START

004895

RCRA Ground-Water Monitoring Projects for Hanford Facilities

Progress Report for the Period April 1 to June 30, 1989

September 1989

Prepared by the
Pacific Northwest Laboratory

for the
U.S. Department of Energy
Richland Operations Office

OCT 1989
RECEIVED
EDMC

9011771341

THIS PAGE INTENTIONALLY
LEFT BLANK

NOTICE

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or Battelle Memorial Institute.

PACIFIC NORTHWEST LABORATORY
operated by
BATTELLE MEMORIAL INSTITUTE
for the
UNITED STATES DEPARTMENT OF ENERGY
under Contract DE-AC06-76RLO 1830

Printed in the United States of America
Available from
National Technical Information Service
United States Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

NTIS Price Codes
Microfiche A01

Printed Copy

Pages	Price Codes
001-025	A02
026-050	A03
051-075	A04
076-100	A05
101-125	A06
126-150	A07
151-175	A08
176-200	A09
201-225	A10
226-250	A11
251-275	A12
276-300	A13

THIS PAGE INTENTIONALLY
LEFT BLANK

RESOURCE CONSERVATION AND RECOVERY ACT GROUND-WATER MONITORING PROJECTS FOR HANFORD FACILITIES

PROGRESS REPORT

FOR THE PERIOD APRIL 1 TO JUNE 30, 1989

September 1989

Prepared by the
Pacific Northwest Laboratory
for the U.S. Department of Energy
Richland Operations Office
Richland, Washington 99352

THIS PAGE INTENTIONALLY
LEFT BLANK

PREFACE

This document describes the progress of 13 Hanford Site ground-water monitoring projects for the period April 1 to June 30, 1989. 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.

THIS PAGE INTENTIONALLY
LEFT BLANK

SUMMARY

This report describes the progress of 13 Hanford ground-water monitoring projects for the period April 1 to June 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).

This report is the twelfth in a series of quarterly status reports; the first 11 cover the period from May 1, 1986, through March 31, 1989 (PNL 1986; 1987a, 1987b, 1987c, 1987d; 1988b, 1988c, 1988d; Fruland, Bates, and Lundgren 1989a, 1989b; Smith, Bates, and Lundgren 1989).

9 0 1 7 7 1 3 4 7

The 13 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.

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.

ASTM - American Society for Testing and Materials

CFR - U.S. Code of Federal Regulations

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

NRDW - Nonradioactive Dangerous Waste Landfill

PCE - perchloroethylene
pCi/L - pico curies per liter
PNL - Pacific Northwest Laboratory
ppb - parts per billion
ppm - parts per million
PUREX - plutonium-uranium extraction

RCRA - Resource Conservation and Recovery Act

SWL - Solid Waste Landfill
SWS - surface water station

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

VOC - volatile organic compounds, constituents, or chemicals

WAC - Washington Administrative Code
WMA - Waste Management Area

μg/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

ANALYTICAL ANOMALIES. 1.3

Methylene Chloride 1.3

Chromium 1.4

QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM 1.4

2.0 300 AREA PROCESS TRENCHES (R. Schalla). 2.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 2.2

Hydrogeologic Characterization 2.2

WATER LEVELS. 2.2

WATER CHEMISTRY DATA. 2.3

3.0 183-H SOLAR EVAPORATION BASINS (S. H. Hall) 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) 4.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 4.1

WATER LEVELS 4.2

WATER CHEMISTRY DATA 4.2

5.0 NONRADIOACTIVE DANGEROUS WASTE LANDFILL (R. M. Fruland) . . . 5.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 5.2

WATER LEVELS 5.2

WATER CHEMISTRY DATA 5.2

6.0 1301-N LIQUID WASTE DISPOSAL FACILITY (T. J. Gilmore) 6.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 6.2

WATER LEVELS 6.2

WATER CHEMISTRY DATA 6.2

INDICATOR PARAMETER SAMPLING RESULTS 6.3

Ground-Water Analyses Other Than Indicator Parameters 6.4

7.0 1324-N SURFACE IMPOUNDMENT AND 1324-NA PERCOLATION POND (T. J. Gilmore). 7.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 7.2

WATER LEVELS 7.2

WATER CHEMISTRY DATA 7.2

INDICATOR PARAMETER SAMPLING RESULTS 7.3

Ground-Water Analysis Other Than Indicator Parameters 7.4

8.0 1325-N LIQUID WASTE DISPOSAL FACILITY (T. J. Gilmore) 8.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 8.1

WATER LEVELS 8.1

BACKGROUND STATISTICAL DATA 8.2

WATER CHEMISTRY DATA 8.3

Discussion of Results. 8.3

Ground-Water Analyses Other Than Indicator Parameters 8.4

9.0 216-A-10 CRIB (S. P. Luttrell). 9.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 9.1

WATER LEVELS 9.1

WATER CHEMISTRY DATA 9.2

10.0 216-A-29 DITCH (S. P. Luttrell) 10.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 10.1

WATER LEVELS 10.1

WATER CHEMISTRY DATA 10.1

11.0 216-A-36B CRIB (S. P. Luttrell) 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) 12.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 12.1

WATER LEVELS 12.2

WATER CHEMISTRY DATA. 12.2

13.0 2101-M POND (M. A. Chamness). 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) 14.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 14.1

Drilling 14.1

Hydrogeologic Characterization 14.2

WATER LEVELS 14.3

WATER CHEMISTRY DATA 14.3

15.0 REFERENCES. 15.1

9 0 1 1 7 7 1 1 3 5 3

FIGURES

1.1 Location of the 13 RCRA Ground-Water Monitoring Projects and Landmarks on the Hanford Site, April 1989 . . . . . 1.6

2.1 Locations for Wells Used in June for the 27-Well Monitoring Network for the 300 Area Process Trenches 2.6

2.2 Water-Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer, May 1989 . . . . . 2.7

2.3 Water-Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer, June 1989. . . . . 2.8

2.4 Water Levels in Wells 399-1-16A and 399-1-16C, and SWS-2, May 26 through June 28, 1989 . . . . . 2.9

2.5 Water Levels in Wells 399-1-16A and 399-1-16C, January 1987 through July 1989 . . . . . 2.10

2.6 Water Levels in Wells 399-1-10 and 399-1-18, and SWS-2, April, May, and June 1989. . . . . 2.11

3.1 Monitoring Well Locations Near the 183-H Basins 3.4

3.2 Columbia River Elevation at the 100-H Area, February 27 to June 27, 1989. . . . . 3.5

4.1 Ground-Water Monitoring Wells Near Waste Management Area 1, 200-East Area 4.5

4.2 Ground-Water Monitoring Wells Near Waste Management Area 2, 200-East Area 4.6

4.3 Ground-Water Monitoring Wells Near Waste Management Area 3, 200-West Area 4.7

4.4 Ground-Water Monitoring Wells Near Waste Management Area 4, 200-West Area 4.8

4.5 Ground-Water Monitoring Wells Near Waste Management Area 5, 200-West Area 4.9

5.1 Monitoring Well Locations for the Solid Waste Landfill and the Nonradioactive Dangerous Waste Landfill 5.3

6.1 Monitoring Well Locations for the 1301-N Liquid Waste Disposal Facility 6.5

6.2 Water-Levels for the 100-N Area, April 1989 . . . . . 6.6

6.3 Water-Levels for the 100-N Area, May 1989 . . . . . 6.7

6.4 Water-Levels for the 100-N Area, June 1989 . . . . . 6.8

7.1 Monitoring Well Locations for the 1324-N/NA Facilities. . . . 7.5

8.1 Monitoring Well Network for the 1325-N Liquid Waste Disposal Facility 8.5

9.1 Monitoring Well Locations for the 216-A-10 Crib 9.3

10.1 Monitoring Well Locations for the 216-A-29 Ditch. 10.2

11.1 Monitoring Well Locations for the 216-A-36B Crib. 11.4

12.1 Monitoring Well Locations for the 216-B-3 Pond. 12.3

13.1 Monitoring Well Locations for the 2101-M Pond 13.3

14.1 Monitoring Well Locations for the Grout Treatment Facility 14.5

9 0 1 1 7 7 4 1 3 5 9

TABLES

1.1 Status of Hanford Site Resource Conservation and Recovery Act Interim-Status Ground-Water Monitoring Projects as of June 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 on May 19 and June 23, 1989 . . . . . 2.14

2.4 Constituent List and Summary of Sampling Results for the 300 Area Process Trenches, March through May 1989 . . . . . 2.15

2.5 Constituents with at Least One Detected Value for the 300 Area Process Trenches, March through May 1989 . . . . . 2.17

3.1 Sampling Schedule for the 183-H Solar Evaporation Basins . . 3.6

3.2 Water-Level Data for the 183-H Basins, April Through June 1989 . . . . . 3.7

3.3 Constituent List and Summary of Sampling Results for the 183-H Solar Evaporation Basins, May through June 1989 . . . . 3.12

3.4 Constituents with at Least One Detected Value for the 183-H Solar Evaporation Basins, May through June 1989 . . . . 3.22

4.1 Ground-Water Monitoring Wells for the 200 Areas Low-Level Burial Grounds 4.10

4.2 Sampling Schedule for the 200 Areas Low-Level Burial Grounds 4.11

4.3 Water-Level Data for Monitoring Wells Near the 200-East and 200-West Area Low-Level Burial Grounds 4.12

4.4 Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-1, March through May 1989. . . . . 4.15

4.5 Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-1, March through May 1989. . . . . 4.19

4.6 Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-2, December 1988 through February 1989 . . . . . 4.23

4.7 Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-2, March through May 1989. . . . . 4.27

4.8 Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-3, March through May 1989. . . . . 4.30

4.9 Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-3, March through May 1989. . . . . 4.34

4.10 Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-4, March through May 1989. . . . . 4.38

4.11 Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-4, March through May 1989. . . . . 4.42

5.1 Sampling Schedule for the Nonradioactive Dangerous Waste Landfill 5.4

5.2 Water-Level Data for Wells Monitoring the Nonradioactive Dangerous Waste Landfill and the Solid Waste Landfill, April, May, and June 1989 . . . . . 5.5

6.1 Water-Level Data for the 100-N Area, April, May, and June 1989 . . . . . 6.9

6.2 Revised 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, March 1989 through May 1989. . . . . 6.15

6.6 Constituents with at Least One Detected Value for the 1301-N Liquid Waste Disposal Facility, March 1989 through May 1989. . . . . 6.25

6.7 Critical Means Used to Compare March 1989 Samples at the 1301-N Liquid Waste Disposal Facility 6.28

6.8 Contamination Indicator Parameter Replicate Averages for the 1301-N Liquid Waste Disposal Facility, March Through May 1989. . . . . 6.29

7.1 The Regular Sampling List for the 1301-N Ground-Water Quality Assessment Monitoring Network 7.6

7.2 Short List for the 1324-N/NA Ground-Water Quality Assessment Monitoring Network 7.6

7.3 Revised Sampling Schedule for the 1324-N/NA Project 7.7

7.4 Constituent List and Summary of Sampling Results for the 1324-N Surface Impoundment and 1324-NA Percolation Pond, March 1989 through May 1989 . . . . . 7.8

7.5 Constituents with at Least One Detected Value for the 1324-N Surface Impoundment and 1324-NA Percolation Pond, March through May 1989 . . . . . 7.17

7.6 Critical Means Used to Compare March 1989 Samples at the 1324-N/NA Facilities 7.20

7.7 Contamination Indicator Parameter Replicate Averages for the 1324-N/NA Surface Impoundment and Percolation Pond, March through May 1989 . . . . . 7.21

8.1 Critical Means Used to Compare March 1989 Samples at the 1325-N Liquid Waste Disposal Facility 8.6

8.2 Revised Sampling Schedule for the 1325-N Liquid Waste Disposal Facility 8.7

8.3 The Regular Sampling List for the 1325-N Ground-Water Quality Assessment Monitoring Network 8.8

8.4 Contamination Indicator Parameter Replicate Averages for the 1325-N Liquid Waste Disposal Facility, March 1989 . . . . 8.9

8.5 Results of the May Resampling of Wells in the 1325-N Monitoring Network 8.11

8.6 Constituents with at Least One Detected Value for the 1325-N Liquid Waste Disposal Facility, May 1989 Contamination Indicator Parameter Resample 8.12

8.7 Constituent List and Summary of Sampling Results for the 1325-N Liquid Waste Disposal Facility, March 1989 . . . . 8.14

8.8 Constituents with at Least One Detected Value for the 1325-N Liquid Waste Disposal Facility, March 1989 . . . . . 8.23

9.1 Sampling Schedule for the 216-A-10 Crib 9.4

9.2 Water-Level Data for Wells Near the 216-A-10 Crib 9.5

10.1 Sampling Schedule for the 216-A-29 Ditch 10.3

10.2 Water-Level Data for Wells Near the 216-A-29 Ditch 10.3

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, March 1989 through May 1989 . . . . . 11.7

11.4 Constituents with at Least One Detected Value for the 216-A-36B Crib, March 1989 through May 1989 . . . . . 11.17

12.1 Sampling Schedule for the 216-B-3 Pond 12.4

12.2 Water-Level Data for Wells Near the 216-B-3 Pond 12.5

13.1 Sampling Schedule for the 2101-M Pond 13.4

13.2 Water-Level Elevation Data for Wells Near the 2101-M Pond 13.5

13.3 Constituent Lists and Summary of Sampling Results for the 2101-M Pond, March 1989 through May 1989. . . . . 13.6

13.4 Constituents with at Least One Detected Value for the 2101-M Pond, March 1989 through May 1989. . . . . 13.10

14.1 Sampling Schedule for the Grout Treatment Facility 14.6

14.2 Water-Level Data Taken Before Sample Collection at the Grout Treatment Facility, June 1989 . . . . . 14.7

14.3 Monthly Water-Level Data Collected During the Third Quarter of 1989 for the Grout Treatment Facility Ground-Water Monitoring Wells 14.8

14.4 List 2 Constituents for the Grout Treatment Facility 14.10

14.5 List 4 Constituents for the Grout Treatment Facility 14.10

THIS PAGE INTENTIONALLY
LEFT BLANK

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. The analytical results of the RCRA ground-water monitoring programs 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 either 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

9 0 1 1 7 1 1 3 6 0

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 April 1 through June 30, 1989, for 13 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, and the Grout Treatment Facility. 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 and the 1325-N LWDF are in the indicator evaluation phase, and the remaining programs are in the first year of background monitoring.

Eleven previous quarterly reports (PNL 1986; 1987a, 1987b, 1987c, 1987d; 1988b, 1988c, 1988d; Fruland, Bates, and Lundgren 1989a, 1989b; Smith, Bates, and Lundgren 1989) have been issued in this series and cover the period from May 1, 1986, to March 31, 1989. This report includes activities conducted during the second calendar quarter of 1989 (April 1 to June 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 (July 1 to September 30, 1989).

PURGE WATER

Throughout this report, changes in ground-water sampling schedules will be reported. Many of these changes resulted from decisions concerning purge water (water pumped from a well before and during sample collection) disposal. 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 remainder of the quarter.

ANALYTICAL ANOMALIES

Several projects report two constituents that are currently suspected of not representing true ground-water conditions. These are methylene chloride (dichloromethane), listed in WAC 173-303-9905 and 40 CFR 264, Appendix IX, and chromium (for some sites), listed in 40 CFR 265, Appendix III.

Methylene Chloride

This constituent has been found sporadically in volatile organic compound (VOC) and total organic halogen (TOX) samples since the implementation of RCRA ground-water monitoring in 1985. Early cases were apparently caused by contaminated sample bottles; a few bladder pumps in the 100-H and 300 Area wells may also have been contaminated by methylene chloride. Incidents of methylene chloride detection decreased to only spurious events until the summer of 1988.

Beginning in June and continuing into the fall of 1988, a number of elevated methylene chloride and TOX (believed to be a result of methylene chloride) levels have been reported across the Site. However, there is no consistent pattern: the occurrence is random in time and space, and resampling the wells thus far has not verified the presence of methylene chloride in the ground water. A number of investigations into the problem, including resampling the wells, analysis of some materials and lubricants on field vehicles, and investigation into sampling preparations, have ruled out

contamination in the field from two commonly used lubricants, contamination from sample bottles, and laboratory contamination. The occurrence of this constituent is being carefully monitored and evaluated. Although the source has not yet been determined, it currently appears to have been introduced during sample collection in the field.

Chromium

Elevated concentrations of chromium greater than 50 μg/L in unfiltered samples have been observed in a number of newly constructed Hanford ground-water monitoring wells over the past year. These chromium concentrations, associated with elevated iron, manganese, and nickel concentrations, are mainly observed in unfiltered samples and are much lower or undetected in the corresponding filtered samples. Possible sources of these constituents are natural borehole sediments and well construction materials. Although the source for some constituents may seem obvious (e.g., stainless steel materials for nickel and chromium), it is not possible to attribute these constituents to one particular source (e.g., iron is also a very common constituent in natural sediments), based on the present data. The contamination is of a particulate nature that can be readily purged by pumping and may therefore be an artifact of well construction rather than true ground-water contamination. The source of these metals and practical solutions to the problem are the subjects of an ongoing investigation. Meanwhile, chromium concentrations are being carefully monitored and evaluated.

Elevated chromium concentrations resulting from past disposal practices do exist in specific locations throughout the site. Filtered and unfiltered samples in these locations exhibit similar chromium concentrations and contain little if any of the other particulate indicators (i.e., iron, manganese, nickel, and aluminum).

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; 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 (TEGD) (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. 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. This is equivalent to the 95% confidence interval for two independent samples for which a true value is not known. This calculation takes into account the uncertainties associated with these analyses.

For blind standard samples where a true concentration is known, 2.0 standard deviations is the target range, equivalent to the 95% confidence limit. If results fall outside the 99% confidence interval, a request for data verification is warranted (ASTM 1987).

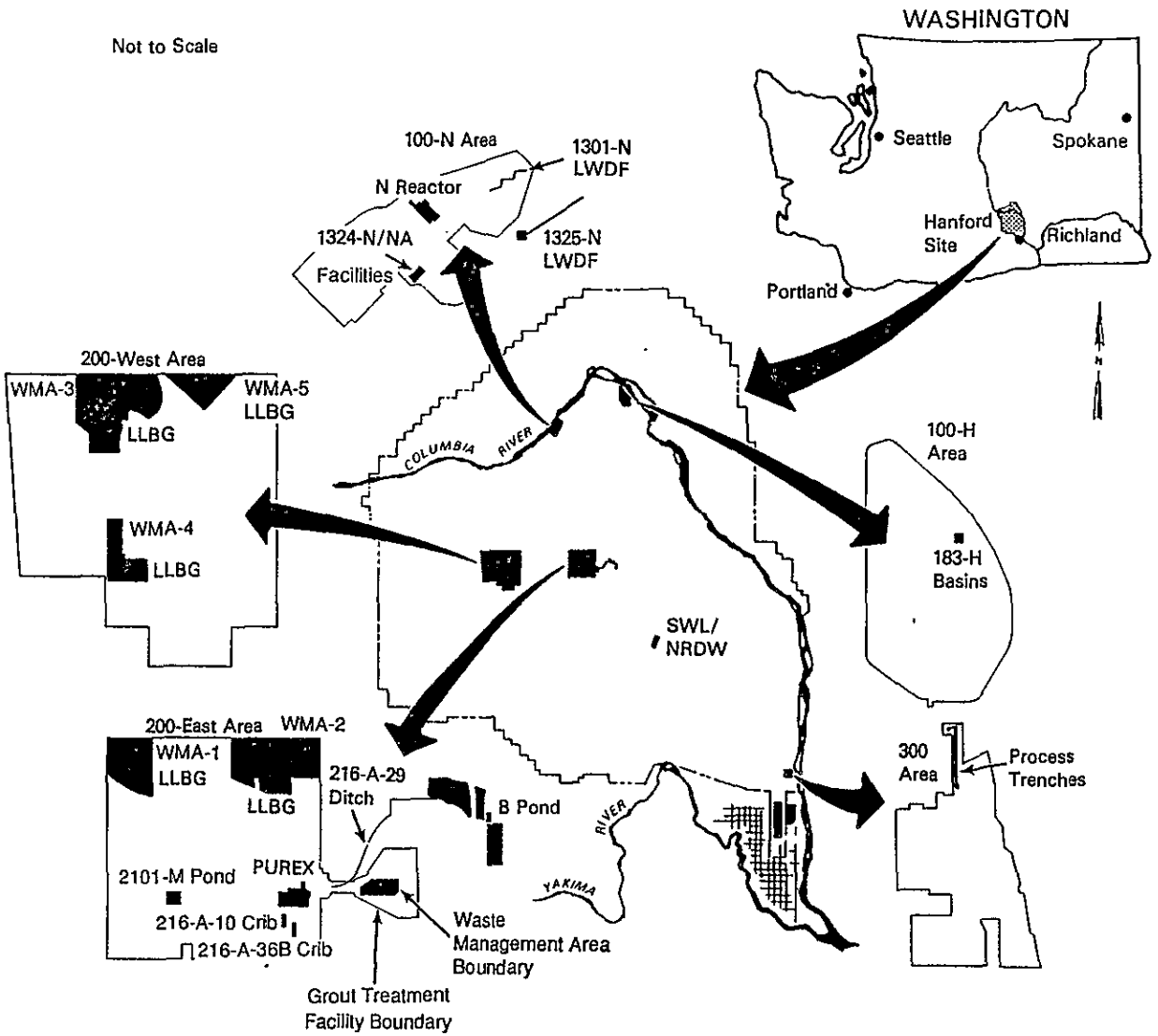


FIGURE 1.1. Locations of the 13 RCRA Ground-Water Monitoring Projects and Landmarks on the Hanford Site, April 1989

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

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

(a) Five sets of quarterly samples have been collected; however, the samples collected the first quarter are not considered representative because of incomplete well development.

THIS PAGE INTENTIONALLY
LEFT BLANK

2.0 300 AREA PROCESS TRENCHES

R. Schalla

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. 1988).

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. 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 May and June are shown in Figures 2.2 and 2.3, respectively. Table 2.2 shows the sampling schedule for the 27-well network.

9 0 1 1 7 7 1 3 6 7

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

There were no drilling activities during this quarter.

Hydrogeologic Characterization

Hydrogeologic characterization efforts (other than water levels) have been suspended until additional data are collected for analysis.

WATER LEVELS

Water-level hydrographs of the unconfined aquifer well 399-1-16A, the adjacent confined aquifer well 399-1-16C, and the nearest surface-water station SWS-2 are shown in Figure 2.4. The water level in well 399-1-16C has not shown any discernable recovery since January 24, 1989, when abandonment of well 399-1-16D was completed. The apparent rise in water levels in well 399-1-16C relative to 399-1-16A during the last 3 weeks of June may have been caused by one or more of 3 factors: 1) the data logger in well 399-1-16A had a downward drift error of 0.09 ft relative to the data logger in well 399-1-16C by the end of June, 2) partial isolation may have been achieved during abandonment earlier this year, and 3) partial response to dramatic declines in water levels. These aquifers typically have differences in hydraulic head of 30 ft as shown in Table 2.3 for 2 pairs of shallow and deep wells, which are wells 399-1-7 and 399-1-9, and wells 399-1-17A and 399-1-17C. When well 399-1-16C was drilled to its total depth in early January 1987, the water-level elevation in well 399-1-16C was 28 ft higher than that of the adjacent shallow well 399-1-16A. After breakage of the casing in well 399-1-16D in late January, the two aquifers were interconnected, and the water levels in well 399-1-16C declined (Figure 2.5).

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.

The southerly flow of ground water and the gentle hydraulic gradient (only 1.5 ft/mi in Figure 2.2) represents a flow pattern that was sustained

through all of May and the first 2 weeks of June, based on the hydrographs in Figure 2.6. Because the high river water levels in May were beyond the range of the SWS-2 transducer, river water levels shown in Figure 2.6 are truncated. Following a steep decline in river stage in the Columbia River in late June, the ground-water gradients steepened and flow was predominantly easterly as ground water from the unconfined aquifer discharged into the river.

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. As discussed in the previous quarterly report, there have been several failures of transducers installed in well 399-1-17A. Because replacement transducers are no longer available, the data logger in well 399-1-17A was removed. Another more precise data logging system has been installed in well 399-4-7 as part of other Hanford Site work. Water-level data collected as part of this work may be used in subsequent months to supplement the existing data logging system.

WATER CHEMISTRY DATA

On March 25, 1989, all RCRA sampling at Hanford was suspended until the proper disposal of purge water could be determined for all sampled wells. Therefore, the ground water near the 300 Area Process Trenches was not sampled biweekly from four adjacent wells (399-1-11, 399-1-17A, 399-1-18A, and 399-1-19) as originally scheduled for March 29, April 12, and April 26, 1989. Biweekly sampling resumed in the 300 Area in May and continued into June; however, because accessible purge water storage containers were not available for biweekly well 399-1-19, it was not sampled this quarter. Also, biweekly well 399-1-11 was only sampled once this quarter, for the long list (WAC 173-303-9905) on June 14, 1989. Therefore, the ground water near the 300 Area Process Trenches was sampled biweekly from only two and later three of the four adjacent wells as originally scheduled for June 1989.

A purge water storage tank has not been placed at 399-1-19 because it 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. No alternative wells in more accessible locations are available, so other options were reviewed. A reduction in the amount of water purged from the well has been selected as an appropriate alternative. A water sample that is representative of the ground may be collected from this well with a minimum of purging because ground water is thought to move freely through the well under existing conditions. Well 399-1-19 is located between the two process trenches where the hydraulic gradient is steep; the well is screened with a continuous wire wrap screen in a very permeable portion of the aquifer; and the well has a naturally developed sand pack. Because the well casing will be naturally purged under these conditions, the only water that must be removed before sample collection is the water contained in the pump chamber and the discharge column. This would mean that only 0.8 gal of purge water would have to be contained; therefore, it is possible to collect the samples for the long list and ensuing biweekly samples by using a covered 5-gal container. The pump can be throttled to control the flow sufficiently for that size vessel to also catch overflow. Well 399-1-19 will be sampled following this procedure in the future. July 12 and 26 are the first two collection dates planned for the resumption of the biweekly sampling schedule of all four wells in the network.

The results for anions, uranium, and volatile organic compounds (VOCs) for the two biweekly samplings in March and the one sampling in May indicate that anion concentrations have not changed significantly, nor have those for the VOCs. The results of VOCs from March and May in the biweekly sampling network were below the detection limit. Uranium concentrations in well 399-1-17A began to decline. Results from the June sampling will be available for the next quarterly report.

In addition to the biweekly sampling, the semiannual sampling cycle of 27 wells was performed during the first 2 weeks of June, about a week behind schedule. Wells 399-1-19, 399-3-7, and 399-4-1 were not sampled in June. Well 399-1-19 was not sampled because the purge water containment was not available. Well 399-3-7 was not sampled because the one available storage container (500-gal capacity) would not hold all of the purge water for a single sampling and additional storage capacity was not available. Well

399-4-1 was not sampled because it has a broken pump. By accomplishing the sampling of 24 wells in this spatially comprehensive network, any releases would have been detected even with temporary suspension of biweekly sampling. The loss of the three wells did not seriously compromise the network's ability to detect a release; however, had there been a release, the loss of data might have made interpretation of the contaminant plume difficult. The sample collection from well 399-1-19 for the long list has been rescheduled for July 12, 1989.

In addition to the standard laboratory quality control program, duplicate field samples have been analyzed by PNL to confirm the results from United States Testing Company, Incorporated (UST), the contracted analytical laboratory.

A summary of all results from March 1989 through May 1989 are presented in Table 2.4. Analytical data for detected constituents are presented in Table 2.5 for the biweekly network.

9 0 1 1 7 1 1 3 7 1

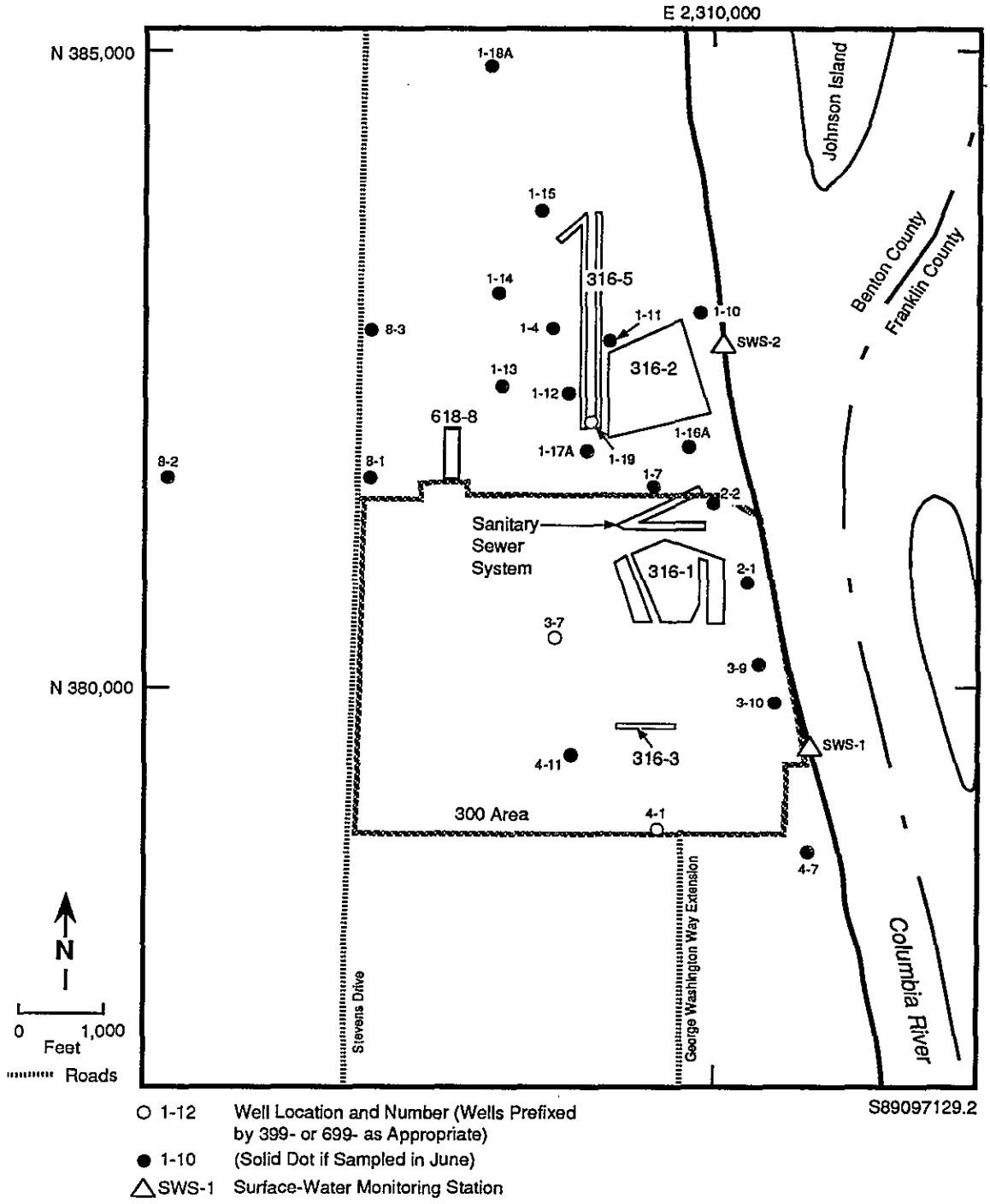


FIGURE 2.1. Locations for Wells Used in June for the 27-Well Monitoring Network for the 300 Area Process Trenches

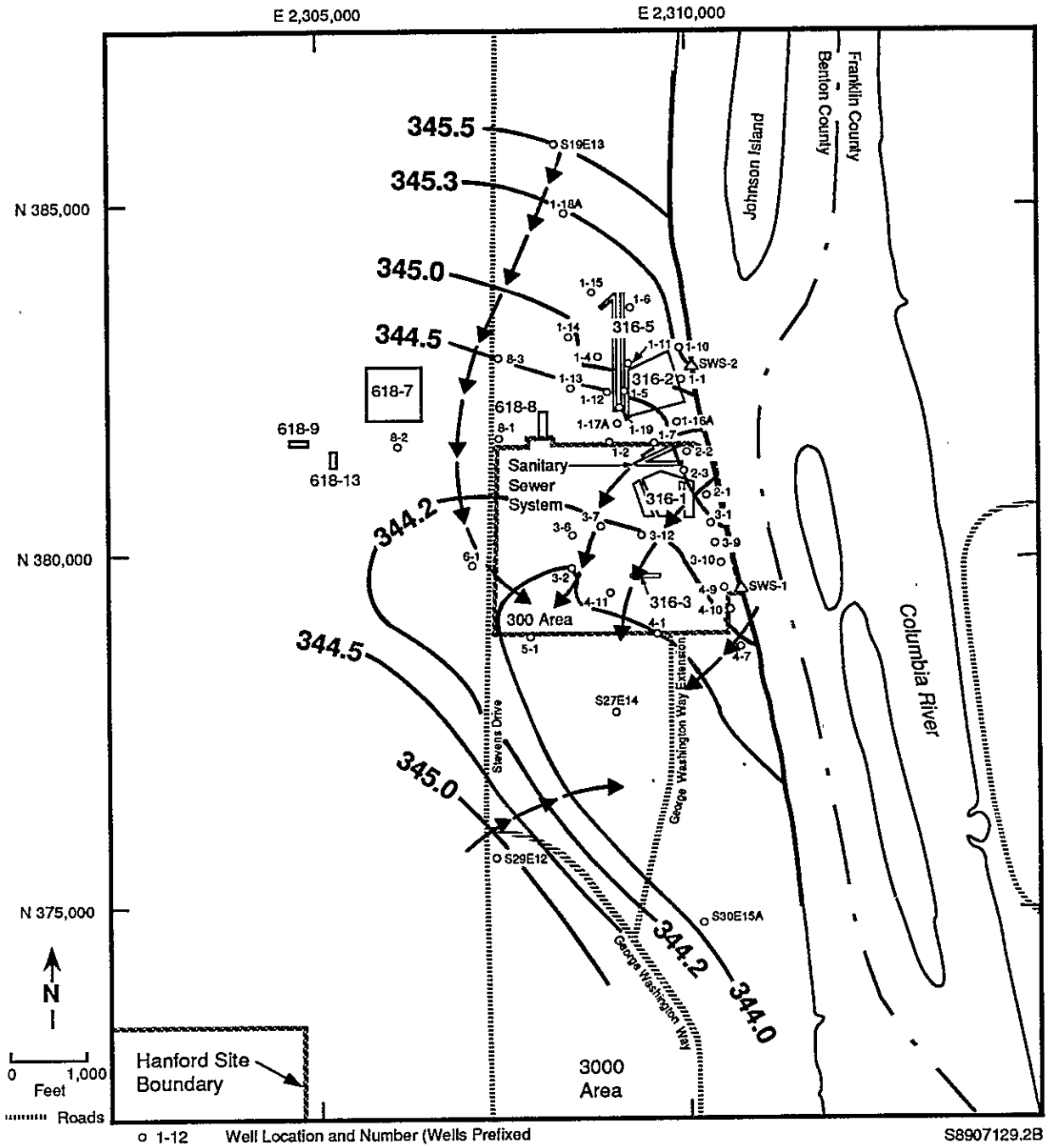


FIGURE 2.2. Water-Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer, May 1989

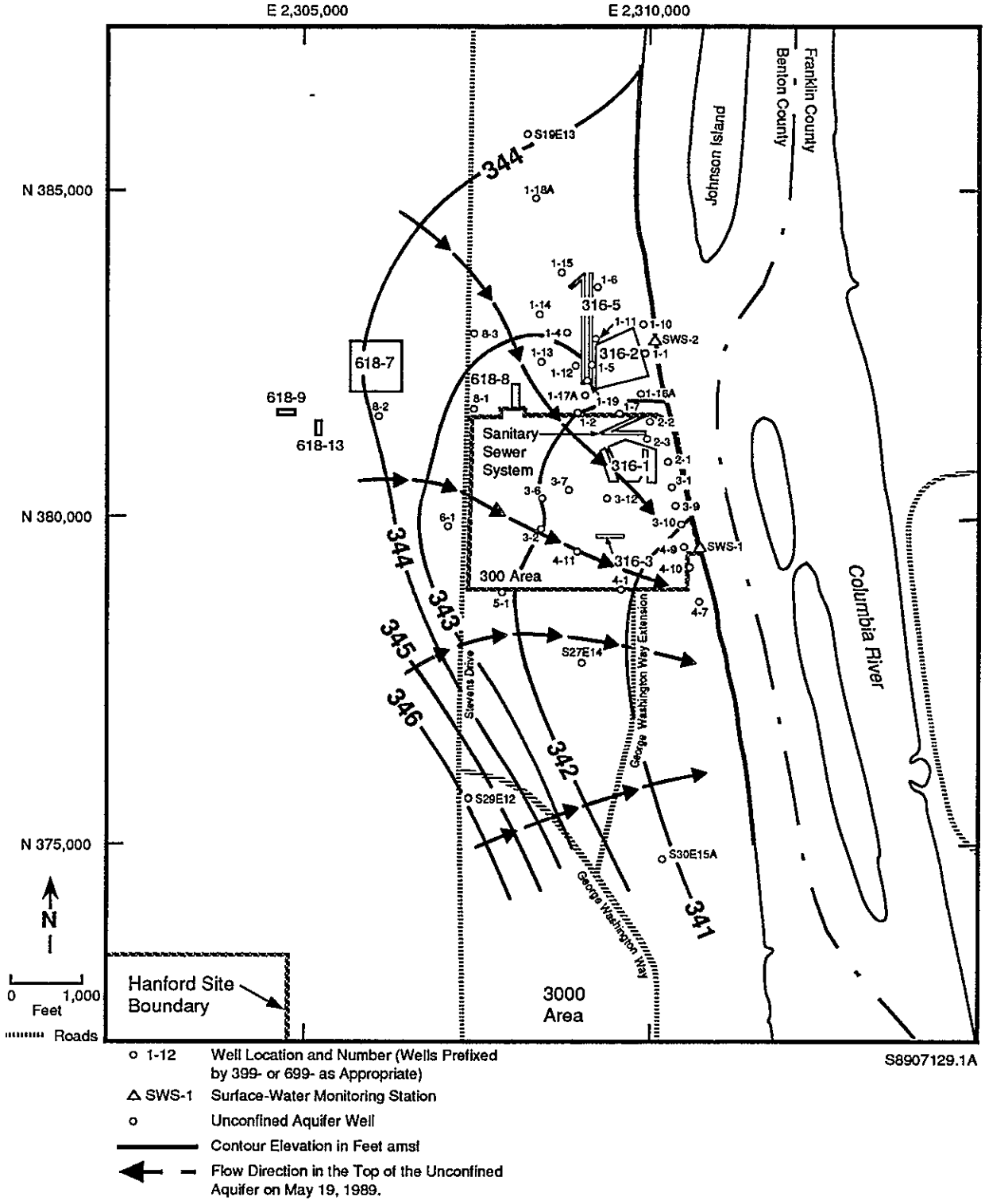


FIGURE 2.3. Water-Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer, June 1989

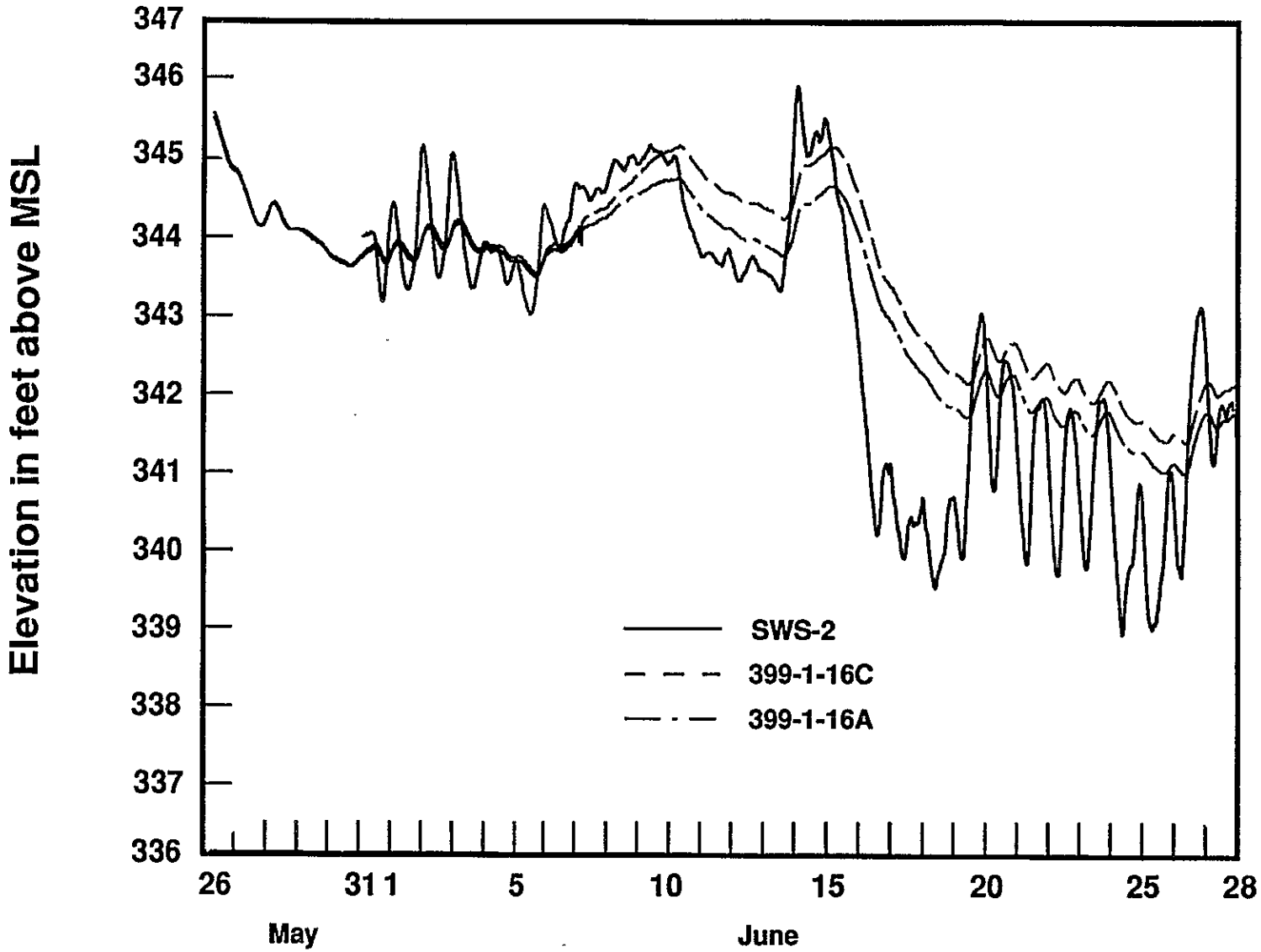


FIGURE 2.4. Water Levels in Wells 399-1-16A and 399-1-16C, and SWS-2, May 26 through June 28, 1989

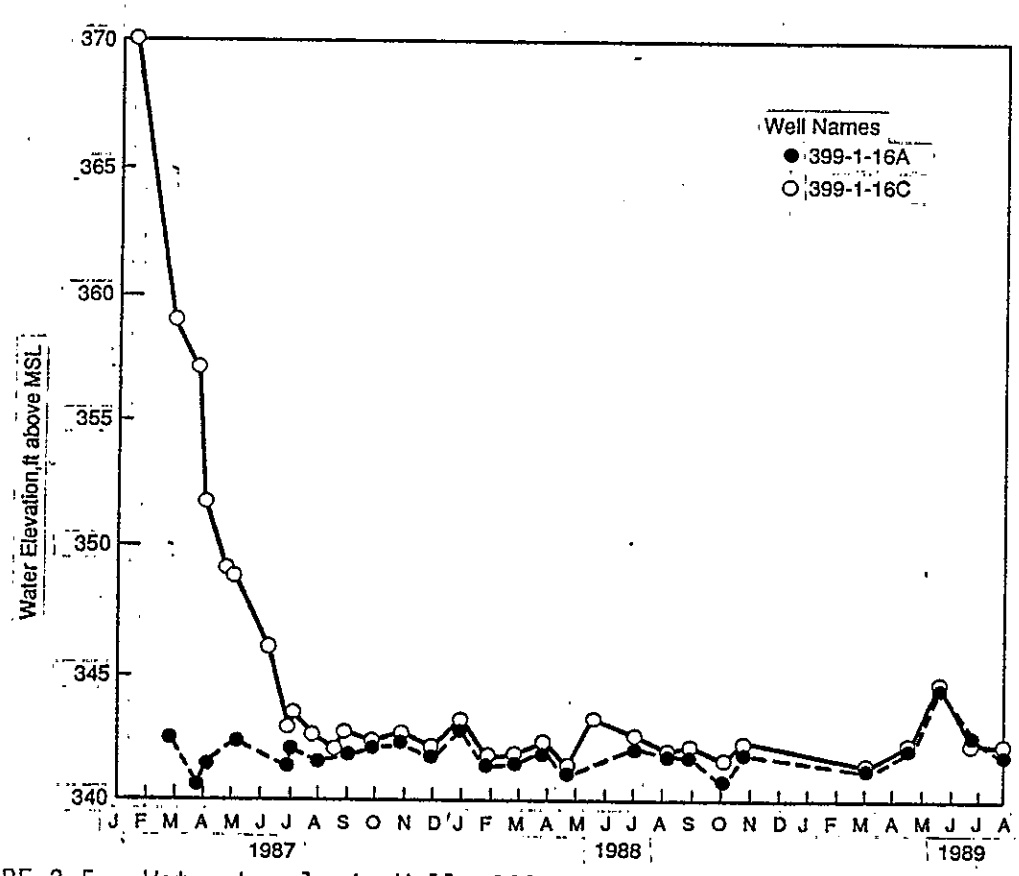


FIGURE 2.5. Water Levels in Wells 399-1-16A and 399-1-16C, January 1987 through July 1989

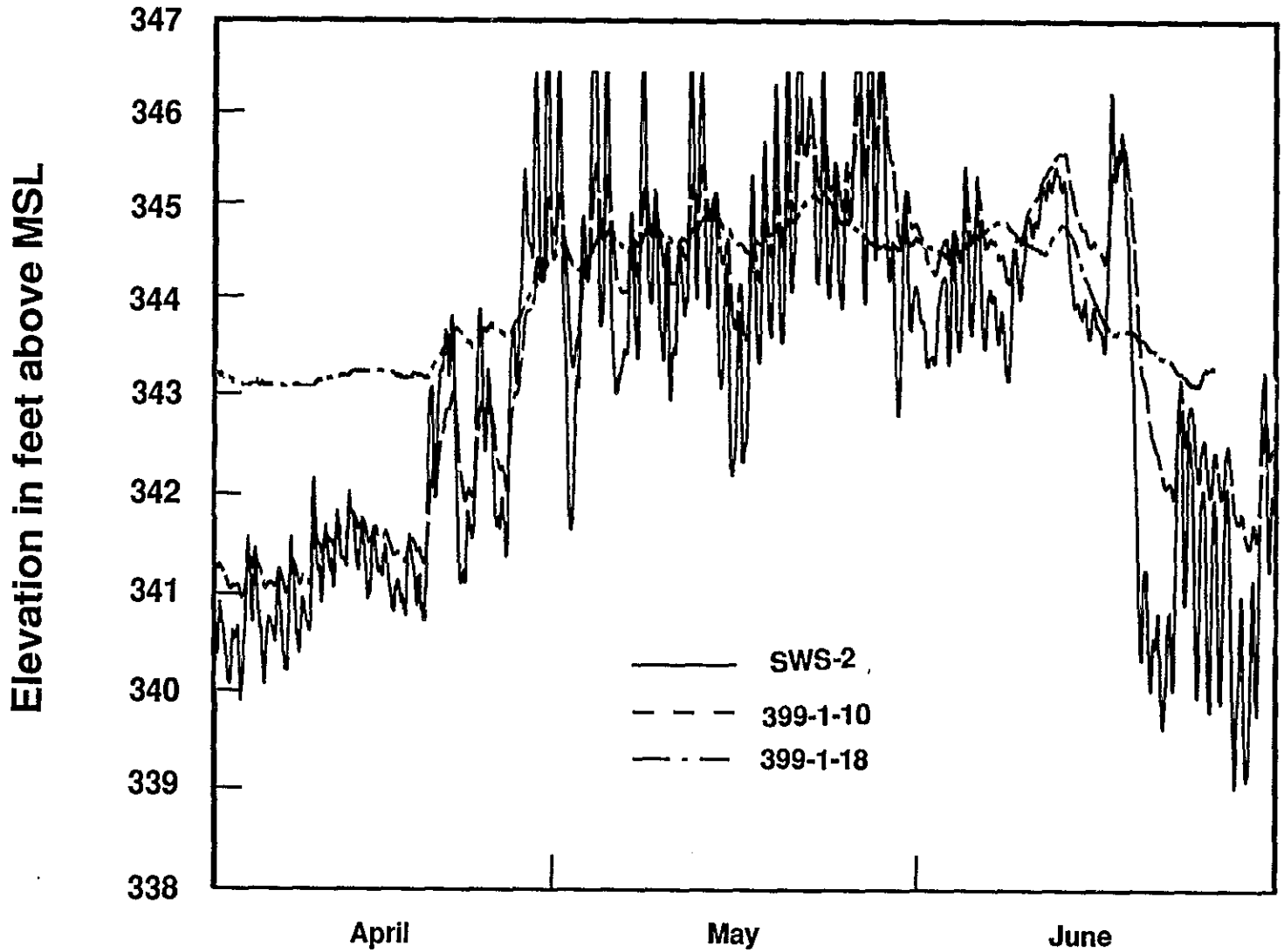


FIGURE 2.6. Water Levels in Wells 399-1-10 and 399-1-18, and SWS-2, April, May, and June 1989

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			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			LBW	BW	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			LBW	BW	BW	BW
399-1-17B			X						L			
399-1-17C			X						L			
399-1-18A	BW	BW	XBW	BW	BW	BW			LBW	BW	BW	BW
399-1-18B			X						L			
399-1-19	BW	BW	XBW	BW	BW	BW				BW	BW	BW
399-2-1			X						L			
399-2-2			X						L			
399-3-7			X									
399-3-9			X						L			
399-3-10			X						L			
399-4-1			X									
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 = 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 on May 19 and June 23, 1989

Well Number	Depth to Water[a]		Casing Elevation[b]	Elevation[b] of Water Surface	
Shallow Wells	5/19/89	6/23/89		5/19/89	6/23/89
399-1-1	30.64	33.92	375.90	345.26	341.98
399-1-2	40.22	42.50	384.52	344.30	342.02
399-1-3	40.29	43.00	384.75	344.46	341.75
399-1-4	35.57	37.40	380.83	345.26	343.43
399-1-5	35.27	37.32	379.82	344.55	342.50
399-1-6	28.59	30.95	373.81	345.22	342.86
399-1-7	41.16	43.91	385.63	344.47	341.20
399-1-10	28.21	31.67	373.65	345.44	341.98
399-1-11	32.72	34.46	377.79	345.07	343.33
399-1-12	39.96	41.98	384.45	344.49	342.47
399-1-13	44.16	46.01	388.62	344.46	342.61
399-1-14	38.35	40.01	383.23	344.88	343.22
399-1-15	34.46	36.28	379.59	345.13	343.31
399-1-16A	36.97	38.92	381.51	344.54	342.59
399-1-17A	33.15	35.16	377.47	344.32	342.31
399-1-18A	45.55	47.11	390.83	345.28	343.72
399-1-19	30.23	32.29	374.64	344.41	342.35
399-2-1	30.61	33.95	375.26	344.65	341.31
399-2-2	30.93	34.02	375.53	344.60	341.51
399-2-3	30.87	33.98	375.44	344.57	341.46
399-3-1	39.90	43.16	384.43	344.53	341.27
399-3-2	48.32	50.63	392.36	344.04	342.00
399-3-6	48.74	50.89	392.85	344.11	341.96
399-3-7	50.05	52.41	394.22	344.17	341.81
399-3-9	42.93	46.13	387.31	344.38	341.18
399-3-10	41.12	44.38	385.40	344.28	341.02
399-3-12	42.15	44.93	386.38	344.23	341.45
399-4-1	51.02	53.82	395.00	343.98	341.18
399-4-7	32.80	36.30	376.99	344.19	340.69
399-4-9	37.14	40.47	381.40	344.26	340.93
399-4-10	33.33	36.89	377.59	344.26	340.70
399-4-11	60.42	63.05	404.53	344.11	341.48
399-5-1	51.65	53.36	395.60	343.95	342.24
399-6-1	42.86	44.15	386.93	344.07	342.78
399-8-1	50.60	52.10	394.88	344.28	342.78
399-8-2	51.73	52.13	396.06	344.33	343.93
399-8-3	48.60	49.86	393.11	344.51	343.25
699-S19-E13	48.93	50.20	394.51	345.58	344.31
699-S27-E14	55.85	58.60	399.76	343.91	341.16
699-S29-E12	42.70	42.07	387.95	345.25	345.88
699-S30-E15A	56.34	58.82	400.14	343.80	341.32
Shallow Hybrid Well					
399-1-8	40.48	43.12	384.91	344.43	341.79
Intermediate Wells					
399-1-16B	36.24	39.31	381.14	344.90	341.83
399-1-17B	33.35	35.57	377.87	344.52	342.30
399-1-18B	44.41	46.07	389.94	345.53	343.87
399-1-18C	42.18	43.59	388.05	345.87	344.46
Deep Wells					
399-1-9	18.22	19.56	384.80	366.58	365.24
399-1-16C	37.56	40.09	382.29	344.73	342.20
399-1-17C	1.14	2.57	378.13	376.99	375.56

(a) Depth to water measured in feet from top of casing with steel tape.
(b) Elevations are in feet above mean sea level according to the U.S. Coast and Geodetic 1929 survey datum, which is 0.28 ft lower than the 300 Area Reference datum.

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

Constituent List=Contamination Indicator Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
191	CONDFLD	umho	1	10	0	700	WDOE		Specific conductance, field
199	PHFIELD		0.1	10	0	8.5	EPAS	xxx	pH, field

Constituent List=Interim Primary Drinking Water Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
C72	NITRATE	ppb	500	10	0	45000	EPA		Nitrate
C74	FLUORID	ppb	500	10	10 ***	4000	EPA		Fluoride

Constituent List=Water Quality Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
C73	SULFATE	ppb	500	10	0	250000	EPAS		Sulfate
C75	CHLORID	ppb	500	10	0	250000	EPAS		Chloride

Constituent List=Site Specific and Other Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
104	U	pCi/L	0.5	10	0	600	DOE		Uranium
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	3	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	TRANDCE	ppb	5	10	10 ***	70	EPAP		trans-1,2-Dichloroethene
A93	METHYCH	ppb	5	10	10 ***	.			Methylene chloride [Dichloromethane]
B13	VINYIDE	ppb	10	10	10 ***	2	EPA		Vinyl chloride
B14	M-XYLE	ppb	5	10	10 ***	440	EPAP		Xylene-m

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
C76	PHOSPHA	ppb	1000	10	10 ***	.		Phosphate
H66	BROMIDE	ppb	1000	10	10 ***	.		Bromide
H67	NITRITE	ppb	1000	10	10 ***	.		Nitrite
H68	HEXONE	ppb	10	10	10 ***	.		Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	10	8	.		Acetone by VOA
I28	TAF	ppb	10	10	10 ***	.		Tetrahydorfuran
L63	14DBEN	ppb	5	10	10 ***	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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 2.5. Constituents with at Least One Detected Value for the 300 Area Process Trenches
March through May 1989

Bi-weekly Samples

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	CHLFORM ppb 5/100	CHLORID ppb 500/250000s	CONDFLD umho 1/700w	NITRATE ppb 500/45000	PHFIELD 0.1/8.5s	SULFATE ppb 500/250000s	U pCi/L 0.5/800d
3-1-11	01MAR89		<10	15	12,200	195	1,800	8.1	16,500	55.90
	16MAR89		<10	14	9,500	171	1,300	7.1	18,000	59.70
3-1-17A	01MAR89		<10	13	23,400	216	2,300	7.3	16,900	150.00
	16MAR89		#4	13	15,800	190	2,000	7.7	17,400	164.00
	10MAY89		<10	14	15,800	181	1,600	7.6	22,400	196.00
3-1-18A	01MAR89		<10	<5	17,400	464	21,000	8.6	46,400	3.59
	16MAR89		#6	<5	17,200	457	21,300	8.2	49,300	3.82
	10MAY89		<10	<5	16,300	373	22,600	7.7	48,600	2.58
3-1-19	01MAR89		#5	13	18,200	199	1,800	7.6	16,900	350.00
	16MAR89		#3	13	12,000	175	1,600	7.0	17,200	370.00

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

Suffix
none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
w - based on additional Secondary Maximum Contaminant Levels given 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

THIS PAGE INTENTIONALLY
LEFT BLANK

3.0 183-H SOLAR EVAPORATION BASINS

S. H. Hall

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 currently 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, it received 8000 gal of waste, and from January 1975 to August 1978, it received wastes at the rate of about 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 to receive 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 Hypalon®[a] coating).

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

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

9 0 1 1 7 7 1 1 3 8 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 fiscal year 1989 sampling schedule for wells in this monitoring network.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or aquifer testing was conducted during the report period.

WATER LEVELS

Water-table measurements made during the period are listed in Table 3.2. Figure 3.2 represents river-stage data collected from February 27 to June 27, 1989. March data have been included in the figure to illustrate the 6 weeks of low river stage during the first part of the reporting period and the last part of the previous period.

WATER CHEMISTRY DATA

Ground water in the vicinity of the 183-H basins has been routinely sampled and analyzed since 1985. Twenty-three wells were sampled in May and the early part of June 1989, and the results of analysis are summarized in Tables 3.3 and 3.4. Table 3.3 summarizes analytical data for May and June 1989 for each of the sampled wells.

Table 3.4 shows that two chemical parameters, chromium (in both filtered and unfiltered samples) and nitrate, exceeded the standards in 40 CFR 265, Appendix III, in at least one well in the monitoring network surrounding the 183-H basins. 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 due to the presence of uranium which is excluded from the gross alpha standard.

On May 25, during the high river stage, springs were located and sampled upstream, adjacent to, and downstream from the basins. The river was sampled near-shore at the same locations. Samples were analyzed for nitrate and

chromium. No chromium was detected above 10 ppb in any of the samples, and nitrate concentrations in spring water samples were comparable to river water concentrations. The second phase of the river and spring sampling task will be performed during the late summer low river stage.

9011177131 93

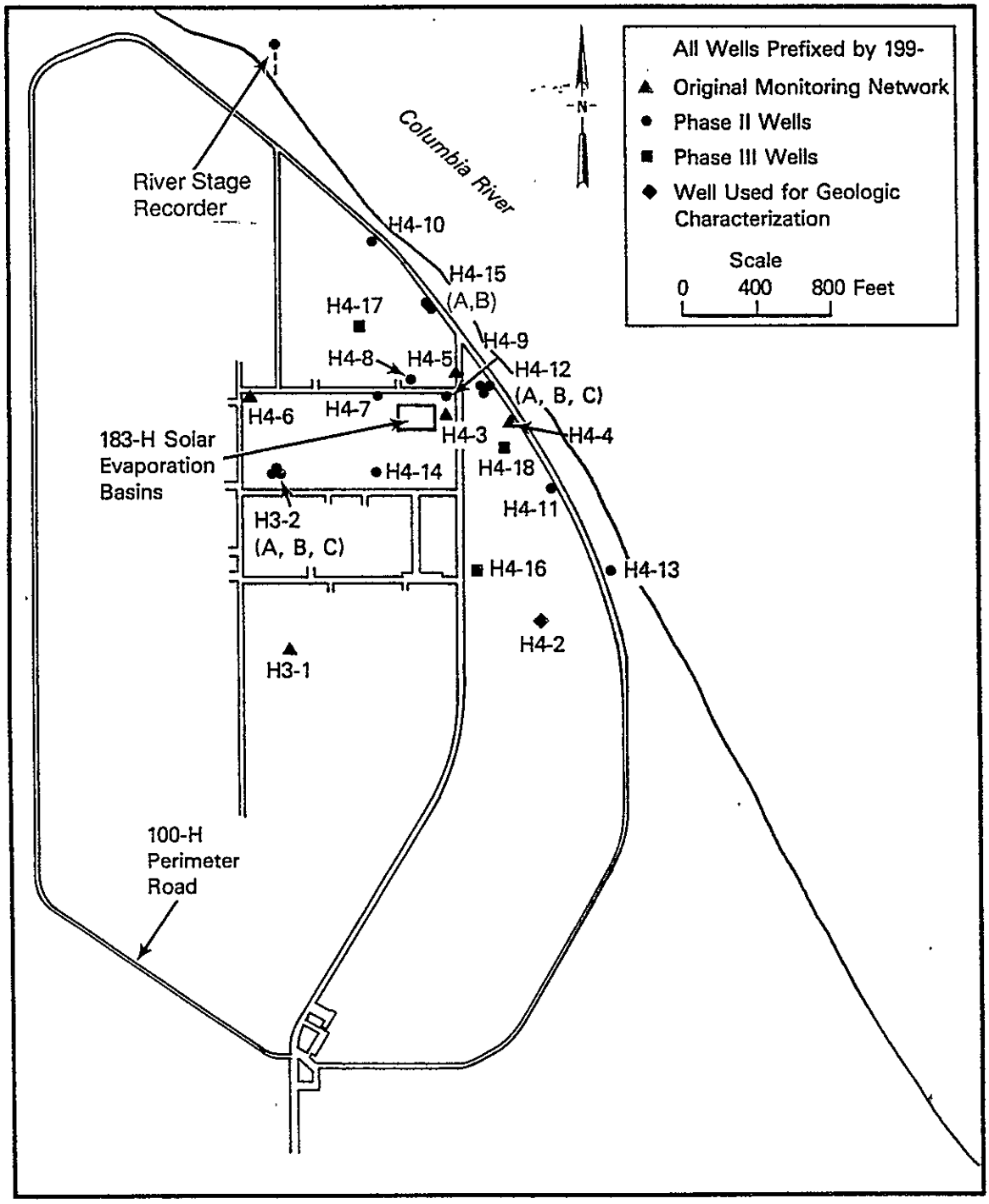


FIGURE 3.1. Monitoring Well Locations Near the 183-H Basins

9011177113307

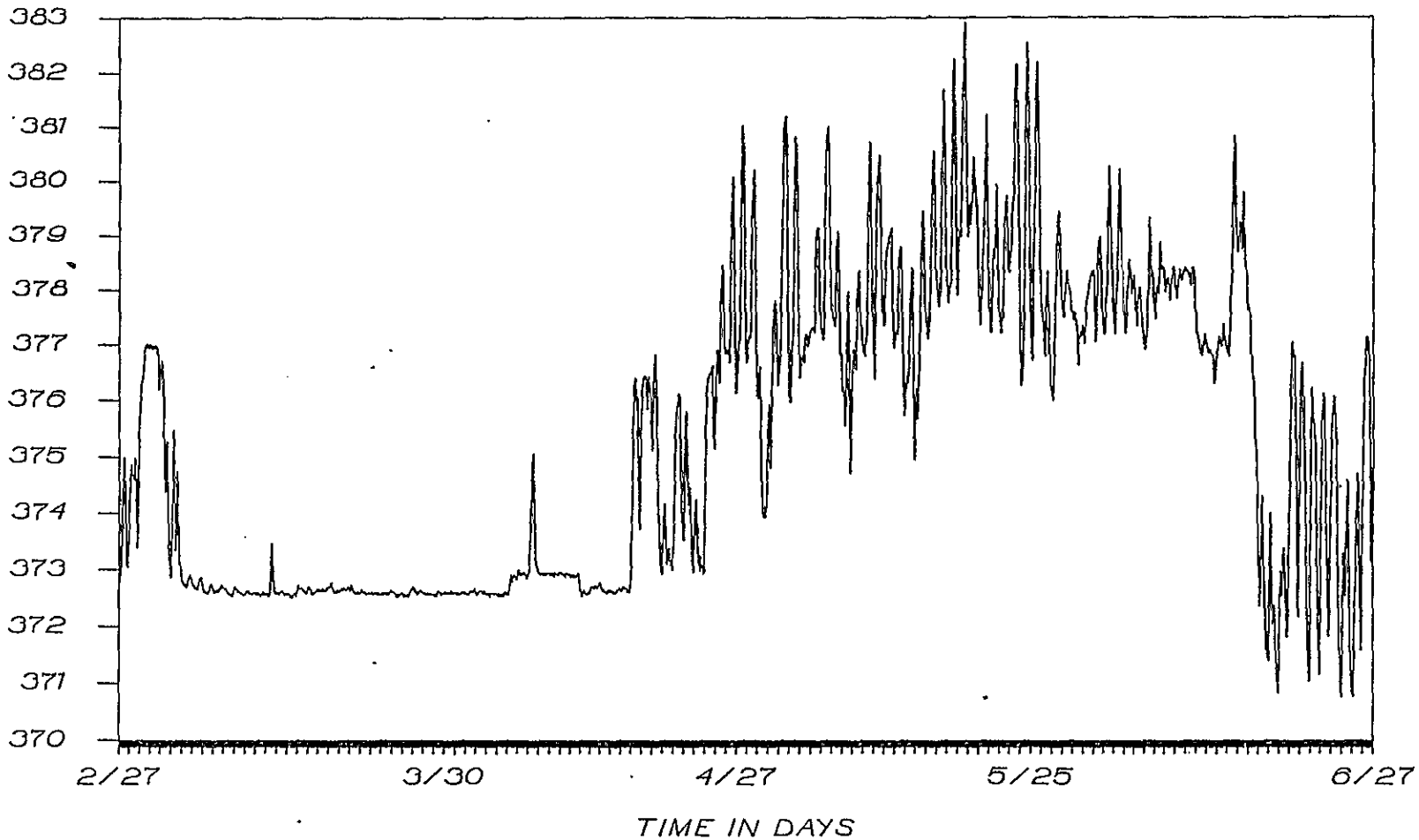


FIGURE 3.2. Columbia River Elevation (in feet above mean sea level) at the 100-H Area, February 27 to June 27, 1989

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

	1988			1989								
Well Name	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		

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 Basins, April Through June 1989

Well Number	Date	Surveyed Casing Elevation, ft above MSL[a]	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-H3-1	4/14/89	421.48	45.86	375.62
199-H3-1	4/28/89	421.48	45.93	375.55
199-H3-1	5/15/89	421.48	45.69	375.79
199-H3-1	5/31/89	421.48	45.34	376.14
199-H3-1	6/16/89	421.48	45.09	376.39
199-H3-1	6/29/89	421.48	45.15	376.33
199-H3-2A	4/14/89	417.83	42.75	375.08
199-H3-2A	4/28/89	417.83	42.72	375.11
199-H3-2A	5/15/89	417.83	42.12	375.71
199-H3-2A	5/31/89	417.83	41.51	376.32
199-H3-2A	6/16/89	417.83	41.34	376.49
199-H3-2A	6/29/89	417.83	41.73	376.10
199-H3-2B	4/14/89	418.42	43.34	375.08
199-H3-2B	4/28/89	418.42	43.30	375.12
199-H3-2B	5/15/89	418.42	42.71	375.71
199-H3-2B	5/31/89	418.42	42.10	376.32
199-H3-2B	6/16/89	418.42	41.93	376.49
199-H3-2B	6/29/89	418.42	42.31	376.11
199-H3-2C	4/14/89	418.22	43.37	374.85
199-H3-2C	4/28/89	418.22	43.04	375.18
199-H3-2C	5/15/89	418.22	42.44	375.78
199-H3-2C	5/31/89	418.22	41.89	376.33
199-H3-2C	6/16/89	418.22	41.82	376.40
199-H3-2C	6/29/89	418.22	42.32	375.90
199-H4-3	4/14/89	420.29	47.46	372.83
199-H4-3	4/28/89	420.29	46.22	374.07
199-H4-3	5/15/89	420.29	44.71	375.58
199-H4-3	5/31/89	420.29	44.16	376.13
199-H4-3	6/16/89	420.29	44.28	376.01
199-H4-3	6/29/89	420.29	45.95	374.34
199-H4-4	4/14/89	413.70	42.09	371.61
199-H4-4	4/28/89	413.70	37.80	375.90
199-H4-4	5/15/89	413.70	37.78	375.92
199-H4-4	5/31/89	413.70	37.70	376.00
199-H4-4	6/16/89	413.70	38.46	375.24
199-H4-4	6/29/89	413.70	40.27	373.43

TABLE 3.2. (contd)

Well Number	Date	Surveyed Casing Elevation, ft above MSL[a]	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-H4-5	4/14/89	416.21	44.13	372.08
199-H4-5	4/28/89	416.21	41.65	374.56
199-H4-5	5/15/89	416.21	40.39	375.82
199-H4-5	5/31/89	416.21	40.03	376.18
199-H4-5	6/16/89	416.21	40.32	375.89
199-H4-5	6/29/89	416.21	42.52	373.69
199-H4-6	4/14/89	419.58	44.50	375.08
199-H4-6	4/28/89	419.58	44.46	375.12
199-H4-6	5/15/89	419.58	43.85	375.73
199-H4-6	5/31/89	419.58	43.24	376.34
199-H4-6	6/16/89	419.58	43.08	376.50
199-H4-6	6/29/89	419.58	43.48	376.10
199-H4-7	4/14/89	420.59	46.64	373.95
199-H4-7	4/28/89	420.59	46.21	374.38
199-H4-7	5/15/89	420.59	44.99	375.60
199-H4-7	5/31/89	420.59	44.32	376.27
199-H4-7	6/16/89	420.59	44.38	376.21
199-H4-7	6/29/89	420.59	45.32	375.27
199-H4-8	4/14/89	420.00	46.70	373.30
199-H4-8	4/28/89	420.00	46.01	373.99
199-H4-8	5/15/89	420.00	44.31	375.69
199-H4-8	5/31/89	420.00	43.64	376.36
199-H4-8	6/16/89	420.00	43.85	376.15
199-H4-8	6/29/89	420.00	45.20	374.80
199-H4-9	4/14/89	418.08	45.41	372.67
199-H4-9	4/28/89	418.08	44.14	373.94
199-H4-9	5/15/89	418.08	42.30	375.78
199-H4-9	5/31/89	418.08	41.72	376.36
199-H4-9	6/16/89	418.08	41.98	376.10
199-H4-9	6/29/89	418.08	43.82	374.26
199-H4-10	4/14/89	404.44	32.28	372.16
199-H4-10	4/28/89	404.44	28.70	375.74
199-H4-10	5/15/89	404.44	28.31	376.13
199-H4-10	5/31/89	404.44	28.18	376.26
199-H4-10	6/16/89	404.44	28.82	375.62
199-H4-10	6/29/89	404.44	30.73	373.71
199-H4-11	4/14/89	416.84	45.60	371.24
199-H4-11	4/28/89	416.84	41.06	375.78
199-H4-11	5/15/89	416.84	41.08	375.76

TABLE 3.2. (contd)

Well Number	Date	Surveyed Casing Elevation, ft above MSL[a]	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-H4-11	5/31/89	416.84	40.93	375.91
199-H4-11	6/16/89	416.84	41.72	375.12
199-H4-11	6/29/89	416.84	43.65	373.19
199-H4-12A	4/14/89	413.50	41.62	371.88
199-H4-12A	4/28/89	413.50	37.70	375.80
199-H4-12A	5/15/89	413.50	37.57	375.93
199-H4-12A	5/31/89	413.50	37.45	376.05
199-H4-12A	6/16/89	413.50	38.19	375.31
199-H4-12A	6/29/89	413.50	39.94	373.56
199-H4-12B	4/14/89	413.52	41.63	371.89
199-H4-12B	4/28/89	413.52	37.73	375.79
199-H4-12B	5/15/89	413.52	37.58	375.94
199-H4-12B	5/31/89	413.52	37.46	376.06
199-H4-12B	6/16/89	413.52	38.19	375.33
199-H4-12B	6/29/89	413.52	39.95	373.57
199-H4-12C	4/14/89	413.52	41.51	372.01
199-H4-12C	4/28/89	413.52	38.19	375.33
199-H4-12C	5/15/89	413.52	37.57	375.95
199-H4-12C	5/31/89	413.52	37.28	376.24
199-H4-12C	6/16/89	413.52	38.60	374.92
199-H4-12C	6/29/89	413.52	40.00	373.52
199-H4-13	4/14/89	418.20	47.22	370.98
199-H4-13	4/28/89	418.20	42.58	375.62
199-H4-13	5/15/89	418.20	42.55	375.65
199-H4-13	5/31/89	418.20	42.42	375.78
199-H4-13	6/16/89	418.20	43.50	374.70
199-H4-13	6/29/89	418.20	45.14	373.06
199-H4-14	4/14/89	420.59	45.93	374.66
199-H4-14	4/28/89	420.59	45.79	374.80
199-H4-14	5/15/89	420.59	45.04	375.55
199-H4-14	5/31/89	420.59	44.38	376.21
199-H4-14	6/16/89	420.59	44.27	376.32
199-H4-14	6/29/89	420.59	44.77	375.82
199-H4-15A	4/14/89	407.21	35.11	372.10
199-H4-15A	4/28/89	407.21	31.51	375.70
199-H4-15A	5/15/89	407.21	31.10	376.11
199-H4-15A	5/31/89	407.21	30.96	376.25
199-H4-15A	6/16/89	407.21	31.65	375.56
199-H4-15A	6/29/89	407.21	33.52	373.69

TABLE 3.2. (contd)

Well Number	Date	Surveyed Casing Elevation, ft above MSL[a]	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-H4-15B	4/14/89	406.92	34.81	372.11
199-H4-15B	4/28/89	406.92	31.22	375.70
199-H4-15B	5/15/89	406.92	30.81	376.11
199-H4-15B	5/31/89	406.92	30.68	376.24
199-H4-15B	6/16/89	406.92	31.36	375.56
199-H4-15B	6/29/89	406.92	33.24	373.68
199-H4-15CP	4/14/89	407.07	21 psi[b]	--
199-H4-15CP	4/28/89	407.07	21 psi	--
199-H4-15CP	5/15/89	407.07	21 psi	--
199-H4-15CP	5/31/89	407.07	21 psi	--
199-H4-15CP	6/16/89	407.07	20 psi	--
199-H4-15CP	6/29/89	407.07	21 psi	--
199-H4-15CQ	4/14/89	407.27	21.61	385.66
199-H4-15CQ	4/28/89	407.27	19.05	388.22
199-H4-15CQ	5/15/89	407.27	18.80	388.47
199-H4-15CQ	5/31/89	407.27	18.65	388.62
199-H4-15CQ	6/16/89	407.27	18.98	388.29
199-H4-15CQ	6/29/89	407.27	20.36	386.91
199-H4-15CR	4/14/89	407.37	34.08	373.29
199-H4-15CR	4/28/89	407.37	33.65	373.72
199-H4-15CR	5/15/89	407.37	32.40	374.97
199-H4-15CR	5/31/89	407.37	31.34	376.03
199-H4-15CR	6/16/89	407.37	31.47	375.90
199-H4-15CR	6/29/89	407.37	33.02	374.35
199-H4-15CS	4/14/89	407.44	35.24	372.20
199-H4-15CS	4/28/89	407.44	31.96	375.48
199-H4-15CS	5/15/89	407.44	31.35	376.09
199-H4-15CS	5/31/89	407.44	31.07	376.37
199-H4-15CS	6/16/89	407.44	32.35	375.09
199-H4-15CS	6/29/89	407.44	33.84	373.60
199-H4-16	4/14/89	424.23	50.20	374.03
199-H4-16	4/28/89	424.23	49.95	374.28
199-H4-16	5/15/89	424.23	49.04	375.19
199-H4-16	5/31/89	424.23	48.37	375.86
199-H4-16	6/16/89	424.23	48.27	375.96
199-H4-16	6/29/89	424.23	48.89	375.34
199-H4-17	4/14/89	419.09	45.96	373.13
199-H4-17	4/28/89	419.09	44.82	374.27
199-H4-17	5/15/89	419.09	43.20	375.89

TABLE 3.2. (contd)

Well Number	Date	Surveyed Casing Elevation, ft above MSL[a]	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-H4-17	5/31/89	419.09	42.66	376.43
199-H4-17	6/16/89	419.09	42.88	376.21
199-H4-17	6/29/89	419.09	44.77	374.32
199-H4-18	4/14/89	421.82	48.73	373.09
199-H4-18	4/28/89	421.82	47.59	374.23
199-H4-18	5/15/89	421.82	46.33	375.49
199-H4-18	5/31/89	421.82	45.72	376.10
199-H4-18	6/16/89	421.82	45.82	376.00
199-H4-18	6/29/89	421.82	47.27	374.55

(a) MSL = mean sea level.
(b) psi = pounds per square inch; gauge pressure, pressure above atmospheric pressure due to confined aquifer.

TABLE 3.3. Constituent List and Summary of Sampling Results for the 183-H Solar Evaporation Basins
May through June, 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	23	0	700	WDOE	xxx	Specific conductance, field
199	PHFIELD		0.1	23	0	6.5-8.5	EPAS		pH, field
207	PH-LAB		0.01	23	0	6.5-8.5	EPAS		pH, laboratory
C69	TOC	ppb	2000	23	2	.			Total organic carbon
H42	TOXLDL	ppb	10	23	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	22	22 ***	1	EPA		Coliform bacteria
111	BETA	pCi/L	8	25	0	50	EPA	xxx	Gross beta
112	ALPHAHI	pCi/L	4	25	0	15	EPA	xxx	Gross alpha, high DL
181	RADIUM	pCi/L	1	25	0	5	EPA		Radium, total
A06	BARIUM	ppb	6	25	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	25	25 ***	10	EPA		Cadmium
A08	CHROMUM	ppb	10	25	0	50	EPA	xxx	Chromium
A10	SILVER	ppb	10	25	25 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	25	18	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	23	23 ***	2	EPA		Mercury
A22	SELENUM	ppb	5	25	25 ***	10	EPA		Selenium
A33	ENDRIN	ppb	0.1	23	23 ***	0.2	EPA		Endrin
A34	METHLOR	ppb	3	23	23 ***	100	EPA		Methoxychlor
A35	TOXAENE	ppb	1	23	23 ***	5	EPA		Toxaphene
A36	a-BHC	ppb	0.1	23	23 ***	4	EPA		Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	23	23 ***	4	EPA		Lindane, beta-BHC
A38	g-BHC	ppb	0.1	23	23 ***	4	EPA		Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	23	23 ***	4	EPA		Lindane, delta-BHC
A51	LEADGF	ppb	5	25	24	50	EPA		Lead (graphite furnace)
C72	NITRATE	ppb	500	25	0	45000	EPA	xxx	Nitrate
C74	FLUORID	ppb	500	25	24	4000	EPA		Fluoride
H13	2,4-D	ppb	2	23	23 ***	100	EPA		2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	23	23 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	ppb	6	25	0	1000	EPA		Barium, filtered
H21	FCADMIU	ppb	2	25	25 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	ppb	10	25	0	50	EPA	xxx	Chromium, filtered
H23	FSILVER	ppb	10	25	25 ***	50	EPA		Silver, filtered
H37	FARSENI	ppb	5	25	20	50	EPA		Arsenic, filtered
H38	FMERCUR	ppb	0.1	23	23 ***	2	EPA		Mercury, filtered
H39	FSELENI	ppb	5	25	25 ***	10	EPA		Selenium, filtered
H41	FLEAD	ppb	5	25	25 ***	50	EPA		Lead, filtered
H60	TURBID	ntu	0.1	23	5	1	EPA	xxx	Turbidity, nephelometric

TABLE 3.3. (contd)

Constituent List=Water Quality Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
A11	SODIUM	ppb	200	25	0	.			Sodium
A17	MANGESE	ppb	5	25	15	50	EPAS	xxx	Manganese
A19	IRON	ppb	30	25	10	300	EPAS	xxx	Iron
C57	PHENOL	ppb	10	23	23 ***	.			Phenol
C73	SULFATE	ppb	500	25	0	250000	EPAS		Sulfate
C75	CHLORID	ppb	500	25	0	250000	EPAS		Chloride
H24	FSODIUM	ppb	200	25	0	.			Sodium, filtered
H29	FMANGAN	ppb	5	25	21	50	EPAS		Manganese, filtered
H31	FIRON	ppb	30	25	25 ***	300	EPAS		Iron, filtered

Constituent List=Site Specific and Other Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
104	U	pCi/L	0.5	23	0	600	DOE		Uranium
197	TC-99	pCi/L	15	23	0	900	EPAR	xxx	Technetium-99
A01	BERYLUM	ppb	5	25	24	.			Beryllium
A03	STRONUM	ppb	10	25	0	.			Strontium
A04	ZINC	ppb	5	25	18	5000	EPAS		Zinc
A05	CALCIUM	ppb	50	25	0	.			Calcium
A12	NICKEL	ppb	10	25	23	.			Nickel
A13	COPPER	ppb	10	25	23	1300	EPAP		Copper
A14	VANADUM	ppb	5	25	6	.			Vanadium
A15	ANTIONY	ppb	100	25	25 ***	.			Antimony
A16	ALUMNUM	ppb	150	25	23	.			Aluminum
A18	POTASUM	ppb	100	25	0	.			Potassium
A50	MAGNES	ppb	50	25	0	.			Magnesium
C76	PHOSPHA	ppb	1000	25	25 ***	.			Phosphate
H16	TC	ppb	1000	23	0	.			Total carbon
H18	FZINC	ppb	5	25	18	5000	EPAS		Zinc, filtered
H19	FCALCIU	ppb	50	25	0	.			Calcium, filtered
H25	FNICKEL	ppb	10	25	22	.			Nickel, filtered
H26	FCOPPER	ppb	10	25	23	1300	EPAP		Copper, filtered
H27	FVANADI	ppb	5	25	9	.			Vanadium, filtered
H28	FALUMIN	ppb	150	25	25 ***	.			Aluminum, filtered
H30	FPOTASS	ppb	100	25	0	.			Potassium, filtered
H32	FMAGNES	ppb	50	25	0	.			Magnesium, filtered
H33	FBERYLL	ppb	5	25	24	.			Beryllium, filtered
H35	FSTRONT	ppb	10	25	0	.			Strontium, filtered
H36	FANTIMO	ppb	100	25	25 ***	.			Antimony, filtered
H58	ALKALIN	ppb	20000	23	0	.			Total alkalinity, as CaCO3 (Method B)
H66	BROMIDE	ppb	1000	25	25 ***	.			Bromide
H67	NITRITE	ppb	1000	25	25 ***	.			Nitrite

TABLE 3.3. (contd)

Constituent List=Site Specific and Other Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full name
H86	FBORON	ppb	10	25	0	.		Boron, filtered
H87	FCOBALT	ppb	20	25	25 ***	.		Cobalt, filtered
H88	FLITHIU	ppb	10	25	25 ***	.		Lithium, filtered
H89	FMOLY	ppb	40	25	25 ***	.		Molybdenum, filtered
H90	FSILICO	ppb	50	25	0	.		Silicon, filtered
H91	FTIN	ppb	30	25	25 ***	.		Tin, filtered
H92	FTITAN	ppb	60	25	25 ***	.		Titanium, filtered
H93	FZIRCON	ppb	50	25	25 ***	.		Zirconium, filtered
P01	BORON	ppb	10	25	0	.		Boron
P02	COBALT	ppb	20	25	25 ***	.		Cobalt
P03	LITHIUM	ppb	10	25	25 ***	.		Lithium
P04	MOLY	ppb	40	25	25 ***	.		Molybdenum
P05	SILICON	ppb	50	25	0	.		Silicon
P06	TIN	ppb	30	25	25 ***	.		Tin
P07	TITAN	ppb	60	25	25 ***	.		Titanium
P08	ZIRCON	ppb	50	25	25 ***	.		Zirconium

Constituent List=WAC 173-303-9905 Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full name
A23	THALIUM	ppb	5	25	25 ***	.		Thallium
A24	THIOURA	ppb	200	23	23 ***	.		Thiourea
A25	ACETREA	ppb	200	23	23 ***	.		1-Acetyl-2-thiourea
A26	CHLOREA	ppb	200	23	23 ***	.		1-(o-Chlorophenyl) thiourea
A27	DIETROL	ppb	200	23	23 ***	.		Diethylstilbesterol
A28	ETHYREA	ppb	200	23	23 ***	.		Ethylenethiourea
A29	NAPHREA	ppb	200	23	23 ***	.		1-Naphthyl-2-thiourea
A32	PHENREA	ppb	500	23	23 ***	.		n-Phenylthiourea
A40	DDD	ppb	0.1	23	23 ***	.		DDD
A41	DDE	ppb	0.1	23	23 ***	.		DDE
A42	DDT	ppb	0.1	23	23 ***	.		DDT
A43	HEPTLOR	ppb	0.1	23	23 ***	0	EPAP	Heptachlor
A44	HEPTIDE	ppb	0.1	23	23 ***	0	EPAP	Heptachlor epoxide
A45	KEPONE	ppb	1	23	23 ***	.		Kepone (discontinued)
A46	DIELRIN	ppb	0.1	23	23 ***	.		Dieldrin
A47	ALDRIN	ppb	0.1	23	23 ***	.		Aldrin
A48	CHLOANE	ppb	1	23	23 ***	0	EPAP	Chlordane
A49	END01	ppb	0.1	23	23 ***	.		Endosulfan I (alpha)
A52	END02	ppb	0.1	23	23 ***	.		Endosulfan II (beta)
A54	AR1016	ppb	1	23	23 ***	0	EPAP	Arochlor 1016
A55	AR1221	ppb	1	23	23 ***	0	EPAP	Arochlor 1221
A56	AR1232	ppb	1	23	23 ***	0	EPAP	Arochlor 1232

TABLE 3.3. (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
A57	AR1242	ppb	1	23	23 ***	0	EPAP	Arochlor 1242
A58	AR1248	ppb	1	23	23 ***	0	EPAP	Arochlor 1248
A59	AR1254	ppb	1	23	23 ***	0	EPAP	Arochlor 1254
A60	AR1260	ppb	1	23	23 ***	0	EPAP	Arochlor 1260
A61	TETRANE	ppb	5	25	25 ***	5	EPA	Tetrachloromethane [Carbon Tetrachloride
A62	BENZENE	ppb	5	25	25 ***	5	EPA	Benzene
A63	DIOXANE	ppb	500	25	25 ***	.		Dioxane
A64	METHONE	ppb	10	25	25 ***	.		Methyl ethyl ketone
A65	PYRIDIN	ppb	500	25	25 ***	.		Pyridine
A66	TOLUENE	ppb	5	25	25 ***	2000	EPAP	Toluene
A67	1,1,1-T	ppb	5	25	24	200	EPA	1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	25	25 ***	.		1,1,2-Trichloroethane
A69	TRICENE	ppb	5	25	25 ***	5	EPA	Trichloroethylene [1,1,2-Trichloroethene
A70	PERCENE	ppb	5	25	25 ***	.		Perchloroethylene [Tetrachloroethene]
A71	OPXYLE	ppb	5	25	25 ***	440	EPAP	Xylene-o,p
A72	ACROLIN	ppb	10	25	25 ***	.		Acrolein
A73	ACRYILE	ppb	10	25	25 ***	.		Acrylonitrile
A74	BISTHER	ppb	5	25	25 ***	.		bis(Chloromethyl) ether
A75	BROMONE	ppb	5	25	25 ***	.		Bromoacetone
A76	METHBRO	ppb	10	25	25 ***	.		Bromomethane [Methyl bromide]
A77	CARBIDE	ppb	10	25	25 ***	.		Carbon disulfide
A78	CHLBENZ	ppb	5	25	25 ***	60	EPAP	Chlorobenzene
A79	CHLTHER	ppb	5	25	25 ***	.		2-Chloroethyl vinyl ether
A80	CHLFORM	ppb	5	25	5	100	EPA	Chloroform [Trichloromethane]
A81	METHCHL	ppb	10	25	25 ***	.		Methyl chloride [Chloromethane]
A82	CHMTHER	ppb	10	25	25 ***	.		Chloromethyl methyl ether
A83	CROTONA	ppb	10	25	25 ***	.		Crotonaldehyde
A84	DIBRCHL	ppb	10	25	25 ***	0	EPAP	1,2-Dibromo-3-chloropropane
A85	DIBRETH	ppb	10	25	25 ***	.		1,2-Dibromoethane
A86	DIBRMET	ppb	10	25	25 ***	.		Dibromomethane
A87	DIBUTEN	ppb	10	25	25 ***	.		1,4-Dichloro-2-butene
A88	DICDIFM	ppb	10	25	25 ***	.		Dichlorodifluoromethane
A89	1,1-DIC	ppb	5	25	25 ***	.		1,1-Dichloroethane
A90	1,2-DIC	ppb	5	25	25 ***	5	EPA	1,2-Dichloroethane
A91	TRANDCE	ppb	5	25	25 ***	70	EPAP	trans-1,2-Dichloroethene
A92	DICETHY	ppb	10	25	25 ***	7	EPA	1,1-Dichloroethylene
A93	METHYCH	ppb	5	25	25 ***	.		Methylene chloride [Dichloromethane]
A94	DICPANE	ppb	5	25	25 ***	6	EPAP	1,2-Dichloropropane
A95	DICPENE	ppb	5	25	25 ***	.		1,3-Dichloropropene
A96	NNDIEHY	ppb	10	25	25 ***	.		N,N-diethylhydrazine
A97	1,1-DIM	ppb	10	25	25 ***	.		1,1-Dimethylhydrazine
A98	1,2-DIM	ppb	10	25	25 ***	.		1,2-Dimethylhydrazine
B01	IODOMET	ppb	10	25	25 ***	.		Iodomethane
B02	METHACR	ppb	10	25	25 ***	.		Methacrylonitrile

TABLE 3.3. (contd)

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

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full name
B03	METHTHI	ppb	10	25	25 ***	.		Methanethiol
B04	PENTACH	ppb	10	25	25 ***	.		Pentachloroethane
B05	1112-tc	ppb	10	25	25 ***	.		1,1,1,2-Tetrachloroethane
B06	1122-tc	ppb	5	25	25 ***	.		1,1,2,2-Tetrachloroethane
B08	BROMORM	ppb	5	25	25 ***	100	EPA	Bromoform [Tribromomethane]
B09	TRCMEOL	ppb	10	25	25 ***	.		Trichloromethanethiol
B10	TRCMFLM	ppb	10	25	24	.		Trichloromonofluoromethane
B12	123-trp	ppb	10	25	25 ***	.		1,2,3-Trichloropropane
B13	VINYIDE	ppb	10	25	25 ***	2	EPA	Vinyl chloride
B14	M-XYLE	ppb	5	25	25 ***	440	EPAP	Xylene-m
B19	ACETILE	ppb	10	25	25 ***	.		Acetonitrile
B20	ACETOPH	ppb	10	23	23 ***	.		Acetophenone
B21	WARFRIN	ppb	10	23	23 ***	.		Warfarin
B22	ACEFENE	ppb	10	23	23 ***	.		2-Acetylaminofluorene
B23	AMINOYL	ppb	10	23	23 ***	.		4-Aminobiphenyl
B24	AMIISOX	ppb	10	23	23 ***	.		5-(Aminomethyl)-3-isoxazolol
B25	AMITROL	ppb	10	23	23 ***	.		Amitrole
B26	ANILINE	ppb	10	23	23 ***	.		Aniline
B27	ARAMITE	ppb	10	23	23 ***	.		Aramite
B28	AURAMIN	ppb	10	23	23 ***	.		Auramine
B29	BENZCAC	ppb	10	23	23 ***	.		Benz[c]acridine
B30	BENZAAN	ppb	10	23	23 ***	.		Benz[a]anthracene
B31	BENDICM	ppb	10	23	23 ***	.		Benzene, dichloromethyl
B32	BENTHOL	ppb	10	23	23 ***	.		Benzenethiol
B33	BENDINE	ppb	10	23	23 ***	.		Benzidine
B34	BENZBFL	ppb	10	23	23 ***	.		Benzo[b]fluoranthene
B35	BENZJFL	ppb	10	23	23 ***	.		Benzo[j]fluoranthene
B36	PBENZQU	ppb	10	23	23 ***	.		p-Benzoquinone
B37	BENZCHL	ppb	10	23	23 ***	.		Benzyl chloride
B38	BIS2CHM	ppb	10	23	23 ***	.		bis(2-Chloroethoxy) methane
B39	BIS2CHE	ppb	10	23	23 ***	.		bis(2-Chloroethyl) ether
B40	BIS2EPH	ppb	10	23	19	.		bis(2-Ethylhexyl) phthalate
B41	BROPHEN	ppb	10	23	23 ***	.		4-Bromophenyl phenyl ether
B42	BUTBENP	ppb	10	23	23 ***	.		Butyl benzyl phthalate
B43	BUTDINP	ppb	10	23	23 ***	.		2-sec-Butyl-4,6-dinitrophenol [Dinoseb]
B44	CHALETH	ppb	10	23	23 ***	.		Chloroalkyl ethers
B45	CHLANIL	ppb	10	23	23 ***	.		p-Chloroaniline [4-Chloroaniline]
B46	CHLCRES	ppb	10	23	23 ***	.		p-Chloro-m-cresol
B47	CHLEPOX	ppb	10	23	23 ***	0	EPAP	1-Chloro-2,3-epoxypropane
B48	CHLNAPH	ppb	10	23	23 ***	.		2-Chloronaphthalene
B49	CHLPHEN	ppb	10	23	23 ***	.		2-Chlorophenol
B50	CHRYSEN	ppb	10	23	23 ***	.		Chrysene
B51	CRESOLS	ppb	10	23	23 ***	.		Cresols
B52	CYCHDIN	ppb	10	23	23 ***	.		2-Cyclohexyl-4,6-dinitrophenol

TABLE 3.3. (contd)

Constituent List=WAC 173-303-9905 Constituents

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Standards Agency Exceeded	Full name
B53	DIBAHAC	ppb	10	23	23 ***	.		Dibenz[a,h]acridine
B54	DIBAJAC	ppb	10	23	23 ***	.		Dibenz[a,j]acridine
B55	DIBAHAN	ppb	10	23	23 ***	.		Dibenz[a,h]anthracene
B56	DIBCGCA	ppb	10	23	23 ***	.		7H-Dibenzo[c,g]carbazole
B57	DIBAEPY	ppb	10	23	23 ***	.		Dibenzo[a,e]pyrene
B58	DIBAHPY	ppb	10	23	23 ***	.		Dibenzo[a,h]pyrene
B59	DIBAIPY	ppb	10	23	23 ***	.		Dibenzo[a,i]pyrene
B60	DIBPHTH	ppb	10	23	23 ***	.		Di-n-butyl phthalate
B61	12-dben	ppb	10	23	23 ***	.		1,2-Dichlorobenzene [o-Dichlorobenzene]
B62	13-dben	ppb	10	23	23 ***	.		1,3-Dichlorobenzene [m-Dichlorobenzene]
B63	14-dben	ppb	10	23	23 ***	75	EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
B64	DICHBEN	ppb	10	23	23 ***	.		3,3'-Dichlorobenzidine
B65	24-dchp	ppb	10	23	23 ***	.		2,4-Dichlorophenol
B66	26-dchp	ppb	10	23	23 ***	.		2,6-Dichlorophenol
B67	DIEPHTH	ppb	10	23	23 ***	.		Diethyl phthalate
B68	DIHYSAF	ppb	10	23	23 ***	.		Dihydrosafrole
B69	DIMETHB	ppb	10	23	23 ***	.		3,3'-Dimethoxybenzidine
B70	DIMEAMB	ppb	10	23	23 ***	.		p-Dimethylaminoazobenzene
B71	DIMBENZ	ppb	10	23	23 ***	.		7,12-Dimethylbenz[a]anthracene
B72	DIMEYLB	ppb	10	23	23 ***	.		3,3'-Dimethylbenzidine
B73	THIONOX	ppb	10	23	23 ***	.		Thiofanox
B74	DIMPHAM	ppb	10	23	23 ***	.		alpha,alpha-Dimethylphenethylamine
B76	DIMPHTH	ppb	10	23	23 ***	.		Dimethyl phthalate
B77	DINBENZ	ppb	10	23	23 ***	.		Dinitrobenzene
B78	DINCRES	ppb	10	23	23 ***	.		4,6-Dinitro-o-cresol and salts
B79	DINPHEN	ppb	10	23	23 ***	.		2,4-Dinitrophenol
B80	24-dint	ppb	10	23	23 ***	.		2,4-Dinitrotoluene
B81	26-dint	ppb	10	23	23 ***	.		2,6-Dinitrotoluene
B82	DIOPHTH	ppb	10	23	23 ***	.		Di-n-octyl phthalate
B83	DIPHAMI	ppb	10	23	23 ***	.		Diphenylamine
B84	DIPHHYD	ppb	10	23	23 ***	.		1,2-Diphenylhydrazine
B85	DIPRNIT	ppb	10	23	23 ***	.		Di-n-propylnitrosamine
B86	ETHMINE	ppb	10	23	23 ***	.		Ethyleneimine
B87	ETHMETS	ppb	10	23	23 ***	.		Ethyl methanesulfonate
B88	FLUORAN	ppb	10	23	23 ***	.		Fluoranthene
B89	HEXCBEN	ppb	10	23	23 ***	.		Hexachlorobenzene
B90	HEXCBUT	ppb	10	23	23 ***	.		Hexachlorobutadiene
B91	HEXCCYC	ppb	10	23	23 ***	.		Hexachlorocyclopentadiene
B92	HEXCETH	ppb	10	23	23 ***	.		Hexachloroethane
B93	INDENOP	ppb	10	23	23 ***	.		Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	ppb	10	23	23 ***	.		Isosafrole
B95	MALOILE	ppb	10	23	23 ***	.		Malononitrile
B96	MELPHAL	ppb	10	23	23 ***	.		Melphalan
B97	METHAPY	ppb	10	23	23 ***	.		Methapyrilene

TABLE 3.3. (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
B98	METHNYL	ppb	10	23	23 ***	.		Metholonyl
B99	METAZIR	ppb	10	23	23 ***	.		2-Methylaziridine
C01	METCHAN	ppb	10	23	23 ***	.		3-Methylcholanthrene
C02	METBISC	ppb	10	23	23 ***	.		4,4'-Methylenebis(2-chloroaniline)
C03	METACTO	ppb	10	23	23 ***	.		2-Methyllactonitrile
C04	METACRY	ppb	10	23	23 ***	.		Methyl methacrylate
C05	METMSUL	ppb	10	23	23 ***	.		Methyl methanesulfonate
C06	METPROP	ppb	10	23	23 ***	.		2-Methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	ppb	10	23	23 ***	.		Methylthiouracil
C08	NAPHQUI	ppb	10	23	23 ***	.		1,4-Naphthoquinone
C09	1-napha	ppb	10	23	23 ***	.		1-Naphthylamine
C10	2-napha	ppb	10	23	23 ***	.		2-Naphthylamine
C11	NITRANI	ppb	10	23	23 ***	.		p-Nitroaniline [4-Nitroaniline]
C12	NITBENZ	ppb	10	23	23 ***	.		Nitrobenzene
C13	NITPHEN	ppb	10	23	23 ***	.		4-Nitrophenol [p-Nitrophenol]
C14	NNIBUTY	ppb	10	23	23 ***	.		n-Nitrosodi-n-butylamine
C15	NNIDIEA	ppb	10	23	23 ***	.		n-Nitrosodiethanolamine
C16	NNIDIEY	ppb	10	23	23 ***	.		n-Nitrosodiethylamine
C17	NNIDIME	ppb	10	23	23 ***	.		n-Nitrosodimethylamine
C18	NNIMETH	ppb	10	23	23 ***	.		n-Nitrosomethylethylamine
C19	NNIURET	ppb	10	23	23 ***	.		n-Nitroso-n-methylurethane
C20	NNIVINY	ppb	10	23	23 ***	.		n-Nitrosomethylvinylamine
C21	NNIMORP	ppb	10	23	23 ***	.		n-Nitrosomorpholine
C22	NNINICO	ppb	10	23	23 ***	.		n-Nitrosonornicotine
C23	NNIPIPE	ppb	10	23	23 ***	.		n-Nitrosopiperidine
C24	NITRPYR	ppb	10	23	23 ***	.		Nitrosopyrrolidine
C25	NITRTOL	ppb	10	23	23 ***	.		5-Nitro-o-toluidine
C26	PENTCHB	ppb	10	23	23 ***	.		Pentachlorobenzene
C27	PENTCHN	ppb	10	23	23 ***	.		Pentachloronitrobenzene
C28	PENTCHP	ppb	50	23	23 ***	220	EPAP	Pentachlorophenol
C29	PHENTIN	ppb	10	23	23 ***	.		Phenacetin
C30	PHENINE	ppb	10	23	23 ***	.		Phenylenediamine
C31	PHTHEST	ppb	10	23	23 ***	.		Phthalic acid esters
C32	PICOLIN	ppb	10	23	23 ***	.		2-Picoline
C33	PRONIDE	ppb	10	23	23 ***	.		Pronamide
C34	RESERPI	ppb	10	23	23 ***	.		Reserpine
C35	RESORCI	ppb	10	23	23 ***	.		Resorcinol
C36	SAFROL	ppb	10	23	23 ***	.		Safrol
C37	TETRCHB	ppb	10	23	23 ***	.		1,2,4,5-Tetrachlorobenzene
C39	TETRCHP	ppb	10	23	23 ***	.		2,3,4,6-Tetrachlorophenol
C40	THIURAM	ppb	10	23	23 ***	.		Thiuram
C41	TOLUDIA	ppb	10	23	23 ***	.		Toluenediamine
C42	OTOLHYD	ppb	10	23	23 ***	.		o-Toluidine hydrochloride
C43	TRICHLB	ppb	10	23	23 ***	.		1,2,4-Trichlorobenzene

TABLE 3.3. (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
C44	245-trp	ppb	10	23	23 ***	.		2,4,5-Trichlorophenol
C45	246-trp	ppb	10	23	23 ***	.		2,4,6-Trichlorophenol
C46	TRIPHOS	ppb	10	23	23 ***	.		O,o,o-triethyl phosphorothioate
C47	SYMTRIN	ppb	10	23	23 ***	.		Sym-trinitrobenzene
C48	TRISPHO	ppb	10	23	23 ***	.		Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	ppb	10	23	23 ***	.		Benzo[a]pyrene
C50	CHLNAPZ	ppb	10	23	23 ***	.		Chlornaphazine
C51	BIS2ETH	ppb	10	23	23 ***	.		bis(2-Chloroisopropyl) ether
C52	HEXAENE	ppb	10	23	23 ***	.		Hexachloropropene
C54	HEXACHL	ppb	10	23	23 ***	.		Hexachlorophene
C55	NAPHTHA	ppb	10	23	23 ***	.		Naphthalene
C56	123TRI	ppb	10	23	23 ***	.		1,2,3-Trichlorobenzene
C58	135TRI	ppb	10	23	23 ***	.		1,3,5-Trichlorobenzene
C59	1234TE	ppb	10	23	23 ***	.		1,2,3,4-Tetrachlorobenzene
C60	1235TE	ppb	10	23	23 ***	.		1,2,3,5-Tetrachlorobenzene
C61	TETEPYR	ppb	2	18	18 ***	.		Tetraethylpyrophosphate
C62	CHLLATE	ppb	300	23	23 ***	.		Chlorobenzilate
C63	CARBPHT	ppb	2	21	21 ***	.		Carbophenothion
C64	DISULFO	ppb	2	21	21 ***	.		Disulfoton
C65	DIMETHO	ppb	2	21	21 ***	.		Dimethoate
C66	METHPAR	ppb	2	21	21 ***	.		Methyl parathion
C67	PARATHI	ppb	2	21	21 ***	.		Parathion
C70	CYANIDE	ppb	10	23	23 ***	.		Cyanide
C71	FORMALN	ppb	500	25	25 ***	.		Formalin
C77	PERCHLO	ppb	500	23	23 ***	.		Perchlorate
C78	SULFIDE	ppb	1000	23	23 ***	.		Sulfide
C79	KEROSEN	ppb	10000	23	23 ***	.		Kerosene
C80	AMMONIU	ppb	50	23	22	.		Ammonium ion
C87	CITRUSR	ppb	1000	23	23 ***	.		Citrus red
C90	PARALDE	ppb	10000	22	22 ***	.		Paraldehyde
C91	STRYCHN	ppb	50	23	23 ***	.		Strychnine
C92	MALHYDR	ppb	500	23	23 ***	.		Maleic hydrazide
C93	NICOTIN	ppb	100	23	23 ***	.		Nicotinic acid
C94	ACRYIDE	ppb	10000	22	22 ***	0	EPAP	Acrylamide
C95	ALLYLAL	ppb	10000	22	22 ***	.		Allyl alcohol
C98	CHLPROP	ppb	10000	22	22 ***	.		3-Chloropropionitrile
D01	PCDDs	ppb	0.01	23	23 ***	.		PCDDs
D02	PCDFs	ppb	0.01	23	23 ***	.		PCDFs
D03	2378TCD	ppb	0.01	23	23 ***	.		2,3,7,8-TCDD [Dioxin]
H03	ETHCARB	ppb	10000	22	22 ***	.		Ethyl carbamate
H04	ETHCYAN	ppb	10000	22	22 ***	.		Ethyl cyanide
H05	ETHOXID	ppb	10	25	25 ***	.		Ethylene oxide
H06	ETHMETH	ppb	10	25	25 ***	.		Ethyl methacrylate
H09	ISOBUTY	ppb	10000	22	22 ***	.		Isobutyl alcohol

TABLE 3.3. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency Exceeded	Full name
H11	PROPYLA	ppb	10000	22	22 ***	.		n-Propylamine
H12	PROPYNO	ppb	10000	22	22 ***	.		2-Propyn-1-ol
H15	2,4,5-T	ppb	2	23	23 ***	.		2,4,5-T
H40	FTHALLI	ppb	5	25	25 ***	.		Thallium, filtered
H62	LHYDRAZ	ppb	30	18	18 ***	.		Hydrazine, low DL
H68	HEXONE	ppb	10	25	25 ***	.		Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	25	24	.		Acetone by VOA
I06	ISOPHER	ppb	10	23	23 ***	.		Isopherone
I09	BUTANOL	ppb	10000	22	22 ***	.		1-Butanol
I21	TRIBUPH	ppb	10	23	23 ***	.		Tributylphosphoric acid
I28	TAF	ppb	10	25	25 ***	.		Tetrahydrofuran
I29	ACENAPH	ppb	10	23	23 ***	.		Acenaphthene
I30	FLRENE	ppb	10	23	23 ***	.		Fluorene
I31	ANTHRA	ppb	10	23	23 ***	.		Anthracene
I32	PYRENE	ppb	10	23	23 ***	.		Pyrene
I33	ETHBENZ	ppb	5	25	25 ***	680	EPAP	Ethylbenzene
I34	STYRENE	ppb	5	25	25 ***	140	EPAP	Styrene
I42	BDCM	ppb	5	25	25 ***	100	EPA	Bromodichloromethane
I43	CDBM	ppb	5	25	25 ***	100	EPA	Chlorodibromomethane
I64	2NITPH	ppb	10	23	23 ***	.		2-Nitrophenol [o-Nitrophenol]
I67	ETHANOL	ppb	10000	22	22 ***	.		Ethanol
I76	2MENAPH	ppb	10	23	23 ***	.		2-Methylnaphthalene
I82	PHENANT	ppb	10	23	23 ***	.		Phenanthrene
J43	BENZALC	ppb	10	23	23 ***	.		Benzyl alcohol
J69	2HEXAND	ppb	50	25	25 ***	.		2-Hexanone
J71	BNZKFLU	ppb	10	23	23 ***	.		Benzo[k]fluoranthene
J83	BGHIPER	ppb	10	23	23 ***	.		Benzo (ghi) perylene
J89	DINOSEB	ppb	10	23	23 ***	.		Dinoseb
J91	DIALLAT	ppb	10	23	23 ***	.		Diallate
K52	NNDIPHA	ppb	10	23	23 ***	.		n-Nitrosodiphenylamine
K56	DIBENFR	ppb	10	23	23 ***	.		Dibenzofuran
K58	ACENATL	ppb	10	23	23 ***	.		Acenaphthylene
L20	MBP	ppb	10000	22	22 ***	.		Monobutylphosphate
L21	DBP	ppb	10000	22	22 ***	.		Dibutylphosphate
L45	ALLYLCL	ppb	100	25	25 ***	.		Allyl chloride
L46	CLETHAN	ppb	10	25	25 ***	.		Chlorethane
L48	PROPCN	ppb	5	25	25 ***	.		Propionitrile
L49	VINYLAC	ppb	5	25	25 ***	.		Vinyl acetate
L50	B2CLMEE	ppb	10	23	23 ***	.		bis(2-Chloro-1-methylethyl)ether
L52	DIPHOS	ppb	10	23	23 ***	.		O,O-Diethyl-O,2-pyrazinyl phosphorothion
L53	ISODRIN	ppb	10	23	23 ***	.		Isodrin
L54	ONITANI	ppb	10	23	23 ***	.		o-Nitroaniline [2-Nitroaniline]
L55	MNITANI	ppb	10	23	23 ***	.		m-Nitroaniline [3-Nitroaniline]
L56	4NITQUI	ppb	10	23	23 ***	.		4-Nitroquinoline 1-oxide

TABLE 3.3. (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
L57	ETHGLYC	ppb	10000	22	22 ***	.		Ethylene glycol
L59	1PROPAN	ppb	10000	22	22 ***	.		1-Propanol
L60	1BUTYN	ppb	10000	22	22 ***	.		1-Butynol
L62	ACETON	ppb	10	23	23 ***	.		Acetone by ABN
L63	14DBEN	ppb	5	25	25 ***	75	EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
L64	CHLROB	ppb	10	23	23 ***	60	EPAP	Chlorobenzene (by ABN)
P12	ENDSFAN	ppb	0.5	23	23 ***	.		Endosulfan
P13	PHORATE	ppb	2	21	21 ***	.		Phorate

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
DOE - based on draft DOE Derived Concentration Guides, DOE Order 5480.xx
EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 3.4. Constituents with at Least One Detected Value for the 183-H Solar Evaporation Basins
May through June 1989

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	1,1,1-T ppb 5/200	ACETONE ppb 10/.	ALKALIN ppb 20000/.	ALPHAHI pCi/L 4/15	ALUMNUM ppb 150/.	AMMONIU ppb 50/.	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 6/1000
1-H3-1	24MAY89		<5	<10	132,000	1.610	<150	<50	<5	<5	30
1-H3-2A	26MAY89		<5	<10	145,000	4.080	<150	<50	5	<5	41
1-H3-2B	26MAY89		<5	<10	132,000	2.190	<150	<50	<5	<5	35
	26MAY89	1	<5	<10	.	5.520	<150	.	<5	<5	41
1-H3-2C	01JUN89		<5	<10	101,000	*0.181	<150	<50	7	7	12
1-H4-3	25MAY89		#3	<10	157,000	133.000	239	108	<5	<5	69
1-H4-4	25MAY89		<5	<10	85,200	*-0.027	<150	<50	<5	<5	27
1-H4-5	20JUN89		<5	<10	147,000	4.060	<150	<50	5	5	64
1-H4-6	24MAY89		<5	<10	150,000	2.080	<150	<50	<5	<5	49
1-H4-7	06JUN89		<5	<10	148,000	2.890	<150	<50	<5	5	47
1-H4-8	12MAY89		<5	#5	158,000	2.120	<150	<50	<5	<5	53
1-H4-9	15MAY89		<5	<10	173,000	6.310	<150	<50	13	9	54
1-H4-10	18MAY89		<5	<10	79,000	*0.803	<150	<50	<5	<5	35
1-H4-11	12MAY89		<5	<10	112,000	4.620	<150	<50	<5	<5	39
1-H4-12A	23MAY89		<5	<10	88,500	1.350	<150	<50	6	<5	36
1-H4-12B	22MAY89		<5	<10	110,000	3.120	<150	<50	<5	<5	79
1-H4-12C	22MAY89		<5	<10	105,000	0.899	<150	<50	5	5	6
1-H4-13	23MAY89		<5	<10	93,800	*1.010	<150	<50	<5	<5	27
	23MAY89	1	<5	<10	.	1.720	<150	.	<5	<5	26
1-H4-14	18MAY89		<5	<10	103,000	1.480	<150	<50	<5	<5	19
1-H4-15A	25MAY89		<5	<10	98,400	1.370	<150	<50	<5	<5	60
1-H4-15B	25MAY89		<5	<10	120,000	*0.569	<150	<50	5	<5	117
1-H4-16	23MAY89		<5	<10	106,000	2.180	<150	<50	<5	<5	21
1-H4-17	23MAY89		<5	<10	147,000	2.830	518	<50	<5	<5	64
1-H4-18	23MAY89		<5	<10	122,000	3.450	<150	<50	<5	<5	35

TABLE 3.4. (contd)

Well name	Collection Date	Duplicate sample number	FBARIUM ppb 6/1000	FBERYLL ppb 5/.	BERYLUM ppb 5/.	BETA pCi/L 8/50	BIS2EPH ppb 10/.	BORON ppb 10/.	FBORON ppb 10/.	FCALCIU ppb 50/.	CALCIUM ppb 50/.
1-H3-1	24MAY89		32	<5	<5	7.320	<10	28	25	47,600	45,500
1-H3-2A	26MAY89		30	<5	<5	8.510	<10	47	41	56,800	68,800
1-H3-2B	26MAY89		30	5	<5	6.780	<10	33	33	50,500	54,200
	26MAY89	1	34	<5	<5	4.770	.	39	32	53,600	60,000
1-H3-2C	01JUN89		8	<5	<5	*0.222	19	24	22	26,600	28,300
1-H4-3	25MAY89		53	<5	<5	250.000	<10	59	56	45,700	51,700
1-H4-4	25MAY89		17	<5	<5	6.860	<10	15	22	27,600	29,600
1-H4-5	20JUN89		68	<5	<5	8.970	<10	63	60	72,800	90,500
1-H4-6	24MAY89		53	<5	<5	4.430	<10	61	56	68,200	70,800
1-H4-7	06JUN89		49	<5	8	3.180	<10	97	107	76,100	73,300
1-H4-8	12MAY89		54	<5	<5	7.060	11	89	87	86,800	83,200
1-H4-9	15MAY89		62	<5	<5	27.600	<10	52	63	84,700	75,900
1-H4-10	18MAY89		37	<5	<5	2.660	<10	16	11	25,700	27,300
1-H4-11	12MAY89		36	<5	<5	61.100	23	25	21	52,300	53,800
1-H4-12A	23MAY89		35	<5	<5	*1.850	<10	23	21	38,800	39,400
1-H4-12B	22MAY89		86	<5	<5	5.980	<10	42	58	54,900	50,100
1-H4-12C	22MAY89		7	<5	<5	2.730	<10	16	14	34,200	29,700
1-H4-13	23MAY89		21	<5	<5	48.700	<10	22	13	41,300	41,200
	23MAY89	1	23	<5	<5	50.200	.	24	13	38,300	42,400
1-H4-14	18MAY89		22	<5	<5	6.360	<10	19	18	42,600	44,100
1-H4-15A	25MAY89		53	<5	<5	4.580	20	25	26	42,500	45,300
1-H4-15B	25MAY89		109	<5	<5	5.130	<10	26	27	44,100	47,700
1-H4-16	23MAY89		19	<5	<5	15.400	<10	18	21	44,100	47,000
1-H4-17	23MAY89		66	<5	<5	10.100	<10	41	46	83,300	74,800
1-H4-18	23MAY89		38	<5	<5	16.300	<10	27	30	54,300	52,800

TABLE 3.4. (contd)

Well name	Collection Date	Duplicate sample number	CHLFORM ppb 5/100	CHLORID ppb 500/250000s	FCHROMI ppb 10/50	CHROMUM ppb 10/50	CONDFLD umho 1/700w	COPPER ppb 10/1300p	FCOPPER ppb 10/1300p	FLUORID ppb 500/4000
1-H3-1	24MAY89		19	8,400	15	19	347	<10	<10	<500
1-H3-2A	26MAY89		7	10,500	94	110	440	<10	<10	<500
1-H3-2B	26MAY89		11	8,700	61	73	383	<10	<10	<500
	26MAY89	1	10	8,800	70	81	.	13	<10	<500
1-H3-2C	01JUN89		<5	3,700	12	15	252	<10	<10	<500
1-H4-3	25MAY89		14	9,000	146	256	1355	14	15	1100
1-H4-4	25MAY89		<5	2,000	18	25	179	<10	10	<500
1-H4-5	20JUN89		11	6,600	88	86	517	<10	<10	<500
1-H4-6	24MAY89		#4	12,000	89	92	484	<10	<10	<500
1-H4-7	06JUN89		9	9,600	77	76	560	<10	<10	<500
1-H4-8	12MAY89		8	9,900	63	70	469	<10	<10	<500
1-H4-9	15MAY89		10	10,200	49	43	481	<10	<10	<500
1-H4-10	18MAY89		<5	1,800	17	13	160	<10	<10	<500
1-H4-11	12MAY89		17	5,200	132	136	303	<10	<10	<500
1-H4-12A	23MAY89		<5	3,000	31	28	304	<10	<10	<500
1-H4-12B	22MAY89		#4	6,700	81	72	380	<10	<10	<500
1-H4-12C	22MAY89		9	2,500	318	265	273	<10	<10	<500
1-H4-13	23MAY89		17	3,800	56	51	289	<10	<10	<500
	23MAY89	1	18	3,800	48	51	.	<10	<10	<500
1-H4-14	18MAY89		28	5,100	358	378	280	<10	<10	<500
1-H4-15A	25MAY89		<5	4,800	47	53	360	<10	<10	<500
1-H4-15B	25MAY89		#3	5,800	81	90	386	<10	<10	<500
1-H4-16	23MAY89		26	5,000	14	13	265	<10	<10	<500
1-H4-17	23MAY89		7	9,800	97	86	512	<10	<10	<500
1-H4-18	23MAY89		21	5,700	162	159	333	<10	<10	<500

TABLE 3.4. (contd)

Well name	Collection Date	Duplicate sample number	IRON ppb 30/300s	LEADGF ppb 5/50	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	NICKEL ppb 10/.	FNICKEL ppb 10/.
1-H3-1	24MAY89		148	<5	11,400	11,500	<5	9	<10	<10
1-H3-2A	26MAY89		40	<5	14,700	12,800	<5	<5	<10	<10
1-H3-2B	26MAY89		<30	<5	12,600	12,100	10	9	<10	<10
	26MAY89	1	<30	<5	13,900	12,800	9	9	<10	<10
1-H3-2C	01JUN89		<30	<5	9,240	8,330	<5	6	<10	<10
1-H4-3	25MAY89		16,400	6	9,050	7,850	11	44	74	14
1-H4-4	25MAY89		350	<5	5,340	5,060	<5	<5	<10	<10
1-H4-5	20JUN89		503	<5	11,900	11,600	<5	<5	<10	<10
1-H4-6	24MAY89		195	<5	15,800	15,000	36	53	<10	<10
1-H4-7	06JUN89		141	<5	14,200	14,500	<5	5	<10	<10
1-H4-8	12MAY89		115	<5	14,400	15,000	<5	5	<10	<10
1-H4-9	15MAY89		75	<5	13,900	16,800	<5	<5	<10	<10
1-H4-10	18MAY89		<30	<5	5,960	6,060	<5	<5	<10	<10
1-H4-11	12MAY89		163	<5	7,970	7,930	<5	7	<10	<10
1-H4-12A	23MAY89		<30	<5	7,160	6,930	<5	<5	<10	<10
1-H4-12B	22MAY89		<30	<5	8,530	8,990	<5	<5	<10	<10
1-H4-12C	22MAY89		<30	<5	10,800	11,900	<5	<5	32	31
1-H4-13	23MAY89		36	<5	7,070	6,860	<5	<5	<10	<10
	23MAY89	1	31	<5	7,200	6,380	<5	<5	<10	<10
1-H4-14	18MAY89		<30	<5	8,130	8,530	<5	<5	<10	<10
1-H4-15A	25MAY89		31	<5	9,260	8,870	<5	<5	<10	<10
1-H4-15B	25MAY89		<30	<5	10,800	10,200	<5	<5	<10	13
1-H4-16	23MAY89		<30	<5	5,690	5,300	<5	<5	<10	<10
1-H4-17	23MAY89		849	<5	15,100	16,000	<5	26	<10	<10
1-H4-18	23MAY89		39	<5	9,270	9,250	<5	<5	<10	<10

TABLE 3.4. (contd)

Well name	Collection Date	Duplicate sample number	NITRATE ppb 500/45000	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	FSILICO ppb 50/.	SILICON ppb 50/.
1-H3-1	24MAY89		23,300	7.8	7.70	5,120	5,120	*0.04590	17,000	16,000
1-H3-2A	26MAY89		35,300	7.8	7.71	5,310	6,080	*0.04820	13,100	14,500
1-H3-2B	26MAY89		28,200	8.0	7.90	5,480	5,660	*0.12000	11,500	11,100
	26MAY89	1	28,100	.	.	5,780	6,240	0.20400	12,000	12,700
1-H3-2C	01JUN89		4,600	8.3	7.84	4,350	4,780	*-0.01940	21,300	22,900
1-H4-3	25MAY89		524,000	7.7	7.56	6,980	6,920	*-0.00783	14,500	15,100
1-H4-4	25MAY89		10,400	8.0	7.68	3,040	3,210	*0.09140	11,200	11,400
1-H4-5	20JUN89		44,800	7.8	7.54	4,900	5,020	*0.04700	13,200	13,500
1-H4-6	24MAY89		36,700	7.7	7.50	6,580	6,990	*0.01870	14,100	14,500
1-H4-7	08JUN89		56,800	7.9	7.41	5,860	5,870	0.44600	12,800	12,500
1-H4-8	12MAY89		39,400	7.7	7.30	5,670	5,470	*0.09910	14,800	14,300
1-H4-9	15MAY89		69,300	7.8	7.40	5,830	4,990	*-0.04140	15,900	13,100
1-H4-10	18MAY89		12,700	7.4	7.20	2,700	2,620	*0.07640	9,920	10,000
1-H4-11	12MAY89		32,000	7.9	7.40	2,970	3,050	*0.16900	12,900	12,900
1-H4-12A	23MAY89		30,200	8.0	7.82	3,960	3,840	0.56800	12,600	13,100
1-H4-12B	22MAY89		27,400	8.0	7.83	4,870	4,480	*0.14900	14,200	13,200
1-H4-12C	22MAY89		6,400	8.0	7.81	5,210	4,550	*0.05110	30,600	27,100
1-H4-13	23MAY89		15,800	7.7	7.44	2,320	2,230	0.18400	12,500	12,800
	23MAY89	1	16,200	.	.	2,110	2,250	0.35700	11,600	13,100
1-H4-14	18MAY89		18,600	7.8	7.70	4,250	3,930	*0.09550	13,500	13,200
1-H4-15A	25MAY89		41,400	7.5	7.40	4,260	4,480	*-0.01720	14,600	15,200
1-H4-15B	25MAY89		22,500	7.7	7.57	5,060	5,260	0.23500	18,400	18,700
1-H4-16	23MAY89		13,900	8.0	7.70	2,780	2,790	*0.13100	10,600	10,900
1-H4-17	23MAY89		51,200	7.5	7.40	7,550	6,970	0.75800	17,000	16,300
1-H4-18	23MAY89		31,500	7.9	7.47	4,480	4,390	*0.10800	13,600	13,500

TABLE 3.4. (contd)

Well name	Collection Date	Duplicate sample number	SODIUM ppb 200/.	FSODIUM ppb 200/.	FSTRONT ppb 10/.	STRONUM ppb 10/.	SULFATE ppb 500/250000s	TC ppb 1000/.	TC-99 pCi/L 15/900r	TOC ppb 2000/.
1-H3-1	24MAY89		16,700	16,600	295	292	40,400	29,500	*0.13	#800
1-H3-2A	26MAY89		19,300	16,500	317	375	72,200	32,600	*-0.37	#800
1-H3-2B	26MAY89		14,700	13,900	303	317	59,000	29,200	*-0.16	#800
	26MAY89	1	16,300	14,700	325	352	59,400	.	.	.
1-H3-2C	01JUN89		19,600	16,300	173	194	37,800	23,600	*-2.09	#300
1-H4-3	25MAY89		254,000	254,000	267	298	98,000	35,300	3650.00	#1100
1-H4-4	25MAY89		8,980	8,310	135	145	20,600	19,600	*1.11	#800
1-H4-5	20JUN89		11,800	11,800	331	344	74,100	34,300	*3.12	#1100
1-H4-6	24MAY89		27,900	25,700	357	387	90,000	33,500	*-1.16	#900
1-H4-7	06JUN89		21,800	22,000	373	364	104,000	36,900	*-1.86	#1400
1-H4-8	12MAY89		14,600	14,800	402	391	91,200	37,300	*-1.27	#1800
1-H4-9	15MAY89		23,900	27,300	408	358	72,000	39,900	235.00	#1000
1-H4-10	18MAY89		6,560	6,780	127	128	19,000	19,300	*-0.81	#600
1-H4-11	12MAY89		12,700	12,500	243	246	40,600	26,300	88.90	#1400
1-H4-12A	23MAY89		9,600	9,880	188	184	33,000	20,100	91.30	#800
1-H4-12B	22MAY89		11,500	12,700	272	241	44,000	26,400	26.30	#800
1-H4-12C	22MAY89		4,200	4,840	243	208	24,700	23,400	*-0.20	#500
1-H4-13	23MAY89		6,310	6,540	190	187	31,900	22,300	*3.62	#700
	23MAY89	1	6,410	6,020	178	192	32,100	.	.	.
1-H4-14	18MAY89		7,760	8,260	219	215	40,300	23,100	*1.12	#700
1-H4-15A	25MAY89		10,300	9,580	220	233	49,200	23,100	*1.25	#800
1-H4-15B	25MAY89		11,400	10,600	246	263	48,000	27,700	*1.54	#500
1-H4-16	23MAY89		4,680	4,660	201	208	30,900	23,400	*0.20	#600
1-H4-17	23MAY89		14,600	16,400	398	349	93,600	34,700	*1.01	#1000
1-H4-18	23MAY89		11,300	11,900	262	247	47,600	27,700	65.50	#700

TABLE (contd)

Well name	Collection Date	Duplicate sample number	TOXLDL ppb 10/.	TRCMFLM ppb 10/.	TURBID ntu 0.1/1	U pCi/L 0.5/600d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
1-H3-1	24MAY89		44	<10	0.6	2.390	8	7	<5	<5
1-H3-2A	26MAY89		10	<10	0.2	3.680	7	6	<5	<5
1-H3-2B	26MAY89		12	<10	0.1	3.110	7	<5	7	<5
	26MAY89	1	.	<10	.	.	6	8	7	<5
1-H3-2C	01JUN89		13	<10	0.2	0.744	22	18	<5	<5
1-H4-3	25MAY89		30	<10	13.3	71.700	8	10	<5	<5
1-H4-4	25MAY89		10	<10	6.4	1.670	<5	<5	75	7
1-H4-5	20JUN89		17	<10	0.4	3.620	6	6	95	43
1-H4-6	24MAY89		15	<10	0.6	2.980	7	<5	184	131
1-H4-7	06JUN89		16	<10	0.5	4.950	<5	<5	<5	6
1-H4-8	12MAY89		17	<10	0.8	3.970	<5	8	<5	<5
1-H4-9	15MAY89		23	<10	0.3	6.180	7	6	33(b)	<5
1-H4-10	18MAY89		#2	<10	<0.1	0.410	6	<5	<5	<5
1-H4-11	12MAY89		24	13(a)	0.4	5.260	<5	9	<5	<5
1-H4-12A	23MAY89		#8	<10	<0.1	1.680	8	11	<5	7
1-H4-12B	22MAY89		#8	<10	0.1	2.480	8	10	<5	<5
1-H4-12C	22MAY89		#8	<10	<0.1	2.190	29	25	<5	<5
1-H4-13	23MAY89		19	<10	0.3	1.430	<5	5	<5	<5
	23MAY89	1	.	<10	.	.	<5	<5	<5	5
1-H4-14	18MAY89		24	<10	<0.1	1.120	5	10	<5	<5
1-H4-15A	25MAY89		#9	<10	0.3	1.220	7	6	<5	<5
1-H4-15B	25MAY89		13	<10	<0.1	1.340	9	6	19	9
1-H4-16	23MAY89		32	<10	0.1	1.040	<5	10	<5	<5
1-H4-17	23MAY89		20	<10	21.5	4.170	<5	8	<5	<5
1-H4-18	23MAY89		22	<10	0.6	3.650	<5	14	<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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 (July, 1987) 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 given 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) The laboratory reported that the sample was cloudy or contained particulates. The higher result for this unfiltered sample above the filtered sample may be attributed to suspended solids.

(b) Suspect data. First replicate analyzed was out of the calibration range. Samples were then diluted (see page 1.3).

4.0 200 AREAS LOW-LEVEL BURIAL GROUNDS

G. V. Last

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 currently in the background stage of monitoring. Three complete sample sets have been collected for each network.

A revised ground-water monitoring plan has been prepared that discusses the expansion of the ground-water monitoring program for the LLBGs from four waste management areas (WMAs) covering all or portions of six burial grounds to five WMAs covering all or portions of eight burial grounds. Each of these LLBGs is located in either the 200-East or 200-West Area of the Hanford Site (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 (submarine reactor core barrels, 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 continuing since 1960.

There are currently 35 wells in the monitoring networks for the LLBGs (see Figures 4.1, 4.2, 4.3, 4.4, and 4.5). Table 4.1 lists the upgradient and downgradient wells at each WMA. Table 4.2 shows the sampling schedule for the wells in the monitoring network. This monitoring network is being expanded to include 16 additional new wells: 10 to be installed during 1989, and 6 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 was initiated on the first of the 10 new wells to be installed this year. Well 299-E27-11 (temporary well number E12-MW8) was started on June 27, 1989. This well is located along the southern boundary of WMA-2 and is being drilled by Kaiser Engineers Hanford. Drilling had progressed to a depth of 35 ft by the end of the quarter, using hard-tool methods.

The interim characterization report (Hydrogeology of the 200 Areas Low-Level Burial Grounds) was submitted for offsite printing in mid-May. Printing is expected to take 6 to 8 weeks.

WATER LEVELS

Water levels at each well were measured three times during this quarter; results are listed in Table 4.3 for wells in both the 200-East and 200-West Areas.

WATER CHEMISTRY DATA

Eleven of the 34 wells scheduled for sampling during the first quarter of 1989 were sampled in May. The last well to be sampled to complete the first quarter sampling was sampled in June. The first quarter sampling schedule had been interrupted because purge water disposal issues had not been resolved. Samples were not collected from well 299-E32-3 because of a faulty pump.

The analytical results for the first quarter samples (collected in March, May, and June 1989) are summarized in Tables 4.4, 4.6, 4.8, and 4.10 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 4.5, 4.7, 4.9, and 4.11 for WMA-1, WMA-2, WMA-3, and WMA-4, respectively. Major observations of the analyses from each WMA are discussed below.

- WMA-1
  - Tritium exceeded the 40 CFR 141 standard of 20,000 pCi/L in wells 299-E28-26 (169,000 pCi/L), 299-E28-27 (212,000 pCi/L), and 299-E32-2 (95,900 pCi/L).
  - Nitrate (40 CFR 141) and iron (40 CFR 143) exceeded their standards in well 299-E28-26, and ammonium continues to be found at slightly less than 1 ppm in this well.
- WMA-2
  - Chromium (40 CFR 141) and iron (40 CFR 143) exceeded their respective standards in well 299-E27-9. However, a duplicate sample set from this well did not exceed these standards.

- WMA-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.

  - Chromium exceeded the 50-ppb standard in 40 CFR 141 in wells 299-W6-2 (56 ppb), 299-W7-1 (75 ppb), and 299-W10-13 (54 ppb).

  - Nitrate exceed the 45-ppm standard in 40 CFR 141 in wells 299-W6-2 (74.9 ppm) and 299-W7-4 (74.2 ppm).

  - Both filtered and unfiltered manganese results for well 299-W7-3 (153 and 181, respectively) exceeded the 50-ppb standard in 40 CFR 143.

  - Iron exceeded the 300-ppb standard in 40 CFR 143 in wells 299-W7-1, 299-W7-3, 299-W7-6, and 299-W9-1.

  - Tetrachloromethane (carbon tetrachloride) exceeded the 5-ppb standard in 40 CFR 141 in wells 299-W6-2 (102 ppb), 299-W7-4 (222 ppb), 299-W7-5 (34 ppb), and 299-W10-13 (13 ppb).

- WMA-4

  Note: Ground-water samples were collected from well 299-W15-17 using a Teflon®[a] bailer, rather than a HydroStar pump as in the other wells. This well has been recently remediated to remove sand from the well, and thus the samples may not be totally representative of the ground water. The HydroStar[b] pump has been scheduled to be reinstalled in this well.

  - The field and laboratory pH exceeded the 6.5 to 8.5 standard (40 CFR 143) in well 299-W15-17.

  - Gross alpha exceeded the 15-pCi/L standard in 40 CFR 141 in the samples collected in May at well 299-W18-21 (19.4 pCi/L and 24.8 pCi/L), but not in the samples collected in March (12.3 pCi/L).

  - Nitrate exceeded the 45-ppm standard in 40 CFR 141 in wells 299-W15-16 (70.7 ppm) and 299-W15-18 (68.9 ppm).

(a) Teflon is a registered trademark of E. I. du Pont de Nemours and Company, Incorporated, Wilmington, Delaware.
(b) HydroStar is a tradename of Instrumentation Northwest, Inc., Redmond, Washington.

- Tetrachloromethane (carbon tetrachloride) exceeded the 5-ppb standard in 40 CFR 141 in all shallow wells: 299-W15-15 (440 ppb), 299-W15-16 (6650 ppb), 299-W15-18 (1710 ppb), 299-W18-21 (146, 139, and 148 ppb), 299-W18-23 (732 ppb), and 299-W18-24 (945 ppb).

- Cadmium exceeded the 10-ppb standard in 40 CFR 141 in well 299-W15-17 (55 ppb), which was sampled by bailing.

- Various other metals (chromium, manganese, and iron) exceeded their respective standards in at least one well. A comparison of filtered versus unfiltered samples for most of the wells suggests that particulates may represent the dominant source of these metals.

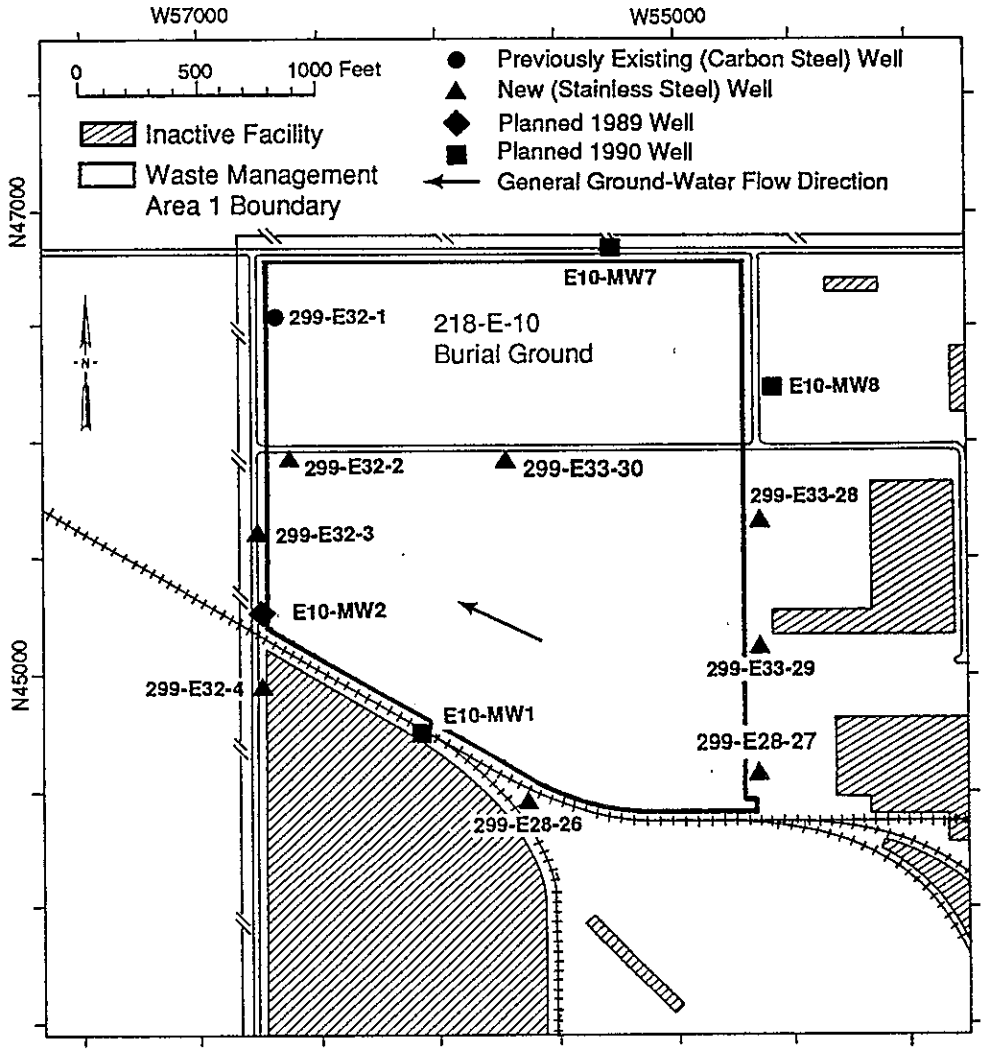


FIGURE 4.1. Ground-Water Monitoring Wells Near Waste Management Area 1, 200-East Area

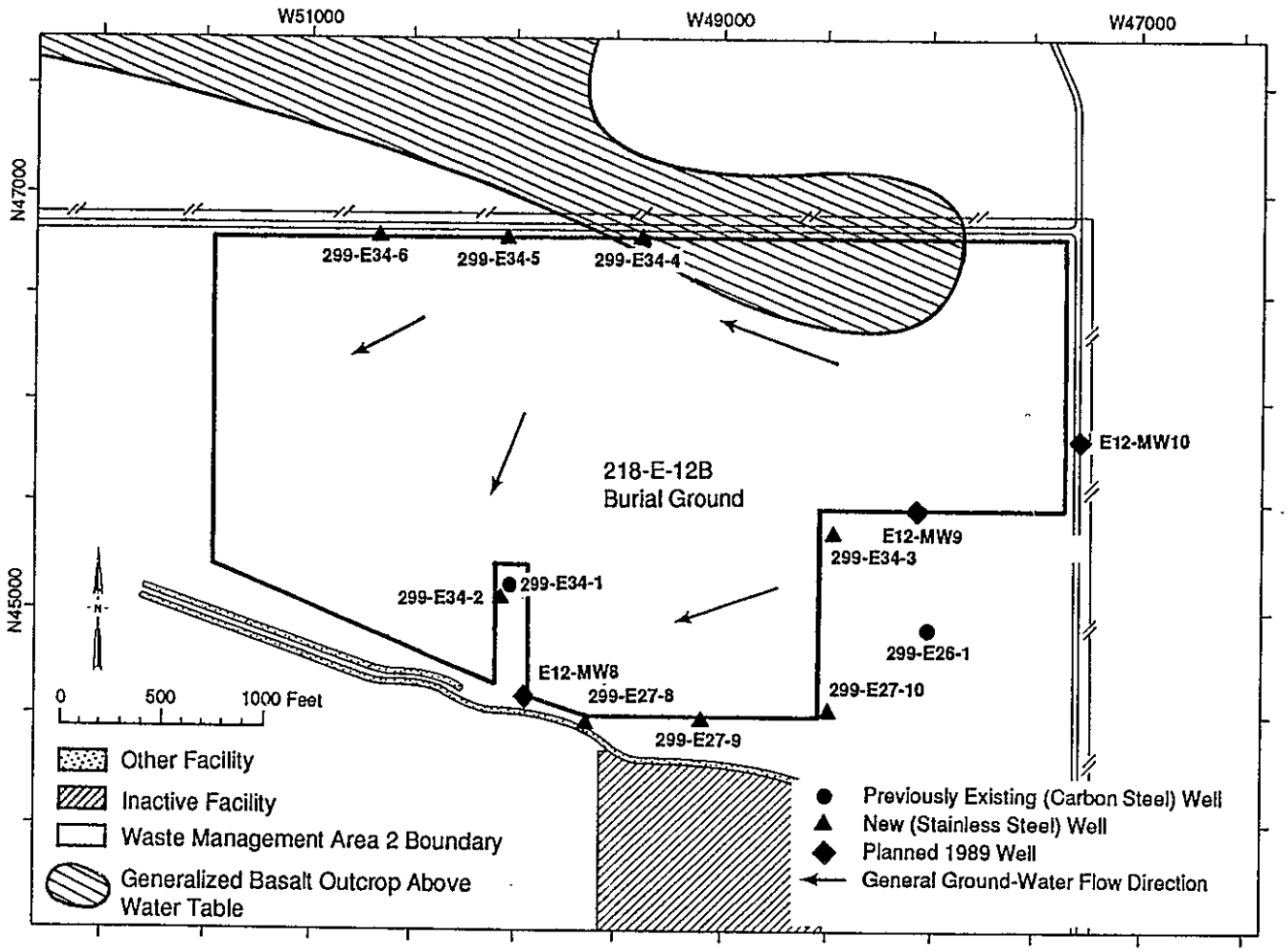


FIGURE 4.2. Ground-Water Monitoring Wells Near Waste Management Area 2, 200-East Area

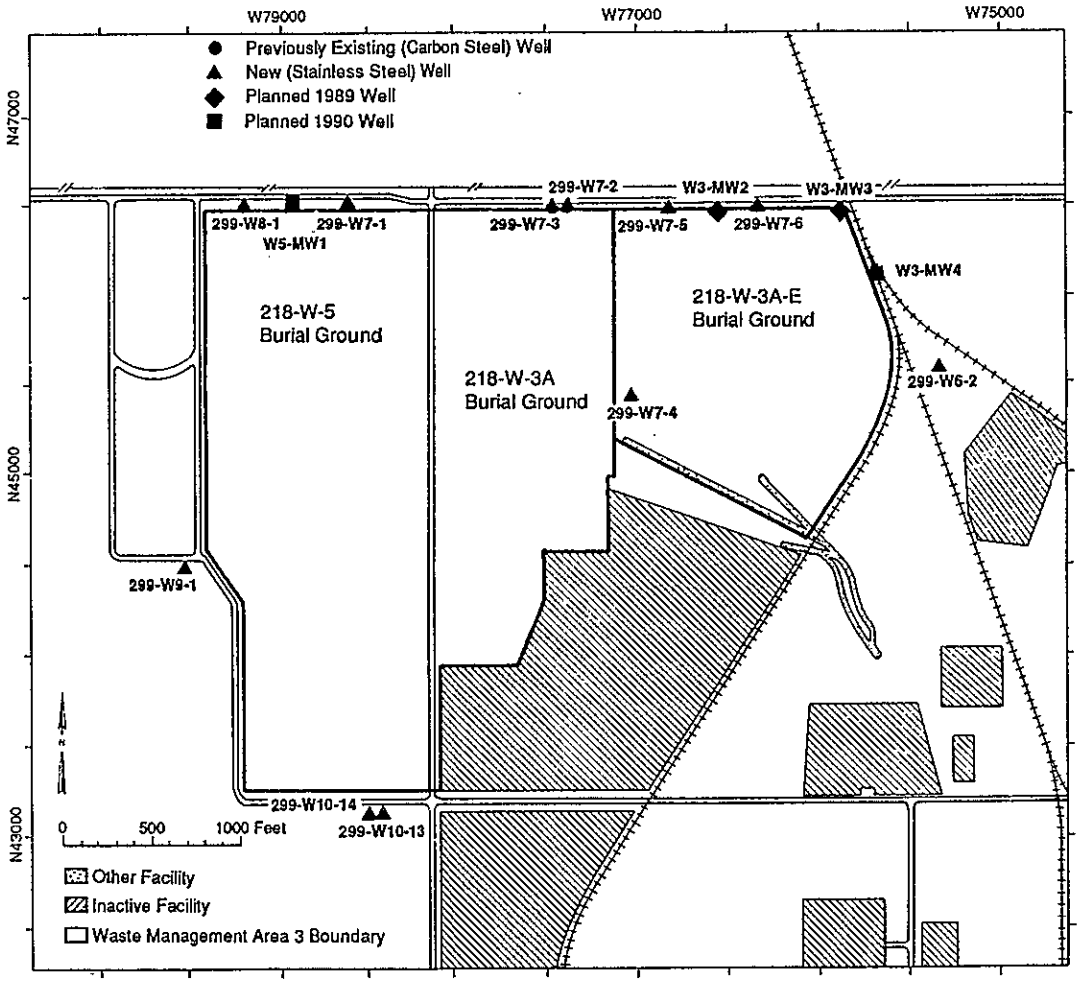


FIGURE 4.3. Ground-Water Monitoring Wells Near Waste Management Area 3, 200-West Area

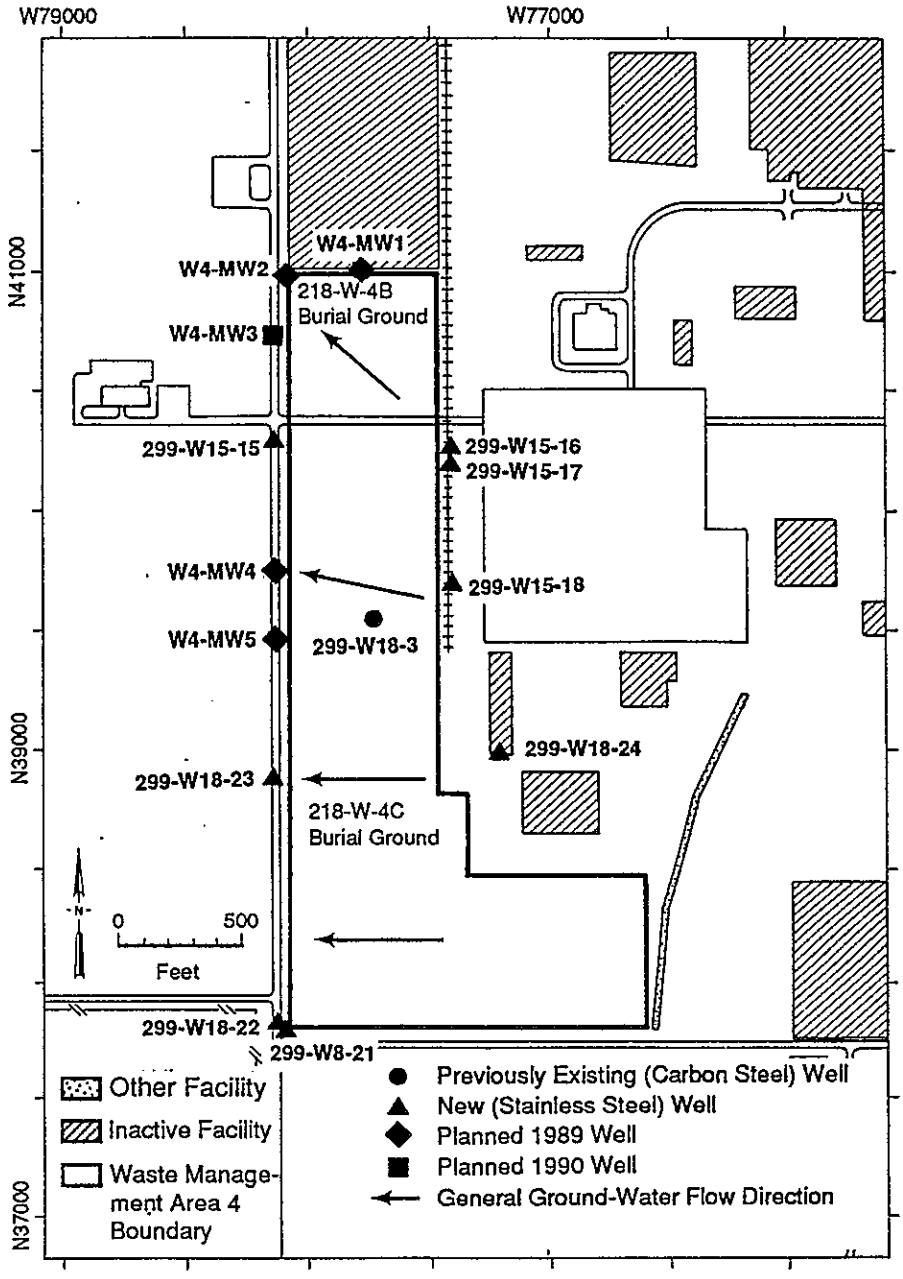


FIGURE 4.4. Ground-Water Monitoring Wells Near Waste Management Area 4, 200-West Area

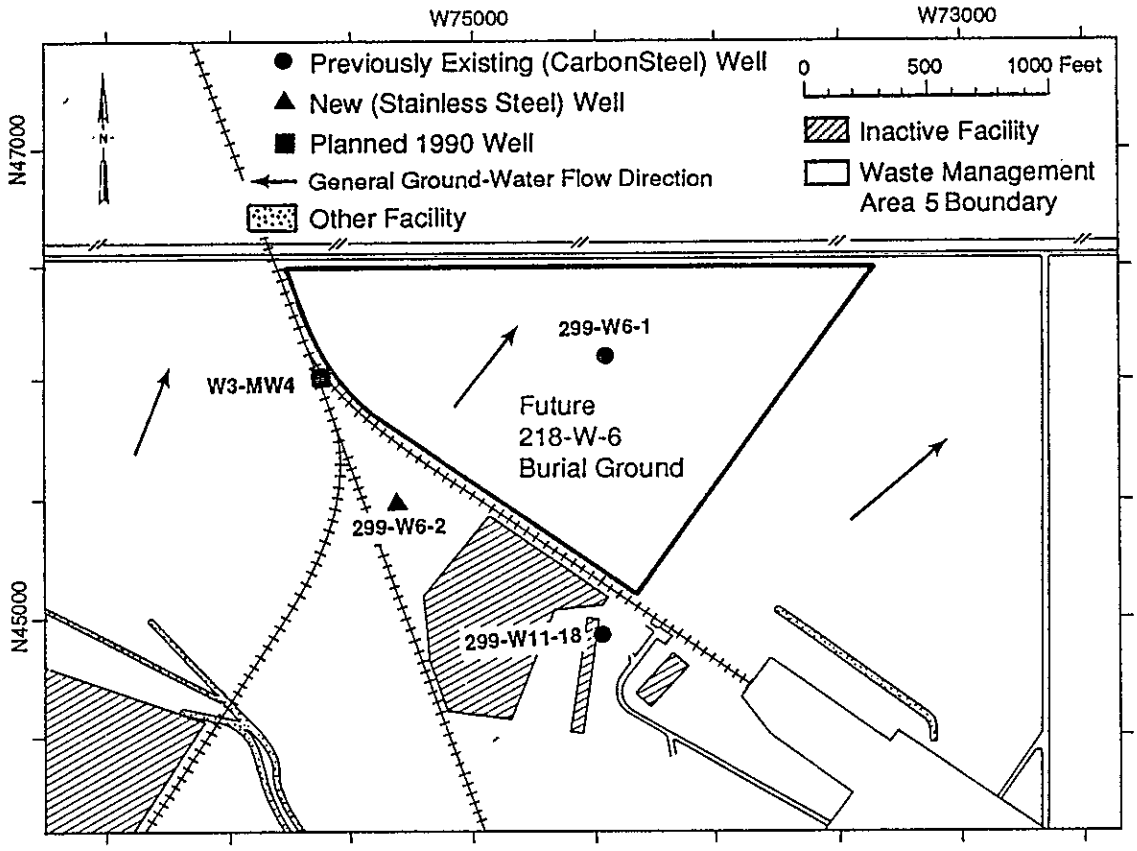


FIGURE 4.5. Ground-Water Monitoring Wells Near Waste Management Area 5, 200-West Area

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

Upgradient Wells	WMA-1	WMA-2	WMA-3	WMA-4
Shallow Wells (Top of Aquifer)	299-E33-27 299-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
Deep Wells (Bottom of Aquifer)	None	None	299-W10-14	299-W15-17
Downgradient Wells				
Shallow Wells (Top of Aquifer)	299-E28-26 299-E32-2 299-E33-3 299-E33-4 299-E33-30	299-E27-8 299-E27-9 299-E34-2 299-E34-4[a] 299-E34-5 299-E34-6	299-W6-2 299-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
Deep Wells (Bottom of Aquifer)	None	None	299-W7-3	299-W18-22

(a) Well is dry.

9011171142 1

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

Well	1989 Jul	Aug	Sep
299-E27-8	X		X
299-E27-9	X		X
299-E27-10	X		X
299-E28-26	X		X
299-E28-27	XRV		X
299-E32-2	X		X
299-E32-3	X		X
299-E32-4	X		X
299-E33-28	X		XRV
299-E33-29	X		X
299-E33-30	X		X
299-E34-2	X		X
299-E34-3	X		X
299-E34-4[a]			
299-E34-5	X		X
299-E34-6	X		X
299-W 6-2	XRV		X
299-W 7-1	X		X
299-W 7-2	X		X
299-W 7-3	X		X
299-W 7-4	X		X
299-W 7-5	X		X
299-W 7-6	X		X
299-W 8-1	X		X
299-W 9-1	X		X
299-W10-13	X		XRV
299-W10-14	X		X
299-W15-15	X		X
299-W15-16	X		X
299-W15-17	X		X
299-W15-18	X		X
299-W18-21	X		X
299-W18-22	X		X
299-W18-23	X		X
299-W18-24	X		X

(a) Well is dry.
R = quality control replicates were collected.
V = volatile organic analyses blanks were collected.
X = sampled for the regular list of constituents.

TABLE 4.3. Water-Level Data for Monitoring Wells Near the 200-East and 200-West Area Low-Level Burial Grounds

Well Number	Date	Casing Elevation, ft above MSL[a]	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E27-8	4/21/89	637.83	232.47	405.36
299-E27-8	5/23/89	637.83	232.64	405.19
299-E27-8	6/20/89	637.83	232.77	405.06
299-E27-9	4/21/89	629.21	223.72	405.49
299-E27-9	5/23/89	629.21	223.90	405.31
299-E27-9	6/20/89	629.21	224.07	405.14
299-E27-10	4/21/89	624.47	218.66	405.81
299-E27-10	5/23/89	624.47	218.82	405.65
299-E27-10	6/20/89	624.47	218.96	405.51
299-E28-26	4/21/89	687.26	282.15	405.11
299-E28-26	5/23/89	687.26	282.31	404.95
299-E28-26	6/20/89	687.26	282.50	404.76
299-E28-27	4/21/89	680.37	275.30	405.07
299-E28-27	5/23/89	680.37	275.44	404.93
299-E28-27	6/20/89	680.37	275.54	404.83
299-E32-2	4/21/89	670.06	265.18	404.88
299-E32-2	5/23/89	670.06	265.32	404.74
299-E32-2	6/20/89	670.06	265.45	404.61
299-E32-3	4/21/89	676.51	271.55	404.96
299-E32-3	5/23/89	676.51	271.70	404.81
299-E32-3	6/20/89	676.51	271.82	404.69
299-E32-4	4/21/89	685.88	281.02	404.86
299-E32-4	5/23/89	685.88	281.19	404.69
299-E32-4	6/20/89	685.88	281.35	404.53
299-E33-28	4/21/89	664.23	259.13	405.10
299-E33-28	5/23/89	664.23	259.27	404.96
299-E33-28	6/20/89	664.23	259.37	404.86
299-E33-29	4/21/89	673.77	268.68	405.09
299-E33-29	5/23/89	673.77	268.82	404.95
299-E33-29	6/20/89	673.77	268.94	404.83
299-E33-30	4/21/89	663.70	258.64	405.06
299-E33-30	5/23/89	663.70	258.77	404.93
299-E33-30	6/20/89	663.70	258.93	404.77
299-E34-2	4/21/89	630.80	225.46	405.34
299-E34-2	5/23/89	630.80	225.62	405.18
299-E34-2	6/20/89	630.80	225.77	405.03
299-E34-3	4/21/89	611.52	205.68	405.84
299-E34-3	5/23/89	611.52	205.83	405.69
299-E34-3	6/20/89	611.52	205.95	405.57
299-E34-4	4/21/89	587.56	Dry	--
299-E34-4	5/23/89	587.56	Dry	--
299-E34-4	6/20/89	587.56	Dry	--
299-E34-5	4/21/89	590.79	184.61	406.18

TABLE 4.3. (contd)

Well Number	Date	Casing Elevation, ft above MSL[a]	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E34-5	5/23/89	590.79	184.75	406.04
299-E34-5	6/20/89	590.79	184.87	405.92
299-E34-6	4/21/89	597.83	192.53	405.30
299-E34-6	5/23/89	597.83	192.69	405.14
299-E34-6	6/20/89	597.83	192.84	404.99
299-W10-13	4/21/89	699.04	232.54	466.50
299-W10-13	5/23/89	699.04	232.67	466.37
299-W10-13	6/19/89	699.04	232.79	466.25
299-W10-14	4/21/89	699.43	233.34	466.09
299-W10-14	5/23/89	699.43	233.46	465.97
299-W10-14	6/19/89	699.43	233.60	465.83
299-W15-15	4/21/89	697.96	228.95	469.01
299-W15-15	5/23/89	697.96	229.10	468.86
299-W15-15	6/19/89	697.96	229.21	468.75
299-W15-16	4/21/89	684.89	215.06	469.83
299-W15-16	5/23/89	684.89	215.24	469.65
299-W15-16	6/19/89	684.89	215.34	469.55
299-W15-17	5/23/89	684.64	215.41	469.23
299-W15-17	6/19/89	684.64	215.52	469.12
299-W15-18	4/21/89	685.71	215.56	470.15
299-W15-18	5/23/89	685.71	215.74	469.97
299-W15-18	6/19/89	685.71	215.83	469.88
299-W18-21	4/21/89	668.62	199.32	469.30
299-W18-21	5/23/89	668.62	199.48	469.14
299-W18-21	6/19/89	668.62	199.59	469.03
299-W18-22	4/21/89	668.49	200.07	468.42
299-W18-22	5/23/89	668.49	200.16	468.33
299-W18-22	6/19/89	668.49	200.27	468.22
299-W18-23	4/21/89	696.81	227.49	469.32
299-W18-23	5/23/89	696.81	227.66	469.15
299-W18-23	6/19/89	696.81	227.77	469.04
299-W18-24	4/21/89	684.35	213.96	470.39
299-W18-24	5/23/89	684.35	214.15	470.20
299-W18-24	6/19/89	684.35	214.21	470.14
299-W6-2	4/21/89	692.45	230.73	461.72
299-W6-2	5/23/89	692.45	230.82	461.63
299-W6-2	6/19/89	692.45	230.94	461.51
299-W7-1	4/21/89	690.71	229.05	461.66
299-W7-1	5/23/89	690.71	229.17	461.54
299-W7-1	6/19/89	690.71	229.32	461.39
299-W7-2	4/21/89	675.59	214.90	460.69
299-W7-2	5/23/89	675.59	215.02	460.57
299-W7-2	6/19/89	675.59	215.14	460.45
299-W7-3	4/21/89	676.14	216.70	459.44

TABLE 4.3. (contd)

Well Number	Date	Casing Elevation, ft above MSL[a]	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-W7-3	5/23/89	676.14	216.80	459.34
299-W7-3	6/19/89	676.14	216.90	459.24
299-W7-4	4/21/89	671.69	208.77	462.92
299-W7-4	5/23/89	671.69	208.88	462.81
299-W7-4	6/19/89	671.69	208.96	462.73
299-W7-5	4/21/89	673.03	212.78	460.25
299-W7-5	5/23/89	673.03	212.87	460.16
299-W7-5	6/19/89	673.03	213.01	460.02
299-W7-6	4/21/89	678.64	218.49	460.15
299-W7-6	5/23/89	678.64	218.58	460.06
299-W7-6	6/19/89	678.64	218.66	459.98
299-W8-1	4/21/89	701.33	239.26	462.07
299-W8-1	5/23/89	701.33	239.39	461.94
299-W8-1	6/19/89	701.33	239.54	461.79
299-W9-1	4/21/89	737.73	272.62	465.11
299-W9-1	5/23/89	737.73	272.74	464.99
299-W9-1	6/19/89	737.73	272.90	464.83

(a) MSL = mean sea level.

TABLE 4.4. Constituent List and Summary of Sampling Results for the Low Level Burial Grounds, WMA-1
March through May 1989

Constituent List=Contamination Indicator Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Standards Agency	Exceeded	Full name
088	CONDLAB	umho	.	29	0	700	WDOE		Specific conductance, laboratory
191	CONDFLD	umho	1	11	0	700	WDOE		Specific conductance, field
199	PHFIELD		0.1	11	0	6.5-8.5	EPAS		pH, field
207	PH-LAB		0.01	29	0	6.5-8.5	EPAS		pH, laboratory
C69	TOC	ppb	2000	32	0	.			Total organic carbon
H42	TOXLDL	ppb	10	32	0	.			Total organic halogens, low DL

Constituent List=Interim Primary Drinking Water Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Standards Agency	Exceeded	Full name
109	COLIFRM	MPN	2.2	8	8 ***	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		Total radium
A06	BARIUM	ppb	6	8	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	8	8 ***	10	EPA		Cadmium
A08	CHROMUM	ppb	10	8	0	50	EPA		Chromium
A10	SILVER	ppb	10	8	8 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	8	2	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	8	8 ***	2	EPA		Mercury
A22	SELENUM	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	xxx	Nitrate
C74	FLUORID	ppb	500	8	3	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	6	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	3	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
H60	TURBID	ntu	0.1	1	0	1	EPA		Turbidity, nephelometric

TABLE 4.4. (contd)

Constituent List=Water Quality Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards 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	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
H57	LPHENOL	ppb	10	8	8 ***	.			Phenol, low DL

Constituent List=Site Specific and Other Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards 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		Ruthenium-106
104	U	pCi/L	0.5	8	0	600	DOE		Uranium
108	TRITIUM	pCi/L	500	8	0	20000	EPA	xxx	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	8	8 ***	.			Beryllium
A03	STRONUM	ppb	20	8	0	.			Strontium
A04	ZINC	ppb	5	8	2	5000	EPAS		Zinc
A05	CALCIUM	ppb	50	8	0	.			Calcium
A12	NICKEL	ppb	10	8	0	.			Nickel
A13	COPPER	ppb	10	8	7	1300	EPAP		Copper
A14	VANADUM	ppb	5	8	0	.			Vanadium
A15	ANTIONY	ppb	100	8	8 ***	.			Antimony
A16	ALUMNUM	ppb	150	8	8 ***	.			Aluminum
A18	POTASUM	ppb	100	8	0	.			Potassium
A50	MAGNES	ppb	50	8	0	.			Magnesium
C76	PHOSPHA	ppb	1000	8	8 ***	.			Phosphate
H16	TC	ppb	1000	1	0	.			Total carbon
H18	FZINC	ppb	5	8	5	5000	EPAS		Zinc, filtered
H19	FCALCIU	ppb	50	8	0	.			Calcium, filtered
H25	FNICKEL	ppb	10	8	5	.			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

TABLE 4.4. (contd)

Constituent List=Site Specific and Other Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full name
H33	FBERYLL	ppb	5	8	8 ***	.		Beryllium, filtered
H35	FSTRONT	ppb	20	8	0	.		Strontium, filtered
H36	FANTIMO	ppb	100	8	8 ***	.		Antimony, filtered
H66	BROMIDE	ppb	1000	8	8 ***	.		Bromide
H67	NITRITE	ppb	1000	8	8 ***	.		Nitrite
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	60	8	8 ***	.		Titanium, filtered
H93	FZIRCON	ppb	50	8	8 ***	.		Zirconium, filtered
P01	BORON	ppb	10	8	0	.		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	60	8	8 ***	.		Titanium
P08	ZIRCON	ppb	50	8	8 ***	.		Zirconium

Constituent List=WAC 173-303-9905 Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full name
A61	TETRANE	ppb	5	8	8 ***	5	EPA	Tetrachloromethane [Carbon Tetrachloride
A62	BENZENE	ppb	5	8	8 ***	5	EPA	Benzene
A64	METHONE	ppb	10	8	8 ***	.		Methyl ethyl ketone
A66	TOLUENE	ppb	5	8	8 ***	2000	EPAP	Toluene
A67	1,1,1-T	ppb	5	8	8 ***	200	EPA	1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	8	8 ***	.		1,1,2-Trichloroethane
A69	TRICENE	ppb	5	8	7	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	TRANDCE	ppb	5	8	8 ***	70	EPAP	trans-1,2-Dichloroethene
A93	METHYCH	ppb	5	8	7	.		Methylene chloride [Dichloromethane]
B13	VINYIDE	ppb	10	8	8 ***	2	EPA	Vinyl chloride
B14	M-XYLE	ppb	5	8	8 ***	440	EPAP	Xylene-m

TABLE 4.4. (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
C70	CYANIDE	ppb	10	7	7 ***	.		Cyanide
C80	AMMONIU	ppb	50	8	7	.		Ammonium ion
H15	2,4,5-T	ppb	2	8	8 ***	.		2,4,5-T
H62	LHYDRAZ	ppb	30	1	1 ***	.		Hydrazine, low DL
H68	HEXONE	ppb	10	8	8 ***	.		Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	8	6	.		Acetone by VOA
I28	TAF	ppb	10	8	8 ***	.		Tetrahydorfuran
L63	14DBEN	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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 4.5- Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-1
March through May 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-E28-26	16MAR89		533	522	7.70	7.80	#300	19 [a]
		1	.	522	7.70	.	#300	15 [a]
		2	.	526	7.70	.	#300	15 [a]
		3	.	526	7.70	.	#300	22 [a]
2-E28-27	15MAR89		327	308	8.10	8.00	#400	#8
		1	.	319	8.10	.	#400	#4
		2	.	313	8.10	.	#400	#4
		3	.	317	8.10	.	#400	#6
2-E32-2	13MAR89		279	297	8.10	8.00	#400	#6
		1	.	293	8.10	.	#400	#8
		2	.	292	8.10	.	#400	12
		3	.	294	8.10	.	#500	#5
2-E32-4	01MAR89		395	414	7.93	7.90	#500	#5
		1	395	.	.	7.90	#500	#6
		2	397	.	.	7.90	#200	#7
		3	398	.	.	8.10	#200	#6
2-E32-4	13MAR89		422	418	8.00	8.00	#200	#5
		1	.	417	8.00	.	#200	#4
		2	.	418	8.00	.	#200	#6
		3	.	421	8.00	.	#300	#4
2-E33-28	16MAR89		262	253	8.10	8.20	#500	#3
		1	.	254	8.10	.	#500	#4
		2	.	252	8.10	.	#400	#9
		3	.	256	8.10	.	#400	#4
2-E33-29	16MAR89		325	308	8.10	8.20	#400	12
		1	.	310	8.10	.	#400	#4
		2	.	307	8.10	.	#300	#8
		3	.	310	8.10	.	#400	#8
2-E33-30	14MAR89		282	298	8.10	8.00	#500	#5
		1	.	296	8.10	.	#500	#4
		2	.	296	8.10	.	#500	#7
		3	.	298	8.10	.	#600	#7

TABLE 4.5. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplica sample number	ACETONE ppb 10/.	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
2-E28-26	16MAR89		#8	14.000	760	5	<5	41	39	10.00
2-E28-27	15MAR89		#3(b)	*0.759	<50	7	7	35	34	27.30
2-E32-2	13MAR89		<10	2.210	<50	5	5	30	30	19.20
2-E32-4	01MAR89		<10	4.250	<50	<5	<5	74	73	5.99
	13MAR89		<10	5.890	<50	<5	<5	73	72	3.72
2-E33-28	16MAR89		<10	1.150	<50	8	10	32	33	9.36
2-E33-29	16MAR89		<10	0.965	<50	6	6	35	37	11.30
2-E33-30	14MAR89		<10	1.720	<50	5	7	26	23	10.50

Well name	Collection Date	Duplicate sample number	BORON ppb 10/.	FBORON ppb 10/.	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s	CHROMUM ppb 10/50	CO-60 pCi/L 22.5/100r
2-E28-26	16MAR89		185	182	62,300	63,900	8,800	19	*1.320
2-E28-27	15MAR89		37	36	26,900	26,500	5,700	31	*4.270
2-E32-2	13MAR89		24	23	25,600	24,500	8,700	47	*3.590
2-E32-4	01MAR89		31	33	38,900	39,200	8,400	30	.
	13MAR89		38	41	39,800	39,900	9,300	43	*-0.195
2-E33-28	16MAR89		15	19	26,500	24,900	5,500	22	*2.480
2-E33-29	16MAR89		25	22	28,500	26,900	19,600	21	5.870
2-E33-30	14MAR89		21	22	29,500	30,100	17,200	36	*-1.450

Well name	Collection Date	Duplicate sample number	COPPER ppb 10/1300p	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000	IRON ppb 30/300s	FIRON ppb 30/300s	LEADGF ppb 5/50	MAGNES ppb 50/.
2-E28-26	16MAR89		<10	*-3.180	600	486	42	<5	15,800
2-E28-27	15MAR89		<10	*-4.410	600	183	<30	<5	8,860
2-E32-2	13MAR89		<10	*1.410	600	245	37	<5	8,170
2-E32-4	01MAR89		13	.	500	299	<30	5	13,300
	13MAR89		<10	*1.440	600	267	41	<5	13,600
2-E33-28	16MAR89		<10	*-1.120	<500	101	30	<5	8,190
2-E33-29	16MAR89		<10	*0.481	<500	120	<30	<5	9,070
2-E33-30	14MAR89		<10	*0.373	<500	236	48	<5	10,100

TABLE 4.5. (contd)

Well name	Collection Date	Duplica sample number	FMAGNES ppb 50/.	MANGESE ppb 5/50s	METHYCH ppb 5/.	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.
2-E28-26	16MAR89		15,700	9	<5	16	<10	49,300	5,060	5,200
2-E28-27	15MAR89		8,910	<5	<5	19	<10	23,100	5,200	5,320
2-E32-2	13MAR89		8,510	5	<5	27	<10	15,900	5,320	5,270
2-E32-4	01MAR89		13,400	8	<5	15	<10	24,600	5,950	5,890
	13MAR89		13,500	5	<5	22	<10	24,800	6,060	6,330
2-E33-28	16MAR89		8,520	<5	#2	12	10	3,500	4,980	4,870
2-E33-29	16MAR89		9,390	<5	<5	14	12	7,600	5,220	5,130
2-E33-30	14MAR89		9,810	5	<5	19	10	7,400	5,420	5,800

Well name	Collection Date	Duplica sample number	RADIUM pCi/L 1/5	RU-106 pCi/L 172.5/30r	SELENUM ppb 5/10	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8
2-E28-26	16MAR89		*0.14800	*11.90	5	18,200	18,200	26,300	25,600	*-0.129
2-E28-27	15MAR89		*-0.00218	*16.70	<5	19,200	18,800	24,400	24,000	*-0.247
2-E32-2	13MAR89		*0.00337	*-11.80	<5	18,700	17,700	22,600	23,200	*-0.450
2-E32-4	01MAR89		0.25300	.	<5	16,400	16,600	27,500	27,300	.
	13MAR89		*0.01310	*-15.00	<5	16,600	16,700	28,200	27,000	*-0.338
2-E33-28	16MAR89		0.21400	*-6.25	<5	18,100	17,000	14,000	14,400	*0.153
2-E33-29	16MAR89		0.37300	*-1.01	<5	17,600	16,800	18,500	18,900	*0.271
2-E33-30	14MAR89		*0.07350	*28.20	<5	18,300	18,500	19,800	18,800	*0.169

Well name	Collection Date	Duplicate sample number	FSTRONT ppb 20/.	STRONUM ppb 20/.	SULFATE ppb 500/250000s	TC ppb 1000/.	TC-99 pCi/L 15/900r	TRICENE ppb 5/5	TRITIUM pCi/L 500/20000
2-E28-26	16MAR89		264	276	91,100	.	19.80	<5	169,000
2-E28-27	15MAR89		152	154	33,000	.	151.00	<1	212,000
2-E32-2	13MAR89		141	138	30,000	.	159.00	<5	95,900
2-E32-4	01MAR89		230	233	60,800	25,900	.	<5	5,650
	13MAR89		231	236	67,400	.	*4.44	<5	5,590
2-E33-28	16MAR89		147	140	22,700	.	100.00	<5	2,610
2-E33-29	16MAR89		161	155	28,800	.	56.70	<5	6,390
2-E33-30	14MAR89		161	167	29,900	.	69.50	<5	5,860

Well name	Collection Date	Duplicate sample number	TURBID ntu 0.1/1	U pCi/L 0.5/600d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-E28-26	16MAR89		.	24.60	18	21	12	<5
2-E28-27	15MAR89		.	3.31	23	28	10	<5
2-E32-2	13MAR89		.	2.91	24	27	7	<5
2-E32-4	01MAR89		0.95	4.15	17	18	22	8
	13MAR89		.	4.27	13	20	9	<5
2-E33-28	16MAR89		.	1.75	25	22	<5	27
2-E33-29	16MAR89		.	1.84	22	20	<5	<5
2-E33-30	14MAR89		.	1.54	22	22	10	24

TABLE 4.5. (contd)

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

Suffix
none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 26890
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 given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
w - based on additional Secondary Maximum Contaminant Levels given 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. Deterioration of the sample bottle cap was observed, which may have contaminated the sample.

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

TABLE 4.6. Constituent List and Summary of Sampling Results for the Low Level Burial Grounds, WMA-2
December 1988 through February 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	7	0	700	WDOE		Specific conductance, field
199	PHFIELD		0.1	7	0	6.5-8.5	EPAS		pH, field
207	PH-LAB		0.01	28	0	6.5-8.5	EPAS		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	8	8 ***	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		Total radium
A06	BARIUM	ppb	6	8	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	8	8 ***	10	EPA		Cadmium
A08	CHROMUM	ppb	10	8	1	50	EPA	xxx	Chromium
A10	SILVER	ppb	10	8	8 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	8	1	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	7	7 ***	2	EPA		Mercury
A22	SELENUM	ppb	5	8	7	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	5	8	8 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	ppb	500	8	0	45000	EPA		Nitrate
C74	FLUORID	ppb	500	8	7	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	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	0	50	EPA		Arsenic, filtered
H38	FMERCUR	ppb	0.1	7	7 ***	2	EPA		Mercury, filtered
H39	FSELENI	ppb	5	8	8 ***	10	EPA		Selenium, filtered
H41	FLEAD	ppb	5	8	8 ***	50	EPA		Lead, filtered

TABLE 4.6. (contd)

Constituent List=Water Quality Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full name
A11	SODIUM	ppb	200	8	0	.			Sodium
A17	MANGESE	ppb	5	8	4	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	7	50	EPAS		Manganese, filtered
H31	FIRON	ppb	30	8	2	300	EPAS		Iron, filtered
H57	LPHENOL	ppb	10	8	8 ***	.			Phenol, low DL

Constituent List=Site Specific and Other Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards 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	600	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
197	TC-99	pCi/L	15	7	0	900	EPAR		Technetium-99
A01	BERYLUM	ppb	5	8	8 ***	.			Beryllium
A03	STRONUM	ppb	20	8	0	.			Strontium
A04	ZINC	ppb	5	8	3	5000	EPAS		Zinc
A05	CALCIUM	ppb	50	8	0	.			Calcium
A12	NICKEL	ppb	10	8	0	.			Nickel
A13	COPPER	ppb	10	8	8 ***	1300	EPAP		Copper
A14	VANADUM	ppb	5	8	0	.			Vanadium
A15	ANTIONY	ppb	100	8	8 ***	.			Antimony
A16	ALUMNUM	ppb	150	8	8 ***	.			Aluminum
A18	POTASUM	ppb	100	8	0	.			Potassium
A50	MAGNES	ppb	50	8	0	.			Magnesium
C76	PHOSPHA	ppb	1000	8	8 ***	.			Phosphate
H18	FZINC	ppb	5	8	5	5000	EPAS		Zinc, filtered
H19	FCALCIU	ppb	50	8	0	.			Calcium, filtered
H25	FNICKEL	ppb	10	8	6	.			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	7	.			Beryllium, filtered

TABLE 4.6. (contd)

Constituent List=Site Specific and Other Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full name
H35	FSTRONT	ppb	20	8	0	.		Strontium, filtered
H36	FANTIMO	ppb	100	8	8 ***	.		Antimony, filtered
H66	BROMIDE	ppb	1000	8	8 ***	.		Bromide
H67	NITRITE	ppb	1000	8	8 ***	.		Nitrite
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	60	8	8 ***	.		Titanium, filtered
H93	FZIRCON	ppb	50	8	8 ***	.		Zirconium, filtered
P01	BORON	ppb	10	8	0	.		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	60	8	8 ***	.		Titanium
P08	ZIRCON	ppb	50	8	8 ***	.		Zirconium

Constituent List=WAC 173-303-9905 Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full name
A61	TETRANE	ppb	5	8	8 ***	5	EPA	Tetrachloromethane [Carbon Tetrachloride
A62	BENZENE	ppb	5	8	8 ***	5	EPA	Benzene
A64	METHONE	ppb	10	8	8 ***	.		Methyl ethyl ketone
A66	TOLUENE	ppb	5	8	8 ***	2000	EPAP	Toluene
A67	1,1,1-T	ppb	5	8	8 ***	200	EPA	1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	8	8 ***	.		1,1,2-Trichloroethane
A69	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	TRANDCE	ppb	5	8	8 ***	70	EPAP	trans-1,2-Dichloroethene
A93	METHYCH	ppb	5	8	8 ***	.		Methylene chloride [Dichloromethane]
B13	VINYIDE	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

TABLE 4.6. (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	50	7	7 ***	.		Ammonium ion
H15	2,4,5-T	ppb	2	7	7 ***	.		2,4,5-T
H68	HEXONE	ppb	10	8	8 ***	.		Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	8	4	.		Acetone by VOA
I28	TAF	ppb	10	8	8 ***	.		Tetrahydorfuran
L63	14DBEN	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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 4.7. Constituents with at Least One Detected Value for the Low Level Burial Grounds, WMA-2
March through May 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	13MAR89		357	321	8.10	8.30	#400	#4
		1	.	320	8.10	.	#400	#3
		2	.	319	8.10	.	#400	#4
		3	.	321	8.00	.	#300	#5
2-E27-9	13MAR89		373	337	8.10	8.20	#400	#5
		1	.	333	8.10	.	#300	#5
		2	.	335	8.00	.	#400	#3
		3	.	336	8.00	.	#400	#5
2-E27-10	13MAR89		291	263	8.10	8.10	#900	#2
		1	.	261	8.10	.	#500	#-1
		2	.	263	8.10	.	#400	#2
		3	.	262	8.10	.	#600	#4
2-E34-2	15MAR89		580	502	8.00	8.30	#400	#5
		1	.	518	8.00	.	#400	#1
		2	.	515	8.00	.	#300	#7
		3	.	511	8.00	.	#300	#1
2-E34-3	14MAR89		323	287	8.10	7.90	#400	#6
		1	.	286	8.10	.	#300	#5
		2	.	289	8.10	.	#300	#5
		3	.	290	8.10	.	#300	#3
2-E34-5	15MAR89		587	486	8.00	8.40	#400	#6
		1	.	497	8.00	.	#400	#3
		2	.	505	8.00	.	#400	#7
		3	.	514	8.00	.	#400	#3
2-E34-6	16MAR89		445	441	8.10	8.10	#400	#4
		1	.	443	8.10	.	#600	#4
		2	.	443	8.10	.	#300	#5
		3	.	438	8.10	.	#400	#5

TABLE 4.7. (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 6/1000	FBARIUM ppb 6/1000	FBERYLL ppb 5/.	BETA pCi/L 8/50
2-E27-8	13MAR89		<10	*0.846	7	7	34	31	<5	5.74
2-E27-9	13MAR89		<10	3.180	7	7	42	36	<5	6.21
	13MAR89	1	<10	1.410	8	8	38	38	<5	4.74
2-E27-10	13MAR89		<10	1.410	9	7	37	33	<5	5.39
2-E34-2	15MAR89		#8(a)	2.040	6	6	35	37	<5	6.19
2-E34-3	14MAR89		#5(a)	1.700	6	7	45	45	6	17.80
2-E34-5	15MAR89		#6(a)	2.720	5	6	28	27	<5	3.97
2-E34-6	16MAR89		10	1.240	<5	5	36	33	<5	5.33

Well name	Collection Date	Duplicate sample number	BORON ppb 10/.	FBORON ppb 10/.	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s	CHROMUM ppb 10/50	CO-60 pCi/L 22.5/100r
2-E27-8	13MAR89		17	19	35,900	38,700	6,900	41	*2.040
2-E27-9	13MAR89		21	17	35,900	39,400	7,700	63	*-0.202
	13MAR89	1	19	20	37,500	37,300	7,700	30	.
2-E27-10	13MAR89		24	13	31,000	31,500	4,100	19	8.660
2-E34-2	15MAR89		21	33	51,800	48,300	12,200	38	*4.650
2-E34-3	14MAR89		20	21	34,100	33,000	6,600	28	*-0.204
2-E34-5	15MAR89		24	22	47,600	46,700	21,300	20	*-5.290
2-E34-6	16MAR89		30	26	42,200	45,700	18,100	<10	*2.450

Well name	Collection Date	Duplicate sample number	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000	IRON ppb 30/300s	FIRON ppb 30/300s	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s
2-E27-8	13MAR89		*2.010	<500	211	55	10,600	10,300	<5	<5
2-E27-9	13MAR89		*1.380	<500	320	48	11,700	10,500	<5	5
	13MAR89	1	.	<500	181	38	11,000	10,900	<5	<5
2-E27-10	13MAR89		*3.230	<500	106	<30	8,940	8,720	<5	<5
2-E34-2	15MAR89		*-4.760	<500	216	34	14,500	15,400	<5	6
2-E34-3	14MAR89		*1.510	<500	161	31	9,950	10,200	<5	<5
2-E34-5	15MAR89		*-0.361	<500	120	43	14,600	14,700	<5	7
2-E34-6	16MAR89		*1.640	600	96	<30	13,400	12,200	32	36

Well name	Collection Date	Duplic sampl numbe	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	RU-106 pCi/L 172.5/30r	SELENUM ppb 5/10
2-E27-8	13MAR89		21	<10	7,200	6,520	6,960	0.23500	*35.50	<5
2-E27-9	13MAR89		32	<10	7,400	6,380	7,310	*0.02310	*31.10	<5
	13MAR89	1	15	<10	7,400	6,670	6,890	*0.16100	.	<5
2-E27-10	13MAR89		12	<10	3,300	6,140	6,470	*0.07760	*-20.60	<5
2-E34-2	15MAR89		22	11	15,400	7,680	7,360	*0.06130	*25.10	5
2-E34-3	14MAR89		14	<10	5,100	6,290	6,460	*0.06080	*-9.52	<5
2-E34-5	15MAR89		26	19	13,600	7,500	7,700	0.17000	*45.40	<5
2-E34-6	16MAR89		14	<10	6,400	7,410	8,180	*0.00477	*47.40	<5

TABLE 4.7. (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 20/.	STRONUM ppb 20/.	SULFATE ppb 500/250000s
2-E27-8	13MAR89		19,600	19,800	15,100	14,400	*0.0558	184	192	43,800
2-E27-9	13MAR89		20,000	21,900	19,100	18,900	*-0.0166	187	206	50,400
	13MAR89	1	20,800	20,600	17,900	17,600	.	192	193	48,700
2-E27-10	13MAR89		18,400	18,700	14,300	13,600	*0.5110	168	174	18,000
2-E34-2	15MAR89		19,100	17,900	27,000	28,300	*-0.2550	269	255	135,000
2-E34-3	14MAR89		18,800	17,900	13,900	13,700	*-0.0442	192	192	34,900
2-E34-5	15MAR89		17,400	16,900	29,900	29,600	*-0.3060	255	254	108,000
2-E34-6	16MAR89		17,400	18,700	35,300	32,200	*0.4420	237	260	81,600

Well name	Collection Date	Duplicate sample number	TC-99 pCi/L 15/900r	TRITIUM pCi/L 500/20000	U pCi/L 0.5/600d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-E27-8	13MAR89		*-2.5100	11,500	1.89	25	29	10	<5
2-E27-9	13MAR89		*-0.2230	12,800	1.90	28	35	17	<5
	13MAR89	1	.	.	.	31	34	5	7
2-E27-10	13MAR89		*-1.6700	7,960	2.01	29	30	<5	<5
2-E34-2	15MAR89		*-1.9400	2,340	3.00	21	22	7	<5
2-E34-3	14MAR89		*-1.9400	9,480	2.43	27	27	<5	8
2-E34-5	15MAR89		*-0.5330	*207	4.26	20	22	10	8
2-E34-6	16MAR89		*-0.0679	431	3.71	12	11	<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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
w - based on additional Secondary Maximum Contaminant Levels given 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 sample group showed contamination by this constituent.

TABLE 4.8. Constituent List and Summary of Sampling Results for the Low Level Burial Grounds, WMA-3
March through May 1989

Constituent List=Contamination Indicator Parameters

Code	Constituent 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	16	0	700	WDOE		Specific conductance, field
199	PHFIELD		0.1	16	0	6.5-8.5	EPAS		pH, field
207	PH-LAB		0.01	44	0	6.5-8.5	EPAS		pH, laboratory
C69	TOC	ppb	2000	44	0	.			Total organic carbon
H42	TOXLDL	ppb	10	44	0	.			Total organic halogens, low DL

Constituent List=Interim Primary Drinking Water Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
109	COLIFRM	MPN	2.2	11	11 ***	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		Total radium
A06	BARIUM	ppb	6	11	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	11	10	10	EPA		Cadmium
A08	CHROMUM	ppb	10	11	1	50	EPA	xxx	Chromium
A10	SILVER	ppb	10	11	11 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	11	11 ***	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	11	11 ***	2	EPA		Mercury
A22	SELENUM	ppb	5	11	11 ***	10	EPA		Selenium
A33	ENDRIN	ppb	0.1	11	11 ***	0.2	EPA		Endrin
A34	METHLOR	ppb	3	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	xxx	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	6	11	0	1000	EPA		Barium, filtered
H21	FCADMIU	ppb	2	11	11 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	ppb	10	11	7	50	EPA		Chromium, filtered
H23	FSILVER	ppb	10	11	11 ***	50	EPA		Silver, filtered
H37	FARSENI	ppb	5	11	11 ***	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

TABLE 4.8. (contd)

Constituent List=Water Quality Parameters

Code	Constituent 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	2	50	EPAS	xxx	Manganese
A19	IRON	ppb	30	11	0	300	EPAS	xxx	Iron
C73	SULFATE	ppb	500	11	0	250000	EPAS		Sulfate
C75	CHLORID	ppb	500	11	0	250000	EPAS		Chloride
H24	FSODIUM	ppb	200	11	0	.			Sodium, filtered
H29	FMANGAN	ppb	5	11	5	50	EPAS	xxx	Manganese, filtered
H31	FIRON	ppb	30	11	1	300	EPAS		Iron, filtered
H57	LPHENOL	ppb	10	11	11 ***	.			Phenol, low DL

Constituent List=Site Specific and Other Constituents

Code	Constituent 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
100	PU39-40	pCi/L	17	11	0	30	DOE		Plutonium-239,240
102	PU-238	pCi/L	17	11	0	40	DOE		Plutonium-238
104	U	pCi/L	0.5	11	0	600	DOE		Uranium
105	AM-241	pCi/L	0.1	11	0	30	DOE		Americium-241
108	TRITIUM	pCi/L	500	11	0	20000	EPA		Tritium (H-3)
121	SR-90	pCi/L	5	11	0	8	EPA		Strontium-90
197	TC-99	pCi/L	15	11	0	900	EPAR		Technetium-99
A01	BERYLUM	ppb	5	11	11 ***	.			Beryllium
A03	STRONUM	ppb	20	11	0	.			Strontium
A04	ZINC	ppb	5	11	5	5000	EPAS		Zinc
A05	CALCIUM	ppb	50	11	0	.			Calcium
A12	NICKEL	ppb	10	11	1	.			Nickel
A13	COPPER	ppb	10	11	11 ***	1300	EPAP		Copper
A14	VANADUM	ppb	5	11	0	.			Vanadium
A15	ANTIONY	ppb	100	11	11 ***	.			Antimony
A16	ALUMNUM	ppb	150	11	10	.			Aluminum
A18	POTASUM	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	7	.			Nickel, filtered
H26	FCOPPER	ppb	10	11	11 ***	1300	EPAP		Copper, filtered
H27	FVANADI	ppb	5	11	0	.			Vanadium, filtered
H28	FALUMIN	ppb	150	11	9	.			Aluminum, filtered

TABLE 4.8. (contd)

Constituent List=Site Specific and Other Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
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	20	11	0	.			Strontium, filtered
H36	FANTIMO	ppb	100	11	11 ***	.			Antimony, filtered
H66	BROMIDE	ppb	1000	11	11 ***	.			Bromide
H67	NITRITE	ppb	1000	11	11 ***	.			Nitrite
H86	FBORON	ppb	10	11	0	.			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	FSILICO	ppb	50	11	0	.			Silicon, filtered
H91	FTIN	ppb	30	11	11 ***	.			Tin, filtered
H92	FTITAN	ppb	60	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	60	11	11 ***	.			Titanium
P08	ZIRCON	ppb	50	11	11 ***	.			Zirconium

Constituent List=WAC 173-303-9905 Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
A61	TETRANE	ppb	5	11	7	5	EPA	xxx	Tetrachloromethane [Carbon Tetrachloride
A62	BENZENE	ppb	5	11	11 ***	5	EPA		Benzene
A64	METHONE	ppb	10	11	10	.			Methyl ethyl ketone
A66	TOLUENE	ppb	5	11	11 ***	2000	EPAP		Toluene
A67	1,1,1-T	ppb	5	11	9	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-Trichloroethene
A70	PERCENE	ppb	5	11	11 ***	.			Perchloroethylene [Tetrachloroethene]
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	TRANDCE	ppb	5	11	11 ***	70	EPAP		trans-1,2-Dichloroethene
A93	METHYCH	ppb	5	11	11 ***	.			Methylene chloride [Dichloromethane]

TABLE 4.8. (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
B13	VINYIDE	ppb	10	11	11 ***	2	EPA	Vinyl chloride
B14	M-XYLE	ppb	5	11	11 ***	440	EPAP	Xylene-m
C70	CYANIDE	ppb	10	11	11 ***	.		Cyanide
C80	AMMONIU	ppb	50	11	10	.		Ammonium ion
H15	2,4,5-T	ppb	2	11	11 ***	.		2,4,5-T
H68	HEXONE	ppb	10	11	11 ***	.		Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	11	11 ***	.		Acetone by VOA
I28	TAF	ppb	10	11	11 ***	.		Tetrahydorfuran
L63	14DBEN	ppb	5	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
DOE - based on draft DOE Derived Concentration Guides, DOE Order 5480.xx
EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 4.9. Constituents with at Least One Detected Value for the Low Level Burial Grounds, WMA-3
March through May 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-W8-2	09MAY89		332	397	8.00	7.70	#400	92
		1	.	400	8.00	.	#400	89
		2	.	401	8.00	.	#500	84
		3	.	400	8.00	.	#500	88
2-W7-1	10MAY89		334	393	7.80	7.80	#500	#4
		1	.	400	7.90	.	#200	#1
		2	.	399	7.90	.	#200	#2
		3	.	397	7.90	.	#300	#6
2-W7-2	20MAR89		235	252	8.10	8.10	#600	58
		1	.	259	8.10	.	#400	59
		2	.	259	8.10	.	#300	1590[a]
		3	.	258	8.10	.	#400	1670[a]
2-W7-3	20MAR89		.	277	8.10	.	#300	#3
		1	.	278	8.10	.	#200	#8
		2	.	280	8.10	.	#200	#9
		3	.	275	8.10	.	#400	#3
2-W7-4	22MAR89		345	443	8.00	8.00	#300	148
		1	.	444	8.00	.	#300	133
		2	.	447	8.00	.	#200	155
		3	.	448	8.00	.	#300	153
2-W7-5	17MAR89		302	380	7.90	7.90	#400	31
		1	.	376	8.00	.	#400	25
		2	.	376	8.00	.	#300	23
		3	.	381	8.00	.	#300	25
2-W7-6	17MAR89		258	299	8.10	8.30	#500	#4
		1	.	297	8.10	.	#400	#2
		2	.	299	8.20	.	#500	#1
		3	.	298	8.20	.	#500	#4
2-W8-1	12MAY89		414	389	7.90	7.60	#400	10
		1	414	392	7.90	7.80	#300	#7
		2	414	393	7.90	7.80	#400	12
		3	415	395	7.90	7.80	#700	#6
2-W9-1	12MAY89		373	385	8.00	8.00	#400	#4
		1	374	387	8.00	8.00	#400	#5
		2	375	387	8.00	8.00	#500	#3
		3	377	389	8.00	8.00	#600	#2

TABLE 4.9. (contd)

2-W10-13	22MAR89		271	320	8.00	7.90	#300	31[b]
		1	.	333	8.00	.	#300	46[b]
		2	.	332	8.00	.	#300	33[b]
		3	.	334	8.00	.	#300	32[b]
2-W10-14	21MAR89		323	316	7.70	7.50	#200	#7
		1	.	320	7.90	.	#200	#-1
		2	.	315	7.90	.	#200	#4
		3	.	310	7.90	.	#200	#1

Regular Monitoring Data

Well name	Collection Date	Duplica sample number	1,1,1-T ppb 5/200	ALPHAHI pCi/L 4/15	FALUMIN ppb 150/.	ALUMNUM ppb 150/.	AM-241 pCi/L 0.1/30d	AMMONIU ppb 50/.	BARIUM ppb 6/1000	FBARIUM ppb 6/1000
2-W6-2	09MAY89		<5	1.650	<150	<150	*0.002090	<50	43	39
2-W7-1	10MAY89		<5	*0.687	<150	<150	0.013900	<50	32	31
2-W7-2	20MAR89		<5	1.100	<150	<150	*0.001630	<50	39	32
2-W7-3	20MAR89		<5	*0.301	<150	<150	*-0.005740	60	43	35
2-W7-4	22MAR89		8	*0.162	<150	<150	*-0.003810	<50	37	33
2-W7-5	17MAR89		<5	1.710	166	<150	*-0.001470	<50	33	40
2-W7-6	17MAR89		<5	4.210	306	1060[c]	*-0.000127	<50	47	34
2-W8-1	12MAY89		<5	*0.478	<150	<150	0.000000	<50	34	37
2-W9-1	12MAY89		<5	1.620	<150	<150	*0.006900	<50	40	36
2-W10-13	22MAR89		8	*0.702	<150	<150	*-0.003190	<50	30	27
2-W10-14	21MAR89		<5	*0.687	<150	<150	*-0.004760	<50	70	65

Well name	Collection Date	Dupl sam num	BETA pCi/L 8/50	BORON ppb 10/.	FBORON ppb 10/.	CADMIUM ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLFORM ppb 5/100	CHLORID ppb 500/250000s
2-W6-2	09MAY89		13.20	15	11	<2	43,500	45,600	<5	5,700
2-W7-1	10MAY89		4.61	24	14	<2	44,300	45,200	<5	9,000
2-W7-2	20MAR89		3.11	12	14	<2	27,000	34,800	<5	3,000
2-W7-3	20MAR89		4.99	16	16	<2	25,000	29,000	<5	3,900
2-W7-4	22MAR89		7.79	11	14	<2	48,900	52,800	5	17,800
2-W7-5	17MAR89		15.40	13	18	<2	62,600	38,500	#3	13,500
2-W7-6	17MAR89		7.63	20	13	<2	20,800	22,900	<5	6,000
2-W8-1	12MAY89		5.63	20	17	<2	47,200	44,900	<5	15,100
2-W9-1	12MAY89		9.05	25	15	3	41,200	44,200	<5	18,600
2-W10-13	22MAR89		5.88	19	15	<2	35,500	37,200	<5	22,300
2-W10-14	21MAR89		*2.02	19	21	<2	32,800	34,800	<5	9,200

TABLE 4.9. (contd)

Well name	Collection Date	Duplica sample number	FCHROMI ppb 10/50	CHROMUM ppb 10/50	CO-60 pCi/L 22.5/100r	CS-137 pCi/L 20/200r	IRON ppb 30/300s	FIRON ppb 30/300s	LEADGF ppb 5/50	MAGNES ppb 50/.
2-W6-2	09MAY89		39	56	*5.990	*-1.610	102	35	<5	18,900
2-W7-1	10MAY89		<10	75	*-0.355	*0.772	326	34	<5	14,900
2-W7-2	20MAR89		12	34	*1.600	*2.760	210	75	<5	14,900
2-W7-3	20MAR89		<10	45	*3.590	*-0.707	607	250	<5	12,100
2-W7-4	22MAR89		14	40	*0.979	*4.810	137	34	<5	17,500
2-W7-5	17MAR89		11	31	*2.270	*-1.770	177	125	<5	14,100
2-W7-6	17MAR89		<10	<10	*0.809	*3.760	1040 (c)	289	7 (a)	8,610
2-W8-1	12MAY89		<10	40	*3.410	*-3.770	198	31	<5	14,100
2-W9-1	12MAY89		<10	29	*-0.207	*1.120	789	<30	<5	15,300
2-W10-13	22MAR89		<10	54	0.000	*2.640	246	42	<5	11,700
2-W10-14	21MAR89		<10	42	*2.420	*2.500	170	41	<5	13,000

Well name	Collection Date	Duplica sample number	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	METHONE ppb 10/.	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.
2-W6-2	09MAY89		18,200	<5	<5	<10	14	14	74,900	3,230
2-W7-1	10MAY89		14,700	13	18	<10	39	<10	42,600	3,640
2-W7-2	20MAR89		13,800	<5	11	<10	<10	<10	29,900	2,400
2-W7-3	20MAR89		10,900	153	181	<10	22	<10	3,000	4,440
2-W7-4	22MAR89		17,000	<5	<5	<10	15	<10	74,200	3,400
2-W7-5	17MAR89		15,600	17	6	#5	23	12	43,300	3,530
2-W7-6	17MAR89		7,760	19	43	<10	12	<10	5,300	2,870
2-W8-1	12MAY89		15,200	<5	5	<10	20	<10	28,200	3,980
2-W9-1	12MAY89		14,800	7	18	<10	29	16	18,800	4,480
2-W10-13	22MAR89		11,700	<5	8	<10	34	15	8,100	3,500
2-W10-14	21MAR89		12,800	6	8	<10	20	<10	21,100	4,640

Well name	Collection Date	Duplica sample number	POTASUM ppb 100/.	PU-238 pCi/L 17/40d	PU39-40 pCi/L 17/30d	RADIUM pCi/L 1/5	RU-106 pCi/L 172.5/30r	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.
2-W6-2	09MAY89		3,410	*-0.00224	*-0.000165	*0.0997	*-15.600	19,200	20,100	11,500
2-W7-1	10MAY89		3,810	*-0.00100	*0.003310	*0.0839	*0.923	19,800	19,800	9,530
2-W7-2	20MAR89		2,670	*-0.00144	*-0.000165	0.5290	*2.750	17,400	19,100	9,310
2-W7-3	20MAR89		4,990	*-0.00456	*-0.000165	0.4460	*-2.950	16,800	19,500	19,100
2-W7-4	22MAR89		3,530	*-0.00144	*0.007890	*0.0535	*-11.100	15,700	16,600	8,700
2-W7-5	17MAR89		3,250	*-0.00144	*-0.000165	0.2340	0.000	17,700	16,500	9,310
2-W7-6	17MAR89		3,030	*-0.00144	*0.003650	1.4700	*-17.700	16,600	18,400	29,400
2-W8-1	12MAY89		3,660	*-0.00144	*0.002500	0.1820	*23.900	21,000	19,700	10,200
2-W9-1	12MAY89		4,620	*-0.00144	*-0.002120	0.5800	*1.050	17,200	18,100	11,700
2-W10-13	22MAR89		3,560	*-0.00144	0.045200	*0.0211	*5.270	19,900	20,800	10,500
2-W10-14	21MAR89		4,860	*-0.00144	*-0.000165	0.4200	*17.600	20,900	22,100	17,900

TABLE 4.9. (contd)

Well name	Collection Date	Duplicate sample number	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONUM ppb 20/.	SULFATE ppb 500/250000s	TC-99 pCi/L 15/900r	TETRANE ppb 5/5
2-W6-2	09MAY89		11,000	*-0.4100	258	275	26,500	78.800	102
2-W7-1	10MAY89		9,240	*-0.3210	173	176	49,200	*6.160	<5
2-W7-2	20MAR89		8,320	*-0.1400	157	172	24,400	*2.770	<5
2-W7-3	20MAR89		16,900	*0.1490	144	160	24,200	*1.740	<5
2-W7-4	22MAR89		8,330	*0.0407	243	251	32,000	76.700	222
2-W7-5	17MAR89		9,880	*-0.3520	203	177	27,500	36.800	34
2-W7-6	17MAR89		25,600	*0.0402	133	152	27,700	*-0.633	<5
2-W8-1	12MAY89		11,100	*-0.0108	200	187	45,300	16.300	<5
2-W9-1	12MAY89		11,200	*0.0284	179	191	49,600	16.100	<5
2-W10-13	22MAR89		10,200	*-0.1940	162	162	22,800	19.800	13
2-W10-14	21MAR89		16,900	*-0.3750	190	194	25,200	*2.500	<5

Well name	Collection Date	Duplicate sample number	TRITIUM pCi/L 500/20000	U pCi/L 0.5/600d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-W6-2	09MAY89		13,500	0.833	29	30	<5	<5
2-W7-1	10MAY89		*82	0.503	27	31	<5	<5
2-W7-2	20MAR89		*41	0.900	28	20	76	<5
2-W7-3	20MAR89		*65	0.950	18	15	69	17
2-W7-4	22MAR89		283	1.280	27	20	<5	<5
2-W7-5	17MAR89		*113	0.981	20	22	33	407
2-W7-6	17MAR89		842	1.860	28	24	23	<5
2-W8-1	12MAY89		*64	0.691	22	27	<5	<5
2-W9-1	12MAY89		*36	1.080	14	19	9	<5
2-W10-13	22MAR89		*140	0.702	29	25	<5	<5
2-W10-14	21MAR89		*-83	0.694	34	34	13	12

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

Suffix
none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
w - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies
d - based on draft DOE Derived Concentration Guides, DOE Order 5480.xx (March 1988)

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. Inconsistent with previous data from noted well and adjacent wells.
(b) Suspect data. First replicate analyzed was out of the calibration range. Samples were then diluted (see page 1.3).
(c) The laboratory reported that the sample was cloudy or contained particulates. The higher result for this unfiltered sample above the filtered sample can be attributed to suspended solids.

TABLE 4.10- Constituent List and Summary of Sampling Results for the Low Level Burial Grounds, WMA-4
March through May 1989

Constituent List=Contamination Indicator Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
088	CONDLAB	umho	.	36	0	700	WDOE		Specific conductance, laboratory
191	CONDFLD	umho	1	27	0	700	WDOE		Specific conductance, field
199	PHFIELD		0.1	27	0	6.5-8.5	EPAS	xxx	pH, field
207	PH-LAB		0.01	36	0	6.5-8.5	EPAS	xxx	pH, laboratory
C69	TOC	ppb	2000	36	0	.			Total organic carbon
H42	TOXLDL	ppb	10	36	0	.			Total organic halogens, low DL

Constituent List=Interim Primary Drinking Water Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
109	COLIFRM	MPN	2.2	10	10 ***	1	EPA		Coliform bacteria
111	BETA	pCi/L	8	10	0	50	EPA		Gross beta
112	ALPHAHI	pCi/L	4	10	0	15	EPA	xxx	Gross alpha, high DL
181	RADIUM	pCi/L	1	10	0	5	EPA		Radium, total
A06	BARIUM	ppb	6	10	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	10	8	10	EPA	xxx	Cadmium
A08	CHROMUM	ppb	10	10	0	50	EPA	xxx	Chromium
A10	SILVER	ppb	10	10	10 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	10	8	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	9	9 ***	2	EPA		Mercury
A22	SELENUM	ppb	5	10	10 ***	10	EPA		Selenium
A33	ENDRIN	ppb	0.1	10	10 ***	0.2	EPA		Endrin
A34	METHLOR	ppb	3	10	10 ***	100	EPA		Methoxychlor
A35	TOXAENE	ppb	1	10	10 ***	5	EPA		Toxaphene
A36	a-BHC	ppb	0.1	10	10 ***	4	EPA		Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	10	10 ***	4	EPA		Lindane, beta-BHC
A38	g-BHC	ppb	0.1	10	10 ***	4	EPA		Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	10	10 ***	4	EPA		Lindane, delta-BHC
A51	LEADGF	ppb	5	10	9	50	EPA	xxx	Lead (graphite furnace)
C72	NITRATE	ppb	500	10	0	45000	EPA	xxx	Nitrate
C74	FLUORID	ppb	500	10	7	4000	EPA		Fluoride
H13	2,4-D	ppb	2	10	10 ***	100	EPA		2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	10	10 ***	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	7	50	EPA		Chromium, filtered
H23	FSILVER	ppb	10	9	9 ***	50	EPA		Silver, filtered
H37	FARSENI	ppb	5	9	8	50	EPA		Arsenic, filtered
H38	FMERCUR	ppb	0.1	8	8 ***	2	EPA		Mercury, filtered
H39	FSELENI	ppb	5	9	9 ***	10	EPA		Selenium, filtered
H41	FLEAD	ppb	5	9	9 ***	50	EPA		Lead, filtered

TABLE 4.10. (contd)

Constituent List=Water Quality Parameters

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full name
A11	SODIUM	ppb	200	10	0	.			Sodium
A17	MANGESE	ppb	5	10	1	50	EPAS	xxx	Manganese
A19	IRON	ppb	30	10	0	300	EPAS	xxx	Iron
C73	SULFATE	ppb	500	10	0	250000	EPAS		Sulfate
C75	CHLORID	ppb	500	10	0	250000	EPAS		Chloride
H24	FSODIUM	ppb	200	9	0	.			Sodium, filtered
H29	FMANGAN	ppb	5	9	8	50	EPAS		Manganese, filtered
H31	FIRON	ppb	30	9	5	300	EPAS		Iron, filtered
H57	LPHENOL	ppb	10	10	10 ***	.			Phenol, low DL

Constituent List=Site Specific and Other Constituents

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full name
010	CO-60	pCi/L	22.5	10	0	100	EPAR		Cobalt-60
024	CS-137	pCi/L	20	10	0	200	EPAR		Cesium-137
034	RU-106	pCi/L	172.5	10	0	30	EPAR	xxx	Ruthenium-106
100	PU39-40	pCi/L	17	9	0	30	DOE		Plutonium-239,240
102	PU-238	pCi/L	17	9	0	40	DOE		Plutonium-238
104	U	pCi/L	0.5	9	0	600	DOE		Uranium
105	AM-241	pCi/L	0.1	9	0	30	DOE		Americium-241
108	TRITIUM	pCi/L	500	9	0	20000	EPA		Tritium (H-3)
121	SR-90	pCi/L	5	10	0	8	EPA		Strontium-90
197	TC-99	pCi/L	15	9	0	900	EPAR		Technetium-99
A01	BERYLUM	ppb	5	10	10 ***	.			Beryllium
A03	STRONUM	ppb	20	10	0	.			Strontium
A04	ZINC	ppb	5	10	3	5000	EPAS		Zinc
A05	CALCIUM	ppb	50	10	0	.			Calcium
A12	NICKEL	ppb	10	10	1	.			Nickel
A13	COPPER	ppb	10	10	9	1300	EPAP		Copper
A14	VANADUM	ppb	5	10	0	.			Vanadium
A15	ANTIONY	ppb	100	10	10 ***	.			Antimony
A16	ALUMNUM	ppb	150	10	8	.			Aluminum
A18	POTASUM	ppb	100	10	0	.			Potassium
A50	MAGNES	ppb	50	10	0	.			Magnesium
C76	PHOSPHA	ppb	1000	10	10 ***	.			Phosphate
H18	FZINC	ppb	5	9	8	5000	EPAS		Zinc, filtered
H19	FCALCIU	ppb	50	9	0	.			Calcium, filtered
H25	FNICKEL	ppb	10	9	7	.			Nickel, filtered
H26	FCOPPER	ppb	10	9	7	1300	EPAP		Copper, filtered
H27	FVANADI	ppb	5	9	0	.			Vanadium, filtered
H28	FALUMIN	ppb	150	9	9 ***	.			Aluminum, filtered

TABLE 4.10. (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
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	20	9	0		.			Strontium, filtered
H36	FANTIMO	ppb	100	9	9	***	.			Antimony, filtered
H66	BROMIDE	ppb	1000	10	10	***	.			Bromide
H67	NITRITE	ppb	1000	10	10	***	.			Nitrite
H86	FBORON	ppb	10	9	0		.			Boron, filtered
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	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	10	0		.			Boron
P02	COBALT	ppb	20	10	10	***	.			Cobalt
P03	LITHIUM	ppb	10	10	9		.			Lithium
P04	MOLY	ppb	40	10	10	***	.			Molybdenum
P05	SILICON	ppb	50	10	0		.			Silicon
P06	TIN	ppb	30	10	10	***	.			Tin
P07	TITAN	ppb	60	10	9		.			Titanium
P08	ZIRCON	ppb	50	10	10	***	.			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	10	2		5	EPA	xxx	Tetrachloromethane [Carbon Tetrachloride
A62	BENZENE	ppb	5	10	10	***	5	EPA		Benzene
A64	METHONE	ppb	10	10	9		.			Methyl ethyl ketone
A66	TOLUENE	ppb	5	10	10	***	2000	EPAP		Toluene
A67	1,1,1-T	ppb	5	10	9		200	EPA		1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	10	10	***	.			1,1,2-Trichloroethane
A69	TRICENE	ppb	5	10	9		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	5		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	TRANDCE	ppb	5	10	10	***	70	EPAP		trans-1,2-Dichloroethene
A93	METHYCH	ppb	5	10	10	***	.			Methylene chloride [Dichloromethane]

TABLE 4.10. (contd)

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

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full name
B13	VINYIDE	ppb	10	10	10 ***	2	EPA	Vinyl chloride
B14	M-XYLE	ppb	5	10	10 ***	440	EPAP	Xylene-m
C70	CYANIDE	ppb	10	10	10 ***	.		Cyanide
C80	AMMONIU	ppb	50	10	9	.		Ammonium ion
H15	2,4,5-T	ppb	2	10	10 ***	.		2,4,5-T
H68	HEXONE	ppb	10	10	10 ***	.		Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	10	10 ***	.		Acetone by VOA
I28	TAF	ppb	10	10	10 ***	.		Tetrahydorfuran
L63	14DBEN	ppb	5	10	10 ***	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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 4.11- Constituents with at Least One Detected Value for the Low Level Burial Grounds, WMA-4
March through May 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-W15-15	15MAY89		248	244	8.10	7.90	#300	520 [a]
		1	248	244	8.00	7.91	#400	442 [a]
		2	248	246	8.00	7.91	#300	416 [a]
		3	248	247	8.00	7.91	#300	522 [a]
2-W15-16	09MAY89		531	586	7.90	7.70	#800	3,500
		1	.	586	8.00	.	#800	3,590
		2	.	585	7.90	.	#600	3,920
		3	.	585	7.90	.	#700	3,280
2-W15-17	31MAY89		381	420	7.80	6.40	#1800	14
		1	.	415	7.80	.	#1800	#9
		2	.	452	9.30	.	#1700	18
		3	.	418	7.80	.	2100	12
2-W15-18	15MAY89		361	350	7.90	7.67	#400	1,260
		1	361	355	8.00	7.67	#500	1,360
		2	360	357	7.90	7.64	#400	1,150
		3	362	352	7.90	7.63	#400	1,340
2-W18-21	22MAR89		227	218	7.90	7.70	#300	109
		1	.	225	8.00	.	#300	106
		2	.	224	8.00	.	#300	103
		3	.	224	8.00	.	#300	106
2-W18-21	16MAY89		230	224	7.90	7.80	#400	120
		1	232	222	7.90	7.81	#400	123
		2	231	220	8.00	7.80	#400	115
		3	231	221	7.90	7.79	#400	125
2-W18-22	15JUN89		247	325	8.00	7.30	#300	#2
		1	246	328	8.00	7.30	#200	#1
		2	245	328	8.00	7.30	#200	#0
		3	246	326	8.00	7.30	#300	#1
2-W18-23	11MAY89		205	214	8.00	7.70	#500	629
		1	206	243	8.00	7.60	#300	600
		2	206	246	8.00	7.60	#300	588
		3	206	244	8.00	7.60	#300	562
2-W18-24	11MAY89		256	264	8.00	7.70	#200	831
		1	256	265	8.00	7.70	#300	843
		2	258	264	8.00	7.70	#300	761
		3	257	266	8.00	7.70	#200	728

TABLE 4.11. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	1,1,1-T ppb 5/200	ALPHAHI pCi/L 4/15	ALUMNUM ppb 150/.	AM-241 pCi/L 0.1/30d	AMMONIU ppb 50/.	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 6/1000
2-W15-15	15MAY89		<5	2.090	<150	0.01390	<50	5	<5	27
2-W15-16	09MAY89		<5	2.520	<150	*0.00264	<50	<5	<5	67
2-W15-17	31MAY89		<5	*0.991	2950	*-0.00412	<50	<5	.	118
2-W15-18	15MAY89		<5	*1.140	<150	*0.00992	<50	<5	<5	43
2-W18-21	22MAR89		8	12.300	<150	*-0.00393	<50	<5	<5	25
	16MAY89		<5	19.400	<150	0.00000	<50	5	<5	24
	16MAY89	1	<5	24.800	<150	.	<50	<5	5	22
2-W18-22	15JUN89		<5	*1.030	<150	*-0.00029	<50	<5	<5	52
2-W18-23	11MAY89		<5	*1.250	352	0.00000	59	<5	<5	24
2-W18-24	11MAY89		<5	1.130	<150	*0.00249	<50	<5	<5	31

Well name	Collection Date	Duplicate sample number	FBARIUM ppb 6/1000	FBERYLL ppb 5/.	BETA pCi/L 8/50	BORON ppb 10/.	FBORON ppb 10/.	CADMIUM ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.
2-W15-15	15MAY89		34	<5	7.150	30	24	<2	25,000	21,900
2-W15-16	09MAY89		65	<5	6.260	30	22	<2	58,600	61,600
2-W15-17	31MAY89		.	.	8.300	44	.	55	.	38,400
2-W15-18	15MAY89		44	6	5.760	17	20	<2	35,600	34,200
2-W18-21	22MAR89		20	<5	9.250	25	24	<2	18,000	21,700
	16MAY89		26	<5	7.050	25	27	<2	22,900	21,600
	16MAY89	1	22	<5	6.110	23	26	<2	20,600	20,300
2-W18-22	15JUN89		53	<5	6.240	17	14	<2	34,900	33,700
2-W18-23	11MAY89		25	<5	*0.486	24	19	3	25,000	24,600
2-W18-24	11MAY89		26	<5	3.930	26	14	<2	24,100	26,600

Well name	Collection Date	Duplicate sample number	CHLFORM ppb 5/100	CHLORID ppb 500/250000s	FCHROMI ppb 10/50	CHROMUM ppb 10/50	CO-60 pCi/L 22.5/100r	COPPER ppb 10/1300p	FCOPPER ppb 10/1300p
2-W15-15	15MAY89		#3	3,500	<10	13	*-8.480	<10	<10
2-W15-16	09MAY89		33	22,600	12	44	*-1.860	<10	<10
2-W15-17	31MAY89		<5	16,000	.	577	*-1.820	127	.
2-W15-18	15MAY89		12	38,300	13	54	*0.809	<10	<10
2-W18-21	22MAR89		<5	2,800	<10	30	*-1.700	<10	<10
	16MAY89		<5	3,100	<10	44	*2.080	<10	24
	16MAY89	1	<5	3,100	<10	52	*0.190	<10	15
2-W18-22	15JUN89		<5	9,600	<10	86	*2.460	<10	<10
2-W18-23	11MAY89		5	3,100	<10	54	*3.510	<10	<10
2-W18-24	11MAY89		16	3,800	<10	109	*2.020	<10	<10

TABLE 4.11. (contd)

Well name	Collection Date	Duplicate sample number	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000	IRON ppb 30/300s	FIRON ppb 30/300s	LEADGF ppb 5/50	LITHIUM ppb 10/.	MAGNES ppb 50/.	FMAGNES ppb 50/.
2-W15-15	15MAY89		0.000	<500	158	<30	<5	<10	6,470	7,700
2-W15-16	09MAY89		*-4.590	697	211	32	<5	<10	16,400	15,900
2-W15-17	31MAY89		*0.376	<500	31,100	.	1,000	13	13,700	.
2-W15-18	15MAY89		*-5.640	600	292	<30	<5	<10	10,300	11,200
2-W18-21	22MAR89		*-1.410	<500	164	<30	<5	<10	6,980	6,030
	16MAY89		*2.240	<500	503	81	<5	<10	6,450	6,690
	16MAY89	1	*-0.118	<500	541	<30	<5	<10	5,990	6,050
2-W18-22	15JUN89		*1.890	<500	585	<30	<5	<10	11,500	12,200
2-W18-23	11MAY89		*3.350	<500	1,150	47	<5	<10	7,190	7,350
2-W18-24	11MAY89		*-2.250	600	438	32	<5	<10	8,290	7,750

Well name	Collection Date	Duplicate sample number	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	METHONE ppb 10/.	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.
2-W15-15	15MAY89		<5	8	<10	<10	<10	10,500	3,150	2,740
2-W15-16	09MAY89		<5	5	<10	21	<10	70,700	4,740	5,010
2-W15-17	31MAY89		.	470	<10	269	.	16,700	.	5,970
2-W15-18	15MAY89		<5	10	<10	23	<10	68,900	4,130	3,830
2-W18-21	22MAR89		<5	<5	#5	17	<10	2,200	2,530	2,950
	16MAY89		7	12	<10	25	13	3,000	2,880	2,780
	16MAY89	1	<5	12	<10	28	11	2,600	2,690	2,570
2-W18-22	15JUN89		<5	9	<10	43	<10	16,900	4,270	4,040
2-W18-23	11MAY89		<5	17	<10	24	<10	5,700	3,030	3,010
2-W18-24	11MAY89		<5	16	<10	52	<10	21,700	3,010	3,240

Well name	Collection Date	Duplicate sample number	PU-238 pCi/L 17/40d	PU39-40 pCi/L 17/30d	RADIUM pCi/L 1/5	RU-106 pCi/L 172.5/30r	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.
2-W15-15	15MAY89		*-0.00508	*-0.000165	*0.0458	*-6.26	20,800	17,600	17,000	19,300
2-W15-16	09MAY89		*-0.00455	*-0.001720	0.3620	*3.12	22,400	22,700	43,800	42,800
2-W15-17	31MAY89		*-0.00432	0.041300	*0.1330	*-9.45	.	20,100	25,700	.
2-W15-18	15MAY89		*-0.00144	*-0.000165	*0.0840	*-15.70	22,700	21,500	24,900	26,300
2-W18-21	22MAR89		*0.00291	*0.004190	*0.1120	*-20.80	15,800	19,000	19,400	16,300
	16MAY89		*-0.00144	*0.002340	*0.0700	*-5.94	18,900	18,500	18,700	19,300
	16MAY89	1	.	.	*0.1320	*38.10	17,100	17,200	17,300	17,600
2-W18-22	15JUN89		*-0.00144	*0.00725	0.4000	*-87.90	20,800	19,900	13,700	14,500
2-W18-23	11MAY89		*0.00043	*0.002170	*0.1260	*-40.40	19,400	19,100	13,500	13,900
2-W18-24	11MAY89		*0.00119	*-0.003320	0.2280	*-6.25	20,400	22,000	18,100	16,700

TABLE 4.11. (contd)

Well name	Collection Date	Duplicate sample number	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONUM ppb 20/.	SULFATE ppb 500/250000s	TC-99 pCi/L 15/900r	TETRANE ppb 5/5	TITAN ppb 60/.
2-W15-15	15MAY89		*-0.36900	103	91	14,600	*4.340	440	<60
2-W15-16	09MAY89		*-0.18400	265	273	69,100	11.800	6,650	<60
2-W15-17	31MAY89		*0.46400	.	209	41,500	7.950	<5	163
2-W15-18	15MAY89		*0.23600	154	153	21,500	27.400	1,710	<60
2-W18-21	22MAR89		*-0.07360	79	92	14,000	*-0.480	146	<60
	16MAY89		*0.04990	95	89	14,400	*1.300	139	<60
	16MAY89	1	0.93300	85	81	14,400	.	148	<60
2-W18-22	15JUN89		*0.14500	167	161	19,600	*0.517	<5	<60
2-W18-23	11MAY89		*0.10500	104	104	15,600	*0.362	732	<60
2-W18-24	11MAY89		*-0.00176	101	112	20,500	46.000	945	<60

Well name	Collection Date	Duplicate sample number	TRICENE ppb 5/5	TRITIUM pCi/L 500/20000	U pCi/L 0.5/600d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-W15-15	15MAY89		<5	315	3.640	27	25	15	<5
2-W15-16	09MAY89		5	*100	3.520	26	30	8	<5
2-W15-17	31MAY89		<5	*32	0.552	.	18	1,940	.
2-W15-18	15MAY89		<5	*122	0.751	28	28	17	<5
2-W18-21	22MAR89		<5	*-4	23.200	29	26	<5	<5
	16MAY89		<5	734	20.800	28	28	<5	<5
	16MAY89	1	<5	.	.	27	25	6	<5
2-W18-22	15JUN89		<5	1,150	0.644	31	22	39	21
2-W18-23	11MAY89		<5	*160	1.100	27	30	22	<5
2-W18-24	11MAY89		<5	*126	1.100	32	39	<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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
w - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies
d - based on draft DOE Derived Concentration Guides, DOE Order 5480.xx (March 1988)

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. First replicate analyzed was out of the calibration range. Samples were then diluted (see page 1.3).

THIS PAGE INTENTIONALLY
LEFT BLANK

5.0 NONRADIOACTIVE DANGEROUS WASTE LANDFILL

R. M. Fruland

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 miles 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 at the bottom of the unconfined aquifer; 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. Table 5.1 shows the FY 1989 sampling schedule for wells in the NRDW monitoring network. No sampling was scheduled or conducted during this quarter.

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 significant impact to the ground water from past NRDW operations has been detected.

9 0 1 1 7 7 1 1 4 5 7

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Currently, no additional drilling or hydrologic characterization work (other than water levels) is planned at the NRDW.

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 continue to support the previously determined general ground-water flow direction of northwest to southeast (Table 5.2). Survey data for wells installed before 1987 are considered to be of lower quality than survey data for wells installed since then. Because of these differences in survey data and the low ground-water gradient, the ground-water flow direction is difficult to determine.

WATER CHEMISTRY DATA

No ground-water sampling was scheduled for this quarter at the NRDW, and therefore, there are no new results to report. The NRDW ground-water monitoring wells are scheduled for sampling in July for the long list of constituents (WAC 173-303-9905), and those results will be reported in the next quarterly report.

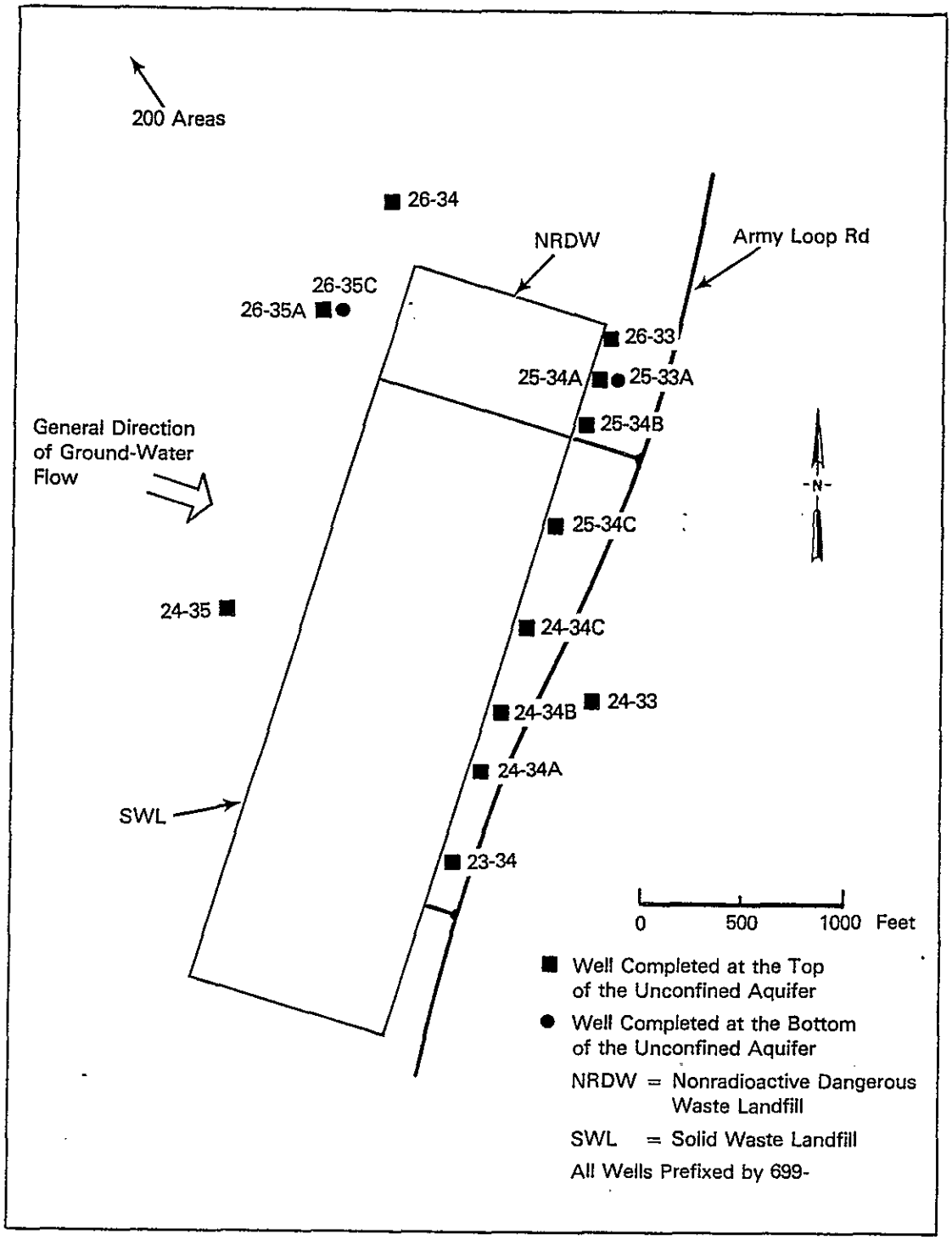


FIGURE 5.1. Monitoring Well Locations for the Solid Waste Landfill and the Nonradioactive Dangerous Waste Landfill

TABLE 5.1. Sampling Schedule for the Nonradioactive Dangerous Waste Landfill

	1988			1989[a]								
Well Name	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
699-25-33A	X		X							L		
699-25-34A	X		X							L		
699-25-34B	X		X							L		
699-26-33	X		X							L		
699-26-34	X		X							L		
699-26-35A	X		X							L		
699-26-35C	X		X							L		

(a) In the previous quarterly report, 1989 projected sampling indicated NRDW sampling would occur in June 1989. This was an error; NRDW sampling has been planned for July 1989 since the beginning of FY 1989.

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

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, April, May, and June 1989

Well Name	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water Table, ft above MSL
NRDW Wells				
699-25-33A	528.55	4/27/89	(Not scheduled, and not measured)	
		5/26/89	"	
		6/26/89	"	
699-25-34A	530.03	4/27/89	"	
		5/26/89	"	
		6/26/89	"	
699-25-34B	529.15	4/27/89	124.48	404.67
		5/26/89	124.62	404.53
		6/26/89	124.72	404.43
699-26-33	535.51	4/27/89	130.85	404.66
		5/26/89	130.98	404.53
		6/26/89	131.09	404.42
699-26-34	528.09	4/27/89	123.41	404.68
		5/26/89	123.55	404.54
		6/26/89	123.65	404.44
699-26-35A	532.37	4/27/89	127.67	404.70
		5/26/89	127.79	404.58
		6/26/89	127.90	404.47
699-26-35C	532.13	4/27/89	(Not scheduled, and not measured)	
		5/26/89	"	
		6/26/89	"	
SWL Wells				
699-23-34	532.86	4/27/89	128.23	404.63
		5/19/89	128.34	404.52[b]
		5/26/89	128.35	404.51
		6/26/89	128.45	404.41
699-24-33	524.21	4/27/89	119.67	404.54
		5/18/89	119.78	404.43[b]
		5/26/89	119.79	404.42
		6/26/89	119.89	404.32

TABLE 5.2. (contd)

Well Name	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water Table, ft above MSL
SWL Wells (contd)				
699-24-34A	533.89	4/27/89	129.26	404.63
		5/19/89	129.36	404.53[b]
		5/26/89	129.38	404.51
		6/26/89	129.48	404.41
699-24-34B	533.50	4/27/89	128.84	404.66
		5/19/89	128.95	404.55[b]
		5/26/89	128.96	404.54
		6/26/89	129.07	404.43
699-24-34C	532.58	4/27/89	127.95	404.63
		5/17/89	127.97	404.61[b]
		5/26/89	128.07	404.51
		6/26/89	128.18	404.40
699-24-35	538.81	4/27/89	134.13	404.68
		5/18/89	134.23	404.58[b]
		5/26/89	134.25	404.56
		6/26/89	134.36	404.45
699-25-34C	535.46	4/27/89	130.81	404.65
		5/18/89	130.91	404.55[b]
		5/26/89	130.93	404.53
		6/26/89	131.05	404.41

(a) MSL = mean sea level.
(b) Measurements made before ground-water sampling.

6.0 1301-N LIQUID WASTE DISPOSAL FACILITY

T. J. Gilmore

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 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 start-up of the N Reactor in 1963 until September 1985. It is currently not in use.

There are seven core 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 went into 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.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or hydrogeologic characterization work (other than water levels) 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 1325-N facilities. Monthly water-level measurements continued during this quarter, with measurements obtained from 49 wells in April, May, and June. 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 disposal facilities, river stage in the nearby Columbia River, and ground water entering the 100-N Area from other parts of the Hanford Site. The amount of liquid waste discharge to 100-N Area disposal facilities is determined by the operational status of the N Reactor. In April, the average water-table elevation under the 1301-N LWDF was 394 ft; in May, this increased to 396 ft; and in June, the water-table elevation was approximately 398.5 ft. This increase in water-table elevations is attributed to increased discharges to the nearby 1325-N LWDF in May and June 1989. These discharges resulted primarily from decontamination activities in the N Reactor (see Section 8.0). The average weekly discharge to the 1325-N LWDF was 11.3 million gal between May 11 and June 24.

WATER CHEMISTRY DATA

Ground-water samples were obtained from 8 of the total of 15 wells in the ground-water quality assessment monitoring network in June 1989. Wells 199-N-4, 199-N-16, 199-N-17, 199-N-18, 199-N-54, 199-N-55, 199-N-56 and 199-N-57 were the only wells sampled in June because these were the only wells in the network with purge water containment vessels. Analytical results from samples collected in June will be presented in the next quarterly report.

The logistics of ordering and placing containment vessels at the wells delayed sampling of many wells on the Hanford Site. The sampling schedule at 1301-N LWDF was effectively delayed 3 months. A revised sampling schedule is presented in Table 6.2. The regular and short lists of analyses identified in Table 6.2 are presented in Tables 6.3 and 6.4, respectively.

INDICATOR PARAMETER SAMPLING RESULTS

The analytical results from the sampling conducted in March 1989 were received this quarter and are presented in Tables 6.5 and 6.6. Seven wells were sampled in March for the 1301-N LWDF. Currently, background data for contamination indicator parameters consist of

- March 1988 - 1 pH, 1 conductivity
- June 1988 - 4 pH, 4 conductivity, 4 TOC, 4 TOXLDL
- September 1988 - 4 pH, 4 conductivity, 4 TOC, 4 TOXLDL
- December 1988 - 4 pH, 4 conductivity, 4 TOC, 4 TOXLDL.

Data from the first two samplings in December 1987 and March 1988 lacked the quadruplicate samples required to establish the background data. The indicator parameter data were updated in December 1988 as more quadruplicate sample data were obtained. In March 1989, however, the critical means for specific conductance were exceeded, and the new quadruplicate data collected in March were not used to update the quadruplicate sample data base. Table 6.7 lists the average background, standard deviation, and critical mean for the four contamination indicator parameters. The critical mean is the value to which analytical results are compared. If a parameter is greater than (and less than, for pH) its critical mean, that measurement is considered statistically different from background. These values were determined following the recommended techniques in Appendix B of the TEGD (EPA 1986a). Some of these critical mean values are outside the range that would be reasonably anticipated.

Table 6.8 lists the replicate averages for the March 1989 samples to be compared to the critical means. The 1301-N LWDF is currently in a groundwater quality assessment program for conductivity. The background critical

mean for specific conductance was exceeded in well 199-N-3 in March 1989. This well also exceeded the critical mean for specific conductance in December 1988, which resulted in the project converting to a ground-water quality assessment program (Smith, Bates, and Lundgren 1989).

The critical mean for total organic halogen (TOX, 25.7 ppb) was exceeded in well 199-N-4 for the March sampling. The TOX average from the quadruplicate samples was 5005.0 ppb. This well was resampled June 26 for verification, and the average TOX value for the quadruplicate samples was 4.75 ppb. This resampling did not verify the presence of high TOX observed in March.

Ground-Water Analyses Other Than Indicator Parameters

In addition to indicator parameters, constituents and parameters on the comprehensive WAC 173-303-9905 list were analyzed for in March (Tables 6.5 and 6.6). Of these, gross beta, tritium, strontium-90, and nitrate were detected above the drinking water standards in the ground water around the 1301-N LWDF. Well 199-N-67 had the highest concentrations of gross beta at 39,000 pCi/L, more than 780 times the screening level of 50 pCi/L. Gross beta exceeded the screening level in wells 199-N-2, 199-N-3, 199-N-14, and 199-N-67. The tritium drinking water standard of 20,000 pCi/L was exceeded in all seven wells ranging from a low of 52,400 pCi/L in the upgradient well 199-N-66 to a high of 95,600 pCi/L in the downgradient well 199-N-2. Strontium-90 concentrations exceeded the drinking water standard of 8 pCi/L in wells 199-N-2, 199-N-3, 199-N-4, 199-N-14, and well 199-N-67. Concentrations ranged from 9.3 to 23,400 pCi/L. Nitrate concentrations exceed the drinking water standard of 45,000 ppb in well 199-N-67 at 87,900 ppb.

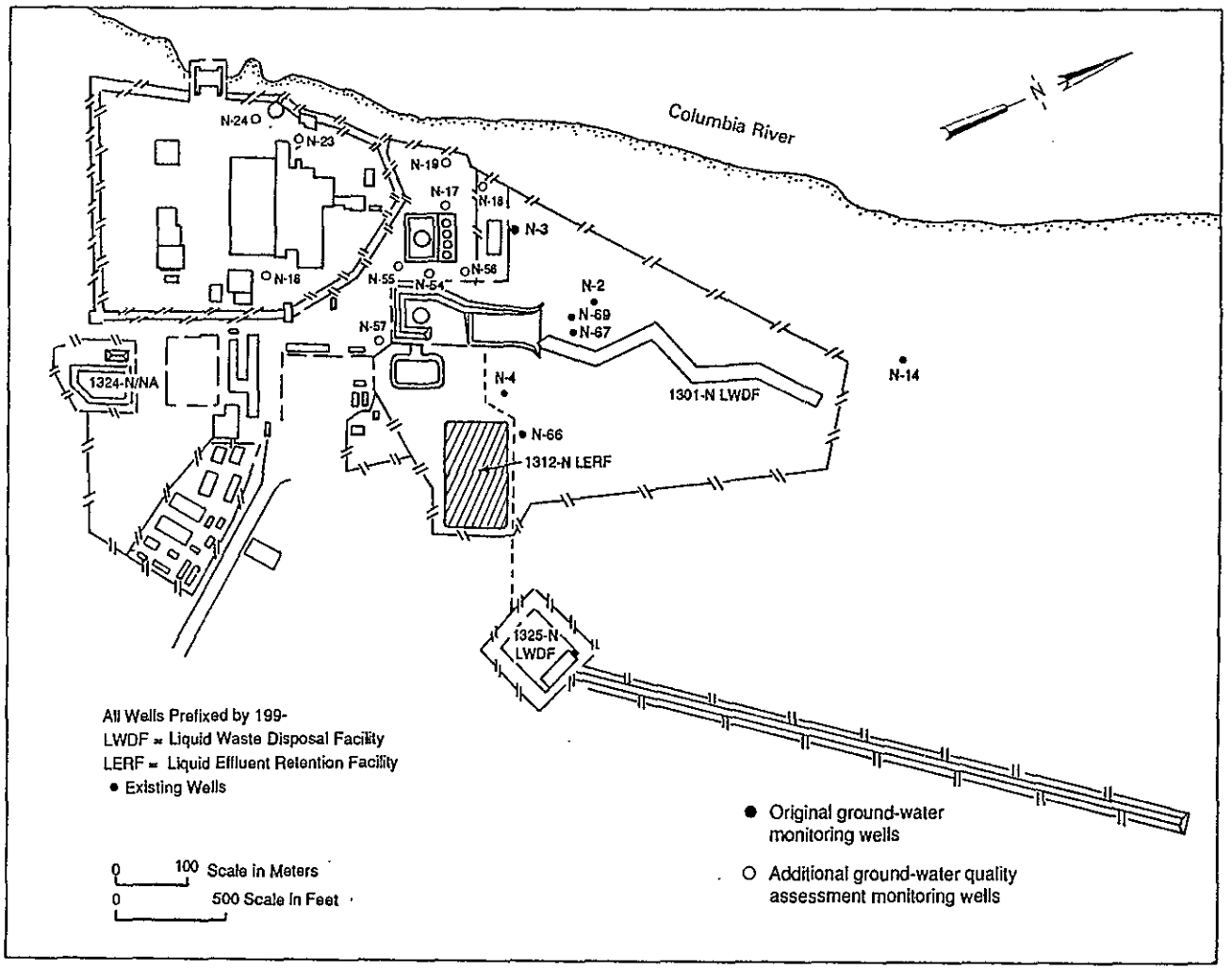
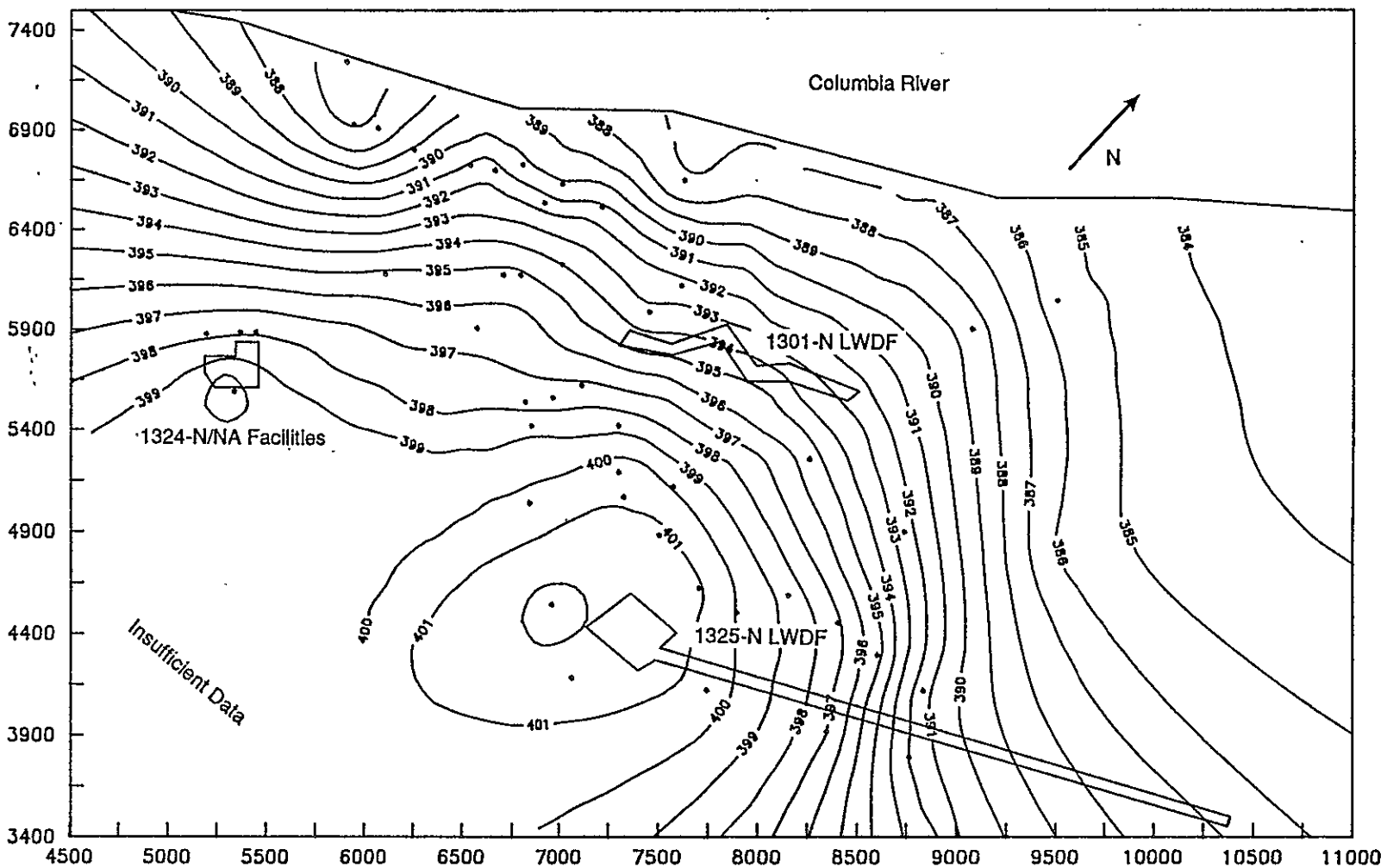
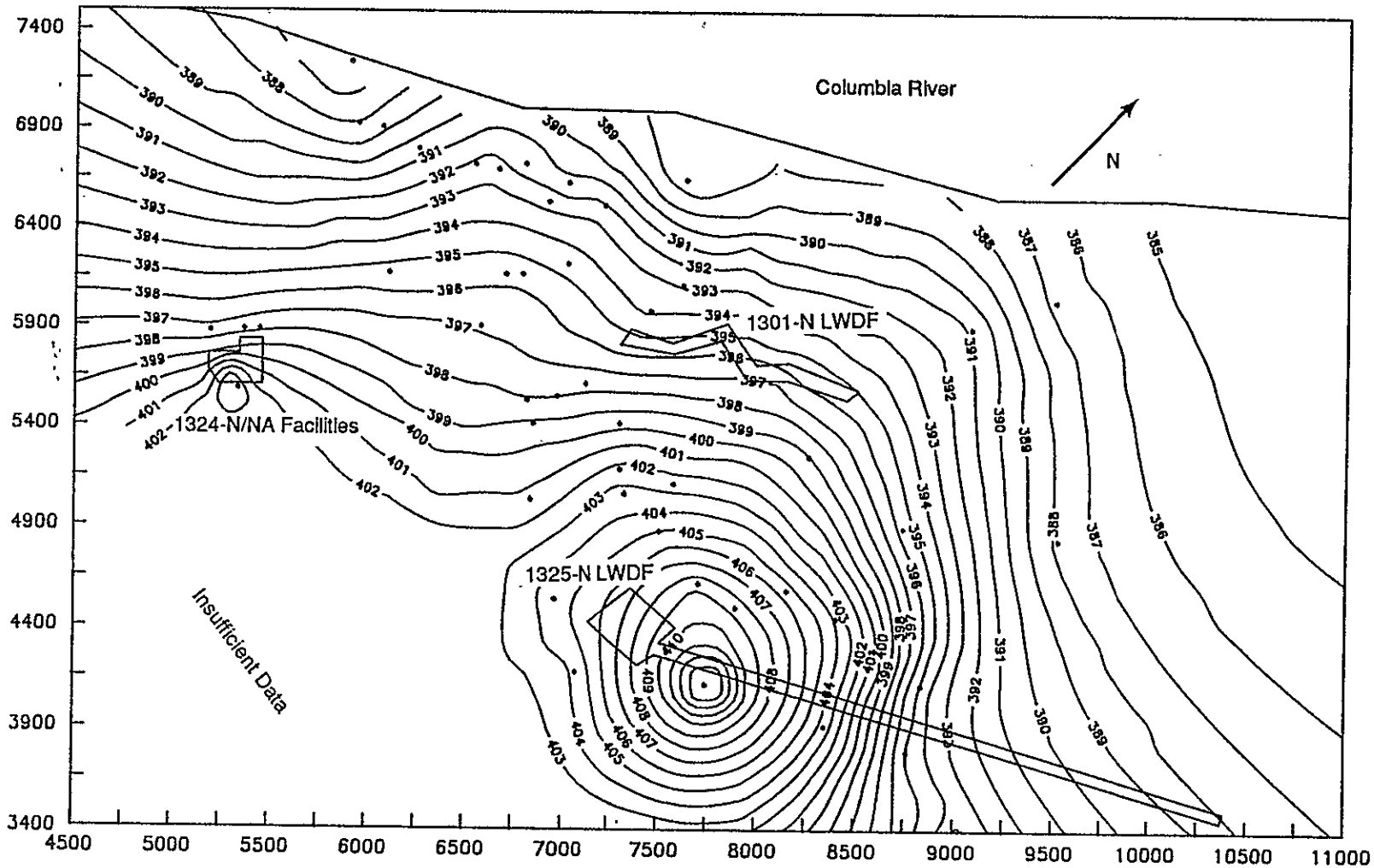


FIGURE 6.1. Monitoring Well Locations for the 1301-N Liquid Waste Disposal Facility



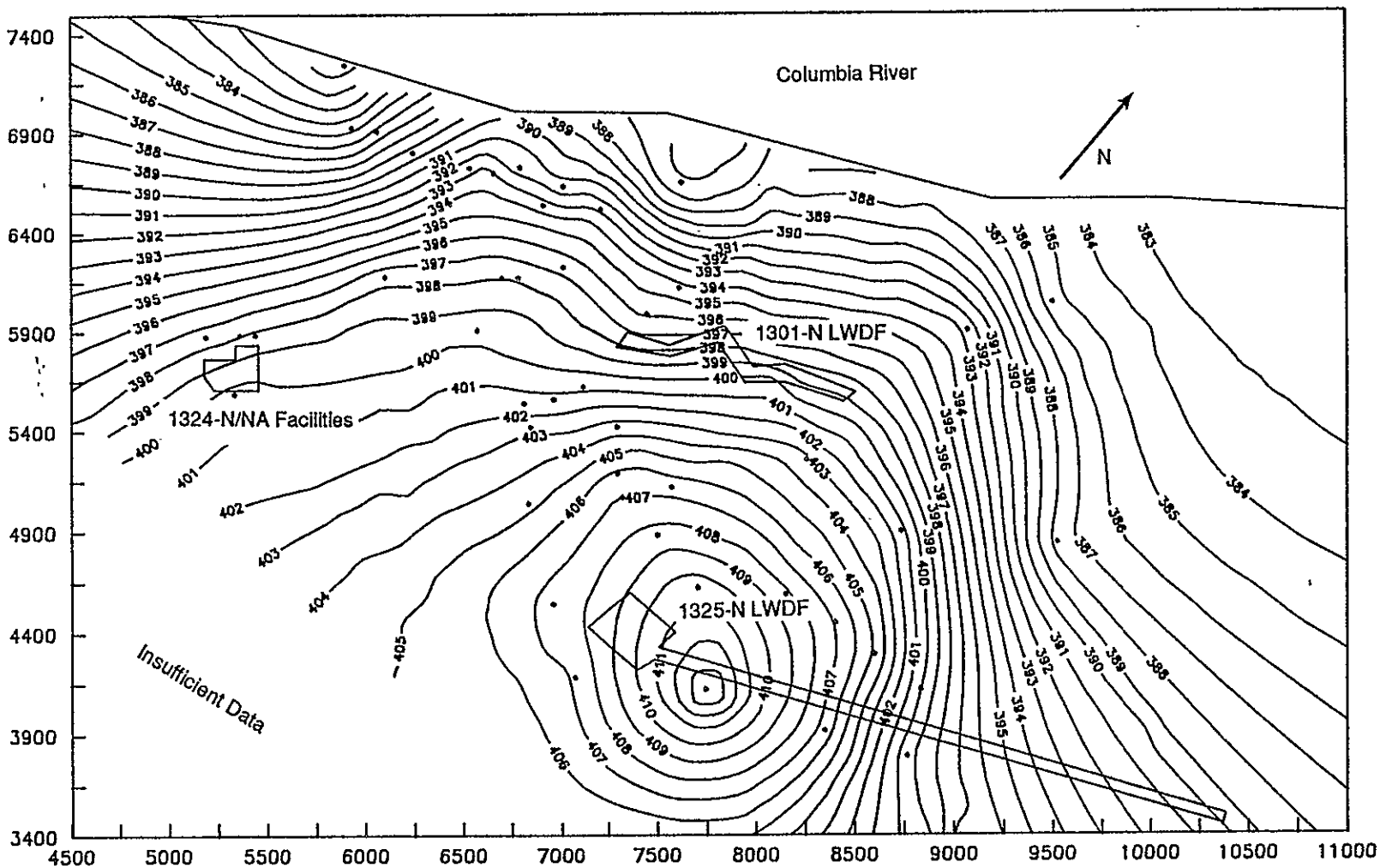
• Data points

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



• Data points

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



• Data points

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

TABLE 6.1. Water-Level Data for the 100-N Area, April, May, and June 1989

Well Number	Date	Depth to Water, ft	Water Level, ft above MSL[a]
199-N-2	4/26/89	67.18	392.65
199-N-3	4/26/89	67.80	391.65
199-N-4	4/26/89	61.35	397.38
199-N-6	4/26/89	60.13	400.84
199-N-8S[b]	4/26/89	17.43	386.89
199-N-14	4/26/89	64.43	388.72
199-N-16	4/26/89	61.42	395.36
199-N-17	4/26/89	69.34	391.87
199-N-18	4/26/89	68.57	389.96
199-N-19	4/26/89	63.81	390.13
199-N-20	4/26/89	63.84	392.01
199-N-21	4/26/89	65.82	391.15
199-N-23	4/26/89	67.19	389.11
199-N-24	4/26/89	45.21	387.28
199-N-25	4/26/89	39.12	386.64
199-N-27	4/26/89	48.34	400.75
199-N-28	4/26/89	62.74	401.50
199-N-29	4/26/89	62.80	402.45
199-N-31	4/26/89	61.22	401.41
199-N-32	4/26/89	60.77	401.31
199-N-33	4/26/89	59.82	400.05
199-N-34	4/26/89	58.70	400.93
199-N-36	4/26/89	58.99	399.98
199-N-37	4/26/89	57.32	398.80
199-N-39	4/26/89	56.87	397.44
199-N-40	4/26/89	60.73	395.62
199-N-41	4/26/89	66.40	391.19
199-N-42	4/26/89	63.09	392.05
199-N-44	4/26/89	63.53	397.23
199-N-49	4/26/89	58.08	392.64
199-N-50	4/26/89	77.59	385.77
199-N-51	4/26/89	76.61	385.57
199-N-52	4/26/89	64.98	398.72
199-N-53	4/26/89	66.10	395.66
199-N-54	4/26/89	62.10	395.41
199-N-55	4/26/89	62.51	395.34
199-N-56	4/26/89	63.92	394.17
199-N-57	4/26/89	61.10	396.66
199-N-58	4/26/89	64.78	398.10
199-N-59	4/26/89	61.58	397.95
199-N-60	4/26/89	63.93	398.01
199-N-61	4/26/89	61.90	400.12
199-N-62	4/26/89	63.39	400.20
199-N-63	4/26/89	67.75	398.95

TABLE 6.1. (contd)

Well Number	Date	Depth to Water, ft	Water Level, ft above MSL[a]
199-N-64	4/26/89	56.89	397.74
199-N-65	4/26/89	58.92	397.52
199-N-66	4/26/89	66.38	398.87
199-N-67	4/26/89	65.32	393.14
199-N-69	4/26/89	66.08	392.76
199-N-2	5/30/89	66.51	393.32
199-N-3	5/30/89	66.81	392.64
199-N-4	5/30/89	60.93	397.80
199-N-6	5/30/89	58.34	402.63
199-N-8S[b]	5/30/89	17.22	387.10
199-N-14	5/30/89	61.93	391.22
199-N-16	5/30/89	61.26	395.52
199-N-17	5/30/89	68.30	392.91
199-N-18	5/30/89	67.31	391.22
199-N-19	5/30/89	62.51	391.43
199-N-20	5/30/89	62.92	392.93
199-N-21	5/30/89	64.77	392.20
199-N-23	5/30/89	65.73	390.57
199-N-24	5/30/89	43.66	388.83
199-N-25	5/30/89	37.86	387.90
199-N-27	5/30/89	35.93	413.16
199-N-28	5/30/89	60.35	403.89
199-N-29	5/30/89	60.45	404.80
199-N-31	5/30/89	57.55	405.08
199-N-32	5/30/89	53.18	408.90
199-N-33	5/30/89	57.21	402.66
199-N-34	5/30/89	56.21	403.42
199-N-36	5/30/89	49.94	409.03
199-N-37	5/30/89	50.30	405.82
199-N-39	5/30/89	49.93	404.38
199-N-40	5/30/89	54.68	401.67
199-N-41	5/30/89	62.99	394.60
199-N-42	5/30/89	60.14	395.00
199-N-44	5/30/89	56.89	403.87
199-N-49	5/30/89	54.88	395.84
199-N-50	5/30/89	75.64	387.72
199-N-51	5/30/89	75.48	386.70
199-N-52	5/30/89	62.77	400.93
199-N-53	5/30/89	62.43	399.33
199-N-54	5/30/89	61.75	395.76
199-N-55	5/30/89	62.17	395.68
199-N-56	5/30/89	63.39	394.70
199-N-57	5/30/89	60.59	397.17

TABLE 6.1. (contd)

Well Number	Date	Depth to Water, ft	Water Level, ft above MSL[a]
199-N-58	5/30/89	64.91	397.97
199-N-59	5/30/89	62.18	397.35
199-N-60	5/30/89	64.21	397.73
199-N-61	5/30/89	58.81	403.21
199-N-62	5/30/89	62.33	401.26
199-N-63	5/30/89	67.23	399.47
199-N-64	5/30/89	56.57	398.06
199-N-65	5/30/89	58.51	397.93
199-N-66	5/30/89	65.40	399.85
199-N-67	5/30/89	64.75	393.71
199-N-69	5/30/89	65.50	393.34
199-N-2	6/30/89	64.93	394.90
199-N-3	6/30/89	65.81	393.64
199-N-4	6/30/89	57.74	400.99
199-N-6	6/30/89	54.46	406.51
199-N-8S[b]	6/30/89	18.70	385.62
199-N-14	6/30/89	59.87	393.28
199-N-16	6/30/89	58.88	397.90
199-N-17	6/30/89	67.19	394.02
199-N-18	6/30/89	67.26	391.27
199-N-19	6/30/89	62.36	391.58
199-N-20	6/30/89	62.00	393.85
199-N-21	6/30/89	64.25	392.72
199-N-23	6/30/89	66.74	389.56
199-N-24	6/30/89	45.95	386.54
199-N-25	6/30/89	41.28	384.48
199-N-27	6/30/89	35.87	413.22
199-N-28	6/30/89	57.29	406.95
199-N-29	6/30/89	57.78	407.47
199-N-31	6/30/89	54.15	408.48
199-N-32	6/30/89	51.22	410.86
199-N-33	6/30/89	53.12	406.75
199-N-34	6/30/89	52.55	407.08
199-N-36	6/30/89	48.18	410.79
199-N-37	6/30/89	47.68	408.44
199-N-39	6/30/89	47.07	407.24
199-N-40	6/30/89	51.13	405.22
199-N-41	6/30/89	57.50	400.09
199-N-42	6/30/89	55.79	399.35
199-N-44	6/30/89	53.93	406.83
199-N-49	6/30/89	48.87	401.85
199-N-50	6/30/89	75.85	387.51
199-N-51	6/30/89	76.78	385.40

TABLE 6.1. (contd)

Well Number	Date	Depth to Water, ft	Water Level, ft above MSL[a]
199-N-52	6/30/89	59.58	404.12
199-N-53	6/30/89	58.34	403.42
199-N-54	6/30/89	59.43	398.08
199-N-55	6/30/89	59.80	398.05
199-N-56	6/30/89	61.22	396.87
199-N-57	6/30/89	57.99	399.77
199-N-58	6/30/89	64.49	398.39
199-N-59	6/30/89	61.89	397.64
199-N-60	6/30/89	64.01	397.93
199-N-61	6/30/89	61.50	400.52
199-N-62	6/30/89	58.90	404.69
199-N-63	6/30/89	63.69	403.01
199-N-64	6/30/89	53.08	401.55
199-N-65	6/30/89	55.20	401.24
199-N-66	6/30/89	61.58	403.67
199-N-67	6/30/89	62.73	395.73
199-N-69	6/30/89	63.63	395.21

(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.

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

	1988			1989								
Well	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

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
Arsenic
Selenium
Lead
Mercury
Alkalinity
Anions
pH
Specific conductance

TABLE 6.5. Constituent List and Summary of Sampling Results for the 1301-N Liquid Waste Disposal Facility March 1989 through May 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	6.5-8.5	EPAS	xxx	pH, field
207	PH-LAB		0.01	28	0	6.5-8.5	EPAS	xxx	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	7	7 ***	1	EPA		Coliform bacteria
111	BETA	pCi/L	8	7	0	50	EPA	xxx	Gross beta
112	ALPHAHI	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	6	7	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	7	7 ***	10	EPA		Cadmium
A08	CHROMUM	ppb	10	7	7 ***	50	EPA		Chromium
A10	SILVER	ppb	10	7	7 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	7	7 ***	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	7	7 ***	2	EPA		Mercury
A22	SELENUM	ppb	5	7	7 ***	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	5	7	7 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	ppb	500	7	0	45000	EPA	xxx	Nitrate
C74	FLUORID	ppb	500	7	7 ***	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	7 ***	50	EPA		Chromium, filtered
H23	FSILVER	ppb	10	7	7 ***	50	EPA		Silver, filtered
H37	FARSENI	ppb	5	7	7 ***	50	EPA		Arsenic, filtered
H38	FMERCUR	ppb	0.1	7	7 ***	2	EPA		Mercury, filtered
H39	FSELENI	ppb	5	7	7 ***	10	EPA		Selenium, filtered
H41	FLEAD	ppb	5	7	7 ***	50	EPA		Lead, filtered

TABLE 6.5. (contd)

Constituent List=Water Quality Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full name
A11	SODIUM	ppb	200	7	0	.			Sodium
A17	MANGESE	ppb	5	7	5	50	EPAS		Manganese
A19	IRON	ppb	30	7	1	300	EPAS	xxx	Iron
C57	PHENOL	ppb	10	7	7 ***	.			Phenol
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	7 ***	50	EPAS		Manganese, filtered
H31	FIRON	ppb	30	7	6	300	EPAS		Iron, filtered

Constituent List=Site Specific and Other Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards 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		Ruthenium-106
104	U	pCi/L	0.5	7	0	600	DOE		Uranium
108	TRITIUM	pCi/L	500	7	0	20000	EPA	xxx	Tritium (H-3)
121	SR-90	pCi/L	5	7	0	8	EPA	xxx	Strontium-90
A01	BERYLUM	ppb	5	7	7 ***	.			Beryllium
A03	STRONUM	ppb	20	7	0	.			Strontium
A04	ZINC	ppb	5	7	1	5000	EPAS		Zinc
A05	CALCIUM	ppb	50	7	0	.			Calcium
A12	NICKEL	ppb	10	7	6	.			Nickel
A13	COPPER	ppb	10	7	7 ***	1300	EPAP		Copper
A14	VANADUM	ppb	5	7	5	.			Vanadium
A15	ANTIONY	ppb	100	7	7 ***	.			Antimony
A16	ALUMNUM	ppb	150	7	7 ***	.			Aluminum
A18	POTASUM	ppb	100	7	0	.			Potassium
A50	MAGNES	ppb	50	7	0	.			Magnesium
C76	PHOSPHA	ppb	1000	7	7 ***	.			Phosphate
H16	TC	ppb	1000	7	0	.			Total carbon
H18	FZINC	ppb	5	7	4	5000	EPAS		Zinc, filtered
H19	FCALCIU	ppb	50	7	0	.			Calcium, filtered
H25	FNICKEL	ppb	10	7	7 ***	.			Nickel, filtered
H26	FCOPPER	ppb	10	7	7 ***	1300	EPAP		Copper, filtered
H27	FVANADI	ppb	5	7	4	.			Vanadium, filtered
H28	FALUMIN	ppb	150	7	7 ***	.			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

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
H35	FSTRONT	ppb	20	7	0	.		Strontium, filtered
H36	FANTIMO	ppb	100	7	7 ***	.		Antimony, filtered
H66	BROMIDE	ppb	1000	7	7 ***	.		Bromide
H67	NITRITE	ppb	1000	7	7 ***	.		Nitrite
H86	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	60	7	7 ***	.		Titanium, filtered
H93	FZIRCON	ppb	50	7	7 ***	.		Zirconium, filtered
P01	BORON	ppb	10	7	0	.		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	60	7	7 ***	.		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 Standard	Agency Exceeded	Full name
A23	THALIUM	ppb	5	7	7 ***	.		Thallium
A24	THIOURA	ppb	200	7	7 ***	.		Thiourea
A25	ACETREA	ppb	200	7	7 ***	.		1-Acetyl-2-thiourea
A26	CHLOREA	ppb	200	7	7 ***	.		1-(o-Chlorophenyl) thiourea
A27	DIETROL	ppb	200	7	7 ***	.		Diethylstilbesterol
A28	ETHYREA	ppb	200	7	7 ***	.		Ethylenethiourea
A29	NAPHREA	ppb	200	7	7 ***	.		1-Naphthyl-2-thiourea
A32	PHENREA	ppb	500	7	7 ***	.		n-Phenylthiourea
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 ***	.		Kepone (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

TABLE 6.5. (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
A49	ENDO1	ppb	0.1	7	7 ***	.		Endosulfan I (alpha)
A52	ENDO2	ppb	0.1	7	7 ***	.		Endosulfan II (beta)
A54	AR1016	ppb	1	7	7 ***	0	EPAP	Arochlor 1016
A55	AR1221	ppb	1	7	7 ***	0	EPAP	Arochlor 1221
A56	AR1232	ppb	1	7	7 ***	0	EPAP	Arochlor 1232
A57	AR1242	ppb	1	7	7 ***	0	EPAP	Arochlor 1242
A58	AR1248	ppb	1	7	7 ***	0	EPAP	Arochlor 1248
A59	AR1254	ppb	1	7	7 ***	0	EPAP	Arochlor 1254
A60	AR1260	ppb	1	7	7 ***	0	EPAP	Arochlor 1260
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	5	.		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
A68	1,1,2-T	ppb	5	7	7 ***	.		1,1,2-Trichloroethane
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 ***	.		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	0	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	TRANDCE	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	5	.		Methylene chloride [Dichloromethane]
A94	DICPANE	ppb	5	7	7 ***	6	EPAP	1,2-Dichloropropane
A95	DICPENE	ppb	5	7	7 ***	.		1,3-Dichloropropene

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
A96	NNDIEHY	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	IODOMET	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-Tetrachlorethane
B06	1122-tc	ppb	5	7	7 ***	.		1,1,2,2-Tetrachlorethane
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	3000	7	7 ***	.		Acetonitrile
B20	ACETOPH	ppb	10	7	7 ***	.		Acetophenone
B21	WARFRIN	ppb	10	7	7 ***	.		Warfarin
B22	ACEFENE	ppb	10	7	7 ***	.		2-Acetylaminofluorene
B23	AMINOYL	ppb	10	7	7 ***	.		4-Aminobiphenyl
B24	AMIISOX	ppb	10	7	7 ***	.		5-(Aminomethyl)-3-isoxazolol
B25	AMITROL	ppb	10	7	7 ***	.		Amitrole
B26	ANILINE	ppb	10	7	7 ***	.		Aniline
B27	ARAMITE	ppb	10	7	7 ***	.		Aramite
B28	AURAMIN	ppb	10	7	7 ***	.		Auramine
B29	BENZCAC	ppb	10	7	7 ***	.		Benz[c]acridine
B30	BENZAAN	ppb	10	7	7 ***	.		Benz[a]anthracene
B31	BENDICM	ppb	10	7	7 ***	.		Benzene, dichloromethyl
B32	BENTHOL	ppb	10	7	7 ***	.		Benzenethiol
B33	BENDINE	ppb	10	7	7 ***	.		Benzidine
B34	BENZBFL	ppb	10	7	7 ***	.		Benzo[b]fluoranthene
B35	BENZJFL	ppb	10	7	7 ***	.		Benzo[j]fluoranthene
B36	PBENZQU	ppb	10	7	7 ***	.		p-Benzoquinone
B37	BENZCHL	ppb	10	7	7 ***	.		Benzyl chloride
B38	BIS2CHM	ppb	10	7	7 ***	.		Bis(2-chloroethoxy) methane
B39	BIS2CHE	ppb	10	7	7 ***	.		Bis(2-chloroethyl) ether
B40	BIS2EPH	ppb	10	7	7 ***	.		Bis(2-ethylhexyl) phthalate
B41	BROPHEN	ppb	10	7	7 ***	.		4-Bromophenyl phenyl ether
B42	BUTBENP	ppb	10	7	7 ***	.		Butyl benzyl phthalate
B43	BUTDINP	ppb	10	7	7 ***	.		2-sec-Butyl-4,6-dinitrophenol (DNBP)
B44	CHALETH	ppb	10	7	7 ***	.		Chloroalkyl ethers
B45	CHLANIL	ppb	10	7	7 ***	.		p-Chloroaniline
B46	CHLCRES	ppb	10	7	7 ***	.		p-Chloro-m-cresol
B47	CHLEPOX	ppb	10	7	7 ***	0	EPAP	1-Chloro-2,3-epoxypropane

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
B48	CHLNAPH	ppb	10	7	7 ***	.		2-Chloronaphthalene
B49	CHLPHEN	ppb	10	7	7 ***	.		2-Chlorophenol
B50	CHRYSEN	ppb	10	7	7 ***	.		Chrysene
B51	CRESOLS	ppb	10	7	7 ***	.		Cresols
B52	CYCHDIN	ppb	10	7	7 ***	.		2-Cyclohexyl-4,6-dinitrophenol
B53	DIBAHAC	ppb	10	7	7 ***	.		Dibenz[a,h]acridine
B54	DIBAJAC	ppb	10	7	7 ***	.		Dibenz[a,j]acridine
B55	DIBAHAN	ppb	10	7	7 ***	.		Dibenz[a,h]anthracene
B56	DIBCGCA	ppb	10	7	7 ***	.		7H-Dibenzo[c,g]carbazole
B57	DIBAEPY	ppb	10	7	7 ***	.		Dibenzo[a,e]pyrene
B58	DIBAHPY	ppb	10	7	7 ***	.		Dibenzo[a,h]pyrene
B59	DIBAIPY	ppb	10	7	7 ***	.		Dibenzo[a,i]pyrene
B60	DIBPHTH	ppb	10	7	7 ***	.		Di-n-butyl phthalate
B61	12-dben	ppb	10	7	7 ***	.		1,2-Dichlorobenzene
B62	13-dben	ppb	10	7	7 ***	.		1,3-Dichlorobenzene
B63	14-dben	ppb	10	7	7 ***	75	EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
B64	DICHBEN	ppb	20	7	7 ***	.		3,3'-Dichlorobenzidine
B65	24-dchp	ppb	10	7	7 ***	.		2,4-Dichlorophenol
B66	26-dchp	ppb	10	7	7 ***	.		2,6-Dichlorophenol
B67	DIEPHTH	ppb	10	7	7 ***	.		Diethyl phthalate
B68	DIHYSAF	ppb	10	7	7 ***	.		Dihydrosafrole
B69	DIMETHB	ppb	10	7	7 ***	.		3,3'-Dimethoxybenzidine
B70	DIMEAMB	ppb	10	7	7 ***	.		p-Dimethylaminoazobenzene
B71	DIMBENZ	ppb	10	7	7 ***	.		7,12-Dimethylbenz[a]anthracene
B72	DIMEYLB	ppb	10	7	7 ***	.		3,3'-Dimethylbenzidine
B73	THIONOX	ppb	10	7	7 ***	.		Thiofanox
B74	DIMPHAM	ppb	10	7	7 ***	.		alpha,alpha-Dimethylphenethylamine
B76	DIMPHTH	ppb	10	7	7 ***	.		Dimethyl phthalate
B77	DINBENZ	ppb	10	7	7 ***	.		Dinitrobenzene
B78	DINCRES	ppb	10	7	7 ***	.		4,6-Dinitro-o-cresol and salts
B79	DINPHEN	ppb	50	7	7 ***	.		2,4-Dinitrophenol
B80	24-dint	ppb	10	7	7 ***	.		2,4-Dinitrotoluene
B81	26-dint	ppb	10	7	7 ***	.		2,6-Dinitrotoluene
B82	DIOPHTH	ppb	10	7	7 ***	.		Di-n-octyl phthalate
B83	DIPHAMI	ppb	10	7	7 ***	.		Diphenylamine
B84	DIPHHYD	ppb	10	7	7 ***	.		1,2-Diphenylhydrazine
B85	DIPRNIT	ppb	10	7	7 ***	.		Di-n-propylnitrosamine
B86	ETHMINE	ppb	10	7	7 ***	.		Ethyleneimine
B87	ETHMETS	ppb	10	7	7 ***	.		Ethyl methanesulfonate
B88	FLUORAN	ppb	10	7	7 ***	.		Fluoranthene
B89	HEXCBEN	ppb	10	7	7 ***	.		Hexachlorobenzene
B90	HEXCBUT	ppb	10	7	7 ***	.		Hexachlorobutadiene
B91	HEXCCYC	ppb	10	7	7 ***	.		Hexachlorocyclopentadiene
B92	HEXCETH	ppb	10	7	7 ***	.		Hexachloroethane

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
B93	INDENOP	ppb	10	7	7 ***	.		Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	ppb	10	7	7 ***	.		Isosafrole
B95	MALOILE	ppb	10	7	7 ***	.		Malononitrile
B96	MELPHAL	ppb	10	7	7 ***	.		Melphalan
B97	METHAPY	ppb	10	7	7 ***	.		Methapyrilene
B98	METHNYL	ppb	10	7	7 ***	.		Metholonyl
B99	METAZIR	ppb	10	7	7 ***	.		2-Methylaziridine
C01	METCHAN	ppb	10	7	7 ***	.		3-Methylcholanthrene
C02	METBISC	ppb	10	7	7 ***	.		4,4'-Methylenebis(2-chloroaniline)
C03	METACTO	ppb	10	7	7 ***	.		2-Methyllactonitrile
C04	METACRY	ppb	10	7	7 ***	.		Methyl methacrylate
C05	METMSUL	ppb	10	7	7 ***	.		Methyl methanesulfonate
C06	METPROP	ppb	10	7	7 ***	.		2-Methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	ppb	10	7	7 ***	.		Methylthiouracil
C08	NAPHQUI	ppb	10	7	7 ***	.		1,4-Naphthoquinone
C09	1-napha	ppb	10	7	7 ***	.		1-Naphthylamine
C10	2-napha	ppb	10	7	7 ***	.		2-Naphthylamine
C11	NITRANI	ppb	50	7	7 ***	.		p-Nitroaniline
C12	NITBENZ	ppb	10	7	7 ***	.		Nitrobenzene
C13	NITPHEN	ppb	50	7	7 ***	.		4-Nitrophenol [p-Nitrophenol]
C14	NNIBUTY	ppb	10	7	7 ***	.		n-Nitrosodi-n-butylamine
C15	NNIDIEA	ppb	10	7	7 ***	.		n-Nitrosodiethanolamine
C16	NNIDIEY	ppb	10	7	7 ***	.		n-Nitrosodiethylamine
C17	NNIDIME	ppb	10	7	7 ***	.		n-Nitrosodimethylamine
C18	NNIMETH	ppb	10	7	7 ***	.		n-Nitrosomethylethylamine
C19	NNIURET	ppb	10	7	7 ***	.		n-Nitroso-n-methylurethane
C20	NNIVINY	ppb	10	7	7 ***	.		n-Nitrosomethylvinylamine
C21	NNIMORP	ppb	10	7	7 ***	.		n-Nitrosomorpholine
C22	NNINICO	ppb	10	7	7 ***	.		n-Nitrosonornicotine
C23	NNIPIPE	ppb	10	7	7 ***	.		n-Nitrosopiperidine
C24	NITRPYR	ppb	10	7	7 ***	.		Nitrosopyrrolidine
C25	NITRTOL	ppb	10	7	7 ***	.		5-Nitro-o-toluidine
C26	PENTCHB	ppb	10	7	7 ***	.		Pentachlorobenzene
C27	PENTCHN	ppb	10	7	7 ***	.		Pentachloronitrobenzene
C28	PENTCHP	ppb	50	7	7 ***	220	EPAP	Pentachlorophenol
C29	PHENTIN	ppb	10	7	7 ***	.		Phenacetin
C30	PHENINE	ppb	10	7	7 ***	.		Phenylenediamine
C31	PHTHEST	ppb	10	7	7 ***	.		Phthalic acid esters
C32	PICOLIN	ppb	10	7	7 ***	.		2-Picoline
C33	PRONIDE	ppb	10	7	7 ***	.		Pronamide
C34	RESERPI	ppb	10	7	7 ***	.		Reserpine
C35	RESORCI	ppb	10	7	7 ***	.		Resorcinol
C36	SAFROL	ppb	10	7	7 ***	.		Safrol
C37	TETRCHB	ppb	10	7	7 ***	.		1,2,4,5-Tetrachlorobenzene

TABLE 6.5. (contd)

Constituent List=WAC 173-303-9905 Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full name
C39	TETRCHP	ppb	10	7	7 ***	.		2,3,4,6-Tetrachlorophenol
C40	THIURAM	ppb	10	7	7 ***	.		Thiuram
C41	TOLUDIA	ppb	10	7	7 ***	.		Toluenediamine
C42	OTOLHYD	ppb	10	7	7 ***	.		o-Toluidine hydrochloride
C43	TRICHLB	ppb	10	7	7 ***	.		1,2,4-Trichlorobenzene
C44	245-trp	ppb	50	7	7 ***	.		2,4,5-Trichlorophenol
C45	246-trp	ppb	10	7	7 ***	.		2,4,6-Trichlorophenol
C46	TRIPHOS	ppb	10	7	7 ***	.		O,o,o-triethyl phosphorothioate
C47	SYMTRIN	ppb	10	7	7 ***	.		Sym-trinitrobenzene
C48	TRISPHO	ppb	10	7	7 ***	.		Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	ppb	10	7	7 ***	.		Benzo[a]pyrene
C50	CHLNAPZ	ppb	10	7	7 ***	.		Chlornaphazine
C51	BIS2ETH	ppb	10	7	7 ***	.		Bis(2-chloroisopropyl) ether
C52	HEXAENE	ppb	10	7	7 ***	.		Hexachloropropene
C54	HEXACHL	ppb	10	7	7 ***	.		Hexachlorophene
C55	NAPHTHA	ppb	10	7	7 ***	.		Naphthalene
C56	123TRI	ppb	10	7	7 ***	.		1,2,3-Trichlorobenzene
C58	135TRI	ppb	10	7	7 ***	.		1,3,5-Trichlorobenzene
C59	1234TE	ppb	10	7	7 ***	.		1,2,3,4-Tetrachlorobenzene
C60	1235TE	ppb	10	7	7 ***	.		1,2,3,5-Tetrachlorobenzene
C61	TETEPYR	ppb	2	7	7 ***	.		Tetraethylpyrophosphate
C62	CHLLATE	ppb	300	7	7 ***	.		Chlorobenzilate
C63	CARBPHT	ppb	2	7	7 ***	.		Carbophenothion
C64	DISULFO	ppb	2	7	7 ***	.		Disulfoton
C65	DIMETHO	ppb	2	7	7 ***	.		Dimethoate
C66	METHPAR	ppb	2	7	7 ***	.		Methyl parathion
C67	PARATHI	ppb	2	7	7 ***	.		Parathion
C70	CYANIDE	ppb	10	7	7 ***	.		Cyanide
C71	FORMALN	ppb	500	7	7 ***	.		Formalin
C78	SULFIDE	ppb	1000	7	6	.		Sulfide
C79	KEROSEN	ppb	10000	7	7 ***	.		Kerosene
C80	AMMONIU	ppb	50	7	7 ***	.		Ammonium ion
C87	CITRUSR	ppb	1000	7	7 ***	.		Citrus red
C90	PARALDE	ppb	10000	7	7 ***	.		Paraldehyde
C91	STRYCHN	ppb	50	7	7 ***	.		Strychnine
C92	MALHYDR	ppb	500	7	7 ***	.		Maleic hydrazide
C93	NICOTIN	ppb	100	7	7 ***	.		Nicotinic acid
C94	ACRYIDE	ppb	10000	7	7 ***	0	EPAP	Acrylamide
C95	ALLYLAL	ppb	10000	7	7 ***	.		Allyl alcohol
C98	CHLPROP	ppb	10000	7	7 ***	.		3-Chloropropionitrile
D01	PCDDs	ppb	0.01	7	7 ***	.		PCDDs
D02	PCDFs	ppb	0.01	7	7 ***	.		PCDFs
D03	2378TCD	ppb	0.01	7	7 ***	.		2,3,7,8-TCDD [Dioxin]
H03	ETHCARB	ppb	10000	7	7 ***	.		Ethyl carbamate

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
H04	ETHCYAN	ppb	10000	7	7 ***	.		Ethyl cyanide
H05	ETHOXID	ppb	10	7	7 ***	.		Ethylene oxide
H08	ETHMETH	ppb	10	7	7 ***	.		Ethyl methacrylate
H09	ISOBUTY	ppb	10000	7	7 ***	.		Isobutyl alcohol
H11	PROPYLA	ppb	10000	7	7 ***	.		n-Propylamine
H12	PROPYNO	ppb	10000	7	7 ***	.		2-Propyn-1-ol
H15	2,4,5-T	ppb	2	7	7 ***	.		2,4,5-T
H40	FTHALLI	ppb	5	7	7 ***	.		Thallium, filtered
H68	HEXONE	ppb	10	7	7 ***	.		Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	7	7 ***	.		Acetone by VOA
I06	ISOPHER	ppb	10	7	7 ***	.		Isopherone
I09	BUTANOL	ppb	10000	7	7 ***	.		1-Butanol
I21	TRIBUPH	ppb	10	7	7 ***	.		Tributylphosphoric acid
I28	TAF	ppb	10	7	7 ***	.		Tetrahydorfuran
I29	ACENAPH	ppb	10	7	7 ***	.		Acenaphthene
I30	FLRENE	ppb	10	7	7 ***	.		Fluorene
I31	ANTHRA	ppb	10	7	7 ***	.		Anthracene
I32	PYRENE	ppb	10	7	7 ***	.		Pyrene
I33	ETHBENZ	ppb	5	7	7 ***	880	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
I64	2NITPH	ppb	10	7	7 ***	.		2-Nitrophenol [o-Nitrophenol]
I67	ETHANOL	ppb	10000	7	7 ***	.		Ethanol
I75	2MENAPH	ppb	10	7	7 ***	.		2-Methylnaphthalene
I82	PHENANT	ppb	10	7	7 ***	.		Phenanthrene
I99	UNKNOWN	ppb	0	2	0	.		Unknown
J43	BENZALC	ppb	10	7	7 ***	.		Benzyl alcohol
J69	2HEXANO	ppb	50	7	7 ***	.		2-Hexanone
J71	BNZKFLU	ppb	10	7	7 ***	.		Benzo (k) fluoranthene
J83	BGHIPER	ppb	10	7	7 ***	.		Benzo (ghi) perylene
J89	DINOSEB	ppb	10	7	7 ***	.		Dinoseb
J91	DIALLAT	ppb	10	7	7 ***	.		Diallate
K52	NNDIPHA	ppb	10	7	7 ***	.		n-Nitrosodiphenylamine
K56	DIBENFR	ppb	10	7	7 ***	.		Dibenzofuran
K58	ACENATL	ppb	10	7	7 ***	.		Acenaphthylene
L20	MBP	ppb	10000	7	7 ***	.		Monobutylphosphate
L21	DBP	ppb	10000	7	7 ***	.		Dibutylphosphate
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
L50	B2CLMEE	ppb	10	7	7 ***	.		bis(2-Chloro-1-methylethyl)ether
L52	DIPHOS	ppb	10	7	7 ***	.		O,O-Diethyl-O,2-pyrazinyl phosphorothion

TABLE 6.5. (contd)

Constituent List=WAC 173-303-9906 Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full name
L53	ISODRIN	ppb	10	7	7 ***	.		Isodrin
L54	ONITANI	ppb	10	7	7 ***	.		o-Nitroaniline
L56	MNITANI	ppb	10	7	7 ***	.		m-Nitroaniline
L58	4NITQUI	ppb	10	7	7 ***	.		4-Nitroquinoline 1-oxide
L57	ETHGLYC	ppb	10000	7	7 ***	.		Ethylene glycol
L59	1PROPAN	ppb	10000	7	7 ***	.		1-Propanol
L60	1BUTYN	ppb	10000	7	7 ***	.		1-Butynol
L62	ACETON	ppb	10	7	7 ***	.		Acetone by ABN
L63	14DBEN	ppb	5	7	7 ***	75	EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
L64	CHLROB	ppb	10	7	7 ***	.		Chlorobenzene (by ABN)
L66	UNKC6	ppb	.	1	0	.		Unknown aliphatic substituted cyclohexan
L79	CYCSILX	ppb	.	1	0	.		Cyclotetrasiloxane, octamethyl
P12	ENDSFAN	ppb	0.5	7	7 ***	.		Endosulfan
P13	PHORATE	ppb	2	7	7 ***	.		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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given 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 March 1989 through May 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-2	09MAR89		212	192	8.00	8.00	#200	#5
		1	211	192	8.00	8.00	#300	#3
		2	211	192	8.00	8.10	#200	#3
		3	211	191	8.00	8.00	#200	#5
1-N-3	09MAR89		607	561	7.50	7.40	#400	#8
		1	607	554	7.50	7.40	#400	#4
		2	607	563	7.50	7.40	#300	#7
		3	606	563	7.50	7.40	#300	#8
1-N-4	09MAR89		204	188	7.90	7.70	#300	4,690[a]
		1	204	192	7.90	7.70	#300	5,000[a]
		2	204	192	7.90	7.60	#300	5,190[a]
		3	204	191	7.90	7.70	#300	5,140[a]
1-N-14	09MAR89		223	197	8.30	8.20	#200	#4
		1	222	199	8.30	8.20	#200	#5
		2	222	199	8.30	8.20	#200	#5
		3	221	200	8.30	8.20	#200	#4
1-N-66	08MAR89		161	148	8.23	8.30	#400	#4
		1	160	147	8.27	8.30	#400	#4
		2	161	146	8.28	8.40	#400	#4
		3	160	148	8.27	8.30	#300	10
1-N-67	08MAR89		312	295	7.56	7.70	#300	#3
		1	308	292	7.67	7.70	#300	#1
		2	309	282	7.63	7.70	#200	#3
		3	310	291	7.66	7.60	#200	#1
1-N-69	08MAR89		196	188	8.50	8.50	#200	#4
		1	195	184	8.51	8.60	#200	#6
		2	195	185	8.47	8.60	#200	#2
		3	196	184	8.48	8.60	#300	#5

TABLE 6.6. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ALPHAHI pCi/L 4/15	BARIUM ppb 6/1000	FBARIUM ppb 6/1000	BETA pCi/L 8/50	BORON ppb 10/.	FBORON ppb 10/.	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLFORM ppb 5/100
1-N-2	09MAR89		*0.5140	20	20	4,180.0	14	14	28,500	27,600	#3
1-N-3	09MAR89		*1.1900	100	103	2,820.0	14	14	87,100	83,000	5
1-N-4	09MAR89		0.9990	24	19	40.9	28	27	28,000	28,800	#3
1-N-14	09MAR89		*-0.1860	15	16	1,080.0	15	14	28,200	26,300	#3
1-N-66	08MAR89		*-0.3370	13	13	36.0	33	30	21,800	23,500	#4
1-N-67	08MAR89		*-0.0062	35	37	39,000.0	14	15	43,800	42,200	#2
1-N-69	08MAR89		*-0.2730	24	23	18.4	13	14	26,100	27,000	#3

Well name	Collection Date	Duplicate sample number	CHLORID ppb 500/250000s	CO-60 pCi/L 22.5/100r	CS-137 pCi/L 20/200r	CYCSILX ppb ./.	IRON ppb 30/300s	FIRON ppb 30/300s	MAGNES ppb 50/.	FMAGNES ppb 50/.
1-N-2	09MAR89		900	57.0	*0.662	.	82	<30	4,970	5,010
1-N-3	09MAR89		5,700	24.0	*-4.880	.	390	32	14,200	15,100
1-N-4	09MAR89		2,600	32.7	*-7.280	.	1270	<30	5,210	5,000
1-N-14	09MAR89		700	47.3	*-6.140	60	81	<30	4,530	4,800
1-N-66	08MAR89		900	25.6	*0.373	.	48	<30	3,900	3,690
1-N-67	08MAR89		1,100	36.4	*-3.370	.	<30	<30	6,780	7,140
1-N-69	08MAR89		900	28.1	*5.660	.	87	<3C	5,700	5,590

Well name	Collection Date	Duplicate sample number	MANGESE ppb 5/50s	METHONE ppb 10/.	METHYCH ppb 5/.	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
1-N-2	09MAR89		<5	<10	<5	<10	30,700	1,630	1,680	*0.00400	*14.80
1-N-3	09MAR89		26	<10	<5	<10	23,400	3,340	3,180	0.17100	*-44.90
1-N-4	09MAR89		47	<10	<5	<10	18,600	2,790	2,950	0.17600	*4.62
1-N-14	09MAR89		<5	<10	<5	<10	30,900	1,860	1,830	*0.06530	*-4.18
1-N-66	08MAR89		<5	<10	<5	<10	8,600	2,220	2,340	*0.05350	*-67.70
1-N-67	08MAR89		<5	#3	#2	<10	87,900	1,690	1,650	*0.00057	*-20.10
1-N-69	08MAR89		<5	#3	#3	11	30,300	2,110	2,150	*0.12300	*23.20

Well name	Collection Date	Duplicate sample number	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONUM ppb 20/.	SULFATE ppb 500/250000s	SULFIDE ppb 1000/.
1-N-2	09MAR89		7,330	7,210	2,880	2,870	2,550.0	130	129	9,700	<1000
1-N-3	09MAR89		10,600	10,000	16,300	16,900	2,640.0	386	363	180,000	1350
1-N-4	09MAR89		11,300	11,900	3,980	3,820	9.3	140	148	12,700	<1000
1-N-14	09MAR89		7,830	7,350	3,420	3,580	1,040.0	152	145	8,800	<1000
1-N-66	08MAR89		9,270	9,930	2,980	2,820	*0.6	108	116	12,400	<1000
1-N-67	08MAR89		7,310	7,290	3,300	3,360	23,400.0	188	180	11,900	<1000
1-N-69	08MAR89		7,900	8,020	2,960	2,890	*0.7	179	184	9,900	<1000

TABLE 6.6. (contd)

Well name	Collection Date	Duplicate sample number	TC ppb 1000/.	TRITIUM pCi/L 500/20000	U pCi/L 0.5/600d	UNKC8 ppb ./.	UNKNOWN ppb 0/.	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
1-N-2	09MAR89		14,800	95,600	0.298	.	.	<5	<5	10	<5
1-N-3	09MAR89		22,200	47,100	0.824	.	.	<5	<5	9	31
1-N-4	09MAR89		16,500	88,900	0.760	.	.	10	11	33	9
1-N-14	09MAR89		15,000	93,100	0.289	21	28(b)	7	<5	18	6
	09MAR89	1	.	.	.	.	18(b)	.	.	.	.
1-N-66	08MAR89		13,700	52,400	0.391	.	.	12	8	5	<5
1-N-67	08MAR89		16,000	77,300	0.369	.	.	<5	<5	<5	<5
1-N-69	08MAR89		14,400	85,100	0.312	.	.	<5	<5	25	<5

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

Suffix
none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
w - based on additional Secondary Maximum Contaminant Levels given 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. Inconsistent with trends and not validated by next sample analyzed.

(b) Unknown semivolatile constituent found during analyses.

TABLE 6.7. Critical Means Used to Compare March 1989 Samples at the 1301-N Liquid Waste Disposal Facility

Constituent	N	df	tc[a]	Background Average	Standard Deviation	Critical Mean
Conductivity, field, μmho/cm	6	5	7.388	216	43.2	560.7
pH, field	6	5	8.567	7.60	0.95	-1.19, 16.39
Total organic carbon, ppb	4	3	14.479	345.8	157.3	2,892.2
Total organic halogen (lower detection limit), ppb	4	3	14.479	5.0	1.28	25.7

(a) tc given for appropriate df and 28 comparisons (7 wells * 4 parameters).
N = number of samples.
df = degrees of freedom.
tc = critical values for Bonferroni t-test.

TABLE 6.8. Contamination Indicator Parameter Replicate Averages for the 1301-N Liquid Waste Disposal Facility March through May 1989

Constituent Code	Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088	CONDLAB	umho	1-N-2	09MAR89	4	192	0.50	191	192	0.3
			1-N-3	09MAR89	4	560	4.27	554	563	0.8
			1-N-4	09MAR89	4	191	1.89	188	192	1.0
			1-N-14	09MAR89	4	199	1.26	197	200	0.6
			1-N-66	08MAR89	4	147	0.96	146	148	0.7
			1-N-67	08MAR89	4	290	5.60	282	295	1.9
			1-N-69	08MAR89	4	185	1.89	184	188	1.0
191	CONDFLD	umho	1-N-2	09MAR89	4	211	0.5	211	212	0.2
			1-N-3	09MAR89	4	607	0.5	606	607	0.1
			1-N-4	09MAR89	4	204	0	204	204	0.0
			1-N-14	09MAR89	4	222	0.8	221	223	0.4
			1-N-66	08MAR89	4	161	0.6	160	161	0.4
			1-N-67	08MAR89	4	310	1.7	308	312	0.6
			1-N-69	08MAR89	4	196	0.6	195	196	0.3
199	PHFIELD		1-N-2	09MAR89	4	8.03	0.05	8.0	8.1	0.6
			1-N-3	09MAR89	4	7.40	0	7.4	7.4	0.0
			1-N-4	09MAR89	4	7.68	0.05	7.6	7.7	0.7
			1-N-14	09MAR89	4	8.20	0	8.2	8.2	0.0
			1-N-66	08MAR89	4	8.33	0.05	8.3	8.4	0.6
			1-N-67	08MAR89	4	7.68	0.05	7.6	7.7	0.7
			1-N-69	08MAR89	4	8.58	0.05	8.5	8.6	0.6
207	PH-LAB		1-N-2	09MAR89	4	8.00	0	8.00	8.00	0.0
			1-N-3	09MAR89	4	7.50	0	7.50	7.50	0.0
			1-N-4	09MAR89	4	7.90	0	7.90	7.90	0.0
			1-N-14	09MAR89	4	8.30	0	8.30	8.30	0.0
			1-N-66	08MAR89	4	8.26	0.02	8.23	8.28	0.3
			1-N-67	08MAR89	4	7.63	0.05	7.56	7.67	0.7
			1-N-69	08MAR89	4	8.49	0.02	8.47	8.51	0.2
C69	TOC	ppb	1-N-2	09MAR89	4	225	50.0	200	300	22.2
			1-N-3	09MAR89	4	350	57.7	300	400	16.5
			1-N-4	09MAR89	4	300	0	300	300	0.0
			1-N-14	09MAR89	4	200	0	200	200	0.0
			1-N-66	08MAR89	4	375	50.0	300	400	13.3
			1-N-67	08MAR89	4	250	57.7	200	300	23.1
			1-N-69	08MAR89	4	225	50.0	200	300	22.2
H42	TOXLDL	ppb	1-N-2	09MAR89	4	4.0	1.15	3	5	28.9
			1-N-3	09MAR89	4	6.3	1.71	4	8	27.3
			1-N-4	09MAR89	4	5,005.0[a]	225.00	4,690[a]	5,190[a]	4.5
			1-N-14	09MAR89	4	4.5	0.58	4	5	12.8
			1-N-66	08MAR89	4	5.5	3.00	4	10	54.5
			1-N-67	08MAR89	4	2.0	1.15	1	3	57.7
			1-N-69	08MAR89	4	4.3	1.71	2	6	40.2

(a) Data suspect. Inconsistent with trends and not validated by next sample analyzed.

THIS PAGE INTENTIONALLY
LEFT BLANK

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

T. J. Gilmore

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 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 Surface Impoundment was in service from May 1986 to November 1988, and was then 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. The 1324-NA pond is currently receiving treated wastes from an elementary neutralization vessel that replaced the 1324-N facility. The facilities are located in the 100-N Area approximately 1300 ft east of the Columbia River (see Figure 7.1).

Waste products resulting from the regeneration of anion and cation exchange columns are treated in the elementary neutralization vessel and discharged to the 1324-NA percolation pond. The exchange columns are used to demineralize Columbia River water for use in the N Reactor cooling system. Before neutralization and discharge to the 1324-NA pond, the waste streams range in pH from 1.0 to 14.0, depending on the type of regeneration. When the pH of this waste is less than or equal to 2.0 or greater than or equal to 12.5, the waste is defined as corrosive [40 CFR 261.22(a)(2) and WAC 173-303-090(6)(a)(i)].

There are 5 original ground-water monitoring wells and an additional 13 quality assessment ground-water wells in the 1324-N/NA ground-water

9 0 1 1 7 7 1 1 4 9 9

monitoring network (Figure 7.1). (These 13 wells are also used in the assessment of the 1301-N LWDF.) 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.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or hydrogeologic characterization work (other than water levels) 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 effluent 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 49 wells in April, May, and June. 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 water-table elevations from April show the characteristic ground-water mound under the 1324-N/NA facilities (PNL 1988c, 1988d; Fruland, Bates, and Lundgren 1989b; Smith, Bates, and Lundgren 1989). In May and June the ground-water mound under the 1324-N/NA facility decreased and was obscured by the larger ground-water mound developed under the nearby 1325-N LWDF (see Section 8.0, on 1325-N LWDF).

WATER CHEMISTRY DATA

Ground-water samples were obtained from wells 199-N-54, 199-N-55, 199-N-56, and 199-N-57 in June 1989. These wells are all part of the ground-water quality assessment monitoring network and were sampled for the constituents listed in Table 7.1. The short list of constituents is shown in Table 7.2. Containment vessels for purge waters are available only at these

9 0 1 1 7 7 1 4 9 5

wells, and consequently they were the only wells in the network that could be sampled in June. The logistics of ordering and placing troughs at the wells to contain these purge waters delayed the sampling schedule 3 months. A revised sampling schedule is presented in Table 7.3. The analytical results from the June sampling will be presented in the next quarterly report.

INDICATOR PARAMETER SAMPLING RESULTS

The analytical results from the sampling conducted in March 1989 were received this quarter and are presented in Tables 7.4 and 7.5. Five wells were sampled in March for the 1324-N/NA ground-water monitoring project. Currently, background data for contamination indicator parameters consist of

- March 1988 - 1 pH, 1 conductivity, 1 TOC, 1 TOXLDL
- June 1988 - 4 pH, 4 conductivity, 4 TOC, 4 TOXLDL
- September 1988 - 4 pH, 4 conductivity, 4 TOC, 4 TOXLDL
- December 1988 - 4 pH, 4 conductivity, 4 TOC, 4 TOXLDL.

Data from the first two samplings in December 1987 and March 1988 lacked the quadruplicate samples required to establish the background conditions. The indicator parameter data were updated in December 1988 as more quadruplicate sample data were obtained. In March 1989, however, the critical means for specific conductance were exceeded, and the new quadruplicate data collected in March were not used to update the quadruplicate sample data base. Table 7.6 lists the average background, standard deviation, and critical mean for the four contamination indicator parameters. The critical mean is the value to which analytical results are compared. If a parameter is greater than (or less than in the case of pH) its critical mean, that measurement is considered statistically different from background. These values were determined following the recommended techniques in Appendix B of the TEGD (EPA 1986a). Some of these critical mean values are outside the range that would be reasonably anticipated.

Table 7.7 presents the replicate averages for the March 1989 samples to be compared to the critical means. The 1324-N/NA project is currently a ground-water quality assessment program for conductivity as a result of

above-background specific conductance values in wells 199-N-58, 199-N-59, 199-N-60, and 199-N-61 in March 1989. Specific conductance in these wells ranged from a low of 1127 μmho/cm in well 199-N-61 to a high of 2275 μmho/cm in well 199-N-58. The critical mean for specific conductance is 910.6 μmho/cm. Because it was obvious from historical data that these high specific conductance values were representative of ground-water conditions and not due to analytical error, the wells were not resampled for verification. No other indicator parameter exceeded the critical means in the March 1989 sampling. The indicator parameter pH, however, was lower than the U.S. Environmental Protection Agency (EPA) range of 6.5 to 8.5 in well 199-N-59 as determined in the laboratory (Table 7.5). This was not consistent with the field pH measurements, which were within the range.

Ground-Water Analyses Other Than Indicator Parameters

In addition to the indicator parameters, constituents and parameters on the comprehensive WAC 173-303-9905 list were analyzed in March. Of these, drinking water standards for iron, manganese, and sulfate were exceeded (Tables 7.4 and 7.5). Iron (311 ppb) exceeded the secondary drinking water standard of 300 ppb in well 699-81-58 in the unfiltered sample. Manganese in unfiltered samples from well 199-N-59 also exceeded the secondary drinking water standard of 50 ppb. Manganese in filtered samples ranged from less than 5 ppb to 195 ppb for the same samples. These data suggest that particulates in the unfiltered samples are likely responsible for the higher concentrations of both iron and manganese. Sulfate exceeded the secondary drinking water standard of 250,000 ppb in wells 199-N-58, 199-N-59, 199-N-60, and 199-N-61. The highest sulfate concentrations were in well 199-N-58 at 1,180,000 ppb.

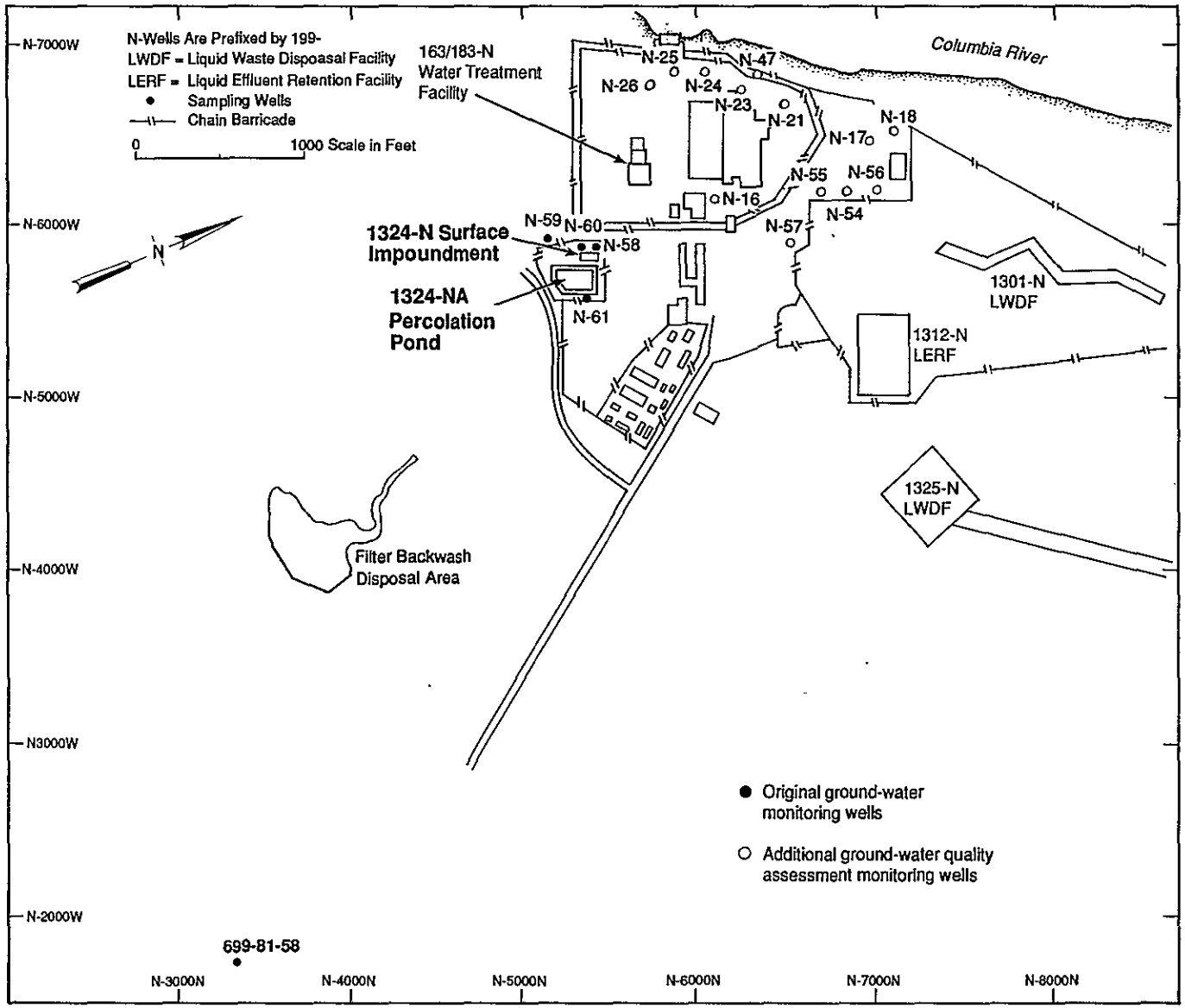


FIGURE 7.1. Monitoring Well Locations for the 1324-N/NA Facilities

TABLE 7.1. The Regular Sampling List for the 1301-N Ground-Water Quality Assessment Monitoring Network

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

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

Turbidity
Metals Analyzed by the Inductively Coupled Argon Plasma Method
Arsenic
Selenium
Lead
Mercury
Alkalinity
Anions
pH
Specific Conductance

TABLE 7.3. Revised Sampling Schedule for the 1324-N/NA Project

Well	1988			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
*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

L = long sample list (WAC 173-303-9905).
S = sampled for the short list (Table 7.1).
X = sampled for the regular list of constituents (Table 7.2).
* = data also used in the 1301-N Project.

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

Constituent List=Contamination Indicator Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
088	CONDLAB	umho	.	20	0	700	WDOE	xxx	Specific conductance, laboratory
191	CONDFLD	umho	1	20	0	700	WDOE	xxx	Specific conductance, field
199	PHFIELD		0.1	20	0	6.5-8.5	EPAS		pH, field
207	PH-LAB		0.01	20	0	6.5-8.5	EPAS	xxx	pH, laboratory
C69	TOC	ppb	2000	20	4	.			Total organic carbon
H42	TOXLDL	ppb	10	20	0	.			Total organic halogens, low DL

Constituent List=Interim Primary Drinking Water Parameters

Code	Constituent 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	6	0	50	EPA		Gross beta
112	ALPHAHI	pCi/L	4	6	0	15	EPA		Gross alpha, high DL
181	RADIUM	pCi/L	1	6	0	5	EPA		Radium, total
A06	BARIUM	ppb	6	6	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	6	6 ***	10	EPA		Cadmium
A08	CHROMUM	ppb	10	6	4	50	EPA		Chromium
A10	SILVER	ppb	10	6	6 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	6	5	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	5	5 ***	2	EPA		Mercury
A22	SELENUM	ppb	5	6	6 ***	10	EPA		Selenium
A33	ENDRIN	ppb	0.1	6	6 ***	0.2	EPA		Endrin
A34	METHLOR	ppb	3	6	6 ***	100	EPA		Methoxychlor
A35	TOXAENE	ppb	1	6	6 ***	5	EPA		Toxaphene
A36	a-BHC	ppb	0.1	6	6 ***	4	EPA		Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	6	6 ***	4	EPA		Lindane, beta-BHC
A38	g-BHC	ppb	0.1	6	6 ***	4	EPA		Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	6	6 ***	4	EPA		Lindane, delta-BHC
A51	LEADGF	ppb	5	6	6 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	ppb	500	6	0	45000	EPA		Nitrate
C74	FLUORID	ppb	500	6	5	4000	EPA		Fluoride
H13	2,4-D	ppb	2	6	6 ***	100	EPA		2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	6	6 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	ppb	6	6	0	1000	EPA		Barium, filtered
H21	FCADMIU	ppb	2	6	6 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	ppb	10	6	5	50	EPA		Chromium, filtered
H23	FSILVER	ppb	10	6	6 ***	50	EPA		Silver, filtered
H37	FARSENI	ppb	5	6	6 ***	50	EPA		Arsenic, filtered
H38	FMERCUR	ppb	0.1	5	5 ***	2	EPA		Mercury, filtered
H39	FSELENI	ppb	5	6	6 ***	10	EPA		Selenium, filtered
H41	FLEAD	ppb	5	6	6 ***	50	EPA		Lead, filtered

TABLE 7.4 (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	6	0	.			Sodium
A17	MANGESE	ppb	5	6	1	50	EPAS	xxx	Manganese
A19	IRON	ppb	30	6	2	300	EPAS	xxx	Iron
C57	PHENOL	ppb	10	6	6 ***	.			Phenol
C73	SULFATE	ppb	500	6	0	250000	EPAS	xxx	Sulfate
C75	CHLORID	ppb	500	6	0	250000	EPAS		Chloride
H24	FSODIUM	ppb	200	6	0	.			Sodium, filtered
H29	FMANGAN	ppb	5	6	3	50	EPAS	xxx	Manganese, filtered
H31	FIRON	ppb	30	6	6 ***	300	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
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	6	0	600	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	6	5	.			Beryllium
A03	STRONUM	ppb	20	6	0	.			Strontium
A04	ZINC	ppb	5	6	4	5000	EPAS		Zinc
A05	CALCIUM	ppb	50	6	0	.			Calcium
A12	NICKEL	ppb	10	6	6 ***	.			Nickel
A13	COPPER	ppb	10	6	6 ***	1300	EPAP		Copper
A14	VANADUM	ppb	5	6	5	.			Vanadium
A15	ANTIONY	ppb	100	6	6 ***	.			Antimony
A16	ALUMNUM	ppb	150	6	4	.			Aluminum
A18	POTASUM	ppb	100	6	0	.			Potassium
A50	MAGNES	ppb	50	6	0	.			Magnesium
C76	PHOSPHA	ppb	1000	6	6 ***	.			Phosphate
H18	FZINC	ppb	5	6	4	5000	EPAS		Zinc, filtered
H19	FCALCIU	ppb	50	6	0	.			Calcium, filtered
H25	FNICKEL	ppb	10	6	6 ***	.			Nickel, filtered
H26	FCOPPER	ppb	10	6	6 ***	1300	EPAP		Copper, filtered
H27	FVANADI	ppb	5	6	5	.			Vanadium, filtered
H28	FALUMIN	ppb	150	6	4	.			Aluminum, filtered
H30	FPOTASS	ppb	100	6	0	.			Potassium, filtered
H32	FMAGNES	ppb	50	6	0	.			Magnesium, filtered
H33	FBERYLL	ppb	5	6	6 ***	.			Beryllium, filtered
H35	FSTRONT	ppb	20	6	0	.			Strontium, filtered

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
H36	FANTIMO	ppb	100	6	6 ***	.		Antimony, filtered
H66	BROMIDE	ppb	1000	6	6 ***	.		Bromide
H67	NITRITE	ppb	1000	6	6 ***	.		Nitrite
H86	FBORON	ppb	10	6	1	.		Boron, filtered
H87	FCOBALT	ppb	20	6	6 ***	.		Cobalt, filtered
H88	FLITHIU	ppb	10	6	6 ***	.		Lithium, filtered
H89	FMOLY	ppb	40	6	6 ***	.		Molybdenum, filtered
H90	FSILICO	ppb	50	6	0	.		Silicon, filtered
H91	FTIN	ppb	30	6	6 ***	.		Tin, filtered
H92	FTITAN	ppb	60	6	6 ***	.		Titanium, filtered
H93	FZIRCON	ppb	50	6	6 ***	.		Zirconium, filtered
P01	BORON	ppb	10	6	1	.		Boron
P02	COBALT	ppb	20	6	6 ***	.		Cobalt
P03	LITHIUM	ppb	10	6	6 ***	.		Lithium
P04	MOLY	ppb	40	6	6 ***	.		Molybdenum
P05	SILICON	ppb	50	6	0	.		Silicon
P06	TIN	ppb	30	6	6 ***	.		Tin
P07	TITAN	ppb	60	6	6 ***	.		Titanium
P08	ZIRCON	ppb	50	6	6 ***	.		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	6	6 ***	.		Thallium
A24	THIOURA	ppb	200	6	6 ***	.		Thiourea
A25	ACETREA	ppb	200	6	6 ***	.		1-Acetyl-2-thiourea
A26	CHLOREA	ppb	200	6	6 ***	.		1-(o-Chlorophenyl) thiourea
A27	DIETROL	ppb	200	6	6 ***	.		Diethylstilbesterol
A28	ETHYREA	ppb	200	6	6 ***	.		Ethylenethiourea
A29	NAPHREA	ppb	200	6	6 ***	.		1-Naphthyl-2-thiourea
A32	PHENREA	ppb	500	6	6 ***	.		n-Phenylthiourea
A40	DDD	ppb	0.1	6	6 ***	.		DDD
A41	DDE	ppb	0.1	6	6 ***	.		DDE
A42	DDT	ppb	0.1	6	6 ***	.		DDT
A43	HEPTLOR	ppb	0.1	6	6 ***	0	EPAP	Heptachlor
A44	HEPTIDE	ppb	0.1	6	6 ***	0	EPAP	Heptachlor epoxide
A45	KEPONE	ppb	1	6	6 ***	.		Kepone (discontinued)
A46	DIELRIN	ppb	0.1	6	6 ***	.		Dieldrin
A47	ALDRIN	ppb	0.1	6	6 ***	.		Aldrin
A48	CHLOANE	ppb	1	6	6 ***	0	EPAP	Chlordane
A49	ENDO1	ppb	0.1	6	6 ***	.		Endosulfan I (alpha)
A52	ENDO2	ppb	0.1	6	6 ***	.		Endosulfan II (beta)

TABLE 7.4. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency Exceeded	Full name
A54	AR1016	ppb	1	6	6 ***	0	EPAP	Arochlor 1016
A55	AR1221	ppb	1	6	6 ***	0	EPAP	Arochlor 1221
A56	AR1232	ppb	1	6	6 ***	0	EPAP	Arochlor 1232
A57	AR1242	ppb	1	6	6 ***	0	EPAP	Arochlor 1242
A58	AR1248	ppb	1	6	6 ***	0	EPAP	Arochlor 1248
A59	AR1254	ppb	1	6	6 ***	0	EPAP	Arochlor 1254
A60	AR1260	ppb	1	6	6 ***	0	EPAP	Arochlor 1260
A61	TETRANE	ppb	5	6	6 ***	5	EPA	Tetrachloromethane [Carbon Tetrachloride
A62	BENZENE	ppb	5	6	6 ***	5	EPA	Benzene
A63	DIOXANE	ppb	500	6	6 ***	.		Dioxane
A64	METHONE	ppb	10	6	6 ***	.		Methyl ethyl ketone
A65	PYRIDIN	ppb	500	6	6 ***	.		Pyridine
A66	TOLUENE	ppb	5	6	6 ***	2000	EPAP	Toluene
A67	1,1,1-T	ppb	5	6	6 ***	200	EPA	1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	6	6 ***	.		1,1,2-Trichloroethane
A69	TRICENE	ppb	5	6	6 ***	5	EPA	Trichloroethylene [1,1,2-Trichloroethene
A70	PERCENE	ppb	5	6	6 ***	.		Perchloroethylene [Tetrachloroethene]
A71	OPXYLE	ppb	5	6	6 ***	440	EPAP	Xylene-o,p
A72	ACROLIN	ppb	10	6	6 ***	.		Acrolein
A73	ACRYILE	ppb	10	6	6 ***	.		Acrylonitrile
A74	BISTHER	ppb	5	6	6 ***	.		Bis(chloromethyl) ether
A75	BROMONE	ppb	5	6	6 ***	.		Bromoacetone
A76	METHBRO	ppb	10	6	6 ***	.		Methyl bromide
A77	CARBIDE	ppb	10	6	6 ***	.		Carbon disulfide
A78	CHLBENZ	ppb	5	6	6 ***	60	EPAP	Chlorobenzene
A79	CHLTHER	ppb	5	6	6 ***	.		2-Chloroethyl vinyl ether
A80	CHLFORM	ppb	5	6	1	100	EPA	Chloroform [Trichloromethane]
A81	METHCHL	ppb	10	6	6 ***	.		Methyl chloride [Chloromethane]
A82	CHMTHER	ppb	10	6	6 ***	.		Chloromethyl methyl ether
A83	CROTONA	ppb	10	6	6 ***	.		Crotonaldehyde
A84	DIBRCHL	ppb	10	6	6 ***	0	EPAP	1,2-Dibromo-3-chloropropane
A85	DIBRETH	ppb	10	6	6 ***	.		1,2-Dibromoethane
A86	DIBRMET	ppb	10	6	6 ***	.		Dibromomethane
A87	DIBUTEN	ppb	10	6	6 ***	.		1,4-Dichloro-2-butene
A88	DICDIFM	ppb	10	6	6 ***	.		Dichlorodifluoromethane
A89	1,1-DIC	ppb	5	6	6 ***	.		1,1-Dichloroethane
A90	1,2-DIC	ppb	5	6	6 ***	5	EPA	1,2-Dichloroethane
A91	TRANDCE	ppb	5	6	6 ***	70	EPAP	trans-1,2-Dichloroethene
A92	DICETHY	ppb	10	6	6 ***	7	EPA	1,1-Dichloroethylene
A93	METHYCH	ppb	5	6	6 ***	.		Methylene chloride [Dichloromethane]
A94	DICPANE	ppb	5	6	6 ***	6	EPAP	1,2-Dichloropropane
A95	DICPENE	ppb	5	6	6 ***	.		1,3-Dichloropropene
A96	NNDIEHY	ppb	10	6	6 ***	.		N,N-diethylhydrazine
A97	1,1-DIM	ppb	10	6	6 ***	.		1,1-Dimethylhydrazine

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
B50	CHRYSEN	ppb	10	6	6 ***	.		Chrysene
B51	CRESOLS	ppb	10	6	6 ***	.		Cresols
B52	CYCHDIN	ppb	10	6	6 ***	.		2-Cyclohexyl-4,6-dinitrophenol
B53	DIBAHAC	ppb	10	6	6 ***	.		Dibenz[a,h]acridine
B54	DIBAJAC	ppb	10	6	3 ***	.		Dibenz[a,j]acridine
B55	DIBAHAN	ppb	10	6	6 ***	.		Dibenz[a,h]anthracene
B56	DIBCGCA	ppb	10	6	6 ***	.		7H-Dibenzo[c,g]carbazole
B57	DIBAEPY	ppb	10	6	6 ***	.		Dibenzo[a,e]pyrene
B58	DIBAHPY	ppb	10	6	6 ***	.		Dibenzo[a,h]pyrene
B59	DIBAIPY	ppb	10	6	6 ***	.		Dibenzo[a,i]pyrene
B60	DIBPHTH	ppb	10	6	6 ***	.		Di-n-butyl phthalate
B61	12-dben	ppb	10	6	6 ***	.		1,2-Dichlorobenzene
B62	13-dben	ppb	10	6	6 ***	.		1,3-Dichlorobenzene
B63	14-dben	ppb	10	6	6 ***	75	EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
B64	DICHBEN	ppb	20	6	6 ***	.		3,3'-Dichlorobenzidine
B65	24-dchp	ppb	10	6	6 ***	.		2,4-Dichlorophenol
B66	26-dchp	ppb	10	6	6 ***	.		2,6-Dichlorophenol
B67	DIEPHTH	ppb	10	6	6 ***	.		Diethyl phthalate
B68	DIHYSAF	ppb	10	6	6 ***	.		Dihydrosafrole
B69	DIMETHB	ppb	10	6	6 ***	.		3,3'-Dimethoxybenzidine
B70	DIMEAMB	ppb	10	6	6 ***	.		p-Dimethylaminoazobenzene
B71	DIMBENZ	ppb	10	6	6 ***	.		7,12-Dimethylbenz[a]anthracene
B72	DIMEYLB	ppb	10	6	6 ***	.		3,3'-Dimethylbenzidine
B73	THIONOX	ppb	10	6	6 ***	.		Thiofanox
B74	DIMPHAM	ppb	10	6	6 ***	.		alpha,alpha-Dimethylphenethylamine
B76	DIMPHTH	ppb	10	6	6 ***	.		Dimethyl phthalate
B77	DINBENZ	ppb	10	6	6 ***	.		Dinitrobenzene
B78	DINCRES	ppb	10	6	6 ***	.		4,6-Dinitro-o-cresol and salts
B79	DINPHEN	ppb	50	6	6 ***	.		2,4-Dinitrophenol
B80	24-dint	ppb	10	6	6 ***	.		2,4-Dinitrotoluene
B81	26-dint	ppb	10	6	6 ***	.		2,6-Dinitrotoluene
B82	DIOPHTH	ppb	10	6	6 ***	.		Di-n-octyl phthalate
B83	DIPHAMI	ppb	10	6	6 ***	.		Diphenylamine
B84	DIPHHYD	ppb	10	6	6 ***	.		1,2-Diphenylhydrazine
B85	DIPRNIT	ppb	10	6	6 ***	.		Di-n-propylnitrosamine
B86	ETHMINE	ppb	10	6	6 ***	.		Ethyleneimine
B87	ETHMETS	ppb	10	6	6 ***	.		Ethyl methanesulfonate
B88	FLUORAN	ppb	10	6	6 ***	.		Fluoranthene
B89	HEXCBEN	ppb	10	6	6 ***	.		Hexachlorobenzene
B90	HEXCBUT	ppb	10	6	6 ***	.		Hexachlorobutadiene
B91	HEXCCYC	ppb	10	6	6 ***	.		Hexachlorocyclopentadiene
B92	HEXCETH	ppb	10	6	6 ***	.		Hexachloroethane
B93	INDENOP	ppb	10	6	6 ***	.		Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	ppb	10	6	6 ***	.		Isosafrole

TABLE 7.4. (contd)

Constituent List=WAC 173-303-9905 Constituents

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency Exceeded	Full name
B95	MALOILE	ppb	10	6	6 ***	.		Malononitrile
B96	MELPHAL	ppb	10	6	6 ***	.		Melphalan
B97	METHAPY	ppb	10	6	6 ***	.		Methapyrilene
B98	METHNYL	ppb	10	6	6 ***	.		Metholonyl
B99	METAZIR	ppb	10	6	6 ***	.		2-Methylaziridine
C01	METCHAN	ppb	10	6	6 ***	.		3-Methylcholanthrene
C02	METBISC	ppb	10	6	6 ***	.		4,4'-Methylenebis(2-chloroaniline)
C03	METACTO	ppb	10	6	6 ***	.		2-Methyllactonitrile
C04	METACRY	ppb	10	6	6 ***	.		Methyl methacrylate
C05	METMSUL	ppb	10	6	6 ***	.		Methyl methanesulfonate
C06	METPROP	ppb	10	6	6 ***	.		2-Methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	ppb	10	6	6 ***	.		Methylthiouracil
C08	NAPHQUI	ppb	10	6	6 ***	.		1,4-Naphthoquinone
C09	1-napha	ppb	10	6	6 ***	.		1-Naphthylamine
C10	2-napha	ppb	10	6	6 ***	.		2-Naphthylamine
C11	NITRANI	ppb	50	6	6 ***	.		p-Nitroaniline
C12	NITBENZ	ppb	10	6	6 ***	.		Nitrobenzene
C13	NITPHEN	ppb	50	6	6 ***	.		4-Nitrophenol [p-Nitrophenol]
C14	NNIBUTY	ppb	10	6	6 ***	.		n-Nitrosodi-n-butylamine
C15	NNIDIEA	ppb	10	6	6 ***	.		n-Nitrosodiethanolamine
C16	NNIDIEY	ppb	10	6	6 ***	.		n-Nitrosodiethylamine
C17	NNIDIME	ppb	10	6	6 ***	.		n-Nitrosodimethylamine
C18	NNIMETH	ppb	10	6	6 ***	.		n-Nitrosomethylethylamine
C19	NNIURET	ppb	10	6	6 ***	.		n-Nitroso-n-methylurethane
C20	NNIVINY	ppb	10	6	6 ***	.		n-Nitrosomethylvinylamine
C21	NNIMORP	ppb	10	6	6 ***	.		n-Nitrosomorpholine
C22	NNINICO	ppb	10	6	6 ***	.		n-Nitrosonornicotine
C23	NNIPIPE	ppb	10	6	6 ***	.		n-Nitrosopiperidine
C24	NITRPYR	ppb	10	6	6 ***	.		Nitrosopyrrolidine
C25	NITRTOL	ppb	10	6	6 ***	.		5-Nitro-o-toluidine
C26	PENTCHB	ppb	10	6	6 ***	.		Pentachlorobenzene
C27	PENTCHN	ppb	10	6	6 ***	.		Pentachloronitrobenzene
C28	PENTCHP	ppb	50	6	6 ***	220	EPAP	Pentachlorophenol
C29	PHENTIN	ppb	10	6	6 ***	.		Phenacetin
C30	PHENINE	ppb	10	6	6 ***	.		Phenylenediamine
C31	PHTHEST	ppb	10	6	6 ***	.		Phthalic acid esters
C32	PICOLIN	ppb	10	6	6 ***	.		2-Picoline
C33	PRONIDE	ppb	10	6	6 ***	.		Pronamide
C34	RESERPI	ppb	10	6	6 ***	.		Reserpine
C35	RESORCI	ppb	10	6	6 ***	.		Resorcinol
C36	SAFROL	ppb	10	6	6 ***	.		Safrol
C37	TETRCHB	ppb	10	6	6 ***	.		1,2,4,5-Tetrachlorobenzene
C39	TETRCHP	ppb	10	6	6 ***	.		2,3,4,6-Tetrachlorophenol
C40	THIURAM	ppb	10	6	6 ***	.		Thiuram

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
C41	TOLUDIA	ppb	10	6	6 ***	.		Toluenediamine
C42	OTOLHYD	ppb	10	6	6 ***	.		o-Toluidine hydrochloride
C43	TRICHLB	ppb	10	6	6 ***	.		1,2,4-Trichlorobenzene
C44	245-trp	ppb	50	6	6 ***	.		2,4,5-Trichlorophenol
C45	246-trp	ppb	10	6	6 ***	.		2,4,6-Trichlorophenol
C46	TRIPHOS	ppb	10	6	6 ***	.		O,o,o-triethyl phosphorothioate
C47	SYMTRIN	ppb	10	6	6 ***	.		Sym-trinitrobenzene
C48	TRISPHO	ppb	10	6	6 ***	.		Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	ppb	10	6	6 ***	.		Benzo[a]pyrene
C50	CHLNAPZ	ppb	10	6	6 ***	.		Chlornaphazine
C51	BIS2ETH	ppb	10	6	6 ***	.		Bis(2-chloroisopropyl) ether
C52	HEXAENE	ppb	10	6	6 ***	.		Hexachloropropene
C54	HEXACHL	ppb	10	6	6 ***	.		Hexachlorophene
C55	NAPHTHA	ppb	10	6	6 ***	.		Naphthalene
C56	123TRI	ppb	10	6	6 ***	.		1,2,3-Trichlorobenzene
C58	135TRI	ppb	10	6	6 ***	.		1,3,5-Trichlorobenzene
C59	1234TE	ppb	10	6	6 ***	.		1,2,3,4-Tetrachlorobenzene
C60	1235TE	ppb	10	6	6 ***	.		1,2,3,5-Tetrachlorobenzene
C61	TETEPYR	ppb	2	6	6 ***	.		Tetraethylpyrophosphate
C62	CHLLATE	ppb	300	6	6 ***	.		Chlorobenzilate
C63	CARBPHT	ppb	2	6	6 ***	.		Carbophenothion
C64	DISULFO	ppb	2	6	6 ***	.		Disulfoton
C65	DIMETHO	ppb	2	6	6 ***	.		Dimethoate
C66	METHPAR	ppb	2	6	6 ***	.		Methyl parathion
C67	PARATHI	ppb	2	6	6 ***	.		Parathion
C70	CYANIDE	ppb	10	6	6 ***	.		Cyanide
C71	FORMALN	ppb	500	6	6 ***	.		Formalin
C78	SULFIDE	ppb	1000	6	6 ***	.		Sulfide
C79	KEROSEN	ppb	10000	6	6 ***	.		Kerosene
C80	AMMONIU	ppb	50	6	6 ***	.		Ammonium ion
C87	CITRUSR	ppb	1000	6	6 ***	.		Citrus red
C90	PARALDE	ppb	10000	6	6 ***	.		Paraldehyde
C91	STRYCHN	ppb	50	6	6 ***	.		Strychnine
C92	MALHYDR	ppb	500	6	6 ***	.		Maleic hydrazide
C93	NICOTIN	ppb	100	6	6 ***	.		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	6	6 ***	.		PCDDs
D02	PCDFs	ppb	0.01	6	6 ***	.		PCDFs
D03	2378TCD	ppb	0.01	6	6 ***	.		2,3,7,8-TCDD [Dioxin]
H03	ETHCARB	ppb	10000	6	6 ***	.		Ethyl carbamate
H04	ETHCYAN	ppb	10000	6	6 ***	.		Ethyl cyanide
H05	ETHOXID	ppb	10	6	6 ***	.		Ethylene oxide

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
H06	ETHMETH	ppb	10	6	6 ***	.		Ethyl methacrylate
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
H15	2,4,5-T	ppb	2	6	6 ***	.		2,4,5-T
H40	FTHALLI	ppb	5	6	6 ***	.		Thallium, filtered
H68	HEXONE	ppb	10	6	6 ***	.		Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	6	6 ***	.		Acetone by VOA
I06	ISOPHER	ppb	10	6	6 ***	.		Isopherone
I09	BUTANOL	ppb	10000	6	6 ***	.		1-Butanol
I21	TRIBUPH	ppb	10	6	6 ***	.		Tributylphosphoric acid
I28	TAF	ppb	10	6	6 ***	.		Tetrahydorfuran
I29	ACENAPH	ppb	10	6	6 ***	.		Acenaphthene
I30	FLRENE	ppb	10	6	6 ***	.		Fluorene
I31	ANTHRA	ppb	10	6	6 ***	.		Anthracene
I32	PYRENE	ppb	10	6	6 ***	.		Pyrene
I33	ETHBENZ	ppb	5	6	6 ***	680	EPAP	Ethylbenzene
I34	STYRENE	ppb	5	6	6 ***	140	EPAP	Styrene
I42	BDCM	ppb	5	6	6 ***	100	EPA	Bromodichloromethane
I43	CDBM	ppb	5	6	6 ***	100	EPA	Chlorodibromomethane
I64	2NITPH	ppb	10	6	6 ***	.		2-Nitrophenol [o-Nitrophenol]
I67	ETHANOL	ppb	10000	6	6 ***	.		Ethanol
I75	2MENAPH	ppb	10	6	6 ***	.		2-Methylnaphthalene
I82	PHENANT	ppb	10	6	6 ***	.		Phenanthrene
J43	BENZALC	ppb	10	6	6 ***	.		Benzyl alcohol
J69	2HEXANO	ppb	50	6	6 ***	.		2-Hexanone
J71	BNZKFLU	ppb	10	6	6 ***	.		Benzo (k) fluoranthene
J83	BGHIPER	ppb	10	6	6 ***	.		Benzo (ghi) perylene
J89	DINOSEB	ppb	10	6	6 ***	.		Dinoseb
J91	DIALLAT	ppb	10	6	6 ***	.		Diallate
K52	NNDIPHA	ppb	10	6	6 ***	.		n-Nitrosodiphenylamine
K56	DIBENFR	ppb	10	6	6 ***	.		Dibenzofuran
K58	ACENATL	ppb	10	6	6 ***	.		Acenaphthylene
L20	MBP	ppb	10000	6	6 ***	.		Monobutylphosphate
L21	DBP	ppb	10000	6	6 ***	.		Dibutylphosphate
L45	ALLYLCL	ppb	100	6	6 ***	.		Allyl chloride
L46	CLETHAN	ppb	10	6	6 ***	.		Chlorethane
L48	PROPCN	ppb	5	6	6 ***	.		Propionitrile
L49	VINYLAC	ppb	5	6	6 ***	.		Vinyl acetate
L50	B2CLMEE	ppb	10	6	6 ***	.		bis(2-Chloro-1-methylethyl)ether
L52	DIPHOS	ppb	10	6	6 ***	.		O,O-Diethyl-O,2-pyrazinyl phosphorothion
L53	ISODRIN	ppb	10	6	6 ***	.		Isodrin
L54	ONITANI	ppb	10	6	6 ***	.		o-Nitroaniline
L55	MNITANI	ppb	10	6	6 ***	.		m-Nitroaniline

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
L56	4NITQUI	ppb	10	6	6 ***	.		4-Nitroquinoline 1-oxide
L57	ETHGLYC	ppb	10000	6	6 ***	.		Ethylene glycol
L59	1PROPAN	ppb	10000	6	6 ***	.		1-Propanol
L60	1BUTYN	ppb	10000	6	6 ***	.		1-Butynol
L62	ACETON	ppb	10	6	6 ***	.		Acetone by ABN
L63	14DBEN	ppb	5	6	6 ***	75	EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
L64	CHLROB	ppb	10	6	6 ***	.		Chlorobenzene (by ABN)
P12	ENDSFAN	ppb	0.5	6	6 ***	.		Endosulfan
P13	PHORATE	ppb	2	6	6 ***	.		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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 26890
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 given in 40 CFR Part 143 National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given 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 March through May 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-58	02MAR89		21,500	2260	7.23	6.90	#1000	10
		1	21,000	2270	7.33	6.80	#1000	11
		2	21,000	2290	7.32	6.80	#1000	13
		3	20,900	2280	7.14	6.80	#900	10
1-N-59	01MAR89		1,838	1580	5.89	6.90	#1000	13
		1	1,829	1560	5.86	7.60	#900	13
		2	1,815	1570	5.97	7.20	#900	13
		3	1,825	1580	5.92	7.20	#900	14
1-N-60	02MAR89		1,629	1720	6.99	6.90	#800	12
		1	1,619	1,690	7.09	6.80	#700	12
		2	1,622	1710	7.02	6.70	#700	#9
		3	1,628	1,680	7.17	6.70	#800	12
1-N-61	02MAR89		1,037	1130	7.20	6.80	#1100	15
		1	1,042	1130	7.28	6.80	#1100	20
		2	1,039	1120	7.24	6.80	#1100	20
		3	1,040	1130	7.21	6.80	#1200	19
6-81-58	03MAR89		156	212	8.02	7.60	#200	#4
		1	155	211	8.05	7.60	#100	#5
		2	154	210	8.10	7.60	#200	#1
		3	153	216	8.08	7.70	#200	#0

TABLE 7.5. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	ALPHAHI pCi/L 4/15	FALUMIN ppb 150/.	ALUMNUM ppb 150/.	ARSENIC ppb 5/50	BARIUM ppb 8/1000	FBARIUM ppb 6/1000	BERYLUM ppb 5/.	BETA pCi/L 8/50
1-N-58	02MAR89		*1.670	<150	<150	<5	48	48	8	4.050
1-N-59	01MAR89		*0.601	302	315	<5	18	18	<5	*2.000
	01MAR89	1	*0.290	298	379	<5	20	20	<5	3.010
1-N-60	02MAR89		*1.200	<150	<150	<5	30	30	<5	2.950
1-N-61	02MAR89		*0.149	<150	<150	<5	11	13	<5	*1.920
6-81-58	03MAR89		*0.416	<150	<150	5	18	20	<5	*0.868

Well name	Collection Date	Duplicate sample number	BIS2EPH ppb 10/.	BORON ppb 10/.	FBORON ppb 10/.	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLFORM ppb 5/100	CHLORID ppb 500/250000s
1-N-58	02MAR89		<10	14	17	119,000	121,000	#3	4,800
1-N-59	01MAR89		<10	20	19	45,800	46,400	#4	3,900
	01MAR89	1	<10	16	22	47,500	48,700	#4	3,900
1-N-60	02MAR89		<10	16	20	86,600	88,800	5	5,000
1-N-61	02MAR89		11	11	13	25,600	24,000	5	2,500
6-81-58	03MAR89		<10	<10	<10	31,400	28,300	<5	1,400

Well name	Collection Date	Duplicate sample number	FCHROMI ppb 10/50	CHROMUM ppb 10/50	CO-60 pCi/L 22.5/100r	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000	IRON ppb 30/300s	MAGNES ppb 50/.
1-N-58	02MAR89		<10	10	*-4.290	*-3.900	<500	158	25,400
1-N-59	01MAR89		<10	<10	*0.783	*-0.722	<500	<30	11,800
	01MAR89	1	<10	<10	.	.	<500	<30	12,400
1-N-60	02MAR89		<10	<10	*4.540	*-3.180	<500	91	17,000
1-N-61	02MAR89		<10	<10	*-7.640	*2.610	800(a)	34	6,740
6-81-58	03MAR89		14	15	*1.780	*1.210	<500	311	8,370

Well name	Collection Date	Duplicate sample number	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5
1-N-58	02MAR89		24,700	<5	8	3,500	5,720	5,700	0.591000
1-N-59	01MAR89		11,800	195	188	3,000	3,180	3,190	0.191000
	01MAR89	1	12,100	195	202	3,100	3,270	3,310	0.319000
1-N-60	02MAR89		16,700	27	24	2,900	5,110	5,300	0.678000
1-N-61	02MAR89		7,100	<5	<5	1,800	1,650	1,540	*-0.013200
6-81-58	03MAR89		9,280	<5	5	2,900	3,070	2,860	*0.000725

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/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONUM ppb 20/.
1-N-58	02MAR89		*15.8	12,500	12,000	347,000	341,000	*0.7840	551	549
1-N-59	01MAR89		63.5	12,400	12,300	325,000	312,000	*-0.2900	239	242
	01MAR89	1	.	12,700	12,900	341,000	324,000	.	247	252
1-N-60	02MAR89		*14.8	16,600	17,000	304,000	298,000	*0.0756	369	379
1-N-61	02MAR89		*12.5	5,950	5,570	218,000	236,000	*-0.0852	135	127
6-81-58	03MAR89		*43.3	11,100	10,200	4,740	5,210	*0.5110	215	192

TABLE 7.5. (contd)

Well name	Collection Date	Duplicate sample number	SULFATE ppb 500/250000s	TRITIUM pCi/L 500/20000	U pCi/L 0.5/600d	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
1-N-58	02MAR89		1,180,000	*-147	2.210	<5	<5	<5	<5
1-N-59	01MAR89		742,000	*-26	0.842	<5	<5	23	24
	01MAR89	1	754,000	.	1.190	<5	<5	19	25
1-N-60	02MAR89		833,000	*31	1.350	<5	<5	<5	<5
1-N-61	02MAR89		495,000	*34	0.787	<5	<5	<5	<5
6-81-58	03MAR89		16,000	*270	1.210	8	15	<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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
w - based on additional Secondary Maximum Contaminant Levels given 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) A matrix effect was observed that may have caused indeterminate recovery during analysis.

TABLE 7.6. Critical Means to be Compared Against March 1989 Samples at the 1324-N/NA Facilities

Constituent	N	df	tc[a]	Background Average	Standard Deviation	Critical Mean
Conductivity, field, μmho/cm	4	3	12.924	181.8	50.44	910.6
pH, field	4	3	16.326	8.22	0.487	-0.67, 17.11
Total organic carbon, ppb	4	3	12.924	277.3	76.02	1,375.7
Total organic halogen (lower detection limit), ppb	4	3	12.924	1.3	3.29	48.8

(a) tc given for appropriate df and 28 comparisons (7 wells * 4 parameters).
N = number of samples.
df = degrees of freedom.
tc = critical values for Bonferroni t-test.

TABLE 7.7. Contamination Indicator Parameter Replicate Averages for the 1324-N/NA Surface Impoundment and Percolation Pond March through May 1989

Constituent Code	Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088	CONDLAB	umho	1-N-58	02MAR89	4	2,280	12.9	2,260	2,290	0.6
			1-N-59	01MAR89	4	1,570	9.6	1,560	1,580	0.6
			1-N-60	02MAR89	4	1,700	18.3	1,680	1,720	1.1
			1-N-61	02MAR89	4	1,130	5.0	1,120	1,130	0.4
			6-81-58	03MAR89	4	212	2.6	210	216	1.2
191	CONDFLD	umho	1-N-58	02MAR89	4	21,100	271.0	20,900	21,500	1.3
			1-N-59	01MAR89	4	1,830	9.5	1,815	1,838	0.5
			1-N-60	02MAR89	4	1,620	4.8	1,619	1,629	0.3
			1-N-61	02MAR89	4	1,040	2.1	1,037	1,042	0.2
			6-81-58	03MAR89	4	155	1.3	153	156	0.8
199	PHFIELD		1-N-58	02MAR89	4	6.83	0.05	6.8	6.9	0.7
			1-N-59	01MAR89	4	7.23	0.29	6.9	7.6	4.0
			1-N-60	02MAR89	4	6.78	0.10	6.7	6.9	1.4
			1-N-61	02MAR89	4	6.80	0	6.8	6.8	0.0
			6-81-58	03MAR89	4	7.63	0.05	7.6	7.7	0.7
207	PH-LAB		1-N-58	02MAR89	4	7.26	0.09	7.14	7.33	1.2
			1-N-59	01MAR89	4	5.91	0.05	5.86	5.97	0.8
			1-N-60	02MAR89	4	7.07	0.08	6.99	7.17	1.1
			1-N-61	02MAR89	4	7.23	0.03	7.20	7.26	0.4
			6-81-58	03MAR89	4	8.06	0.04	8.02	8.10	0.4
C69	TOC	ppb	1-N-58	02MAR89	4	975	50	900	1,000	5.1
			1-N-59	01MAR89	4	925	50	900	1,000	5.4
			1-N-60	02MAR89	4	750	58	700	800	7.7
			1-N-61	02MAR89	4	1,130	50	1,100	1,200	4.4
			6-81-58	03MAR89	4	175	50	100	200	28.6
H42	TOXLDL	ppb	1-N-58	02MAR89	4	11.0	1.4	10	13	12.9
			1-N-59	01MAR89	4	13.3	0.5	13	14	3.8
			1-N-60	02MAR89	4	11.3	1.5	9	12	13.3
			1-N-61	02MAR89	4	18.5	2.4	15	20	12.9
			6-81-58	03MAR89	4	2.0	2.9	-1	5	146.9

THIS PAGE INTENTIONALLY
LEFT BLANK

8.0 1325-N LIQUID WASTE DISPOSAL FACILITY

T. J. Gilmore

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. 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 1989) and is now considered downgradient.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or hydrogeologic characterization work (other than water levels) 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 49 wells in April, May, and June. 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 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. Decontamination activities at the N Reactor caused the release of approximately 11.3 million gal per week between May 11 and June 24, 1989. Consequently, the ground-water mound under the 1325-N LWDF increased approximately 13 ft in May and June from an elevation of approximately 400 ft in April (see Figures 6.2, 6.3, and 6.4). As this mound increased, ground-water gradients and flow patterns changed in the 100-N Area.

BACKGROUND STATISTICAL DATA

Currently, background data from well 699-81-58 for contamination indicator parameters consist of

- June 1988 - 4 pH, 4 conductivity, 4 TOC, 4 TOXLDL
- September 1988 - 4 pH, 4 conductivity, 4 TOC, 4 TOXLDL
- December 1988 - 4 pH, 4 conductivity, 4 TOC, 4 TOXLDL
- March 1989 - 4 pH, 4 conductivity, 4 TOC, 4 TOXDL.

Data from the first two samplings in December 1987 and March 1988 lacked the quadruplicate samples required to establish the background data. As indicator parameter data were obtained in quadruplicates, the background data were updated. Four quarters of quadruplicates have now been obtained. 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 analytical results are compared. If a parameter is greater than (and less than, for pH) its critical mean, that measurement is considered statistically different from background. These values were determined following the recommended techniques in Appendix B of the TEGD (EPA 1986b). Some of these critical mean values are outside the range that would be reasonably anticipated.

WATER CHEMISTRY DATA

No samples were obtained this quarter from the 1325-N LWDF network as part of the scheduled sampling because purge water containment vessels were not available at all well sites. The logistics of ordering and placing containment vessels at the wells has delayed the 1325-N sampling schedule 3 months. A revised sampling schedule is presented in Table 8.2. A special sampling of six wells, however, was conducted in May 1989 to verify elevated levels of TOX, specific conductance, and, in one well, PCBs that were detected in the March 1989 sampling (see subsection, Discussion of Results).

Discussion of Results

Results from ground-water monitoring at the 1325-N Liquid Waste Disposal Facility (LWDF) in March 1989 (Table 8.4) indicated several constituent values exceeded the established background critical means. The following constituents in the following wells exceeded the critical means: 199-N-27, specific conductance; 199-N-29, specific conductance and TOX; 199-N-41, TOX; 199-N-52, TOX; and 199-N-70, TOX (see Table 8.5). The critical means used for comparison were 63.3 ppb for TOX and 1132 μmho/cm for specific conductance. The wells are required by 40 CFR 265.93 to be resampled to verify that the established background values for TOX and specific conductance have been exceeded. The wells were resampled in May 1989 for the respective constituents (Tables 8.5 and 8.6). Additionally, well 199-N-33 was resampled because a detectable amount (4.9 ppb) of the polychlorinated biphenyl (PCB) Arochlor 1016 was reported in March 1989.

One set of samples was sent to United States Testing Company, Inc., Richland, and one set to Pacific Northwest Laboratory (PNL). All TOX samples were done in quadruplicates, and the field conductivity measurements were verified by a PNL scientist. None of the initial results for TOX and specific conductance were verified to have exceeded the established critical means. Detectable quantities of polychlorinated biphenyl (Arochlor 1016) were confirmed in the ground-water sample from well 199-N-33.

Ground-Water Analyses Other Than Indicator Parameters

In addition to indicator parameters, constituents and parameters on the comprehensive WAC 173-303-9905 "long list" were analyzed in March (Tables 8.7 and 8.8). Of these, gross beta, tritium, strontium-90, iron, and Arochlor 1016 were detected in concentrations above the drinking water standards in the ground water around the 1325-N facility. Gross beta concentrations were above the screening level of 50 pCi/L in all wells except 199-N-41, 199-N-42, 199-N-52, 699-81-58, and 199-N-70. The highest levels were in well 199-N-29 at 463 pCi/L. Tritium was detected above the screening level in all wells except well 699-81-58. Strontium-90 exceed the screening levels in all wells except 199-N-41, 199-N-42, 199-N-52, 699-81-58, and 199-N-70. Iron screening levels were exceeded only in well 699-81-58 but only in the unfiltered samples. Arochlor 1016 was detected at an average of 8.4 ppb in well 199-N-33. The source of this constituent is currently being investigated.

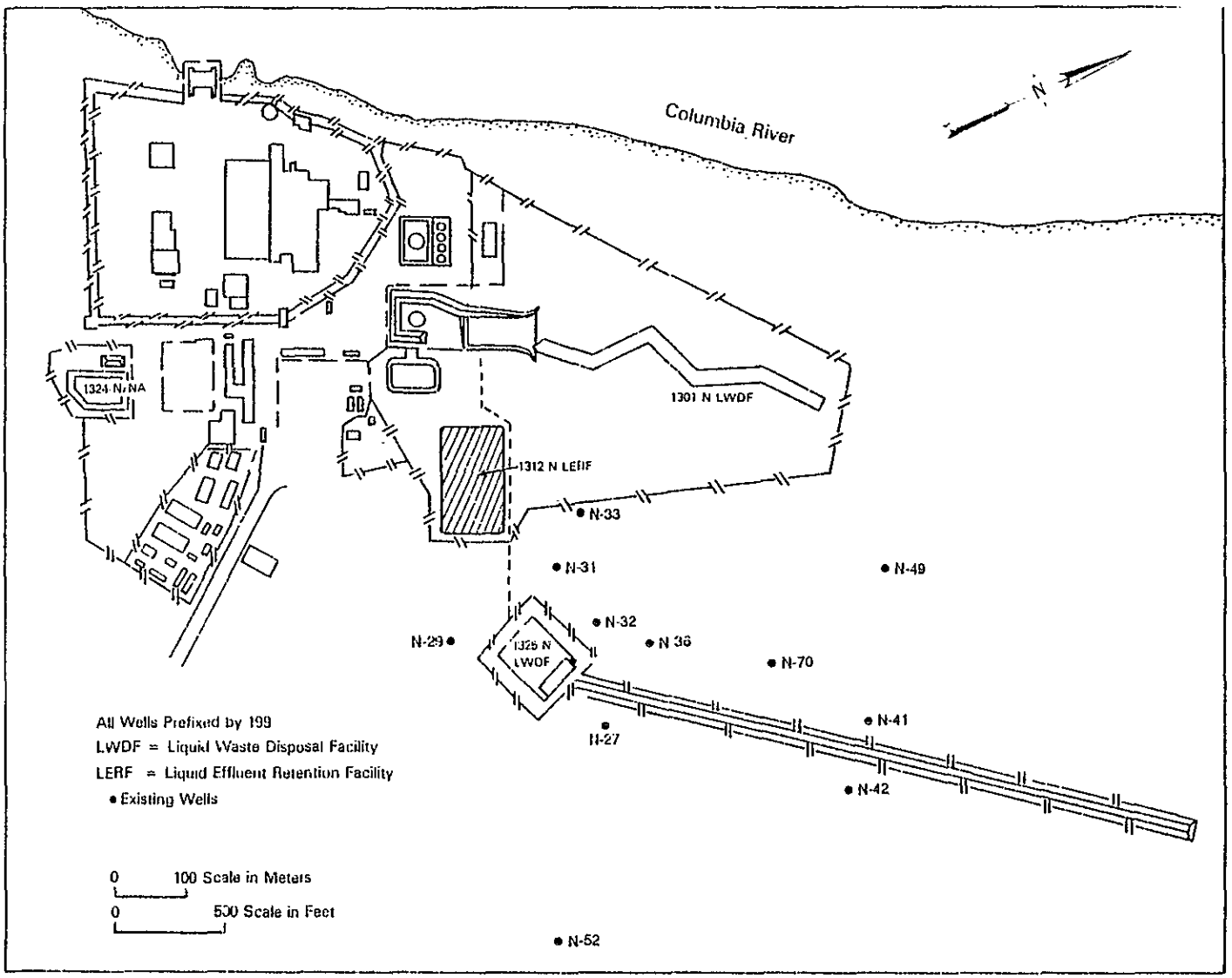


FIGURE 8.1. Monitoring Well Network for the 1325-N Liquid Waste Disposal Facility. (Well 699-81-58 is also part of the monitoring network. It is not shown on this figure because of the scale, but is shown in Figure 7.1.)

TABLE 8.1. Critical Means Used to Compare March 1989 Samples at the 1325-N Liquid Waste Disposal Facility

Constituent	N	df	tc[a]	Background Average	Standard Deviation	Critical Mean
Conductivity, field, μmho/cm	4	3	16.858	181.8	50.44	1,132.5
pH, field	4	3	21.273	8.22	0.487	-3.36, 19.80
Total organic carbon, ppb	4	3	16.858	277.3	76.02	1,710.1
Total organic halogen (lower detection limit), ppb	4	3	16.858	1.3	3.29	63.3

(a) tc given for appropriate df and 28 comparisons (7 wells * 4 parameters).
N = number of samples.
df = degrees of freedom.
tc = critical values for Bonferroni t-test.

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

				1989								
Well	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

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

TABLE 8.4 Contamination Indicator Parameter Replicate Averages for the 1325-N Liquid Waste Disposal Facility March 1989

Constituent Code Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
191 CONDFLD	umho	1-N-27	06MAR89	4	1,390	0.6	1,393	1,394	0.0
		1-N-29	06MAR89	4	1,150	1.0	1,144	1,146	0.1
		1-N-31	06MAR89	4	133	0.5	133	134	0.4
		1-N-32	06MAR89	4	145	0.5	145	146	0.3
		1-N-33	06MAR89	4	159	0.5	158	159	0.3
		1-N-36	07MAR89	4	135	0.5	134	135	0.4
		1-N-41	08MAR89	4	211	0	211	211	0.0
		1-N-42	07MAR89	4	242	0	242	242	0.0
		1-N-52	08MAR89	4	168	0.5	167	168	0.3
		1-N-70	08MAR89	4	196	0	196	196	0.0
		6-81-58	03MAR89	4	155	1.3	153	156	0.8
088 CONDLAB	umho	1-N-27	06MAR89	4	142	7.85	130	146	5.5
		1-N-29	06MAR89	4	132	1.15	131	133	0.9
		1-N-31	06MAR89	4	125	0.96	124	126	0.8
		1-N-32	06MAR89	4	144	1.26	142	145	0.9
		1-N-33	06MAR89	4	153	1.89	152	156	1.2
		1-N-36	07MAR89	4	116	6.55	106	120	5.7
		1-N-41	08MAR89	4	186	2.50	185	190	1.3
		1-N-42	07MAR89	4	173	1.41	172	175	0.8
		1-N-52	08MAR89	4	171	1.71	169	173	1.0
		1-N-70	08MAR89	4	182	2.22	180	185	1.2
		6-81-58	03MAR89	4	212	2.63	210	216	1.2
199 PHFIELD		1-N-27	06MAR89	4	8.13	0.05	8.1	8.2	0.6
		1-N-29	06MAR89	4	8.10	0	8.1	8.1	0.0
		1-N-31	06MAR89	4	8.95	0.06	8.9	9.0	0.6
		1-N-32	06MAR89	4	8.35	0.06	8.3	8.4	0.7
		1-N-33	06MAR89	4	8.23	0.05	8.2	8.3	0.6
		1-N-36	07MAR89	4	7.55	0.06	7.5	7.6	0.8
		1-N-41	08MAR89	4	8.10	0	8.1	8.1	0.0
		1-N-42	07MAR89	4	8.20	0	8.2	8.2	0.0
		1-N-52	08MAR89	4	7.50	0	7.5	7.5	0.0
		1-N-70	08MAR89	4	8.20	0	8.2	8.2	0.0
		6-81-58	03MAR89	4	7.63	0.05	7.6	7.7	0.7
207 PH-LAB		1-N-27	06MAR89	4	8.27	0.019	8.26	8.30	0.2
		1-N-29	06MAR89	4	8.19	0.013	8.17	8.20	0.2
		1-N-31	06MAR89	4	8.52	0.019	8.49	8.53	0.2
		1-N-32	06MAR89	4	8.29	0.026	8.26	8.31	0.3
		1-N-33	06MAR89	4	8.27	0.017	8.25	8.29	0.2
		1-N-36	07MAR89	4	8.30	0.021	8.28	8.32	0.2
		1-N-41	08MAR89	4	8.20	0	8.20	8.20	0.0
		1-N-42	07MAR89	4	8.25	0.017	8.22	8.26	0.2
		1-N-52	08MAR89	4	8.20	0	8.20	8.20	0.0
		1-N-70	08MAR89	4	8.20	0	8.20	8.20	0.0
		6-81-58	03MAR89	4	8.06	0.035	8.02	8.10	0.4

TABLE 8.4. (contd)

C69 TOC	ppb	1-N-27	06MAR89	4	525	126	400	700	24.0
		1-N-29	06MAR89	4	400	0	400	400	0.0
		1-N-31	06MAR89	4	400	0	400	400	0.0
		1-N-32	06MAR89	4	350	58	300	400	16.5
		1-N-33	06MAR89	4	300	0	300	300	0.0
		1-N-36	07MAR89	4	450	58	400	500	12.8
		1-N-41	08MAR89	4	300	0	300	300	0.0
		1-N-42	07MAR89	4	350	58	300	400	16.5
		1-N-52	08MAR89	4	325	50	300	400	15.4
		1-N-70	08MAR89	4	425	50	400	500	11.8
		6-81-58	03MAR89	4	175	50	100	200	28.6
H42 TOXLDL	ppb	1-N-27	06MAR89	4	21.3	1.5	20	23	7.1
		1-N-29	06MAR89	4	89.8	6.1	82	97	6.8
		1-N-31	06MAR89	4	11.5	0.6	11	12	5.0
		1-N-32	06MAR89	4	6.3	1.0	5	7	15.3
		1-N-33	06MAR89	4	6.5	0.6	6	7	8.9
		1-N-36	07MAR89	4	8.8	0.5	8	9	5.7
		1-N-41	08MAR89	4	426.0	23.1	394	449	5.4
		1-N-42	07MAR89	4	13.8	1.0	13	15	7.0
		1-N-52	08MAR89	4	482.0	20.0	455	498	4.2
		1-N-70	08MAR89	4	103.0	53.4	28	148	52.0
		6-81-58	03MAR89	4	2.0	2.9	-1	5	146.9

TABLE 8.5. Results of the May Resampling of Wells in the 1325-N Monitoring Network

Well Number	Parameter, unit	March Results, UST[a]	May Results UST	May Results PNL[b]
199-N-27	Conductivity, field, μmho/cm	1393.0	138	180
	Conductivity laboratory, μmho/cm	141.8	--	158.2
199-N-29	Conductivity, field, μmho/cm	1145.0	127	169
	Conductivity, laboratory, μmho/cm	132.0	--	152.2
	TOX,ppb	89.6	15	12
199-N-33	Arochlor 1016, ppb	4.90	7.13	9.7
199-N-41	TOX, ppb	426.0	14	5.0
199-N-52	TOX, ppb	481.5	12	8.2
199-N-70	TOX, ppb	102.8	6.3	6.4

(a) UST = United States Testing Company, Incorporated.
(b) PNL = Pacific Northwest Laboratory.

TABLE 8.6- Constituents with at Least One Detected Value for the 1325-N Liquid Waste Disposal Facility May 1989 Contamination Indicator Parameter Resample

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PHFIELD 0.1/8.5s	TOXLDL ppb 10/.
1-N-27	05MAY89		137	.	7.90	.
		1	138	.	8.01	.
		2	139	.	8.05	.
		3	139	.	8.10	.
1-N-27(x)	05MAY89		180	158.2	8.02	.
		1	181	.	8.07	.
		2	180	.	8.08	.
		3	179	.	8.12	.
1-N-29	05MAY89		128	.	8.00	10
		1	128	.	8.10	18
		2	127	.	8.10	17
		3	126	.	8.10	15
1-N-29(x)	05MAY89		169	152.2	7.85	10.8
		1	172	.	7.92	11.1
		2	167	.	7.98	12.6
		3	167	.	8.05	13.4
1-N-33	05MAY89		139	.	7.60	.
1-N-41	08MAY89		145	.	7.50	15
		1	145	.	7.60	10
		2	146	.	7.50	10
		3	145	.	7.50	17
1-N-41(x)	08MAY89		.	.	.	6.2
		1	.	.	.	4.2
		2	.	.	.	5.4
		3	.	.	.	4.5
1-N-52	08MAY89		145	.	7.70	#8
		1	145	.	7.70	16
		2	145	.	7.70	11
		3	145	.	7.70	13
1-N-52(x)	08MAY89		.	.	.	9.4
		1	.	.	.	8.1
		2	.	.	.	8.9
		3	.	.	.	6.2

TABLE 8.6. (contd)

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PHFIELD 0.1/8.5s	TOXLDL ppb 10/.
1-N-70	08MAY89		152	.	7.80	#7
		1	152	.	7.80	#8
		2	152	.	7.80	#4
		3	152	.	7.80	#6
1-N-70(x)	08MAY89		.	.	.	8.1
		1	.	.	.	8.2
		2	.	.	.	5.7
		3	.	.	.	3.7

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

Suffix
none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
w - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies
x - samples analyzed by a different laboratory with lower detection limits

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 8.7. Constituent List and Summary of Sampling Results for the 1325-N Liquid Waste Disposal Facility
March 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	xxx	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	xxx	pH, laboratory
C69	TOC	ppb	2000	44	0	.			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	12	12 ***	1	EPA		Coliform bacteria
111	BETA	pCi/L	8	12	0	50	EPA	xxx	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	6	12	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	12	12 ***	10	EPA		Cadmium
A08	CHROMUM	ppb	10	12	11	50	EPA		Chromium
A10	SILVER	ppb	10	12	12 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	12	6	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	12	12 ***	2	EPA		Mercury
A22	SELENUM	ppb	5	12	12 ***	10	EPA		Selenium
A33	ENDRIN	ppb	0.1	12	12 ***	0.2	EPA		Endrin
A34	METHLOR	ppb	3	12	12 ***	100	EPA		Methoxychlor
A35	TOXAENE	ppb	1	12	12 ***	5	EPA		Toxaphene
A36	a-BHC	ppb	0.1	12	12 ***	4	EPA		Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	12	12 ***	4	EPA		Lindane, beta-BHC
A38	g-BHC	ppb	0.1	12	12 ***	4	EPA		Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	12	12 ***	4	EPA		Lindane, delta-BHC
A51	LEADGF	ppb	5	12	12 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	ppb	500	12	0	45000	EPA		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	6	12	0	1000	EPA		Barium, filtered
H21	FCADMIU	ppb	2	12	12 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	ppb	10	12	11	50	EPA		Chromium, filtered
H23	FSILVER	ppb	10	12	12 ***	50	EPA		Silver, filtered
H37	FARSENI	ppb	5	12	10	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

TABLE 8.7. (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	12	0	.			Sodium
A17	MANGESE	ppb	5	12	10	50	EPAS		Manganese
A19	IRON	ppb	30	12	0	300	EPAS	xxx	Iron
C57	PHENOL	ppb	10	12	12 ***	.			Phenol
C73	SULFATE	ppb	500	12	0	250000	EPAS		Sulfate
C75	CHLORID	ppb	500	12	0	250000	EPAS		Chloride
H24	FSODIUM	ppb	200	12	0	.			Sodium, filtered
H29	FMANGAN	ppb	5	12	11	50	EPAS		Manganese, filtered
H31	FIRON	ppb	30	12	11	300	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
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	xxx	Ruthenium-106
037	SB-125	pCi/L	48	1	0	300	EPAR		Antimony-125
104	U	pCi/L	0.5	12	0	600	DOE		Uranium
108	TRITIUM	pCi/L	500	11	0	20000	EPA	xxx	Tritium (H-3)
121	SR-90	pCi/L	5	11	0	8	EPA	xxx	Strontium-90
A01	BERYLUM	ppb	5	12	12 ***	.			Beryllium
A03	STRONUM	ppb	20	12	0	.			Strontium
A04	ZINC	ppb	5	12	6	5000	EPAS		Zinc
A05	CALCIUM	ppb	50	12	0	.			Calcium
A12	NICKEL	ppb	10	12	11	.			Nickel
A13	COPPER	ppb	10	12	12 ***	1300	EPAP		Copper
A14	VANADUM	ppb	5	12	3	.			Vanadium
A15	ANTIONY	ppb	100	12	12 ***	.			Antimony
A16	ALUMNUM	ppb	150	12	11	.			Aluminum
A18	POTASUM	ppb	100	12	0	.			Potassium
A50	MAGNES	ppb	50	12	0	.			Magnesium
C76	PHOSPHA	ppb	1000	12	12 ***	.			Phosphate
H16	TC	ppb	1000	11	0	.			Total carbon
H18	FZINC	ppb	5	12	9	5000	EPAS		Zinc, filtered
H19	FCALCIU	ppb	50	12	0	.			Calcium, filtered
H25	FNICKEL	ppb	10	12	12 ***	.			Nickel, filtered
H26	FCOPPER	ppb	10	12	12 ***	1300	EPAP		Copper, filtered
H27	FVANADI	ppb	5	12	3	.			Vanadium, filtered
H28	FALUMIN	ppb	150	12	12 ***	.			Aluminum, filtered
H30	FPOTASS	ppb	100	12	0	.			Potassium, filtered
H32	FMAGNES	ppb	50	12	0	.			Magnesium, filtered
H33	FBERYLL	ppb	5	12	12 ***	.			Beryllium, filtered
H35	FSTRONT	ppb	20	12	0	.			Strontium, filtered
H36	FANTIMO	ppb	100	12	12 ***	.			Antimony, filtered
H66	BROMIDE	ppb	1000	12	12 ***	.			Bromide
H67	NITRITE	ppb	1000	12	12 ***	.			Nitrite

TABLE 8.7. (contd)

Constituent List=Site Specific and Other Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
H86	FBORON	ppb	10	12	1	.			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	12 ***	.			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 173-303-9905 Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full name
A23	THALIUM	ppb	5	12	12 ***	.			Thallium
A24	THIOURA	ppb	200	12	12 ***	.			Thiourea
A25	ACETREA	ppb	200	12	12 ***	.			1-Acetyl-2-thiourea
A26	CHLOREA	ppb	200	12	12 ***	.			1-(o-Chlorophenyl) thiourea
A27	DIETROL	ppb	200	12	12 ***	.			Diethylstilbesterol
A28	ETHYREA	ppb	200	12	12 ***	.			Ethylenethiourea
A29	NAPHREA	ppb	200	12	12 ***	.			1-Naphthyl-2-thiourea
A32	PHENREA	ppb	500	12	12 ***	.			n-Phenylthiourea
A40	DDD	ppb	0.1	12	12 ***	.			DDD
A41	DDE	ppb	0.1	12	12 ***	.			DDE
A42	DDT	ppb	0.1	12	12 ***	.			DDT
A43	HEPTLOR	ppb	0.1	12	12 ***	0	EPAP		Heptachlor
A44	HEPTIDE	ppb	0.1	12	12 ***	0	EPAP		Heptachlor epoxide
A45	KEPONE	ppb	1	12	12 ***	.			Kepone (discontinued)
A46	DIELRIN	ppb	0.1	12	12 ***	.			Dieldrin
A47	ALDRIN	ppb	0.1	12	12 ***	.			Aldrin
A48	CHLOANE	ppb	1	12	12 ***	0	EPAP		Chlordane
A49	END01	ppb	0.1	12	12 ***	.			Endosulfan I (alpha)
A52	END02	ppb	0.1	12	12 ***	.			Endosulfan II (beta)
A54	AR1016	ppb	1	12	11	0	EPAP	xxx	Arochlor 1016
A55	AR1221	ppb	1	12	12 ***	0	EPAP		Arochlor 1221
A56	AR1232	ppb	1	12	12 ***	0	EPAP		Arochlor 1232
A57	AR1242	ppb	1	12	12 ***	0	EPAP		Arochlor 1242
A58	AR1248	ppb	1	12	12 ***	0	EPAP		Arochlor 1248
A59	AR1254	ppb	1	12	12 ***	0	EPAP		Arochlor 1254
A60	AR1260	ppb	1	12	12 ***	0	EPAP		Arochlor 1260

TABLE 8.7. (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
A61	TETRANE	ppb	5	12	12 ***	5	EPA	Tetrachloromethane [Carbon Tetrachloride
A62	BENZENE	ppb	5	12	12 ***	5	EPA	Benzene
A63	DIOXANE	ppb	500	12	12 ***	.		Dioxane
A64	METHONE	ppb	10	12	9	.		Methyl ethyl ketone
A65	PYRIDIN	ppb	500	12	12 ***	.		Pyridine
A66	TOLUENE	ppb	5	12	12 ***	2000	EPAP	Toluene
A67	1,1,1-T	ppb	5	12	12 ***	200	EPA	1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	12	12 ***	.		1,1,2-Trichloroethane
A69	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
A72	ACROLIN	ppb	10	12	12 ***	.		Acrolein
A73	ACRYILE	ppb	10	12	12 ***	.		Acrylonitrile
A74	BISTHER	ppb	5	12	12 ***	.		Bis(chloromethyl) ether
A75	BROMONE	ppb	5	12	12 ***	.		Bromoacetone
A76	METHBRO	ppb	10	12	12 ***	.		Methyl bromide
A77	CARBIDE	ppb	10	12	12 ***	.		Carbon disulfide
A78	CHLBENZ	ppb	5	12	12 ***	60	EPAP	Chlorobenzene
A79	CHLTHER	ppb	5	12	12 ***	.		2-Chloroethyl vinyl ether
A80	CHLFORM	ppb	5	12	2	100	EPA	Chloroform [Trichloromethane]
A81	METHCHL	ppb	10	12	12 ***	.		Methyl chloride [Chloromethane]
A82	CHMTHER	ppb	10	12	12 ***	.		Chloromethyl methyl ether
A83	CROTONA	ppb	10	12	12 ***	.		Crotonaldehyde
A84	DIBRCHL	ppb	10	12	12 ***	0	EPAP	1,2-Dibromo-3-chloropropane
A85	DIBRETH	ppb	10	12	12 ***	.		1,2-Dibromoethane
A86	DIBRMET	ppb	10	12	12 ***	.		Dibromomethane
A87	DIBUTEN	ppb	10	12	12 ***	.		1,4-Dichloro-2-butene
A88	DICDIFM	ppb	10	12	12 ***	.		Dichlorodifluoromethane
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	TRANDCE	ppb	5	12	12 ***	70	EPAP	trans-1,2-Dichloroethene
A92	DICETHY	ppb	10	12	12 ***	7	EPA	1,1-Dichloroethylene
A93	METHYCH	ppb	5	12	8	.		Methylene chloride [Dichloromethane]
A94	DICPANE	ppb	5	12	12 ***	6	EPAP	1,2-Dichloropropane
A95	DICPENE	ppb	5	12	12 ***	.		1,3-Dichloropropene
A96	NNDIEHY	ppb	10	12	12 ***	.		N,N-diethylhydrazine
A97	1,1-DIM	ppb	10	12	12 ***	.		1,1-Dimethylhydrazine
A98	1,2-DIM	ppb	10	12	12 ***	.		1,2-Dimethylhydrazine
B01	IODOMET	ppb	10	12	12 ***	.		Iodomethane
B02	METHACR	ppb	10	12	12 ***	.		Methacrylonitrile
B03	METHTHI	ppb	10	12	12 ***	.		Methanethiol
B04	PENTACH	ppb	10	12	12 ***	.		Pentachloroethane
B05	1112-tc	ppb	10	12	12 ***	.		1,1,1,2-Tetrachlorethane
B06	1122-tc	ppb	5	12	12 ***	.		1,1,2,2-Tetrachlorethane
B08	BROMORM	ppb	5	12	12 ***	100	EPA	Bromoform [Tribromomethane]
B09	TRCMEOL	ppb	10	12	12 ***	.		Trichloromethanethiol
B10	TRCMFLM	ppb	10	12	12 ***	.		Trichloromonofluoromethane
B12	123-trp	ppb	10	12	12 ***	.		1,2,3-Trichloropropane

TABLE 8.7. (contd)

Constituent List=WAC 173-303-9905 Constituents

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency Exceeded	Full name
B13	VINYIDE	ppb	10	12	12 ***	2	EPA	Vinyl chloride
B14	M-XYLE	ppb	5	12	12 ***	440	EPAP	Xylene-m
B19	ACETILE	ppb	3000	12	12 ***	.		Acetonitrile
B20	ACETOPH	ppb	10	12	12 ***	.		Acetophenone
B21	WARFRIN	ppb	10	12	12 ***	.		Warfarin
B22	ACEFENE	ppb	10	12	12 ***	.		2-Acetylaminofluorene
B23	AMINOYL	ppb	10	12	12 ***	.		4-Aminobiphenyl
B24	AMIISOX	ppb	10	12	12 ***	.		5-(Aminomethyl)-3-isoxazolol
B25	AMITROL	ppb	10	12	12 ***	.		Amitrole
B26	ANILINE	ppb	10	12	12 ***	.		Aniline
B27	ARAMITE	ppb	10	12	12 ***	.		Aramite
B28	AURAMIN	ppb	10	12	12 ***	.		Auramine
B29	BENZCAC	ppb	10	12	12 ***	.		Benz[c]acridine
B30	BENZAAN	ppb	10	12	12 ***	.		Benz[a]anthracene
B31	BENDICM	ppb	10	12	12 ***	.		Benzene, dichloromethyl
B32	BENTHOL	ppb	10	12	12 ***	.		Benzenethiol
B33	BENDINE	ppb	10	12	12 ***	.		Benzidine
B34	BENZBFL	ppb	10	12	12 ***	.		Benzo[b]fluoranthene
B35	BENZJFL	ppb	10	12	12 ***	.		Benzo[j]fluoranthene
B36	PBENZQU	ppb	10	12	12 ***	.		p-Benzoquinone
B37	BENZCHL	ppb	10	12	12 ***	.		Benzyl chloride
B38	BIS2CHM	ppb	10	12	12 ***	.		Bis(2-chloroethoxy) methane
B39	BIS2CHE	ppb	10	12	12 ***	.		Bis(2-chloroethyl) ether
B40	BIS2EPH	ppb	10	12	11	.		Bis(2-ethylhexyl) phthalate
B41	BROPHEN	ppb	10	12	12 ***	.		4-Bromophenyl phenyl ether
B42	BUTBENP	ppb	10	12	12 ***	.		Butyl benzyl phthalate
B43	BUTDINP	ppb	10	12	12 ***	.		2-sec-Butyl-4,6-dinitrophenol (DNBP)
B44	CHALETH	ppb	10	12	12 ***	.		Chloroalkyl ethers
B45	CHLANIL	ppb	10	12	12 ***	.		p-Chloroaniline
B46	CHLCRES	ppb	10	12	12 ***	.		p-Chloro-m-cresol
B47	CHLEPOX	ppb	10	12	12 ***	0	EPAP	1-Chloro-2,3-epoxypropane
B48	CHLNAPH	ppb	10	12	12 ***	.		2-Chloronaphthalene
B49	CHLPHEN	ppb	10	12	12 ***	.		2-Chlorophenol
B50	CHRYSEN	ppb	10	12	12 ***	.		Chrysene
B51	CRESOLS	ppb	10	12	12 ***	.		Cresols
B52	CYCHDIN	ppb	10	12	12 ***	.		2-Cyclohexyl-4,6-dinitrophenol
B53	DIBAHAC	ppb	10	12	12 ***	.		Dibenz[a,h]acridine
B54	DIBAJAC	ppb	10	12	12 ***	.		Dibenz[a,j]acridine
B55	DIBAHAN	ppb	10	12	12 ***	.		Dibenz[a,h]anthracene
B56	DIBCGCA	ppb	10	12	12 ***	.		7H-Dibenzo[c,g]carbazole
B57	DIBAEPY	ppb	10	12	12 ***	.		Dibenzo[a,e]pyrene
B58	DIBAHPY	ppb	10	12	12 ***	.		Dibenzo[a,h]pyrene
B59	DIBAIPY	ppb	10	12	12 ***	.		Dibenzo[a,i]pyrene
B60	DIBPHTH	ppb	10	12	12 ***	.		Di-n-butyl phthalate
B61	12-dben	ppb	10	12	12 ***	.		1,2-Dichlorobenzene
B62	13-dben	ppb	10	12	12 ***	.		1,3-Dichlorobenzene
B63	14-dben	ppb	10	12	12 ***	75	EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
B64	DICHBEN	ppb	20	12	12 ***	.		3,3'-Dichlorobenzidine

TABLE 8.7. (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
B65	24-dchp	ppb	10	12	12 ***	.		2,4-Dichlorophenol
B66	26-dchp	ppb	10	12	12 ***	.		2,6-Dichlorophenol
B67	DIEPHTH	ppb	10	12	12 ***	.		Diethyl phthalate
B68	DIHYSAF	ppb	10	12	12 ***	.		Dihydrosafrole
B69	DIMETHB	ppb	10	12	12 ***	.		3,3'-Dimethoxybenzidine
B70	DIMEAMB	ppb	10	12	12 ***	.		p-Dimethylaminoazobenzene
B71	DIMBENZ	ppb	10	12	12 ***	.		7,12-Dimethylbenz[a]anthracene
B72	DIMEYLB	ppb	10	12	12 ***	.		3,3'-Dimethylbenzidine
B73	THIONOX	ppb	10	12	12 ***	.		Thiofanox
B74	DIMPHAM	ppb	10	12	12 ***	.		alpha,alpha-Dimethylphenethylamine
B76	DIMPHTH	ppb	10	12	12 ***	.		Dimethyl phthalate
B77	DINBENZ	ppb	10	12	12 ***	.		Dinitrobenzene
B78	DINCRES	ppb	10	12	12 ***	.		4,6-Dinitro-o-cresol and salts
B79	DINPHEN	ppb	50	12	12 ***	.		2,4-Dinitrophenol
B80	24-dint	ppb	10	12	12 ***	.		2,4-Dinitrotoluene
B81	26-dint	ppb	10	12	12 ***	.		2,6-Dinitrotoluene
B82	DIOPHTH	ppb	10	12	12 ***	.		Di-n-octyl phthalate
B83	DIPHAMI	ppb	10	12	12 ***	.		Diphenylamine
B84	DIPHHYD	ppb	10	12	12 ***	.		1,2-Diphenylhydrazine
B85	DIPRNIT	ppb	10	12	12 ***	.		Di-n-propylnitrosamine
B86	ETHMINE	ppb	10	12	12 ***	.		Ethyleneimine
B87	ETHMETS	ppb	10	12	12 ***	.		Ethyl methanesulfonate
B88	FLUORAN	ppb	10	12	12 ***	.		Fluoranthene
B89	HEXCBEN	ppb	10	12	12 ***	.		Hexachlorobenzene
B90	HEXCBUT	ppb	10	12	12 ***	.		Hexachlorobutadiene
B91	HEXCCYC	ppb	10	12	12 ***	.		Hexachlorocyclopentadiene
B92	HEXCETH	ppb	10	12	12 ***	.		Hexachloroethane
B93	INDENOP	ppb	10	12	12 ***	.		Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	ppb	10	12	12 ***	.		Isosafrole
B95	MALOILE	ppb	10	12	12 ***	.		Malononitrile
B96	MELPHAL	ppb	10	12	12 ***	.		Melphalan
B97	METHAPY	ppb	10	12	12 ***	.		Methapyrilene
B98	METHNYL	ppb	10	12	12 ***	.		Metholonyl
B99	METAZIR	ppb	10	12	12 ***	.		2-Methylaziridine
C01	METCHAN	ppb	10	12	12 ***	.		3-Methylcholanthrene
C02	METBISC	ppb	10	12	12 ***	.		4,4'-Methylenebis(2-chloroaniline)
C03	METACTO	ppb	10	12	12 ***	.		2-Methyllactonitrile
C04	METACRY	ppb	10	12	12 ***	.		Methyl methacrylate
C05	METMSUL	ppb	10	12	12 ***	.		Methyl methanesulfonate
C06	METPROP	ppb	10	12	12 ***	.		2-Methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	ppb	10	12	12 ***	.		Methylthiouracil
C08	NAPHQUI	ppb	10	12	12 ***	.		1,4-Naphthoquinone
C09	1-napha	ppb	10	12	12 ***	.		1-Naphthylamine
C10	2-napha	ppb	10	12	12 ***	.		2-Naphthylamine
C11	NITRANI	ppb	50	12	12 ***	.		p-Nitroaniline
C12	NITBENZ	ppb	10	12	12 ***	.		Nitrobenzene
C13	NITPHEN	ppb	50	12	12 ***	.		4-Nitrophenol [p-Nitrophenol]

TABLE 8.7. (contd)

Constituent List=WAC 173-303-9905 Constituents

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency Exceeded	Full name
C14	NNIBUTY	ppb	10	12	12 ***	.		n-Nitrosodi-n-butylamine
C15	NNIDIEA	ppb	10	12	12 ***	.		n-Nitrosodiethanolamine
C16	NNIDIEY	ppb	10	12	12 ***	.		n-Nitrosodiethylamine
C17	NNIDIME	ppb	10	12	12 ***	.		n-Nitrosodimethylamine
C18	NNIMETH	ppb	10	12	12 ***	.		n-Nitrosomethylethylamine
C19	NNIURET	ppb	10	12	12 ***	.		n-Nitroso-n-methylurethane
C20	NNIVINY	ppb	10	12	12 ***	.		n-Nitrosomethylvinylamine
C21	NNIMORP	ppb	10	12	12 ***	.		n-Nitrosomorpholine
C22	NNINICO	ppb	10	12	12 ***	.		n-Nitrosonornicotine
C23	NNIPIPE	ppb	10	12	12 ***	.		n-Nitrosopiperidine
C24	NITRPYR	ppb	10	12	12 ***	.		Nitrosopyrrolidine
C25	NITRTOL	ppb	10	12	12 ***	.		5-Nitro-o-toluidine
C26	PENTCHB	ppb	10	12	12 ***	.		Pentachlorobenzene
C27	PENTCHN	ppb	10	12	12 ***	.		Pentachloronitrobenzene
C28	PENTCHP	ppb	50	12	12 ***	220	EPAP	Pentachlorophenol
C29	PHENTIN	ppb	10	12	12 ***	.		Phenacetin
C30	PHENINE	ppb	10	12	12 ***	.		Phenylenediamine
C31	PHTHEST	ppb	10	12	12 ***	.		Phthalic acid esters
C32	PICOLIN	ppb	10	12	12 ***	.		2-Picoline
C33	PRONIDE	ppb	10	12	12 ***	.		Pronamide
C34	RESERPI	ppb	10	12	12 ***	.		Reserpine
C35	RESORCI	ppb	10	12	12 ***	.		Resorcinol
C36	SAFROL	ppb	10	12	12 ***	.		Safrol
C37	TETRCHB	ppb	10	12	12 ***	.		1,2,4,5-Tetrachlorobenzene
C39	TETRCHP	ppb	10	12	12 ***	.		2,3,4,6-Tetrachlorophenol
C40	THIURAM	ppb	10	12	12 ***	.		Thiuram
C41	TOLUDIA	ppb	10	12	12 ***	.		Toluenediamine
C42	OTOLHYD	ppb	10	12	12 ***	.		o-Toluidine hydrochloride
C43	TRICHLB	ppb	10	12	12 ***	.		1,2,4-Trichlorobenzene
C44	245-trp	ppb	50	12	12 ***	.		2,4,5-Trichlorophenol
C45	246-trp	ppb	10	12	12 ***	.		2,4,6-Trichlorophenol
C46	TRIPHOS	ppb	10	12	12 ***	.		O,o,o-triethyl phosphorothioate
C47	SYMTRIN	ppb	10	12	12 ***	.		Sym-trinitrobenzene
C48	TRISPHO	ppb	10	12	12 ***	.		Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	ppb	10	12	12 ***	.		Benzo[a]pyrene
C50	CHLNAPZ	ppb	10	12	12 ***	.		Chlornaphazine
C51	BIS2ETH	ppb	10	12	12 ***	.		Bis(2-chloroisopropyl) ether
C52	HEXAENE	ppb	10	12	12 ***	.		Hexachloropropene
C54	HEXACHL	ppb	10	12	12 ***	.		Hexachlorophene
C55	NAPHTHA	ppb	10	12	12 ***	.		Naphthalene
C56	123TRI	ppb	10	12	12 ***	.		1,2,3-Trichlorobenzene
C58	135TRI	ppb	10	12	12 ***	.		1,3,5-Trichlorobenzene
C59	1234TE	ppb	10	12	12 ***	.		1,2,3,4-Tetrachlorobenzene
C60	1235TE	ppb	10	12	12 ***	.		1,2,3,5-Tetrachlorobenzene
C61	TETEPYR	ppb	2	12	12 ***	.		Tetraethylpyrophosphate
C62	CHLLATE	ppb	300	12	12 ***	.		Chlorobenzilate
C63	CARBPHT	ppb	2	12	12 ***	.		Carbophenothion
C64	DISULFO	ppb	2	12	12 ***	.		Disulfoton
C65	DIMETHO	ppb	2	12	12 ***	.		Dimethoate
C66	METHPAR	ppb	2	12	12 ***	.		Methyl parathion
C67	PARATHI	ppb	2	12	12 ***	.		Parathion

TABLE 8.7. (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
C70	CYANIDE	ppb	10	12	12 ***	.		Cyanide
C71	FORMALN	ppb	500	12	12 ***	.		Formalin
C78	SULFIDE	ppb	1000	12	12 ***	.		Sulfide
C79	KEROSEN	ppb	10000	12	12 ***	.		Kerosene
C80	AMMONIU	ppb	50	12	11	.		Ammonium ion
C87	CITRUSR	ppb	1000	12	12 ***	.		Citrus red
C90	PARALDE	ppb	10000	12	12 ***	.		Paraldehyde
C91	STRYCHN	ppb	50	12	12 ***	.		Strychnine
C92	MALHYDR	ppb	500	12	12 ***	.		Maleic hydrazide
C93	NICOTIN	ppb	100	12	12 ***	.		Nicotinic acid
C94	ACRYIDE	ppb	10000	12	12 ***	0	EPAP	Acrylamide
C95	ALLYLAL	ppb	10000	12	12 ***	.		Allyl alcohol
C98	CHLPROP	ppb	10000	12	12 ***	.		3-Chloropropionitrile
D01	PCDDs	ppb	0.01	12	12 ***	.		PCDDs
D02	PCDFs	ppb	0.01	12	12 ***	.		PCDFs
D03	2378TCD	ppb	0.01	12	12 ***	.		2,3,7,8-TCDD [Dioxin]
H03	ETHCARB	ppb	10000	12	12 ***	.		Ethyl carbamate
H04	ETHCYAN	ppb	10000	12	12 ***	.		Ethyl cyanide
H05	ETHOXID	ppb	10	12	12 ***	.		Ethylene oxide
H06	ETHMETH	ppb	10	12	12 ***	.		Ethyl methacrylate
H09	ISOBUTY	ppb	10000	12	12 ***	.		Isobutyl alcohol
H11	PROPYLA	ppb	10000	12	12 ***	.		n-Propylamine
H12	PROPYNO	ppb	10000	12	12 ***	.		2-Propyn-1-ol
H15	2,4,5-T	ppb	2	12	12 ***	.		2,4,5-T
H40	FTHALLI	ppb	5	12	12 ***	.		Thallium, filtered
H68	HEXONE	ppb	10	12	12 ***	.		Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	12	12 ***	.		Acetone by VOA
I06	ISOPHER	ppb	10	12	12 ***	.		Isopherone
I09	BUTANOL	ppb	10000	12	12 ***	.		1-Butanol
I21	TRIBUPH	ppb	10	12	12 ***	.		Tributylphosphoric acid
I28	TAF	ppb	10	12	12 ***	.		Tetrahydorfuran
I29	ACENAPH	ppb	10	12	12 ***	.		Acenaphthene
I30	FLRENE	ppb	10	12	12 ***	.		Fluorene
I31	ANTHRA	ppb	10	12	12 ***	.		Anthracene
I32	PYRENE	ppb	10	12	12 ***	.		Pyrene
I33	ETHBENZ	ppb	5	12	12 ***	680	EPAP	Ethylbenzene
I34	STYRENE	ppb	5	12	12 ***	140	EPAP	Styrene
I42	BDCM	ppb	5	12	12 ***	100	EPA	Bromodichloromethane
I43	CDBM	ppb	5	12	12 ***	100	EPA	Chlorodibromomethane
I64	2NITPH	ppb	10	12	12 ***	.		2-Nitrophenol [o-Nitrophenol]
I67	ETHANOL	ppb	10000	12	12 ***	.		Ethanol
I75	2MENAPH	ppb	10	12	12 ***	.		2-Methylnaphthalene
I82	PHENANT	ppb	10	12	12 ***	.		Phenanthrene
I98	UNKALI	ppb	0	13	0	.		Unknown aliphatic HC
I99	UNKNOWN	ppb	0	4	0	.		Unknown

TABLE 8.7. (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
J43	BENZALC	ppb	10	12	12 ***	.		Benzyl alcohol
J69	2HEXANO	ppb	50	12	12 ***	.		2-Hexanone
J71	BNZKFLU	ppb	10	12	12 ***	.		Benzo (k) fluoranthene
J83	BGHIPER	ppb	10	12	12 ***	.		Benzo (ghi) perylene
J89	DINOSEB	ppb	10	12	12 ***	.		Dinoseb
J91	DIALLAT	ppb	10	12	12 ***	.		Diallate
K52	NNDIPHA	ppb	10	12	12 ***	.		n-Nitrosodiphenylamine
K56	DIBENFR	ppb	10	12	12 ***	.		Dibenzofuran
K58	ACENATL	ppb	10	12	12 ***	.		Acenaphthylene
L20	MBP	ppb	10000	12	12 ***	.		Monobutylphosphate
L21	DBP	ppb	10000	12	12 ***	.		Dibutylphosphate
L45	ALLYLCL	ppb	100	12	12 ***	.		Allyl chloride
L46	CLETHAN	ppb	10	12	12 ***	.		Chlorethane
L48	PROPCN	ppb	5	12	12 ***	.		Propionitrile
L49	VINYLAC	ppb	5	12	12 ***	.		Vinyl acetate
L50	B2CLMEE	ppb	10	12	12 ***	.		bis(2-Chloro-1-methylethyl)ether
L52	DIPHOS	ppb	10	12	12 ***	.		O,O-Diethyl-O,2-pyrazinyl phosphorothion
L53	ISODRIN	ppb	10	12	12 ***	.		Isodrin
L54	ONITANI	ppb	10	12	12 ***	.		o-Nitroaniline
L55	MNITANI	ppb	10	12	12 ***	.		m-Nitroaniline
L56	4NITQUI	ppb	10	12	12 ***	.		4-Nitroquinoline 1-oxide
L57	ETHGLYC	ppb	10000	12	12 ***	.		Ethylene glycol
L59	1PROPAN	ppb	10000	12	12 ***	.		1-Propanol
L60	1BUTYN	ppb	10000	12	12 ***	.		1-Butynol
L62	ACETON	ppb	10	12	12 ***	.		Acetone by ABN
L63	14DBEN	ppb	5	12	12 ***	75	EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
L64	CHLROB	ppb	10	12	12 ***	.		Chlorobenzene (by ABN)
P12	ENDSFAN	ppb	0.5	12	12 ***	.		Endosulfan
P13	PHORATE	ppb	2	12	12 ***	.		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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 8.8. Constituents with at Least One Detected Value for the 1325-N Liquid Waste Disposal Facility March 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	06MAR89		1,394	130	8.27	8.10	#400	23
		1	1,393	145	8.30	8.10	#700	22
		2	1,394	146	8.26	8.20	#500	20
		3	1,393	146	8.26	8.10	#500	20
1-N-29	06MAR89		1,144	133	8.17	8.10	#400	90
		1	1,146	131	8.20	8.10	#400	97
		2	1,146	133	8.19	8.10	#400	90
		3	1,146	131	8.19	8.10	#400	82
1-N-31	06MAR89		133	124	8.49	8.90	#400	12
		1	133	126	8.53	9.00	#400	11
		2	133	126	8.52	8.90	#400	12
		3	134	125	8.53	9.00	#400	11
1-N-32	06MAR89		145	144	8.26	8.30	#300	#5
		1	146	144	8.31	8.30	#400	#7
		2	145	145	8.31	8.40	#400	#6
		3	145	142	8.27	8.40	#300	#7
1-N-33	06MAR89		158	152	8.26	8.20	#300	#7
		1	159	153	8.27	8.20	#300	#7
		2	159	152	8.25	8.30	#300	#6
		3	159	156	8.29	8.20	#300	#6
1-N-36	07MAR89		135	120	8.31	7.50	#500	#8
		1	134	119	8.32	7.50	#400	#9
		2	135	108	8.28	7.60	#400	#9
		3	135	118	8.28	7.60	#500	#9
1-N-41	08MAR89		211	185	8.20	8.10	#300	449 (a)
		1	211	185	8.20	8.10	#300	430 (a)
		2	211	190	8.20	8.10	#300	431 (a)
		3	211	185	8.20	8.10	#300	394 (a)
1-N-42	07MAR89		242	172	8.25	8.20	#300	15
		1	242	175	8.26	8.20	#400	13
		2	242	172	8.25	8.20	#400	13
		3	242	173	8.22	8.20	#300	14
1-N-52	08MAR89		167	171	8.20	7.50	#400	496 (a)
		1	168	173	8.20	7.50	#300	477 (a)
		2	168	170	8.20	7.50	#300	498 (a)
		3	168	169	8.20	7.50	#300	455 (a)

TABLE 8.8. (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-70	08MAR89		196	181	8.20	8.20	#400	133 [a]
		1	196	181	8.20	8.20	#400	#28 [a]
		2	196	180	8.20	8.20	#400	102 [a]
		3	196	185	8.20	8.20	#500	148 [a]
6-81-58	03MAR89		156	212	8.02	7.60	#200	#4
		1	155	211	8.05	7.60	#100	#5
		2	154	210	8.10	7.60	#200	#-1
		3	153	216	8.08	7.70	#200	#0

Regular Monitoring Data

Well name	Collection Date	Duplicat sample number	ALPHAHI pCi/L 4/15	ALUMNUM ppb 150/.	AMMONIU ppb 50/.	AR1016 ppb 1/0p	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 6/1000	FBARIUM ppb 6/1000	BETA pCi/L 8/50
1-N-27	06MAR89		*0.2000	<150	90	<1.0	6	<5	10	12	393.000
1-N-29	06MAR89		*0.7520	<150	<50	<1.0	<5	<5	8	9	463.000
1-N-31	06MAR89		*0.3940	<150	<50	<1.0	<5	<5	10	10	51.600
1-N-32	06MAR89		1.2800	<150	<50	<1.0	5	<5	13	14	55.300
1-N-33	06MAR89		*0.4450	<150	<50	4.9	<5	<5	13	15	332.000
1-N-36	07MAR89		*0.2340	<150	<50	<1.0	<5	<5	8	8	313.000
	07MAR89	1	*0.4410	<150	<50	<1.0	<5	<5	8	8	294.000
1-N-41	08MAR89		*0.0623	<150	<50	<1.0	5	<5	19	17	31.000
1-N-42	07MAR89		*0.8380	259	<50	<1.0	8	5	21	13	34.400
1-N-52	08MAR89		*0.8670	<150	<50	<1.0	5	5	15	19	26.300
1-N-70	08MAR89		*-0.2940	<150	<50	<1.0	<5	<5	23	20	47.400
6-81-58	03MAR89		*0.4160	<150	<50	<1.0	5	<5	18	20	*0.868

Well name	Collection Date	Duplicat sample number	BIS2EPH ppb 10/.	BORON ppb 10/.	FBORON ppb 10/.	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLFORM ppb 5/100	CHLORID ppb 500/250000s	FCHROMI ppb 10/50	CHROMUM ppb 10/50
1-N-27	06MAR89		<10	17	19	21,300	18,600	<5	800	<10	<10
1-N-29	06MAR89		<10	18	20	20,100	19,400	#3	900	<10	<10
1-N-31	06MAR89		<10	19	20	18,500	18,400	#4	1,000	<10	<10
1-N-32	06MAR89		<10	28	24	18,500	19,700	#4	700	<10	<10
1-N-33	06MAR89		14	29	36	24,300	22,300	#3	700	<10	<10
1-N-36	07MAR89		<10	20	16	16,600	17,200	#3	900	<10	<10
	07MAR89	1	<10	19	15	16,800	17,100	#4	900	<10	<10
1-N-41	08MAR89		<10	23	21	24,700	25,100	#3	1,000	<10	<10
1-N-42	07MAR89		<10	22	50	23,100	23,500	#3	1,000	<10	<10
1-N-52	08MAR89		<10	25	22	20,300	20,100	#3	900	<10	<10
1-N-70	08MAR89		<10	18	14	21,100	22,000	#4	700	<10	<10
6-81-58	03MAR89		<10	<10	<10	31,400	28,300	<5	1,400	14	15

TABLE 8.8. (contd)

Well name	Collection Date	Duplicat sample number	CO-60 pCi/L 22.5/100r	CS-137 pCi/L 20/200r	IRON ppb 30/300s	FIRON ppb 30/300s	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	METHONE ppb 10/.
1-N-27	06MAR89		33.40	*0.745	60	<30	3,530	4,060	<5	<5	<10
1-N-29	06MAR89		31.30	*1.680	73	<30	3,100	3,290	<5	<5	<10
1-N-31	06MAR89		10.60	*6.360	101	<30	2,990	3,070	<5	<5	<10
1-N-32	06MAR89		20.20	*-4.740	43	<30	4,140	3,910	<5	<5	<10
1-N-33	06MAR89		26.20	*-6.070	38	<30	3,870	4,150	<5	<5	<10
1-N-36	07MAR89		16.40	*-2.770	35	<30	3,290	3,260	<5	<5	<10
	07MAR89	1	.	.	76	<30	3,260	3,280	<5	<5	<10
1-N-41	08MAR89		30.70	*-2.000	185	<30	5,810	5,900	<5	<5	#3
1-N-42	07MAR89		51.50	*-4.410	4,490	<30	5,820	5,800	<5	21	<10
1-N-52	08MAR89		34.70	*1.990	68	<30	5,710	6,010	<5	<5	#3
1-N-70	08MAR89		51.00	*4.630	103	33	6,580	6,430	8	<5	#3
6-81-58	03MAR89		*1.78	*1.210	311	<30	8,370	9,280	<5	5	<10

Well name	Collection Date	Duplicat sample number	METHYCH ppb 5/.	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	SB-125 pCi/L 48/300r	FSILICO ppb 50/.
1-N-27	06MAR89		<5	<10	9,100	2,040	1,750	*-0.035200	*40.30	.	7,100
1-N-29	06MAR89		<5	<10	5,400	1,420	1,330	*-0.017700	*13.90	.	5,100
1-N-31	06MAR89		<5	<10	2,600	1,730	1,670	*0.072600	*38.20	.	5,480
1-N-32	06MAR89		<5	<10	7,100	2,270	2,470	*0.070700	*-11.90	93.6	8,600
1-N-33	06MAR89		<5	<10	6,300	2,440	2,250	*0.053000	*50.40	.	9,060
1-N-36	07MAR89		<5	<10	4,800	1,550	1,590	*0.070300	*8.07	.	6,350
	07MAR89	1	<5	<10	4,600	1,560	1,590	*-0.030100	.	.	6,420
1-N-41	08MAR89		#3	<10	22,700	3,280	3,230	*0.027200	*38.70	.	12,300
1-N-42	07MAR89		#3	<10	16,000	3,360	3,320	*0.057600	*8.44	.	14,400
1-N-52	08MAR89		#3	<10	17,200	3,400	3,160	*-0.008600	*24.00	.	14,200
1-N-70	08MAR89		#3	10	28,800	2,970	3,070	*0.094800	*7.40	.	12,100
6-81-58	03MAR89		<5	<10	2,900	3,070	2,860	*0.000726	*43.30	.	11,100

Well name	Collection Date	Duplicate sample number	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONUM ppb 20/.	SULFATE ppb 500/250000s	TC ppb 1000/.
1-N-27	06MAR89		6,330	2,190	2,550	326.000	101	89	11,800	13,000
1-N-29	06MAR89		4,900	1,140	1,230	591.000	86	82	12,500	12,000
1-N-31	06MAR89		5,420	1,230	1,310	36.600	78	76	12,500	11,500
1-N-32	06MAR89		8,950	2,090	1,960	11.200	102	109	11,200	13,300
1-N-33	06MAR89		8,300	2,320	2,500	285.000	110	101	10,700	14,900
1-N-36	07MAR89		6,500	1,640	1,650	173.000	90	90	11,600	11,400
	07MAR89	1	6,450	1,650	1,660	.	90	89	11,600	11,500
1-N-41	08MAR89		12,400	4,990	5,190	*-0.148	158	151	10,100	16,800
1-N-42	07MAR89		15,300	6,200	6,390	*0.125	174	171	10,000	11,600
1-N-52	08MAR89		13,800	5,710	6,180	*0.106	146	136	10,500	15,900
1-N-70	08MAR89		12,500	5,640	5,500	*0.090	170	174	8,800	15,100
6-81-58	03MAR89		10,200	4,740	5,210	*0.511	215	192	16,000	.

TABLE 8.8. (contd)

Well name	Collection Date	Duplicate sample number	TRITIUM pCi/L 500/20000	U pCi/L 0.5/600d	UNKALI ppb 0/.	UNKNOWN ppb 0/.	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
1-N-27	06MAR89		40,200	0.563	.	.	6	<5	<5	<5
1-N-29	06MAR89		38,900	0.468	.	.	6	<5	<5	<5
1-N-31	06MAR89		27,200	0.314	.	.	<5	<5	<5	<5
1-N-32	06MAR89		67,800	0.576	.	.	<5	12	<5	6
1-N-33	06MAR89		57,200	0.639	36	24(b)	11	5	5	<5
	06MAR89	A	.	.	26	33(b)	.	.	.	.
	06MAR89	B	.	.	26	24(b)	.	.	.	.
	06MAR89	C	.	.	29	.	.	.	.	.
	06MAR89	D	.	.	26	.	.	.	.	.
	06MAR89	E	.	.	38	.	.	.	.	.
	06MAR89	F	.	.	58	.	.	.	.	.
	06MAR89	G	.	.	32	.	.	.	.	.
	06MAR89	H	.	.	30	.	.	.	.	.
	06MAR89	I	.	.	21	.	.	.	.	.
	06MAR89	J	.	.	33	.	.	.	.	.
	06MAR89	K	.	.	23	.	.	.	.	.
	06MAR89	L	.	.	23	.	.	.	.	.
1-N-36	07MAR89		43,600	0.387	.	.	<5	9	<5	<5
	07MAR89	1	.	0.364	.	.	7	9	6	<5
1-N-41	08MAR89		66,600	0.378	.	.	22	24	22	12
1-N-42	07MAR89		71,900	0.546	.	20(b)	28	36	85	<5
1-N-52	08MAR89		80,800	0.529	.	.	26	23	7	<5
1-N-70	08MAR89		120,000	0.499	.	.	20	18	27	6
6-81-58	03MAR89		*270	1.210	.	.	8	15	<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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
w - based on additional Secondary Maximum Contaminant Levels given 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. First replicate analyzed was out of the calibration range. Samples were then diluted (see page 1.3).

(b) Unknown semivolatile constituent found during analyses.

9.0 216-A-10 CRIB

S. P. Luttrell

The ground water beneath the 216-A-10 crib has been monitored by a RCRA interim-status well network since November 1988. This project is in the background stage of monitoring; three sample sets have been 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 water levels) were conducted during the quarter.

WATER LEVELS

Water-level measurements were made when samples were collected in June; also, supplemental measurements were made in June (Table 9.2).

WATER CHEMISTRY DATA

Ground-water samples were collected from wells at the 216-A-10 crib during the period June 16 through 22, 1989. No sample was collected from well 299-E17-19 because a water-level measurement could not be obtained. The well will be sampled in July. The analytical results for these samples are not yet available.

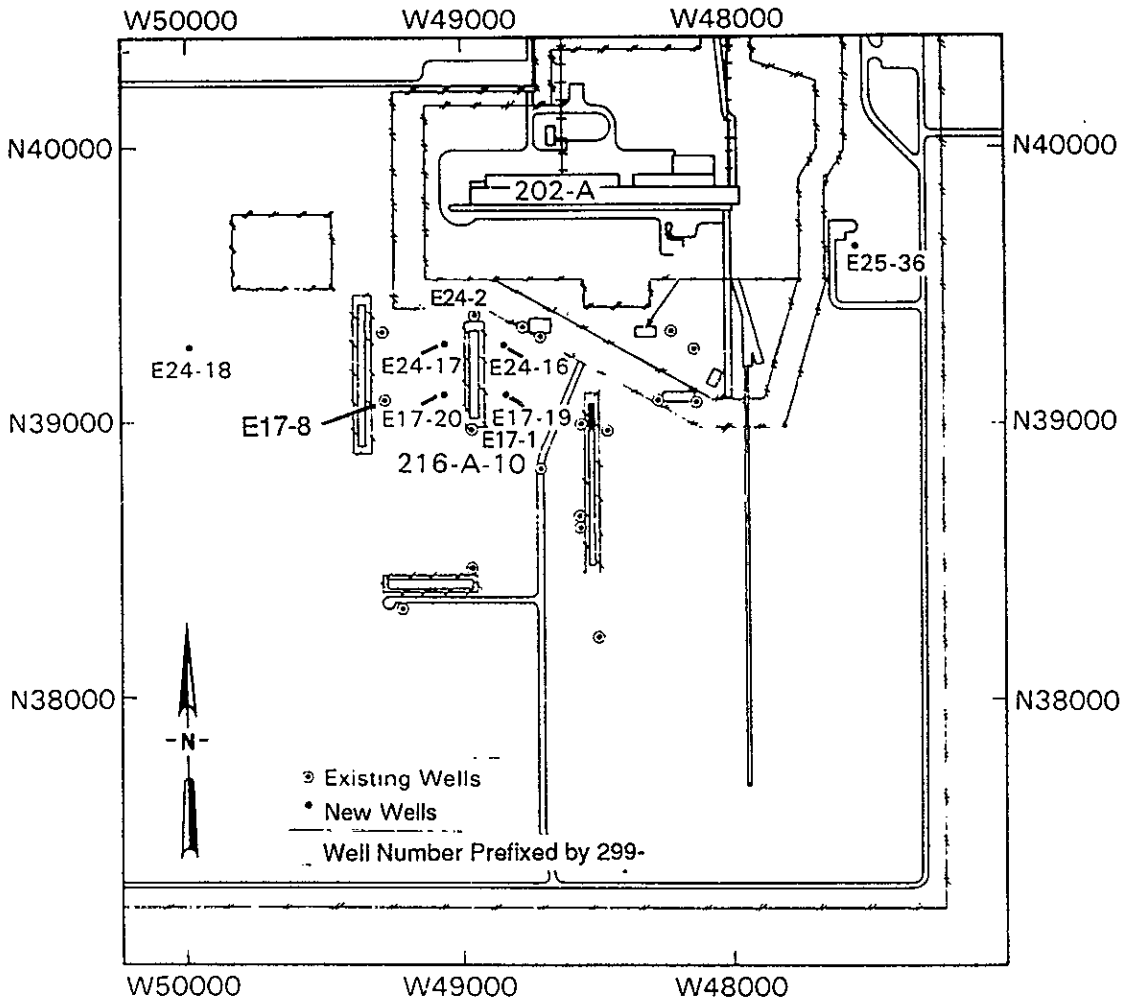


FIGURE 9.1. Monitoring Well Locations for the 216-A-10 Crib

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

Well	1988			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E17- 1		L			X[a]				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	

(a) Sample not collected.
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).

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

Well Number	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E17-1	719.17	6/19/89	314.57	404.60
		6/28/89	314.36	404.81
299-E17-8	718.38	6/28/89	313.73	404.65
299-E17-19	719.33	6/16/89	NM[b]	--
		6/28/89	314.78	404.55
299-E17-20	719.23	6/16/89	314.97	404.26
		6/28/89	314.13	405.10
299-E24-2	717.47	6/22/89	312.19	405.28
		6/28/89	312.35	405.12
299-E24-16	718.27	6/19/89	313.52	404.75
		6/28/89	313.14	405.13
299-E24-17	718.69	6/19/89	314.85	403.84
		6/28/89	314.53	404.16
299-E24-18	719.28	6/19/89	314.77	404.51
		6/28/89	314.31	404.97
299-E25-36	707.39	6/19/89	302.39	405.00
		6/28/89	302.35	405.04

(a) MSL = mean sea level
(b) NM = no measurement

THIS PAGE INTENTIONALLY
LEFT BLANK

10.0 216-A-29 DITCH

S. P. Luttrell

The ground water beneath the 216-A-29 ditch has been monitored by a RCRA interim-status well network since November 1988. This project is in the background stage of monitoring; two sets of samples have been collected. A ground-water monitoring plan has been prepared for this ditch.

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, 299-E25-34, and 299-E25-35 are the downgradient monitoring wells (see Figure 10.1). Also, wells 299-E25-26, 299-E25-28, and 299-E25-32 are 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. In addition to the monitoring wells, the water level in well 299-E25-10 has been measured.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

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

WATER LEVELS

Supplemental water-level measurements were made in May 1989 (Table 10.2).

WATER CHEMISTRY DATA

Ground-water samples were not collected from wells around the 216-A-29 ditch this quarter because purge water containment vessels were not yet in place to contain purge waters from the wells. Samples are scheduled to be collected in July 1989.

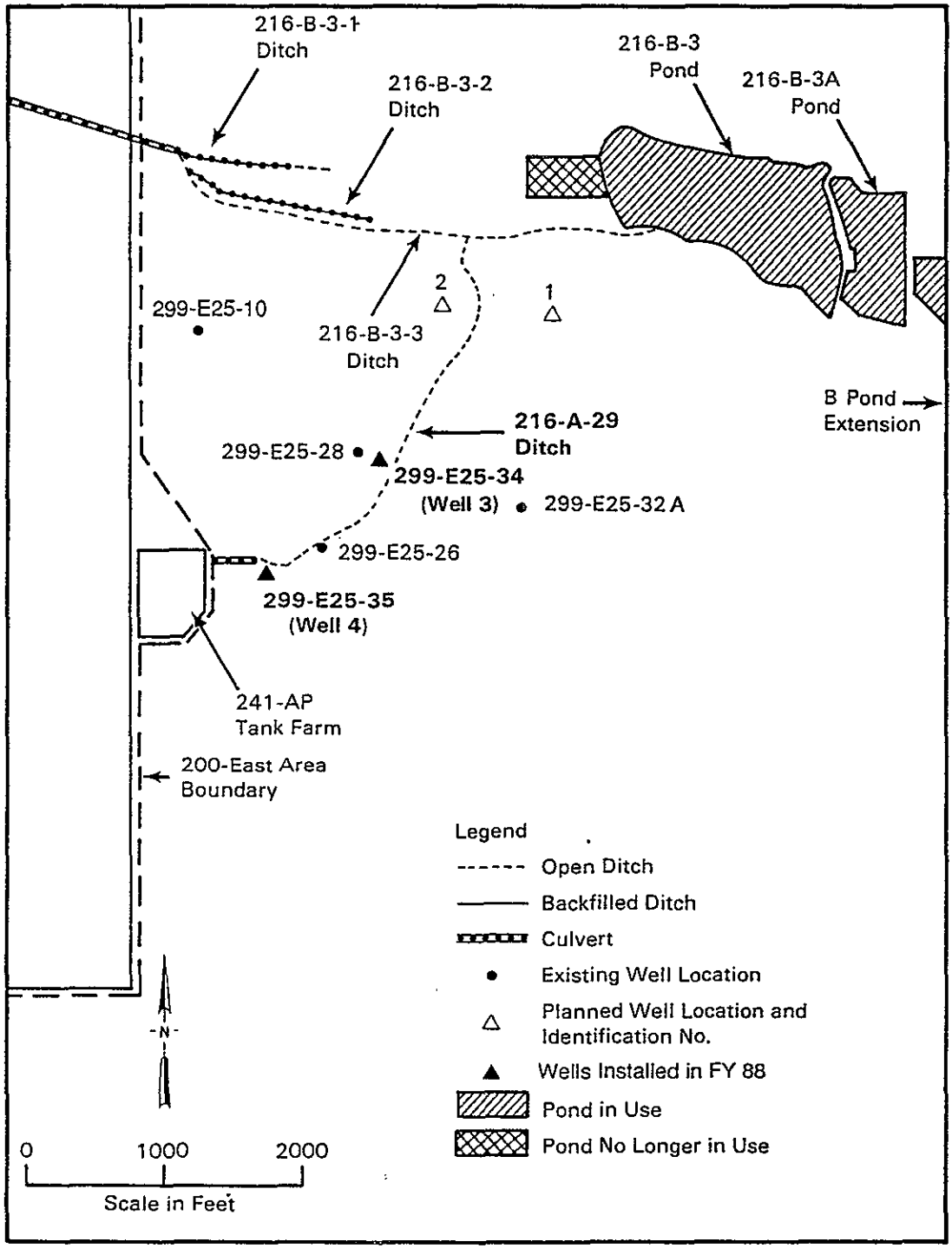


FIGURE 10.1. Monitoring Well Locations for the 216-A-29 Ditch

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

Well	1988			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E25-26			X		S					S	OL	
299-E25-28		X			S					S	OLR	
299-E25-32A		XR			S					SRV	OL	
299-E25-34		X			XRV					X	X	
299-E25-35		X			X					X	X	

OL = sampled for the long 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

Well Number	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E25-10	655.84	5/24/89	250.38	405.46
299-E25-26	668.55	5/24/89	262.62	405.93
299-E25-28	662.44	5/24/89	256.42	406.02
299-E25-32A	669.19	5/24/89	263.12	406.07
299-E25-34	662.87	5/24/89	256.96	405.91
299-E25-35	674.39	5/24/89	268.96	405.43

(a) MSL = mean sea level.

THIS PAGE INTENTIONALLY
LEFT BLANK

11.0 216-A-36B CRIB

S. P. Luttrell

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 background stage of monitoring. Five sample sets have been collected; however, the first of these is not considered to be representative of ground water and, therefore, will not be included to establish background. 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. 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 (see Figure 11.1). 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 is pending sampling 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.

9 0 1 1 7 7 1 5 4 7

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

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

WATER LEVELS

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

WATER CHEMISTRY DATA

A set of ground-water samples was collected in May and another in June. Two sets of samples were collected to make up for the set missed in the previous quarter. Samples were not collected from well 299-E17-15 in June because a water-level measurement could not be taken, or from well 299-E17-6 because there was inadequate containment capacity for purge water. The wells are scheduled to be sampled in July.

The analytical results for samples collected in May are summarized in Table 11.3. The May results for constituents with at least one detected value are provided in Table 11.4. The results for samples collected in June are not yet available. Major observations of the May analyses are the following:

- Nitrate exceeded the 40 CFR 265, Appendix III, standard of 45 ppm in wells 299-E17-5 (97.4 ppm), 299-E17-9 (121 ppm), 299-E17-14 (257 ppm), 299-E17-15 (287 ppm), 299-E17-16 (56.7 ppm), and 299-E17-17 (67.6 ppm).

- Total beta was reported to be 293 pCi/L in well 299-E17-5, 289 pCi/L in well 299-E17-14, 836 pCi/L in well 299-E17-15, and 152 pCi/L in well 299-E17-17, all exceeding the 40 CFR 265, Appendix III, screening level of 50 pCi/L. Total beta has decreased in each of these wells from the previous quarter's results. Total beta was less than 50 pCi/L in samples from all other wells.

- Total alpha was reported to be 16.5 pCi/L in well 299-E17-14, exceeding the 40 CFR 265, Appendix III, screening level of 15 pCi/L.

- Tritium was reported to range from 41,100 to 3,980,000 pCi/L in the monitoring wells (including well 299-E17-17). All of the wells exceeded the 40 CFR 141 standard of 20,000 pCi/L. The results for wells 299-E17-6 and 299-E17-15 are not yet available.

- Several other radionuclides, including strontium-90 and iodine-129, exceeded the primary drinking water standard or radionuclide standards (EPA 1976) for one or more wells. Strontium-90 was reported to be 28.1 pCi/L in well 299-E17-14.

9 0 1 1 7 7 1 1 5 4 9

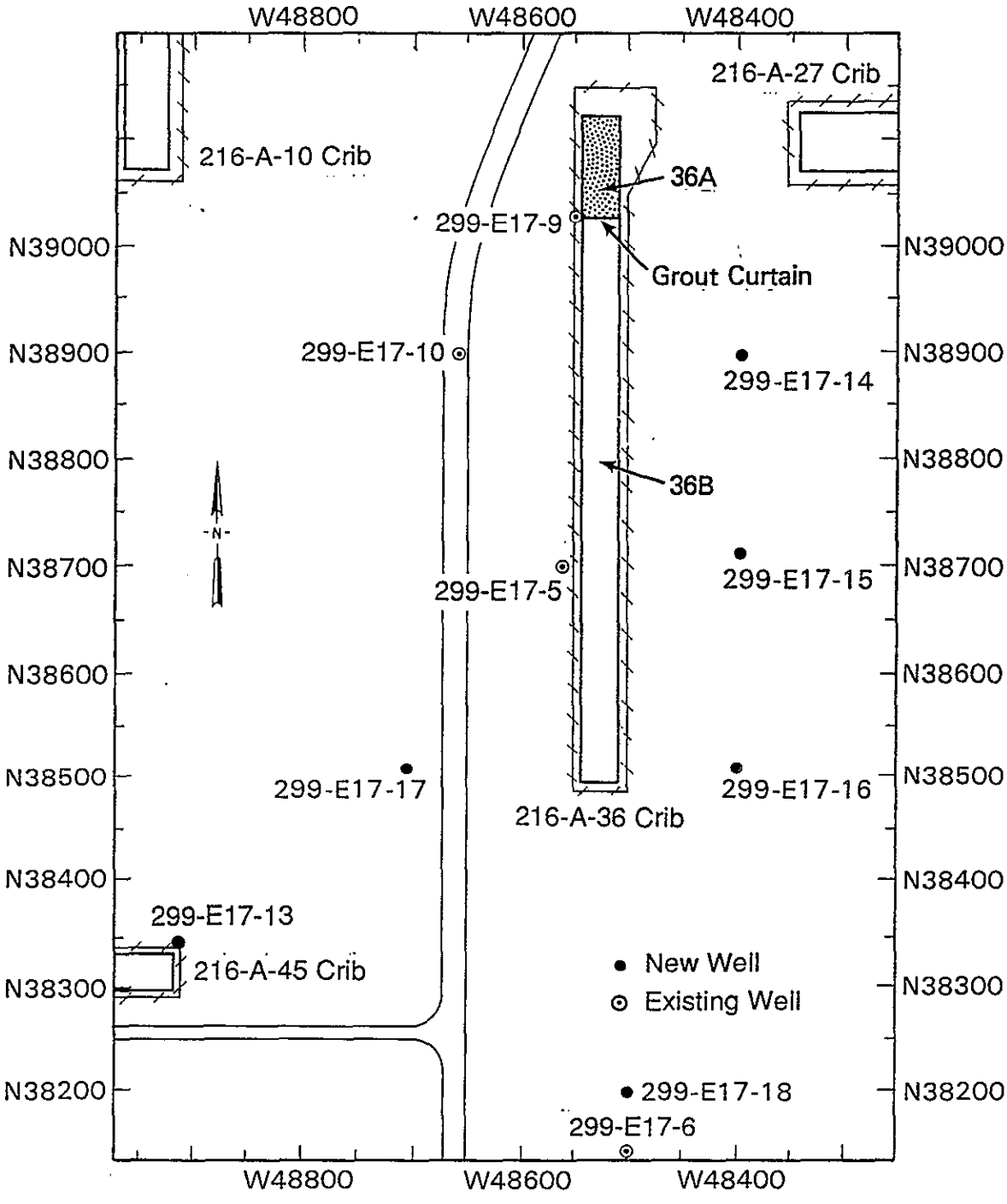


FIGURE 11.1. Monitoring Well Locations for the 216-A-36B Crib

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

Well	1988			1989								
	Oct	Nov	Dec	Jan	Feb	Mar[a]	Apr	May	Jun	Jul	Aug	Sep
299-E17- 5			X					L	X			X
299-E17- 6			S					S	S			S
299-E17- 9			X					L	X			X
299-E17-10[b]			--					--	--			--
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 March sample set was not collected because purge water disposal issues had not been resolved; samples were collected in May.
(b) Planned, pending remediation.
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.

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

Well Number	Casing Elevation, ft above MSL[a]	Date[b]	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E17-5	718.69	5/16/89	315.16	403.53
		6/22/89	313.79	404.90
		6/28/89	313.76	404.93
299-E17-6	720.10	5/16/89	314.96	405.14
		6/22/89	NM	--
		6/28/89	315.09	405.01
299-E17-9	717.64	5/16/89	313.01	404.63
		6/22/89	313.54	404.10
		6/28/89	313.13	404.51
299-E17-10	714.74	6/28/89	309.67	405.07
299-E17-13	719.25	6/28/89	314.29	404.96
299-E17-14	722.18	5/15/89	317.28	404.90
		6/26/89	316.28	405.90
		6/28/89	317.11	405.07
299-E17-15	721.78	5/17/89	320.23	401.55
		6/23/89	NM	--
		6/28/89	NM	--
299-E17-16	720.58	5/15/89	316.97	403.61
		6/26/89	315.71	404.87
		6/28/89	315.73	404.85
299-E17-17	719.92	5/12/89	314.80	405.12
		6/23/89	314.96	404.96
		6/28/89	314.97	404.95
299-E17-18	720.65	5/19/89	314.33	406.32
		6/23/89	315.75	404.90
		6/28/89	315.67	404.98

(a) MSL = mean sea level.
(b) Water levels were measured on June 28, 1989, in addition to the measurements made at the time of sample collection.

TABLE 11.3. Constituent List and Summary of Sampling Results for the 216-A-36-B Crib
March 1989 through May 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	xxx	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	8	0	6.5-8.5	EPAS		pH, laboratory
C69	TOC	ppb	2000	32	0	.			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	9	9 ***	1	EPA		Coliform bacteria
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
181	RADIUM	pCi/L	1	8	0	5	EPA		Radium, total
A06	BARIUM	ppb	6	9	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	9	9 ***	10	EPA		Cadmium
A08	CHROMUM	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	SELENUM	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	xxx	Nitrate
C74	FLUORID	ppb	500	9	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	6	9	0	1000	EPA		Barium, filtered
H21	FCADMIU	ppb	2	9	8	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	1	50	EPA		Arsenic, filtered
H38	FMERCUR	ppb	0.1	9	9 ***	2	EPA		Mercury, filtered
H39	FSELENI	ppb	5	9	8	10	EPA		Selenium, filtered
H41	FLEAD	ppb	5	9	9 ***	50	EPA		Lead, filtered
H60	TURBID	ntu	0.1	9	1	1	EPA		Turbidity, nephelometric

TABLE 11.3. (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	9	0	.			Sodium
A17	MANGESE	ppb	5	9	2	50	EPAS	xxx	Manganese
A19	IRON	ppb	30	9	1	300	EPAS	xxx	Iron
C67	PHENOL	ppb	10	8	8 ***	.			Phenol
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	3	50	EPAS	xxx	Manganese, filtered
H31	FIRON	ppb	30	9	7	300	EPAS	xxx	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
010	CO-60	pCi/L	22.5	6	0	100	EPAR		Cobalt-60
024	CS-137	pCi/L	20	6	0	200	EPAR		Cesium-137
034	RU-106	pCi/L	172.5	6	0	30	EPAR	xxx	Ruthenium-106
081	I-129	pCi/L	15	6	0	1	EPAR	xxx	Iodine-129
108	TRITIUM	pCi/L	500	6	0	20000	EPA	xxx	Tritium (H-3)
121	SR-90	pCi/L	5	6	0	8	EPA	xxx	Strontium-90
197	TC-99	pCi/L	15	6	0	900	EPAR		Technetium-99
A01	BERYLUM	ppb	5	9	9 ***	.			Beryllium
A03	STRONUM	ppb	20	9	0	.			Strontium
A04	ZINC	ppb	5	9	4	5000	EPAS		Zinc
A05	CALCIUM	ppb	50	9	0	.			Calcium
A12	NICKEL	ppb	10	9	3	.			Nickel
A13	COPPER	ppb	10	9	4	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
C76	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	6	.			Nickel, filtered
H26	FCOPPER	ppb	10	9	2	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

TABLE 11.3. (contd)

Constituent List=Site Specific and Other Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H33	FBERYLL	ppb	5	9	9 ***	.	Beryllium, filtered
H35	FSTRONT	ppb	20	9	0	.	Strontium, filtered
H36	FANTIMO	ppb	100	9	9 ***	.	Antimony, filtered
H66	BROMIDE	ppb	1000	9	9 ***	.	Bromide
H67	NITRITE	ppb	1000	9	9 ***	.	Nitrite
H86	FBORON	ppb	10	9	0	.	Boron, filtered
H87	FCOBALT	ppb	20	9	9 ***	.	Cobalt, filtered
H88	FLITHIU	ppb	10	9	8	.	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	9	0	.	Boron
P02	COBALT	ppb	20	9	9 ***	.	Cobalt
P03	LITHIUM	ppb	10	9	8	.	Lithium
P04	MOLY	ppb	40	9	9 ***	.	Molybdenum
P05	SILICON	ppb	50	9	0	.	Silicon
P06	TIN	ppb	30	9	9 ***	.	Tin
P07	TITAN	ppb	60	9	9 ***	.	Titanium
P08	ZIRCON	ppb	50	9	9 ***	.	Zirconium

Constituent List=WAC 173-303-9905 Constituents

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A23	THALIUM	ppb	5	8	8 ***	.	Thallium
A24	THIOURA	ppb	200	8	8 ***	.	Thiourea
A25	ACETREA	ppb	200	8	8 ***	.	1-Acetyl-2-thiourea
A26	CHLOREA	ppb	200	8	8 ***	.	1-(o-Chlorophenyl) thiourea
A27	DIETROL	ppb	200	8	8 ***	.	Diethylstilbesterol
A28	ETHYREA	ppb	200	8	8 ***	.	Ethylenethiourea
A29	NAPHREA	ppb	200	8	8 ***	.	1-Naphthyl-2-thiourea
A32	PHENREA	ppb	500	8	8 ***	.	n-Phenylthiourea
A40	DDD	ppb	0.1	8	8 ***	.	DDD
A41	DDE	ppb	0.1	8	8 ***	.	DDE
A42	DDT	ppb	0.1	8	8 ***	.	DDT
A43	HEPTLOR	ppb	0.1	8	8 ***	0 EPAP	Heptachlor
A44	HEPTIDE	ppb	0.1	8	8 ***	0 EPAP	Heptachlor epoxide
A45	KEPONE	ppb	1	8	8 ***	.	Kepone (discontinued)
A46	DIELRIN	ppb	0.1	8	8 ***	.	Dieldrin
A47	ALDRIN	ppb	0.1	8	8 ***	.	Aldrin

TABLE 11.3. (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
A48	CHLOANE	ppb	1	8	8 ***	0	EPAP	Chlordane
A49	ENDO1	ppb	0.1	8	8 ***	.		Endosulfan I (alpha)
A52	ENDO2	ppb	0.1	8	8 ***	.		Endosulfan II (beta)
A54	AR1016	ppb	1	8	8 ***	0	EPAP	Arochlor 1016
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	8	8 ***	5	EPA	Tetrachloromethane [Carbon Tetrachloride
A62	BENZENE	ppb	5	8	8 ***	5	EPA	Benzene
A63	DIOXANE	ppb	500	8	8 ***	.		Dioxane
A64	METHONE	ppb	10	8	8 ***	.		Methyl ethyl ketone
A65	PYRIDIN	ppb	500	8	8 ***	.		Pyridine
A66	TOLUENE	ppb	5	8	8 ***	2000	EPAP	Toluene
A67	1,1,1-T	ppb	5	8	8 ***	200	EPA	1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	8	8 ***	.		1,1,2-Trichloroethane
A69	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
A72	ACROLIN	ppb	10	8	8 ***	.		Acrolein
A73	ACRYILE	ppb	10	8	8 ***	.		Acrylonitrile
A74	BISTHER	ppb	5	8	8 ***	.		Bis(chloromethyl) ether
A75	BROMONE	ppb	5	8	8 ***	.		Bromoacetone
A76	METHBRO	ppb	10	8	8 ***	.		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	8	8 ***	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	8	8 ***	.		1,1-Dichloroethane
A90	1,2-DIC	ppb	5	8	8 ***	5	EPA	1,2-Dichloroethane
A91	TRANDCE	ppb	5	8	8 ***	70	EPAP	trans-1,2-Dichloroethene
A92	DICETHY	ppb	10	8	8 ***	7	EPA	1,1-Dichloroethylene
A93	METHYCH	ppb	5	8	8 ***	.		Methylene chloride [Dichloromethane]
A94	DICPANE	ppb	5	8	8 ***	6	EPAP	1,2-Dichloropropane

TABLE 11.3. (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
A95	DICPENE	ppb	5	8	8 ***	.		1,3-Dichloropropene
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	IODOMET	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-Tetrachlorethane
B06	1122-tc	ppb	5	8	8 ***	.		1,1,2,2-Tetrachlorethane
B08	BROMORM	ppb	5	8	8 ***	100	EPA	Bromoform [Tribromomethane]
B09	TRCMEOL	ppb	10	8	8 ***	.		Trichloromethanethiol
B10	TRCMFLM	ppb	10	8	7	.		Trichloromonofluoromethane
B12	123-trp	ppb	10	8	8 ***	.		1,2,3-Trichloropropane
B13	VINYIDE	ppb	10	8	8 ***	2	EPA	Vinyl chloride
B14	M-XYLE	ppb	5	8	8 ***	440	EPAP	Xylene-m
B19	ACETILE	ppb	3000	8	8 ***	.		Acetonitrile
B20	ACETOPH	ppb	10	8	8 ***	.		Acetophenone
B21	WARFRIN	ppb	10	8	8 ***	.		Warfarin
B22	ACEFENE	ppb	10	8	8 ***	.		2-Acetylaminofluorene
B23	AMINOYL	ppb	10	8	8 ***	.		4-Aminobiphenyl
B24	AMIISOX	ppb	10	8	8 ***	.		5-(Aminomethyl)-3-isoxazolol
B25	AMITROL	ppb	10	8	8 ***	.		Amitrole
B26	ANILINE	ppb	10	8	8 ***	.		Aniline
B27	ARAMITE	ppb	10	8	8 ***	.		Aramite
B28	AURAMIN	ppb	10	8	8 ***	.		Auramine
B29	BENZCAC	ppb	10	8	8 ***	.		Benz[c]acridine
B30	BENZAAN	ppb	10	8	8 ***	.		Benz[a]anthracene
B31	BENDICM	ppb	10	8	8 ***	.		Benzene, dichloromethyl
B32	BENTHOL	ppb	10	8	8 ***	.		Benzenethiol
B33	BENDINE	ppb	10	8	8 ***	.		Benzidine
B34	BENZBFL	ppb	10	8	8 ***	.		Benzo[b]fluoranthene
B35	BENZJFL	ppb	10	8	8 ***	.		Benzo[j]fluoranthene
B36	PBENZQU	ppb	10	8	8 ***	.		p-Benzoquinone
B37	BENZCHL	ppb	10	8	8 ***	.		Benzyl chloride
B38	BIS2CHM	ppb	10	8	8 ***	.		Bis(2-chloroethoxy) methane
B39	BIS2CHE	ppb	10	8	8 ***	.		Bis(2-chloroethyl) ether
B40	BIS2EPH	ppb	10	8	7	.		Bis(2-ethylhexyl) phthalate
B41	BROPHEN	ppb	10	8	8 ***	.		4-Bromophenyl phenyl ether
B42	BUTBENP	ppb	10	8	8 ***	.		Butyl benzyl phthalate
B43	BUTDINP	ppb	10	8	8 ***	.		2-sec-Butyl-4,6-dinitrophenol (DNBP)
B44	CHALETH	ppb	10	8	8 ***	.		Chloroalkyl ethers
B45	CHLANIL	ppb	10	8	8 ***	.		p-Chloroaniline
B46	CHLCRES	ppb	10	8	8 ***	.		p-Chloro-m-cresol

TABLE 11.3. (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
B47	CHLEPOX	ppb	10	8	8 ***	0	EPAP	1-Chloro-2,3-epoxypropane
B48	CHLNAPH	ppb	10	8	8 ***	.		2-Chloronaphthalene
B49	CHLPHEN	ppb	10	8	8 ***	.		2-Chlorophenol
B50	CHRYSEN	ppb	10	8	8 ***	.		Chrysene
B51	CRESOLS	ppb	10	8	8 ***	.		Cresols
B52	CYCHDIN	ppb	10	8	8 ***	.		2-Cyclohexyl-4,6-dinitrophenol
B53	DIBAHAC	ppb	10	8	8 ***	.		Dibenz[a,h]acridine
B54	DIBAJAC	ppb	10	8	8 ***	.		Dibenz[a,j]acridine
B55	DIBAHAN	ppb	10	8	8 ***	.		Dibenz[a,h]anthracene
B56	DIBCGCA	ppb	10	8	8 ***	.		7H-Dibenzo[c,g]carbazole
B57	DIBAEPY	ppb	10	8	8 ***	.		Dibenzo[a,e]pyrene
B58	DIBAHPY	ppb	10	8	8 ***	.		Dibenzo[a,h]pyrene
B59	DIBAIPY	ppb	10	8	8 ***	.		Dibenzo[a,i]pyrene
B60	DIBPHTH	ppb	10	8	8 ***	.		Di-n-butyl phthalate
B61	12-dben	ppb	10	8	8 ***	.		1,2-Dichlorobenzene
B62	13-dben	ppb	10	8	8 ***	.		1,3-Dichlorobenzene
B63	14-dben	ppb	10	8	8 ***	75	EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
B64	DICHBEN	ppb	20	8	8 ***	.		3,3'-Dichlorobenzidine
B65	24-dchp	ppb	10	8	8 ***	.		2,4-Dichlorophenol
B66	26-dchp	ppb	10	8	8 ***	.		2,6-Dichlorophenol
B67	DIEPHTH	ppb	10	8	8 ***	.		Diethyl phthalate
B68	DIHYSAF	ppb	10	8	8 ***	.		Dihydrosafrole
B69	DIMETHB	ppb	10	8	8 ***	.		3,3'-Dimethoxybenzidine
B70	DIMEAMB	ppb	10	8	8 ***	.		p-Dimethylaminoazobenzene
B71	DIMBENZ	ppb	10	8	8 ***	.		7,12-Dimethylbenz[a]anthracene
B72	DIMEYLB	ppb	10	8	8 ***	.		3,3'-Dimethylbenzidine
B73	THIONOX	ppb	10	8	8 ***	.		Thiofanox
B74	DIMPHAM	ppb	10	8	8 ***	.		alpha,alpha-Dimethylphenethylamine
B76	DIMPHTH	ppb	10	8	8 ***	.		Dimethyl phthalate
B77	DINBENZ	ppb	10	8	8 ***	.		Dinitrobenzene
B78	DINCRES	ppb	10	8	8 ***	.		4,6-Dinitro-o-cresol and salts
B79	DINPHEN	ppb	50	8	8 ***	.		2,4-Dinitrophenol
B80	24-dint	ppb	10	8	8 ***	.		2,4-Dinitrotoluene
B81	26-dint	ppb	10	8	8 ***	.		2,6-Dinitrotoluene
B82	DIOPHTH	ppb	10	8	8 ***	.		Di-n-octyl phthalate
B83	DIPHAMI	ppb	10	8	8 ***	.		Diphenylamine
B84	DIPHHYD	ppb	10	8	8 ***	.		1,2-Diphenylhydrazine
B85	DIPRNIT	ppb	10	8	8 ***	.		Di-n-propylnitrosamine
B86	ETHMINE	ppb	10	8	8 ***	.		Ethyleneimine
B87	ETHMETS	ppb	10	8	8 ***	.		Ethyl methanesulfonate
B88	FLUORAN	ppb	10	8	8 ***	.		Fluoranthene
B89	HEXCBEN	ppb	10	8	8 ***	.		Hexachlorobenzene
B90	HEXCBUT	ppb	10	8	8 ***	.		Hexachlorobutadiene
B91	HEXCCYC	ppb	10	8	8 ***	.		Hexachlorocyclopentadiene

TABLE 11.3. (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
B92	HEXCETH	ppb	10	8	8 ***	.		Hexachloroethane
B93	INDENOP	ppb	10	8	8 ***	.		Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	ppb	10	8	8 ***	.		Isosafrole
B95	MALOILE	ppb	10	8	8 ***	.		Malononitrile
B96	MELPHAL	ppb	10	8	8 ***	.		Melphalan
B97	METHAPY	ppb	10	8	8 ***	.		Methapyrilene
B98	METHNYL	ppb	10	8	8 ***	.		Metholonyl
B99	METAZIR	ppb	10	8	8 ***	.		2-Methylaziridine
C01	METCHAN	ppb	10	8	8 ***	.		3-Methylcholanthrene
C02	METBISC	ppb	10	8	8 ***	.		4,4'-Methylenebis(2-chloroaniline)
C03	METACTO	ppb	10	8	8 ***	.		2-Methyllactonitrile
C04	METACRY	ppb	10	8	8 ***	.		Methyl methacrylate
C05	METMSUL	ppb	10	8	8 ***	.		Methyl methanesulfonate
C06	METPROP	ppb	10	8	8 ***	.		2-Methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	ppb	10	8	8 ***	.		Methylthiouracil
C08	NAPHQUI	ppb	10	8	8 ***	.		1,4-Naphthoquinone
C09	1-napha	ppb	10	8	8 ***	.		1-Naphthylamine
C10	2-napha	ppb	10	8	8 ***	.		2-Naphthylamine
C11	NITRANI	ppb	50	8	8 ***	.		p-Nitroaniline
C12	NITBENZ	ppb	10	8	8 ***	.		Nitrobenzene
C13	NITPHEN	ppb	50	8	8 ***	.		4-Nitrophenol [p-Nitrophenol]
C14	NNIBUTY	ppb	10	8	8 ***	.		n-Nitrosodi-n-butylamine
C15	NNIDIEA	ppb	10	8	8 ***	.		n-Nitrosodiethanolamine
C16	NNIDIEY	ppb	10	8	8 ***	.		n-Nitrosodiethylamine
C17	NNIDIME	ppb	10	8	8 ***	.		n-Nitrosodimethylamine
C18	NNIMETH	ppb	10	8	8 ***	.		n-Nitrosomethylethylamine
C19	NNIURET	ppb	10	8	8 ***	.		n-Nitroso-n-methylurethane
C20	NNIVINY	ppb	10	8	8 ***	.		n-Nitrosomethylvinylamine
C21	NNIMORP	ppb	10	8	8 ***	.		n-Nitrosomorpholine
C22	NNINICO	ppb	10	8	8 ***	.		n-Nitrosonornicotine
C23	NNIPIPE	ppb	10	8	8 ***	.		n-Nitrosopiperidine
C24	NITRPYR	ppb	10	8	8 ***	.		Nitrosopyrrolidine
C25	NITRTOL	ppb	10	8	8 ***	.		5-Nitro-o-toluidine
C26	PENTCHB	ppb	10	8	8 ***	.		Pentachlorobenzene
C27	PENTCHN	ppb	10	8	8 ***	.		Pentachloronitrobenzene
C28	PENTCHP	ppb	50	8	8 ***	220	EPAP	Pentachlorophenol
C29	PHENTIN	ppb	10	8	8 ***	.		Phenacetin
C30	PHENINE	ppb	10	8	8 ***	.		Phenylenediamine
C31	PHTHEST	ppb	10	8	8 ***	.		Phthalic acid esters
C32	PICOLIN	ppb	10	8	8 ***	.		2-Picoline
C33	PRONIDE	ppb	10	8	8 ***	.		Pronamide
C34	RESERPI	ppb	10	8	8 ***	.		Reserpine
C35	RESORCI	ppb	10	8	8 ***	.		Resorcinol
C36	SAFROL	ppb	10	8	8 ***	.		Safrol

TABLE 11.3. (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
C37	TETRCHB	ppb	10	8	8 ***	.		1,2,4,5-Tetrachlorobenzene
C39	TETRCHP	ppb	10	8	8 ***	.		2,3,4,6-Tetrachlorophenol
C40	THIURAM	ppb	10	8	8 ***	.		Thiuram
C41	TOLUDIA	ppb	10	8	8 ***	.		Toluenediamine
C42	OTOLHYD	ppb	10	8	8 ***	.		o-Toluidine hydrochloride
C43	TRICHLB	ppb	10	8	8 ***	.		1,2,4-Trichlorobenzene
C44	245-trp	ppb	50	8	8 ***	.		2,4,5-Trichlorophenol
C45	246-trp	ppb	10	8	8 ***	.		2,4,6-Trichlorophenol
C46	TRIPHOS	ppb	10	8	8 ***	.		O,o,o-triethyl phosphorothioate
C47	SYMTRIN	ppb	10	8	8 ***	.		Sym-trinitrobenzene
C48	TRISPHO	ppb	10	8	8 ***	.		Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	ppb	10	8	8 ***	.		Benzo[a]pyrene
C50	CHLNAPZ	ppb	10	8	8 ***	.		Chlornaphazine
C51	BIS2ETH	ppb	10	8	8 ***	.		Bis(2-chloroisopropyl) ether
C52	HEXAENE	ppb	10	8	8 ***	.		Hexachloropropene
C54	HEXACHL	ppb	10	8	8 ***	.		Hexachlorophene
C55	NAPHTHA	ppb	10	8	8 ***	.		Naphthalene
C56	123TRI	ppb	10	8	8 ***	.		1,2,3-Trichlorobenzene
C58	135TRI	ppb	10	8	8 ***	.		1,3,5-Trichlorobenzene
C59	1234TE	ppb	10	8	8 ***	.		1,2,3,4-Tetrachlorobenzene
C60	1235TE	ppb	10	8	8 ***	.		1,2,3,5-Tetrachlorobenzene
C61	TETEPYR	ppb	2	8	8 ***	.		Tetraethylpyrophosphate
C62	CHLLATE	ppb	300	8	8 ***	.		Chlorobenzilate
C63	CARBPHT	ppb	2	8	8 ***	.		Carbophenothion
C64	DISULFO	ppb	2	8	8 ***	.		Disulfoton
C65	DIMETHO	ppb	2	8	8 ***	.		Dimethoate
C66	METHPAR	ppb	2	8	8 ***	.		Methyl parathion
C67	PARATHI	ppb	2	8	8 ***	.		Parathion
C70	CYANIDE	ppb	10	8	8 ***	.		Cyanide
C71	FORMALN	ppb	500	8	8 ***	.		Formalin
C77	PERCHLO	ppb	500	8	8 ***	.		Perchlorate
C78	SULFIDE	ppb	1000	8	8 ***	.		Sulfide
C79	KEROSEN	ppb	10000	8	8 ***	.		Kerosene
C80	AMMONIU	ppb	50	8	8 ***	.		Ammonium ion
C87	CITRUSR	ppb	1000	8	8 ***	.		Citrus red
C90	PARALDE	ppb	10000	8	8 ***	.		Paraldehyde
C91	STRYCHN	ppb	50	8	8 ***	.		Strychnine
C92	MALHYDR	ppb	500	8	8 ***	.		Maleic hydrazide
C93	NICOTIN	ppb	100	8	8 ***	.		Nicotinic acid
C94	ACRYIDE	ppb	10000	8	8 ***	0	EPAP	Acrylamide
C95	ALLYLAL	ppb	10000	8	8 ***	.		Allyl alcohol
C98	CHLPROP	ppb	10000	8	8 ***	.		3-Chloropropionitrile
D01	PCDDs	ppb	0.01	8	8 ***	.		PCDDs
D02	PCDFs	ppb	0.01	8	8 ***	.		PCDFs

TABLE 11.3. (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
D03	2378TCD	ppb	0.01	8	7	.		2,3,7,8-TCDD [Dioxin]
H03	ETHCARB	ppb	10000	8	8 ***	.		Ethyl carbamate
H04	ETHCYAN	ppb	10000	8	8 ***	.		Ethyl cyanide
H05	ETHOXID	ppb	10	8	8 ***	.		Ethylene oxide
H08	ETHMETH	ppb	10	8	8 ***	.		Ethyl methacrylate
H09	ISOBUTY	ppb	10000	8	8 ***	.		Isobutyl alcohol
H11	PROPYLA	ppb	10000	8	8 ***	.		n-Propylamine
H12	PROPYNO	ppb	10000	8	8 ***	.		2-Propyn-1-ol
H15	2,4,5-T	ppb	2	8	8 ***	.		2,4,5-T
H40	FTHALLI	ppb	5	8	8 ***	.		Thallium, filtered
H68	HEXONE	ppb	10	8	8 ***	.		Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	8	8 ***	.		Acetone by VOA
I06	ISOPHER	ppb	10	8	8 ***	.		Isopherone
I09	BUTANOL	ppb	10000	8	8 ***	.		1-Butanol
I21	TRIBUPH	ppb	10	8	8 ***	.		Tributylphosphoric acid
I28	TAF	ppb	10	8	8 ***	.		Tetrahydorfuran
I29	ACENAPH	ppb	10	8	8 ***	.		Acenaphthene
I30	FLRENE	ppb	10	8	8 ***	.		Fluorene
I31	ANTHRA	ppb	10	8	8 ***	.		Anthracene
I32	PYRENE	ppb	10	8	8 ***	.		Pyrene
I33	ETHBENZ	ppb	5	8	8 ***	680	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
I64	2NITPH	ppb	10	8	8 ***	.		2-Nitrophenol [o-Nitrophenol]
I67	ETHANOL	ppb	10000	8	8 ***	.		Ethanol
I75	2MENAPH	ppb	10	8	8 ***	.		2-Methylnaphthalene
I82	PHENANT	ppb	10	8	8 ***	.		Phenanthrene
J43	BENZALC	ppb	10	8	8 ***	.		Benzyl alcohol
J69	2HEXANO	ppb	50	8	8 ***	.		2-Hexanone
J71	BNZKFLU	ppb	10	8	8 ***	.		Benzo (k) fluoranthene
J83	BGHIPER	ppb	10	8	8 ***	.		Benzo (ghi) perylene
J89	DINOSEB	ppb	10	8	8 ***	.		Dinoseb
J91	DIALLAT	ppb	10	8	8 ***	.		Diallate
K52	NNDIPHA	ppb	10	8	8 ***	.		n-Nitrosodiphenylamine
K56	DIBENFR	ppb	10	8	8 ***	.		Dibenzofuran
K58	ACENATL	ppb	10	8	8 ***	.		Acenaphthylene
L20	MBP	ppb	10000	8	8 ***	.		Monobutylphosphate
L21	DBP	ppb	10000	8	8 ***	.		Dibutylphosphate
L45	ALLYLCL	ppb	100	8	8 ***	.		Allyl chloride
L46	CLETHAN	ppb	10	8	8 ***	.		Chlorethane
L48	PROPCN	ppb	5	8	8 ***	.		Propionitrile
L49	VINYLAC	ppb	5	8	8 ***	.		Vinyl acetate
L50	B2CLMEE	ppb	10	8	8 ***	.		bis(2-Chloro-1-methylethyl)ether

TABLE 11.3. (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
L52	DIPHOS	ppb	10	8	8 ***	.		0,0-Diethyl-0,2-pyrazinyl phosphorothion
L53	ISODRIN	ppb	10	8	8 ***	.		Isodrin
L54	ONITANI	ppb	10	8	8 ***	.		o-Nitroaniline
L55	MNITANI	ppb	10	8	8 ***	.		m-Nitroaniline
L56	4NITQUI	ppb	10	8	8 ***	.		4-Nitroquinoline 1-oxide
L57	ETHGLYC	ppb	10000	8	8 ***	.		Ethylene glycol
L59	1PROPAN	ppb	10000	8	8 ***	.		1-Propanol
L60	1BUTYN	ppb	10000	8	8 ***	.		1-Butynol
L62	ACETON	ppb	10	8	8 ***	.		Acetone by ABN
L63	14DBEN	ppb	5	8	8 ***	75	EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]
L64	CHLROB	ppb	10	8	8 ***	.		Chlorobenzene (by ABN)
P12	ENDSFAN	ppb	0.5	8	8 ***	.		Endosulfan
P13	PHORATE	ppb	2	8	8 ***	.		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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 11.4- Constituents with at Least One Detected Value for the 216-A-36B Crib
March 1989 through May 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-E17-5	16MAY89		426	403	8.00	8.23	#600	#6
		1	428	.	.	8.18	#600	10
		2	428	.	.	8.21	#500	14
		3	428	.	.	8.20	#500	#6
2-E17-6	16MAY89		323	.	.	7.85	#200	#4
		1	323	.	.	7.78	#300	11
		2	323	.	.	7.78	#400	#9
		3	323	.	.	7.73	#200	20
2-E17-9	16MAY89		534	485	8.00	7.85	#400	10
		1	534	.	.	7.87	#400	#1
		2	532	.	.	7.85	#500	#4
		3	533	.	.	7.87	#700	#1
2-E17-14	15MAY89		663	670	7.80	7.30	#600	#5
		1	663	.	.	7.40	#600	10
		2	663	.	.	7.40	#600	#4
		3	663	.	.	7.30	#500	#0
2-E17-15	17MAY89		617	728	7.90	7.63	#700	11
		1	618	735	7.90	7.65	#800	#3
		2	617	.	.	7.63	#700	#3
		3	616	.	.	7.65	#600	#3
2-E17-16	15MAY89		359	509	8.00	7.50	#900	#1
		1	360	.	.	7.50	#900	#2
		2	362	.	.	7.50	#700	#8
		3	362	.	.	7.50	#900	#4
2-E17-17	12MAY89		230	373	8.00	7.90	#600	#5
		1	230	.	.	8.00	#500	#6
		2	230	.	.	8.04	#500	#4
		3	230	.	.	8.05	#500	#2
2-E17-18	19MAY89		224	255	8.10	7.40	#300	#1
		1	224	.	.	7.42	#300	#7
		2	224	.	.	7.43	#400	#5
		3	224	.	.	7.43	#200	#7

TABLE 11.4. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicate sample number	2378TCD ppb 0.01/.	ALPHAHI pCi/L 4/15	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 6/1000	FBARIUM ppb 6/1000	BETA pCi/L 8/50	BIS2EPH ppb 10/.
2-E17-5	16MAY89		<0.010	4.360	8	7	38	43	293.00	<10
2-E17-6	16MAY89		.	*0.266	<5	<5	66	71	8.07	.
2-E17-9	16MAY89		<0.010	1.480	13	12	60	62	28.70	<10
2-E17-14	15MAY89		<0.010	16.500	10	5	64	70	289.00	<10
2-E17-15	17MAY89		<0.010	2.890	8	6	53	57	836.00	12
	17MAY89	1	#0.005	3.810	8	6	64	58	845.00	<10
2-E17-16	15MAY89		<0.010	5.260	15	9	41	46	21.20	<10
2-E17-17	12MAY89		<0.010	3.360	6	7	44	42	152.00	<10
2-E17-18	19MAY89		<0.010	2.910	11	11	33	32	4.95	<10

Well name	Collection Date	Duplicate sample number	BORON ppb 10/.	FBORON ppb 10/.	FCADMIU ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s	CHROMUM ppb 10/50
2-E17-5	16MAY89		16	20	<2	42,200	41,600	3,500	<10
2-E17-6	16MAY89		22	21	<2	33,000	31,500	3,100	<10
2-E17-9	16MAY89		22	25	7	50,200	48,300	5,500	<10
2-E17-14	15MAY89		16	28	<2	79,400	74,300	4,100	12
2-E17-15	17MAY89		22	17	<2	78,800	83,400	3,300	23
	17MAY89	1	27	17	<2	80,200	97,000	3,300	22
2-E17-16	15MAY89		14	22	<2	49,300	47,100	24,000	16
2-E17-17	12MAY89		17	20	<2	33,500	35,100	3,800	23
2-E17-18	19MAY89		21	12	<2	21,900	22,500	2,900	15

Well name	Collection Date	Duplicate sample number	CO-60 pCi/L 22.5/100r	COPPER ppb 10/1300p	FCOPPER ppb 10/1300p	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000	I-129 pCi/L 15/1r	IRON ppb 30/300s
2-E17-5	16MAY89		25.80	<10	16	*-5.960	500	13.20	44
2-E17-6	16MAY89		.	<10	13	.	<500	.	503
2-E17-9	16MAY89		*4.16	<10	15	*1.410	600	16.00	<30
2-E17-14	15MAY89		40.90	19	13	*0.943	500	14.00	78
2-E17-15	17MAY89		.	22	13	.	600	.	124
	17MAY89	1	.	26	11	.	600	.	138
2-E17-16	15MAY89		18.90	<10	<10	*5.630	500	2.03	83
2-E17-17	12MAY89		10.80	14	12	*-3.600	600	8.22	90
2-E17-18	19MAY89		*1.78	11	<10	*-0.662	500	3.60	76

TABLE 11.4. (contd)

Well name	Collection Date	Duplicate sample number	FIRON ppb 30/300s	FLITHIU ppb 10/.	LITHIUM ppb 10/.	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	NICKEL ppb 10/.
2-E17-5	16MAY89		<30	<10	<10	11,900	12,000	<5	<5	<10
2-E17-6	16MAY89		387	12	12	11,400	11,900	88	88	<10
2-E17-9	16MAY89		<30	<10	<10	14,600	15,100	6	6	<10
2-E17-14	15MAY89		<30	<10	<10	21,600	24,300	6	6	11
2-E17-15	17MAY89		<30	<10	<10	21,500	19,500	5	6	16
	17MAY89	1	<30	<10	<10	25,900	20,900	5	8	19
2-E17-16	15MAY89		<30	<10	<10	19,200	21,000	6	9	21
2-E17-17	12MAY89		<30	<10	<10	10,700	10,300	<5	5	11
2-E17-18	19MAY89		32	<10	<10	6,910	6,820	<5	<5	13

Well name	Collection Date	Duplicat sample number	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	RU-106 pCi/L 172.5/30r	FSELENI ppb 5/10	FSILICO ppb 50/.
2-E17-5	16MAY89		<10	97,400	6,170	6,000	*-0.0123	225.00	<5	18,600
2-E17-6	16MAY89		<10	3,100	6,280	6,070	.	.	<5	26,300
2-E17-9	16MAY89		<10	121,000	6,740	6,600	*0.1340	*-25.70	<5	21,300
2-E17-14	15MAY89		<10	257,000	7,420	6,720	0.1880	79.70	<5	19,600
2-E17-15	17MAY89		13	287,000	6,090	6,310	0.3010	.	<5	17,700
	17MAY89	1	12	288,000	6,380	6,760	0.2140	.	<5	18,200
2-E17-16	15MAY89		13	56,700	7,020	6,310	0.2740	*8.34	9	20,100
2-E17-17	12MAY89		<10	67,600	5,800	6,260	0.3990	*40.90	<5	18,900
2-E17-18	19MAY89		<10	4,900	4,520	4,650	*0.0651	*39.10	<5	18,400

Well name	Collection Date	Duplicat sample number	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONUM ppb 20/.	SULFATE ppb 500/250000s	TC ppb 1000/.
2-E17-5	16MAY89		18,600	21,500	21,800	3.360	236	230	28,500	21,100
2-E17-6	16MAY89		25,800	16,600	17,600	.	221	208	20,800	32,800
2-E17-9	16MAY89		20,400	27,500	28,200	4.020	296	282	36,900	23,600
2-E17-14	15MAY89		18,100	26,300	28,900	28.100	443	413	36,400	23,700
2-E17-15	17MAY89		17,300	33,100	31,400	.	368	376	38,700	21,200
	17MAY89	1	17,900	39,100	32,500	.	375	451	39,300	21,300
2-E17-16	15MAY89		17,800	33,900	36,200	3.620	256	242	102,000	20,700
2-E17-17	12MAY89		19,200	23,600	22,200	*-0.161	186	193	28,800	21,700
2-E17-18	19MAY89		18,500	18,200	18,000	*0.281	119	122	24,500	22,400

TABLE 11.4. (contd)

Well name	Collection Date	Duplicate sample number	TC-99 pCi/L 15/900r	TRCMFLM ppb 10/.	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	16MAY89		199.00	<10	125,000	<0.1	23	26	8	<5
2-E17-6	16MAY89		.	.	.	0.6	<5	<5	6	<5
2-E17-9	16MAY89		92.20	<10	3,980,000	0.1	37	24	7	9
2-E17-14	15MAY89		599.00	<10	1,920,000	0.4	21	19	6	<5
2-E17-15	17MAY89		.	<10	.	0.4	23	23	<5	<5
	17MAY89	1	.	<10	.	0.4	23	22	<5	<5
2-E17-16	15MAY89		14.10	<10	54,500	0.4	33	21	13	<5
2-E17-17	12MAY89		164.00	13[a]	334,000	0.4	22	27	<5	<5
2-E17-18	19MAY89		*2.25	<10	41,100	0.7	26	33	<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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
w - based on additional Secondary Maximum Contaminant Levels given 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 sample group showed contamination by this constituent

12.0 216-B-3 POND

S. P. Luttrell

The ground water beneath the 216-B-3 Pond (B Pond) has been monitored by a RCRA interim-status well network since November 1988. This project is in the background stage of monitoring; three sample sets have been 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 x 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 are being constructed and will be added to the network after they have been completed, developed, and have had 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 for 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. Geologic samples have been collected during the drilling activities, and several aquifer tests (slug injection-withdrawal tests) have been conducted. Additional information will be provided after the wells have been completed.

WATER LEVELS

Water levels were measured when samples were collected in June, and supplemental measurements were made in April, May, and June (Table 12.2).

WATER CHEMISTRY DATA

Ground-water samples were collected from B Pond monitoring wells on May 26 and 31, and June 15 and 16. The analytical results are not yet available.

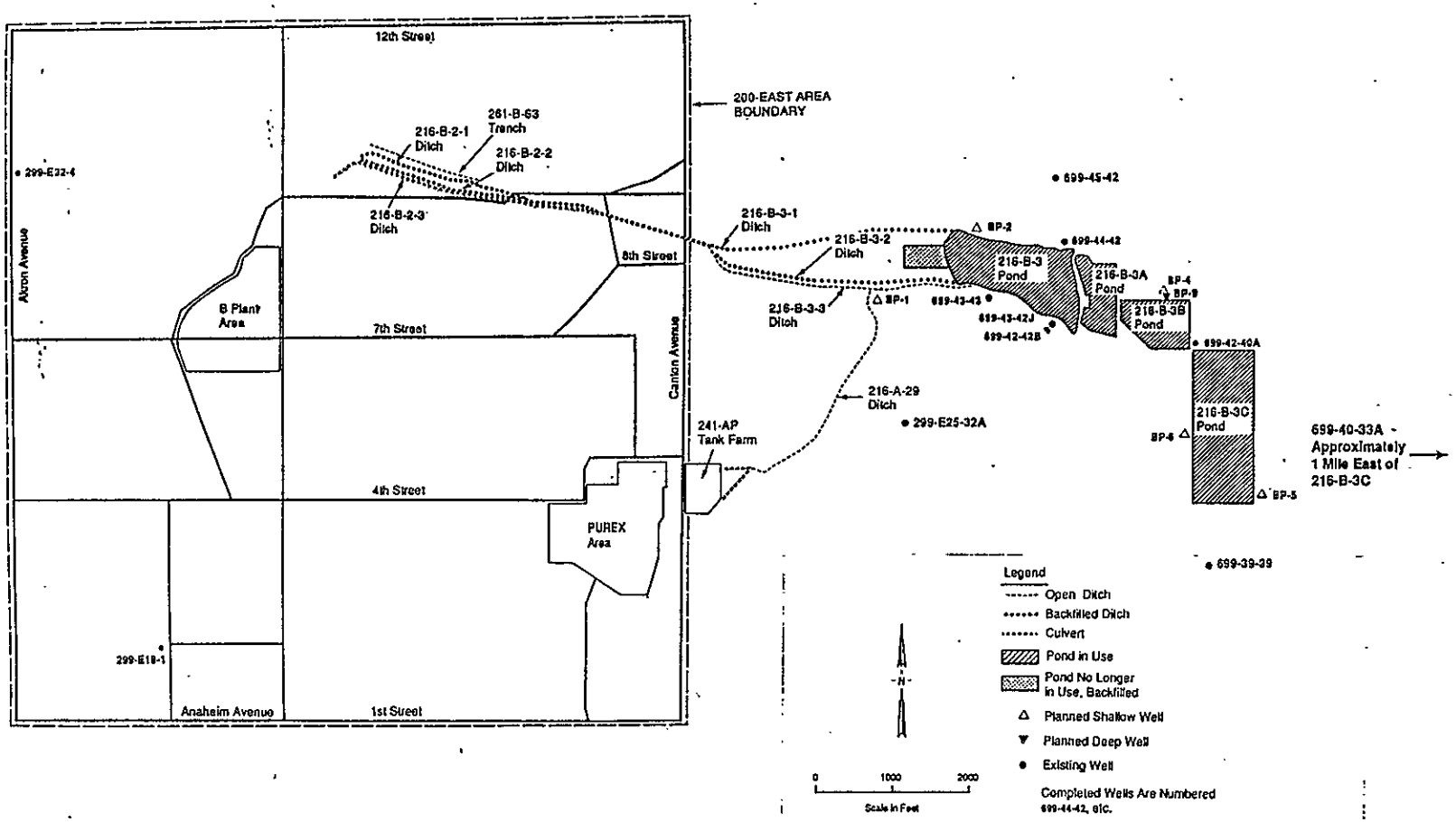


FIGURE 12.1. Monitoring Well Locations for the 216-B-3 Pond

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

	1988			1989								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E18-1		X			XRV				X		X	
299-E32-4					S				S		S	
699-42-40A		XRV			X				X		X	
699-42-42B		X			X				XRV		X	
699-43-42J		X			X				X		XRV	
699-43-43		X			X				X		X	
699-44-42		X			X				X		X	
BP-1[a]											X	
BP-2											X	
BP-4											X	
BP-5											X	
BP-6											X	
BP-9											X	

(a) The new wells may not be completed in time to be sampled.
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.

TABLE 12.2. Water-Level Data for Wells Near the 216-B-3 Pond

Well Number	Casing Elevation, ft above MSL[a]	Date[b]	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E18-1	720.24	5/26/89	314.95	405.29
299-E25-32A	669.19	4/24/89	262.89	406.30
		5/24/89	263.12	406.07
		6/22/89	263.16	406.03
299-E32-4	685.88	6/16/89	281.42	404.46
699-39-39	536.65	4/24/89	117.12	419.53
		5/24/89	121.98	414.67
		6/22/89	122.19	414.46
699-40-33A	518.05	4/24/89	106.43	411.62
		5/24/89	106.57	411.48
		6/22/89	106.57	411.48
699-42-40A	545.53	4/24/89	122.61	422.92
		5/24/89	122.60	422.93
		6/15/89	122.47	423.06
		6/22/89	122.49	423.04
699-42-42B	583.23	4/24/89	165.59	417.64
		5/24/89	165.65	417.58
		6/16/89	165.59	417.64
		6/22/89	165.52	417.71
699-43-42J	581.68	4/24/89	162.05	419.63
		5/24/89	162.04	419.64
		6/15/89	161.91	419.77
		6/22/89	161.94	419.74
699-43-43	579.37	4/24/89	164.06	415.31
		5/24/89	163.97	415.40
		6/15/89	163.64	415.73
		6/22/89	163.85	415.52
699-44-42	579.22	4/24/89	157.98	421.24
		5/24/89	157.97	421.25
		6/15/89	157.87	421.35
		6/22/89	157.90	421.32

TABLE 12.2. (contd)

Well Number	Casing Elevation, ft above MSL[a]	Date[b]	Depth to Water, ft	Water-Level Elevation, ft above MSL
699-45-42	577.33	4/24/89	158.70	418.63
		5/24/89	159.02	418.31
		6/22/89	159.03	418.30
699-47-35B	476.65	4/24/89	61.91	414.74
		5/24/89	62.10	414.55
		6/22/89	62.06	414.59

(a) MSL = mean sea level.
(b) Water levels were measured June 22, 1989, in addition to the measurements taken at the time of sample collection.

13.0 2101-M POND

M. A. Chamness

Ground water near the 2101-M Pond has been monitored by a RCRA interim-status well network since August 1988. This project is currently in the background stage of monitoring; the fourth sample set has now been collected. A closure plan is being prepared for this site by Westinghouse Hanford Company.

The 2101-M Pond is located west-southwest of the 2101-M Building in the southwest 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 downgradient wells. Well 299-E18-1 is also used 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 currently 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 on May 26 and June 1, 1989. All samples were collected after approximately three

9 0 1 1 7 7 1 5 7 3

borehole volumes of water had been purged from the well using dedicated HydroStar 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

The fourth set of quarterly samples has been taken, as required in 40 CFR 265.92. Iron and turbidity were at levels above standards in at least one of the four wells. Iron was above the 40 CFR 143 standard only in the unfiltered sample from well 299-E18-1. Turbidity exceeded the standard in 40 CFR 265, Appendix III, in three of the four wells. Monitoring for turbidity is required only for surface water, but was measured in this case as an indicator of particulate content. Four quarters of background data are presently being evaluated.

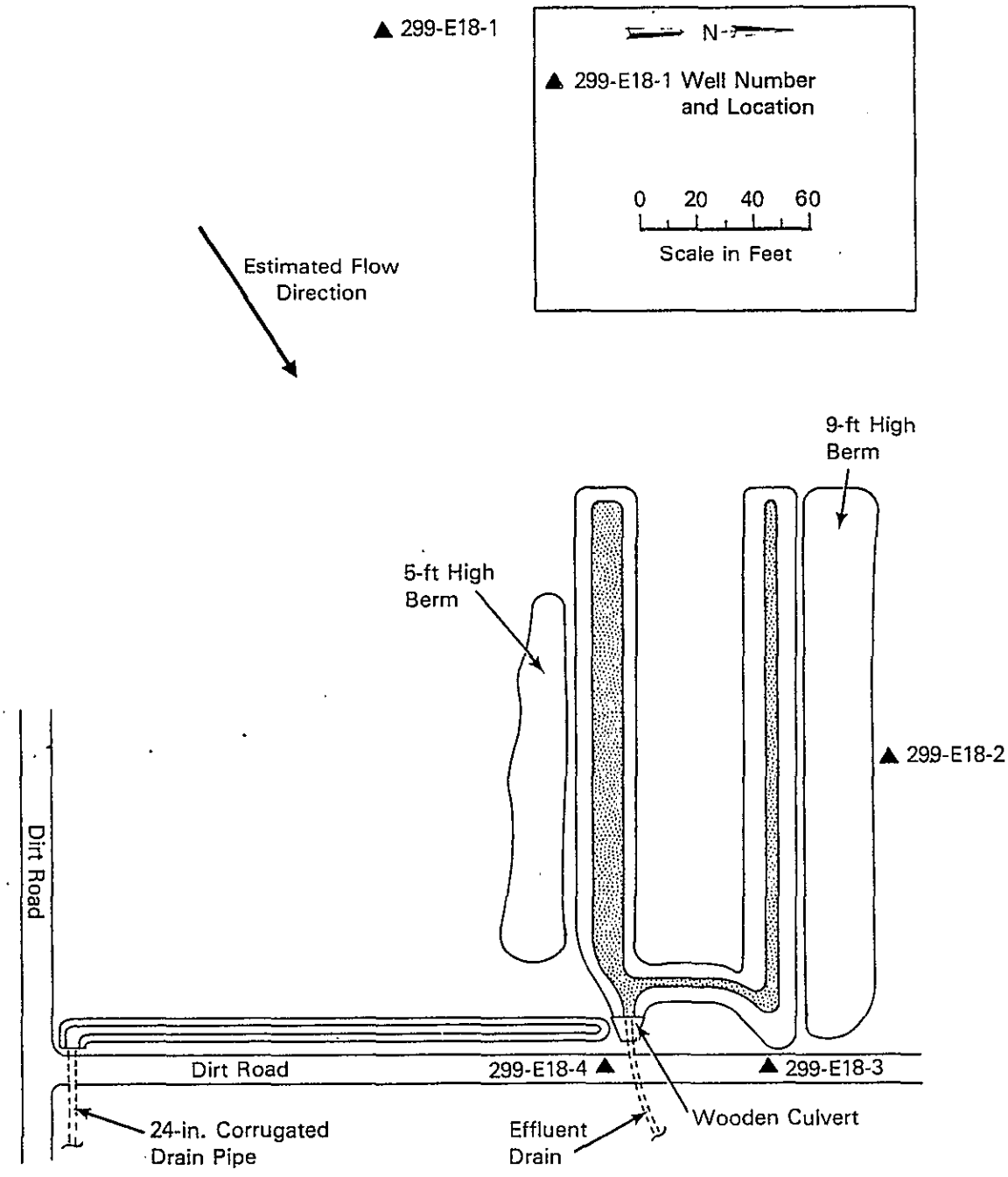


FIGURE 13.1. Monitoring Well Locations for the 2101-M Pond

TABLE 13.1. Sampling Schedule for the 2101-M Pond

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

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

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

Well Number	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
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
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
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

(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
March 1989 through May 1989

Constituent List=Contamination Indicator Parameters

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Standards Agency	Exceeded	Full name
088	CONDLAB	umho	.	16	0	700	WDOE		Specific conductance, laboratory
191	CONDFLD	umho	1	16	0	700	WDOE		Specific conductance, field
199	PHFIELD		0.1	16	0	6.5-8.5	EPAS		pH, field
207	PH-LAB		0.01	16	0	6.5-8.5	EPAS		pH, laboratory
C69	TOC	ppb	2000	16	1	.			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 Standard	Standards Agency	Exceeded	Full name
109	COLIFRM	MPN	2.2	4	4 ***	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		Total radium
A06	BARIUM	ppb	6	5	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	5	5 ***	10	EPA		Cadmium
A08	CHROMUM	ppb	10	5	0	50	EPA		Chromium
A10	SILVER	ppb	10	5	5 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	5	1	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	5	5 ***	2	EPA		Mercury
A22	SELENUM	ppb	5	5	4	10	EPA		Selenium
A33	ENDRIN	ppb	0.1	5	5 ***	0.2	EPA		Endrin
A34	METHLOR	ppb	3	5	5 ***	100	EPA		Methoxychlor
A35	TOXAENE	ppb	1	5	5 ***	5	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	5	5 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	ppb	500	5	1	45000	EPA		Nitrate
C74	FLUORID	ppb	500	5	3	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	5	0	1000	EPA		Barium, filtered
H21	FCADMIU	ppb	2	5	5 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	ppb	10	5	4	50	EPA		Chromium, filtered
H23	FSILVER	ppb	10	5	5 ***	50	EPA		Silver, filtered
H37	FARSENI	ppb	5	5	1	50	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
H60	TURBID	ntu	0.1	5	0	1	EPA	xxx	Turbidity, nephelometric

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	2	300	EPAS		Iron, filtered
H57	LPHENOL	ppb	10	5	5 ***	.			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
A01	BERYLUM	ppb	5	5	5 ***	.			Beryllium
A03	STRONUM	ppb	20	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	3	1300	EPAP		Copper
A14	VANADUM	ppb	5	5	0	.			Vanadium
A15	ANTIONY	ppb	100	5	5 ***	.			Antimony
A16	ALUMNUM	ppb	150	5	5 ***	.			Aluminum
A18	POTASUM	ppb	100	5	0	.			Potassium
A50	MAGNES	ppb	50	5	0	.			Magnesium
C76	PHOSPHA	ppb	1000	5	5 ***	.			Phosphate
H18	FZINC	ppb	5	5	4	5000	EPAS		Zinc, filtered
H19	FCALCIU	ppb	50	5	0	.			Calcium, filtered
H25	FNICKEL	ppb	10	5	3	.			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	5 ***	.			Beryllium, filtered
H35	FSTRONT	ppb	20	5	0	.			Strontium, filtered
H36	FANTIMO	ppb	100	5	5 ***	.			Antimony, filtered
H58	ALKALIN	ppb	20000	4	0	.			Total alkalinity, as CaCO3
H66	BROMIDE	ppb	1000	5	5 ***	.			Bromide
H67	NITRITE	ppb	1000	5	5 ***	.			Nitrite
H86	FBORON	ppb	10	5	1	.			Boron, filtered
H87	FCOBALT	ppb	20	5	5 ***	.			Cobalt, 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
H88	FLITHIU	ppb	10	5	5 ***	.		Lithium, filtered
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	TRANDCE	ppb	5	1	1 ***	70	EPAP	trans-1,2-Dichloroethene
A93	METHYCH	ppb	5	1	1 ***	.		Methylene chloride [Dichloromethane]
B13	VINYIDE	ppb	10	1	1 ***	2	EPA	Vinyl chloride
B14	M-XYLE	ppb	5	1	1 ***	440	EPAP	Xylene-m
H15	2,4,5-T	ppb	2	5	5 ***	.		2,4,5-T
H68	HEXONE	ppb	10	1	1 ***	.		Hexone [Methyl isobutyl ketone]
I01	ACETONE	ppb	10	1	1 ***	.		Acetone by VOA
I28	TAF	ppb	10	1	1 ***	.		Tetrahydorfuran
L63	14DBEN	ppb	5	1	1 ***	75	EPA	1,4-Dichlorobenzene [p-Dichlorobenzene]

TABLE 13.3. (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 given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 13.4. Constituents with at Least One Detected Value for the 2101-M Pond
March 1989 through May 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	26MAY89		550	503	8.00	7.89	#500	#4
		1	549	474	8.00	7.89	#500	#3
		2	549	484	8.00	7.89	#300	#3
		3	549	498	8.00	7.89	#600	#3
2-E18-2	01JUN89		244	247	8.10	7.45	#400	15
		1	244	223	8.10	7.46	#600	14
		2	243	249	8.10	7.46	#500	12
		3	244	252	8.10	7.46	#400	13
2-E18-3	01JUN89		176	183	8.10	7.39	#500	11
		1	176	178	8.20	7.40	#500	#9
		2	178	178	8.10	7.40	#400	21
		3	176	201	8.20	7.41	#400	15
2-E18-4	26MAY89		255	298	8.20	8.05	#900	#5
		1	255	282	8.10	8.05	#900	#7
		2	255	294	8.10	8.05	#1000	12
		3	255	293	8.10	8.05	#900	16

TABLE 13.4. (contd)

Regular Monitoring Data

Well name	Collection Date	Duplicat sample number	ALKALIN ppb 20000/.	ALPHAHI pCi/L 4/15	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 6/1000	FBARIUM ppb 6/1000	BETA pCi/L 8/50	BORON ppb 10/.	FBORON ppb 10/.
2-E18-1	26MAY89		102,000	5.530	<5	<5	28	25	6.58	37	34
2-E18-2	01JUN89		90,500	3.010	7	5	61	56	4.70	19	23
2-E18-3	01JUN89		96,600	0.931	14	14	53	55	6.81	18	<10
	01JUN89	1	.	1.100	13	13	53	58	5.36	13	11
2-E18-4	26MAY89		105,000	2.330	11	12	57	57	6.08	17	16

Well name	Collection Date	Duplicat sample number	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s	FCHROMI ppb 10/50	CHROMUM ppb 10/50	COPPER ppb 10/1300p	FCOPPER ppb 10/1300p	FLUORID ppb 500/4000
2-E18-1	26MAY89		60,400	58,000	7,100	<10	20	<10	<10	500
2-E18-2	01JUN89		26,300	27,700	8,000	<10	28	15	<10	700
2-E18-3	01JUN89		28,500	27,800	7,000	<10	30	<10	<10	<500
	01JUN89	1	27,900	27,700	6,900	12	36	<10	<10	<500
2-E18-4	26MAY89		31,700	31,600	14,600	<10	24	18	11	<500

Well name	Collection Date	Duplicat sample number	IRON ppb 30/300s	FIRON ppb 30/300s	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-E18-1	26MAY89		546	<30	14,600	15,100	<5	12	13	<10	12,000
2-E18-2	01JUN89		124	<30	7,800	7,140	<5	9	11	<10	600
2-E18-3	01JUN89		284	39	7,720	7,740	<5	7	21	12	500
	01JUN89	1	294	31	7,790	7,600	<5	7	22	<10	<500
2-E18-4	26MAY89		121	32	8,650	9,350	6	<5	12	17	1,000

Well name	Collection Date	Duplicat sample number	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	FSELENI ppb 5/10	SELENUM ppb 5/10	FSILICO ppb 50/.	SILICON ppb 50/.	SODIUM ppb 200/.	FSODIUM ppb 200/.
2-E18-1	26MAY89		5,810	5,780	0.4710	7	6	15,400	15,000	27,800	28,500
2-E18-2	01JUN89		4,790	5,150	*0.0415	<5	<5	18,300	19,800	18,700	17,400
2-E18-3	01JUN89		5,050	4,960	0.2520	<5	<5	18,100	17,600	5,710	5,980
	01JUN89	1	5,010	5,100	0.1380	<5	<5	17,600	18,100	5,930	5,890
2-E18-4	26MAY89		5,980	5,490	*0.1470	<5	<5	17,800	18,300	6,790	14,400

TABLE 13.4. (contd)

Well name	Collection Date	Duplicate sample number	FSTRONT ppb 20/.	STRONUM ppb 20/.	SULFATE ppb 500/250000s	TURBID ntu 0.1/1	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-E18-1	26MAY89		259	257	151,000	19.5	14	6	30	12
	26MAY89	1	.	.	.	19.2	.	.	.	.
2-E18-2	01JUN89		147	161	44,000	0.9	25	27	10	<5
2-E18-3	01JUN89		148	148	12,500	3.0	35	31	22	<5
	01JUN89	1	143	149	12,600	.	34	29	9	<5
2-E18-4	26MAY89		171	173	35,400	1.4	25	27	8	<5

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

Suffix
none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July,1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
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 given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
w - based on additional Secondary Maximum Contaminant Levels given 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

14.0 GROUT TREATMENT FACILITY

S. S. Teel

The ground water near the Grout Treatment Facility (GTF) has been monitored by a RCRA interim-status well network since 1988. This project is currently in the background stage of monitoring; however, indicator parameter evaluation will begin with the samples scheduled for collection late this quarter. 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 waste 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 (299-E25-28). The locations of the wells in the monitoring network are shown in Figure 14.1. Table 14.1 shows the sampling schedule for these wells.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Drilling

Drilling activities at the planned additional ground-water monitoring wells, 299-E25-37 and 299-E25-38, began during the past quarter. The locations of these wells are shown in Figure 14.1. Both of these wells will

be drilled to a depth of approximately 15 ft below the static water-table elevation using the cable-tool drilling method. Well 299-E25-37 was started on June 14 and reached a depth of 198 ft by June 30. It is estimated that the total depth for this well will be 280 ft. Well 299-E25-38, which was started on June 7, reached its total depth of 282 ft by June 30. The static depth to the water table in this well is approximately 265 ft. Well completion activities for both wells are planned for early next quarter.

Onsite monitoring was conducted using Geiger-Muller (GM) radiation detection meters and organic vapor analyzers. To date, no contamination has been detected by these instruments.

A pre-development water sample was collected at well 299-E25-38 on June 29. The analytical results will be used to assist in determining appropriate water handling and disposal methods for this well. In the interim, all drill cuttings (below the water table) and purge waters will be contained.

No aquifer tests are planned for either well 299-E25-37 or 299-E25-38.

Hydrogeologic Characterization

Hydrogeologic characterization efforts included the collection and description of geologic samples during drilling, determinations of moisture content, 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 will be included in the next quarterly report.

Moisture content analyses were conducted by PNL on representative samples collected by the core barrel. Samples were also collected approximately every 20 ft from both wells for possible chemical/radiological analysis. A total of 10 of these samples will be selected for analyses for gross alpha,

gross beta, TOC, and anions. These analyses will be performed by UST. Results of the moisture and chemical/radiological analyses will be presented in the next quarterly report.

Borehole geophysical logging was conducted inside the length of the 8-in. casing at well 299-E25-38, and through the length of the 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. The 8-in. casing at well 299-E25-37 will be logged when the well is complete. All logging is performed using the natural gamma probe. The geophysical logs for these wells will be included the next quarterly report.

WATER LEVELS

Water-level measurements were made both before sample collection and on a monthly basis. Table 14.2 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 14.3.

WATER CHEMISTRY DATA

Quarterly sampling is being conducted to establish background levels for ground-water constituents and for indicator parameter evaluation. Sampling occurred at four of the 13 wells scheduled. These four wells, and the date which they were sampled are: 299-E25-18 (June 23, 1989), 299-E25-20 (June 21, 1989), 299-E25-24 (June 21, 1989), and 299-E25-25 (June 21 and 23, 1989). All of the samples were collected after approximately three borehole volumes of water had been purged. Analytical data from this sampling have not yet been received. The other wells were not sampled because of the lack of troughs for purge water disposal. These remaining wells should be sampled by the end of July.

Analyses results for semivolatile organic compounds (acid/base/neutrals) from October 1988 samples from wells 299-E25-25, 299-E25-27, 299-E25-29A, and 299-E25-33 were received in April. These analyses were performed to determine the cause of elevated TOX concentrations in these samples. Results for

all constituents were below the detection limit except those for ethanol, a-chlorophosphate (93 ppb) in well 299-E25-29. A course of action for determining the cause of the detectable TOX concentrations is now being formulated. This course of action includes performing the 9905 list analysis on samples collected next quarter from wells 299-E25-29 and 299-E25-31, the two wells that consistently show TOX results above detection.

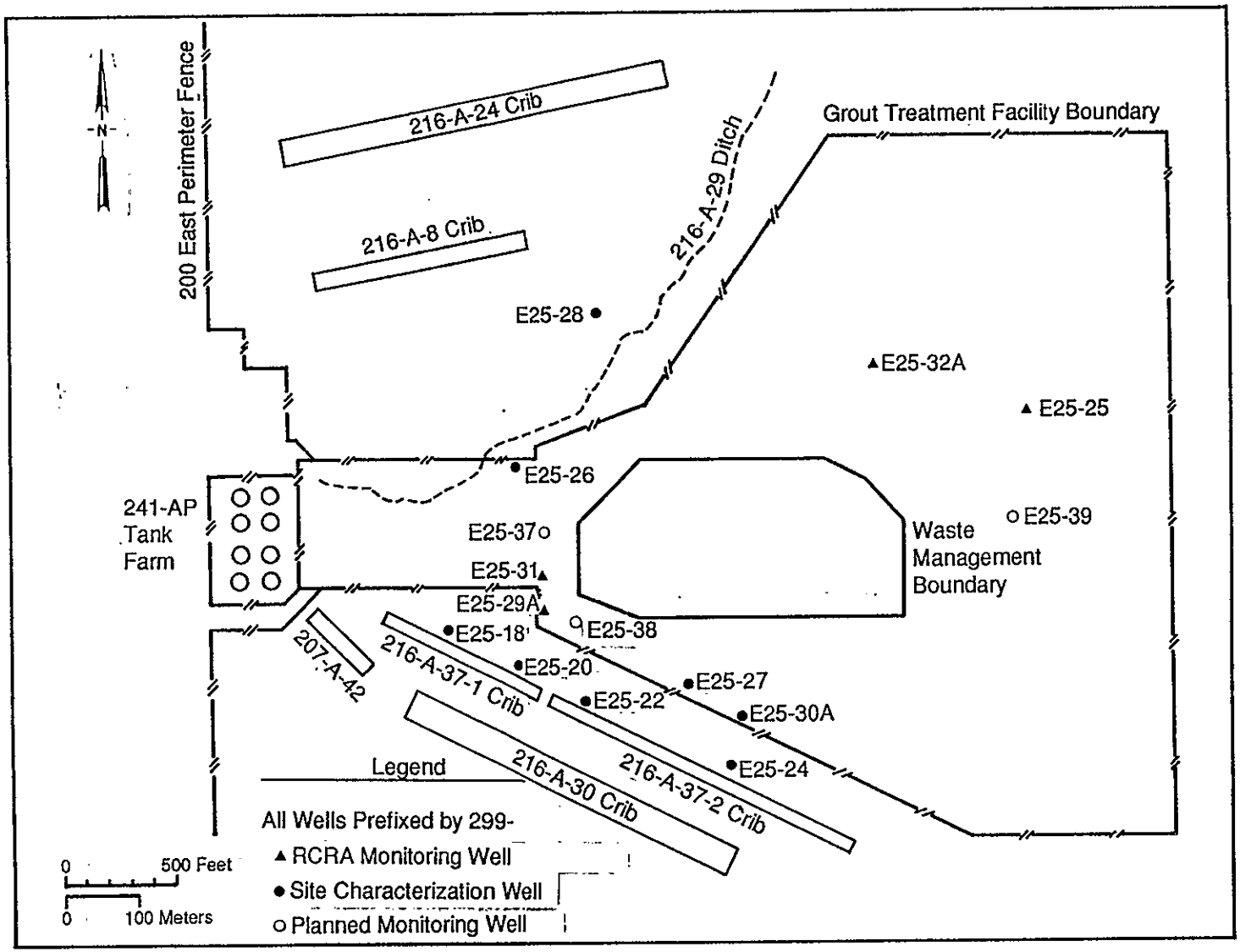


FIGURE 14.1. Monitoring Well Locations for the Grout Treatment Facility

TABLE 14.1. Sampling Schedule for the Grout Treatment Facility

Well	1988			1989 Projected								
	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-E25-29	L3			X		X			L			X1
299-E25-30	L4					XR			X1			X1
299-E25-31	L3			X		X			L			X1
299-E25-32	L3			X		X			X1R			X1
299-E25-33	L3			X		X			X1			X1

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 in Table 14.4 of this report.
L3 = List 3, samples collected for constituents in Table 14.5.
L4 = List 4, samples collected for constituents in List 1, Table 14.4, and pH (field), specific conductance (field), total organic carbon, and total organic halogen.
R = quality control replicates were collected.
V = volatile organic analyses blanks were collected.
X = sampled for the regular list of constituents (see Table 14.4 in Smith, Bates, and Lundgren 1989).
X1 = sampled for the regular list of constituents (see Table 14.4 in Smith, Bates, and Lundgren 1989) including quadruplicates of the site-specific parameters.

TABLE 14.2. Water-Level Data Taken Before Sample Collection at the Grout Treatment Facility, June 1989

Well Number	Date	Casing Elevation, ft above MSL[a]	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E25-18	6/23/89	679.05	273.98	405.07
299-E25-18	6/23/89	679.05	273.97	405.08
299-E25-20	6/21/89	676.30	271.42	404.88
299-E25-20	6/21/89	676.30	271.41	404.89
299-E25-24	6/21/89	679.55	274.04	405.51
299-E25-24	6/21/89	679.55	274.04	405.51
299-E25-25	6/21/89	669.42	264.46	404.96
299-E25-25	6/21/89	669.42	264.46	404.96
299-E25-25	6/23/89	669.42	263.08	406.34
299-E25-25	6/23/89	669.42	263.09	406.33

(a) MSL = mean sea level.

TABLE 14.3. Monthly Water-Level Data Collected During the Third Quarter of 1989 for the Grout Treatment Facility Ground-Water Monitoring Wells

Well Number	Date	Casing Elevation, ft above MSL[a]	Water-Level Elevation, ft above MSL
299-E25-18	6/26/89	679.05	405.42
299-E25-18	6/26/89	679.05	405.43
299-E25-18	5/24/89	679.05	405.49
299-E25-18	5/24/89	679.05	405.49
299-E25-18	4/28/89	679.05	405.62
299-E25-18	4/28/89	679.05	405.63
299-E25-20	6/26/89	676.30	405.27
299-E25-20	6/26/89	676.30	405.27
299-E25-20	5/24/89	676.30	405.32
299-E25-20	5/24/89	676.30	405.34
299-E25-20	4/28/89	676.30	405.52
299-E25-20	4/28/89	676.30	405.52
299-E25-22	6/26/89	674.05	405.37
299-E25-22	6/26/89	674.05	405.37
299-E25-22	5/24/89	674.05	405.42
299-E25-22	5/24/89	674.05	405.43
299-E25-22	4/28/89	674.05	405.54
299-E25-22	4/28/89	674.05	405.56
299-E25-24	6/26/89	679.55	405.85
299-E25-24	6/26/89	679.55	405.85
299-E25-24	5/24/89	679.55	405.87
299-E25-24	5/24/89	679.55	405.86
299-E25-24	4/28/89	679.55	406.02
299-E25-24	4/28/89	679.55	406.00
299-E25-25	6/27/89	669.42	406.39
299-E25-25	6/27/89	669.42	406.39
299-E25-25	5/24/89	669.42	406.38
299-E25-25	5/24/89	669.42	406.40
299-E25-25	4/27/89	669.42	406.57
299-E25-25	4/27/89	669.42	406.58
299-E25-26	6/27/89	668.52	405.83
299-E25-26	6/27/89	668.52	405.83
299-E25-26	5/24/89	668.52	405.79
299-E25-26	5/24/89	668.52	405.79
299-E25-26	4/27/89	668.52	405.87
299-E25-26	4/27/89	668.52	405.87
299-E25-27	6/26/89	676.08	NM
299-E25-27	5/24/89	676.08	405.83

TABLE 14.3. (contd)

Well Number	Date	Casing Elevation, ft above MSL[a]	Water-Level Elevation, ft above MSL
299-E25-27	5/24/89	676.08	405.83
299-E25-27	4/27/89	676.08	NM
299-E25-28	6/26/89	662.44	405.97
299-E25-28	6/26/89	662.44	405.96
299-E25-28	5/24/89	662.44	406.02
299-E25-28	5/24/89	662.44	406.02
299-E25-29A	6/26/89	672.86	405.48
299-E25-29A	6/26/89	672.86	405.48
299-E25-29A	5/24/89	672.86	405.53
299-E25-29A	5/24/89	672.86	405.51
299-E25-29A	4/27/89	672.86	405.69
299-E25-29A	4/27/89	672.86	405.69
299-E25-30A	6/26/89	678.20	NM
299-E25-30A	5/24/89	678.20	NM
299-E25-30A	4/27/89	678.20	NM
299-E25-31	6/27/89	672.53	405.50
299-E25-31	6/27/89	672.53	405.50
299-E25-31	5/24/89	672.53	405.48
299-E25-31	5/24/89	672.53	405.48
299-E25-31	4/28/89	672.53	405.68
299-E25-31	4/28/89	672.53	405.67
299-E25-32A	6/26/89	670.04	405.72
299-E25-32A	6/26/89	670.04	405.72
299-E25-32A	5/24/89	670.04	405.71
299-E25-32A	5/24/89	670.04	405.71
299-E25-32A	4/27/89	670.04	405.01
299-E25-32A	4/27/89	670.04	405.01
299-E25-33	6/26/89	650.03	405.66
299-E25-33	6/26/89	650.03	405.65
299-E25-33	5/24/89	650.03	405.64
299-E25-33	5/24/89	650.03	405.65
299-E25-33	4/27/89	650.03	404.45
299-E25-33	4/27/89	650.03	404.44

(a) MSL = mean sea level.
NM = no measurement taken.

TABLE 14.4. List 2 Constituents for the Grout Treatment Facility

Total Carbon
Metals Analyzed by the Inductively Coupled Plasma Method
Ions
Nitrite
Ammonium
Gamma Scan
Tritium

TABLE 14.5. List 4 Constituents for the Grout Treatment Facility

pH (Field)
Specific Conductance (Field)
Total Organic Carbon
Total Organic Halogen
Arsenic (filtered/unfiltered)
Chromium (filtered/unfiltered)
Selenium (filtered/unfiltered)
Technetium-99
Barium
Cadmium
Fluoride
Lead
Mercury
Nitrate
Silver
Endrin
Lindane
Methoxychlor
Toxaphene
2,4-D
2,4,5-TP Silvex
Radium
Gross Alpha
Gross Beta
Coliform Bacteria
Chloride
Iron
Manganese
Phenols
Sodium
Sulfate
Total Carbon
Metals Analyzed by the Inductively Coupled Plasma Method
Ions
Nitrite
Ammonium
Gamma Scan
Tritium

15.0 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. Groundwater Monitoring at the Hanford Site, January-December 1984. PNL-5408, Pacific Northwest Laboratory, Richland, Washington.

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.

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.

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. 1988. Revised Ground-Water Monitoring Compliance Plan for the 300 Area Process Trenches. PNL-6671, 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.

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.

9011771597

THIS PAGE INTENTIONALLY
LEFT BLANK