evaluations of the data will commence when the fifth-quarter sample is collected. A draft ground-water monitoring plan has been prepared for this crib.

The 216-A-10 Crib is a V-shaped crib in cross-section, approximately 45 ft deep and 275 ft long, located in the 200-East Area of the Hanford Site (see Figure 1.1). Although it received startup wastes from the Plutonium-Uranium Extraction (PUREX) Plant 400 ft to the north during a 4-month period in 1956, it did not begin continuous service until 1961, when it replaced the retired 216-A-5 Crib. The 216-A-10 Crib operated nearly continuously from 1961 to 1973; sporadically in 1977, 1978, and 1981; and again, nearly continuously from 1982 to January 1987.

Six wells drilled in 1988, combined with two pre-existing wells, constitute the interim-status ground-water monitoring network for the 216-A-10 Crib (Figure 9.1). Wells 299-E24-18 and 299-E25-36 are upgradient monitoring wells; wells 299-E17-1, 299-E17-19, 299-E17-20, 299-E24-2, 299-E24-16, and 299-E24-17 are downgradient monitoring wells (see Figure 9.1). Also, well 299-E17-8, located west of the 216-A-10 Crib, is used for water-level measurements. The sampling schedule for the 216-A-10 Crib is shown in Table 9.1.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or hydrogeologic characterization activities (other than measurement of water levels) were conducted during the quarter.

WATER LEVELS

Water-level measurements were made when samples were collected in August; supplemental measurements were made on September 26, 1989 (Table 9.2).

WATER CHEMISTRY DATA

Ground-water samples were collected from wells at the 216-A-10 Crib between August 10 and 15, 1989. A sample was inadvertently not collected from well 299-E25-36 in August. A sample was collected from well 299-E17-19 on July 14, 1989, from which a sample had not been collected in June. The analyses for these samples and for samples collected in June 1989 are completed. The analytical results for the samples are summarized in Table 9.3. The results for constituents with at least one detected value are provided in Table 9.4. Highlights of the results of analyses for samples collected in June and July are discussed below.

- Chromium (unfiltered) was reported to be above the 40 CFR 265, Appendix III, standard of 50 ppb in wells 299-E24-17 (103 ppb), 299-E24-18 (104 ppb), and 299-E25-36 (118 ppb). Results of filtered analyses were reported below the detection level of 10 ppb for all the wells.
- Nitrate was reported to be above the 40 CFR 265, Appendix III, standard of 45,000 ppb in every well except 299-E25-36. The values for the wells exceeding the standard are 299-E17-1, 151,000 ppb; 299-E17-19, 88,800 ppb; 299-E17-20, 228,000 ppb; 299-E24-2, 109,000 ppb; 299-E24-16, 108,000 ppb; 299-E24-17, 97,300 ppb; and 299-E24-18, 58,100 ppb.
- Tritium was reported to be above the 40 CFR 141 standard of 20,000 pCi/L in every well except 299-E25-36. The values for the wells exceeding the standard are 299-E17-1, 3,300,000 pCi/L; 299-E17-19, 2,560,000 pCi/L; 299-E17-20, 4,590,000 pCi/L; 299-E24-2, 1,980,000 pCi/L; 299-E24-16, 2,660,000 pCi/L; 299-E24-17, 2,490,000 pCi/L; and 299-E24-18, 1,370,000 pCi/L.
- Beta was reported to be below the 40 CFR 265, Appendix III, standard of 50 pCi/L in all the wells.
- Acetone was reported to be 23 ppb in well 299-E17-19. This is a suspect value. The reagent blank for this group showed acetone contamination.

Highlights of the results of analyses for samples collected in August are discussed below.

- Chromium (unfiltered) was reported to be above the 40 CFR 265, Appendix III, standard of 50 ppm in wells 299-E17-19 (58 and 64 ppb; duplicate samples were collected), 299-E24-16 (53 ppb), and 299-E24-17 (93 ppb). Results of filtered chromium analyses were all below the detection level of 10 ppb.
- Nitrate was reported to be above the 40 CFR 265, Appendix III, screening level of 45,000 ppb in every well except 299-E25-36. The values for the wells exceeding the standard are 299-E17-1, 147,000 ppb; 299-E17-19, 91,000 ppb; 299-E17-20, 217,000 ppb; 299-E24-2, 105,000 ppb; 299-E24-16, 114,000 ppb; 299-E24-17, 104,000 ppb; and 299-E24-18, 59,000 ppb.
- Tritium was reported to exceed the 40 CFR 141 standard of 20,000 pCi/L in every well except 299-E25-36. The values for the wells exceeding the standard are 299-E17-1, 3,370,000 pCi/L; 299-E17-19, 2,620,000 pCi/L; 299-E17-20, 4,210,000 pCi/L; 299-E24-2, 2,560,000 pCi/L; 299-E24-16, 2,580,000 pCi/L; 299-E24-17, 2,350,000 pCi/L; and 299-E24-18, 1,430,000 pCi/L.
- Beta was reported to be 60.5 pCi/L in well 299-E17-20, exceeding the 40 CFR 265, Appendix III, standard limit of 50 pCi/L.

FIGURE 9.1. Monitoring Well Locations for the 216-A-10 Crib

TABLE 9.1. Sampling Schedule for the 216-A-10 Crib

Well	1988 ^(a)			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E17- 1		L			x ^(b)				X		X	
299-E17-19		L			X					X	XRV	
299-E17-20		L			X				XRV		X	
299-E24- 2		L			X				X		X	
299-E24-16		L			X				X		X	
299-E24-17		LRV			X				X		X	
299-E24-18		L			X				X		X	
299-E25-36		L			XRV				X		X ^(c)	

(a) The following abbreviations are used in this table:

L = sampled for the long list of constituents (WAC 173-303-9905).

R = quality control replicates were collected.

V = volatile organic analyses blanks were collected.

X = sampled for the regular list of constituents (Smith, Bates, and Lundgren 1989).

(b) Sample not collected.

(c) Sample not collected. The wrong well was identified for sample collection.

TABLE 9.2. Water-Level Data for Wells Near the 216-A-10 Crib

<u>Well</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Date</u>	<u>Depth to Water, ft</u>	<u>Water-Level Elevation, ft above MSL</u>
299-E17-1	719.17	8/15/89	315.03	404.14
		9/26/89	314.60	404.57
299-E17-8	718.38	9/26/89	313.97	404.41
299-E17-19	719.33	8/14/89	309.29 ^(b)	410.04
		9/26/89	314.95	404.38
299-E17-20	719.23	8/15/89	314.60	404.63
		9/26/89	314.31	404.92
299-E24-2	717.47	8/14/89	312.73	404.74
		9/26/89	312.60	404.87
299-E24-16	718.27	8/14/89	313.63	404.64
		9/26/89	313.34	404.93
299-E24-17	718.69	8/10/89	315.65	403.04
		9/26/89	314.70	403.99
299-E24-18	719.28	8/11/89	315.41	403.87
		9/26/89	314.48	404.80
299-E25-36	707.39	8/11/89	(c)	--
		9/26/89	302.51	404.88

(a) MSL = mean sea level.

(b) Measurement was made with an electric tape and is questionable.

(c) The water level in well 299-E25-36 was not measured because the wrong well was identified for sample collection.

TABLE 9.3. Constituent List and Summary of Sampling Results for the 216-A10 Crib
June through August 1989

----- Constituent List=Contamination Indicator Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
088 CONDLAB	umho	.	15	0	700 WDOE	Specific conductance, laboratory	
191 CONDFLD	umho	1	80	0	700 WDOE	Specific conductance, field	
199 PHFIELD		0.1	80	0	9.5 EPAS	pH, field	
207 PH-LAB		0.01	16	0	8.5 EPAS xxx	pH, laboratory	
C69 TOC	ppb	2000	80	1	.	Total organic carbon	
H42 TOXLDL	ppb	10	80	0	.	Total organic halogens, low DL	

----- Constituent List=Interim Primary Drinking Water Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
109 COLIFRM	MPN	2.2	13	13 ***	1 EPA	Coliform bacteria	
111 BETA	pCi/L	8	17	0	50 EPA	Gross beta	
112 ALPHAHI	pCi/L	4	17	0	15 EPA	Gross alpha, high DL	
191 RADIUM	pCi/L	1	8	0	5 EPA	Radium, total	
A06 BARIUM	ppb	8	17	0	1000 EPA	Barium	
A07 CADMIUM	ppb	2	17	16	10 EPA	Cadmium	
A08 CHROMIUM	ppb	10	17	4	50 EPA	Chromium	
A10 SILVER	ppb	10	17	17 ***	50 EPA	Silver	
A20 ARSENIC	ppb	5	17	1	50 EPA	Arsenic	
A21 MERCURY	ppb	0.1	16	16 ***	2 EPA	Mercury	
A22 SELENIUM	ppb	5	17	17 ***	10 EPA	Selenium	
A33 ENDRIIN	ppb	0.1	16	16 ***	0.2 EPA	Endrin	
A34 METHLOR	ppb	3	16	16 ***	100 EPA	Methoxychlor	
A35 TOXAENE	ppb	1	16	16 ***	5 EPA	Toxaphene	
A36 a-BHC	ppb	0.1	16	16 ***	4 EPA	Lindane, alpha-BHC	
A37 b-BHC	ppb	0.1	16	16 ***	4 EPA	Lindane, beta-BHC	
A38 g-BHC	ppb	0.1	16	16 ***	4 EPA	Lindane, gamma-BHC	
A39 d-BHC	ppb	0.1	16	16 ***	4 EPA	Lindane, delta-BHC	
A61 LEADGF	ppb	5	17	17 ***	50 EPA	Lead (graphite furnace)	
C72 NITRATE	ppb	500	17	0	45000 EPA	Nitrate	
C74 FLUORID	ppb	500	17	10	4000 EPA	Fluoride	
H13 2,4-D	ppb	2	16	16 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]	
H14 2,4,5TP	ppb	2	16	16 ***	10 EPA	2,4,5-TP silvex	
H20 FBARIUM	ppb	8	17	0	1000 EPA	Barium, filtered	
H21 FCADMIU	ppb	2	17	16	10 EPA	Cadmium, filtered	
H22 FCHROMI	ppb	10	17	17 ***	50 EPA	Chromium, filtered	
H23 FSILVER	ppb	10	17	17 ***	50 EPA	Silver, filtered	
H37 FARSENI	ppb	5	17	1	50 EPA	Arsenic, filtered	
H38 FMERCUR	ppb	0.1	17	17 ***	2 EPA	Mercury, filtered	
H39 FSELENI	ppb	5	17	17 ***	10 EPA	Selenium, filtered	
H41 FLEAD	ppb	5	17	17 ***	50 EPA	Lead, filtered	
H60 TURBID	ntu	0.1	16	0	1 EPA	Turbidity, nephelometric	
F19 COLIMF	100ml	1	3	3 ***	1 EPA	Coliform (Membrane Filter)	

TABLE 9.3. (contd)

----- Constituent List=Water Quality Parameters -----								
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards Agency Exceeded	Full name
A11	SODIUM	ppb	200	17	0	.		Sodium
A17	MANGESE	ppb	6	17	3	50 EPAS		Manganese
A19	IRON	ppb	30	17	2	300 EPAS	xxx	Iron
C67	PHENOL	ppb	10	18	18 ***	.		Phenol
C73	SULFATE	ppb	500	17	0	250000 EPAS		Sulfate
C75	CHLORID	ppb	500	17	0	250000 EPAS		Chloride
H24	FSODIUM	ppb	200	17	0	.		Sodium, filtered
H29	FMANGAN	ppb	5	17	10	50 EPAS		Manganese, filtered
H31	FIIRON	ppb	30	17	8	. EPAS		Iron, filtered
H57	LPHENOL	ppb	10	7	7 ***	.		Phenol, low DL
----- Constituent List=Site Specific and Other Constituents -----								
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards Agency Exceeded	Full name
104	U	pCi/L	0.5	17	0	500 DOE		Uranium
108	TRITIUM	pCi/L	500	16	0	20000 EPA	xxx	Tritium (H-3)
A01	BERYLUM	ppb	5	17	18	.		Beryllium
A03	STRONTIUM	ppb	10	17	0	.		Strontium
A04	ZINC	ppb	5	17	0	5000 EPAS		Zinc
A06	CALCIUM	ppb	50	17	0	.		Calcium
A12	NICKEL	ppb	10	17	4	.		Nickel
A13	COPPER	ppb	10	17	18	1300 EPAP		Copper
A14	VANADIUM	ppb	5	17	0	.		Vanadium
A16	ANTIMONY	ppb	100	17	17 ***	.		Antimony
A18	ALUMINUM	ppb	150	17	17 ***	.		Aluminum
A19	POTASSIUM	ppb	100	17	0	.		Potassium
A50	MAGNESIUM	ppb	50	17	0	.		Magnesium
C76	PHOSPHATE	ppb	1000	17	17 ***	.		Phosphate
H18	TC	ppb	1000	16	0	.		Total carbon
H18	FZINC	ppb	5	17	7	5000 EPAS		Zinc, filtered
H19	FCALCIUM	ppb	50	17	0	.		Calcium, filtered
H26	FNICKEL	ppb	10	17	13	.		Nickel, filtered
H26	FCOPPER	ppb	10	17	18	1300 EPAP		Copper, filtered
H27	FVANADIUM	ppb	5	17	0	.		Vanadium, filtered
H28	FALUMINUM	ppb	150	17	17 ***	.		Aluminum, filtered
H30	FPOTASSIUM	ppb	100	17	0	.		Potassium, filtered
H32	FMAGNESIUM	ppb	50	17	0	.		Magnesium, filtered
H33	FBERYLLIUM	ppb	5	17	17 ***	.		Beryllium, filtered
H35	FSTRONTIUM	ppb	10	17	0	.		Strontium, filtered
H36	FANTIMONY	ppb	100	17	17 ***	.		Antimony, filtered
H58	BROMIDE	ppb	1000	17	17 ***	.		Bromide
H57	NITRITE	ppb	1000	17	17 ***	.		Nitrite
H58	FBORON	ppb	10	17	3	.		Boron, filtered
H57	FCOBALT	ppb	20	17	17 ***	.		Cobalt, filtered

TABLE 9.3. (contd)

----- Constituent List=Site Specific and Other Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
H88 FLITHIU	ppb	10	17	17 ***	.	Lithium, filtered
H89 FMOLY	ppb	40	17	17 ***	.	Molybdenum, filtered
H90 FSILICO	ppb	50	17	0	.	Silicon, filtered
H91 FTIN	ppb	30	17	17 ***	.	Tin, filtered
H92 FTITAN	ppb	60	17	17 ***	.	Titanium, filtered
H93 FZIRCON	ppb	50	17	17 ***	.	Zirconium, filtered
P01 BORON	ppb	10	17	0	.	Boron
P02 COBALT	ppb	20	17	17 ***	.	Cobalt
P03 LITHIUM	ppb	10	17	16	.	Lithium
P04 MOLY	ppb	40	17	17 ***	.	Molybdenum
P06 SILICON	ppb	50	17	0	.	Silicon
P06 TIN	ppb	30	17	17 ***	.	Tin
P07 TITAN	ppb	60	17	17 ***	.	Titanium
P08 ZIRCON	ppb	50	17	17 ***	.	Zirconium

----- Constituent List=WAC 173-3D3-9905 Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
A81 TETRANE	ppb	5	17	17 ***	5 EPA	Tetrachloromethane [Carbon Tetrachloride]
A82 BENZENE	ppb	5	17	17 ***	5 EPA	Benzene
A84 METHONE	ppb	10	17	17 ***	.	Methyl ethyl ketone
A86 TOLUENE	ppb	5	17	17 ***	2000 EPAP	Toluene
A87 1,1,1-T	ppb	5	17	17 ***	200 EPA	1,1,1-Trichloroethane
A88 1,1,2-T	ppb	5	17	17 ***	.	1,1,2-Trichloroethane
A89 TRICENE	ppb	5	17	17 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethane]
A70 PERCENE	ppb	5	17	17 ***	.	Perchloroethylene [Tetrachloroethane]
A71 OPXYLE	ppb	5	17	17 ***	440 EPAP	Xylene-o,p
A80 CHLFORM	ppb	5	17	17 ***	100 EPA	Chloroform [Trichloromethane]
A89 1,1-DIC	ppb	5	17	17 ***	.	1,1-Dichloroethane
A80 1,2-DIC	ppb	5	17	17 ***	5 EPA	1,2-Dichloroethane
A81 TRANDC	ppb	5	17	17 ***	70 EPAP	trans-1,2-Dichloroethane
A93 METHYCH	ppb	5	17	17 ***	.	Methylene chloride [Dichloromethane]
B13 VINYLIDE	ppb	10	17	17 ***	2 EPA	Vinyl chloride
B14 M-XYLE	ppb	5	17	17 ***	440 EPAP	Xylene-m
B51 12-dben	ppb	10	16	16 ***	.	1,2-Dichlorobenzene [o-Dichlorobenzene]
B52 13-dben	ppb	10	16	16 ***	.	1,3-Dichlorobenzene [m-Dichlorobenzene]
B53 14-dben	ppb	10	16	16 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
B89 HEXCBEN	ppb	10	16	16 ***	.	Hexachlorobenzene
C26 PENTCHB	ppb	10	16	16 ***	.	Pentachlorobenzene
C37 TETRCHB	ppb	10	16	16 ***	.	1,2,4,5-Tetrachlorobenzene
C43 TRICHLB	ppb	10	16	16 ***	.	1,2,4-Trichlorobenzene
C54 HEXACHL	ppb	10	16	16 ***	.	Hexachlorophene
C56 NAPHTHA	ppb	10	16	16 ***	.	Naphthalene

TABLE 9.3. (contd)

Constituent List-WAC 173-303-0906 Constituents							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C68	123TRI	ppb	10	18	18 ***	.	1,2,3-Trichlorobenzene
C68	135TRI	ppb	10	18	18 ***	.	1,3,5-Trichlorobenzene
C69	1234TE	ppb	10	18	18 ***	.	1,2,3,4-Tetrachlorobenzene
C80	1235TE	ppb	10	18	18 ***	.	1,2,3,5-Tetrachlorobenzene
C79	KEROSEN	ppb	10000	18	18 ***	.	Kerosene
C90	PARALDE	ppb	10000	18	18 ***	.	Paraldehyde
C94	ACRYIDE	ppb	10000	18	18 ***	0 EPAP	Acrylamide
C95	ALLYLAL	ppb	10000	18	18 ***	.	Allyl alcohol
C98	CHLPROP	ppb	10000	18	18 ***	.	3-Chloropropionitrile
H03	ETHCARB	ppb	10000	18	18 ***	.	Ethyl carbamate
H04	ETHCYAN	ppb	10000	18	18 ***	.	Ethyl cyanide
H09	ISOBUTY	ppb	10000	18	18 ***	.	Isobutyl alcohol
H11	PROPYLA	ppb	10000	18	18 ***	.	n-Propylamine
H12	PROPYNO	ppb	10000	18	18 ***	.	2-Propyn-1-ol
H15	2,4,6-T	ppb	2	18	18 ***	.	2,4,6-T
H08	HEXONE	ppb	10	17	17 ***	.	Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	17	18 ***	.	Acetone by VOA
I09	BUTANOL	ppb	10000	18	18 ***	.	1-Butanol
I21	TRIBUPH	ppb	10	18	18 ***	.	Tributylphosphoric acid
I28	TAF	ppb	10	17	17 ***	.	Tetrahydrofuran
I87	ETHANOL	ppb	10000	18	18 ***	.	Ethanol
L20	MBP	ppb	10000	18	18 ***	.	Monobutylphosphate
L21	DBP	ppb	10000	18	18 ***	.	Dibutylphosphate
L57	ETHGLYC	ppb	10000	18	18 ***	.	Ethylene glycol
L59	1PROPAN	ppb	10000	18	18 ***	.	1-Propanol
L60	1BUTYN	ppb	10000	18	18 ***	.	1-Butynol
L83	14DBEN	ppb	5	17	17 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
L84	CHLROB	ppb	10	18	18 ***	80 EPAP	Chlorobenzene (by ABN)

*** - Indicates all samples were reported as below contractual detection limits

xxx - Indicates that Drinking Water standards were exceeded

EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936

EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx

WDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

**TABLE 9.4. Constituents with at Least One Detected Value for the 216-A10 Crib
June through August 1989**

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5a	PHFIELD 0.1/8.5a	TOC ppb 2000/.	TOXLDL ppb 10/.
2-E17-1	19JUN89		479	388	8.10	7.50	900	8
		1	480	.	.	7.50	900	4
		2	480	.	.	7.50	800	2
		3	480	.	.	7.50	800	4
2-E17-1	15AUG89		511	482	8.00	7.73	900	1
		1	510	.	.	7.75	1,000	5
		2	509	.	.	7.76	1,400	16
		3	508	.	.	7.76	1,100	11
2-E17-19	14JUL89		401	390	7.80	7.79	500	20
		1	403	.	.	7.78	800	7
		2	402	.	.	7.78	800	2
		3	399	.	.	7.77	701	18
2-E17-19	14AUG89		320	405	7.80	7.86	700	4
		1	319	.	.	7.87	800	5
		2	318	.	.	7.86	500	10
		3	319	.	.	7.86	700	1
2-E17-20	16JUN89		496	555	7.80	7.41	800	1
		1	497	.	.	7.38	400	1
		2	494	.	.	7.37	500	1
		3	495	.	.	7.37	500	1
2-E17-20	15AUG89		626	485	7.80	7.74	800	6
		1	624	.	.	7.74	500	2
		2	625	.	.	7.75	1,300	16
		3	626	.	.	7.75	700	0
2-E24-2	22JUN89		358	382	7.90	7.62	800	1
		1	359	.	.	7.66	800	3
		2	359	.	.	7.67	700	4
		3	359	.	.	7.67	700	2
2-E24-2	14AUG89		309	396	7.90	7.89	500	4
		1	310	.	.	7.89	500	7
		2	310	.	.	7.89	500	8
		3	310	.	.	7.90	500	3
2-E24-18	19JUN89		335	323	8.90	7.50	700	10
		1	332	.	.	7.49	800	11
		2	335	.	.	7.49	500	3
		3	334	.	.	7.49	500	1

TABLE 9.4. (contd)

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5w	PHFIELD 0.1/8.5w	TOC ppb 2000/.	TOXLDL ppb 10/.
2-E24-16	14AUG89		303	412	7.90	7.95	#500	#3
		1	302	.	.	7.97	#500	#3
		2	305	.	.	7.96	#700	#2
		3	307	.	.	7.95	#400	#4
2-E24-17	19JUN89		319	294	7.90	7.60	#600	#7
		1	319	.	.	7.49	#800	#6
		2	320	.	.	7.49	#500	#9
		3	319	.	.	7.49	#500	#1
2-E24-17	10AUG89		410	391	7.90	7.80	#500	#3
		1	412	.	.	7.90	#600	#1
		2	413	.	.	7.89	#600	#2
		3	412	.	.	7.89	#600	#2
2-E24-18	19JUN89		274	252	8.00	7.83	#400	#1
		1	274	.	.	7.83	#600	#5
		2	274	.	.	7.83	#1,100	#1
		3	274	.	.	7.83	#1,100	#1
2-E24-18	11AUG89		338	328	8.00	7.96	#500	#3
		1	335	.	.	7.95	#700	#8
		2	334	.	.	7.96	#700	#4
		3	335	.	.	7.95	#500	10
2-E25-36	19JUN89		232	183	8.20	8.01	#500	#5
		1	233	.	.	8.11	#500	#3
		2	235	.	.	8.05	#500	#0
		3	236	.	.	8.06	#500	#8

TABLE 9.4. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALPHAHI pCi/L 4/15	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BERYLUM ppb 5/.	BETA pCi/L 5/50
2-E17-1	19JUN89		<10	*1.050	5	5.0	45	45	<5	28.20
	15AUG89		<10	2.110	<5	<5.0	45	49	<5	30.00
2-E17-19	14JUL89		23 ^(a)	4.500	7	5.4	47	53	<5	19.70
	14AUG89		<10	5.250	8	6.0	55	58	<5	19.80
	14AUG89	1	<10	2.070	6	6.0	58	60	<5	13.20
2-E17-20	16JUN89		<10	2.810	6	6.0	73	72	<5	38.60
	16JUN89	1	57 ^(a)	3.100	6	6.0	71	70	<5	47.30
	15AUG89		<10	3.370	6	5.0	80	75	<5	60.50
2-E24-2	22JUN89		<10	3.100	9	10.0	46	44	<5	20.80
	14AUG89		<10	2.550	9	9.0	46	50	<5	16.80
2-E24-16	19JUN89		<10	2.820	11	10.0	49	49	<5	46.30
	14AUG89		<10	3.060	10	10.0	54	52	<5	37.40
2-E24-17	19JUN89		<10	3.820	11	11.0	51	51	5	41.30
	10AUG89		<10	1.770	9	9.0	52	56	<5	25.80
2-E24-18	19JUN89		<10	1.900	7	7.0	46	42	<5	15.00
	11AUG89		<10	2.450	6	7.0	41	55	<5	17.40
2-E25-36	19JUN89		<10	*0.786	9	9.0	19	18	<5	5.51

Well name	Collection Date	Duplicate sample number	BORON ppb 10/.	FBORON ppb 10/.	FCADMIU ppb 2/10	CADMIUM ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s	CHROMIUM ppb 10/50
2-E17-1	19JUN89		24	18	<2	<2	48,700	48,400	3,700	<10
	15AUG89		17	12	<2	<2	54,800	49,400	3,900	<10
2-E17-19	14JUL89		12	17	<2	2	42,900	36,200	3,930	34
	14AUG89		17	19	<2	<2	44,700	39,800	3,800	59
	14AUG89	1	28	14	<2	<2	45,800	42,900	3,900	64
2-E17-20	16JUN89		23	20	<2	<2	69,200	69,300	3,500	49
	16JUN89	1	21	17	<2	3	66,800	70,200	3,500	36
	15AUG89		19	<10	<2	<2	68,600	75,600	3,700	49
2-E24-2	22JUN89		14	<10	<2	<2	40,600	41,400	3,700	<10
	14AUG89		20	12	<2	<2	46,800	43,100	3,900	<10
2-E24-16	19JUN89		17	14	2	<2	41,900	41,500	3,600	43
	14AUG89		14	<10	<2	<2	46,500	46,300	3,600	53
2-E24-17	19JUN89		20	15	<2	<2	37,900	38,500	3,500	103
	10AUG89		17	19	<2	<2	46,300	39,900	3,500	93
2-E24-18	19JUN89		21	13	<2	<2	30,100	31,100	3,600	104
	11AUG89		20	20	<2	<2	34,200	30,600	3,900	21
2-E25-36	19JUN89		15	12	<2	<2	23,000	23,500	3,600	118

TABLE 9.4. (contd)

Well name	Collection Date	Duplicate sample number	COPPER ppb 10/1300p	FCOPPER ppb 10/1300p	FLUORID ppb 500/4000	IRON ppb 30/300*	FIROM ppb 30/300*	LITHIUM ppb 10/.	MAGNES ppb 50/.
2-E17-1	19JUN89		<10	<10	500	494	<30	<10	14,300
	15AUG89		<10	<10	500	504	32	<10	14,800
2-E17-19	14JUL89		<10	<10	<500	610	49	<10	11,500
	14AUG89		<10	<10	800	528	50	<10	12,900
	14AUG89	1	<10	<10	500	735	98	<10	13,700
2-E17-20	16JUN89		<10	<10	<500	243	<30	<10	19,500
	16JUN89	1	<10	<10	<500	205	<30	<10	20,900
	15AUG89		<10	<10	500	268	50	12	22,600
2-E24-2	22JUN89		<10	<10	<500	<30	<30	<10	12,200
	14AUG89		<10	<10	<500	<30	<30	<10	13,200
2-E24-16	19JUN89		<10	<10	<500	259	41	<10	12,900
	14AUG89		<10	17	<500	312	82	<10	14,700
2-E24-17	19JUN89		<10	<10	<500	520	<30	<10	11,500
	10AUG89		<10	<10	<500	440	54	<10	11,700
2-E24-18	19JUN89		<10	<10	800	475	<30	<10	9,380
	11AUG89		13	<10	800	141	<30	<10	9,000
2-E25-35	19JUN89		<10	<10	<500	564	32	<10	6,350

Well name	Collection Date	Duplicate sample number	FMAGNES ppb 50/.	FMANGAN ppb 5/50*	MANGESE ppb 6/50*	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.
2-E17-1	19JUN89		14,800	<5	7	<10	<10	151,000	7,580	7,240
	15AUG89		16,100	10	20	<10	<10	147,000	8,280	7,380
2-E17-19	14JUL89		13,100	8	13	17	11	88,800	6,810	6,320
	14AUG89		13,900	<5	19	37	<10	91,000	7,020	6,510
	14AUG89	1	14,300	<5	13	40	11	91,000	7,240	6,880
2-E17-20	16JUN89		21,200	6	8	21	<10	228,000	8,290	7,860
	16JUN89	1	19,600	8	5	28	12	228,000	7,810	7,990
	15AUG89		20,400	<5	8	32	<10	217,000	8,240	8,830
2-E24-2	22JUN89		11,700	<5	<5	<10	<10	109,000	5,380	5,700
	14AUG89		13,800	<5	<5	<10	<10	105,000	6,140	5,920
2-E24-16	19JUN89		13,300	<5	6	24	<10	108,000	5,520	5,590
	14AUG89		14,400	<5	7	32	<10	114,000	6,340	6,180
2-E24-17	19JUN89		11,500	8	10	59	<10	97,300	5,520	5,530
	10AUG89		13,600	8	12	49	13	104,000	6,560	5,810
2-E24-18	19JUN89		9,400	8	11	50	<10	59,100	5,620	5,810
	11AUG89		10,200	<5	<5	18	<10	59,000	6,210	5,310
2-E25-35	19JUN89		6,110	<5	13	55	<10	5,300	4,620	4,680

TABLE 9.4. (contd)

Well name	Collection Date	Duplicate sample number	RADIUM pCi/L 1/5	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	FSTRONT ppb 10/.	STRONUM ppb 10/.	SULFATE ppb 500/250000*
2-E17-1	19JUN89		.	18,900	18,500	23,300	23,900	284	281	31,000
	15AUG89		*0.1370	21,600	19,300	22,200	25,200	308	280	31,000
2-E17-19	14JUL89		.	836	17,900	19,300	20,000	257	238	33,000
	14AUG89		0.3810	21,300	19,500	19,300	21,200	270	246	33,000
	14AUG89	1	0.3220	21,900	21,100	20,500	21,900	277	264	33,000
2-E17-20	16JUN89		.	19,500	19,100	23,500	24,500	388	383	33,800
	16JUN89	1	.	16,900	19,700	24,100	23,400	378	395	33,800
	15AUG89		0.5610	20,900	22,300	25,000	23,500	385	425	32,000
2-E24-2	22JUN89		.	17,600	18,000	18,100	17,300	218	230	24,600
	14AUG89		*0.0323	20,300	19,400	17,800	18,400	244	231	26,000
2-E24-16	19JUN89		.	17,900	17,500	18,800	18,500	249	248	27,900
	14AUG89		0.2950	20,200	20,300	19,400	20,300	268	272	27,100
2-E24-17	19JUN89		.	17,400	17,600	17,900	17,500	214	216	26,900
	10AUG89		0.4420	21,400	18,400	18,000	21,700	266	216	26,300
2-E24-18	19JUN89		.	17,100	17,500	17,700	17,600	159	164	27,800
	11AUG89		0.6140	20,100	17,700	16,400	19,800	183	156	26,500
2-E25-36	19JUN89		.	16,400	16,900	14,900	14,700	114	117	28,800

Well name	Collection Date	Duplicate sample number	TC ppb 1000/.	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/1	U pCi/L 0.5/800d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000*	FZINC ppb 5/5000*
2-E17-1	19JUN89		21,300	3,300,000	1.1	2.05	18	18	12	9
	15AUG89		22,000	3,370,000	2.3	2.15	17	19	15	7
2-E17-19	14JUL89		23,000	2,560,000	3.8	3.40	22	19	27	9
	14AUG89		23,000	2,620,000	3.9	3.04	24	21	18	<5
	14AUG89	1	.	.	.	3.90	24	21	22	<5
2-E17-20	16JUN89		20,100	4,590,000	1.3	3.38	22	19	9	7
	16JUN89	1	.	.	.	3.65	19	22	17	7
	15AUG89		21,000	4,210,000	1.4	3.75	23	24	7	<5
2-E24-2	22JUN89		19,100	1,980,000	0.1	2.36	26	32	12	8
	14AUG89		20,000	2,540,000	0.1	3.05	40	31	18	8
2-E24-16	19JUN89		19,900	2,660,000	1.6	3.50	29	29	6	<5
	14AUG89		20,600	2,580,000	1.9	3.00	33	29	15	<5
2-E24-17	19JUN89		19,300	2,490,000	1.7	2.72	30	28	11	6
	10AUG89		19,900	2,350,000	2.2	2.67	34	25	10	9
2-E24-18	19JUN89		20,500	1,370,000	1.5	3.35	17	19	5	<5
	11AUG89		21,200	1,430,000	1.9	3.37	26	20	6	6
2-E25-36	19JUN89		19,400	4,720	1.9	1.40	32	37	6	<5

TABLE 9.4. (contd)

The column headers consist of : Constituent Name
Analysis Units
Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-670/9-76-003
- p - based on proposed Maximum Contaminant Level Goals in 60 FR 46938
- s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- d - based on Derived Concentration Guides in draft DOE Order 5400.xx
- u - based on additional Secondary Maximum Contaminant Levels in MAC 248-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- # - Less than Contractual Detection Limit, measured value reported
- e - For radioactive constituents, reported value is less than 2-sigma error

(a) Suspect data. The reagent blank for this group showed contamination for this constituent.

10.0 216-A-29 DITCH

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The ground water beneath the 216-A-29 Ditch has been monitored by a RCRA interim-status well network since November 1988. The background stage of monitoring was completed for this project; four sample sets have been collected and analyzed. Indicator evaluation monitoring and statistical evaluations of the data will commence when the fifth-quarter sample is collected. A ground-water monitoring plan has been prepared for this site.

The 216-A-29 Ditch (Figure 10.1) is an earthen ditch, approximately 6 ft wide and 6500 ft long, that has been in use since 1955. The ditch receives discharge from the Plutonium-Uranium Extraction (PUREX) Plant chemical sewer line.

There are five wells in the monitoring network for the 216-A-29 Ditch (see Figure 10.1). Well 299-E25-32A is the upgradient monitoring well; wells 299-E25-26, 299-E25-28 (base of unconfined aquifer), 299-E25-34, and 299-E25-35 are the downgradient monitoring wells. Wells 299-E25-26, 299-E25-28, and 299-E25-32 are also in the Grout Treatment Facility ground-water monitoring network. The sampling schedule for wells around the 216-A-29 Ditch is shown in Table 10.1. The water level in well 299-E25-10 has also been measured.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or hydrogeologic characterization activities (other than measurement of water levels) were conducted during the quarter.

WATER LEVELS

Water-level measurements were made in July and August when samples were collected, and supplemental water-level measurements were made on August 23, 1989 (Table 10.2).

WATER CHEMISTRY DATA

Ground-water samples were collected from wells around the 216-A-29 Ditch in July and August 1989. The July samples were collected between July 12 and 17, and the August samples were collected on August 29 and 30. Samples collected from wells 299-E25-26, 299-E25-28, and 299-E25-32A during August were to be analyzed for the long list of constituents, but were analyzed for the regular list instead. Table 10.1 reflects the revised sampling schedule. The analytical results for the samples are summarized in Table 10.3. The results for constituents with at least one detected value are provided in Table 10.4. Highlights of the results of analyses for samples collected in July are discussed below.

- Specific conductance is elevated in well 299-E25-35 in relation to the other wells. Major ions are also elevated in this well and are likely the cause of the elevated specific conductance values.
- Tritium was reported to be 51,500 and 60,800 pCi/L in well 299-E25-35 (duplicate samples were collected from this well). These values exceed the 40 CFR 141 standard of 20,000 pCi/L for tritium.
- Chromium (unfiltered) was reported to exceed the 40 CFR 265, Appendix III, standard of 50 ppb in wells 299-E25-32 (70 ppb), 299-E25-34 (91 ppb), and 299-E25-35 (123 ppb). Chromium (filtered) was reported to be at or below the detection level of 10 ppb in all the wells.

Highlights of the results of analyses for samples collected in August are discussed below.

- Specific conductance was elevated in well 299-E25-35 in relation to the other wells.
- Tritium was reported to be 62,400 pCi/L in well 299-E25-35, exceeding the 40 CFR 141 standard for tritium of 20,000 pCi/L.

FIGURE 10.1. Monitoring Well Locations for the 216-A-29 Ditch

TABLE 10.1. Sampling Schedule for the 216-A-29 Ditch

Well	1988 ^(a)			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E25-26			X		S					S	OX	
299-E25-28		X			S					S	OXR	
299-E25-32A		XR			S					SRV	OX	
299-E25-34		X			XR					X	X	
299-E25-35		X			X					X	X	

(a) The following abbreviations are used in this table:

OX = sampled for the regular list of constituents (overlap with another project).

R = quality control replicates were collected.

S = sampled for the short list of constituents (overlap with another project).

V = volatile organic analyses blanks were collected.

X = sampled for the regular list of constituents (Smith, Bates, and Lundgren 1989).

TABLE 10.2. Water-Level Data for Wells Near the 216-A-29 Ditch

<u>Well</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Date</u>	<u>Depth to Water, ft</u>	<u>Water-Level Elevation, ft above MSL</u>
299-E25-10	655.84	8/23/89	250.52	405.32
299-E25-26	668.55	7/12/89	265.22	403.33
		8/23/89	262.80	405.75
		8/29/89	262.65	405.90
299-E25-28	662.44	7/24/89	256.71	405.73
		8/23/89	256.57	405.87
		8/29/89	256.77	405.67
299-E25-32A	669.19	7/13/89	263.21	405.98
		8/23/89	263.21	405.98
		8/29/89	263.71	405.48
299-E25-34	662.87	7/17/89	256.51	406.36
		8/23/89	257.09	405.78
		8/30/89	256.85	406.02
299-E25-35	674.39	7/17/89	269.08	405.31
		8/23/89	269.21	405.18
		8/30/89	269.21	405.18

(a) MSL = mean sea level.

TABLE 10.3. Constituent List and Summary of Sampling Results for the 216-A-29 Ditch
July through August 1989

----- Constituent List=Contamination Indicator Parameters -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088 CONDLAB	umho	.	8	0	700 WDOE	Specific conductance, laboratory
191 CONDFLD	umho	1	48	0	700 WDOE	Specific conductance, field
199 PHFIELD		0.1	48	0	6.5-8.5 EPAS	pH, field
207 PH-LAB		0.01	8	0	6.5-8.5 EPAS	pH, laboratory
C69 TOC	ppb	2000	44	1	.	Total organic carbon
H42 TOXLDL	ppb	10	44	0	.	Total organic halogens, low DL
----- Constituent List=Interim Primary Drinking Water Parameters -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109 COLIFRM	MPN	2.2	6	6 ***	1 EPA	Coliform bacteria
111 BETA	pCi/L	8	13	0	50 EPA	Gross beta
112 ALPHAHI	pCi/L	4	13	0	15 EPA	Gross alpha, high DL
181 RADIUM	pCi/L	1	13	0	5 EPA	Radium, total
A06 BARIUM	ppb	8	19	0	1000 EPA	Barium
A07 CADMIUM	ppb	2	19	19 ***	10 EPA	Cadmium
A08 CHROMIUM	ppb	10	19	6	50 EPA	Chromium
A10 SILVER	ppb	10	19	19 ***	50 EPA	Silver
A20 ARSENIC	ppb	5	19	9	50 EPA	Arsenic
A21 MERCURY	ppb	0.1	13	13 ***	2 EPA	Mercury
A22 SELENIUM	ppb	5	19	19 ***	10 EPA	Selenium
A33 ENDRIIN	ppb	0.1	16	16 ***	0.2 EPA	Endrin
A34 METHLOR	ppb	3	16	16 ***	100 EPA	Methoxychlor
A35 TOXAENE	ppb	1	16	16 ***	5 EPA	Toxaphene
A36 a-BHC	ppb	0.1	16	16 ***	4 EPA	Lindane, alpha-BHC
A37 b-BHC	ppb	0.1	16	16 ***	4 EPA	Lindane, beta-BHC
A38 g-BHC	ppb	0.1	16	16 ***	4 EPA	Lindane, gamma-BHC
A39 d-BHC	ppb	0.1	16	16 ***	4 EPA	Lindane, delta-BHC
A51 LEADGF	ppb	5	14	14 ***	50 EPA	Lead (graphite furnace)
C72 NITRATE	ppb	500	14	0	45000 EPA	Nitrate
C74 FLUORID	ppb	500	14	11	4000 EPA	Fluoride
H13 2,4-D	ppb	2	13	13 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14 2,4,5TP	ppb	2	13	13 ***	10 EPA	2,4,5-TP silvex
H20 FBARIUM	ppb	8	19	0	1000 EPA	Barium, filtered
H21 FCADMIU	ppb	2	19	19 ***	10 EPA	Cadmium, filtered
H22 FCHROMI	ppb	10	19	18	50 EPA	Chromium, filtered
H23 FSILVER	ppb	10	19	19 ***	50 EPA	Silver, filtered
H37 FARSENI	ppb	5	19	9	50 EPA	Arsenic, filtered
H38 FMERCUR	ppb	0.1	13	13 ***	2 EPA	Mercury, filtered
H39 FSELENI	ppb	5	19	19 ***	10 EPA	Selenium, filtered
H41 FLEAD	ppb	5	14	14 ***	50 EPA	Lead, filtered
H60 TURBID	ntu	0.1	14	1	1 EPA	Turbidity, nephelometric
P19 COLIMF	100mL	1	7	7 ***	1 EPA	Coliform (Membrane Filter)

TABLE 10.3. (contd)

----- Constituent List=Water Quality Parameters -----								
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name
A11	SODIUM	ppb	200	19	0	.		Sodium
A17	MANGESE	ppb	5	19	12	50 EPAS		Manganese
A19	IRON	ppb	30	19	3	300 EPAS	xxx	Iron
C67	PHENOL	ppb	10	4	4 ***	.		Phenol
C73	SULFATE	ppb	500	14	0	250000 EPAS		Sulfate
C75	CHLORID	ppb	500	14	0	250000 EPAS		Chloride
H24	FSODIUM	ppb	200	19	0	.		Sodium, filtered
H29	FMANGAN	ppb	5	19	16	50 EPAS		Manganese, filtered
H31	FIRON	ppb	30	19	13	. EPAS		Iron, filtered
H57	LPHENOL	ppb	10	13	13 ***	.		Phenol, low DL
----- Constituent List=Site Specific and Other Constituents -----								
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name
104	U	pCi/L	0.5	1	0	800 DOE		Uranium
108	TRITIUM	pCi/L	500	6	0	20000 EPA	xxx	Tritium (H-3)
A01	BERYLUM	ppb	5	19	17	.		Beryllium
A03	STRONUM	ppb	10	19	0	.		Strontium
A04	ZINC	ppb	5	19	1	5000 EPAS		Zinc
A05	CALCIUM	ppb	50	19	0	.		Calcium
A12	NICKEL	ppb	10	19	6	.		Nickel
A13	COPPER	ppb	10	19	18	1300 EPAP		Copper
A14	VANADUM	ppb	5	19	1	.		Vanadium
A15	ANTIONY	ppb	100	19	19 ***	.		Antimony
A16	ALUMNUM	ppb	150	19	19 ***	.		Aluminum
A18	POTASUM	ppb	100	19	0	.		Potassium
A50	MAGNES	ppb	50	19	0	.		Magnesium
C76	PHOSPHA	ppb	1000	14	14 ***	.		Phosphate
H16	TC	ppb	1000	13	0	.		Total carbon
H18	FZINC	ppb	5	19	10	5000 EPAS		Zinc, filtered
H19	FCALCIU	ppb	50	19	0	.		Calcium, filtered
H25	FNICKEL	ppb	10	19	19 ***	.		Nickel, filtered
H26	FCOPPER	ppb	10	19	18	1300 EPAP		Copper, filtered
H27	FVANADI	ppb	5	19	0	.		Vanadium, filtered
H28	FALUMIN	ppb	150	19	19 ***	.		Aluminum, filtered
H30	FPOTASS	ppb	100	19	0	.		Potassium, filtered
H32	FMAGNES	ppb	50	19	0	.		Magnesium, filtered
H33	FBERYLL	ppb	5	19	18	.		Beryllium, filtered
H35	FSTRONT	ppb	10	19	0	.		Strontium, filtered
H36	FANTIMO	ppb	100	19	19 ***	.		Antimony, filtered
H66	BROMIDE	ppb	1000	14	14 ***	.		Bromide
H67	NITRITE	ppb	1000	14	14 ***	.		Nitrite
H68	FBORON	ppb	10	19	9	.		Boron, filtered
H67	FCOBALT	ppb	20	19	19 ***	.		Cobalt, filtered

TABLE 10.3. (contd)

----- Constituent List=Site Specific and Other Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H88 FLITHIU	ppb	10	19	19 ***	.	Lithium, filtered
H89 FMOLY	ppb	40	19	19 ***	.	Molybdenum, filtered
H90 FSILICO	ppb	50	19	0	.	Silicon, filtered
H91 FTIN	ppb	30	19	19 ***	.	Tin, filtered
H92 FTITAN	ppb	80	19	19 ***	.	Titanium, filtered
H93 FZIRCON	ppb	50	19	19 ***	.	Zirconium, filtered
P01 BORON	ppb	10	19	6	.	Boron
P02 COBALT	ppb	20	19	19 ***	.	Cobalt
P03 LITHIUM	ppb	10	19	19 ***	.	Lithium
P04 MOLY	ppb	40	19	19 ***	.	Molybdenum
P05 SILICON	ppb	50	19	0	.	Silicon
P06 TIN	ppb	30	19	19 ***	.	Tin
P07 TITAN	ppb	80	19	19 ***	.	Titanium
P08 ZIRCON	ppb	50	19	19 ***	.	Zirconium

----- Constituent List=WAC 173-303-9905 Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A23 THALIUM	ppb	5	3	3 ***	.	Thallium
A24 THIOURA	ppb	200	3	3 ***	.	Thiourea
A25 ACETREA	ppb	200	3	3 ***	.	1-Acetyl-2-thiourea
A26 CHLOREA	ppb	200	3	3 ***	.	1-(o-Chlorophenyl) thiourea
A27 DIETROL	ppb	200	3	3 ***	.	Diethylstilbestrol
A28 ETHYREA	ppb	200	3	3 ***	.	Ethylenethiourea
A29 NAPHREA	ppb	200	3	3 ***	.	1-Naphthyl-2-thiourea
A32 PHENREA	ppb	500	3	3 ***	.	n-Phenylthiourea
A40 DDD	ppb	0.1	3	3 ***	.	DDD
A41 DDE	ppb	0.1	3	3 ***	.	DDE
A42 DDT	ppb	0.1	3	3 ***	.	DDT
A43 HEPTLOR	ppb	0.1	3	3 ***	0 EPAP	Heptachlor
A44 HEPTIDE	ppb	0.1	3	3 ***	0 EPAP	Heptachlor epoxide
A45 KEPONE	ppb	1	3	3 ***	.	Kepone (discontinued)
A46 DIELRIN	ppb	0.1	3	3 ***	.	Dieldrin
A47 ALDRIN	ppb	0.1	3	3 ***	.	Aldrin
A48 CHLOANE	ppb	1	3	3 ***	0 EPAP	Chlordane
A49 END01	ppb	0.1	3	3 ***	.	Endosulfan I (alpha)
A52 END02	ppb	0.1	3	3 ***	.	Endosulfan II (beta)
A54 AR1016	ppb	1	3	3 ***	0 EPAP	Arochlor 1016
A55 AR1221	ppb	1	3	3 ***	0 EPAP	Arochlor 1221
A56 AR1232	ppb	1	3	3 ***	0 EPAP	Arochlor 1232
A57 AR1242	ppb	1	3	3 ***	0 EPAP	Arochlor 1242
A58 AR1248	ppb	1	3	3 ***	0 EPAP	Arochlor 1248
A59 AR1254	ppb	1	3	3 ***	0 EPAP	Arochlor 1254
A60 AR1260	ppb	1	3	3 ***	0 EPAP	Arochlor 1260

TABLE 10.3. (contd)

----- Constituent List=WAC 173-303-9905 Constituents -----									
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name	
A61	TETRANE	ppb	5	13	13 ***	5 EPA		Tetrachloromethane [Carbon Tetrachloride]	
A62	BENZENE	ppb	5	13	13 ***	5 EPA		Benzene	
A64	METHONE	ppb	10	13	13 ***	.		Methyl ethyl ketone	
A66	TOLUENE	ppb	5	13	13 ***	2000 EPAP		Toluene	
A67	1,1,1-T	ppb	5	13	13 ***	200 EPA		1,1,1-Trichloroethane	
A68	1,1,2-T	ppb	5	13	13 ***	.		1,1,2-Trichloroethane	
A69	TRICENE	ppb	5	13	13 ***	5 EPA		Trichloroethylene [1,1,2-Trichloroethene]	
A70	PERCENE	ppb	5	13	13 ***	.		Perchloroethylene [Tetrachloroethene]	
A71	OPXYLE	ppb	5	13	13 ***	440 EPAP		Xylene-o,p	
A80	CHLFORM	ppb	5	13	13 ***	100 EPA		Chloroform [Trichloromethane]	
A89	1,1-DIC	ppb	5	13	13 ***	.		1,1-Dichloroethane	
A90	1,2-DIC	ppb	5	13	13 ***	5 EPA		1,2-Dichloroethane	
A91	TRANDC	ppb	5	13	13 ***	70 EPAP		trans-1,2-Dichloroethene	
A93	METHYCH	ppb	5	13	13 ***	.		Methylene chloride [Dichloromethane]	
B13	VINYIDE	ppb	10	13	13 ***	2 EPA		Vinyl chloride	
B14	M-XYLE	ppb	5	13	13 ***	440 EPAP		Xylene-m	
B40	BIS2EPH	ppb	10	1	0	.		bis(2-Ethylhexyl) phthalate	
B51	CRESOLS	ppb	10	3	3 ***	.		Cresols	
B61	12-dben	ppb	10	4	4 ***	.		1,2-Dichlorobenzene [o-Dichlorobenzene]	
B62	13-dben	ppb	10	4	4 ***	.		1,3-Dichlorobenzene [m-Dichlorobenzene]	
B63	14-dben	ppb	10	4	4 ***	75 EPA		1,4-Dichlorobenzene [p-Dichlorobenzene]	
B89	HEXC BEN	ppb	10	4	4 ***	.		Hexachlorobenzene	
C26	PENTCHB	ppb	10	4	4 ***	.		Pentachlorobenzene	
C28	PENTCHP	ppb	50	3	3 ***	220 EPAP		Pentachlorophenol	
C37	TETRCHB	ppb	10	4	4 ***	.		1,2,4,5-Tetrachlorobenzene	
C43	TRICHLB	ppb	10	4	4 ***	.		1,2,4-Trichlorobenzene	
C64	HEXACHL	ppb	10	4	4 ***	.		Hexachlorophene	
C66	NAPHTHA	ppb	10	4	4 ***	.		Naphthalene	
C68	123TRI	ppb	10	4	4 ***	.		1,2,3-Trichlorobenzene	
C68	136TRI	ppb	10	4	4 ***	.		1,3,6-Trichlorobenzene	
C69	1234TE	ppb	10	4	4 ***	.		1,2,3,4-Tetrachlorobenzene	
C80	1235TE	ppb	10	4	4 ***	.		1,2,3,5-Tetrachlorobenzene	
C81	TETEPYR	ppb	2	3	3 ***	.		Tetraethylpyrophosphate	
C82	CHLLATE	ppb	300	3	3 ***	.		Chlorobenzilate	
C83	CARBPHT	ppb	2	3	3 ***	.		Carbophenothion	
C84	DISULFO	ppb	2	3	3 ***	.		Disulfoton	
C85	DIMETHO	ppb	2	3	3 ***	.		Dimethoate	
C86	METHPAR	ppb	2	3	3 ***	.		Methyl parathion	
C87	PARATHI	ppb	2	3	3 ***	.		Parathion	
C70	CYANIDE	ppb	10	3	3 ***	.		Cyanide	
C77	PERCHLO	ppb	500	3	3 ***	.		Perchlorate	
C78	SULFIDE	ppb	1000	3	3 ***	.		Sulfide	
C79	KEROSEN	ppb	10000	4	4 ***	.		Kerosene	
C80	AMMONIU	ppb	50	12	12 ***	.		Ammonium ion	
C87	CITRUSR	ppb	1000	3	3 ***	.		Citrus red	
C90	PARALDE	ppb	10000	4	4 ***	.		Paraldehyde	
C91	STRYCHN	ppb	50	3	3 ***	.		Strychnine	

TABLE 10.3. (contd)

----- Constituent List=WAC 173-303-9906 Constituents -----						
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
C92	MALHYDR	ppb	500	3	3 ***	. Maleic hydrazide
C93	NICOTIN	ppb	100	3	3 ***	. Nicotinic acid
C94	ACRYIDE	ppb	10000	4	4 ***	0 EPAP Acrylamide
C95	ALLYLAL	ppb	10000	4	4 ***	. Allyl alcohol
C98	CHLPROP	ppb	10000	4	4 ***	. 3-Chloropropionitrile
D01	PCDDs	ppb	0.01	3	3 ***	. PCDDs
D02	PCDFs	ppb	0.01	3	3 ***	. PCDFs
D03	2378TCD	ppb	0.01	3	3 ***	. 2,3,7,8-TCDD [Dioxin]
H03	ETHCARB	ppb	10000	4	4 ***	. Ethyl carbamate
H04	ETHCYAN	ppb	10000	4	4 ***	. Ethyl cyanide
H09	ISOBUTY	ppb	10000	4	4 ***	. Isobutyl alcohol
H11	PROPYLA	ppb	10000	4	4 ***	. n-Propylamine
H12	PROPYNO	ppb	10000	4	4 ***	. 2-Propyn-1-ol
H15	2,4,6-T	ppb	2	13	13 ***	. 2,4,6-T
H40	FTHALLI	ppb	5	4	4 ***	. Thallium, filtered
H82	LHYDRAZ	ppb	30	12	12 ***	. Hydrazine, low DL
H88	HEXONE	ppb	10	13	13 ***	. Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	13	11	. Acetone by VOA
I09	BUTANOL	ppb	10000	4	4 ***	. 1-Butanol
I21	TRIBUPH	ppb	10	4	4 ***	. Tributylphosphoric acid
I28	TAF	ppb	10	13	13 ***	. Tetrahydrofuran
I87	ETHANOL	ppb	10000	4	4 ***	. Ethanol
L20	MBP	ppb	10000	4	4 ***	. Monobutylphosphate
L21	DBP	ppb	10000	4	4 ***	. Dibutylphosphate
L57	ETHGLYC	ppb	10000	4	4 ***	. Ethylene glycol
L59	1PROPAN	ppb	10000	4	4 ***	. 1-Propanol
L60	1BUTYN	ppb	10000	4	4 ***	. 1-Butynol
L63	14DBEN	ppb	5	13	13 ***	75 EPA 1,4-Dichlorobenzene [p-Dichlorobenzene]
L64	CHLROB	ppb	10	4	4 ***	60 EPAP Chlorobenzene (by ABN)
P12	ENDSFAN	ppb	0.5	3	3 ***	. Endosulfan
P13	PHORATE	ppb	2	3	3 ***	. Phorate

*** - Indicates all samples were reported as below contractual detection limits

xxx - Indicates that Drinking Water standards were exceeded

EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936

EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx

WDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

**TABLE 10.4. Constituents with at Least One Detected Value for the 216-A-29 Ditch
July through August 1989**

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
2-E25-26	12JUL89	1	154	.	.	7.22	#800	#5
		2	154	.	.	7.22	#600	#2
		2	154	.	.	7.22	#700	#4
		3	154	.	.	7.22	#600	#2
2-E25-26	11AUG89	1	209	187	8.20	8.24	#900	#8
		2	209	.	.	8.26	#800	12
		2	208	.	.	8.26	#1,300	#4
		3	208	.	.	8.26	#1,200	10
2-E25-26	29AUG89	1	180	183	8.10	8.17	#800	#2
		2	179	.	.	8.16	#1,000	#3
		2	179	.	.	8.16	#700	#6
		3	182	.	.	8.15	#900	#5
2-E25-28	20JUL89	1	150	.	.	8.21	#500	#4
		2	147	.	.	8.20	#500	#7
		2	146	.	.	8.19	#700	#4
		3	148	.	.	8.21	#600	#5
2-E25-28	24JUL89	1	140	.	.	8.17	.	.
		2	140	.	.	8.17	.	.
		2	140	.	.	8.16	.	.
		3	140	.	.	8.14	.	.
2-E25-28	29AUG89	1	190	183	8.00	8.20	#600	14
		2	187	.	.	8.20	#700	#3
		2	186	.	.	8.21	#600	#9
		3	186	.	.	8.21	#500	#8
2-E25-32	13JUL89	1	174	.	.	6.92	#989	#5
		2	173	.	.	6.96	#1,140	#8
		2	172	.	.	7.01	#767	#9
		3	173	.	.	7.00	#928	#5
2-E25-32	29AUG89	1	142	160	8.10	8.22	#800	#3
		2	136	.	.	8.21	#800	#6
		2	139	.	.	8.22	#1,500	#6
		3	134	.	.	8.22	#900	#4
2-E25-34	17JUL89	1	130	183	8.20	7.89	#600	#3
		2	129	.	.	7.88	#1,100	#4
		2	128	.	.	7.89	#800	#2
		3	129	.	.	7.89	#700	#2

TABLE 10.4. (contd)

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho . /700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
2-E25-34	30AUG89		192	674	8.00	8.00	8800	89
		1	191	.	.	8.04	8700	85
		2	191	.	.	8.07	8800	21
		3	190	.	.	8.08	8700	89
2-E25-35	17JUL89		330	508	8.00	7.54	8700	10
		1	330	.	.	7.57	8500	82
		2	330	.	.	7.58	8700	85
		3	330	.	.	7.59	8700	82
2-E25-35	30AUG89		731	185	7.80	7.80	8500	84
		1	729	.	.	7.79	8500	84
		2	734	.	.	7.79	8500	88
		3	738	.	.	7.81	8500	88

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALPHAHI pCi/L 4/15	ARSENIC ppb 5/50	FARSENIC ppb 5/50	BARIUM ppb 6/1000	FBARIUM ppb 6/1000	FBERYLL ppb 5/.	BERYLUM ppb 5/.
2-E25-26	12JUL89		<10	*0.4360	6.0	5.0	12	12	<5	<5
	11AUG89		85(a)	1.1200	5.0	<5.0	9	16	<5	<5
	29AUG89		<10	*0.6690	<5.0	5.0	13	13	<5	<5
2-E25-28	20JUL89			1.3600	8.8	9.3	12	12	<5	<5
	24JUL89		86(a)	.	.	.	.	.	.	.
	29AUG89		<10	*-0.0958	8.0	10.0	15	13	<5	<5
2-E25-32	29AUG89	1	<10	.	9.0	9.0	14	12	<5	<5
	13JUL89		<10	*0.7700	<5.0	<5.0	13	11	<5	<5
	13JUL89	1	.	1.0900	<5.0	<5.0	13	13	<5	<5
	13JUL89	2	.	.	<5.0	<5.0	13	11	<5	<5
	13JUL89	3	.	.	<5.0	<5.0	10	12	<5	<5
	29AUG89		<10	*0.5070	<5.0	<5.0	13	11	<5	<5
	30AUG89	1	.	.	<5.0	<5.0	11	12	<5	<5
	30AUG89	2	.	.	<5.0	<5.0	12	12	<5	<5
2-E25-34	30AUG89	3	.	.	<5.0	<5.0	12	11	<5	<5
	17JUL89		<10	*0.6390	7.3	8.5	19	19	<5	<5
	30AUG89		<10	*0.6210	5.0	6.0	22	19	6	6
2-E25-35	17JUL89		<10	3.8600	9.9	10.4	27	24	<5	<5
	17JUL89	1	<10	2.0500	10.0	10.4	27	25	<5	<5
	30AUG89		<10	2.7800	9.0	8.0	36	34	<5	5

TABLE 10.4. (contd)

Well name	Collection Date	Duplicate sample number	BETA pCi/L 8/50	BIS2EPH ppb 10/.	BORON ppb 10/.	FBORON ppb 10/.	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s	FCHROMI ppb 10/50
2-E25-28	12JUL89		3.73	14	12	13	21,400	23,000	3,110	<10
	11AUG89		8.34	.	17	<10	22,500	19,400	3,000	<10
	29AUG89		5.16	.	13	<10	21,500	20,700	2,900	<10
2-E25-28	20JUL89		10.50	.	12	14	19,900	18,800	2,990	<10
	29AUG89		3.51	.	12	64	19,400	21,000	3,300	<10
	29AUG89	1	.	.	14	<10	18,400	20,100	3,300	<10
2-E25-32	13JUL89		10.20	.	<10	<10	18,500	20,900	2,950	<10
	13JUL89	1	23.00	.	<10	<10	19,800	19,800	2,930	<10
	13JUL89	2	.	.	<10	<10	19,200	20,600	.	<10
	13JUL89	3	.	.	<10	<10	19,100	18,800	.	<10
	29AUG89		6.63	.	15	<10	19,000	20,000	2,900	<10
	30AUG89	1	.	.	<10	11	18,800	19,400	.	<10
	30AUG89	2	.	.	19	12	19,200	19,000	.	<10
	30AUG89	3	.	.	12	12	18,300	19,700	.	<10
2-E25-34	17JUL89		3.97	.	19	17	20,900	20,200	3,190	<10
	30AUG89		5.48	.	12	<10	19,200	20,800	3,300	<10
2-E25-35	17JUL89		3.37	.	22	21	46,600	51,800	6,190	<10
	17JUL89	1	7.51	.	21	20	47,200	53,200	6,820	10
	30AUG89		6.89	.	25	24	72,800	75,100	8,000	<10

Well name	Collection Date	Duplicate sample number	CHROMIUM ppb 10/50	COPPER ppb 10/1300p	FCOPPER ppb 10/1300p	FLUORID ppb 500/4000	IRON ppb 30/300s	FIRON ppb 30/.	MAGNES ppb 50/.
2-E25-28	12JUL89		<10	20	<10	<500	130	<30	5,910
	11AUG89		<10	<10	12	<500	53	<30	5,130
	29AUG89		<10	<10	<10	<500	35	<30	5,570
2-E25-28	20JUL89		<10	<10	<10	<500	<30	<30	5,210
	29AUG89		<10	<10	<10	<500	<30	<30	5,100
	29AUG89	1	<10	<10	<10	<500	<30	<30	5,850
2-E25-32	13JUL89		70	<10	<10	<500	373	33	5,000
	13JUL89	1	49	<10	<10	<500	297	<30	5,880
	13JUL89	2	41	<10	<10	.	288	<30	5,940
	13JUL89	3	25	<10	<10	.	167	33	4,850
	29AUG89		33	<10	<10	<500	164	34	5,540
	30AUG89	1	43	<10	<10	.	205	<30	5,180
	30AUG89	2	18	<10	<10	.	112	38	5,060
	30AUG89	3	31	<10	<10	.	166	<30	5,270
2-E25-34	17JUL89		91	<10	<10	<500	791	<30	5,460
	30AUG89		31	<10	<10	<500	177	<30	5,680
2-E25-35	17JUL89		123	<10	<10	588	804	45	18,900
	17JUL89	1	49	<10	<10	616	473	61	19,400
	30AUG89		31	<10	<10	1,000	329	<30	27,300

TABLE 10.4. (contd)

Well name	Collection Date	Duplicate sample number	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	NICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5
2-E25-26	12JUL89		5,480	<5	<5	<10	1,600	4,190	4,580	*0.0534
	11AUG89		6,040	<5	<5	<10	1,500	4,730	3,880	*-0.0194
	29AUG89		5,630	<5	<5	<10	1,400	4,620	4,090	0.1950
2-E25-28	20JUL89		5,430	<5	<5	<10	996	3,730	3,820	0.1880
	29AUG89		5,410	<5	<5	<10	1,000	4,000	4,120	*0.1100
	29AUG89	1	5,120	<5	<5	<10	900	3,800	3,980	.
2-E25-32	13JUL89		5,420	5	9	43	1,270	3,980	4,290	*-0.0602
	13JUL89	1	5,750	<5	7	28	1,020	4,160	4,020	0.1750
	13JUL89	2	5,580	<5	7	25	.	4,040	4,320	.
	13JUL89	3	5,610	6	<5	16	.	4,090	3,530	.
	29AUG89		5,130	<5	<5	21	800	4,000	3,860	*0.0451
	30AUG89	1	5,260	<5	<5	24	.	3,900	3,930	.
	30AUG89	2	5,340	<5	<5	13	.	3,980	3,890	.
	30AUG89	3	5,050	<5	<5	18	.	3,770	4,060	.
	17JUL89		5,620	<5	14	46	1,090	3,980	3,950	*0.1670
2-E25-34	30AUG89		5,130	6	<5	13	1,200	4,040	3,920	*0.0232
	17JUL89		16,900	<5	23	60	5,960	4,880	5,240	0.2680
2-E25-35	17JUL89	1	17,100	<5	16	26	6,830	4,930	5,130	0.2720
	30AUG89		25,100	<5	27	20	6,300	6,460	6,040	0.5510

Well name	Collection Date	Duplicate sample number	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	FSTRONT ppb 10/.	STRONUM ppb 10/.	SULFATE ppb 500/250000s	TC ppb 1000/.
2-E25-26	12JUL89		13,600	14,800	10,100	9,280	111	119	17,500	17,500
	11AUG89		15,400	13,200	8,740	10,600	123	99	15,700	18,600
	29AUG89		14,600	14,000	9,070	10,000	113	108	15,300	18,000
2-E25-28	20JUL89		16,000	16,200	10,100	10,300	102	95	13,800	.
	24JUL89		.	.	.	.	.	.	.	18,700
	29AUG89		16,500	17,900	11,500	10,800	97	110	14,100	18,300
2-E25-32	29AUG89	1	15,700	17,200	11,000	10,100	92	105	14,200	18,200
	13JUL89		9,660	10,100	6,430	6,030	119	131	13,300	17,600
	13JUL89	1	9,500	9,550	6,020	6,330	125	124	13,300	.
	13JUL89	2	9,300	9,900	6,480	6,070	120	130	.	.
	13JUL89	3	9,390	8,140	6,260	6,270	120	108	.	.
	29AUG89		9,460	10,000	5,760	5,790	105	112	11,800	16,300
	30AUG89	1	9,620	9,650	5,820	5,620	104	108	.	.
	30AUG89	2	9,850	9,490	5,740	5,660	105	105	.	.
	30AUG89	3	9,290	9,810	5,970	5,400	100	109	.	.
2-E25-34	17JUL89		15,000	14,700	9,400	9,600	112	110	15,000	18,300
	30AUG89		13,700	15,400	9,300	9,420	99	107	14,700	18,300
2-E25-35	17JUL89		18,400	18,400	37,100	33,900	255	288	142,000	30,000
	17JUL89	1	18,800	17,400	36,200	34,400	259	293	165,000	28,900
	30AUG89		18,500	19,300	43,400	44,900	359	382	221,000	30,600

TABLE 10.4. (contd)

Well name	Collection Date	Duplicate sample number	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/1	U pCi/L 0.5/800d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/6000s	FZINC ppb 5/6000s
2-E25-28	12JUL89		.	0.4	.	28	32	23	8
	11AUG89		3,590	0.5	0.978	28	15	13	7
	29AUG89		.	0.3	.	24	21	10	7
2-E25-28	20JUL89		.	.	.	42	36	9	<5
	24JUL89		.	0.1	.	.	.	.	.
	29AUG89		.	<0.1	.	37	40	11	10
	29AUG89	1	.	0.1	.	36	39	9	10
2-E25-32	13JUL89		.	0.5	.	9	12	8	<5
	13JUL89	1	.	.	.	15	12	9	<5
	13JUL89	2	.	.	.	14	12	8	<5
	13JUL89	3	.	.	.	11	11	8	5
	29AUG89		.	0.9	.	8	10	7	8
	29AUG89	1	.	1.6	.	.	.	.	.
	30AUG89	1	.	.	.	12	<5	8	5
	30AUG89	2	.	.	.	9	11	13	<5
	30AUG89	3	.	.	.	9	8	<5	<5
2-E25-34	17JUL89		1,410	2.0	.	34	35	12	<5
	30AUG89		1,520	1.1	.	29	31	15	<5
2-E25-35	17JUL89		51,500	1.3	.	23	28	15	<5
	17JUL89	1	80,800	1.9	.	23	24	13	6
	30AUG89		82,400	5.2	.	17	18	17	<5

The column headers consist of : Constituent Name

Analysis Units

Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-78-003

p - based on proposed Maximum Contaminant Level Goals in 50 FR 48938

s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

d - based on Derived Concentration Guides in draft DOE Order 5400.xx

w - based on additional Secondary Maximum Contaminant Levels in MAC 248-54, Public Water Supplies

Data flags

< - Less than Contractual Detection Limit, reported as Limit

- Less than Contractual Detection Limit, measured value reported

* - For radioactive constituents, reported value is less than 2-sigma error

(a) Suspect data. The reagent blank for this group showed contamination for this constituent.

 

11.0 216-A-36B CRIB

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The ground water beneath the 216-A-36B Crib has been monitored by a RCRA interim-status well network since May 1988. This project is in the indicator evaluation stage of monitoring. Six sample sets have been collected and analyzed. A draft ground-water monitoring plan has been prepared for this facility.

The 216-A-36B Crib is the southern 500-ft section of what was once a 600-ft-long crib (Figure 11.1). The 216-A-36B crib is 12 ft wide and 12 ft deep and was separated from the 216-A-36A crib in 1966 by a grout curtain. The 216-A-36B crib received ammonia scrubber distillate from the PUREX Plant from September 1965 to 1972. After 10 years of retirement, the crib was reactivated from November 1982 until October 1987 with the same waste stream as before. It has not been used since 1987.

Five new monitoring wells installed in 1988, combined with two pre-existing wells near the crib, make up the ground-water monitoring system (see Figure 11.1). Well 299-E17-17 is the upgradient monitoring well; wells 299-E17-5, 299-E17-9, 299-E17-14, 299-E17-15, 299-E17-16, and 299-E17-18 are the downgradient monitoring wells. Because of its long (~150-ft) perforated interval, well 299-E17-6 is used only to characterize the ground-water chemistry and is not used to determine water potentials or for statistical comparisons against background. Comparison of ground-water analyses from this well and nearby well 299-E17-18, completed in the upper 15 ft of the aquifer, provides an indication of the vertical extent of contaminants in the aquifer. Well 299-E17-10 will be sampled on completion of remediation. Also, water levels are measured at nearby well 299-E17-13. The sampling schedule for the wells in the monitoring network is shown in Table 11.1.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or hydrogeologic characterization activities (other than measurement of water levels) were conducted during the quarter.

WATER LEVELS

Water-level measurements were made at the time of sample collection in September 1989, and supplemental water-level measurements were made on September 26, 1989 (Table 11.2).

WATER CHEMISTRY DATA

A set of ground-water samples was collected between September 21 and 28. Samples were also collected on July 27 from well 299-E17-15 and on August 21 from well 299-E17-6, which had not been sampled with the other wells in June. The analytical results for samples collected in June, July, and August are summarized in Table 11.3. The results for constituents with at least one detected value are provided in Table 11.4.

Major observations of the June/July/August sample analyses are the following:

- Nitrate exceeded the 40 CFR 265, Appendix III, screening level of 45,000 ppb in wells 299-E17-5 (82,600 ppb), 299-E17-6 (115,000 ppb), 299-E17-9 (123,000 ppb), 299-E17-14 (284,000 and 300,000 ppb; duplicate samples were collected), 299-E17-15 (242,000 ppb), and 299-E17-17 (65,900 ppb).
- Total beta was reported to be 134 pCi/L in well 299-E17-5, 123 pCi/L in well 299-E17-6, 257 and 203 pCi/L in well 299-E17-14, 699 pCi/L in well 299-E17-15, 52.1 pCi/L in well 299-E17-16, and 112 pCi/L in well 299-E17-17. These results all exceeded the 40 CFR 265, Appendix III, screening level of 50 pCi/L.
- Tritium was reported to be 118,000 pCi/L in well 299-E17-5, 3,950,000 pCi/L in well 299-E17-9, 2,570,000 and 2,700,000 pCi/L in well 299-E17-14, 236,000 pCi/L in well 299-E17-15, 42,300 pCi/L in well 299-E17-16, 215,000 pCi/L in well 299-E17-17, and 38,600 pCi/L in well 299-E17-18. These results all exceeded the 40 CFR 141 standard of 20,000 pCi/L.

- Chromium (filtered) was reported to be 92 ppb in well 299-E17-15, exceeding the 40 CFR 265, Appendix III, standard of 50 ppb. Unfiltered chromium was reported to be below the detection level of 10 ppb in every well.
- Ruthenium-106 was reported to be 83.5 pCi/L in well 299-E17-5, 112 pCi/L and 51.4 pCi/L in well 299-E17-14 (duplicate samples were collected), 547 pCi/L in well 299-E17-15, and 59.5 pCi/L in well 299-E17-17. These results exceed the NPDWS of 30 pCi/L for ruthenium-106. The detection level for ruthenium-106 is 172.5 pCi/L.

Background statistics and critical mean values have been calculated for the 216-A-36B Crib and are presented in Table 11.5. The replicate averages of the indicator parameters are presented in Table 11.6. Statistical comparisons of these data against background were made, and none of the indicator parameters for any of the wells had a statistical increase (or pH decrease) over background.

FIGURE 11.1. Monitoring Well Locations for the 216-A-36B Crib

TABLE 11.1. Sampling Schedule for the 216-A-36B Crib

Well	1988 ^(a)			1989								
	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u> ^(b)	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>
299-E17- 5			X					L	X			X
299-E17- 6			S					S			S	S
299-E17- 9			X					L	X			X
299-E17-10 ^(c)			--					--	--			--
299-E17-14			X					L	XRV			X
299-E17-15			X					LRV		X		X
299-E17-16			XRV					L	X			X
299-E17-17			X					L	X			X
299-E17-18			X					L	X			XR

(a) The following abbreviations are used in this table:

L = sampled for the long list of constituents (WAC 173-303-9905).

R = quality control replicates were collected.

S = sampled for the short list of constituents (overlap with another project).

V = volatile organic analyses blanks were collected.

X = sampled for the regular list of constituents.

(b) The March sample set was not collected because purge water disposal issues had not been resolved; samples were collected in May.

(c) Planned, pending remediation.

TABLE 11.2. Water-Level Data for Wells Near the 216-A-36B Crib

<u>Well</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Date</u>	<u>Depth to Water, ft</u>	<u>Water-Level Elevation, ft above MSL</u>
299-E17-5	718.69	9/21/89	314.78	403.91
		9/26/89	314.68	404.01
299-E17-6	720.10	9/25/89	315.20	404.90
		9/26/89	315.27	404.83
299-E17-9	717.64	9/28/89	313.26	404.38
		9/26/89	313.35	404.29
299-E17-10	714.74	9/26/89	309.86	404.88
299-E17-13	719.25	9/26/89	314.49	404.76
299-E17-14	722.18	9/27/89	317.29	404.89
		9/26/89	317.28	404.90
299-E17-15	721.78	7/27/89	NM ^(b)	
		9/21/89	317.75	404.03
		9/26/89	317.70	404.08
299-E17-16	720.58	9/25/89	315.87	405.91
		9/26/89	315.95	404.63
299-E17-17	719.92	9/21/89	315.18	404.74
		9/26/89	315.14	404.78
299-E17-18	720.65	9/27/89	315.77	404.88
		9/26/89	315.81	404.84

(a) MSL = mean sea level.

(b) NM = no measurement made. Measuring tapes could not be lowered to the water level.

TABLE 11.3. Constituent List and Summary of Sampling Results for the 216-A-36B Crib for June through August 1989

----- Constituent List=Contamination Indicator Parameters -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088	CONDLAB	umho	.	9	0	700 WDOE	xxx Specific conductance, laboratory
191	CONDFLD	umho	1	32	0	700 WDOE	Specific conductance, field
199	PHFIELD		0.1	32	0	8.5 EPAS	pH, field
207	PH-LAB		0.01	9	0	8.5 EPAS	pH, laboratory
C69	TOC	ppb	2000	32	1	.	Total organic carbon
H42	TOXLDL	ppb	10	32	0	.	Total organic halogens, low DL

----- Constituent List=Interim Primary Drinking Water Parameters -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109	COLIFRM	MPN	2.2	7	7 ***	1 EPA	Coliform bacteria
111	BETA	pCi/L	8	9	0	50 EPA	Gross beta
112	ALPHAHI	pCi/L	4	9	0	15 EPA	Gross alpha, high DL
181	RADIUM	pCi/L	1	8	0	5 EPA	Radium, total
A06	BARIUM	ppb	8	9	0	1000 EPA	Barium
A07	CADMIUM	ppb	2	9	9 ***	10 EPA	Cadmium
A08	CHROMIUM	ppb	10	9	3	50 EPA	Chromium
A10	SILVER	ppb	10	9	9 ***	50 EPA	Silver
A20	ARSENIC	ppb	5	9	1	50 EPA	Arsenic
A21	MERCURY	ppb	0.1	9	9 ***	2 EPA	Mercury
A22	SELENIUM	ppb	5	9	9 ***	10 EPA	Selenium
A33	ENDRIN	ppb	0.1	8	8 ***	0.2 EPA	Endrin
A34	METHLOR	ppb	3	8	8 ***	100 EPA	Methoxychlor
A35	TOXAENE	ppb	1	8	8 ***	5 EPA	Toxaphene
A36	a-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, beta-BHC
A38	g-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, delta-BHC
A51	LEADGF	ppb	5	9	9 ***	50 EPA	Lead (graphite furnace)
C72	NITRATE	ppb	500	9	0	45000 EPA	Nitrate
C74	FLUORID	ppb	500	9	0	4000 EPA	Fluoride
H13	2,4-D	ppb	2	8	8 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	8	8 ***	10 EPA	2,4,5-TP silvex
H20	FBARIUM	ppb	8	9	0	1000 EPA	Barium, filtered
H21	FCADMIUM	ppb	2	9	7	10 EPA	Cadmium, filtered
H22	FCHROMIUM	ppb	10	9	9 ***	50 EPA	Chromium, filtered
H23	FSILVER	ppb	10	9	9 ***	50 EPA	Silver, filtered
H37	FARSENIC	ppb	5	9	1	50 EPA	Arsenic, filtered
H38	FMERCURY	ppb	0.1	9	9 ***	2 EPA	Mercury, filtered
H39	FSELENIUM	ppb	5	9	9 ***	10 EPA	Selenium, filtered
H41	FLEAD	ppb	5	9	9 ***	50 EPA	Lead, filtered
H60	TURBID	ntu	0.1	9	0	1 EPA	Turbidity, nephelometric
P19	COLIMF	100mL	1	2	2 ***	1 EPA	Coliform (Membrane Filter)

TABLE 11.3. (contd)

----- Constituent List=Water Quality Parameters -----								
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards	Agency Exceeded	Full name
A11	SODIUM	ppb	200	9	0	.		Sodium
A17	MANGESE	ppb	5	9	5	50 EPAS	xxx	Manganese
A19	IRON	ppb	30	9	2	300 EPAS	xxx	Iron
C73	SULFATE	ppb	500	9	0	250000 EPAS		Sulfate
C75	CHLORID	ppb	500	9	0	250000 EPAS		Chloride
H24	FSODIUM	ppb	200	9	0	.		Sodium, filtered
H29	FMANGAN	ppb	5	9	8	50 EPAS	xxx	Manganese, filtered
H31	FIRON	ppb	30	9	7	. EPAS		Iron, filtered
H57	LPHENOL	ppb	10	8	8 ***	.		Phenol, low DL
----- Constituent List=Site Specific and Other Constituents -----								
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards	Agency Exceeded	Full name
010	CO-60	pCi/L	22.5	8	0	100 EPAR		Cobalt-60
024	CS-137	pCi/L	20	8	0	200 EPAR		Cesium-137
034	RU-106	pCi/L	172.5	8	0	30 EPAR	xxx	Ruthenium-106
108	TRITIUM	pCi/L	500	8	0	20000 EPA	xxx	Tritium (H-3)
A01	BERYLUM	ppb	5	9	9 ***	.		Beryllium
A03	STRONUM	ppb	10	9	0	.		Strontium
A04	ZINC	ppb	5	9	4	5000 EPAS		Zinc
A05	CALCIUM	ppb	50	9	0	.		Calcium
A12	NICKEL	ppb	10	9	5	.		Nickel
A13	COPPER	ppb	10	9	8	1300 EPAP		Copper
A14	VANADUM	ppb	5	9	1	.		Vanadium
A15	ANTIONY	ppb	100	9	9 ***	.		Antimony
A16	ALUMNUM	ppb	150	9	9 ***	.		Aluminum
A18	POTASUM	ppb	100	9	0	.		Potassium
A50	MAGNES	ppb	50	9	0	.		Magnesium
C78	PHOSPHA	ppb	1000	9	9 ***	.		Phosphate
H16	TC	ppb	1000	9	0	.		Total carbon
H18	FZINC	ppb	5	9	8	5000 EPAS		Zinc, filtered
H19	FCALCIU	ppb	50	9	0	.		Calcium, filtered
H25	FNICKEL	ppb	10	9	9 ***	.		Nickel, filtered
H26	FCOPPER	ppb	10	9	8	1300 EPAP		Copper, filtered
H27	FVANADI	ppb	5	9	1	.		Vanadium, filtered
H28	FALUMIN	ppb	150	9	9 ***	.		Aluminum, filtered
H30	FPOTASS	ppb	100	9	0	.		Potassium, filtered
H32	FMAGNES	ppb	50	9	0	.		Magnesium, filtered
H33	FBERYLL	ppb	5	9	8	.		Beryllium, filtered
H35	FSTRONT	ppb	10	9	0	.		Strontium, filtered
H36	FANTIMO	ppb	100	9	9 ***	.		Antimony, filtered
H66	BROWIDE	ppb	1000	9	9 ***	.		Bromide
H67	NITRITE	ppb	1000	9	9 ***	.		Nitrite
H68	FBORON	ppb	10	9	0	.		Boron, filtered

TABLE 11.3. (contd)

----- Constituent List=Site Specific and Other Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H87 FCOBALT	ppb	20	9	9 ***	.	Cobalt, filtered
H88 FLITHIU	ppb	10	9	9 ***	.	Lithium, filtered
H89 FMOLY	ppb	40	9	9 ***	.	Molybdenum, filtered
H90 FSILICO	ppb	60	9	0	.	Silicon, filtered
H91 FTIN	ppb	30	9	9 ***	.	Tin, filtered
H92 FTITAN	ppb	60	9	9 ***	.	Titanium, filtered
H93 FZIRCON	ppb	60	9	9 ***	.	Zirconium, filtered
P01 BORON	ppb	10	9	0	.	Boron
P02 COBALT	ppb	20	9	9 ***	.	Cobalt
P03 LITHIUM	ppb	10	9	9 ***	.	Lithium
P04 MOLY	ppb	40	9	9 ***	.	Molybdenum
P05 SILICON	ppb	60	9	0	.	Silicon
P06 TIN	ppb	30	9	9 ***	.	Tin
P07 TITAN	ppb	60	9	9 ***	.	Titanium
P08 ZIRCON	ppb	60	9	9 ***	.	Zirconium

----- Constituent List=WAC 173-303-9905 Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C80 AMMONIU	ppb	60	8	8 ***	.	Ammonium ion
H15 2,4,5-T	ppb	2	8	8 ***	.	2,4,5-T

*** - Indicates all samples were reported as below contractual detection limits

xxx - Indicates that Drinking Water standards were exceeded

EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936

EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx

WDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

TABLE 11.4. Constituents with at Least One Detected Value for the 216-A-36B Crib, December 1988

Quadruplicate Contamination Indicator Parameters								
Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
2-E17-5	22JUN89		353	364	7.90	7.37	#700	#3
		1	353	.	.	7.58	#600	#1
		2	353	.	.	7.55	#600	#1
		3	353	.	.	7.54	#800	#3
2-E17-6	21AUG89		484	486	7.90	8.10	#800	#9
		1	476	.	.	8.10	#700	#0
		2	475	.	.	8.09	#800	#2
		3	475	.	.	8.08	#600	10
2-E17-9	22JUN89		416	466	7.90	7.78	#400	#3
		1	417	.	.	7.79	#500	#1
		2	419	.	.	7.80	#400	#2
		3	421	.	.	7.80	#500	#1
2-E17-14	26JUN89		590	736	7.80	7.08	#800	#3
		1	590	728	7.80	7.08	#900	#3
		2	590	.	.	7.09	#1,000	#2
		3	591	.	.	7.09	#900	#3
2-E17-15	27JUL89		332	568	7.90	7.84	#700	13
		1	332	.	.	7.86	#700	10
		2	332	.	.	7.86	#800	10
		3	331	.	.	7.87	#800	#4
2-E17-16	26JUN89		334	434	8.10	8.12	#600	#6
		1	333	.	.	8.10	#800	#7
		2	333	.	.	8.10	#600	#2
		3	333	.	.	8.10	#500	#4
2-E17-17	23JUN89		316	337	8.00	7.71	#500	#1
		1	316	.	.	7.76	#700	#2
		2	317	.	.	7.76	#500	#2
		3	317	.	.	7.76	#500	#1
2-E17-18	23JUN89		236	240	8.10	7.75	#400	#-1
		1	236	.	.	7.76	#500	#2
		2	236	.	.	7.78	#600	#-1
		3	236	.	.	7.77	#400	#1

TABLE 11.4. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ALPHAHI pCi/L 4/15	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 8/1000	FBARIUM ppb 8/1000	FBERYLL ppb 5/.	BETA pCi/L 8/50	BORON ppb 10/.
2-E17-5	22JUN89		4.31	7	8	38	38	<5	134.00	21
2-E17-6	21AUG89		4.09	<5	<5	88	85	<5	123.00	18
2-E17-9	22JUN89		2.05	11	13	64	68	<5	27.50	25
2-E17-14	26JUN89		3.95	7	8	70	74	<5	257.00	21
	26JUN89	1	6.01	7	8	73	73	8	203.00	24
2-E17-15	27JUL89		3.28	8	8	51	52	<5	899.00	16
2-E17-16	26JUN89		3.98	10	10	30	31	<5	52.10	21
2-E17-17	23JUN89		2.77	8	8	43	44	<5	112.00	18
2-E17-18	23JUN89		3.88	11	10	35	34	<5	7.82	21
Well name	Collection Date	Duplicate sample number	FBORON ppb 10/.	FCADMIU ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s	CHROMUM ppb 10/50	CO-60 pCi/L 22.5/100r	
2-E17-5	22JUN89		18	<2	35,200	35,200	3,700	<10	18.100	
2-E17-6	21AUG89		19	<2	43,800	45,500	3,800	<10	.	
2-E17-9	22JUN89		23	<2	50,700	48,200	6,000	<10	*5.480	
2-E17-14	26JUN89		18	<2	89,300	85,800	4,300	14	54.400	
	26JUN89	1	28	4	89,800	88,800	4,200	13	39.800	
2-E17-15	27JUL89		18	8	86,400	70,400	3,400	92	23.100	
2-E17-16	26JUN89		20	<2	35,700	34,200	9,400	18	*-2.270	
2-E17-17	23JUN89		17	<2	34,200	32,700	3,700	21	*9.500	
2-E17-18	23JUN89		24	<2	24,800	24,300	3,200	17	*-0.413	
Well name	Collection Date	Duplicate sample number	COPPER ppb 10/1300p	FCOPPER ppb 10/1300p	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000	IRON ppb 30/300s	FIRON ppb 30/.	MAGNES ppb 50/.	FMAGNES ppb 50/.
2-E17-5	22JUN89		<10	<10	*-3.89	800	<30	<30	10,300	10,200
2-E17-6	21AUG89		<10	<10	.	800	89	<30	15,000	14,700
2-E17-9	22JUN89		<10	<10	*-3.01	800	<30	<30	14,400	15,000
2-E17-14	26JUN89		14	<10	*5.30	800	80	<30	22,800	23,800
	26JUN89	1	<10	<10	*-2.85	800	55	<30	23,200	23,800
2-E17-15	27JUL89		<10	13	*-2.98	800	492	<30	17,500	18,800
2-E17-16	26JUN89		<10	<10	*3.53	800	95	<30	10,600	11,300
2-E17-17	23JUN89		<10	<10	*-1.13	800	108	38	9,550	9,830
2-E17-18	23JUN89		<10	<10	*4.47	700	107	45	7,170	7,230

TABLE 11.4. (contd)

Well name	Collection Date	Dupl sam num	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	NICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	RU-106 pCi/L 172.5/30r
2-E17-5	22JUN89		<5	<5	<10	82,800	5,610	5,820	*0.0223	*83.50
2-E17-6	21AUG89		54	62	<10	115,000	6,990	7,270	.	.
2-E17-9	22JUN89		<5	<5	<10	123,000	6,890	7,120	0.1800	*18.80
2-E17-14	26JUN89		<5	5	15	284,000	7,500	7,170	1.0800	112.00
	26JUN89	1	<5	5	<10	300,000	7,510	7,430	1.0100	*51.40
2-E17-15	27JUL89		<5	10	44	242,000	6,370	6,450	*-0.0189	547.00
2-E17-16	26JUN89		<5	<5	11	24,500	5,440	5,410	0.4110	*8.84
2-E17-17	23JUN89		<5	<5	10	65,900	6,120	5,920	0.1470	*59.50
2-E17-18	23JUN89		<5	<5	<10	6,200	5,350	5,190	0.3980	*-18.70

Well name	Collection Date	Dupl sam num	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	FSTRONT ppb 10/.	STRONUM ppb 10/.	SULFATE ppb 500/25000s	TC ppb 1000/.
2-E17-5	22JUN89		17,300	17,300	20,500	20,000	198	204	29,800	21,400
2-E17-6	21AUG89		20,300	20,100	24,700	23,700	267	265	27,100	24,700
2-E17-9	22JUN89		21,200	20,100	29,900	29,100	303	298	40,500	22,500
2-E17-14	26JUN89		19,300	18,200	30,300	31,600	505	477	37,600	23,900
	26JUN89	1	118,900	18,800	31,200	32,000	503	488	40,000	24,100
2-E17-15	27JUL89		17,800	18,700	29,200	28,700	317	332	33,400	22,600
2-E17-16	26JUN89		18,200	17,600	22,000	23,100	191	182	62,300	20,300
2-E17-17	23JUN89		19,300	18,500	22,100	22,700	186	186	29,000	21,300
2-E17-18	23JUN89		20,400	19,900	20,500	20,800	133	136	24,700	22,200

Well name	Collection Date	Duplicate sample number	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/1	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-E17-5	22JUN89		118,000	0.2	21	24	<5	<5
2-E17-6	21AUG89		.	0.4	<5	<5	<5	<5
2-E17-9	22JUN89		3,950,000	0.9	25	27	19	5
2-E17-14	26JUN89		2,570,000	0.6	25	16	<5	<5
	26JUN89	1	2,700,000	0.6	27	21	7	<5
2-E17-15	27JUL89		236,000	0.9	24	28	9	<5
2-E17-16	26JUN89		42,300	0.6	26	30	11	12
2-E17-17	23JUN89		215,000	1.0	24	24	<5	6
2-E17-18	23JUN89		38,600	1.4	33	35	10	<5

TABLE 11.4. (contd)

The column headers consist of : Constituent Name
Analysis Units
Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
- s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- d - based on Derived Concentration Guides in draft DOE Order 5400.xx
- w - based on additional Secondary Maximum Contaminant Levels in MAC 248-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- - Less than Contractual Detection Limit, measured value reported
- * - For radioactive constituents, reported value is less than 2-sigma error

TABLE 11.5. Critical Mean Values^(a) for the 216-A-36B Crib for June through August 1989

<u>Constituent Code Name, Units</u>	<u>n</u>	<u>df</u>	<u>tc</u>	<u>Average</u>	<u>Standard Deviation</u>	<u>Critical Mean</u>
Conductivity, field $\mu\text{mho/cm}$	4	3	14.479	316.7	69.8	1,446.6
pH, field	4	3	18.281	7.956	0.299	[1.850, 14.062]
Total Organic Carbon, ppb	4	3	14.479	554.9	149.6	2,976.5
Total Organic Halogens, ppb	4	3	14.479	3.02	3.48	59.4

(a) Background data collected between August 1988 and May 1989.

n - number of background replicate averages.

df - degrees of freedom (n-1)

tc - Bonferroni critical t-value for appropriate df and 28 comparisons
(4 parameters * 7 wells; well 299-E17-6 is not a monitoring well).

TABLE 11.6. Contamination Indicator Parameter Replicate Averages for the 216-A-36B Crib for June through August 1989

Constituent Code Name Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088 CONDLAB umho	2-E17-5	22JUN89	1	384	.	384	384	.
	2-E17-8	21AUG89	1	486	.	486	486	.
	2-E17-9	22JUN89	1	486	.	486	486	.
	2-E17-14	26JUN89	2	732	5.7	728	736	0.8
	2-E17-15	27JUL89	1	588	.	588	588	.
	2-E17-16	26JUN89	1	434	.	434	434	.
	2-E17-17	23JUN89	1	337	.	337	337	.
	2-E17-18	23JUN89	1	240	.	240	240	.
191 CONDFLD umho	2-E17-5	22JUN89	4	353	0.0	353	353	0.0
	2-E17-8	21AUG89	4	478	4.4	475	484	0.9
	2-E17-9	22JUN89	4	418	2.2	416	421	0.5
	2-E17-14	26JUN89	4	590	0.5	590	591	0.1
	2-E17-15	27JUL89	4	332	0.5	331	332	0.2
	2-E17-16	26JUN89	4	333	0.5	333	334	0.2
	2-E17-17	23JUN89	4	317	0.6	316	317	0.2
	2-E17-18	23JUN89	4	236	0.0	236	236	0.0
199 PHFIELD	2-E17-5	22JUN89	4	7.51	0.09	7.37	7.68	1.3
	2-E17-8	21AUG89	4	8.09	0.01	8.08	8.10	0.1
	2-E17-9	22JUN89	4	7.79	0.01	7.78	7.80	0.1
	2-E17-14	26JUN89	4	7.09	0.01	7.08	7.09	0.1
	2-E17-15	27JUL89	4	7.86	0.01	7.84	7.87	0.2
	2-E17-16	26JUN89	4	8.11	0.01	8.10	8.12	0.1
	2-E17-17	23JUN89	4	7.75	0.02	7.71	7.78	0.3
	2-E17-18	23JUN89	4	7.77	0.01	7.75	7.78	0.2
207 PH-LAB	2-E17-5	22JUN89	1	7.9	.	7.9	7.9	.
	2-E17-8	21AUG89	1	7.9	.	7.9	7.9	.
	2-E17-9	22JUN89	1	7.9	.	7.9	7.9	.
	2-E17-14	26JUN89	2	7.8	0	7.8	7.8	0.0
	2-E17-15	27JUL89	1	7.9	.	7.9	7.9	.
	2-E17-16	26JUN89	1	8.1	.	8.1	8.1	.
	2-E17-17	23JUN89	1	8.0	.	8.0	8.0	.
	2-E17-18	23JUN89	1	8.1	.	8.1	8.1	.
C69 TOC ppb	2-E17-5	22JUN89	4	675	95.7	600	800	14.2
	2-E17-8	21AUG89	4	725	95.7	600	800	13.2
	2-E17-9	22JUN89	4	450	57.7	400	500	12.8
	2-E17-14	26JUN89	4	900	81.6	800	1000	9.1
	2-E17-15	27JUL89	4	750	57.7	700	800	7.7
	2-E17-16	26JUN89	4	825	128.0	500	800	20.1
	2-E17-17	23JUN89	4	550	100.0	500	700	18.2
	2-E17-18	23JUN89	4	475	95.7	400	600	20.2
H42 TOXLDL ppb	2-E17-5	22JUN89	4	2.00	1.15	1	3	57.7
	2-E17-8	21AUG89	4	5.25	4.99	0	10	95.0
	2-E17-9	22JUN89	4	1.75	0.98	1	3	54.7
	2-E17-14	26JUN89	4	2.75	0.50	2	3	18.2
	2-E17-15	27JUL89	4	9.25	3.77	4	13	40.8
	2-E17-16	26JUN89	4	4.75	2.22	2	7	48.7
	2-E17-17	23JUN89	4	1.50	0.58	1	2	38.5
	2-E17-18	23JUN89	4	0.25	1.50	-1	2	600.0

12.0 216-B-3 POND

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The ground water beneath the 216-B-3 Pond (B Pond) has been monitored by a RCRA interim-status well network since November 1988. During this time the background stage of monitoring was completed; four sample sets were collected and analyzed. Indicator evaluation monitoring and statistical evaluations of the data will commence when the fifth-quarter sample is collected. A ground-water monitoring plan has been prepared for this pond.

B Pond consists of a series of interconnected surface ponds covering an area of approximately 102 acres to the east of the 200-East Area (see Figure 1.1). The pond receives large volumes (approximately 6×10^9 gal in 1987) of waste water from facilities in the 200-East Area.

Four new wells installed in 1988, in conjunction with three pre-existing wells, make up the current monitoring network for B Pond (Figure 12.1). The upgradient monitoring wells are 299-E18-1 and 299-E32-4; the downgradient wells are 699-42-40A, 699-42-42B, 699-43-42J, 699-43-43, and 699-44-42 (shown in Figure 12.1). Wells BP-1, BP-2, BP-4, BP-5, BP-6, and BP-9 have been constructed and will be added to the network after they have been developed and have had sampling pumps installed. In addition, wells 299-E25-32A, 699-39-39, 699-40-33A, 699-45-42, and 699-47-35B are used for water-level measurements. Well 299-E18-1 is also used for monitoring the 2101-M Pond, and well 299-E32-4 is used for monitoring the 200 Areas Low-Level Burial Grounds. The sampling schedule for the wells in the monitoring network is shown in Table 12.1.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Drilling and hydrogeologic characterization activities began in April 1989 at the six new (BP) wells around B Pond.

Well Drilling, Completion, Development, and Pump Installation

Information for each of the six wells completed is summarized in Table 12.2. As-built diagrams, well inspection/completion reports, and geologist's logs are included in Appendix A, Volume 2.

The wells were all drilled so that an 8-in.-dia. hole existed at the bottom of the drilled borehole before the final materials were installed. Wire-wound stainless steel screens 4-in. dia. (nominal) and 4-in. stainless steel casings were used in the final completion. The final screens were either standard pipe-sized screens or Channel Pack^{®(a)} screens.

The wells were developed by initial bailing and then by pumping with either a submersible or HydroStar^{®(b)} pump until the turbidity was less than 5 nephelometric turbidity units (NTU).

Hydrogeologic Characterization

Geologic samples were collected during drilling for laboratory analyses, and samples were described in the field by geologists. This latter information is included in the geologist's logs, contained in Appendix A, Volume 2. Gamma-ray geophysical logs were run in each borehole before reducing the casing diameter from 10 in. to 8 in. and when the total depth had been reached. Copies of these logs are also included in Appendix A, Volume 2. Slug tests were conducted in five of the six wells.

WATER LEVELS

Water levels were measured when samples were collected in August, and supplemental measurements were made in July, August, and September (Table 12.3).

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- (a) Channel Pack is a trademark of the Johnson Filtration Systems, Inc., St. Paul, Minnesota.
- (b) HydroStar is a trademark of Instrumentation Northwest, Redmond, Washington.

WATER CHEMISTRY DATA

Ground-water samples were collected from B Pond monitoring wells between August 8 and 10, 1989. The analytical results for samples collected last quarter and this quarter are available. The analytical results for the samples are summarized in Table 12.4. The results for constituents with at least one detected value are provided in Table 12.5. Highlights of the results of analyses for samples collected last quarter are discussed below.

- Chromium (unfiltered) results exceeded the 40 CFR 265, Appendix III, standard of 50 ppb in two wells. The reported values were 58 ppb in well 299-E32-4, and 51 ppb in well 699-43-42J. Filtered chromium analyses were reported below the detection level of 10 ppb in every well.
- Tritium was above the 40 CFR 141 standard of 20,000 pCi/L in well 699-42-42B, where it was reported to be 73,700 and 73,200 pCi/L (duplicate samples were collected).

Highlights of the results of analyses for samples collected in August are discussed below.

- Chromium (unfiltered) analyses exceeded the 40 CFR 265, Appendix III, standard of 50 ppb in three wells. The reported values were 100 ppb in well 299-E18-1, 61 ppb in well 699-42-42B, and 206 ppb and 118 ppb in well 699-43-42J (duplicate samples were collected from this well). Filtered chromium analyses were reported below the detection level of 10 ppb in every well.
- Tritium was above the 40 CFR 141 standard of 20,000 pCi/L in well 699-42-42B, where it was reported to be 79,500 pCi/L.

S8909110.31

FIGURE 12.1. Monitoring Well Locations for the 216-B-3 Pond

TABLE 12.1. Sampling Schedule for the 216-B-3 Pond

<u>Well</u>	<u>1988^(a)</u>			<u>1989</u>								
	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>
299-E18-1		X			XR	V			X		X	
299-E32-4					S				S		S	
699-42-40A		XR	V		X				X		X	
699-42-42B		X			X				XR	V	X	
699-43-42J		X			X				X		XR	V
699-43-43		X			X				X		X	
699-44-42		X			X				X		X	
699-43-45												
699-44-43B												
699-43-41E												
699-40-39												
699-41-40												
699-43-41F												

(a) The following abbreviations are used in this table:

R = quality control replicates were collected.

S = sampled for the short list of constituents (overlap with the LL8G project).

V = volatile organic analyses blanks were collected.

X = sampled for the regular list of constituents.

TABLE 12.2. Drilling, Completion, and Development Information for 216-B-3 Pond Wells

Well Number	Former Number	Drilling Information			Completion Information			Development Information				
		Start Date	End Date	Total Depth, ft	Screened Interval, ft	Screen Slot Size, in.	Screen ^(a) Type	Start Date	End Date	Pump ^(b) Type	Volume Pumped, gal	Final Turbidity, NTU
699-43-45	BP-1	5/2/89	6/2/89	203.55	182.95-203.3	.020	S	8/30/10/9	8/30/10/9	S S	1546 503	0.7 2.7
699-44-43B	BP-2	4/21/89	5/17/89	176.2	155.56-176.2	.020	S	8/30	9/1	S	6850	1.3
699-43-41E	BP-4	4/4/89	4/19/89	150.02	135.19-145.84	.010	CP	9/13	9/14	S	107	1.3
699-40-39	BP-5	4/4/89	6/12/89	212.2	200.98-211.54	.010	CP	9/15/9/18	9/15/9/21	S H	56 387	20 4.6
699-41-40	BP-6	4/4/89	6/7/89	176.14	163.94-174.3	.010	CP	9/5/9/8	9/5/9/13	S H	58 344	14 1.7
699-43-41F	BP-9	4/4/89	4/27/89	177.5	165.03-175.68	.010	CP	8/30	9/1	S	3718	1.2

(a) CP = channel pack; S = standard pipe size.

(b) H = HydroStar; S = submersible.

TABLE 12.3. Water-Level Data for Wells Near the 216-B-3 Pond

<u>Well</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Date</u>	<u>Depth to Water, ft</u>	<u>Water-Level Elevation, ft above MSL</u>
299-E18-1	720.24	7/13/89	315.10	405.14
		8/8/89	315.98	404.26
299-E25-32A	669.19	7/21/89	263.14	406.05
		8/23/89	263.21	405.98
		9/26/89	263.05	406.14
299-E32-4	685.88	8/10/89	281.48	404.40
699-39-39	536.65	7/21/89	122.66	413.99
		8/23/89	122.92	413.73
		9/26/89	123.14	413.51
699-40-33A	518.05	7/21/89	106.56	411.49
		8/23/89	106.52	411.53
		9/26/89	106.63	411.42
699-42-40A	545.53	7/21/89	122.15	423.38
		8/10/89	122.39	423.14
		8/23/89	122.44	423.09
		9/26/89	122.05	423.48
699-42-42B	583.23	7/21/89	165.29	417.94
		8/09/89	165.27	417.96
		8/23/89	165.24	417.99
699-43-42J	581.68	7/21/89	161.59	420.09
		8/09/89	161.46	420.22
		8/23/89	161.50	420.18
		9/26/89	161.20	420.48
699-43-43	579.37	7/21/89	163.58	415.79
		8/09/89	NM (b)	
		8/23/89	163.45	415.92
		9/26/89	163.24	416.13
699-44-42	579.22	7/21/89	157.61	421.61
		8/08/89	157.42	421.80
		8/23/89	157.46	421.76
		9/26/89	157.26	421.96

TABLE 12.3. (contd)

<u>Well</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Date</u>	<u>Depth to Water, ft</u>	<u>Water-Level Elevation, ft above MSL</u>
699-45-42	577.33	7/21/89	159.07	418.26
		8/23/89	158.91	418.42
		9/26/89	158.68	418.65
699-47-35A	476.65	7/21/89	62.14	414.51
		8/23/89	62.13	414.52
		9/26/89	62.04	414.61

(a) MSL = mean sea level.

(b) NM = no measurement was made.

TABLE 12.4. Constituent List and Summary of Sampling Results for the 216-B-3 Pond for
May through August 1989

----- Constituent List=Contamination Indicator Parameters -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088 CONDLAB	umho	.	23	0	700 WDOE	Specific conductance, laboratory
191 CONDFLD	umho	1	60	0	700 WDOE	Specific conductance, field
199 PHFIELD		0.1	60	0	6.5-8.5 EPAS	pH, field
207 PH-LAB		0.01	23	0	6.5-8.5 EPAS	pH, laboratory
C89 TOC	ppb	2000	58	0	.	Total organic carbon
H42 TOXLDL	ppb	10	58	0	.	Total organic halogens, low DL

----- Constituent List=Interim Primary Drinking Water Parameters -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109 COLIFRM	MPN	2.2	12	12 ***	1 EPA	Coliform bacteria
111 BETA	pCi/L	8	18	0	50 EPA	Gross beta
112 ALPHAHI	pCi/L	4	18	0	15 EPA	Gross alpha, high DL
181 RADIUM	pCi/L	1	18	0	5 EPA	Radium, total
A06 BARIUM	ppb	8	18	2	1000 EPA	Barium
A07 CADMIUM	ppb	2	18	14	10 EPA	Cadmium
A08 CHROMIUM	ppb	10	18	4	50 EPA	Chromium
A10 SILVER	ppb	10	18	18 ***	50 EPA	Silver
A20 ARSENIC	ppb	5	18	8	50 EPA	Arsenic
A21 MERCURY	ppb	0.1	18	18 ***	2 EPA	Mercury
A22 SELENIUM	ppb	5	18	14	10 EPA	Selenium
A33 ENDRIIN	ppb	0.1	18	18 ***	0.2 EPA	Endrin
A34 METHLOR	ppb	3	18	18 ***	100 EPA	Methoxychlor
A35 TOXAENE	ppb	1	18	18 ***	5 EPA	Toxaphene
A36 a-BHC	ppb	0.1	18	18 ***	4 EPA	Lindane, alpha-BHC
A37 b-BHC	ppb	0.1	18	18 ***	4 EPA	Lindane, beta-BHC
A38 g-BHC	ppb	0.1	18	18 ***	4 EPA	Lindane, gamma-BHC
A39 d-BHC	ppb	0.1	18	18 ***	4 EPA	Lindane, delta-BHC
A61 LEADGF	ppb	5	18	15	50 EPA	Lead (graphite furnace)
C72 NITRATE	ppb	500	18	0	45000 EPA	Nitrate
C74 FLUORID	ppb	500	18	9	4000 EPA	Fluoride
H13 2,4-D	ppb	2	18	18 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14 2,4,5TP	ppb	2	18	18 ***	10 EPA	2,4,5-TP silvex
H20 FBARIUM	ppb	8	18	1	1000 EPA	Barium, filtered
H21 FCADMIU	ppb	2	18	18 ***	10 EPA	Cadmium, filtered
H22 FCHROMI	ppb	10	18	18 ***	50 EPA	Chromium, filtered
H23 FSILVER	ppb	10	18	18 ***	50 EPA	Silver, filtered
H37 FARSENI	ppb	5	18	8	50 EPA	Arsenic, filtered
H38 FMERCUR	ppb	0.1	18	18 ***	2 EPA	Mercury, filtered
H39 FSELENI	ppb	5	18	14	10 EPA	Selenium, filtered
H41 FLEAD	ppb	5	18	18 ***	50 EPA	Lead, filtered
H60 TURBID	ntu	0.1	14	0	1 EPA	Turbidity, nephelometric
P19 COLIMF	100mL	1	3	3 ***	1 EPA	Coliform (Membrane Filter)

TABLE 12.4. (contd)

----- Constituent List=Water Quality Parameters -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
A11	SODIUM	ppb	200	18	0	.	Sodium
A17	MANGESE	ppb	5	18	4	50 EPAS	Manganese
A19	IRON	ppb	30	18	0	300 EPAS xxx	Iron
C73	SULFATE	ppb	500	18	0	250000 EPAS	Sulfate
C75	CHLORID	ppb	500	18	0	250000 EPAS	Chloride
H24	FSODIUM	ppb	200	18	0	.	Sodium, filtered
H29	FMANGAN	ppb	5	18	11	50 EPAS	Manganese, filtered
H31	FIRON	ppb	30	18	13	. EPAS	Iron, filtered
H57	LPHENOL	ppb	10	18	18 ***	.	Phenol, low DL
----- Constituent List=Site Specific and Other Constituents -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
010	CO-60	pCi/L	22.5	1	0	100 EPAR	Cobalt-60
024	CS-137	pCi/L	20	1	0	200 EPAR	Cesium-137
034	RU-106	pCi/L	172.5	1	0	30 EPAR	Ruthenium-106
104	U	pCi/L	0.5	1	0	600 DOE	Uranium
108	TRITIUM	pCi/L	500	18	0	20000 EPA xxx	Tritium (H-3)
121	SR-90	pCi/L	5	1	0	8 EPA	Strontium-90
197	TC-99	pCi/L	15	1	0	900 EPAR	Technetium-99
A01	BERYLUM	ppb	5	18	18 ***	.	Beryllium
A03	STRONTIUM	ppb	10	18	0	.	Strontium
A04	ZINC	ppb	5	18	9	5000 EPAS	Zinc
A05	CALCIUM	ppb	50	18	0	.	Calcium
A12	NICKEL	ppb	10	18	8	.	Nickel
A13	COPPER	ppb	10	18	18 ***	1300 EPAP	Copper
A14	VANADIUM	ppb	5	18	1	.	Vanadium
A15	ANTIMONY	ppb	100	18	18 ***	.	Antimony
A16	ALUMINUM	ppb	150	18	15	.	Aluminum
A18	POTASSIUM	ppb	100	18	0	.	Potassium
A50	MAGNESIUM	ppb	50	18	0	.	Magnesium
C76	PHOSPHATE	ppb	1000	18	18 ***	.	Phosphate
H16	TC	ppb	1000	14	0	.	Total carbon
H18	FZINC	ppb	5	18	10	5000 EPAS	Zinc, filtered
H19	FCALCIUM	ppb	50	18	0	.	Calcium, filtered
H25	FNICKEL	ppb	10	18	18 ***	.	Nickel, filtered
H26	FCOPPER	ppb	10	18	18 ***	1300 EPAP	Copper, filtered
H27	FVANADIUM	ppb	5	18	0	.	Vanadium, filtered
H28	FALUMINUM	ppb	150	18	18 ***	.	Aluminum, filtered
H30	FPOTASSIUM	ppb	100	18	0	.	Potassium, filtered
H32	FMAGNESIUM	ppb	50	18	0	.	Magnesium, filtered
H33	FBERYLLIUM	ppb	5	18	18 ***	.	Beryllium, filtered
H35	FSTRONTIUM	ppb	10	18	0	.	Strontium, filtered
H36	FANTIMONY	ppb	100	18	18 ***	.	Antimony, filtered

TABLE 12.4- (contd)

Constituent List=Site Specific and Other Constituents							Full name
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	
H88	ALKALIN	ppb	20000	2	0	.	Total alkalinity, as CaCO ₃ (Method B)
H86	BROMIDE	ppb	1000	18	18 ***	.	Bromide
H87	NITRITE	ppb	1000	18	18 ***	.	Nitrite
H88	FBORON	ppb	10	18	1	.	Boron, filtered
H87	FCOBALT	ppb	20	18	18 ***	.	Cobalt, filtered
H89	FLITHIU	ppb	10	18	18 ***	.	Lithium, filtered
H89	FMOLY	ppb	40	18	18 ***	.	Molybdenum, filtered
H90	FSILICO	ppb	50	18	0	.	Silicon, filtered
H91	FTIN	ppb	30	18	18 ***	.	Tin, filtered
H92	FTITAN	ppb	80	18	18 ***	.	Titanium, filtered
H93	FZIRCON	ppb	50	18	18 ***	.	Zirconium, filtered
P01	BORON	ppb	10	18	2	.	Boron
P02	COBALT	ppb	20	18	18 ***	.	Cobalt
P03	LITHIUM	ppb	10	18	18 ***	.	Lithium
P04	MOLY	ppb	40	18	18 ***	.	Molybdenum
P05	SILICON	ppb	50	18	0	.	Silicon
P06	TIN	ppb	30	18	18 ***	.	Tin
P07	TITAN	ppb	80	18	18 ***	.	Titanium
P08	ZIRCON	ppb	50	18	18 ***	.	Zirconium

Constituent List=WAC 173-303-9905 Constituents							Full name
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	
A54	AR1018	ppb	1	8	8 ***	0 EPAP	Arochlor 1018
A55	AR1221	ppb	1	8	8 ***	0 EPAP	Arochlor 1221
A56	AR1232	ppb	1	8	8 ***	0 EPAP	Arochlor 1232
A57	AR1242	ppb	1	8	8 ***	0 EPAP	Arochlor 1242
A58	AR1248	ppb	1	8	8 ***	0 EPAP	Arochlor 1248
A59	AR1254	ppb	1	8	8 ***	0 EPAP	Arochlor 1254
A60	AR1260	ppb	1	8	8 ***	0 EPAP	Arochlor 1260
A61	TETRANE	ppb	5	15	15 ***	5 EPA	Tetrachloromethane [Carbon Tetrachloride]
A62	BENZENE	ppb	5	15	15 ***	5 EPA	Benzene
A63	DIOXANE	ppb	500	8	8 ***	.	Dioxane
A64	METHONE	ppb	10	15	15 ***	.	Methyl ethyl ketone
A65	PYRIDIN	ppb	500	8	8 ***	.	Pyridine
A66	TOLUENE	ppb	5	15	15 ***	2000 EPAP	Toluene
A67	1,1,1-T	ppb	5	15	15 ***	200 EPA	1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	15	15 ***	.	1,1,2-Trichloroethane
A69	TRICENE	ppb	5	15	15 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethane]
A70	PERCENE	ppb	5	15	15 ***	.	Perchloroethylene [Tetrachloroethane]
A71	OPXYLE	ppb	5	15	15 ***	440 EPAP	Xylene-o,p
A72	ACROLIN	ppb	10	8	8 ***	.	Acrolein
A73	ACRYILE	ppb	10	8	8 ***	.	Acrylonitrile
A74	BISTHER	ppb	5	8	8 ***	.	bis(Chloromethyl) ether

TABLE 12.4. (contd)

----- Constituent List=WAC 173-303-9906 Constituents -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
A75	BROMONE	ppb	5	8	8 ***	.	Bromoacetone
A76	METHBRO	ppb	10	8	8 ***	.	Bromomethane [Methyl bromide]
A77	CARBIDE	ppb	10	8	8 ***	.	Carbon disulfide
A78	CHLBENZ	ppb	5	8	8 ***	60 EPAP	Chlorobenzene
A79	CHLTHER	ppb	5	8	8 ***	.	2-Chloroethyl vinyl ether
A80	CHLFORM	ppb	5	15	15 ***	100 EPA	Chloroform [Trichloromethane]
A81	METHCHL	ppb	10	8	8 ***	.	Methyl chloride [Chloromethane]
A82	CHMTHER	ppb	10	8	8 ***	.	Chloromethyl methyl ether
A83	CROTONA	ppb	10	8	8 ***	.	Crotonaldehyde
A84	DIBRCHL	ppb	10	8	8 ***	0 EPAP	1,2-Dibromo-3-chloropropane
A85	DIBRETH	ppb	10	8	8 ***	.	1,2-Dibromoethane
A86	DIBRMET	ppb	10	8	8 ***	.	Dibromomethane
A87	DIBUTEN	ppb	10	8	8 ***	.	1,4-Dichloro-2-butene
A88	DICDIFM	ppb	10	8	8 ***	.	Dichlorodifluoromethane
A89	1,1-DIC	ppb	5	15	15 ***	.	1,1-Dichloroethane
A90	1,2-DIC	ppb	5	15	15 ***	5 EPA	1,2-Dichloroethane
A91	TRANOCE	ppb	5	15	15 ***	70 EPAP	trans-1,2-Dichloroethene
A92	DICETHY	ppb	10	8	8 ***	7 EPA	1,1-Dichloroethylene
A93	METHYCH	ppb	5	15	15 ***	.	Methylene chloride [Dichloromethane]
A94	DICPANE	ppb	5	8	8 ***	8 EPAP	1,2-Dichloropropane
A95	DICPENE	ppb	5	8	8 ***	.	1,3-Dichloropropane
A96	NNDIEHY	ppb	10	8	8 ***	.	N,N-diethylhydrazine
A97	1,1-DIM	ppb	10	8	8 ***	.	1,1-Dimethylhydrazine
A98	1,2-DIM	ppb	10	8	8 ***	.	1,2-Dimethylhydrazine
B01	IODORET	ppb	10	8	8 ***	.	Iodomethane
B02	METHACR	ppb	10	8	8 ***	.	Methacrylonitrile
B03	METHTHI	ppb	10	8	8 ***	.	Methanethiol
B04	PENTACH	ppb	10	8	8 ***	.	Pentachloroethane
B05	1112-tc	ppb	10	8	8 ***	.	1,1,1,2-Tetrachloroethane
B06	1122-tc	ppb	5	8	8 ***	.	1,1,2,2-Tetrachloroethane
B08	BROMORM	ppb	5	8	8 ***	100 EPA	Bromoform [Tribromomethane]
B09	TRCMEOL	ppb	10	8	8 ***	.	Trichloromethanethiol
B10	TRCMFLM	ppb	10	8	8 ***	.	Trichloromonofluoromethane
B12	123-trp	ppb	10	8	8 ***	.	1,2,3-Trichloropropane
B13	VINYIDE	ppb	10	15	15 ***	2 EPA	Vinyl chloride
B14	M-XYLE	ppb	5	15	15 ***	440 EPAP	Xylene-m
B19	ACETILE	ppb	10	8	8 ***	.	Acetonitrile
C70	CYAMIDE	ppb	10	1	1 ***	.	Cyanide
C71	FORMALN	ppb	500	8	8 ***	.	Formalin
C80	AMMONIU	ppb	50	15	15 ***	.	Ammonium ion
H05	ETHOXID	ppb	10	8	8 ***	.	Ethylene oxide
H06	ETHMETH	ppb	10	8	8 ***	.	Ethyl methacrylate
H15	2,4,5-T	ppb	2	18	18 ***	.	2,4,5-T
H82	LHYDRAZ	ppb	30	15	15 ***	.	Hydrazine, low DL
H88	HEXONE	ppb	10	15	15 ***	.	Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	15	12	.	Acetone by VOA
I28	TAF	ppb	10	15	15 ***	.	Tetrahydrofuran

TABLE 12.4. (contd)

----- Constituent List=WAC 173-303-9905 Constituents -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
I33 ETHBENZ	ppb	5	8	8 ***	880 EPAP	Ethylbenzene
I34 STYRENE	ppb	5	8	8 ***	140 EPAP	Styrene
I42 BDCM	ppb	5	8	8 ***	100 EPA	Bromodichloromethane
I43 CDBM	ppb	5	8	8 ***	100 EPA	Chlorodibromomethane
J69 ZHEXANO	ppb	50	8	8 ***	.	2-Hexanone
L45 ALLYLCL	ppb	100	8	8 ***	.	Allyl chloride
L46 CLETHAN	ppb	10	8	8 ***	.	Chloroethane
L48 PROPCN	ppb	5	8	8 ***	.	Propionitrile
L48 VINYLAC	ppb	5	8	8 ***	.	Vinyl acetate
L83 14DBEN	ppb	5	15	15 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]

*** - Indicates all samples were reported as below contractual detection limits

xxx - Indicates that Drinking Water standards were exceeded

EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936

EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx

WOOE - based on additional Secondary Maximum Contaminant Levels in WAC 246-54, Public Water Supplies

TABLE 12.5. Constituents with at Least One Detected Value for the 216-B-3 Pond for May through August 1989

Quadruplicate Contamination Indicator Parameters								
Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho /700w	PH-LAB 0.01/8.5w	PHFIELD 0.1/8.5w	TDC ppb 2000/.	TOXLDL ppb 10/.
2-E18-1	26MAY89	1	550	503	8.00	7.89	#500	#4
		2	549	474	8.00	7.89	#500	#3
		3	549	484	8.00	7.89	#300	#3
		3	549	498	8.00	7.89	#600	#3
2-E18-1	08AUG89	1	564	533	8.00	7.88	#300	#3
		2	567	532	8.00	7.89	#400	#4
		3	568	534	8.00	7.88	#300	#4
		3	567	535	8.00	7.88	#300	#2
2-E32-4	18JUN89	1	410	428	8.00	7.38	#500	#4
		2	410	.	.	7.37	#200	#3
		3	409	.	.	7.38	#300	#2
		3	409	.	.	7.38	#300	#3
2-E32-4	19JUL89	1	348	433	7.90	7.90	#400	#7
		2	347	434	7.90	7.90	#300	#3
		3	345	435	7.90	7.89	#300	#2
		3	345	435	7.90	7.89	#300	#5
2-E32-4	10AUG89	1	426	.	.	7.86	.	.
		2	427	.	.	7.85	.	.
		3	428	.	.	7.86	.	.
		3	427	.	.	7.85	.	.
6-42-40A	31MAY89	1	185	172	8.10	8.12	#1,200	15
		2	186	.	.	8.19	#1,200	14
		3	186	.	.	8.21	#1,100	11
		3	185	.	.	8.20	#1,200	#7
6-42-40A	10AUG89	1	140	145	8.00	8.16	#1,100	#4
		2	137	.	.	8.17	#1,100	#4
		3	139	.	.	8.17	#1,100	#8
		3	139	.	.	8.17	#1,100	#5
6-42-42B	18JUN89	1	237	247	8.20	7.50	#300	#4
		2	238	.	.	7.51	#400	#4
		3	238	.	.	7.50	#300	#5
		3	238	.	.	7.51	#300	#2
6-42-42B	09AUG89	1	173	248	8.10	8.14	#500	84
		2	172	.	.	8.14	#500	82 (b)
		3	173	.	.	8.14	#400	72 (b)
		3	172	.	.	8.14	#400	68 (b)

TABLE 12.5. (contd)

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho . /700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
6-43-42J	16JUN89		228	233	8.20	7.97	#500	#2
		1	228	.	.	7.95	#500	#2
		2	228	.	.	7.94	#600	#0
		3	228	.	.	7.94	#600	#1
6-43-42J	09AUG89		154	220	8.20	8.28	#600	#5
		1	154	.	.	8.24	#600	#3
		2	154	.	.	8.23	#700	#7
		3	153	.	.	8.23	#600	#8
6-43-43	16JUN89		193	213	8.20	7.70	#600	#2
		1	193	.	.	7.71	#500	#2
		2	193	.	.	7.74	#800	#0
		3	193	.	.	7.74	#500	#1
6-43-43	09AUG89		238	214	8.20	8.95	#700	10
		1	236	.	.	8.95	#800	#6
		2	235	.	.	7.00	#700	13
		3	235	.	.	8.95	#700	#8
6-44-42	16JUN89		188	217	8.20	7.82	#800	#2
		1	189	.	.	7.73	#600	#4
		2	188	.	.	7.89	#800	#2
		3	188	.	.	7.84	#800	23
6-44-42	08AUG89		228	231	7.40	8.12	#800	#2
		1	224	.	.	8.11	#800	#4
		2	223	.	.	8.11	#800	#2
		3	222	.	.	8.11	#700	#3

TABLE 12.5. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALKALIN ppb 20000/.	ALPHAHI pCi/L 4/16	ALUMNUM ppb 150/.	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 6/1000	FBARIUM ppb 6/1000
2-E18-1	26MAY89		<10.0	102,000	5.5300	<150	<5	<5	28	25
	08AUG89		<10.0	108,000	5.5300	<150	<5	<5	25	34
2-E32-4	16JUN89		.	.	4.8200	278	<5	<5	74	70
	19JUL89		<10.0	.	7.9300	<150	<5	<5	73	69
8-42-40A	31MAY89		<10.0	.	*-0.1160	<150	<5	<5	<8	<8
	10AUG89		13.3 ^(a)	.	2.9800	<150	<5	<5	<8	12
8-42-42B	16JUN89		<10.0	.	2.1800	<150	8	7	27	28
	16JUN89	1	<10.0	.	*1.1900	<150	7	7	26	23
	09AUG89		<10.0	.	2.3700	<150	8	8	21	33
8-43-42J	15JUN89		<10.0	.	1.8200	<150	10	10	11	13
	09AUG89		18.0 ^(a)	.	1.0300	<150	8	7	11	17
	09AUG89	1	12.0 ^(a)	.	1.9100	<150	8	8	11	14
8-43-43	15JUN89		<10.0	.	*-0.0419	<150	8	8	9	13
	09AUG89		<10.0	.	*0.5330	<150	7	9	12	18
8-44-42	15JUN89		<10.0	.	*0.7910	<150	14	13	13	12
	08AUG89		<10.0	.	1.3800	<150	11	8	12	17

Well name	Collection Date	Duplicate sample number	BETA pCi/L 8/50	BORON ppb 10/.	FBORON ppb 10/.	CADMIUM ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s
2-E18-1	26MAY89		6.58	37	34	<2	60,400	68,000	7,100
	08AUG89		7.48	38	42	<2	69,500	67,000	8,000
2-E32-4	16JUN89		9.12	59	45	<2	40,000	40,700	9,100
	19JUL89		10.00	61	62	<2	43,000	44,200	9,220
8-42-40A	31MAY89		2.72	28	10	<2	20,700	20,800	3,100
	10AUG89		12.70	10	19	3	20,500	16,900	4,000
8-42-42B	16JUN89		7.32	17	18	<2	21,800	21,200	3,900
	16JUN89	1	7.29	28	13	<2	19,800	20,200	3,800
	09AUG89		10.80	13	28	2	22,800	19,500	3,800
8-43-42J	15JUN89		7.18	17	16	<2	26,100	26,300	3,500
	09AUG89		5.85	13	16	<2	25,000	23,000	3,400
	09AUG89	1	6.57	14	14	<2	25,600	22,000	3,400
8-43-43	15JUN89		4.08	<10	<10	<2	24,900	25,600	3,200
	09AUG89		11.90	<10	16	<2	28,400	24,600	3,200
8-44-42	15JUN89		6.07	11	17	<2	20,500	21,000	3,300
	08AUG89		5.94	11	16	<2	22,000	19,900	3,100

TABLE 12.5. (contd)

Well name	Collection Date	Duplicate sample number	CHROMIUM ppb 10/50	CO-60 pCi/L 22.5/100r	CS-137 pCi/L 20/200r	FLUORIDE ppb 500/4000	IRON ppb 30/300*	FIRON ppb 30/.*	LEAD ppb 5/50
2-E18-1	28MAY89		20	.	.	500	548	<30	<5
	08AUG89		100	.	.	800	531	<30	<5
2-E32-4	16JUN89		59	.	.	800	899	<30	<5
	19JUL89		48	*0.378	*1.77	580	368	32	8
6-42-40A	31MAY89		<10	.	.	<500	124	48	<5
	10AUG89		<10	.	.	500	521	44	<5
6-42-42B	16JUN89		13	.	.	800	229	<30	<5
	16JUN89	1	18	.	.	800	237	<30	<5
	09AUG89		81	.	.	<500	201	<30	<5
6-43-42J	15JUN89		51	.	.	<500	189	<30	<5
	09AUG89		208	.	.	<500	786	<30	<5
	09AUG89	1	118	.	.	<500	438	<30	<5
6-43-43	15JUN89		<10	.	.	<500	58	<30	<5
	09AUG89		22	.	.	<500	73	<30	<5
6-44-42	15JUN89		<10	.	.	<500	71	<30	<5
	08AUG89		27	.	.	<500	127	<30	<5

Well name	Collection Date	Duplicate sample number	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50*	MANGESE ppb 5/50*	NICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.
2-E18-1	28MAY89		14,800	15,100	<5	12	18	12,000	5,810	5,780
	08AUG89		13,700	16,200	<5	12	44	12,500	6,210	5,340
2-E32-4	16JUN89		12,800	12,800	<5	13	34	29,000	6,030	5,970
	19JUL89		13,000	12,800	<5	7	25	29,800	5,990	5,130
6-42-40A	31MAY89		5,370	5,190	5	8	<10	700	2,380	2,440
	10AUG89		4,010	4,950	8	9	<10	8,500	3,070	2,400
6-42-42B	16JUN89		7,190	7,750	<5	5	<10	8,200	4,140	3,710
	16JUN89	1	6,910	6,940	<5	8	11	8,400	3,880	3,590
	09AUG89		6,570	7,890	<5	<5	35	8,500	4,120	3,420
6-43-42J	15JUN89		6,300	6,800	5	7	34	1,800	5,490	5,350
	09AUG89		6,830	8,070	<5	18	98	1,400	5,290	4,990
	09AUG89	1	5,330	6,280	5	12	57	1,400	5,810	4,580
6-43-43	15JUN89		5,030	5,980	5	8	<10	1,100	5,830	5,880
	09AUG89		5,620	6,070	<5	<5	<10	1,100	5,810	5,250
6-44-42	15JUN89		5,890	5,810	<5	<5	<10	1,300	4,780	4,790
	08AUG89		5,260	5,750	<5	<5	15	1,500	4,810	4,550

TABLE 12.5. (contd)

Well name	Collection Date	Duplicate sample number	RAOIJUM pCi/L 1/6	RU-106 pCi/L 172.5/30r	FSELENI ppb 5/10	SELENIUM ppb 5/10	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.
2-E18-1	28MAY89		0.47100	.	7	6	16,400	16,000	27,800	28,600
	08AUG89		0.31200	.	7	7	17,300	14,900	26,100	30,500
2-E32-4	18JUN89		*0.07090	.	<5	<5	16,200	16,700	26,300	26,000
	19JUL89		0.41200	*-32.5	<5	<5	16,200	17,000	26,900	24,700
6-42-40A	31MAY89		*0.02290	.	<5	<5	4,420	4,690	4,390	4,260
	10AUG89		*0.04060	.	<5	<5	6,850	6,750	3,980	5,010
6-42-42B	16JUN89		*-0.00581	.	<5	<5	19,100	17,800	18,800	21,800
	16JUN89	1	0.14600	.	<5	<5	17,200	17,200	19,200	19,100
	09AUG89		0.31100	.	<5	<5	20,000	16,800	17,600	21,500
6-43-42J	16JUN89		0.19700	.	<5	<5	16,800	16,100	18,400	16,500
	09AUG89		0.36800	.	<5	<5	17,000	16,600	14,000	15,100
	09AUG89	1	*0.14800	.	<5	<5	17,000	16,000	12,700	15,900
6-43-43	16JUN89		*0.03910	.	<5	<5	12,900	13,400	8,180	7,740
	09AUG89		*-0.01940	.	<5	<5	14,500	11,400	7,440	8,330
6-44-42	16JUN89		0.67900	.	<5	<5	16,800	16,200	16,200	16,900
	08AUG89		*0.08310	.	<5	<5	17,600	16,700	14,200	15,200

Well name	Collection Date	Duplicate sample number	SR-90 pCi/L 5/8	FSTRONT ppb 10/.	STRONTIUM ppb 10/.	SULFATE ppb 500/250000m	TC ppb 1000/.	TC-99 pCi/L 15/900r	TRITIUM pCi/L 500/20000
2-E18-1	28MAY89		.	269	257	161,000	.	.	.
	08AUG89		.	283	231	163,000	24,200	.	*-1
2-E32-4	28MAY89		.	.	.	.	.	.	*-94
	18JUN89		.	216	220	68,300	28,000	.	24,700
	19JUL89		*-0.17	217	228	70,300	.	*6.22	41,700
6-42-40A	31MAY89		.	98	102	13,700	18,100	.	*-94
	10AUG89		.	99	78	19,100	15,300	.	*24
6-42-42B	16JUN89		.	159	161	18,900	23,200	.	73,700
	16JUN89	1	.	142	145	18,800	23,200	.	73,200
	09AUG89		.	163	130	19,000	24,200	.	79,500
6-43-42J	16JUN89		.	127	124	13,900	26,000	.	1,790
	09AUG89		.	121	107	12,800	23,600	.	1,080
	09AUG89	1	.	123	98	12,800	23,600	.	1,160
6-43-43	16JUN89		.	119	126	12,100	23,100	.	283
	09AUG89		.	126	109	10,600	23,600	.	287
6-44-42	16JUN89		.	116	121	16,700	22,800	.	346
	08AUG89		.	123	108	12,700	22,900	.	437

TABLE 12.5. (contd)

Well name	Collection Date	Duplicate sample number	TURBID ntu 0.1/1	U pCi/L 0.6/800d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/6000s	FZINC ppb 5/6000s
2-E18-1	28MAY89	1	19.6	.	14	8	30	12
	28MAY89		19.2	.	.	.	.	.
	08AUG89		3.0	.	14	12	22	19
2-E32-4	18JUN89	1	4.0	.	13	17	12	<5
	19JUL89		.	9.32	18	17	<5	<5
	31MAY89		0.4	.	9	<5	<5	<5
6-42-40A	10AUG89	1	3.2	.	12	10	10	<5
6-42-42B	16JUN89		1.3	.	33	29	14	13
	16JUN89		.	.	38	29	15	12
	09AUG89	1	1.0	.	33	35	13	13
6-43-42J	15JUN89		1.0	.	62	60	<5	<5
	09AUG89		0.8	.	61	68	<5	<5
	09AUG89	1	.	.	64	63	<5	<5
6-43-43	15JUN89		0.3	.	36	28	<5	<5
	09AUG89		0.4	.	40	30	<5	<5
6-44-42	15JUN89	1	0.3	.	53	50	<5	<5
	08AUG89		0.6	.	51	46	<5	16

The column headers consist of : Constituent Name

Analysis Units

Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-78-003

p - based on proposed Maximum Contaminant Level Goals in 60 FR 46936

s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

d - based on Derived Concentration Guides in draft DOE Order 5400.xx

u - based on additional Secondary Maximum Contaminant Levels in WAC 246-54, Public Water Supplies

Data flags

< - Less than Contractual Detection Limit, reported as Limit

- - Less than Contractual Detection Limit, measured value reported

* - For radioactive constituents, reported value is less than 2-sigma error

(a) Suspect data. The reagent blank for this group showed contamination by this constituent.

(b) Suspect data. Samples were mistakenly diluted before analysis.

13.0 2101-M POND

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Ground water near the 2101-M Pond has been monitored by a RCRA interim-status well network since August 1988. This project has completed the first year of background sampling, the analytical data for the first year have been compiled, background values for the ground-water indicator parameters have been established, and a fifth sample set has been collected. A closure plan has been prepared for this site by Westinghouse Hanford Company and sent to the Washington State Department of Ecology in September 1989. The hydrologic characterization report for the site is being written.

The 2101-M Pond is located west-southwest of the 2101-M Building in the southwestern portion of the 200-East Area (Figure 13.1). The pond has received waste water from the 2101-M Building heating and air conditioning system from 1953 to the present. In 1981, laboratory sinks were plumbed into the discharge line from the 2101-M Building to the pond. From 1981 until mid-1985, these laboratories may have discharged dangerous wastes into the pond.

There are four wells in the 2101-M Pond monitoring network (see Figure 13.1). Well 299-E18-1 is the upgradient well, and wells 299-E18-2, 299-E18-3, and 299-E18-4 are the downgradient wells. Well 299-E18-1 is used also as an upgradient well for the 216-B-3 Pond (see Section 12.0). Table 13.1 shows the sampling schedule for the wells in the monitoring network.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No further drilling activities are planned for this site.

WATER LEVELS

In addition to quarterly ground-water sampling, water levels are measured periodically in the four monitoring wells. Table 13.2 provides the water-level data to date.

Samples were collected from each of the four monitoring wells between August 8 and 11, 1989. All samples were collected after approximately three borehole volumes of water had been purged from the well using dedicated HydroStar^(a) sampling pumps.

The analytical data from the wells are summarized in Table 13.3. Data for constituents that had at least one value reported above the detection limit are presented in Table 13.4. Ground-water chemistry is discussed below.

WATER CHEMISTRY DATA

A fifth set of samples has been taken, providing five continuous quarters of samples collected from the 2101-M Pond monitoring network. Iron, chromium, and turbidity were at levels above standards in at least three of the four wells in the last sampling period. Iron was above the 40 CFR 143 standard in the unfiltered samples from wells 299-E18-1, 299-E18-3, and 299-E18-4. Chromium was above the 40 CFR 141 standard in the unfiltered samples from wells 299-E18-1, 299-E18-3, and 299-E18-4. Monitoring for turbidity is required only for surface water, but was measured in this case as an indicator of particulate content because of the elevated concentrations of iron and chromium found in the unfiltered samples.

Background data for contamination indicator parameters consist of quadruplicate measurements for field conductivity and pH, total organic carbon, and total organic halogen for the five quarters sampled. Laboratory conductivity and pH are also collected in quadruplicate for additional information but are not used in the statistical analysis. Statistical analyses required by 40 CFR 265.93(b) were performed on the samples obtained during the first four quarters, and the results are presented in Table 13.5. This table lists the average background standard deviation and critical mean for the four contamination indicator parameters from the upgradient well. The critical mean is the value to which future averages of quadruplicate measurements are compared. If a parameter average is greater than (and less than, in the case

(a) HydroStar is a tradename of Instrumentation Northwest, Inc., Redmond, Washington.

of pH) its critical mean, that parameter is considered statistically different from background. Some of these critical mean values, especially pH, are outside the range that would be reasonably expected or possible. The results from the August sample analyses are the first to be statistically compared to the established background values as required by 40 CFR 265.93(b). The replicate average, standard deviation, and coefficient of variation for the August contamination indicator parameters are provided in Table 13.6 and can be compared to the critical mean values given in Table 13.5. Although the critical means for the field pH and conductivity measurements are unrealistic, they are currently being used as the indicator parameters for the ground water because these parameters are known to change in the time it takes for the samples to arrive at and be analyzed by the analytical laboratory. No ground-water indicator parameters were statistically different from background.

FIGURE 13.1. Monitoring Well Locations for the 2101-M Pond

TABLE 13.1. Sampling Schedule for the 2101-M Pond

Well	1988 ^(a)			1989								
	Oct	Nov ^(b)	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E18-1		LRV			X			X			X	
299-E18-2		L			XRV			X			X	
299-E18-3		L			X			XRV			X	
299-E18-4		L			X			X			X	

(a) The following abbreviations are used in this table:

L = Sampled for the long list of constituents (WAC 173-303-9905).

R = Quality control replicates were collected.

V = Volatile organic analyses blanks were collected.

X = Sampled for the regular list of constituents (see Table 13.3).

(b) All wells were sampled twice this month; once for L, once for volatile organic constituents.

TABLE 13.2. Water-Level Elevation Data for Wells Near the 2101-M Pond(a)

Well	Casing Elevation, ft above MSL(b)	Correction Factor(c)	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E18-1	720.24	+0.06	10/06/88	314.29	406.01
			10/14/88	314.24	406.06
			10/26/88	314.32	405.98
			11/14/88	314.49	405.81
			12/08/88	314.21	406.09
			02/09/89	314.47	405.83
			02/21/89	314.56	405.74
			04/24/89	314.70	405.60
			07/13/89	315.10	405.20
299-E18-2	721.21	+0.22	10/06/88	315.52	405.91
			10/14/88	315.52	405.91
			10/26/88	315.55	405.88
			11/14/88(d)	315.69	405.74
			12/08/88	315.47	405.96
			02/09/89	315.75	405.68
			02/21/89	315.84	405.59
			04/24/89	316.01	405.42
			07/13/89	316.37	405.06
299-E18-3	722.04	+0.03	10/06/88	--(e)	--(e)
			10/14/88	316.13	405.94
			10/26/88	316.10	405.97
			11/14/88	316.21	405.86
			12/08/88(d)	316.02	406.05
			02/09/89(d)	316.31	405.76
			02/21/89	316.39	405.68
			04/24/89	316.58	405.49
			07/13/89	316.91	405.16
299-E18-4	721.57	+0.0	10/06/88	315.59	405.98
			10/14/88	315.66	405.91
			10/26/88	315.62	405.95
			11/14/88	315.74	405.83
			12/08/88	315.53	406.04
			02/09/89	315.81	405.76
			02/21/89	315.91	405.66
			04/24/89	316.08	405.49
			07/13/89	316.43	405.14

(a) Measurements collected at times other than during sampling. All measurements were taken with the same steel tape and within a short time. Measurements are taken until two are within 0.02 ft.

(b) MSL = mean sea level.

(c) Correction factors are based on inclinometer measurements that determined a minimum value from the vertical for the boreholes. This correction factor was added to the elevation of the borehole to provide the corrected water-level elevations given in the last column.

(d) Measured only once.

(e) Unable to measure.

TABLE 13.3. Constituent List and Summary of Sampling Results for the 2101-M Pond for August 1989

----- Constituent List=Contamination Indicator Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
088 CONDLAB	umho	.	18	0	700 WDOE	Specific conductance, laboratory	
191 CONDFLD	umho	1	18	0	700 WDOE	Specific conductance, field	
199 PHFIELD		0.1	18	0	8.5 EPAS	pH, field	
207 PH-LAB		0.01	18	0	8.5 EPAS	pH, laboratory	
C69 TOC	ppb	2000	18	0	.	Total organic carbon	
H42 TOXLDL	ppb	10	18	0	.	Total organic halogens, low DL	

----- Constituent List=Interim Primary Drinking Water Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
109 COLIFRM	MPN	2.2	3	3 ***	1 EPA	Coliform bacteria	
111 BETA	pCi/L	8	5	0	50 EPA	Gross beta	
112 ALPHAHI	pCi/L	4	5	0	15 EPA	Gross alpha, high DL	
181 RADIUM	pCi/L	1	5	0	5 EPA	Radium, total	
A06 BARIUM	ppb	8	5	0	1000 EPA	Barium	
A07 CADMIUM	ppb	2	5	5 ***	10 EPA	Cadmium	
A08 CHROMIUM	ppb	10	5	0	60 EPA	Chromium	xxx
A10 SILVER	ppb	10	5	5 ***	60 EPA	Silver	
A20 ARSENIC	ppb	5	5	1	60 EPA	Arsenic	
A21 MERCURY	ppb	0.1	5	5 ***	2 EPA	Mercury	
A22 SELENIUM	ppb	5	5	4	10 EPA	Selenium	
A33 ENDRIIN	ppb	0.1	4	4 ***	0.2 EPA	Endrin	
A34 METHLOR	ppb	3	4	4 ***	100 EPA	Methoxychlor	
A35 TOXAENE	ppb	1	4	4 ***	5 EPA	Toxaphene	
A36 a-BHC	ppb	0.1	4	4 ***	4 EPA	Lindane, alpha-BHC	
A37 b-BHC	ppb	0.1	4	4 ***	4 EPA	Lindane, beta-BHC	
A38 g-BHC	ppb	0.1	4	4 ***	4 EPA	Lindane, gamma-BHC	
A39 d-BHC	ppb	0.1	4	4 ***	4 EPA	Lindane, delta-BHC	
A61 LEADGF	ppb	5	5	5 ***	50 EPA	Lead (graphite furnace)	
C72 NITRATE	ppb	500	5	2	45000 EPA	Nitrate	
C74 FLUORID	ppb	500	5	3	4000 EPA	Fluoride	
H13 2,4-D	ppb	2	4	4 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]	
H14 2,4,5TP	ppb	2	4	4 ***	10 EPA	2,4,5-TP silvex	
H20 FBARIUM	ppb	8	5	0	1000 EPA	Barium, filtered	
H21 FCADMIU	ppb	2	5	5 ***	10 EPA	Cadmium, filtered	
H22 FCHROMI	ppb	10	5	5 ***	60 EPA	Chromium, filtered	
H23 FSILVER	ppb	10	5	5 ***	60 EPA	Silver, filtered	
H37 FARSENI	ppb	5	5	1	60 EPA	Arsenic, filtered	
H38 FMERCUR	ppb	0.1	5	5 ***	2 EPA	Mercury, filtered	
H39 FSELENI	ppb	5	5	4	10 EPA	Selenium, filtered	
H41 FLEAD	ppb	5	5	5 ***	50 EPA	Lead, filtered	
H80 TURBID	ntu	0.1	4	0	1 EPA	Turbidity, nephelometric	xxx
P19 COLIMF	100mL	1	1	0	1 EPA	Coliform (Membrane Filter)	

TABLE 13.3. (contd)

----- Constituent List=Water Quality Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded		Full name
A11 SODIUM	ppb	200	5	0	.		Sodium
A17 MANGESE	ppb	5	5	1	50 EPAS		Manganese
A19 IRON	ppb	30	5	0	300 EPAS	xxx	Iron
C73 SULFATE	ppb	500	5	0	250000 EPAS		Sulfate
C75 CHLORID	ppb	500	5	0	250000 EPAS		Chloride
H24 FSODIUM	ppb	200	5	0	.		Sodium, filtered
H29 FMANGAN	ppb	5	5	4	50 EPAS		Manganese, filtered
H31 FIRON	ppb	30	5	3	. EPAS		Iron, filtered
H57 LPHENOL	ppb	10	4	4 ***	.		Phenol, low DL

----- Constituent List=Site Specific and Other Constituents -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded		Full name
108 TRITIUM	pCi/L	500	4	0	20000 EPA		Tritium (H-3)
A01 BERYLUM	ppb	5	5	5 ***	.		Beryllium
A03 STRONUM	ppb	10	5	0	.		Strontium
A04 ZINC	ppb	5	5	0	5000 EPAS		Zinc
A05 CALCIUM	ppb	50	5	0	.		Calcium
A12 NICKEL	ppb	10	5	0	.		Nickel
A13 COPPER	ppb	10	5	5 ***	1300 EPAP		Copper
A14 VANADUM	ppb	5	5	0	.		Vanadium
A15 ANTIONY	ppb	100	5	5 ***	.		Antimony
A18 ALUMNUM	ppb	150	5	5 ***	.		Aluminum
A18 POTASUM	ppb	100	5	0	.		Potassium
A50 MAGNES	ppb	50	5	0	.		Magnesium
C78 PHOSPHA	ppb	1000	5	5 ***	.		Phosphate
H18 TC	ppb	1000	1	0	.		Total carbon
H18 FZINC	ppb	5	5	0	5000 EPAS		Zinc, filtered
H19 FCALCIU	ppb	50	5	0	.		Calcium, filtered
H25 FNICKEL	ppb	10	5	4	.		Nickel, filtered
H26 FCOPPER	ppb	10	5	4	1300 EPAP		Copper, filtered
H27 FVANADI	ppb	5	5	0	.		Vanadium, filtered
H28 FALUMIN	ppb	150	5	5 ***	.		Aluminum, filtered
H30 FPOTASS	ppb	100	5	0	.		Potassium, filtered
H32 FMAGNES	ppb	50	5	0	.		Magnesium, filtered
H33 FBERYLL	ppb	5	5	4	.		Beryllium, filtered
H35 FSTRONT	ppb	10	5	0	.		Strontium, filtered
H36 FANTIMO	ppb	100	5	5 ***	.		Antimony, filtered
H58 ALKALIN	ppb	20000	4	0	.		Total alkalinity, as CaCO3 (Method B)
H66 BROMIDE	ppb	1000	5	5 ***	.		Bromide
H67 NITRITE	ppb	1000	5	5 ***	.		Nitrite
H86 FBORON	ppb	10	5	0	.		Boron, filtered
H87 FCOBALT	ppb	20	5	5 ***	.		Cobalt, filtered
H88 FLITHIU	ppb	10	5	5 ***	.		Lithium, filtered

TABLE 13.3. (contd)

----- Constituent List=Site Specific and Other Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H89 FMOLY	ppb	40	5	5 ***	.	Molybdenum, filtered
H90 FSILICO	ppb	50	5	0	.	Silicon, filtered
H91 FTIN	ppb	30	5	5 ***	.	Tin, filtered
H92 FTITAN	ppb	60	5	5 ***	.	Titanium, filtered
H93 FZIRCON	ppb	50	5	5 ***	.	Zirconium, filtered
P01 BORON	ppb	10	5	0	.	Boron
P02 COBALT	ppb	20	5	5 ***	.	Cobalt
P03 LITHIUM	ppb	10	5	5 ***	.	Lithium
P04 MOLY	ppb	40	5	5 ***	.	Molybdenum
P05 SILICON	ppb	50	5	0	.	Silicon
P06 TIN	ppb	30	5	5 ***	.	Tin
P07 TITAN	ppb	60	5	5 ***	.	Titanium
P08 ZIRCON	ppb	50	5	5 ***	.	Zirconium

----- Constituent List=WAC 173-303-9905 Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A61 TETRANE	ppb	5	1	1 ***	5 EPA	Tetrachloromethane [Carbon Tetrachloride]
A62 BENZENE	ppb	5	1	1 ***	5 EPA	Benzene
A64 METHONE	ppb	10	1	1 ***	.	Methyl ethyl ketone
A66 TOLUENE	ppb	5	1	1 ***	2000 EPAP	Toluene
A67 1,1,1-T	ppb	5	1	1 ***	200 EPA	1,1,1-Trichloroethane
A68 1,1,2-T	ppb	5	1	1 ***	.	1,1,2-Trichloroethane
A69 TRICENE	ppb	5	1	1 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethene]
A70 PERCENE	ppb	5	1	1 ***	.	Perchloroethylene [Tetrachloroethene]
A71 OPXYLE	ppb	5	1	1 ***	440 EPAP	Xylene-o,p
A80 CHLFORM	ppb	5	1	1 ***	100 EPA	Chloroform [Trichloromethane]
A89 1,1-DIC	ppb	5	1	1 ***	.	1,1-Dichloroethane
A90 1,2-DIC	ppb	5	1	1 ***	5 EPA	1,2-Dichloroethane
A91 TRANDC	ppb	5	1	1 ***	70 EPAP	trans-1,2-Dichloroethene
A93 METHYCH	ppb	5	1	1 ***	.	Methylene chloride [Dichloromethane]
B13 VINYLIDE	ppb	10	1	1 ***	2 EPA	Vinyl chloride
B14 M-XYLE	ppb	5	1	1 ***	440 EPAP	Xylene-m
C80 AMMONIU	ppb	50	1	1 ***	.	Ammonium ion
H15 2,4,5-T	ppb	2	4	4 ***	.	2,4,5-T
H62 LHYDRAZ	ppb	30	1	1 ***	.	Hydrazine, low DL
H68 HEXONE	ppb	10	1	1 ***	.	Hexone [Methyl isobutyl ketone]
I01 ACETONE	ppb	10	1	1 ***	.	Acetone by VOA
I26 TAF	ppb	10	1	1 ***	.	Tetrahydrofuran
L63 14DBEN	ppb	5	1	1 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]

*** - Indicates all samples were reported as below contractual detection limits

xxx - Indicates that Drinking Water standards were exceeded

EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

EPAP - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936

EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx

MDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

TABLE 13.4. Constituents with at Least One Detected Value for the 2101-M Pond for August 1989

Quadruplicate Contamination Indicator Parameters								
Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho . /700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
2-E18-1	08AUG89	1	564	533	8.00	7.89	#300	#3
		2	567	532	8.00	7.89	#400	#4
		3	568	534	8.00	7.88	#300	#4
		4	567	535	8.00	7.88	#300	#2
2-E18-2	11AUG89	1	288	285	7.90	8.01	#300	#5
		2	285	284	8.00	8.00	#700	13
		3	285	288	8.00	8.00	#500	12
		4	288	288	8.00	8.00	#800	13
2-E18-3	08AUG89	1	156	232	8.10	8.20	#500	#8
		2	156	233	8.10	8.20	#600	#7
		3	156	232	8.10	8.20	#700	#3
		4	157	234	8.20	8.20	#600	#8
2-E18-4	08AUG89	1	171	253	8.00	8.09	#500	#6
		2	171	254	8.10	8.08	#400	10
		3	171	254	8.00	8.08	#500	#5
		4	171	251	8.10	8.09	#400	14

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ALKALIN ppb 20000/.	ALPHAHI pCi/L 4/16	ARSENIC ppb 6/50	FARSENI ppb 5/50	BARIUM ppb 6/1000	FBARIUM ppb 8/1000	FBERYLL ppb 5/.	BETA pCi/L 8/50
2-E18-1	08AUG89		108,000	5.530	<5	<5	25	34	<5	7.48
2-E18-2	11AUG89		90,000	2.200	6	6	58	73	<5	9.44
2-E18-3	08AUG89		98,000	*0.848	11	11	54	61	<5	10.60
2-E18-4	08AUG89		105,000	1.880	10	10	59	64	5	3.37
	08AUG89	1	.	3.490	10	9	57	65	<5	6.64

Well name	Collection Date	Duplicate sample number	BORON ppb 10/.	FBORON ppb 10/.	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 600/250000s	CHROMUM ppb 10/50	COLIMF 100mL 1/1
2-E18-1	08AUG89		38	42	69,500	57,000	6,000	100	.
2-E18-2	11AUG89		19	29	32,300	27,100	7,000	18	1
2-E18-3	08AUG89		13	20	29,900	27,100	6,800	95	.
2-E18-4	08AUG89		15	14	35,000	32,300	7,000	65	.
	08AUG89	1	15	19	34,900	32,000	7,000	80 ^(a)	.

TABLE 13.4. (contd)

Well name	Collection Date	Duplicate sample number	FCOPPER ppb 10/1300p	FLUORID ppb 500/4000	IRON ppb 30/300s	FIRON ppb 30/.s	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s
2-E18-1	08AUG89		<10	600	531	<30	13,700	16,200	<5	12
2-E18-2	11AUG89		<10	700	158	<30	7,330	8,670	<5	<5
2-E18-3	08AUG89		<10	<500	574	<30	7,400	8,000	<5	12
2-E18-4	08AUG89		11	<500	412	31	8,580	9,060	<5	10
	08AUG89	1	<10	<500	465 (a)	32	8,470	8,970	5	12
Well name	Collection Date	Duplicate sample number	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	FSELENI ppb 5/10	SELENUM ppb 5/10
2-E18-1	08AUG89		44	<10	12,500	6,210	5,340	0.312	7	7
2-E18-2	11AUG89		18	<10	800	5,770	4,920	0.757	<5	<5
2-E18-3	08AUG89		49	<10	<500	5,100	5,020	0.239	<5	<5
2-E18-4	08AUG89		35	11	<500	5,570	5,850	0.378	<5	<5
	08AUG89	1	41	<10	570	5,480	5,460	*0.121	<5	<5
Well name	Collection Date	Duplicate sample number	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	FSTRONT ppb 10/.	STRONUM ppb 10/.	SULFATE ppb 500/250000s	TC ppb 1000/.
2-E18-1	08AUG89		17,300	14,900	26,100	30,500	283	231	153,000	24,200
2-E18-2	11AUG89		22,600	18,900	17,500	20,800	164	147	45,000	.
2-E18-3	08AUG89		19,300	17,500	5,640	5,800	158	141	13,900	.
2-E18-4	08AUG89		20,200	19,100	6,130	6,250	183	169	14,900	.
	08AUG89	1	20,300	18,800	5,900	6,180	161	165	14,800	.
Well name	Collection Date	Duplicate sample number	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/1	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s		
2-E18-1	08AUG89		*-1	3.0	14	12	22	19		
2-E18-2	11AUG89		*35	2.7	26	24	16	11		
2-E18-3	08AUG89		*-57	2.2	34	30	24	6		
2-E18-4	08AUG89		*-48	2.1	32	29	12	16		
	08AUG89	1	.	.	32	29	12	14		

The column headers consist of : Constituent Name

Analysis Units

Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 46938
- s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
- d - based on Derived Concentration Guides in draft DOE Order 5400.xx
- w - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- # - Less than Contractual Detection Limit, measured value reported
- * - For radioactive constituents, reported value is less than 2-sigma error
- (a) Value was different from a duplicate sample with the same identification.

TABLE 13.5. Critical Mean Values^(a) for the 2101-M Pond for August 1989

<u>Constituent Code, Name, Units (b)</u>	<u>n</u>	<u>df</u>	<u>tc</u>	<u>Average</u>	<u>Standard Deviation</u>	<u>Critical Mean</u>
Conductivity, field μmho/cm	4	3	11.984	528.4	39.1	1,052.9
pH, field	4	3	15.145	7.804	0.657	[3.316, 18.923]
Total Organic Carbon, ppb	4	3	11.984	387.6	156.2	2,480.5
Total Organic Halogens, ppb	4	3	11.984	3.59	0.99	16.8

(a) Background data collected between August 1988 and June 1989.

(b) The following abbreviations are used in this table:

df = Degrees of freedom (n-1).

n = Number of background replicate averages.

ppb = Parts per billion.

tc = Bonferroni critical t-value for appropriate df and 16 comparisons
(4 parameters * 4 wells).

μmho/cm = Micromho per centimeter

TABLE 13.6. Contamination Indicator Parameter Replicate Averages for the 2101-M Pond for August 1989

Constituent Code Name Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088 CONDLAB umho	2-E18-1	08AUG89	4	534	1.3	532	535	0.2
	2-E18-2	11AUG89	4	288	2.1	284	288	0.7
	2-E18-3	08AUG89	4	233	1.0	232	234	0.4
	2-E18-4	08AUG89	4	253	1.4	251	254	0.6
191 CONDFLD umho	2-E18-1	08AUG89	4	567	1.7	564	568	0.3
	2-E18-2	11AUG89	4	288	1.4	285	288	0.5
	2-E18-3	08AUG89	4	158	0.5	156	157	0.3
	2-E18-4	08AUG89	4	171	0.0	171	171	0.0
199 PHFIELD	2-E18-1	08AUG89	4	7.89	0.01	7.88	7.89	0.1
	2-E18-2	11AUG89	4	8.00	0.01	8.00	8.01	0.1
	2-E18-3	08AUG89	4	8.20	0.00	8.20	8.20	0.0
	2-E18-4	08AUG89	4	8.09	0.01	8.08	8.09	0.1
207 PH-LAB	2-E18-1	08AUG89	4	8.00	0.00	8.0	8.0	0.0
	2-E18-2	11AUG89	4	7.98	0.05	7.9	8.0	0.6
	2-E18-3	08AUG89	4	8.13	0.05	8.1	8.2	0.6
	2-E18-4	08AUG89	4	8.05	0.06	8.0	8.1	0.7
C69 TOC ppb	2-E18-1	08AUG89	4	325	50.1	300	400	15.4
	2-E18-2	11AUG89	4	575	222.0	300	800	38.6
	2-E18-3	08AUG89	4	600	81.6	500	700	13.6
	2-E18-4	08AUG89	4	450	57.7	400	500	12.8
H42 TOXLDL ppb	2-E18-1	08AUG89	4	3.25	0.98	2	4	29.5
	2-E18-2	11AUG89	4	10.80	3.88	5	13	35.9
	2-E18-3	08AUG89	4	6.50	2.38	3	8	36.6
	2-E18-4	08AUG89	4	8.75	4.11	5	14	47.0

14.0 GROUT TREATMENT FACILITY

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The ground water near the Grout Treatment Facility (GTF) has been monitored by a RCRA background well network since 1988. Indicator parameter evaluation began with the samples collected during June/July 1989. A Part B Permit Application was submitted to the Washington State Department of Ecology in November 1988 (DOE 1988b). The ground-water monitoring plan has been completed and is being prepared for publication.

The GTF will be used for the treatment and disposal of liquid mixed waste (DOE 1988b). The wastes will be mixed with a cementitious grout material and then poured into concrete-lined vaults where they will solidify. Field data collection in support of this project began in 1984. Treatment and disposal of a nondangerous mixture of phosphate/sulfate-rich wastes from the N Reactor began in August 1988 (DOE 1988b). The site is scheduled to begin processing mixed wastes in 1991.

There are currently five wells in the RCRA monitoring network for the GTF. Wells 299-E25-25 and 299-E25-32A are upgradient wells; wells 299-E25-29A, 299-E25-31, and 299-E25-33 are downgradient wells. Ground-water samples are also collected and analyzed from eight site characterization wells: 299-E25-18, 299-E25-20, 299-E25-22, 299-E25-24, 299-E25-26, 299-E25-27, 299-E25-28, and 299-E25-30A. These additional wells are sampled to monitor the effects of nearby waste disposal facilities and to monitor the base of the unconfined aquifer (well 299-E25-28). The locations of the wells in the monitoring network are shown in Figure 14.1. The sampling schedule for these wells is shown in Table 14.1.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Drilling

Drilling activities at the additional ground-water monitoring wells planned for installation in FY 1989 (299-E25-37 and 299-E25-38) were completed during the past quarter. The locations of these wells are shown in

Figure 14.1. Both of these wells were drilled to a depth approximately 15 ft below the static water table elevation using the cable-tool drilling method. Drilling, completion, and well development information for these wells is shown in Table 14.2 and is discussed below.

Well 299-E25-37. Drilling activities at well 299-E25-37 began on June 14 and were completed on July 13. Completion activities began on August 10 and were completed on September 18 except for installing the HydroStar pump and surveying the well location. A 10-slot, Channel-Pack, stainless steel screen was placed from 258.85 to 279.05 ft. The static depth-to-water is 264.55 ft (August 11, 1989). On September 18 the well was developed by pumping. A total of 698 gal were pumped, and the final turbidity was 1.4 NTU.

Well 299-E25-38. Drilling activities at well 299-E25-38 began on June 7 and were completed on July 6. Completion activities began on July 17 and were completed on September 18 except for installing the HydroStar pump and surveying the well location. A 10-slot, channel-pack, stainless steel screen was placed from 258.58 ft to 279.63 ft. The static depth-to-water is 264.95 (July 6, 1989). On September 18 the well was developed by pumping. A total of 1091 gal of water was pumped, and the final turbidity was 1.4 NTU.

Onsite monitoring was conducted using Giger-Muller (GM) radiation detection meters and organic vapor analyzers. No contamination was detected by these instruments.

No aquifer tests were performed for either well 299-E25-37 or 299-E25-38. However, water potential data were collected from well 299-E25-37 during development using a pressure transducer.

Hydrogeologic Characterization

Hydrogeologic characterization efforts included the collection and description of geologic samples during drilling, determinations of moisture content, sediment sieve analysis, collection of sediment samples for analysis of radionuclides and chemical contamination indicators, and geophysical logging.

Samples were collected for textural and lithologic description at a minimum of 5-ft intervals. Whenever possible, a core barrel was used to drill and collect the samples. If progress could no longer be made with the core barrel, then the hard tool bit was used and the samples were collected with a bailer. As-built diagrams and drill logs are shown in Appendix B.

Sieve analyses were conducted on samples within the screened interval at both of the wells. Moisture content analyses were conducted by PNL on representative samples collected by the core barrel.

Samples were also collected approximately every 20 ft (or at lithology changes or at areas of higher moisture content) from both wells for possible chemical/radiological analysis. A total of 30 samples were collected, 13 from well 299-E25-37 and 17 from well 299-E25-38.

Borehole geophysical logging was conducted inside the length of the 8-in. casing at well 299-E25-38, and through the length of the 8-in. and 10-in. casing at well 299-E25-37. The 10-in. casing was not logged at well 299-E25-38 because the equipment was not available. All logging was performed using the natural gamma probe. The geophysical logs for these wells are included in Appendix B, Volume 2.

WATER LEVELS

Water-level measurements were made both before sample collection and on a monthly basis. Table 14.3 lists the water-level data collected before sample collection. Measurements were made at each well that was sampled.

Monthly water-level measurements were also obtained from all of the GTF ground-water monitoring wells; these data were shown in Table 14.4.

WATER CHEMISTRY DATA

Sample Collection

Quarterly sampling is being conducted for indicator parameter evaluation. Sampling occurred at seven of the eight wells scheduled for July (the remaining wells for the third quarter FY 1989 sampling), and all 13 wells between August 29 and 31 (the fourth quarter FY 1989 sampling). The

third quarter sampling of well 299-E25-22 was delayed until August 18 because no lid was present on the purge water containment trough. All of the samples were collected after approximately three borehole volumes of water had been purged.

The third quarter (FY 1989) samples include the WAC 173-303-9905, Appendix IX, list analysis at wells 299-E25-29A and 299-E25-31. This analysis was performed to help determine the cause of the elevated total organic halogen (TOX) concentrations in these wells. However, because of an oversight in sample preparation, quadruplicates of the site-specific indicator parameters were not collected from wells 299-E25-29A and 299-E25-31. These wells were resampled for these parameters on August 17.

Discussion of Analytical Results

The analytical results in Tables 14.5 and 14.6 show elevated levels for some constituents.

- Chromium (unfiltered) in wells 299-E25-30A (July and August), 299-E25-32A (in one of four replicates in July), and 299-E25-33 (three of four replicates in July) exceeded the 50-ppb standard (40 CFR 265, Appendix III). No filtered chromium results were above this standard. It is not known the degree to which the observed chromium (unfiltered) concentrations are representative of the ground water or are due to other sources (natural borehole sediments or well construction materials).
- Lead (by graphite furnace) results (68 ppb) for well 299-E25-29A (July) were above the 50-ppb standard (40 CFR 265, Appendix III). This is the first time that this constituent has been detected. It will be closely monitored in the future.
- Nitrate in wells 299-E25-18 and 299-E25-20 for both samplings exceeds the 45,000-ppb standard listed in 40 CFR 265, Appendix III. These elevated values probably result from the disposal of liquids used in chemical processing activities in the 200-East Area. These wells are adjacent to an active waste disposal facility, the 216-A-37-1 Crib.
- Well 299-E25-20 also shows higher values than the other wells for several other constituents, which include specific conductance, barium, filtered barium, gross alpha, gross beta, calcium, filtered calcium, magnesium, filtered magnesium, potassium, filtered potassium, strontium, and filtered strontium.

- Tritium in well 299-E25-29A (85,700 pCi/L) was above the standard of 20,000 pCi/L in 40 CFR 141. This tritium value is also a result of 200-East Area process waste disposal (see above).
- RCRA monitoring wells 299-E25-29A, 299-E25-31, 299-E25-32A, and 299-E25-33 and site characterization well 288-E25-30A show the highest concentrations of iron (unfiltered). All of the above wells have historically shown relatively higher values than the rest of the wells. The source of these higher concentrations is unknown. It may be related to the source of the elevated chromium concentrations.
- Coliform bacteria in well 299-E25-29A was 2400 MPN (most probable number) for the July 14 sampling, greatly exceeding the 1-MPN standard in 40 CFR 265, Appendix III. This number appears anomalous, as this well has no history of detectable coliform values. Therefore, the well was resampled for coliform on August 17, and none were detected.
- Wells 299-E25-29A and 299-E25-31 again showed TOX concentrations above detection.

The TOX concentrations in well 299-E25-31 appear to show a general decrease with time. In the July 14 sampling of this well, 120 ppb of an "unknown chloride compound" was seen. This seems to correspond with the observed TOX concentrations (125, 122, 119, and 125 ppb). Another constituent, dimethoate, a phosphorous pesticide, may also influence TOX concentrations. This constituent was observed in analytical results from the July 1989 WAC 173-303-9905 analysis at wells 299-E25-29A (803 ppb) and 299-E25-31 (349 ppb). Dimethoate was also detected from the previous WAC 173-303-9905 analysis (April 1988) at well 299-E25-31 (20,600 ppb). Analyses for phosphorous pesticides have been added to the FY 1990 sampling schedule for these two wells.

Indicator Parameter Statistical Results

Statistical analysis results for the upgradient wells are shown in Table 14.8; background contamination indicator parameter data are from the previous four quarters (August 1988 to February 1989).

In Table 14.8, the critical mean of 400.0 ppb for TOX is not considered to be representative because it includes anomalous TOX data from well 299-E25-25 for October 1988 (see Figure 14.2). The critical mean of 24.7, which does not include the anomalous data, is considered to be more

representative of background. Several other wells sampled during October 1988 also showed anomalously high TOX values; this suggests that the cause may be some type of sample contamination problem. Selected samples from October 1988, including the sample from well 299-E25-25, were analyzed for volatile organic constituents (VOC) and for semi-volatile organic constituents in an attempt to determine the source of these elevated concentrations. However, the results of these analyses did not isolate the constituents that caused these anomalous values. Therefore, the cause of these elevated TOX values is still unknown.

The third and fourth quarter analytical results (Tables 14.5 and 14.6) for the downgradient wells were compared to the calculated critical means for the contamination indicator parameters (Table 14.7). The results from wells 299-E25-29A and 299-E25-31 are above the critical mean for TOX for both quarters.

The third quarter sampling for specific conductance for well 299-E25-29A for the July sampling was higher than the critical mean value (299.3 $\mu\text{mho/cm}$). Historical specific conductance data for this well show fluctuations both above and below this value. Thus, it was recommended that the well be resampled immediately for verification of specific conductance. This took place on September 11, 1989. Well 299-E25-33 was also resampled because it had shown specific conductance values above the critical mean for the fourth quarter FY 1989 sampling. The sampling at well 299-E25-29A and the fourth quarter sampling results verified that specific conductance concentrations at this well were not significantly above background. However, specific conductance concentrations at well 299-E25-33 were verified as significantly above background.

Therefore, these downgradient wells are showing statistically significant increases above the background concentrations for TOX and specific conductance. The GTF, however, is not yet disposing of dangerous wastes so these concentrations are probably not a result of facility operations. Thus, there are no immediate plans to begin assessment monitoring at the site,

although quarterly analytical data will continue to be closely monitored under indicator parameter evaluation. This decision was discussed in an October letter from DOE to Ecology.

Possible sources for the statistically significant TOX and specific conductance concentrations include 1) past waste-disposal practices within the present GTF boundary before the GTF was constructed, 2) water discharged to the ground during hydro-testing of the GTF vaults, 3) residual effects from drilling operations (well 299-E25-31 was installed using a rotary drilling method and an organic drilling fluid), and 4) contamination from adjacent liquid waste disposal facilities.

FIGURE 14.1. Ground-Water Monitoring Wells Near the Grout Treatment Facility

FIGURE 14.2. Plot of Total Organic Halogen Concentrations from July 1988 to August 1989 for the Five Monitoring Wells

TABLE 14.1. Sampling Schedule for the Grout Treatment Facility

Well	1988(a)			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E25-18	L1					X			X1		X1	
299-E25-20						X			X1		X1	
299-E25-22	L2					X					X1, X1	
299-E25-24						X			X1		X1	
299-E25-25	L3			X		X			X1		X1	
299-E25-26	L4					X				X1	X1	
299-E25-27	L4V					X				X1	X1	
299-E25-28	L4					X				X1	X1R	
299-E25-29A	L3			X		X				L	X1	
299-E25-30A	L4					XR				X1	X1	
299-E25-31	L3			X		X				L	X1	
299-E25-32A	L3			X		X				X1R	X1	
299-E25-33	L3			X		X				X1	X1	

(a) The following abbreviations are used in this table:

- L = sampled for the long list of constituents (WAC 173-303-9905) including quadruplicates of the site-specific parameters (arsenic, chromium, selenium, and technetium-99).
- L1 = List 1, samples collected for filtered/unfiltered arsenic, chromium, and selenium; and for technetium-99.
- L2 = List 2, samples collected for constituents in List 1 and total carbon, metals analyzed by the inductively coupled plasma method, ions, nitrite, ammonium, gamma scan, and tritium.
- L3 = List 3, samples collected for constituents in 40 CFR 265, site-specific parameters, and total carbon, metals analyzed by the inductively coupled plasma method, ions, nitrite, ammonium, gamma scan, and tritium.
- L4 = List 4, samples collected for constituents in List 1, indicator parameters, and total carbon, metals analyzed by the inductively coupled plasma method, ions, nitrite, ammonium, gamma scan, and tritium.
- R = quality control replicates were collected.
- V = volatile organic analyses blanks were collected.
- X = sampled for EPA primary drinking water standards (40 CFR 265, Appendix III), ground-water quality parameters (chloride, iron, manganese, phenols, sodium, and sulfate), and contamination indicator parameters (pH, specific conductance, total organic carbon, and total organic halogen).
- X1 = sampled for the constituents listed in X and quadruplicates of the site-specific parameters.

TABLE 14.2. Drilling, Completion, and Development Information for 1989 Grout Treatment Facility Wells

Well Number	Drilling Information			Completion Information			Development Information			Volume Pumped, gal	Final Turbidity, NTU ^(a)
	Start Date	End Date	Total Depth	Screened Interval	Screen Slot Size	Screen Type	Start Date	End Date	Pump Type		
299-E25-37	6/14/89	7/13/89	280 ft	258.85 ft - 279.05 ft	10	Channel Pack	9/18/89	9/18/89	Submersible	698	1.1
299-E25-38	6/7/89	7/6/89	283 ft	258.58 ft - 279.63 ft	10	Channel Pack	9/18/89	9/18/89	Submersible	1091	1.4

(a) NTU = nephelometric turbidity units.

TABLE 14.3. Water-Level Data Taken Before Sample Collection at the Grout Treatment Facility, July/August 1989

<u>Well</u>	<u>Date</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Water-Level Elevation, ft above MSL</u>
299-E24-18	8/30/89	679.05	406.95
299-E25-18	8/30/89	679.05	406.95
299-E25-20	8/31-89	676.30	404.75
299-E25-20	8/31/89	676.30	404.75
299-E25-22	8/30/89	674.05	404.91
299-E24-22	8/30/89	674.05	404.91
299-E24-24	8/30/89	679.55	405.37
299-E25-24	8/30/89	679.55	405.38
299-E25-25	8/30/89	669.42	406.47
299-E25-25	8/30/89	669.42	406.47
299-E25-26	7/12/89	668.52	403.30
299-E25-26	7/12/89	668.52	403.30
299-E25-26	8/29/89	668.52	405.87
299-E25-26	8/29/89	668.52	405.87
299-E25-27	7/12/89	676.08	405.43
299-E25-27	7/12/89	676.08	405.43
299-E25-27	8/31/89	676.08	405.36
299-E25-27	8/31/89	676.08	405.36
299-E25-28	7/20/89	662.44	405.67
299-E25-28	7/20/89	662.44	405.67
299-E25-28	8/29/89	662.44	405.67
299-E25-28	8/29/89	662.44	405.67
299-E25-29A	7/14/89	672.86	405.61
299-E25-29A	7/14/89	672.86	405.60
299-E25-29A	8/17/89	672.86	406.43
299-E25-29A	8/17/89	672.86	406.43
299-E25-29A	8/30/89	672.86	405.39
299-E25-29A	8/30/89	672.86	405.39
299-E25-30A	7/18/89	678.20	405.65
299-E25-30A	7/18/89	678.20	405.65
299-E25-30A	8/29/89	678.20	405.69
299-E25-30A	8/29/89	678.20	405.69
299-E25-31	7/14/89	672.53	405.52
299-E25-31	7/14/89	672.53	405.51
299-E25-31	8/17/89	672.53	405.38
299-E25-31	8/17/89	672.53	405.38
299-E25-31	8/30/89	672.53	405.24
299-E25-31	8/30/89	672.53	405.25
299-E25-32A	7/13/89	670.04	406.83
299-E25-32A	7/13/89	670.04	406.82
299-E25-32A	8/29/89	670.04	406.33
299-E25-32A	8/29/89	670.04	406.34
299-E25-32A	8/30/89	670.04	408.69

TABLE 14.3. (contd)

Well	Date	Casing Elevation, ft above MSL (a)	Water-Level Elevation, ft above MSL
299-E25-32A	8/30/89	670.04	408.69
299-E25-33	7/27/89	650.03	405.35
299-E25-33	7/27/89	650.03	405.35
299-E25-33	8/31/89	650.03	405.17
299-E25-33	8/31/89	650.03	405.16

(a) MSL = mean sea level.

TABLE 14.4. Monthly Water-Level Data Collected During the Third Quarter of 1989 for the Grout Treatment Facility Ground-Water Monitoring Wells

Well	Date	Casing Elevation, ft above MSL (a)	Water-Level Elevation, ft above MSL
299-E25-18	8/31/89	679.05	405.18
299-E25-18	8/31/89	679.05	405.19
299-E25-18	7/28/89	679.05	405.26
299-E25-18	7/28/89	679.05	405.26
299-E25-20	8/31/89	676.30	405.10
299-E25-20	8/31/89	676.30	405.10
299-E25-20	7/28/89	676.30	405.13
299-E25-20	7/28/89	676.30	405.13
299-E25-22	8/31/89	674.05	405.15
299-E25-22	8/31/89	674.05	405.15
299-E25-22	7/28/89	674.05	405.25
299-E25-22	7/28/89	674.05	405.25
299-E25-24	8/31/89	679.55	405.65
299-E25-24	8/31/89	679.55	405.65
299-E25-24	7/28/89	679.55	405.73
299-E25-24	7/28/89	679.55	405.73
299-E25-25	9/01/89	669.42	406.39
299-E25-25	9/01/89	669.42	406.40
299-E25-25	7/27/89	669.42	406.42
299-E25-25	7/27/89	669.42	406.40
299-E25-26	9/01/89	668.52	405.74
299-E25-26	9/01/89	668.52	405.74
299-E25-26	7/27/89	668.52	405.79
299-E25-26	7/27/89	668.52	405.79
299-E25-27	9/01/89	676.08	405.76
299-E25-27	9/01/89	676.08	405.77

TABLE 14.4. (contd)

<u>Well</u>	<u>Date</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Water-Level Elevation, ft above MSL</u>
299-E25-27	7/28/89	676.08	405.76
299-E25-27	7/28/89	676.08	405.75
299-E25-28	8/31/89	662.44	405.88
299-E25-28	8/31/89	662.44	405.88
299-E25-28	7/28/89	662.44	406.90
299-E25-28	7/28/89	662.44	406.90
299-E25-29A	9/1/89	672.86	405.37
299-E25-29A	9/1/89	672.86	405.37
299-E25-29A	7/28/89	672.86	405.38
299-E25-29A	7/28/89	672.86	405.38
299-E25-30A	9/1/89	678.20	NM ^(b)
299-E25-30A	7/28/89	678.20	NM
299-E25-31	9/1/89	672.53	405.42
299-E25-31	9/1/89	672.53	405.42
299-E25-31	7/28/89	672.53	405.39
299-E25-31	7/28/89	672.53	405.41
299-E25-32A	9/1/89	670.04	405.70
299-E25-32A	9/1/89	670.04	405.71
299-E25-32A	7/27/89	670.04	405.71
299-E25-32A	7/27/89	670.04	405.71
299-E25-33	9/1/89	650.03	405.35
299-E25-33	9/1/89	650.03	405.36
299-E25-33	7/28/89	650.03	405.33
299-E25-33	7/28/89	650.03	405.34

(a) MSL = mean sea level.

(b) NM = Not measured due to obstruction in well.

**TABLE 14.5- Constituent List and Summary of Sampling Results for the Grout Treatment Facility
June through August 1989**

----- Constituent List=Contamination Indicator Parameters -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088 CONDLAB	umho	.	4	0	700 WDOE	Specific conductance, laboratory
191 CONDFLD	umho	1	118	0	700 WDOE	Specific conductance, field
199 PHFIELD		0.1	118	0	6.5-8.5 EPAS	pH, field
207 PH-LAB		0.01	4	0	6.5-8.5 EPAS	pH, laboratory
C69 TOC	ppb	2000	108	10	.	Total organic carbon
H42 TOXLDL	ppb	10	108	0	.	Total organic halogens, low DL

----- Constituent List=Interim Primary Drinking Water Parameters -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109 COLIFRM	MPN	2.2	12	11	1 EPA	Coliform bacteria
111 BETA	pCi/L	8	28	0	50 EPA	Gross beta
112 ALPHAHI	pCi/L	4	28	0	15 EPA	Gross alpha, high DL
181 RADIUM	pCi/L	1	28	0	5 EPA	Radium, total
A06 BARIUM	ppb	8	80	0	1000 EPA	Barium
A07 CADMIUM	ppb	2	80	58	10 EPA	Cadmium
A08 CHROMIUM	ppb	10	80	21	50 EPA	Chromium
A10 SILVER	ppb	10	80	80 ***	50 EPA	Silver
A20 ARSENIC	ppb	5	80	19	50 EPA	Arsenic
A21 MERCURY	ppb	0.1	28	28 ***	2 EPA	Mercury
A22 SELENIUM	ppb	5	80	80 ***	10 EPA	Selenium
A33 ENDRIIN	ppb	0.1	31	31 ***	0.2 EPA	Endrin
A34 METHLOR	ppb	3	31	31 ***	100 EPA	Methoxychlor
A35 TOXAENE	ppb	1	31	31 ***	5 EPA	Toxaphene
A36 a-BHC	ppb	0.1	31	31 ***	4 EPA	Lindane, alpha-BHC
A37 b-BHC	ppb	0.1	31	31 ***	4 EPA	Lindane, beta-BHC
A38 g-BHC	ppb	0.1	31	31 ***	4 EPA	Lindane, gamma-BHC
A39 d-BHC	ppb	0.1	31	31 ***	4 EPA	Lindane, delta-BHC
A51 LEADGF	ppb	5	29	28	50 EPA	Lead (graphite furnace)
C72 NITRATE	ppb	500	29	0	45000 EPA	Nitrate
C74 FLUORID	ppb	500	29	18	4000 EPA	Fluoride
H13 2,4-D	ppb	2	28	28 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14 2,4,5TP	ppb	2	28	28 ***	10 EPA	2,4,5-TP silvex
H20 FBARIUM	ppb	8	80	0	1000 EPA	Barium, filtered
H21 FCADMIU	ppb	2	80	80 ***	10 EPA	Cadmium, filtered
H22 FCHROMI	ppb	10	80	58	50 EPA	Chromium, filtered
H23 FSILVER	ppb	10	80	80 ***	50 EPA	Silver, filtered
H37 FARSENI	ppb	5	80	20	50 EPA	Arsenic, filtered
H38 FMERCUR	ppb	0.1	28	28 ***	2 EPA	Mercury, filtered
H39 FSELENI	ppb	5	80	80 ***	10 EPA	Selenium, filtered
H41 FLEAD	ppb	5	29	28	50 EPA	Lead, filtered
H80 TURBID	ntu	0.1	13	1	1 EPA	Turbidity, nephelometric
P19 COLIMF	100mL	1	18	18 ***	1 EPA	Coliform (Membrane Filter)

TABLE 14.5. (contd)

----- Constituent List=Water Quality Parameters -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A11 SODIUM	ppb	200	60	0	.	Sodium
A17 MANGESE	ppb	5	60	35	50 EPAS	Manganese
A19 IRON	ppb	30	60	5	300 EPAS	Iron
C67 PHENOL	ppb	10	8	8 ***	.	Phenol
C73 SULFATE	ppb	500	29	0	250000 EPAS	Sulfate
C76 CHLORID	ppb	500	29	0	250000 EPAS	Chloride
H24 FSODIUM	ppb	200	60	0	.	Sodium, filtered
H29 FMANGAN	ppb	5	60	52	50 EPAS	Manganese, filtered
H31 FIRON	ppb	30	60	48	. EPAS	Iron, filtered
H57 LPHENOL	ppb	10	28	28 ***	.	Phenol, low DL

----- Constituent List=Site Specific and Other Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
010 CO-60	pCi/L	22.5	2	0	100 EPAR	Cobalt-60
024 CS-137	pCi/L	20	2	0	200 EPAR	Cesium-137
034 RU-106	pCi/L	172.5	2	0	30 EPAR	Ruthenium-106
104 U	pCi/L	0.5	1	0	800 DOE	Uranium
108 TRITIUM	pCi/L	500	3	0	20000 EPA	Tritium (H-3)
A01 BERYLIUM	ppb	5	60	60 ***	.	Beryllium
A03 STRONTIUM	ppb	10	60	0	.	Strontium
A04 ZINC	ppb	5	60	21	5000 EPAS	Zinc
A05 CALCIUM	ppb	50	60	0	.	Calcium
A12 NICKEL	ppb	10	60	29	.	Nickel
A13 COPPER	ppb	10	60	58	1300 EPAP	Copper
A14 VANADIUM	ppb	5	60	1	.	Vanadium
A15 ANTIMONY	ppb	100	60	60 ***	.	Antimony
A16 ALUMINUM	ppb	150	60	57	.	Aluminum
A18 POTASSIUM	ppb	100	60	0	.	Potassium
A50 MAGNESIUM	ppb	50	60	0	.	Magnesium
C76 PHOSPHATE	ppb	1000	29	27	.	Phosphate
H16 TC	ppb	1000	8	0	.	Total carbon
H18 FZINC	ppb	5	60	35	5000 EPAS	Zinc, filtered
H19 FCALCIUM	ppb	50	60	0	.	Calcium, filtered
H25 FNICKEL	ppb	10	60	57	.	Nickel, filtered
H26 FCOPPER	ppb	10	60	58	1300 EPAP	Copper, filtered
H27 FVANADIUM	ppb	5	60	1	.	Vanadium, filtered
H28 FALUMINUM	ppb	150	60	60 ***	.	Aluminum, filtered
H30 FPOTASSIUM	ppb	100	60	0	.	Potassium, filtered
H32 FMAGNESIUM	ppb	50	60	0	.	Magnesium, filtered
H33 FBERYLLIUM	ppb	5	60	60 ***	.	Beryllium, filtered
H35 FSTRONTIUM	ppb	10	60	0	.	Strontium, filtered
H36 FANTIMONY	ppb	100	60	60 ***	.	Antimony, filtered
H66 BROMIDE	ppb	1000	29	29 ***	.	Bromide

TABLE 14.5. (contd)

----- Constituent List=Site Specific and Other Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H87 NITRITE	ppb	1000	29	29 ***	.	Nitrite
H86 FBORON	ppb	10	80	14	.	Boron, filtered
H87 FCOBALT	ppb	20	80	80 ***	.	Cobalt, filtered
H88 FLITHIU	ppb	10	80	58	.	Lithium, filtered
H89 FMOLY	ppb	40	80	80 ***	.	Molybdenum, filtered
H90 FSILICO	ppb	50	80	0	.	Silicon, filtered
H91 FTIN	ppb	30	80	80 ***	.	Tin, filtered
H92 FTITAN	ppb	80	80	80 ***	.	Titanium, filtered
H93 FZIRCON	ppb	50	80	80 ***	.	Zirconium, filtered
P01 BORON	ppb	10	80	10	.	Boron
P02 COBALT	ppb	20	80	80 ***	.	Cobalt
P03 LITHIUM	ppb	10	80	58	.	Lithium
P04 MOLY	ppb	40	80	80 ***	.	Molybdenum
P06 SILICON	ppb	50	80	0	.	Silicon
P08 TIN	ppb	30	80	80 ***	.	Tin
P07 TITAN	ppb	80	80	80 ***	.	Titanium
P08 ZIRCON	ppb	50	80	80 ***	.	Zirconium

----- Constituent List=WAC 173-303-9905 Constituents -----

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A23 THALIUM	ppb	5	5	5 ***	.	Thallium
A24 THIDURA	ppb	200	5	5 ***	.	Thiourea
A26 ACETREA	ppb	200	5	5 ***	.	1-Acetyl-2-thiourea
A28 CHLOREA	ppb	200	5	5 ***	.	1-(o-Chlorophenyl) thiourea
A27 DIETROL	ppb	200	5	5 ***	.	Diethylstilbestrol
A29 ETHYREA	ppb	200	5	5 ***	.	Ethylenethiourea
A29 NAPHREA	ppb	200	5	5 ***	.	1-Naphthyl-2-thiourea
A32 PHENREA	ppb	500	5	5 ***	.	n-Phenylthiourea
A40 DDD	ppb	0.1	5	5 ***	.	DDD
A41 DDE	ppb	0.1	5	5 ***	.	DDE
A42 DDT	ppb	0.1	5	5 ***	.	DDT
A43 HEPTLOR	ppb	0.1	5	5 ***	0 EPAP	Heptachlor
A44 HEPTIDE	ppb	0.1	5	5 ***	0 EPAP	Heptachlor epoxide
A45 KEPONE	ppb	1	5	5 ***	.	Kepona (discontinued)
A46 DIELRIN	ppb	0.1	5	5 ***	.	Dieldrin
A47 ALDRIN	ppb	0.1	5	5 ***	.	Aldrin
A48 CHLOANE	ppb	1	5	5 ***	0 EPAP	Chlordane
A49 END01	ppb	0.1	5	5 ***	.	Endosulfan I (alpha)
A52 END02	ppb	0.1	5	5 ***	.	Endosulfan II (beta)
A54 AR1018	ppb	1	5	5 ***	0 EPAP	Arochlor 1018
A56 AR1221	ppb	1	5	5 ***	0 EPAP	Arochlor 1221
A56 AR1232	ppb	1	5	5 ***	0 EPAP	Arochlor 1232
A57 AR1242	ppb	1	5	5 ***	0 EPAP	Arochlor 1242

TABLE 14.5. (contd)

----- Constituent List=WAC 173-303-9905 Constituents -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
A58 AR1248	ppb	1	5	5 ***	0 EPAP	Arochlor 1248	
A59 AR1254	ppb	1	5	5 ***	0 EPAP	Arochlor 1254	
A60 AR1260	ppb	1	5	5 ***	0 EPAP	Arochlor 1260	
A61 TETRANE	ppb	5	10	10 ***	5 EPA	Tetrachloromethane [Carbon Tetrachloride]	
A62 BENZENE	ppb	5	10	10 ***	5 EPA	Benzene	
A64 METHONE	ppb	10	10	10 ***	.	Methyl ethyl ketone	
A66 TOLUENE	ppb	5	10	10 ***	2000 EPAP	Toluene	
A67 1,1,1-T	ppb	5	10	10 ***	200 EPA	1,1,1-Trichloroethane	
A68 1,1,2-T	ppb	5	10	10 ***	.	1,1,2-Trichloroethane	
A69 TRICENE	ppb	5	10	10 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethene]	
A70 PERCENE	ppb	5	10	10 ***	.	Perchloroethylene [Tetrachloroethene]	
A71 OPXYLE	ppb	5	10	10 ***	440 EPAP	Xylene-o,p	
A80 CHLFORM	ppb	5	10	10 ***	100 EPA	Chloroform [Trichloromethane]	
A89 1,1-DIC	ppb	5	10	10 ***	.	1,1-Dichloroethane	
A90 1,2-DIC	ppb	5	10	10 ***	5 EPA	1,2-Dichloroethane	
A91 TRANSCE	ppb	5	10	10 ***	70 EPAP	trans-1,2-Dichloroethene	
A93 METHYCH	ppb	5	10	10 ***	.	Methylene chloride [Dichloromethane]	
B13 VINYLDE	ppb	10	10	10 ***	2 EPA	Vinyl chloride	
B14 M-XYLE	ppb	5	10	10 ***	440 EPAP	Xylene-m	
B40 BIS2EPH	ppb	10	2	0	.	bis(2-Ethylhexyl) phthalate	
B51 CRESOLS	ppb	10	5	5 ***	.	Cresols	
B51 12-dben	ppb	10	5	5 ***	.	1,2-Dichlorobenzene [o-Dichlorobenzene]	
B52 13-dben	ppb	10	5	5 ***	.	1,3-Dichlorobenzene [m-Dichlorobenzene]	
B53 14-dben	ppb	10	5	5 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]	
B89 HEXCBEN	ppb	10	5	5 ***	.	Hexachlorobenzene	
C26 PENTCHB	ppb	10	5	5 ***	.	Pentachlorobenzene	
C28 PENTCHP	ppb	50	5	5 ***	220 EPAP	Pentachlorophenol	
C37 TETRCHB	ppb	10	5	5 ***	.	1,2,4,6-Tetrachlorobenzene	
C43 TRICHLB	ppb	10	5	5 ***	.	1,2,4-Trichlorobenzene	
C64 HEXACHL	ppb	10	5	5 ***	.	Hexachlorophene	
C55 NAPHTHA	ppb	10	5	5 ***	.	Naphthalene	
C58 123TRI	ppb	10	5	5 ***	.	1,2,3-Trichlorobenzene	
C58 135TRI	ppb	10	5	5 ***	.	1,3,5-Trichlorobenzene	
C59 1234TE	ppb	10	5	5 ***	.	1,2,3,4-Tetrachlorobenzene	
C60 1235TE	ppb	10	5	5 ***	.	1,2,3,5-Tetrachlorobenzene	
C61 TETEPYR	ppb	2	5	5 ***	.	Tetraethylpyrophosphate	
C62 CHLLATE	ppb	300	5	5 ***	.	Chlorobenzilate	
C63 CARBPHT	ppb	2	5	5 ***	.	Carbophenothion	
C64 DISULFO	ppb	2	5	5 ***	.	Disulfoton	
C65 DIMETHO	ppb	2	5	5	.	Dimethoate	
C66 METHPAR	ppb	2	5	5 ***	.	Methyl parathion	
C67 PARATHI	ppb	2	5	5 ***	.	Parathion	
C70 CYANIDE	ppb	10	5	5 ***	.	Cyanide	
C77 PERCHLO	ppb	500	3	3 ***	.	Perchlorate	
C78 SULFIDE	ppb	1000	5	5 ***	.	Sulfide	
C79 KEROSEN	ppb	10000	5	5 ***	.	Kerosene	
C80 AMMONIU	ppb	50	9	5	.	Ammonium ion	

TABLE 14.5. (contd)

----- Constituent List=WAC 173-303-9905 Constituents -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Agency Exceeded	Full name
C81 ETHYGLY	ppb	10000	2	2 ***	.	Ethylene glycol
C87 CITRUSR	ppb	1000	5	5 ***	.	Citrus red
C90 PARALDE	ppb	10000	6	6 ***	.	Paraldehyde
C91 STRYCHN	ppb	50	5	5 ***	.	Strychnine
C92 MALHYDR	ppb	500	5	5 ***	.	Maleic hydrazide
C93 NICOTIN	ppb	100	5	5 ***	.	Nicotinic acid
C94 ACRYIDE	ppb	10000	6	6 ***	0 EPAP	Acrylamide
C95 ALLYLAL	ppb	10000	6	6 ***	.	Allyl alcohol
C98 CHLPROP	ppb	10000	6	6 ***	.	3-Chloropropionitrile
D01 PCDDs	ppb	0.01	3	3 ***	.	PCDDs
D02 PCDFs	ppb	0.01	3	3 ***	.	PCDFs
D03 2378TCDD	ppb	0.01	3	3 ***	.	2,3,7,8-TCDD [Dioxin]
H03 ETHCARB	ppb	10000	6	6 ***	.	Ethyl carbamate
H04 ETHCYAN	ppb	10000	6	6 ***	.	Ethyl cyanide
H09 ISOBUTY	ppb	10000	6	6 ***	.	Isobutyl alcohol
H11 PROPYLA	ppb	10000	6	6 ***	.	n-Propylamine
H12 PROPYNO	ppb	10000	6	6 ***	.	2-Propyn-1-ol
H16 2,4,5-T	ppb	2	28	28 ***	.	2,4,5-T
H40 FTHALLI	ppb	5	6	6 ***	.	Thallium, filtered
H82 LHYDRAZ	ppb	30	7	7 ***	.	Hydrazine, low DL
H88 HEXONE	ppb	10	10	10 ***	.	Hexone [Methyl isobutyl ketone]
I01 ACETONE	ppb	10	10	8	.	Acetone by VOA
I09 BUTANOL	ppb	10000	6	6 ***	.	1-Butanol
I21 TRIBUPH	ppb	10	6	6 ***	.	Tributylphosphoric acid
I28 TAF	ppb	10	10	10 ***	.	Tetrahydrofuran
I67 ETHANOL	ppb	10000	6	6 ***	.	Ethanol
L20 MBP	ppb	10000	6	6 ***	.	Monobutylphosphate
L21 DBP	ppb	10000	6	6 ***	.	Dibutylphosphate
L57 ETHGLYC	ppb	10000	6	6 ***	.	Ethylene glycol
L59 1PROPAN	ppb	10000	6	6 ***	.	1-Propanol
L60 1BUTYN	ppb	10000	6	6 ***	.	1-Butynol
L63 14DBEN	ppb	5	10	10 ***	75 EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
L64 CHLROB	ppb	10	6	6 ***	60 EPAP	Chlorobenzene (by ABN)
P12 ENDSFAN	ppb	0.5	5	5 ***	.	Endosulfan
P13 PHORATE	ppb	2	5	5 ***	.	Phorate

*** - Indicates all samples were reported as below contractual detection limits

xxx - Indicates that Drinking Water standards were exceeded

EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations

EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936

EPAS - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations

DOE - based on Derived Concentration Guides in draft DOE Order 5400.xx

WDOE - based on additional Secondary Maximum Contaminant Levels in WAC 248-54, Public Water Supplies

**TABLE 14.6- Constituents with at Least One Detected Value for the Grout Treatment Facility
June through August 1989**

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
2-E25-18	23JUN89		348	.	.	8.04	#700	#1
		1	351	.	.	8.03	#600	#1
		2	351	.	.	8.03	#500	#1
		3	350	.	.	8.03	#500	#2
2-E25-18	30AUG89		348	.	.	8.05	#500	#1
		1	348	.	.	8.01	#500	#2
		2	333	.	.	7.99	#500	#4
		3	345	.	.	7.96	#600	#2
2-E25-20	21JUN89		712	.	.	7.49	#500	#2
		1	711	.	.	7.48	#700	#2
		2	711	.	.	7.48	#500	#3
		3	711	.	.	7.48	#500	#5
2-E25-20	31AUG89		740	.	.	7.69	#800	#4
		1	741	.	.	7.69	#800	#1
		2	741	.	.	7.69	#500	#0
		3	741	.	.	7.69	#600	#0
2-E25-22	18AUG89		233	.	.	8.08	#600	#2
		1	232	.	.	8.09	#600	#9
		2	232	.	.	8.09	#900	15
		3	233	.	.	8.10	#1,300	#0
2-E25-22	30AUG89		213	.	.	8.22	#600	#4
		1	209	.	.	8.21	#500	#4
		2	212	.	.	8.20	#600	#4
		3	213	.	.	8.20	#500	#3
2-E25-24	21JUN89		241	.	.	7.33	#700	#6
		1	241	.	.	7.30	#500	#6
		2	241	.	.	7.29	#500	#1
		3	241	.	.	7.29	#600	#1
2-E25-24	30AUG89		257	.	.	7.68	#600	#-1
		1	241	.	.	7.74	#600	#-1
		2	249	.	.	7.72	#700	#2
		3	255	.	.	7.72	#700	#7
2-E25-25	21JUN89		106	.	.	7.89	#1,000	#8
		1	105	.	.	7.90	#900	#8
		2	106	.	.	7.90	#900	#7
		3	106	.	.	7.89	#900	#8

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5	PHFIELD 0.1/8.5	TOC ppb 2000/.	TOXL0L ppb 10/.
2-E25-25	23JUN89		189	.	.	8.40	.	.
		1	189	.	.	8.41	.	.
		2	189	.	.	8.41	.	.
		3	189	.	.	8.41	.	.
2-E25-25	30AUG89		149	.	.	8.28	#900	11
		1	149	.	.	8.28	#1,000	#8
		2	148	.	.	8.28	#900	#8
		3	149	.	.	8.27	#800	10
2-E25-26	12JUL89		154	.	.	7.22	#800	#5
		1	154	.	.	7.22	#800	#2
		2	154	.	.	7.22	#700	#4
		3	154	.	.	7.22	#600	#2
2-E25-26	11AUG89		209	187	8.20	8.24	#900	#8
		1	209	.	.	8.26	#800	12
		2	208	.	.	8.26	#1,300	#4
		3	208	.	.	8.26	#1,200	10
2-E25-26	29AUG89		180	183	8.10	8.17	#800	#2
		1	179	.	.	8.16	#1,000	#3
		2	179	.	.	8.16	#700	#6
		3	182	.	.	8.15	#900	#5
2-E25-27	12JUL89		1,112	.	.	7.95	#1,000	#4
		1	1,108	.	.	8.11	#800	#2
		2	1,111	.	.	8.13	#800	#3
		3	1,119	.	.	8.10	#800	#4
2-E25-27	31AUG89		180	.	.	8.12	#800	#3
		1	179	.	.	8.11	#1,000	11
		2	180	.	.	8.12	#1,600	#3
		3	180	.	.	8.12	#1,800	17
2-E25-29	20JUL89		150	.	.	8.21	#500	#4
		1	147	.	.	8.20	#500	#7
		2	146	.	.	8.19	#700	#4
		3	148	.	.	8.21	#600	#5
2-E25-28	24JUL89		140	.	.	8.17	.	.
		1	140	.	.	8.17	.	.
		2	140	.	.	8.16	.	.
		3	140	.	.	8.14	.	.
2-E25-28	29AUG89		190	183	8.00	8.20	#600	14
		1	187	.	.	8.20	#700	#3
		2	186	.	.	8.21	#600	#9
		3	186	.	.	8.21	#500	#8

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho . /700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 2000/.	TOXLDL ppb 10/.
2-E25-29	14JUL89		302	.	.	8.07	#1,000	1,160
		1	302	.	.	8.10	#1,500	1,480
		2	302	.	.	8.10	#900	412
		3	301	.	.	8.11	#1,000	230
2-E25-29	17AUG89		289	.	.	8.17	.	.
2-E25-29	30AUG89		259	.	.	8.21	#700	123
		1	258	.	.	8.18	#1,300	79
		2	260	.	.	8.18	#700	108(a)
		3	260	.	.	8.17	#800	81
2-E25-30	18JUL89		232	.	.	8.40	#600	#9
		1	232	.	.	8.39	#500	#7
		2	232	.	.	8.40	#500	#7
		3	232	.	.	8.39	#500	#9
2-E25-30	29AUG89		467	.	.	8.19	#600	#4
		1	462	.	.	8.19	#600	#2
		2	469	.	.	8.19	#900	#6
		3	469	.	.	8.19	#500	#5
2-E25-31	14JUL89		227	.	.	7.80	#1,000	125
		1	228	.	.	7.80	#1,300	122
		2	228	.	.	7.80	#1,000	119
		3	228	.	.	7.80	#1,000	125
2-E25-31	17AUG89		262	.	.	7.99	.	.
2-E25-31	30AUG89		268	.	.	8.08	#1,200	199
		1	273	.	.	8.06	#1,300	208
		2	283	.	.	8.04	#1,300	199
		3	267	.	.	8.04	#1,200	208
2-E25-32	13JUL89		174	.	.	6.92	#989	#5
		1	173	.	.	6.98	#1,140	#8
		2	172	.	.	7.01	#767	#9
		3	173	.	.	7.00	#928	#5
2-E25-32	29AUG89		142	160	8.10	8.22	#800	#3
		1	136	.	.	8.21	#800	#6
		2	139	.	.	8.22	#1,500	#6
		3	134	.	.	8.22	#900	#4
2-E25-33	27JUL89		200	.	.	8.09	#500	#1
		1	200	.	.	8.07	#600	#1
		2	199	.	.	8.07	#500	#3
		3	200	.	.	8.08	#700	#1
2-E25-33	31AUG89		320	.	.	7.90	#700	#1
		1	320	.	.	7.90	#500	#7
		2	319	.	.	7.89	#700	#1
		3	321	.	.	7.90	#800	0

TABLE 14.6. (contd)
Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALPHAHI pCi/L 4/15	ALUMINUM ppb 150/.	AMMONIUM ppb 50/.	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BETA pCi/L 9/50
2-E25-18	23 JUN 89		.	*0.5700	<150	.	8.0	9.0	20	19	9.33
	30 AUG 89		.	*0.7190	<150	.	7.0	8.0	17	18	8.89
2-E25-20	21 JUN 89		.	2.3600	<150	.	7.0	9.0	69	63	18.40
	31 AUG 89		.	2.1900	<150	.	<5.0	<5.0	69	61	18.30
2-E25-22	18 AUG 89		.	*0.8820	<150	.	9.0	9.0	13	13	6.67
	30 AUG 89		.	*1.1000	<150	.	8.0	8.0	15	15	4.22
2-E25-24	21 JUN 89		.	*0.3960	<150	.	18.0	19.0	27	25	8.44
	30 AUG 89		.	*1.0000	<150	.	16.0	15.0	26	27	7.00
2-E25-25	21 JUN 89		.	*0.0938	<150	.	<5.0	<5.0	15	12	8.28
	21 JUN 89	1	.	.	<150	.	<5.0	<5.0	14	13	.
	21 JUN 89	2	.	.	<150	.	<5.0	<5.0	12	12	.
	21 JUN 89	3	.	.	<150	.	<5.0	<5.0	14	11	.
	30 AUG 89		.	1.2800	<150	.	<5.0	<5.0	13	13	6.73
	30 AUG 89	1	.	.	<150	.	<5.0	<5.0	13	13	.
	30 AUG 89	2	.	.	<150	.	<5.0	<5.0	14	12	.
	30 AUG 89	3	.	.	<150	.	<5.0	<5.0	13	13	.
2-E25-26	12 JUL 89		<10	*0.4360	<150	<50	6.0	5.0	12	12	3.73
	11 AUG 89		#5 (b)	1.1200	<150	.	5.0	<5.0	9	16	8.34
	29 AUG 89		<10	*0.8890	<150	<50	<5.0	5.0	13	13	6.16
2-E25-27	12 JUL 89		.	0.7960	<150	.	5.0	<5.0	11	11	4.84
	31 AUG 89		.	*-0.0343	<150	.	<5.0	<5.0	11	12	9.51
2-E25-28	20 JUL 89		.	1.3600	<150	.	8.8	9.8	12	12	10.60
	24 JUL 89		#5 (b)	.	.	<50	.	.	.	.	.
	29 AUG 89		<10	*-0.0958	<150	<50	8.0	10.0	15	13	3.51
	29 AUG 89	1	<10	.	<150	<50	9.0	9.0	14	12	.
2-E25-29	14 JUL 89		<10	1.4400	<150	<50	12.1	11.5	24	22	3.44
	17 AUG 89		.	.	<150	.	12.0	13.0	20	26	.
	17 AUG 89	1	.	.	<150	.	13.0	13.0	22	25	.
	17 AUG 89	2	.	.	<150	.	12.0	12.0	20	24	.
	17 AUG 89	3	.	.	<150	.	12.0	13.0	23	26	.
	30 AUG 89		.	1.3900	<150	.	11.0	12.0	16	23	3.00
	30 AUG 89	1	.	.	<150	.	10.0	11.0	20	22	.
	30 AUG 89	2	.	.	<150	.	10.0	11.0	17	20	.
	30 AUG 89	3	.	.	<150	.	11.0	11.0	17	20	.
2-E25-30	18 JUL 89		.	*1.4700	<150	.	18.3	18.7	23	26	9.01
	29 AUG 89		.	*0.4920	<150	.	15.0	15.0	33	31	7.92

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALPHANI pCi/L 4/15	ALUMINUM ppb 150/.	AMMONIU ppb 50/.	ARSENIC ppb 5/50	PARSENI ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BETA pCi/L 5/50
2-E25-31	14 JUL 89		<10	2.4300	<150	67	10.1	8.1	33	31	5.95
	17 AUG 89		.	.	<150	.	9.0	8.0	31	37	.
	17 AUG 89	1	.	.	<150	.	9.0	9.0	29	36	.
	17 AUG 89	2	.	.	<150	.	9.0	9.0	29	33	.
	17 AUG 89	3	.	.	<150	.	10.0	9.0	30	36	.
	30 AUG 89		.	*1.5400	<150	.	8.0	9.0	36	37	2.91
	30 AUG 89	1	.	.	<150	.	9.0	9.0	40	35	.
	30 AUG 89	2	.	.	<150	.	9.0	10.0	40	34	.
	30 AUG 89	3	.	.	<150	.	10.0	9.0	37	36	.
											.
2-E25-32	13 JUL 89		<10	*0.7700	<150	<50	<5.0	<5.0	13	11	10.20
	13 JUL 89	1	.	1.0900	<150	.	<5.0	<5.0	13	13	23.00
	13 JUL 89	2	.	.	<150	.	<5.0	<5.0	13	11	.
	13 JUL 89	3	.	.	<150	.	<5.0	<5.0	10	12	.
	29 AUG 89		<10	*0.5070	<150	<50	<5.0	<5.0	13	11	5.83
	30 AUG 89	1	.	.	<150	.	<5.0	<5.0	11	12	.
	30 AUG 89	2	.	.	<150	.	<5.0	<5.0	12	12	.
	30 AUG 89	3	.	.	<150	.	<5.0	<5.0	12	11	.
											.
2-E25-33	27 JUL 89		.	1.4800	<150	.	12.0	10.0	32	29	6.88
	27 JUL 89	1	.	.	153	.	11.0	11.0	32	30	.
	27 JUL 89	2	.	.	166	.	11.0	11.0	31	32	.
	27 JUL 89	3	.	.	156	.	11.0	10.0	30	31	.
	31 AUG 89		.	2.3900	<150	.	12.0	13.0	32	33	4.33
	31 AUG 89	1	.	.	<150	.	12.0	11.0	29	28	.
	31 AUG 89	2	.	.	<150	.	13.0	11.0	33	34	.
	31 AUG 89	3	.	.	<150	.	11.0	11.0	34	31	.

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	BIS2EPH ppb 10/.	BORON ppb 10/.	FBORON ppb 10/.	CADMIUM ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000a	FCHROMI ppb 10/50
2-E25-18	23JUN89		.	16	13	<2	33,900	33,900	3,400	<10
	30AUG89		.	73	13	<2	34,700	33,000	3,400	<10
2-E25-20	21JUN89		.	37	42	<2	59,200	59,200	5,000	<10
	31AUG89		.	40	39	<2	66,900	68,600	4,700	<10
2-E25-22	18AUG89		.	20	16	<2	17,900	21,000	3,400	<10
	30AUG89		.	18	<10	<2	21,900	22,000	3,400	<10
2-E25-24	21JUN89		.	12	15	<2	22,800	23,100	1,400	<10
	30AUG89		.	22	13	<2	24,100	23,800	1,300	<10
2-E25-25	21JUN89		.	<10	<10	<2	19,900	19,800	3,300	<10
	21JUN89	1	.	<10	<10	<2	18,700	19,300	.	<10
	21JUN89	2	.	<10	<10	<2	18,400	19,000	.	<10
	21JUN89	3	.	<10	<10	2	18,500	19,900	.	<10
	30AUG89		.	18	11	<2	19,300	19,100	2,800	12
	30AUG89	1	.	13	13	<2	18,500	18,200	.	<10
	30AUG89	2	.	14	13	<2	17,200	19,500	.	<10
	30AUG89	3	.	16	10	<2	18,400	19,800	.	<10
2-E25-26	12JUL89		14	12	13	<2	21,400	23,000	3,110	<10
	11AUG89		.	17	<10	<2	22,500	19,400	3,000	<10
	29AUG89		.	13	<10	<2	21,500	20,700	2,900	<10
2-E25-27	12JUL89		.	13	12	<2	21,400	20,900	3,470	<10
	31AUG89		.	<10	11	<2	18,200	18,300	3,300	<10
2-E25-28	20JUL89		.	12	14	<2	19,900	18,800	2,990	<10
	29AUG89		.	12	54	<2	19,400	21,000	3,300	<10
	29AUG89	1	.	14	<10	<2	18,400	20,100	3,300	<10
2-E25-29	14JUL89		14	18	18	<2	26,300	23,700	2,940	<10
	17AUG89		.	15	21	<2	26,700	22,800	.	<10
	17AUG89	1	.	20	18	<2	26,000	25,400	.	<10
	17AUG89	2	.	19	21	2	24,700	24,100	.	<10
	17AUG89	3	.	22	22	<2	26,800	26,200	.	<10
	30AUG89		.	32	12	<2	26,700	23,700	2,800	<10
	30AUG89	1	.	13	28	<2	25,900	23,100	.	<10
	30AUG89	2	.	16	16	<2	24,100	25,200	.	<10
	30AUG89	3	.	19	19	<2	22,700	23,800	.	<10
2-E25-30	18JUL89		.	37	47	<2	18,200	15,200	2,270	18
	29AUG89		.	34	32	<2	21,800	20,800	2,200	<10

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	BIS2EPH ppb 10/.	BORON ppb 10/.	FBORON ppb 10/.	CADMIUM ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000*	FCROMI ppb 10/50
2-E25-31	14JUL89		.	17	14	<2	24,200	22,200	3,490	<10
	17AUG89		.	16	15	<2	26,100	23,700	.	<10
	17AUG89	1	.	15	12	<2	26,300	24,100	.	<10
	17AUG89	2	.	17	15	<2	24,000	23,900	.	<10
	17AUG89	3	.	27	14	<2	25,900	23,100	.	<10
	30AUG89		.	14	<10	<2	29,000	28,300	4,700	<10
	30AUG89	1	.	15	14	<2	29,500	31,000	.	<10
	30AUG89	2	.	20	13	<2	28,200	31,100	.	<10
	30AUG89	3	.	13	15	<2	29,300	29,500	.	<10
2-E25-32	13JUL89		.	<10	<10	<2	19,500	20,900	2,950	<10
	13JUL89	1	.	<10	<10	<2	19,600	19,800	2,930	<10
	13JUL89	2	.	<10	<10	<2	19,200	20,600	.	<10
	13JUL89	3	.	<10	<10	<2	19,100	16,800	.	<10
	29AUG89		.	15	<10	<2	19,000	20,000	2,900	<10
	30AUG89	1	.	<10	11	<2	18,800	19,400	.	<10
	30AUG89	2	.	19	12	<2	19,200	19,000	.	<10
	30AUG89	3	.	12	12	<2	18,800	19,700	.	<10
2-E25-33	27JUL89		.	23	24	<2	28,300	28,400	4,500	<10
	27JUL89	1	.	19	22	<2	28,700	28,300	.	<10
	27JUL89	2	.	18	23	<2	28,200	27,800	.	<10
	27JUL89	3	.	19	25	<2	28,900	26,400	.	<10
	31AUG89		.	28	24	<2	30,100	29,700	4,200	<10
	31AUG89	1	.	24	23	<2	28,800	29,400	.	<10
	31AUG89	2	.	23	21	<2	28,000	28,900	.	<10
	31AUG89	3	.	59	24	<2	28,200	31,400	.	<10

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	CHROMIUM ppb 10/50	CO-60 pCi/L 22.6/100r	COLIFORM MPN 2.2/1	COPPER ppb 10/1300p	FCOPPER ppb 10/1300p	CS-137 pCi/L 20/200r	DIMETHO ppb 2/.	FLUORIDE ppb 500/4000
2-E25-18	23 JUN89		<10	.	<2.2	<10	<10	.	.	<500
	30 AUG89		<10	.	.	<10	<10	.	.	500
2-E25-20	21 JUN89		<10	.	<2.2	<10	<10	.	.	500
	31 AUG89		<10	.	.	<10	<10	.	.	1,000
2-E25-22	18 AUG89		<10	.	.	<10	<10	.	.	<500
	30 AUG89		<10	.	<2.2	<10	<10	.	.	<500
2-E25-24	21 JUN89		<10	.	<2.2	<10	<10	.	.	500
	30 AUG89		<10	.	.	<10	<10	.	.	517
2-E25-25	21 JUN89		17	.	<2.2	<10	<10	.	.	<500
	21 JUN89	1	41	.	.	<10	<10	.	.	.
	21 JUN89	2	<10	.	.	<10	<10	.	.	.
	21 JUN89	3	37	.	.	<10	<10	.	.	.
	30 AUG89		19	.	.	<10	<10	.	.	<500
	30 AUG89	1	15	.	.	<10	<10	.	.	.
	30 AUG89	2	13	.	.	<10	<10	.	.	.
	30 AUG89	3	12	.	.	<10	<10	.	.	.
2-E25-26	12 JUL89		<10	.	.	20	<10	.	<2	<500
	11 AUG89		<10	.	.	<10	12	.	.	<500
	29 AUG89		<10	.	.	<10	<10	.	.	<500
2-E25-27	12 JUL89		<10	.	.	<10	<10	.	.	<500
	31 AUG89		<10	.	.	<10	<10	.	.	<500
2-E25-28	20 JUL89		<10	.	.	<10	<10	.	.	<500
	24 JUL89		.	.	.	.	.	.	<2	.
	29 AUG89		<10	.	.	<10	<10	.	.	<500
	29 AUG89	1	<10	.	.	<10	<10	.	.	<500
2-E25-29	14 JUL89		41	*-2.830	2,400.0	<10	<10	*3.75	803	534
	17 AUG89		15	.	.	<10	<10	.	.	.
	17 AUG89	1	<10 (a)	.	.	<10	<10	.	.	.
	17 AUG89	2	20	.	.	<10	<10	.	.	.
	17 AUG89	3	13	.	.	<10	<10	.	.	.
	30 AUG89		12	.	<2.2	<10	<10	.	.	500
	30 AUG89	1	<10	.	.	<10	<10	.	.	.
	30 AUG89	2	18	.	.	<10	<10	.	.	.
	30 AUG89	3	<10	.	.	<10	<10	.	.	.
2-E25-30	18 JUL89		420	.	<2.2	<10	<10	.	.	<500
	29 AUG89		305	.	.	<10	<10	.	.	700

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	CHROMIUM ppb 10/50	CO-60 pCi/L 22.5/100r	COLIFORM MPN 2.2/1	COPPER ppb 10/1300p	FCOPPER ppb 10/1800p	CS-137 pCi/L 20/200r	DIMETHO ppb 2/.	FLUORIDE ppb 500/4000
2-E25-31	14 JUL 89		82	0.712	<2.2	<10	<10	4.97	349	<500
	17 AUG 89		14	.	.	<10	<10	.	.	.
	17 AUG 89	1	28	.	.	11	<10	.	.	.
	17 AUG 89	2	<10	.	.	<10	<10	.	.	.
	17 AUG 89	3	19	.	.	<10	<10	.	.	.
	30 AUG 89		18	.	.	<10	<10	.	.	600
	30 AUG 89	1	37	.	.	<10	<10	.	.	.
	30 AUG 89	2	41	.	.	<10	<10	.	.	.
	30 AUG 89	3	23	.	.	<10	<10	.	.	.
2-E25-32	13 JUL 89		70	.	<2.2	<10	<10	.	<2	<500
	13 JUL 89	1	49	.	<2.2	<10	<10	.	.	<500
	13 JUL 89	2	41	.	.	<10	<10	.	.	.
	13 JUL 89	3	26	.	.	<10	<10	.	.	.
	29 AUG 89		33	.	.	<10	<10	.	.	<500
	30 AUG 89	1	43	.	.	<10	<10	.	.	.
	30 AUG 89	2	19	.	.	<10	<10	.	.	.
	30 AUG 89	3	31	.	.	<10	<10	.	.	.
	30 AUG 89									
2-E25-33	27 JUL 89		51	.	<2.2	<10	<10	.	.	700
	27 JUL 89	1	62	.	.	<10	<10	.	.	.
	27 JUL 89	2	66	.	.	<10	<10	.	.	.
	27 JUL 89	3	41	.	.	<10	24	.	.	.
	31 AUG 89		11	.	.	<10	23	.	.	700
	31 AUG 89	1	17	.	.	<10	<10	.	.	.
	31 AUG 89	2	13	.	.	<10	<10	.	.	.
	31 AUG 89	3	16	.	.	<10	11	.	.	.
	31 AUG 89									

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	IRON ppb 30/300a	FIRON ppb 30/.a	FLEAD ppb 5/50	LEADGF ppb 5/50	FLITHIU ppb 10/.	LITHIUM ppb 10/.	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50a
2-E25-18	23JUN89		36	<30	<5	<5	<10	<10	9,280	9,110	8
	30AUG89		178	<30	<5	<5	<10	<10	9,100	9,510	<5
2-E25-20	21JUN89		55	<30	<5	<5	11	12	15,700	15,600	<5
	31AUG89		72	<30	<5	<5	11	11	17,600	16,700	<5
2-E25-22	18AUG89		34	<30	<5	<5	<10	<10	5,850	5,230	<5
	30AUG89		<30	<30	<5	<5	<10	<10	6,000	5,770	5
2-E25-24	21JUN89		222	<30	<5	<5	<10	<10	5,040	4,880	<5
	30AUG89		182	<30	<5	<5	<10	<10	5,350	4,950	<5
2-E25-25	21JUN89		152	<30	<5	<5	<10	<10	5,560	5,450	<5
	21JUN89	1	238	33	.	.	<10	<10	5,410	5,130	<5
	21JUN89	2	104	<30	.	.	<10	<10	5,290	5,070	<5
	21JUN89	3	287	74	.	.	<10	<10	5,550	5,090	<5
	30AUG89		159	<30	<5	<5	<10	<10	5,400	5,240	<5
	30AUG89	1	143	<30	.	.	<10	<10	5,160	5,020	<5
	30AUG89	2	171	<30	.	.	<10	<10	5,540	4,680	5
	30AUG89	3	111	<30	.	.	<10	<10	5,510	5,050	<5
2-E25-26	12JUL89		130	<30	<5	<5	<10	<10	5,910	5,480	<5
	11AUG89		53	<30	<5	<5	<10	<10	5,130	6,040	<5
	29AUG89		35	<30	<5	<5	<10	<10	5,570	5,630	<5
2-E25-27	12JUL89		114	38	<5	<5	<10	<10	5,950	6,080	8
	31AUG89		<30	<30	<5	<5	<10	<10	5,550	5,490	<5
2-E25-28	20JUL89		<30	<30	<5	<5	<10	<10	5,210	5,430	<5
	29AUG89		<30	<30	<5	<5	<10	<10	5,100	5,410	<5
	29AUG89	1	<30	<30	<5	<5	<10	<10	5,850	5,120	<5
2-E25-29	14JUL89		312	<30	<5	<5	<10	<10	6,640	6,370	<5
	17AUG89		137	<30	.	.	<10	<10	5,930	6,710	<5
	17AUG89	1	136(a)	32	.	.	<10	<10	6,300	6,520	<5
	17AUG89	2	152	<30	.	.	<10	<10	6,220	6,200	<5
	17AUG89	3	126	<30	.	.	<10	<10	6,620	6,660	<5
	30AUG89		120	103	8	88	<10	<10	5,930	5,930	<5
	30AUG89	1	95	<30	.	.	<10	<10	5,660	6,070	<5
	30AUG89	2	109	<30	.	.	<10	<10	6,160	5,500	<5
	30AUG89	3	105	<30	.	.	<10	<10	5,810	5,820	<5
2-E25-30	18JUL89		2,010	99	<5	<5	<10	<10	5,840	6,800	7
	29AUG89		1,280	44	<5	<5	<10	<10	7,360	7,310	8

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	IRON ppb 30/300s	FIION ppb 30/.s	FLEAD ppb 5/50	LEADGF ppb 5/50	FLITHIU ppb 10/.	LITHIUM ppb 10/.	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s
2-E25-31	14JUL89		609	<30	<5	<5	<10	<10	8,680	8,580	<5
	17AUG89		179	<30	.	.	<10	<10	8,620	7,210	<5
	17AUG89	1	323	<30	.	.	<10	<10	8,740	7,220	<5
	17AUG89	2	95	<30	.	.	<10	<10	8,680	8,650	<5
	17AUG89	3	217	<30	.	.	<10	<10	8,510	7,110	<5
	30AUG89		137	<30	<5	<5	<10	<10	8,050	7,840	<5
	30AUG89	1	232	<30	.	.	<10	<10	8,850	7,990	<5
	30AUG89	2	262	<30	.	.	<10	<10	8,890	7,810	<5
	30AUG89	3	178	<30	.	.	<10	<10	8,380	7,920	<5
2-E25-32	13JUL89		373	33	<5	<5	<10	<10	8,000	8,420	5
	13JUL89	1	297	<30	<5	<5	<10	<10	8,880	8,750	<5
	13JUL89	2	288	<30	.	.	<10	<10	8,940	8,580	<5
	13JUL89	3	167	33	.	.	<10	<10	4,850	8,810	8
	29AUG89		164	34	<5	<5	<10	<10	8,640	8,130	<5
	30AUG89	1	205	<30	.	.	<10	<10	8,180	8,280	<5
	30AUG89	2	112	38	.	.	<10	<10	8,080	8,340	<5
	30AUG89	3	166	<30	.	.	<10	<10	8,270	8,050	<5
2-E25-33	27JUL89		586	<30	<5	<5	<10	<10	7,010	7,080	<5
	27JUL89	1	623	<30	.	.	<10	<10	8,980	7,170	<5
	27JUL89	2	701	<30	.	.	<10	<10	8,710	7,080	<5
	27JUL89	3	585	87	.	.	<10	<10	8,520	7,180	<5
	31AUG89		78	<30	<5	<5	<10	<10	7,140	7,080	<5
	31AUG89	1	107	<30	.	.	<10	<10	7,060	8,880	<5
	31AUG89	2	77	<30	.	.	<10	<10	7,200	8,670	<5
	31AUG89	3	76	<30	.	.	<10	<10	7,550	7,180	<5

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	MANGESE ppb 6/50s	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	PHOSPHA ppb 1000/.	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5
2-E25-18	23JUN89		7	<10	<10	88,700	<1000	5,860	6,890	0.27500
	30AUG89		9	<10	<10	87,000	<1000	6,330	6,840	*0.08650
2-E25-20	21JUN89		<5	<10	<10	224,000	<1000	11,100	11,100	0.16700
	31AUG89		<5	<10	<10	235,000	<1000	12,800	13,100	*-0.00189
2-E25-22	18AUG89		<5	<10	<10	3,300	<1000	4,780	5,250	*0.10500
	30AUG89		<5	<10	<10	3,100	<1000	5,860	5,400	*-0.02150
2-E25-24	21JUN89		20	<10	<10	1,300	<1000	7,630	8,080	*0.02760
	30AUG89		12	<10	<10	1,200	<1000	8,390	8,380	*0.03800
2-E25-25	21JUN89		<5	11	<10	800	<1000	3,490	3,760	*-0.03630
	21JUN89	1	5	22	<10	.	.	3,240	3,540	.
	21JUN89	2	<5	<10	<10	.	.	3,270	3,500	.
	21JUN89	3	<5	24	<10	.	.	3,290	3,630	.
	30AUG89		<5	<10	<10	900	<1000	3,940	3,690	*0.03750
	30AUG89	1	<5	<10	<10	.	.	3,830	3,560	.
	30AUG89	2	<5	<10	<10	.	.	3,830	3,830	.
	30AUG89	3	<5	<10	<10	.	.	3,900	3,760	.
	30AUG89		<5	<10	<10	.	.	3,900	3,760	.
2-E25-26	12JUL89		<5	<10	<10	1,800	<1000	4,190	4,560	*0.05340
	11AUG89		<5	<10	<10	1,500	<1000	4,730	3,860	*-0.01940
	29AUG89		<5	<10	<10	1,400	<1000	4,620	4,090	0.19500
2-E25-27	12JUL89		8	<10	<10	2,270	<1000	4,430	4,410	*0.01180
	31AUG89		<5	<10	11	2,200	<1000	4,360	4,290	*0.01770
2-E25-28	20JUL89		<5	<10	<10	998	<1000	3,730	3,820	0.18600
	29AUG89		<5	<10	<10	1,000	<1000	4,000	4,120	*0.11000
	29AUG89	1	<5	<10	<10	900	<1000	3,800	3,960	.
2-E25-29	14JUL89		8	27	<10	12,900	<1000	4,800	5,950	0.31100
	17AUG89		<5	13	<10	.	.	5,120	4,510	.
	17AUG89	1	<5	<10	<10	.	.	5,030	4,730	.
	17AUG89	2	<5	16	<10	.	.	4,820	4,680	.
	17AUG89	3	<5	12	<10	.	.	5,210	4,980	.
	30AUG89		<5	<10	<10	9,100	<1000	4,850	4,420	0.25700
	30AUG89	1	<5	<10	<10	.	.	5,020	4,740	.
	30AUG89	2	8	<10	<10	.	.	4,590	5,240	.
	30AUG89	3	<5	<10	<10	.	.	4,850	4,900	.
2-E25-30	18JUL89		46	208	20	8,400	3280	8,940	7,440	0.40700
	29AUG89		34	158	16	8,700	1700	10,100	9,270	0.29500

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	MANGESE ppb 5/50s	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	PHOSPHA ppb 1000/.	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5
2-E25-31	14 JUL 89		11	22	<10	11,100	<1000	5,090	5,970	*0.13800
	17 AUG 89		<5	14	<10	.	.	5,750	5,090	.
	17 AUG 89	1	9	21	<10	.	.	5,550	5,220	.
	17 AUG 89	2	<5	11	<10	.	.	5,180	5,140	.
	17 AUG 89	3	5	<10	<10	.	.	5,500	5,150	.
	30 AUG 89		<5	11	<10	22,400	<1000	5,850	5,370	*0.04510
	30 AUG 89	1	8	23	<10	.	.	5,970	5,890	.
	30 AUG 89	2	7	22	<10	.	.	5,700	5,950	.
	30 AUG 89	3	5	14	<10	.	.	5,850	5,570	.
2-E25-32	13 JUL 89		9	43	<10	1,270	<1000	3,980	4,290	*-0.06020
	13 JUL 89	1	7	28	<10	1,020	<1000	4,180	4,020	0.17500
	13 JUL 89	2	7	26	<10	.	.	4,040	4,320	.
	13 JUL 89	3	<5	18	<10	.	.	4,090	3,530	.
	29 AUG 89		<5	21	<10	800	<1000	4,000	3,880	*0.04510
	30 AUG 89	1	<5	24	<10	.	.	3,900	3,930	.
	30 AUG 89	2	<5	19	<10	.	.	3,980	3,890	.
	30 AUG 89	3	<5	18	<10	.	.	3,770	4,060	.
2-E25-33	27 JUL 89		13	27	<10	7,800	<1000	5,080	4,910	*0.09810
	27 JUL 89	1	14	31	<10	.	.	5,120	4,850	.
	27 JUL 89	2	14	32	<10	.	.	5,020	4,670	.
	27 JUL 89	3	12	19	<10	.	.	5,080	4,600	.
	31 AUG 89		<5	<10	<10	7,400	<1000	5,400	5,230	*0.13300
	31 AUG 89	1	7	10	<10	.	.	5,280	5,180	.
	31 AUG 89	2	7	12	<10	.	.	5,100	5,340	.
	31 AUG 89	3	<5	<10	<10	.	.	5,370	5,620	.

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	RU-106 pCi/L 172.5/30r	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	FSTRONT ppb 10/.	STRONTIUM ppb 10/.	SULFATE ppb 500/250000s
2-E25-18	23JUN89		.	17,800	18,000	20,300	20,000	170	178	28,300
	30AUG89		.	18,700	18,100	17,900	19,400	167	183	23,700
2-E25-20	21JUN89		.	23,200	23,100	48,400	50,300	304	310	78,400
	31AUG89		.	28,400	27,500	53,500	51,300	328	352	88,000
2-E25-22	18AUG89		.	17,800	19,700	15,300	13,900	96	108	20,900
	30AUG89		.	21,100	21,200	15,500	16,600	112	113	21,500
2-E25-24	21JUN89		.	29,300	30,000	18,200	17,700	127	131	22,700
	30AUG89		.	31,400	32,200	18,200	17,800	128	133	20,800
2-E25-25	21JUN89		.	7,620	7,550	4,710	4,620	115	114	14,000
	21JUN89	1	.	7,200	7,450	4,540	4,340	108	112	.
	21JUN89	2	.	7,080	7,340	4,460	4,310	105	111	.
	21JUN89	3	.	7,100	7,660	4,650	4,320	107	118	.
	30AUG89		.	9,020	8,980	4,880	5,070	107	110	11,800
	30AUG89	1	.	8,880	8,510	4,580	4,870	103	104	.
	30AUG89	2	.	8,060	9,120	4,970	4,550	95	111	.
	30AUG89	3	.	8,630	9,130	4,940	4,970	105	112	.
	30AUG89		.							
2-E25-26	12JUL89		.	13,800	14,800	10,100	9,280	111	119	17,500
	11AUG89		.	15,400	13,200	8,740	10,600	123	99	15,700
	29AUG89		.	14,800	14,000	9,070	10,000	113	108	16,300
2-E25-27	12JUL89		.	14,300	14,100	9,820	9,840	120	117	19,300
	31AUG89		.	13,800	13,700	8,920	8,830	105	107	16,700
2-E25-28	20JUL89		.	16,000	16,200	10,100	10,300	102	95	13,800
	29AUG89		.	16,500	17,900	11,500	10,800	97	110	14,100
	29AUG89	1	.	15,700	17,200	11,000	10,100	92	106	14,200
2-E25-29	14JUL89		*3.16	17,600	17,500	34,300	24,500	128	138	50,800
	17AUG89		.	21,000	17,700	22,700	26,000	133	115	.
	17AUG89	1	.	20,400	18,900	23,800	25,500	129	124	.
	17AUG89	2	.	19,300	18,800	23,500	24,300	123	121	.
	17AUG89	3	.	20,700	20,000	25,100	26,100	132	130	.
	30AUG89		.	19,800	18,700	21,300	22,300	114	114	35,000
	30AUG89	1	.	19,800	18,200	22,700	23,600	119	113	.
	30AUG89	2	.	18,100	19,900	24,600	21,900	108	126	.
	30AUG89	3	.	18,500	18,400	23,100	22,400	111	117	.
2-E25-30	18JUL89		.	28,400	23,800	77,100	83,700	189	156	84,200
	29AUG89		.	31,000	29,300	66,400	68,200	211	207	79,000

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	RU-106 pCi/L 172.5/30r	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	FSTRONT ppb 10/.	STRONUM ppb 10/.	SULFATE ppb 500/250000s
2-E25-31	14 JUL 89		*0.00	17,400	17,400	22,400	18,800	124	129	28,200
	17 AUG 89		.	19,900	18,800	18,600	21,500	135	120	.
	17 AUG 89	1	.	19,900	18,800	19,000	20,900	133	122	.
	17 AUG 89	2	.	17,900	18,300	18,700	19,500	122	120	.
	17 AUG 89	3	.	19,300	17,900	18,700	20,600	131	118	.
	30 AUG 89		.	19,400	17,900	20,100	21,400	145	143	30,000
	30 AUG 89	1	.	19,600	20,000	21,900	21,800	145	157	.
	30 AUG 89	2	.	19,000	20,200	22,200	20,800	139	157	.
	30 AUG 89	3	.	19,500	19,300	20,800	21,600	146	149	.
2-E25-32	13 JUL 89		.	9,660	10,100	6,430	6,030	119	131	13,300
	13 JUL 89	1	.	9,500	9,550	6,020	6,330	125	124	13,300
	13 JUL 89	2	.	9,300	9,900	6,480	6,070	120	130	.
	13 JUL 89	3	.	9,390	8,140	5,260	6,270	120	108	.
	29 AUG 89		.	9,460	10,000	5,780	5,790	105	112	11,800
	30 AUG 89	1	.	9,620	9,650	5,620	5,620	104	108	.
	30 AUG 89	2	.	9,850	9,490	5,740	5,660	105	106	.
	30 AUG 89	3	.	9,290	9,810	5,970	5,400	100	109	.
2-E25-33	27 JUL 89		.	19,900	19,700	27,000	27,800	137	138	44,900
	27 JUL 89	1	.	20,100	19,700	26,800	28,000	138	137	.
	27 JUL 89	2	.	19,800	19,000	25,700	27,500	137	132	.
	27 JUL 89	3	.	20,400	18,300	25,200	27,900	140	127	.
	31 AUG 89		.	19,600	20,400	28,800	26,100	135	141	44,000
	31 AUG 89	1	.	19,600	20,300	28,400	25,300	129	138	.
	31 AUG 89	2	.	18,900	20,600	28,900	24,200	124	140	.
	31 AUG 89	3	.	20,100	21,500	30,400	27,000	141	149	.

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	TC ppb 1000/.	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/1	U pCi/L 0.5/600d	FLUORIDE ppb 5/.	VANADIUM ppb 5/.	ZINC ppb 5/5000s	FE ppb 5/5000s
2-E25-18	23JUN89		.	.	.	.	33	33	31	17
	30AUG89		.	.	.	.	31	32	33	9
2-E25-20	21JUN89		.	.	.	.	35	34	13	<5
	31AUG89		.	.	.	.	35	36	11	<5
2-E25-22	18AUG89		.	.	.	.	39	45	8	7
	30AUG89		.	.	.	.	43	48	<5	10
2-E25-24	21JUN89		.	.	.	.	129	129	6	<5
	30AUG89		.	.	.	.	130	139	<5	<5
2-E25-25	21JUN89		.	.	.	.	10	11	6	<5
	21JUN89	1	.	.	.	.	<5	11	<5	<5
	21JUN89	2	.	.	.	.	8	7	<5	<5
	21JUN89	3	.	.	.	.	6	12	<5	<5
	30AUG89		.	.	1.1	.	8	11	<5	7
	30AUG89	1	.	.	.	.	11	11	<5	<5
	30AUG89	2	.	.	.	.	7	11	<5	<5
	30AUG89	3	.	.	.	.	8	10	<5	<5
2-E25-26	12JUL89		17,500	.	0.4	.	28	32	23	8
	11AUG89		18,500	2,590	0.5	0.978	28	15	13	7
	29AUG89		18,000	.	0.9	.	24	21	10	7
2-E25-27	12JUL89		.	.	.	.	25	25	11	14
	31AUG89		.	.	.	.	19	18	9	12
2-E25-28	20JUL89		.	.	.	.	42	38	9	<5
	24JUL89		18,700	.	0.1	.	.	.	.	.
	28AUG89		18,300	.	<0.1	.	37	40	11	10
	29AUG89	1	18,200	.	0.1	.	36	39	9	10
2-E25-29	14JUL89		.	85,700	.	.	35	38	8	5
	17AUG89		.	.	.	.	44	35	<5	<5
	17AUG89	1	.	.	.	.	43	38	<5	<5
	17AUG89	2	.	.	.	.	40	38	<5	<5
	17AUG89	3	.	.	.	.	40	37	<5	8
	30AUG89		.	.	2.1	.	30	34	18	7
	30AUG89	1	.	.	.	.	34	32	7	<5
	30AUG89	2	.	.	.	.	27	39	5	5
	30AUG89	3	.	.	.	.	36	33	10	6
2-E25-30	18JUL89		.	.	.	.	79	66	<5	<5
	29AUG89		.	.	.	.	79	78	7	<5

TABLE 14.6. (contd)

Well name	Collection Date	Duplicate sample number	TC ppb 1000/.	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/1	U pCi/L 0.5/500d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-E25-31	14JUL89		.	10,100	.	.	35	36	15	<5
	17AUG89		.	.	.	.	40	35	6	<5
	17AUG89	1	.	.	.	.	39	31	9	<5
	17AUG89	2	.	.	.	.	34	32	<5	<5
	17AUG89	3	.	.	.	.	39	33	7	<5
	30AUG89		.	.	2.1	.	32	36	<5	<5
	30AUG89	1	.	.	.	.	33	39	5	9
	30AUG89	2	.	.	.	.	30	38	7	<5
	30AUG89	3	.	.	.	.	30	38	6	5
2-E25-32	13JUL89		17,600	.	0.6	.	9	12	6	<5
	13JUL89	1	.	.	.	.	15	12	9	<5
	13JUL89	2	.	.	.	.	14	12	6	<5
	13JUL89	3	.	.	.	.	11	11	8	5
	29AUG89		16,300	.	0.9	.	8	10	7	8
	29AUG89	1	.	.	1.8	.	.	.	.	.
	30AUG89	1	.	.	.	.	12	<5	8	5
	30AUG89	2	.	.	.	.	9	11	13	<5
	30AUG89	3	.	.	.	.	9	8	<5	<5
2-E25-33	27JUL89		.	.	.	.	29	32	<5	<5
	27JUL89	1	.	.	.	.	30	31	<5	9
	27JUL89	2	.	.	.	.	32	30	<5	<5
	27JUL89	3	.	.	.	.	33	28	<5	<5
	31AUG89		.	.	0.4	.	34	28	6	37
	31AUG89	1	.	.	.	.	29	27	6	<5
	31AUG89	2	.	.	.	.	27	24	7	<5
	31AUG89	3	.	.	.	.	26	34	9	6

The column headers consist of : Constituent Name
Analysis Units
Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-670/9-75-003
p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
s - based on Secondary Maximum Contaminant Levels in 40 CFR Part 143, National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides in draft DOE Order 5400.xx
u - based on additional Secondary Maximum Contaminant Levels in WAC 246-54, Public Water Supplies

Data flags

< - Less than Contractual Detection Limit, reported as Limit
- Less than Contractual Detection Limit, measured value reported
* - For radioactive constituents, reported value is less than 2-sigma error

(a) Value was different from a duplicate sample with the same identification.

(b) Suspect data. The reagent blank for this group showed contamination for this constituent.

**TABLE 14.7. Contamination Indicator Parameters Replicate Averages for the Grout Treatment Facility
for June through August 1989**

Constituent Code Name Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088 CDNDLAB umho	2-E25-32	29AUG89	1	160	.	160	160	.
191 CONDFLD umho	2-E25-25	21JUN89	4	108	0.6	106	108	0.6
	2-E25-25	23JUN89	4	169	0.0	169	169	0.0
	2-E25-25	30AUG89	4	149	0.6	148	149	0.3
	2-E25-29	14JUL89	4	302	0.6	301	302	0.2
	2-E25-29	17AUG89	1	289	.	289	289	.
	2-E25-29	30AUG89	4	259	1.0	258	260	0.4
	2-E25-31	14JUL89	4	228	0.6	227	228	0.2
	2-E25-31	17AUG89	1	262	.	262	262	.
	2-E25-31	30AUG89	4	278	8.8	268	287	3.2
	2-E25-32	13JUL89	4	173	0.8	172	174	0.5
	2-E25-32	29AUG89	4	138	3.6	134	142	2.6
	2-E25-33	27JUL89	4	200	0.5	199	200	0.3
	2-E25-33	31AUG89	4	320	0.8	319	321	0.3
199 PHFIELD	2-E25-25	21JUN89	4	7.90	0.008	7.89	7.90	0.1
	2-E25-25	23JUN89	4	8.41	0.006	8.40	8.41	0.1
	2-E25-25	30AUG89	4	8.28	0.006	8.27	8.28	0.1
	2-E25-29	14JUL89	4	8.10	0.017	8.07	8.11	0.2
	2-E25-29	17AUG89	1	8.17	.	8.17	8.17	.
	2-E25-29	30AUG89	4	8.19	0.017	8.17	8.21	0.2
	2-E25-31	14JUL89	4	7.80	0.000	7.80	7.80	0.0
	2-E25-31	17AUG89	1	7.99	.	7.99	7.99	.
	2-E25-31	30AUG89	4	8.06	0.010	8.04	8.06	0.1
	2-E25-32	13JUL89	4	8.97	0.041	8.92	7.01	0.6
	2-E25-32	29AUG89	4	8.22	0.006	8.21	8.22	0.1
	2-E25-33	27JUL89	4	8.08	0.010	8.07	8.09	0.1
	2-E25-33	31AUG89	4	7.90	0.006	7.89	7.90	0.1
207 PH-LAB	2-E25-32	29AUG89	1	8.10	.	8.10	8.10	.
C69 TOC ppb	2-E25-25	21JUN89	4	926	60	900	1,000	6.4
	2-E25-25	30AUG89	4	900	82	800	1,000	9.1
	2-E25-29	14JUL89	4	1,100	271	900	1,600	24.6
	2-E25-29	30AUG89	4	876	287	700	1,300	32.8
	2-E25-31	14JUL89	4	1,080	160	1,000	1,300	14.0
	2-E25-31	30AUG89	4	1,260	68	1,200	1,300	4.6
	2-E25-32	13JUL89	4	958	164	767	1,140	16.1
	2-E25-32	29AUG89	4	1,000	337	800	1,600	33.7
	2-E25-33	27JUL89	4	660	100	500	700	18.2
	2-E25-33	31AUG89	4	876	128	600	800	18.6

TABLE 14.7 (contd)

Constituent Code Name Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
H42 TOXLDL ppb	2-E25-25	21 JUN 89	4	7.25	0.98	6	8	13.2
	2-E25-25	30 AUG 89	4	8.75	2.22	6	11	25.3
	2-E25-29	14 JUL 89	4	816.00	689.00	280	1,460	72.2
	2-E25-29	30 AUG 89	4	97.30	21.10	79	123	21.7
	2-E25-31	14 JUL 89	4	123.00	2.87	119	125	2.3
	2-E25-31	30 AUG 89	4	203.00	4.69	199	208	2.3
	2-E25-32	13 JUL 89	4	6.75	2.06	6	9	30.6
	2-E25-32	29 AUG 89	4	4.75	1.60	3	6	31.6
	2-E25-33	27 JUL 89	4	1.50	1.00	1	3	66.7
	2-E25-33	31 AUG 89	4	4.75	4.60	1	10	94.7

**TABLE 14.8. Statistical Comparisons of Grout Treatment Facility
Ground-Water Monitoring Data, June Through July 1989
and August 1989**

<u>Contamination Indicator Parameter(a)</u>	<u>df</u>	<u>tc</u>	<u>Background Average</u>	<u>Standard Deviation</u>	<u>Critical Mean (or range)</u>
Specific Conductance, $\mu\text{mho/cm}$	8	5.0413	151.7	27.77	299.3
pH	8	5.6174	8.32	0.306	(6.51, 10.13)
Total Organic Carbon, ppb	8	5.0413	737.9	150.6	1,538.1
Total Organic Halogens, ppb	8	5.0413	29.6	69.70	400.0
Total Organic Halogens (without October 1988 sample from 299-E25-25), ppb	7	5.4079	6.3	3.20	24.7

(a) The following abbreviations are used in this table:
df = Degrees of freedom (n-1).
ppb = Parts per billion.
tc = Bonferroni critical t-value for appropriate df and 20 comparisons
(4 parameters * 5 wells).
 $\mu\text{mho/cm}$ = Micromho/centimeter.

15.0 SINGLE-SHELL TANKS

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The interim-status ground-water monitoring project at the Single-Shell Tanks (SST) was initiated in June 1989 in conformance with RCRA. There are 149 underground SST, located in 7 Waste Management Areas in the 200-East and 200-West Areas on the Hanford Site (see Figure 1.1). These tanks were constructed between 1943 and 1964 to store mixed, radioactive, and hazardous wastes that were a result of Hanford defense operations. They are constructed of single-walled carbon steel liner in a concrete tank. These tanks are no longer in active service, and there is an ongoing program to pump the supernate and interstitial liquids from the SST to double shell tanks. This program is scheduled for completion in 1995.

The installation of 12 monitoring and characterization wells is planned for CY 1989. There are 51 existing ground-water monitoring wells within 1000 ft of the SST. These existing wells will be evaluated according to the ground-water monitoring plan for possible use in the ground-water monitoring network around the SST.

During this quarter, a ground-water monitoring plan was prepared, and 6 of the 12 CY 1989 ground-water monitoring wells have been constructed.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Drilling and installation of the following monitoring wells was completed this quarter:

- 299-E24-19
- 299-E25-40
- 299-E25-41
- 299-E33-31
- 299-E33-32
- 299-E33-33.

The location of these wells and the wells that remain to be drilled are shown in Figures 15.1 to 15.7. During construction, radiological and chemical monitoring data were collected, the geology was described, and the wells

were geophysically logged with a natural gamma probe and inspected with a down-hole television camera. Slug testing and development is being performed on each well after it is completed.

WATER LEVELS

Water-level monitoring will begin after the wells have been surveyed for location and elevation. Water-level measurements will also be taken before sampling.

WATER CHEMISTRY DATA

The 12 new CY 1989 and 25 existing monitoring wells are scheduled for sample collection in February 1990 (Table 15.1).

FIGURE 15.1. Monitoring Well Locations for Waste Management Area A-AX

FIGURE 15.2. Monitoring Well Locations for Waste Management Area B-BX-BY

FIGURE 15.3. Monitoring Well Locations for Waste Management Area C

FIGURE 15.4. Monitoring Well Locations for Waste Management Area S-SX

FIGURE 15.5. Monitoring Well Locations for Waste Management Area T

FIGURE 15.6. Monitoring Well Locations for Waste Management Area TX-TY

FIGURE 15.7. Monitoring Well Locations for Waste Management Area U

TABLE 15.1. Sample Analysis Schedule for the Single-Shell Tanks

Well	FY 90											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E24-13					X			X			X	
299-E25-2					X			X			X	
299-E25-1					X			X			X	
299-E25-13					X			X			X	
299-E25-15					X			X			X	
299-E25-16					X			X			X	
299-E33-19					X			X			X	
299-E33-20					X			X			X	
299-E33-1					X			X			X	
299-E33-5					X			X			X	
299-E33-8					X			X			X	
299-E33-9					X			X			X	
299-E33-18					X			X			X	
299-E33-21					X			X			X	
299-E33-24					X			X			X	
299-E33-27					X			X			X	
299-E27-7					X			X			X	
299-W10-3					X			X			X	
299-W10-8					X			X			X	
299-W10-9					X			X			X	
299-W10-10					X			X			X	
299-W10-11					X			X			X	
299-W10-12					X			X			X	
299-W11-23					X			X			X	
299-W11-24					X			X			X	
299-E24-19					X			X			L	
299-E25-40					X			X			L	
299-E25-41					X			X			L	
299-E33-31					X			X			L	
299-E33-32					X			X			L	
299-E33-33					X			X			L	
299-E27-12					X			X			L	
299-E27-13					X			X			L	
299-E27-14					X			X			L	
299-E27-15					X			X			L	
299-W10-15					X			X			L	
299-W10-16					X			X			L	

X = Regular constituent list (40 CFR 265).

L = Long constituent list (WAC 173-303-9905).

16.0 REFERENCES

40 CFR 141. U.S. Environmental Protection Agency, "National Primary Drinking Water Regulations." U.S. Code of Federal Regulations.

40 CFR 143. U.S. Environmental Protection Agency, "National Secondary Drinking Water Regulations." U.S. Code of Federal Regulations.

40 CFR 261. U.S. Environmental Protection Agency, "Identification and Listing of Hazardous Waste." U.S. Code of Federal Regulations.

40 CFR 265. U.S. Environmental Protection Agency, "Interim Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities." U.S. Code of Federal Regulations.

50 FR 46936. U.S. Environmental Protection Agency, "Proposed Maximum Containment Level Goals." Federal Register.

ASTM. 1987. "Standard Terminology for Statistical Methods." E456-83a in Annual Book of ASTM Standards, Vol. 1402. American Society for Testing and Materials, Philadelphia, Pennsylvania.

Cline, C. S., J. T. Rieger, J. R. Raymond, and P. A. Eddy. 1985. Ground-water Monitoring at the Hanford Site, January-December 1984. PNL-5408, Pacific Northwest Laboratory, Richland, Washington.

DOE Order 5400.XX. "Radiation Protection of the Public and the Environment." Draft October 10, 1988, U.S. Department of Energy, Washington, D.C.

DOE. 1988a. Final Status Post-Closure Permit Application for the 183-H Solar Evaporation Basins. Prepared by Westinghouse Hanford Company for the U.S. Department of Energy, Richland, Washington.

DOE. 1988b. Grout Treatment Facility Dangerous Waste Permit Application. 88-27, prepared by Westinghouse Hanford Company for the U.S. Department of Energy, Richland, Washington.

EPA. 1976. National Primary Drinking Water Regulations. EPA-570/9-76-003, U.S. Environmental Protection Agency, Washington, D.C.

EPA. 1986a. Resource Conservation and Recovery Act (RCRA) Ground-Water Monitoring Technical Enforcement Guidance Document. OWSER-9950.1, U.S. Environmental Protection Agency, Washington, D.C.

EPA. 1986b. Test Methods for Evaluating Solid Waste. SW-846, 3rd edition, U.S. Environmental Protection Agency, Washington, D.C.

Fruiland, R. M., and R. E. Lundgren. 1989. RCRA Ground-Water Monitoring Projects for Hanford Facilities: Annual Progress Report for 1988. PNL-6852, Pacific Northwest Laboratory, Richland, Washington.

Fruland, R. M., D. J. Bates, and R. E. Lundgren, eds. 1989a. Resource Conservation and Recovery Act Ground-Water Monitoring Projects for Hanford Facilities: Progress Report for the Period July 1 to September 30, 1988. PNL-6789, Pacific Northwest Laboratory, Richland, Washington.

Fruland, R. M., D. J. Bates, and R. E. Lundgren, eds. 1989b. Resource Conservation and Recovery Act Ground-Water Monitoring Projects for Hanford Facilities: Progress Report for the Period October 1 to December 31, 1988. PNL-6844, Pacific Northwest Laboratory, Richland, Washington.

Fruland, R. M., R. A. Hagan, C. S. Cline, D. J. Bates, J. C. Evans, and R. L. Aaberg. 1989. Interim Site Characterization Report and Ground-Water Monitoring Program for the Hanford Site Solid Waste Landfill. PNL-6823, Pacific Northwest Laboratory, Richland, Washington.

Gilmore, T. J. 1989. Ground-Water Quality Assessment Program for the 1324-N/NA Facilities. WHC-SD-EN-AP-005, Westinghouse Hanford Company, Richland, Washington.

Gilmore, T. J., and E. J. Jensen. 1989. Ground-Water Quality Assessment Program for the 1301-N Liquid Waste Disposal Facility. WHC-SD-EN-AP-004, Westinghouse Hanford Company, Richland, Washington.

Hall, S. H. 1988. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Annual Progress Report for 1987. PNL-6678, Pacific Northwest Laboratory, Richland, Washington.

Last, G. V., B. N. Bjornstad, M. P. Bergeron, R. W. Wallace, D. R. Newcomer, J. A. Schramke, M. A. Chamness, C. S. Cline, S. P. Airhart, and J. S. Wilbur. 1989. Hydrogeology of the 200 Areas Low-Level Burial Grounds--An Interim Report. PNL-6820, Pacific Northwest Laboratory, Richland, Washington.

Liikala, T. L., R. L. Aaberg, N. J. Aimo, D. J. Bates, T. J. Gilmore, E. J. Jensen, G. V. Last, P. L. Oberlander, K. B. Olsen, K. R. Oster, L. R. Roome, J. C. Simpson, S. S. Teel, and E. J. Westergard. 1988. Geohydrologic Characterization of the Area Surrounding the 183-H Solar Evaporation Basins. PNL-6728, Pacific Northwest Laboratory, Richland, Washington.

PNL. 1986. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Progress Report for the Period May 1 to September 30, 1986. PNL-6466, Pacific Northwest Laboratory, Richland, Washington.

PNL. 1987a. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Progress Report for the Period October 1 to December 31, 1986. Volumes 1, 2, and 3. PNL-6465, Pacific Northwest Laboratory, Richland, Washington.

PNL. 1987b. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Progress Report for the Period January 1 to March 31, 1987. Volumes 1, 2, and 3. PNL-6467, Pacific Northwest Laboratory, Richland, Washington.

PNL. 1987c. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Progress Report of the Period April 1 to June 30, 1987. PNL-6468, Pacific Northwest Laboratory, Richland, Washington.

PNL. 1987d. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Progress Report for the Period July 1 to September 30, 1987. PNL-6469, Pacific Northwest Laboratory, Richland, Washington.

PNL. 1988a. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Annual Progress Report for 1987. PNL-6678, Pacific Northwest Laboratory, Richland, Washington.

PNL. 1988b. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Progress Report for the Period October 1 to December 31, 1987. PNL-6536, Pacific Northwest Laboratory, Richland, Washington.

PNL. 1988c. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Progress Report for the Period January 1 to March 31, 1988. PNL-6581, Pacific Northwest Laboratory, Richland, Washington.

PNL. 1988d. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Progress Report for the Period April 1 to June 30, 1988. PNL-6675, Pacific Northwest Laboratory, Richland, Washington.

Resource Conservation and Recovery Act of 1976. Public Law 94-580, as amended. 90 Stat. 2795 (Title 42).

Schalla, R., R. L. Aaberg, D. J. Bates, J. V. M. Carlile, M. D. Freshley, T. L. Liikala, P. J. Mitchell, K. B. Olsen, and J. T. Rieger. 1988a. Revised Ground-Water Monitoring Compliance Plan for the 300 Area Process Trenches. PNL-6671, Pacific Northwest Laboratory, Richland, Washington.

Schalla, R., R. W. Wallace, R. L. Aaberg, S. P. Airhart, D. J. Bates, J. V. M. Carlile, C. S. Cline, D. I. Dennison, M. D. Freshley, P. R. Heller, E. R. Jensen, K. B. Olsen, R. G. Parkhurst, J. T. Rieger, and E. J. Westergard. 1988b. Interim Characterization Report for the 300 Area Process Trenches. PNL-6716, Pacific Northwest Laboratory, Richland, Washington.

Smith, R. M., D. J. Bates, and R. E. Lundgren. 1989a. Resource Conservation and Recovery Act Ground-Water Monitoring Projects for Hanford Facilities: Progress Report for the Period January 1 to March 30, 1989. PNL-6957, Pacific Northwest Laboratory, Richland, Washington.

Smith, R. M., D. J. Bates, and R. E. Lundgren. 1989b. Resource Conservation and Recovery Act Ground-Water Monitoring Projects for Hanford Facilities: Progress Report for the Period April 1 to June 30, 1989. PNL-7134, Pacific Northwest Laboratory, Richland, Washington.

Stanley, T. W., and S. S. Verner. 1983. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans. EPA-600/4-83-004, U.S. Environmental Protection Agency, Washington, D.C.

Swanson, L. C., D. C. Weekes, S. P. Luttrell, R. M. Mitchell, D. S. Landeen, A. R. Johnson, and R. C. Roos. 1988. Grout Treatment Facility Environmental Baseline and Site Characterization Report. WHC-EP-0150, Westinghouse Hanford Company, Richland, Washington.

WAC 173-303. Washington State Department of Ecology, "Dangerous Waste Regulations." Washington Administrative Code.

WAC 173-304. Washington State Department of Ecology, "Minimum Functional Standards for Solid Waste Handling." Washington Administrative Code.

WAC 248-54. Washington State Department of Social and Health Services, "Public Water Supplies." Washington Administrative Code.

Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy. 1989. Hanford Federal Facility Agreement and Consent Order. Washington State Department of Ecology, Olympia, Washington.

Weekes, D. C., S. P. Luttrell, and M. R. Fuchs. 1987. Interim Hydrologic Characterization Report and Ground-Water Monitoring System for the Non-radioactive Dangerous Waste Landfill, Hanford Site, Washington. WHC-EP-0021, Westinghouse Hanford Company, Richland, Washington.

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