START

0021706

PNL-7306 Vol. 1

UC-903

RCRA Ground-Water Monitoring Projects for Hanford Facilities: Progress Report for the Period October 1 to December 31, 1989

Volume 1 - Text

Edited by
R. M. Smith
R. E. Lundgren
D. J. Bates

March 1990

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

Pacific Northwest Laboratory
Operated for the U.S. Department of Energy
by Battelle Memorial Institute

Battelle

JUN 1990
RECEIVED
EDMC

9 2 1 2 6 4 2 1 5 7 7

PNL-7306 Vol. 1

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

9 2 1 2 5 4 2 1 5 7 3

PNL-7306, Vol.1
UC-903

RESOURCE CONSERVATION AND RECOVERY ACT GROUND-WATER MONITORING PROJECTS FOR HANFORD FACILITIES: PROGRESS REPORT FOR THE PERIOD OCTOBER 1 TO DECEMBER 31, 1989

Volume 1 - Text

Edited by
R. M. Smith
D. J. Bates
R. E. Lundgren

March 1990

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

Pacific Northwest Laboratory
Richland, Washington 99352

9 2 1 2 6 4 2 1 5 7 9

PREFACE

This is Volume 1 of a two-volume document that describes the progress of 15 Hanford Site ground-water monitoring projects for the period October 1 to December 31, 1989. This volume discusses the projects; Volume 2 provides as-built diagrams, completion/inspection reports, drilling logs, and geophysical logs for wells drilled, completed, or logged during this period. Volume 2 may be found on microfiche in the back pocket of Volume 1.

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

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

9 2 1 2 6 4 2 1 5 8 0

9 2 1 2 6 4 2 1 5 8 1

SUMMARY

This report describes the progress of 15 Hanford Site ground-water monitoring projects for the period October 1 to December 31, 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 (200-East and 200-West Areas), composed of

  Waste Management Area 1
  Waste Management Area 2
  Waste Management Area 3
  Waste Management Area 4
  Waste Management Area 5

- Nonradioactive Dangerous Waste Landfill (southeast of the 200 Areas)
- 1301-N Liquid Waste Disposal Facility (100-N Area)
- 1324-N Surface Impoundment and 1324-NA Percolation Pond (100-N Area)
- 1325-N Liquid Waste Disposal Facility (100-N Area)
- 216-A-10 Crib (200-East Area)
- 216-A-29 Ditch (200-East Area)
- 216-A-36B Crib (200-East Area)
- 216-B-3 Pond (east of the 200-East Area)
- 2101-M Pond (200-East Area)
- Grout Treatment Facility (200-East Area)
- Single-Shell Tanks (200-East and 200-West Areas), composed of

  Waste Management Area A-AX
  Waste Management Area B-BX-BY
  Waste Management Area C
  Waste Management Area S-SX
  Waste Management Area T
  Waste Management Area TX-TY
  Waste Management Area U

- 216-B-63 Trench (200-East Area).

This report is the fourteenth in a series of quarterly status reports; the first 13 cover the period from May 1, 1986, through September 30, 1989 (PNL 1986, 1987a, 1987b, 1987c, 1987d, 1988b, 1988c, 1988d; Fruland, Bates, and Lundgren 1989a, 1989b; Smith, Bates, and Lundgren 1989a, 1989b, 1989c).

The 15 projects discussed in this report were designed according to applicable interim-status ground-water monitoring requirements specified in the Resource Conservation and Recovery Act of 1976 (RCRA) as amended; in 40 CFR 265, Subpart F; and in WAC 173-303-400.

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

9 2 1 2 5 4 2 1 0 3 2

ABBREVIATIONS AND ACRONYMS

The following abbreviations and acronyms are used in this report.

1,2-DIC - 1,2-dichloroethane

ASTM - American Society for Testing and Materials

CFR - U.S. Code of Federal Regulations
Cis-1,2-DCE - Cis-1,2-dichloroethene
CY - calendar year (i.e., January through December)

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

Ecology - Washington State Department of Ecology
EPA - U.S. Environmental Protection Agency

ft - feet
ft/mi - feet per mile
FY - fiscal year (i.e., October through September)

gal - gallon
gal/d - gallons per day
gal/yr - gallons per year
gpm - gallons per minute
GTF - Grout Treatment Facility

LLBGs - Low-Level Burial Grounds
LWDF - Liquid Waste Disposal Facility

MCL - maximum contaminant level
mg/L - milligrams per liter

NRDW - Nonradioactive Dangerous Waste Landfill
NTU - nephelometric turbidity unit

PCB - polychlorinated biphenyl
PCE - perchloroethethene
pCi/L - picocuries per liter
PNL - Pacific Northwest Laboratory
ppb - parts per billion
ppm - parts per million
PUREX - plutonium-uranium extraction

RCRA - Resource Conservation and Recovery Act

9 2 1 2 6 4 2 1 5 8 3

SST - Single-Shell Tanks
SWL - Solid Waste Landfill
SWS - surface water station

TCE - trichloroethene
TEGD - RCRA Ground-Water Monitoring Technical Enforcement Guidance Document (EPA 1986a)
TOC - total organic carbon
TOX - total organic halogens
TOXLDL - total organic halogens, lower detection limit

UST - United States Testing Company, Incorporated

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

WAC - Washington Administrative Code
WMA - waste management area

μg/L - micrograms per liter
μmho/cm - micromhos per centimeter (measure of specific conductivity)

CONTENTS

PREFACE iii

SUMMARY v

ABBREVIATIONS AND ACRONYMS vii

1.0 INTRODUCTION. 1.1

QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM 1.3

ANALYTICAL ANOMALIES. 1.4

Fluoride Matrix Interference 1.4

Other Topics 1.5

2.0 300 AREA PROCESS TRENCHES (R. Schalla, Pacific Northwest Laboratory) 2.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 2.2

WATER LEVELS. 2.2

WATER CHEMISTRY DATA. 2.2

3.0 183-H SOLAR EVAPORATION BASINS (S. H. Hall, Pacific Northwest Laboratory) 3.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 3.2

WATER LEVELS 3.2

WATER CHEMISTRY DATA 3.2

4.0 200 AREAS LOW-LEVEL BURIAL GROUNDS (G. V. Last, Pacific Northwest Laboratory) 4.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 4.2

WATER LEVELS 4.2

WATER CHEMISTRY DATA 4.2

5.0 NONRADIOACTIVE DANGEROUS WASTE LANDFILL (R. M. Fruland/ F. N. Hodges, Pacific Northwest Laboratory/ Westinghouse Hanford Company) 5.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 5.2

9 2 1 2 6 4 2 1 5 8 5

WATER LEVELS 5.2

WATER CHEMISTRY DATA 5.3

6.0 1301-N LIQUID WASTE DISPOSAL FACILITY (M. J. Hartman, Westinghouse Hanford Company) 6.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 6.2

WATER LEVELS 6.2

WATER CHEMISTRY DATA 6.2

GROUND-WATER QUALITY ASSESSMENT PROGRAM 6.4

7.0 1324-N SURFACE IMPOUNDMENT AND 1324-NA PERCOLATION POND (M. J. Hartman, Westinghouse Hanford Company) 7.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 7.2

WATER LEVELS 7.2

WATER CHEMISTRY DATA 7.2

GROUND-WATER QUALITY ASSESSMENT PROGRAM 7.4

8.0 1325-N LIQUID WASTE DISPOSAL FACILITY (M. J. Hartman, Westinghouse Hanford Company) 8.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 8.1

WATER LEVELS 8.2

BACKGROUND STATISTICAL DATA 8.2

WATER CHEMISTRY DATA 8.2

9.0 216-A-10 CRIB (S. P. Luttrell, Pacific Northwest Laboratory) 9.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 9.1

WATER LEVELS 9.2

WATER CHEMISTRY DATA 9.2

10.0 216-A-29 DITCH (S. P. Luttrell, Pacific Northwest Laboratory) 10.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 10.1

WATER LEVELS 10.1

WATER CHEMISTRY DATA 10.2

11.0 216-A-36B CRIB (S. P. Luttrell, Pacific Northwest Laboratory) 11.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 11.2

WATER LEVELS 11.2

WATER CHEMISTRY DATA 11.2

12.0 216-B-3 POND (S. P. Luttrell, Pacific Northwest Laboratory) 12.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 12.2

Well Drilling, Completion, Development, and Pump Installation 12.2

Hydrogeologic Characterization 12.2

WATER LEVELS 12.2

WATER CHEMISTRY DATA. 12.2

13.0 2101-M POND (M. A. Chamness, Pacific Northwest Laboratory) 13.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 13.1

WATER LEVELS. 13.1

WATER CHEMISTRY DATA 13.2

14.0 GROUT TREATMENT FACILITY (S. S. Teel, Pacific Northwest Laboratory) 14.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 14.2

WATER LEVELS 14.2

WATER CHEMISTRY DATA 14.2

15.0 SINGLE-SHELL TANKS (E. J. Jensen, Pacific Northwest Laboratory) 15.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 15.2

WATER LEVELS 15.2

9 2 1 2 6 4 2 1 5 8 7

WATER CHEMISTRY DATA 15.2

16.0 216-B-63 TRENCH (B. N. Bjornstad, Pacific Northwest Laboratory) 16.1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION 16.2

17.0 REFERENCES. 17.1

Volume 2 contains

APPENDIX A - SUPPLEMENTAL WELL CONSTRUCTION INFORMATION FOR WELLS COMPLETED DURING 1989 FOR THE GROUT TREATMENT FACILITY. A.1

APPENDIX B - AS-BUILT DIAGRAMS, WELL COMPLETION/INSPECTION REPORTS, DRILLING LOGS, AND GEOPHYSICAL LOGS FOR WELLS COMPLETED THIS QUARTER NEAR THE SINGLE-SHELL TANKS. B.1

9 2 1 2 5 4 2 1 5 8 8

FIGURES

1.1 Locations of the 15 RCRA Ground-Water Monitoring Projects and Landmarks on the Hanford Site, October 1989 . . . . . 1.6

2.1 Monitoring Well Locations for the 300 Area Process Trenches. 2.5

2.2 Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer Near the 300 Area, October 1989 . . . 2.6

2.3 Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer Near the 300 Area, November 1989 . . . 2.7

2.4 Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer Near the 300 Area, December 1989 . . . 2.8

2.5 Uranium Concentrations in pCi/L in Well 399-1-17A 2.9

2.6 Uranium Concentrations in pCi/L in Wells 399-1-11, 399-1-17A, 399-1-18A, and 399-1-19 . . . . . 2.10

3.1 Monitoring Well Locations for the 183-H Solar Evaporation Basins 3.4

3.2 Columbia River Elevation at the 100-H Area, September 26, 1989, to January 3, 1990. . . . . 3.5

4.1 Monitoring Well Locations for Waste Management Area 1, 200-East Area 4.7

4.2 Monitoring Well Locations for Waste Management Area 2, 200-East Area 4.8

4.3 Monitoring Well Locations for Waste Management Area 3, 200-West Area 4.9

4.4 Monitoring Well Locations for Waste Management Area 4, 200-West Area 4.10

4.5 Monitoring Well Locations for Waste Management Area 5, 200-West Area 4.11

5.1 Monitoring Well Locations for the Solid Waste Landfill and the Nonradioactive Dangerous Waste Landfill 5.4

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

6.2 Water Levels in the 100-N Area, October 1989 . . . . . 6.6

9 2 1 2 6 4 2 1 5 8 9

6.3 Water Levels in the 100-N Area, November 1989 . . . . . 6.7

6.4 Water Levels in the 100-N Area, December 1989 . . . . . 6.8

7.1 Monitoring Wells Locations for the 1324-N and 1324-NA Facilities. 7.5

8.1 Monitoring Well Locations for the 1325-N Liquid Waste Disposal Facility 8.4

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

10.1 Monitoring Well Locations for the 216-A-29 Ditch. 10.3

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

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

13.1 Monitoring Well Locations for the 2101-M Pond 13.4

14.1 Monitoring Well Locations for the Grout Treatment Facility 14.3

15.1 Monitoring Well Locations for Waste Management Area A-AX 15.3

15.2 Monitoring Well Locations for Waste Management Area B-BX-BY 15.4

15.3 Monitoring Well Locations for Waste Management Area C. 15.5

15.4 Monitoring Well Locations for Waste Management Area S-SX 15.6

15.5 Monitoring Well Locations for Waste Management Area T. 15.7

15.6 Monitoring Well Locations for Waste Management Area TX-TY 15.8

15.7 Monitoring Well Locations for Waste Management Area U. 15.9

16.1 Monitoring Well Locations for the 216-B-63 Trench 16.3

TABLES

1.1 Status of Hanford Site Resource Conservation and Recovery Act Interim-Status Ground-Water Monitoring Projects as of November 30, 1989 . . . . . 1.7

2.1 Ground-Water Monitoring Wells for the 300 Area Process Trenches 2.11

2.2 Sampling Schedule for the 300 Area Process Trenches 2.12

2.3 Monthly Water-Level Data for Wells Near the 300 Area Process Trenches 2.13

2.4 Water-Level Data Collected Before Sampling from Wells Near the 300 Area Process Trenches 2.18

2.5 Constituent List and Summary of Sampling Results for the 300 Area Process Trenches, September Through November 1989 . . . . . 2.19

2.6 Constituents with at Least One Detected Value for the 300 Area Process Trenches, September Through November 1989 . . . . . 2.29

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

3.2 Monthly Water-Level Data for Wells Near the 183-H Solar Evaporation Basins. 3.7

3.3 Water-Level Data Collected Before Sampling from Wells Near the 183-H Solar Evaporation Basins 3.13

3.4 Constituent List and Summary of Sampling Results for the 183-H Solar Evaporation Basins, September to November 1989 . . . . . 3.14

3.5 Constituents with at Least One Detected Value for the 183-H Solar Evaporation Basins, September Through November 1989 . . . . . 3.17

4.1 Ground-Water Monitoring Wells for the 200 Areas Low-Level Burial Grounds 4.12

4.2 Sampling Schedule for the 200 Areas Low-Level Burial Grounds 4.13

4.3 1989 Drilling Summary for the 200 Areas Low-Level Burial Ground Wells 4.14

9 2 1 2 6 4 2 1 5 9 1

4.4 Monthly Water-Level Data for Wells Near the Low-Level Burial Grounds 4.15

4.5 Water-Level Data Collected Before Sampling from Wells Near the Low-Level Burial Grounds 4.19

4.6 Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-1 September Through December 1989 . . . . . 4.20

4.7 Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-1 September Through December 1989 . . . . . 4.24

4.8 Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-2 September Through November 1989 . . . . . 4.28

4.9 Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-2 September Through November 1989 . . . . . 4.38

4.10 Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-3 September Through November 1989 . . . . . 4.42

4.11 Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-3 September Through November 1989 . . . . . 4.46

4.12 Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-4 September 1989. . . . . 4.52

4.13 Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-4 September 1989. . . . . 4.56

4.14 Critical Mean Values for Indicator Parameter Data at the Low-Level Burial Grounds, Waste Management Area 1, September 1989 . . . . . 4.60

4.15 Contamination Indicator Parameter Replicate Averages for the Low-Level Burial Grounds, Waste Management Area 1, September Through December 1989 . . . . . 4.61

4.16 Critical Mean Values for Indicator Parameter Data at the Low-Level Burial Grounds, Waste Management Area 2, September 1989 . . . . . 4.63

4.17 Contamination Indicator Parameter Replicate Averages for the Low-Level Burial Grounds, Waste Management Area 2, September 1989 . . . . . 4.64

4.18 Critical Mean Values for Indicator Parameter Data at the Low-Level Burial Grounds, Waste Management Area 3, September 1989 . . . . . 4.65

4.19 Contamination Indicator Parameter Replicate Averages for the Low-Level Burial Grounds, Waste Management Area 3, September Through November 1989 . . . . . 4.66

4.20 Critical Mean Values for Indicator Parameter Data at the Low-Level Burial Grounds, Waste Management Area 4, September 1989 . . . . . 4.68

4.21 Contamination Indicator Parameter Replicate Averages for the Low-Level Burial Grounds, Waste Management Area 4, September 1989 . . . . . 4.69

5.1 Sampling Schedule for the Nonradioactive Dangerous Waste Landfill 5.5

5.2 Water-Level Data Collected Before Sampling from Wells Near the Solid Waste Landfill and Nonradioactive Dangerous Waste Landfill 5.6

5.3 Monthly Water-Level Data from Selected Wells Near the Solid Waste Landfill and Nonradioactive Dangerous Waste Landfill 5.7

5.4 Constituent List and Summary of Sampling Results for the Nonradioactive Dangerous Waste Landfill, October 1989 . . . . 5.8

5.5 Constituents with at Least One Detected Value for the Nonradioactive Dangerous Waste Landfill, October 1989 . . . . . 5.9

5.6 Contamination Indicator Parameter Replicate Averages for the Nonradioactive Dangerous Waste Landfill, October 1989 . . . . 5.11

5.7 Critical Mean Values for Indicator Parameter Data at the Nonradioactive Dangerous Waste Landfill, November 1989 . . . . . 5.12

6.1 Monthly Water-Level Data for Wells in the 100-N Area. 6.9

6.2 Water-Level Data Collected Before Sampling from Wells in the 100-N Area 6.14

6.3 Constituent List and Summary of Sampling Results for the 1301-N Liquid Waste Disposal Facility, September Through December 1989 . . . . . 6.15

9 2 1 2 6 4 2 1 5 9 3

6.4 Constituents with at Least One Detected Value for the 1301-N Liquid Waste Disposal Facility, September Through December 1989 . . . . . 6.25

6.5 Sampling Schedule for the 1301-N Liquid Waste Disposal Facility. 6.37

6.6 The Regular Sampling List for the 1301-N Ground-Water Quality Assessment Monitoring Network 6.38

6.7 Short List for the 1301-N Ground-Water Quality Assessment Monitoring Network. 6.38

7.1 Constituent List and Summary of Sampling Results for the 1324-N Surface Impoundment and 1324-NA Percolation Pond, September Through December 1989 . . . . . 7.6

7.2 Constituents with at Least One Detected Value for the 1324-N Surface Impoundment and 1324-NA Percolation Pond, September Through December 1989 . . . . . 7.16

7.3 Sampling Schedule for the 1324-N/NA Project 7.27

7.4 The Regular Sampling List for the 1324-N/NA Ground-Water Quality Assessment Monitoring Network 7.28

7.5 Short List for the 1324-N/NA Ground-Water Quality Assessment Monitoring Network 7.28

8.1 Critical Mean Values for Indicator Parameter Data at the 1325-N Liquid Waste Disposal Facility, September 1989 . . . . 8.5

8.2 Constituent List and Summary of Sampling Results for the 1325-N Liquid Waste Disposal Facility, November Through December 1989 . . . . . 8.6

8.3 Constituents with at Least One Detected Value for the 1325-N Liquid Waste Disposal Facility, November Through December 1989 . . . . . 8.16

8.4 Contamination Indicator Parameter Replicate Averages for the 1325-N Liquid Waste Disposal Facility, September 1989 . . . . . 8.28

8.5 Sampling Schedule for the 1325-N Liquid Waste Disposal Facility. 8.29

8.6 The Regular Sampling List for the 1325-N Ground-Water Quality Assessment Monitoring Network 8.30

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

9.3 Constituent List and Summary of Sampling Results for the 216-A-10 Crib, October 1989 . . . . . 9.6

9.4 Constituents with at Least One Detected Value for the 216-A-10 Crib, October 1989 . . . . . 9.11

10.1 Sampling Schedule for the 216-A-29 Ditch 10.4

10.2 Water-Level Data for Wells Near the 216-A-29 Ditch Sampled in Support of the Hanford Liquid Effluent Study 10.5

10.3 Supplemental Water-Level Data for Wells Near the 216-A-29 Ditch. 10.5

10.4 Constituent List and Summary of Sampling Results for the 216-A-29 Ditch, October to November 1989 . . . . . 10.6

10.5 Constituents with at Least One Detected Value for the 216-A-29 Ditch, October to November 1989. . . . . 10.16

11.1 Sampling Schedule for the 216-A-36B Crib 11.5

11.2 Supplemental 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, September 1989 . . . . . 11.7

11.4 Constituents with at Least One Detected Value for the 216-A-36B Crib, September 1988 . . . . . 11.10

11.5 Critical Mean Values for Indicator Parameter Data at the 216-A-36B Crib, September 1989 . . . . . 11.14

11.6 Contamination Indicator Parameter Replicate Averages for the 216-A-36B Crib, September 1989 . . . . . 11.15

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 Sampled in Support of the Hanford Liquid Effluent Study 12.5

12.3 Monthly Water-Level Data for Wells Near the 216-B-3 Pond. 12.6

13.1 Sampling Schedule for the 2101-M Pond 13.5

9 2 1 2 6 4 2 1 5 9 5

13.2 Water-Level Data at Times Other Than at Sampling for Wells Near the 2101-M Pond 13.6

13.3 Water-Level Data Collected Before Sampling from Wells Near the 2101-M Pond 13.7

13.4 Constituent List and Summary of Sampling Results for the 2101-M Pond for August 1989 . . . . . 13.8

13.5 Constituents with at Least One Detected Value for the 2101-M Pond, August 1989. . . . . 13.19

13.6 Critical Mean Values for Indicator Parameter Data at the 2101-M Pond, November 1989 . . . . . 13.22

13.7 Contamination Indicator Parameter Replicate Averages for the 2101-M Pond, November 1989. . . . . 13.23

14.1 Sampling Schedule for the Grout Treatment Facility 14.4

14.2 Water-Level Data Collected Before Sampling from Wells Near the Grout Treatment Facility 14.4

14.3 Semiannual Water-Level Data for Wells Near the Grout Treatment Facility 14.5

14.4 Constituent List and Summary of Sampling Results for the Grout Treatment Facility, October Through November 1989 . . . 14.6

14.5 Constituents with at Least One Detected Value for the Grout Treatment Facility, October Through November 1989 . . . 14.16

15.1 Sampling Schedule for the Single-Shell Tanks 15.10

1.0 INTRODUCTION

The U.S. Department of Energy, Richland Operations Office (DOE-RL) administers and Westinghouse Hanford Company currently operates the Hanford facilities included in this report. The Hanford Site in southeastern Washington (Figure 1.1) is one of many DOE installations across the United States involved in a variety of activities related to energy research and development, nuclear weapons, and national security. A number of Hanford facilities use and generate hazardous materials and wastes, which must be managed so that public health and the environment are protected. The Resource Conservation and Recovery Act (RCRA) was enacted in 1976, providing a regulatory structure for the management of solid wastes, which includes hazardous wastes. The Pacific Northwest Laboratory (PNL) initiated RCRA site characterization and ground-water monitoring activities in 1985 for UNC Nuclear Industries, Westinghouse Hanford Company, and Rockwell Hanford Operations, which were Hanford operating contractors at the time. Pacific Northwest Laboratory and Rockwell Hanford Operations designed ground-water monitoring programs to meet the requirements contained in RCRA; 40 CFR 265, Subpart F; and in WAC 173-303-400. The analytical results of the RCRA ground-water monitoring programs are compared to various drinking water standards. All drinking water supplied from the sampled aquifer meets regulatory standards for drinking water quality.

A RCRA Part A application for the Hanford Site (DOE-RL 1988) has been submitted to the U.S. Environmental Protection Agency (EPA) Region 10 and the Washington State Department of Ecology (hereafter called Ecology). Currently, the Hanford Site is operating under RCRA interim status. Interim-status standards applicable to ground-water monitoring activities are discussed in 40 CFR 265.90 to 265.94 and WAC 173-303-400, and are applicable to Hanford Site facilities until final administrative disposition of Part B permit or closure application(s).

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

9 2 1 2 6 4 2 1 5 9 7

to characterize the quality of the ground water, followed in subsequent years by a minimum of semiannual monitoring of indicator parameters and annual monitoring of ground-water quality parameters. In addition, each site is monitored annually for those constituents listed in WAC 173-303-9905 for which accepted analytical techniques are available. [Within this report, reference to the long list (WAC 173-303-9905) corresponds to these constituents.] 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.

This report describes progress from October 1 to December 31, 1989, for 15 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) for the 200 Areas Low-Level Burial Grounds (LLBGs), Nonradioactive Dangerous Waste Landfill (NRDW), 1301-N Liquid Waste Disposal Facility (LWDF), 1324-N Surface Impoundment and 1324-NA Percolation Pond, 1325-N LWDF, 216-A-10 Crib, 216-A-29 Ditch, 216-A-36B Crib, 216-B-3 Pond, 2101-M Pond, Grout Treatment Facility, seven WMAs for the Single-Shell Tanks (SST), and the 216-B-63 Trench. The location of each facility is shown in Figure 1.1.

Table 1.1 presents the status of each ground-water monitoring project as of November 30, 1989. 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 SST and 216-B-63 Trench projects and WMA-5 of the LLBG project are drilling and installing their monitoring networks; the Nonradioactive Dangerous Waste Landfill, 2101-M Pond, the 1325-N LWDF, 216-A-36B Crib, the remaining WMAs for the LLBGs, and the Grout Treatment Facility are in the indicator evaluation phase of monitoring; and the remaining projects have completed the final quarter of background monitoring.

Thirteen previous quarterly reports (PNL 1986, 1987a, 1987b, 1987c, 1987d, 1988b, 1988c, 1988d; Fruland, Bates, and Lundgren 1989a, 1989b; Smith, Bates, and Lundgren 1989a, 1989b, 1989c) have been issued in this series and

cover the period from May 1, 1986, to September 30, 1989. This report includes activities conducted during the fourth calendar quarter of 1989 (October 1 to December 31, 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 (January 1 to March 31, 1990).

During this quarter, routine RCRA monitoring of projects discussed in this report was coordinated with special monitoring by Westinghouse Hanford (WHC 1989) for a liquid effluent study. The result of this coordinated effort is that some wells were sampled according to the routine schedule identified and other wells were sampled according to WHC (1989), thereby minimizing duplication of efforts and costs. The data are presented regardless of the program in which they were collected.

9 2 1 2 6 4 2 1 5 9 9

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 duplicate samples to the primary analytical laboratory; 2) submission of replicate samples to the primary analytical laboratory; 2) submission of replicate samples to alternate laboratories; and 3) participation of the primary analytical laboratory in interlaboratory comparison programs. The quality control program has been designed based on draft guidance from EPA Region 10 and the 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 (SW-846, EPA 1986b) and are updated as necessary. For blind standard samples where the concentration is known, 2.0 standard deviations is the target

range. If results fall outside the 95% confidence interval, a request for data verification is warranted (ASTM 1987). If values from the two inter-laboratory comparisons of field samples fall within 2.8 standard deviations based on EPA Water Supply or Water Pollution Laboratory Performance Evaluations they are considered equivalent analyses. This calculation takes into account the uncertainties associated with the two sources of analyses.

In general, for the period from October 1 to December 31, 1989, analytical results were acceptable. For example, for the blind sample data, on the average, 92% of the analyses were within acceptable limits for 113 analyses. The 8% not accounted for can be attributed to two areas: a method still under development (6 analyses) and an analytical difficulty with an ammonium analysis (4 analyses). Replicate analyses demonstrated 98.3% correlation between laboratories, for 939 analyses. The remaining 1.7% is attributable to analysis technique differences between laboratories and sample matrix interferences.

ANALYTICAL ANOMALIES

During the previous quarter, analytical anomalies, acetone in blanks and matrix interference in fluoride analyses, were persistent problems. This quarter, only the fluoride matrix interference was a persistent problem.

Fluoride Matrix Interference

Matrix interferences of unknown origin have been reported for many of the fluoride analyses during the quarter. Specifically, 24 of 49 results during October, 17 of 49 results during November, and 11 results during December are considered suspect. This problem, however, is not new and is primarily an inadequacy of the analytical technique (Method 300.0, EPA 1984). An investigation into how this problem has affected data is ongoing. An alternate method using an Ion Selective Electrode (Method 340.2, EPA 1984) for the analysis of fluoride is available if interferences appear in the future.

Other Topics

United States Testing Company, Incorporated (UST), was involved in a performance evaluation, study #WS 024, conducted by the EPA. All results of this study were acceptable except results for a corrosivity sample where an unusual concentration step was required and results for organic constituents that are not of interest at Hanford or were below target concentrations.

9 2 1 2 6 4 2 1 6 0 1

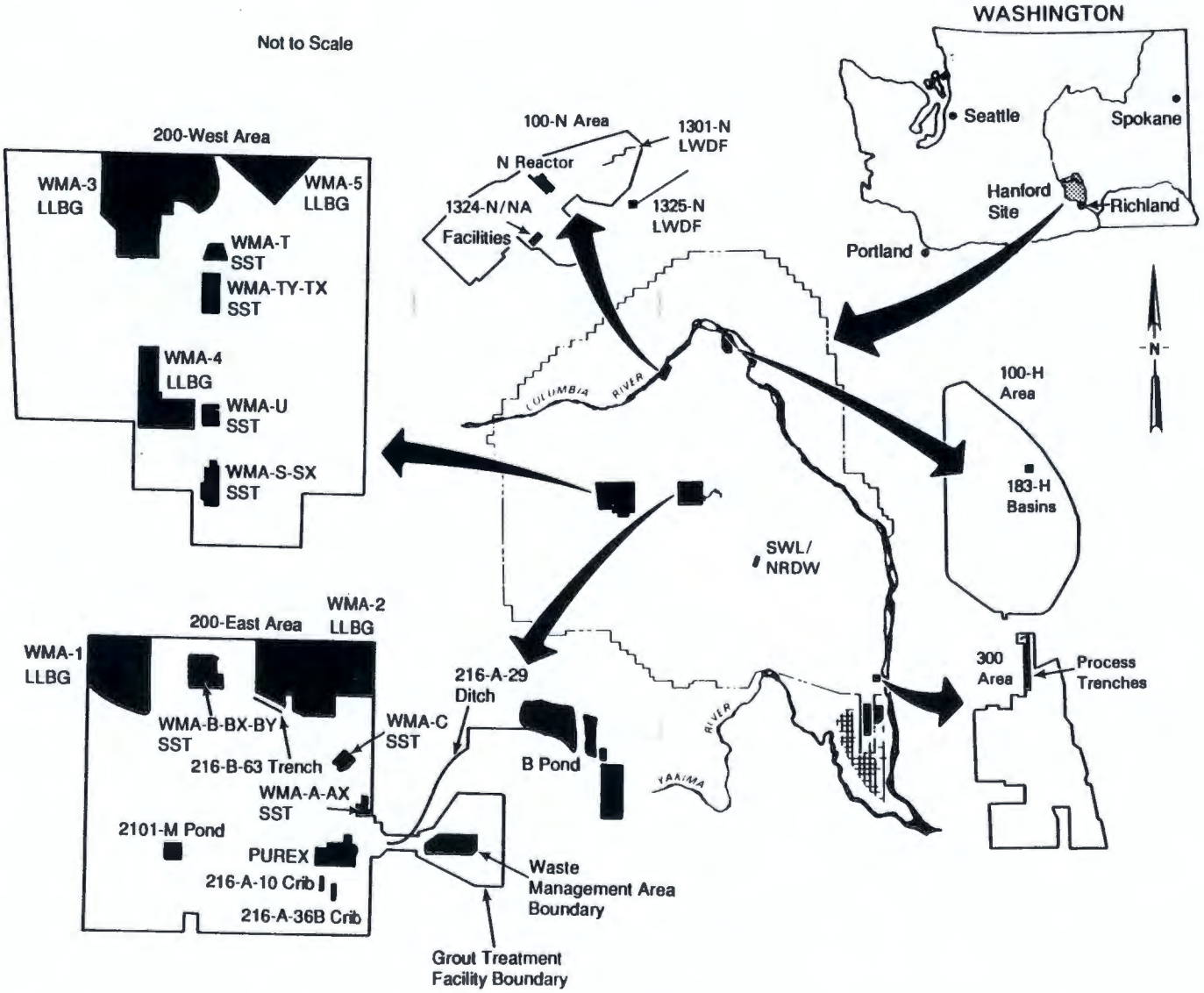

FIGURE 1.1. Locations of the 15 RCRA Ground-Water Monitoring Projects and Landmarks on the Hanford Site, October 1989

TABLE 1.1. Status of Hanford Site Resource Conservation and Recovery Act Interim-Status Ground-Water Monitoring Projects as of November 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 LLBGs			
WMA-1		X	
WMA-2		X	
WMA-3		X	
WMA-4		X	
WMA-5	0[a]		
Nonradioactive Dangerous Waste Landfill		X	
1301-N LWDF			X
1324-N/NA Facilities			X
1325-N LWDF		X	
216-A-10 Crib	4		
216-A-29 Ditch	4		
216-A-36B Crib		X	
216-B-3 Pond	4		
2101-M Pond		X	
Grout Treatment Facility		X	
Single-Shell Tanks	0[a]		
216-B-63 Trench	0[a]		

(a) Wells are currently being drilled at these facilities. When all wells are completed, background monitoring will begin.

9 2 1 2 6 4 2 1 6 0 3

THIS PAGE INTENTIONALLY
LEFT BLANK

2.0 300 AREA PROCESS TRENCHES

R. Schalla
Pacific Northwest Laboratory

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

The 300 Area Process Trenches are located in the northern portion of the 300 Area. The two trenches are each 1500 ft long, 10 ft wide at the bottom, and about 34 ft wide at the top. They are unlined trenches, excavated about 12 ft into the subsurface and separated by an earthen berm. The trench bottoms are about 20 ft above the water table. Since 1975, the trenches have been used for disposal of most liquid wastes generated in the 300 Area. Discharge volumes gradually increased to about 3 million gal/d of waste water in 1987. This waste water consisted primarily of cooling water with small quantities of nonhazardous maintenance and process wastes. Following shutdown of fuel fabrication in February 1987 and some other operations in the 300 Area in 1988, the volume of process water has declined to approximately 1.5 million gal/d of waste water. This waste water is derived from a wide variety of 300 Area operations and typically contains small quantities of nonhazardous maintenance and process waste. The liquid wastes also contained hazardous constituents usually in very low concentrations; however, higher concentrations of hazardous constituents such as perchloroethene (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. Perchloroethene 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 currently 20 wells in the monitoring network for the process trenches. The purposes of these wells are shown in Table 2.1. The locations

9 2 1 2 6 4 2 1 6 0 4

of these wells are shown in Figure 2.1. Table 2.2 shows the sampling schedule for the 20-well network for FY 1990.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

There were no drilling activities during this quarter. Water-level measurement was the only hydrogeologic characterization activity conducted during the quarter. Pertinent site characterization information can be found in Schalla et al. (1988b).

WATER LEVELS

Routine data collection includes the monitoring of continuous surface-water and ground-water levels using pressure transducers and data loggers, in addition to monthly measurement of water levels in a network of 49 wells in the 300 Area. The October, November, and December water-level contour maps are shown in Figures 2.2, 2.3, and 2.4, respectively. Table 2.3 presents the water-level elevation data collected separately from the sampling events. Table 2.4 presents the water-level elevation data collected before sampling. Continuous water-level monitoring was conducted at seven locations: SWS-1 and SWS-2, the two surface-water monitoring stations on the Columbia River (shown in Figure 2.1), and in monitoring wells 399-1-10, 399-1-13, 399-1-16A, 399-1-16C, and 399-1-18A.

The southeasterly flow of ground water from the vicinity of the process trenches and the moderate hydraulic gradient in Figures 2.2, 2.3, and 2.4 represent flow patterns that are typical much of the year in the top portion (upper 20 ft) of the unconfined aquifer. Water-level fluctuations in the river were fairly similar during October through December, which probably accounts for the similarity in the southeasterly flow patterns in the three figures.

WATER CHEMISTRY DATA

A summary of all results from September through November 1989 is presented in Table 2.5. Analytical data for detected constituents are presented

in Table 2.6 for the biweekly network in September and the weekly sampling of well 399-1-17A in October and November. Highlights for the quarter are summarized below.

- Gross alpha exceeded the 40 CFR 141 standard of 15 pCi/L in well 399-1-17A, but this high value is caused primarily by uranium.

- Coliform exceeded the 40 CFR 141 standard of 1 per 100 mL in the November sample from well 399-1-3 (4 MPN).

- Uranium concentrations increased in well 399-1-17A in November to over 100 pCi/L from the annual low (about 30 to 60 pCi/L) that occurs in October each year (Figure 2.5). This annual cycle has developed since cessation of the fuel fabrication activities in February 1987. Uranium concentrations follow a similar cycle in well 399-1-11 (Figure 2.6). The reason for this annual cyclic variation in uranium is unknown.

- Methylene chloride was detected at 3 ppb on September 27, 1989, and 7 ppb on December 5, 1989, in well 399-1-17A, which was sampled biweekly. This constituent was also detected at 4 ppb on September 27, 1989, in well 399-1-11, another biweekly well. Methylene chloride was not detected in October or November. This constituent has been a common laboratory contaminant and probably does not represent actual field conditions during this quarter.

- Methyl ethyl ketone (MEK) was detected in well 399-1-17A on September 27, 1989, at 11 ppb, and again on October 4, 1989, at 9 ppb. This constituent was also detected in background well 399-1-18A at 9 ppb in September, which suggests that the presence of MEK is a laboratory contamination problem rather than an actual release of MEK to the process trenches. MEK was not detected in November.

- Acetone was detected in well 399-1-17A in September, October, and the first week of December at peak concentrations of 13, 8, and 13 ppb, but was not present during the November sampling. Acetone had been reported at 7 ppb in well 399-1-17A for the August 3 sampling; however, acetone was also reported in the sample blank. This constituent has been a common laboratory contaminant and probably does not represent actual field conditions during this quarter.

- Chloroform concentrations in well 399-1-17A near the trenches exhibited a typical seasonal (autumn) decline.

9 2 1 2 6 4 2 1 6 0 6

In the previous four quarters, 27 wells were used to monitor the 300 Area Process Trenches. Beginning December 1989, 20 wells will be sampled semiannually. The seven wells eliminated from the previous network and why they were eliminated are described below:

- Well 399-1-16C monitors the confined aquifer and is no longer needed to comply with RCRA regulations.
- Well 399-1-17C also monitors the confined aquifer and was eliminated for the same reasons as well 399-1-16C.
- Well 399-1-18B was eliminated because historical data prove that it was not necessary as a background well.
- Well 399-1-19 was eliminated because of difficulties in storing and disposing of its purge water. Specifically, purge water stored in the 500-gal storage container would have to be removed by tanker truck. The truck would have to back up 1500 ft along the narrow berm separating the trenches. This procedure was considered unnecessarily risky for the truck driver.
- Well 399-2-2 will not be needed because wells 399-1-7, 399-1-16A, and 399-2-1 adequately define constituents for RCRA monitoring of this area.
- Background well 399-8-2 is being replaced by background well 399-8-1 because the latter has historically provided results equivalent to the former and 399-8-1 is closer to the process trenches.
- Well 399-8-3 has been eliminated because concentration distributions can be adequately defined using the remaining 20 wells.

In addition, only one of the four wells sampled biweekly in the previous quarters was sampled this quarter and on a weekly basis. This single well sampling represents the minimum requirements for detecting significant releases of contaminants of concern from the process trenches. In the event of a significant increase in concentration, sufficient time will be available to monitor a large number of wells to quantify the concentration and extent of the plume. The exact number and location of wells to be sampled will be based on water-level data from the continuous recorders, historical concentration distributions in relation to river stage, and the time since release of the contaminant into the process trenches.

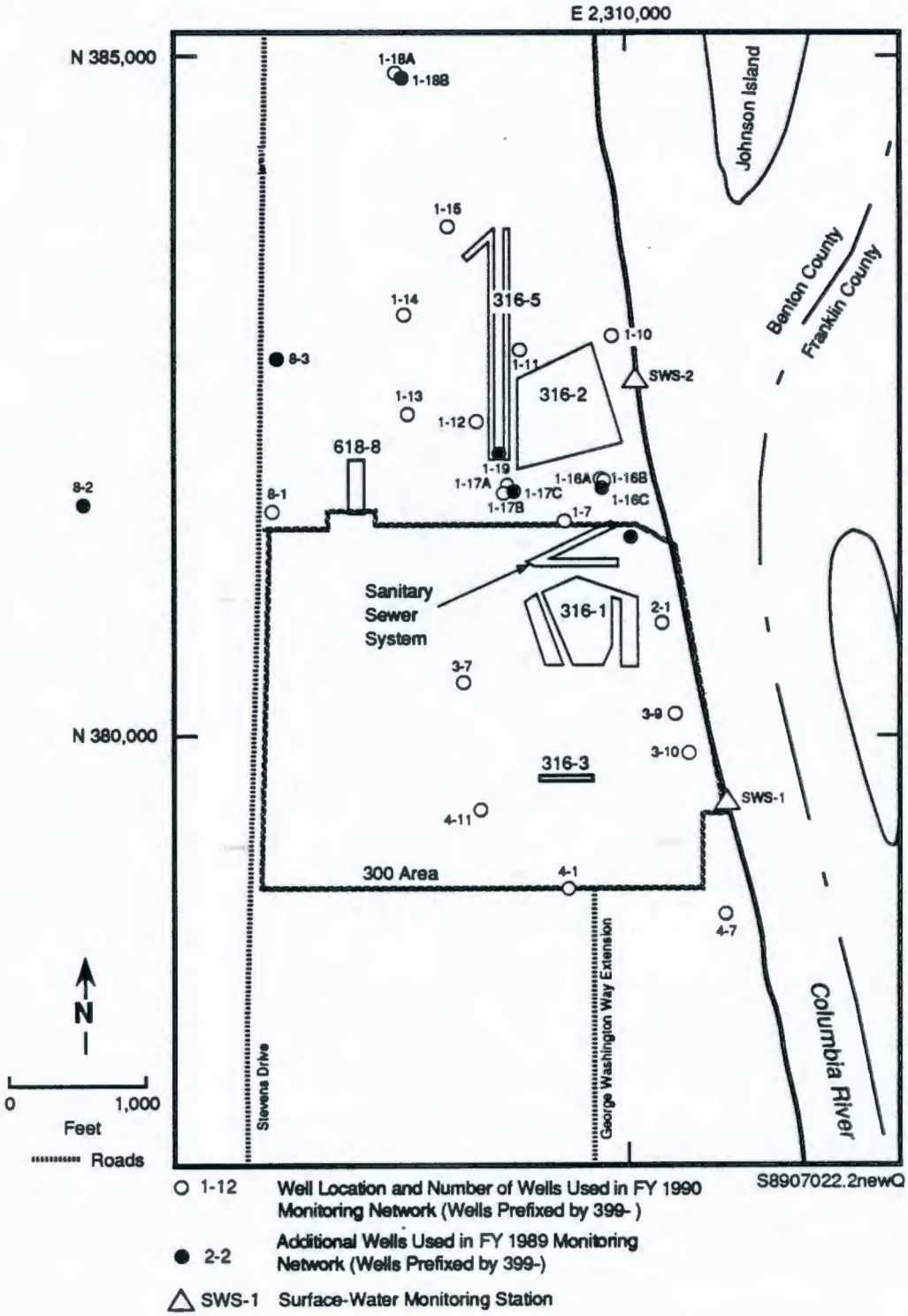

FIGURE 2.1. Monitoring Well Locations for the 300 Area Process Trenches

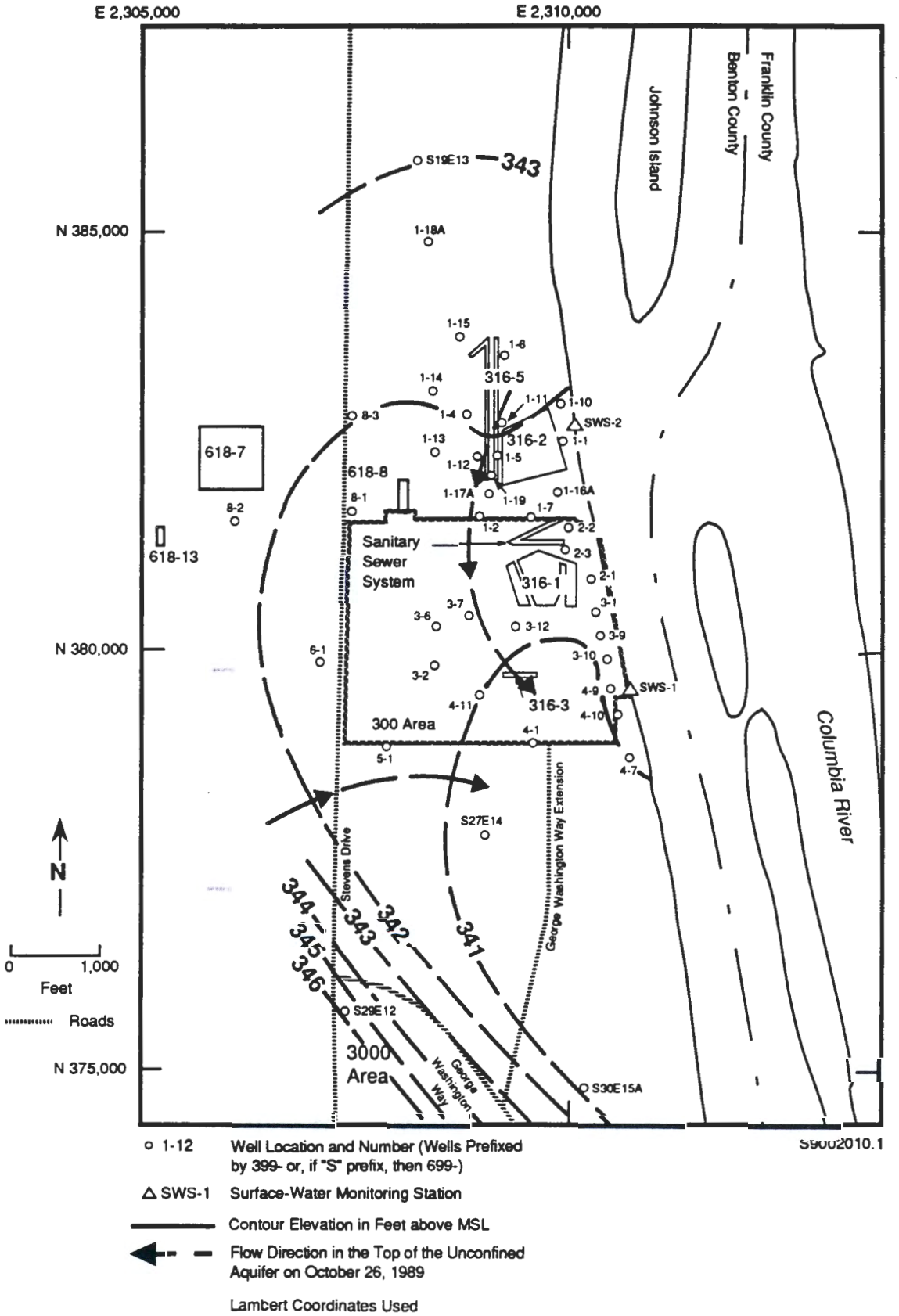

FIGURE 2.2. Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer Near the 300 Area, October 1989

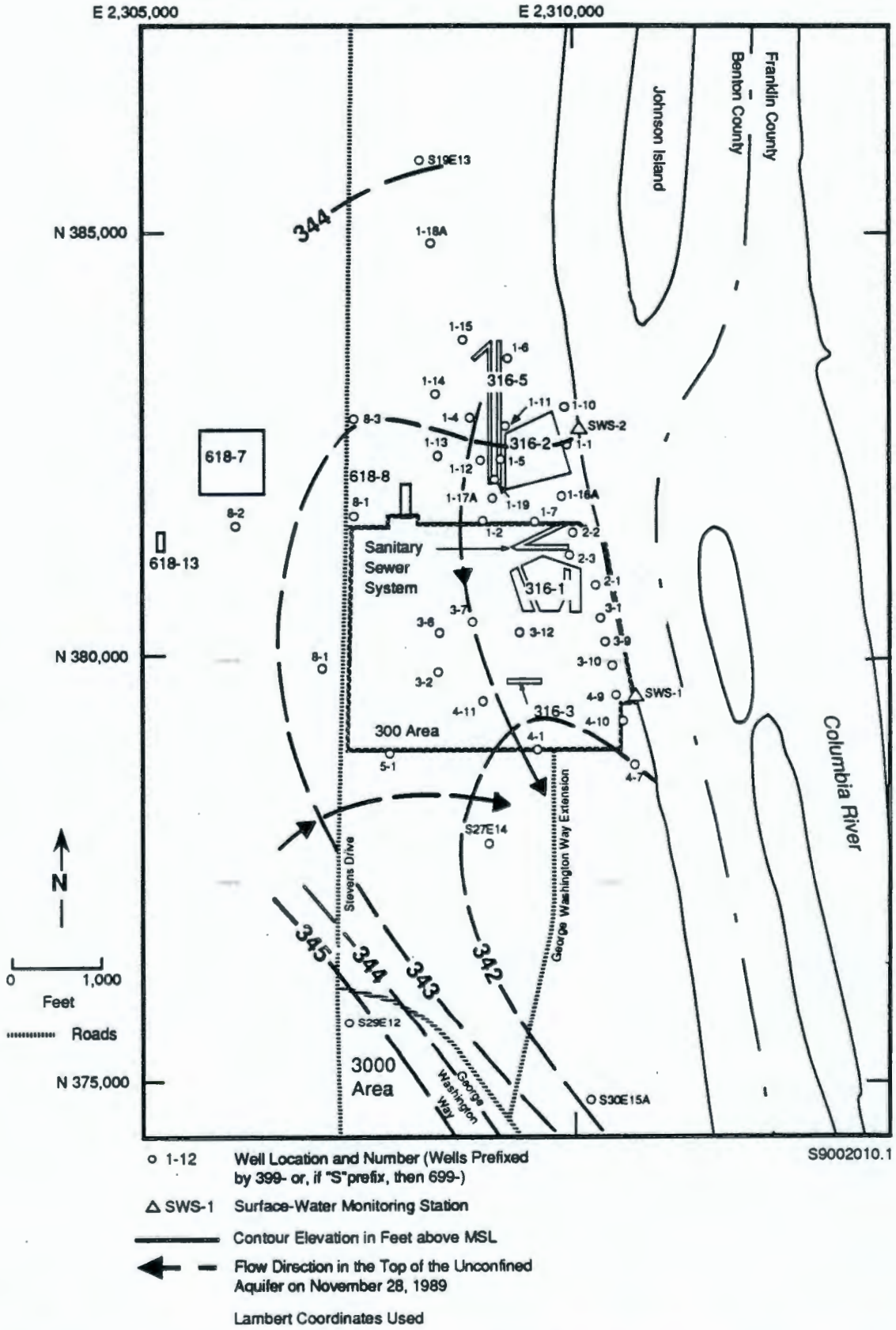

FIGURE 2.3. Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer Near the 300 Area, November 1989

9 2 1 2 6 4 2 1 6 1 0

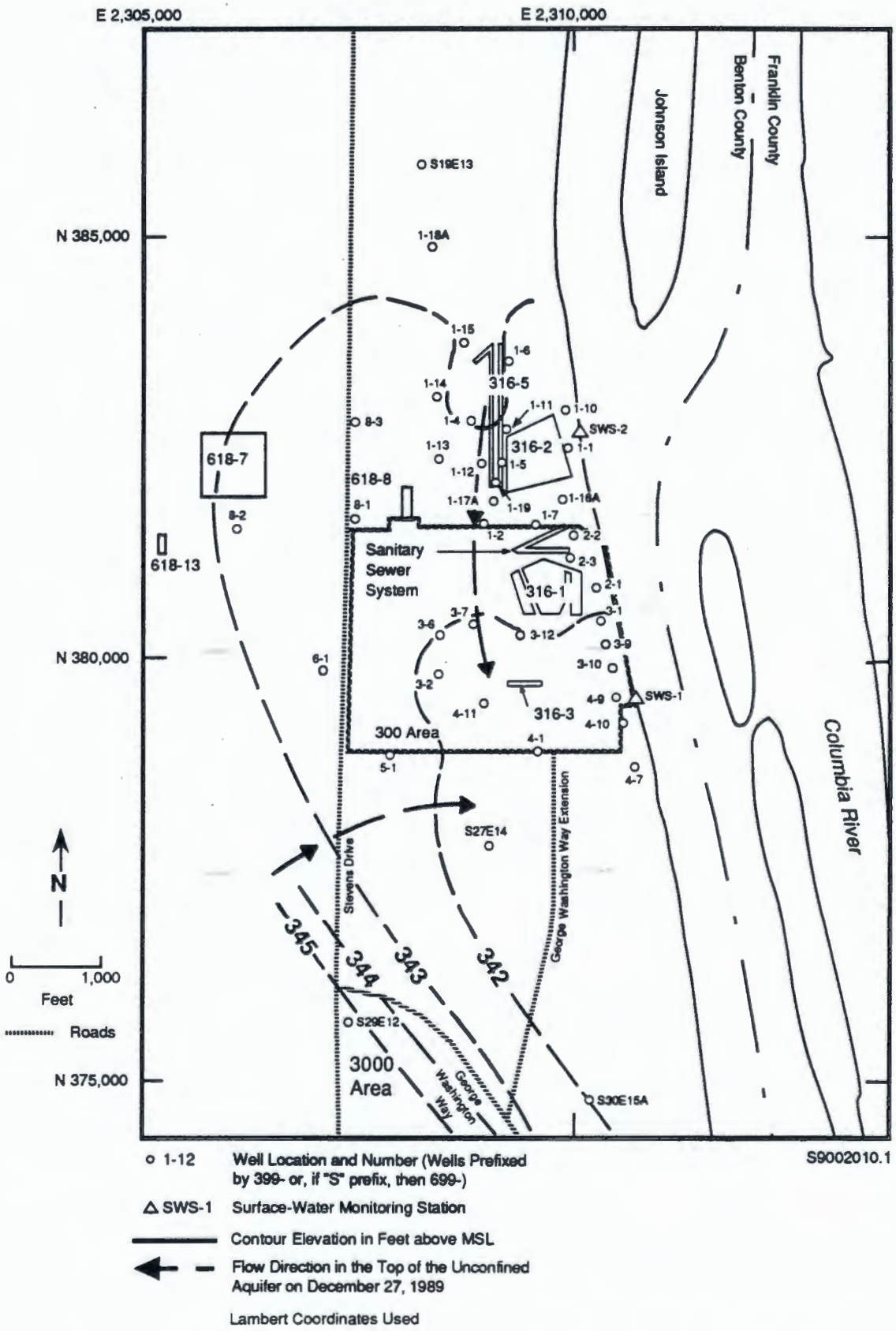

FIGURE 2.4. Water Levels and Ground-Water Flow Pattern in the Top of the Unconfined Aquifer Near the 300 Area, December 1989

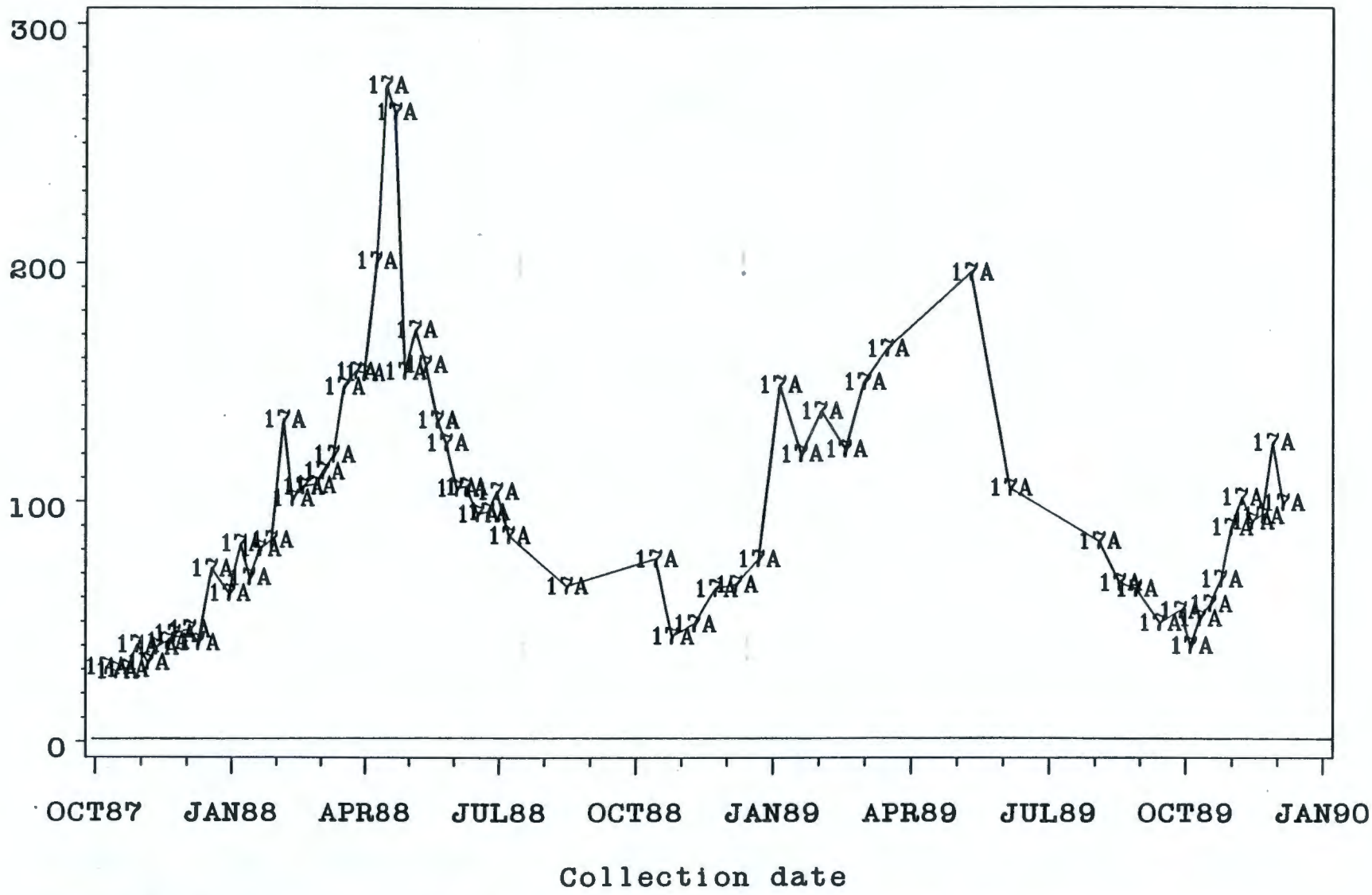

FIGURE 2.5. Uranium Concentrations in pCi/L in Well 399-1-17A (Plotting symbols are abbreviations of well names. Horizontal solid line is contractual detection level.)

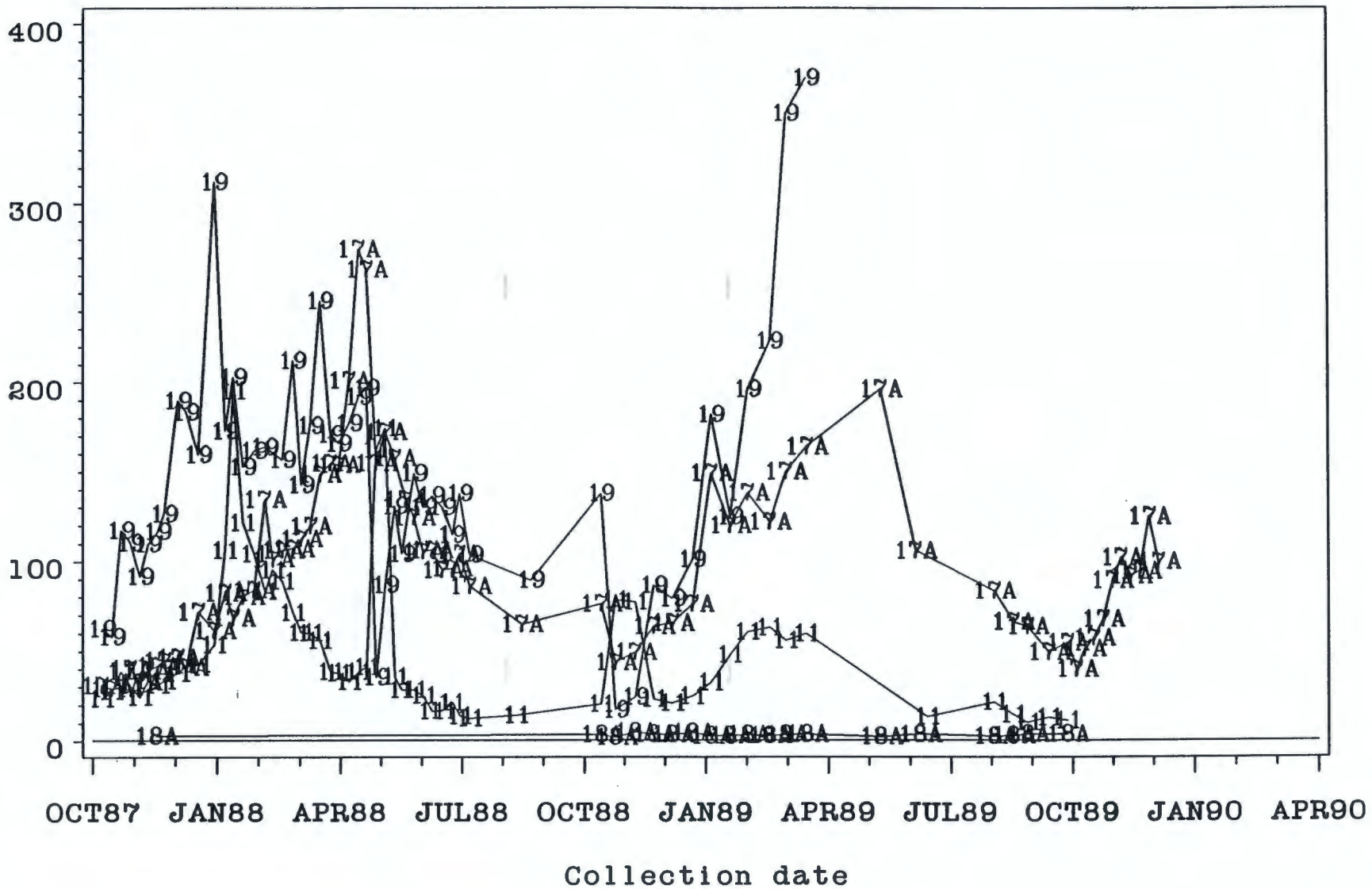

FIGURE 2.6. Uranium Concentrations in pCi/L in Wells 399-1-11, 399-1-17A, 399-1-18A, and 399-1-19. (Plotting symbols are abbreviations of well names. Horizontal solid line is contractual detection level.)

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

Wells for Point of Compliance
399-1-11
399-1-17A

Background Wells
399-1-18A

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
399-3-7
399-3-9
399-3-10
399-4-1
399-4-7
399-4-11
399-8-1

Wells to Define the Vertical Extent of Contamination
399-1-16B
399-1-17B

9 2 1 2 6 4 2 1 6 1 4

TABLE 2.2. Sampling Schedule for the 300 Area Process Trenches

	1989[a]			1990								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
399-1-7			RQV					R				
399-1-10			R					R				
399-1-11			R					R				
399-1-12			R					R				
399-1-13			R					R				
399-1-14			R					R				
399-1-15			R					RQV				
399-1-16A			R					L				
399-1-16B			R					L				
399-1-17A	W	W	R	W	W	W	W	LW	W	W	W	W
399-1-17B			R					L				
399-1-18A			R					R				
399-2-1			R					R				
399-3-7			R					RQV				
399-3-9			R					R				
399-3-10			R					R				
399-4-1			R					R				
399-4-7			R					R				
399-4-11			R					R				
399-8-1			R					R				

(a) The following notations are used in this table:
L = sampled for the long list of constituents (WAC 173-303-9905).
Q = sampled for quality control replicates.
R = sampled for the regular list of constituents.
V = sampled for volatile organic analyses blanks.
W = weekly samples.

TABLE 2.3. Monthly Water-Level Data for Wells Near the 300 Area Process Trenches

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
399-1-1	375.90	10/26/89	34.03	341.87
		11/28/89	33.26	342.64
		12/27/89	32.89	343.01
399-1-2	384.52	10/26/89	43.23	341.29
		11/28/89	42.38	342.14
		12/27/89	42.12	342.40
399-1-3	384.73	10/26/89	43.49	341.24
		11/28/89	42.59	342.14
		12/27/89	42.31	342.42
399-1-4	381.11	10/26/89	38.37	342.74
		11/28/89	37.74	343.37
		12/27/89	37.37	343.74
399-1-5	379.82	10/26/89	38.20	341.62
		11/28/89	37.38	342.44
		12/27/89	37.07	342.75
399-1-6	373.81	10/26/89	31.68	342.13
		11/28/89	30.88	342.93
		12/27/89	30.48	343.33
399-1-7	385.63	10/26/89	44.38	341.25
		11/28/89	43.48	342.15
		12/27/89	43.20	342.43
399-1-8	384.91	10/26/89	43.65	341.26
		11/28/89	42.76	342.15
		12/27/89	42.48	342.43
399-1-9	384.80	10/26/89	21.11	363.69
		11/28/89	20.83	363.97
		12/27/89	20.56	364.24
399-1-10	373.65	10/26/89	31.63	342.02
		11/28/89	30.90	342.75
		12/27/89	30.53	343.12
399-1-11	377.79	10/26/89	35.50	342.29
		11/28/89	34.85	342.94
		12/27/89	34.48	343.31

9 2 1 2 6 4 2 1 6 1 6

TABLE 2.3. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
399-1-12	384.45	10/26/89	42.86	341.59
		11/28/89	42.06	342.39
		12/27/89	41.76	342.69
399-1-13	388.62	10/26/89	46.94	341.68
		11/28/89	46.22	342.40
		12/27/89	45.92	342.70
399-1-14	383.23	10/26/89	41.02	342.21
		11/28/89	40.42	342.81
		12/27/89	40.05	343.18
399-1-15	379.59	10/26/89	37.28	342.31
		11/28/89	36.62	342.97
		12/27/89	36.25	343.34
399-1-16A	381.51	10/26/89	40.23	341.28
		11/28/89	39.35	342.16
		12/27/89	39.05	342.46
399-1-16B	381.14	10/26/89	39.65	341.49
		11/28/89	38.78	342.36
		12/27/89	38.44	342.70
399-1-16C	382.29	10/26/89	40.52	341.77
		11/28/89	39.48	342.81
		12/27/89	39.09	343.20
399-1-17A	377.47	10/26/89	36.16	341.31
		11/28/89	35.26	342.21
		12/27/89	35.05	342.42
399-1-17B	377.87	10/26/89	36.40	341.47
		11/28/89	35.48	342.39
		12/27/89	35.26	342.61
399-1-17C	378.13	10/26/89	3.11	375.02
		11/28/89	3.24	374.89
		12/27/89	2.82	375.31
399-1-18A	390.83	10/26/89	48.23	342.60
		11/28/89	47.58	343.25
		12/27/89	47.18	343.65

TABLE 2.3. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
399-1-18B	389.94	10/26/89	47.09	342.85
		11/28/89	46.44	343.50
		12/27/89	46.02	343.92
399-1-18C	388.05	10/26/89	44.73	343.32
		11/28/89	44.07	343.98
		12/27/89	43.66	344.39
399-1-19	374.64	10/26/89	33.16	341.48
		11/28/89	32.33	342.31
		12/27/89	32.05	342.59
399-2-1	375.26	10/26/89	33.89	341.37
		11/28/89	33.12	342.14
		12/27/89	32.86	342.40
399-2-2	375.53	10/26/89	34.22	341.31
		11/28/89	33.37	342.16
		12/27/89	33.08	342.45
399-2-3	375.44	10/26/89	34.16	341.28
		11/28/89	33.31	342.13
		12/27/89	33.02	342.42
399-3-1	384.43	10/26/89	43.23	341.20
		11/28/89	42.40	342.03
		12/27/89	42.15	342.28
399-3-2	392.36	10/26/89	51.30	341.06
		11/28/89	50.41	341.95
		12/27/89	50.22	342.14
399-3-6	392.85	10/26/89	51.65	341.20
		11/28/89	50.81	342.04
		12/27/89	50.59	342.26
399-3-7	394.22	10/26/89	53.06	341.16
		11/28/89	52.19	342.03
		12/27/89	51.97	342.25
399-3-9	387.31	10/26/89	46.18	341.13
		11/28/89	45.31	342.00
		12/27/89	45.12	342.19

9 2 1 2 6 4 2 1 6 1 8

TABLE 2.3. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
399-3-10	385.40	10/26/89	44.30	341.10
		11/28/89	43.45	341.95
		12/27/89	43.27	342.13
399-3-12	386.38	10/26/89	45.32	341.06
		11/28/89	44.40	341.98
		12/27/89	44.20	342.18
399-4-1	395.00	10/26/89	54.27	340.73
		11/28/89	53.21	341.79
		12/27/89	53.06	341.94
399-4-7	376.99	10/26/89	35.94	341.05
		11/28/89	35.10	341.89
		12/27/89	34.95	342.04
399-4-9	381.40	10/26/89	40.30	341.10
		11/28/89	39.45	341.95
		12/27/89	39.29	342.11
399-4-10	377.59	10/26/89	36.46	341.13
		11/28/89	35.65	341.94
		12/27/89	35.49	342.10
399-4-11	404.53	10/26/89	63.54	340.99
		11/28/89	62.57	341.96
		12/27/89	62.39	342.14
399-5-1	395.60	10/26/89	54.21	341.39
		11/28/89	53.54	342.06
		12/27/89	53.28	342.32
399-6-1	386.93	10/26/89	45.17	341.76
		11/28/89	44.67	342.26
		12/27/89	44.29	342.64
399-8-1	394.88	10/26/89	53.11	341.77
		11/28/89	52.52	342.36
		12/27/89	52.18	342.70
399-8-2	396.06	10/26/89	53.57	342.49
		11/28/89	53.16	342.90
		12/27/89	52.66	343.40

TABLE 2.3. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
399-8-3	393.11	10/26/89	50.99	342.12
		11/28/89	50.49	342.62
		12/27/89	50.08	343.03
699-S19-E13	394.51	10/26/89	51.43	343.08
		11/28/89	50.82	343.69
		12/27/89	50.42	344.09
699-S27-E14	399.76	10/26/89	59.09	340.67
		11/28/89	57.99	341.77
		12/27/89	57.88	341.88
699-S29-E12	387.95	10/26/89	42.02	345.93
		11/28/89	42.29	345.66
		12/27/89	42.39	345.56
699-S30-E15A	400.14	10/26/89	59.15	340.99
		11/28/89	58.26	341.88
		12/27/89	58.15	341.99

(a) MSL = mean sea level.

9 2 1 2 6 4 2 1 6 2 0

TABLE 2.4. Water-Level Data Collected Before Sampling from Wells Near the 300 Area Process Trenches

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
399-1-3	384.73	11/21/89	42.12	342.61
399-1-7	385.63	11/21/89	43.07	342.56
399-1-8	384.91	11/21/89	42.29	342.62
399-1-17A	377.47	10/04/89	35.85	341.62
		10/10/89	36.27	341.20
		10/17/89	36.02	341.45
		10/24/89	36.00	341.47
		10/31/89	36.07	341.40
		11/07/89	35.78	341.69
		11/14/89	35.26	342.21
		11/21/89	34.77	342.70
		11/28/89	35.43	342.04
		12/05/89	35.54	341.93
399-4-7	376.99	11/27/89	35.53	341.46

(a) MSL = mean sea level.

TABLE 2.5. Constituent List and Summary of Sampling Results for the 300 Area Process Trenches, September Through November 1989

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
088	CONDLAB	UMHO	.	2	0	700	WDOE		Conductivity, Laboratory
191	CONDFLD	UMHO	1	17	0	700	WDOE		Specific conductance
199	PHFIELD		.100	17	0	6.5-8.5	EPAS		pH, Field Measurement
207	PH-LAB		.0100	2	0	6.5-8.5	EPAS		pH, Laboratory Measurement
C69	TOC	PPB	2000	2	2 ***	.			Total organic carbon
H42	TOXLDL	PPB	10	2	0	.			Total Organic Halogen, Low Det. Level

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
111	BETA	PCI/L	8	2	0	50	EPA		Gross beta
112	ALPHAHI	PCI/L	4	2	0	15	EPA	xxx	Alpha, High Detection Level
181	RADIUM	PCI/L	1	2	2 ***	5	EPA		Radium
A06	BARIUM	PPB	6	2	0	1000	EPA		Barium
A07	CADMIUM	PPB	2	2	2 ***	10	EPA		Cadmium
A08	CHROMUM	PPB	10	2	2 ***	50	EPA		Chromium
A10	SILVER	PPB	10	2	2 ***	50	EPA		Silver
A20	ARSENIC	PPB	5	2	2 ***	50	EPA		Arsenic
A21	MERCURY	PPB	.100	2	2 ***	2	EPA		Mercury
A22	SELENUM	PPB	5	2	2 ***	10	EPA		Selenium
A33	ENDRIN	PPB	.100	2	2 ***	.200	EPA		Endrin
A34	METHLOR	PPB	3	2	2 ***	100	EPA		Methoxychlor
A35	TOXAENE	PPB	1	2	2 ***	5	EPA		Toxaphene
A36	a-BHC	PPB	.100	2	2 ***	4	EPA		Alpha-BHC
A37	b-BHC	PPB	.100	2	2 ***	4	EPA		Beta-BHC
A38	g-BHC	PPB	.100	2	2 ***	4	EPA		Gamma-BHC
A39	d-BHC	PPB	.100	2	2 ***	4	EPA		Delta-BHC
A51	LEADGF	PPB	5	2	2 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	PPB	500	16	0	45000	EPA		Nitrate
C74	FLUORID	PPB	500	16	16 ***	4000	EPA		Fluoride
H13	2,4-D	PPB	2	2	2 ***	100	EPA		2,4-D
H14	2,4,5TP	PPB	2	2	2 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	PPB	6	2	0	1000	EPA		Barium, filtered
H21	FCADMIU	PPB	2	2	2 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	PPB	10	2	2 ***	50	EPA		Chromium, filtered
H23	FSILVER	PPB	10	2	2 ***	50	EPA		Silver, filtered
H37	FARSENI	PPB	5	2	2 ***	50	EPA		Arsenic, filtered
H38	FMERCUR	PPB	.100	2	2 ***	2	EPA		Mercury, filtered

TABLE 2.5. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
H39	FSELENI	PPB	5	2	2 ***	10	EPA		Selenium, filtered
H41	FLEAD	PPB	5	2	2 ***	50	EPA		Lead, filtered
H60	TURBID	NTU	.100	2	0	1	EPA		Turbidity
P19	COLIMF	PPB	1	2	1	1	EPA	xxx	Coliform (Membrane Filter)

---------- 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	2	0	.			Sodium
A17	MANGESE	PPB	5	2	2 ***	50	EPAS		Manganese
A19	IRON	PPB	30	2	0	300	EPAS		Iron
C57	PHENOL	PPB	10	2	2 ***	.			Phenol
C73	SULFATE	PPB	500	16	0	250000	EPAS		Sulfate
C75	CHLORID	PPB	500	16	0	250000	EPAS		Chloride
H24	FSODIUM	PPB	200	2	0	.			Sodium, filtered
H29	FMANGAN	PPB	5	2	2 ***	50	EPAS		Manganese, filtered
H31	FIRON	PPB	30	2	2 ***	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	2	2 ***	100	EPAR		Cobalt-60
024	CS-137	PCI/L	20	2	2 ***	200	EPAR		Cesium-137
034	RU-106	PCI/L	172.5	2	2 ***	30	EPAR		Ruthenium-106
104	U	PCI/L	.500	16	0	600	DOE		Uranium
108	TRITIUM	PCI/L	500	2	2 ***	20000	EPA		Tritium
121	SR 90	PCI/L	5	2	2 ***	8	EPA		Strontium-90
197	TC-99	PCI/L	15	2	0	900	EPAR		Technetium-99
A01	BERYLUM	PPB	5	2	2 ***	.			Beryllium
A03	STRONUM	PPB	10	2	0	.			Strontium
A04	ZINC	PPB	5	2	1	5000	EPAS		Zinc
A05	CALCIUM	PPB	50	2	0	.			Calcium
A12	NICKEL	PPB	10	2	2 ***	.			Nickel
A13	COPPER	PPB	10	2	2 ***	1300	EPAP		Copper
A14	VANADUM	PPB	5	2	2 ***	.			Vanadium
A15	ANTIONY	PPB	100	2	2 ***	.			Antimony
A16	ALUMNUM	PPB	150	2	2 ***	.			Aluminum
A18	POTASUM	PPB	100	2	0	.			Potassium
A50	MAGNES	PPB	50	2	0	.			Magnesium
C76	PHOSPHA	PPB	1000	16	16 ***	.			Phosphate

TABLE 2.5. (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
H17	TDS		5000	2	0	500000	EPAS	Total dissolved solids
H18	FZINC	PPB	5	2	1	5000	EPAS	Zinc, filtered
H19	FCALCIU	PPB	50	2	0	.		Calcium, filtered
H25	FNICKEL	PPB	10	2	2 ***	.		Nickel, filtered
H26	FCOPPER	PPB	10	2	2 ***	1300	EPAP	Copper, filtered
H27	FVANADI	PPB	5	2	2 ***	.		Vanadium, filtered
H28	FALUMIN	PPB	150	2	2 ***	.		Aluminum, filtered
H30	FPOTASS	PPB	100	2	0	.		Potassium, filtered
H32	FMAGNES	PPB	50	2	0	.		Magnesium, filtered
H33	FBERYLL	PPB	5	2	2 ***	.		Beryllium, filtered
H35	FSTRONT	PPB	10	2	0	.		Strontium, filtered
H36	FANTIMO	PPB	100	2	2 ***	.		Antimony, filtered
H58	ALKALIN		20000	2	0	.		Alkalinity
H66	BROMIDE	PPB	1000	16	16 ***	.		Bromide
H67	NITRITE	PPB	1000	16	16 ***	.		Nitrite
H86	FBORON	PPB	10	2	0	.		Boron, filtered
H87	FCOBALT	PPB	20	2	2 ***	.		Cobalt, filtered
H88	FLITHIU	PPB	10	2	0	.		Lithium, filtered
H89	FMOLY	PPB	40	2	2 ***	.		Molybdenum, filtered
H90	FSILICO	PPB	50	2	0	.		Silicon, filtered
H91	FTIN	PPB	30	2	2 ***	.		Tin, filtered
H92	FTITAN	PPB	60	2	2 ***	.		Titanium, filtered
H93	FZIRCON	PPB	50	2	2 ***	.		Zirconium, filtered
P01	BORON	PPB	10	2	0	.		Boron
P02	COBALT	PPB	20	2	2 ***	.		Cobalt
P03	LITHIUM	PPB	10	2	0	.		Lithium
P04	MOLY	PPB	40	2	2 ***	.		Molybdenum
P05	SILICON	PPB	50	2	0	.		Silicon
P06	TIN	PPB	30	2	2 ***	.		Tin
P07	TITAN	PPB	60	2	2 ***	.		Titanium
P08	ZIRCON	PPB	50	2	2 ***	.		Zirconium
P12	ENDSFAN	PPB	.500	2	2 ***	.		Endosulfan
P13	PHORATE	PPB	2	2	2 ***	.		PHORATE

---------- 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	2	2 ***	.		Thallium
A24	THIOURA	PPB	200	2	2 ***	.		Thiourea
A25	ACETREA	PPB	200	2	2 ***	.		1-acetyl-2-thiourea
A26	CHLOREA	PPB	200	2	2 ***	.		1-(o-chlorophenyl) thiourea
A27	DIETROL	PPB	200	2	2 ***	.		Diethylstilbesterol

TABLE 2.5. (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
A28	ETHYREA	PPB	200	2	2 ***	.		Ethylenethiourea
A29	NAPHREA	PPB	200	2	2 ***	.		1-naphthyl-2-thiourea
A32	PHENREA	PPB	500	2	2 ***	.		N-phenylthiourea
A40	DDD	PPB	.100	2	2 ***	.		DDD
A41	DDE	PPB	.100	2	2 ***	.		DDE
A42	DDT	PPB	.100	2	2 ***	.		DDT
A43	HEPTLOR	PPB	.100	2	2 ***	0	EPAP	Heptachlor
A44	HEPTIDE	PPB	.100	2	2 ***	0	EPAP	Heptchlor epoxide
A45	KEPONE	PPB	1	2	2 ***	.		Kepone
A46	DIELRIN	PPB	.100	2	2 ***	.		Dieldrin
A47	ALDRIN	PPB	.100	2	2 ***	.		Aldrin
A48	CHLOANE	PPB	1	2	2 ***	0	EPAP	Chlordane
A49	ENDO1	PPB	.100	2	2 ***	.		Endosulfan I
A52	ENDO2	PPB	.100	2	2 ***	.		Endosulfan II
A54	AR1016	PPB	1	2	2 ***	0	EPAP	Arochlor 1016
A55	AR1221	PPB	1	2	2 ***	0	EPAP	Arochlor 1221
A56	AR1232	PPB	1	2	2 ***	0	EPAP	Arochlor 1232
A57	AR1242	PPB	1	2	2 ***	0	EPAP	Arochlor 1242
A58	AR1248	PPB	1	2	2 ***	0	EPAP	Arochlor 1248
A59	AR1254	PPB	1	2	2 ***	0	EPAP	Arochlor 1254
A60	AR1260	PPB	1	2	2 ***	0	EPAP	Arochlor 1260
A61	TETRANE	PPB	5	16	16 ***	5	EPA	Carbon Tetrachloride by GC/MS
A62	BENZENE	PPB	5	16	16 ***	5	EPA	Benzene
A63	DIOXANE	PPB	500	2	2 ***	.		Dioxane
A64	METHONE	PPB	10	16	15	.		Methyl ethyl ketone
A65	PYRIDIN	PPB	500	2	2 ***	.		Pyridine
A66	TOLUENE	PPB	5	16	16 ***	2000	EPAP	Toluene
A67	1,1,1-T	PPB	5	16	16 ***	200	EPA	1,1,1-trichloroethane
A68	1,1,2-T	PPB	5	16	16 ***	.		1,1,2-trichloroethane
A69	TRICENE	PPB	5	16	16 ***	5	EPA	Trichloroethylene
A70	PERCENE	PPB	5	16	16 ***	.		Tetrachloroethylene
A71	OPXYLE	PPB	5	16	16 ***	440	EPAP	Xylene-o,p
A72	ACROLIN	PPB	10	2	2 ***	.		Acrolein
A73	ACRYILE	PPB	10	2	2 ***	.		Acrylonitrile
A74	BISTHER	PPB	5	2	2 ***	.		Bis(chloromethyl) ether
A75	BROMONE	PPB	5	2	2 ***	.		Bromoacetone
A76	METHBRO	PPB	10	2	2 ***	.		Methyl bromide
A77	CARBIDE	PPB	10	2	2 ***	.		Carbon disulfide
A78	CHLBENZ	PPB	5	2	2 ***	60	EPAP	Chlorobenzene
A79	CHLTHER	PPB	5	2	2 ***	.		2-chloroethyl vinyl ether
A80	CHLFORM	PPB	5	16	1	100	EPA	Chloroform
A81	METHCHL	PPB	10	2	2 ***	.		Methyl chloride
A82	CHMTHER	PPB	10	2	2 ***	.		Chloromethyl methyl ether
A83	CROTONA	PPB	10	2	2 ***	.		Crotonaldehyde

TABLE 2.5. (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
A84	DIBRCHL	PPB	10	2	2 ***	0	EPAP	1,2-dibromo-3-chloropropane
A85	DIBRETH	PPB	10	2	2 ***	.		1,2-dibromoethane
A86	DIBRMET	PPB	10	2	2 ***	.		Dibromomethane
A87	DIBUTEN	PPB	10	2	2 ***	.		1,4-dichloro-2-butene
A88	DICDIFM	PPB	10	2	2 ***	.		Dichlorodifluoromethane
A89	1,1-DIC	PPB	5	16	16 ***	.		1,1-dichloroethane
A90	1,2-DIC	PPB	5	16	16 ***	5	EPA	1,2-dichloroethane
A91	TRANDCE	PPB	5	16	16 ***	70	EPAP	Trans-1,2-dichloroethene
A92	DICETHY	PPB	10	2	2 ***	7	EPA	1,1-dichloroethylene
A93	METHYCH	PPB	5	16	16 ***	.		Methylene Chloride
A94	DICPANE	PPB	5	2	2 ***	6	EPAP	1,2-dichloropropane
A95	DICPENE	PPB	5	2	2 ***	.		1,3-dichloropropene
A96	NNDIEHY	PPB	10	2	2 ***	.		N,N-diethylhydrazine
A97	1,1-DIM	PPB	10	2	2 ***	.		1,1-dimethylhydrazine
A98	1,2-DIM	PPB	10	2	2 ***	.		1,2-dimethylhydrazine
B01	IODOMET	PPB	10	2	2 ***	.		Iodomethane
B02	METHACR	PPB	10	2	2 ***	.		Methacrylonitrile
B03	METHTHI	PPB	10	2	2 ***	.		Methanethiol
B04	PENTACH	PPB	10	2	2 ***	.		Pentachloroethane
B05	1112-tc	PPB	10	2	2 ***	.		1,1,1,2-tetrachlorethane
B06	1122-tc	PPB	5	2	2 ***	.		1,1,2,2-tetrachlorethane
B08	BROMORM	PPB	5	2	2 ***	100	EPA	Bromoform
B09	TRCMEOL	PPB	10	2	2 ***	.		Trichloromethanethiol
B10	TRCMFLM	PPB	10	2	2 ***	.		Trichloromonofluoromethane
B12	123-trp	PPB	10	2	2 ***	.		1,2,3-trichloropropane
B13	VINYIDE	PPB	10	16	16 ***	2	EPA	Vinyl chloride
B14	M-XYLE	PPB	5	16	16 ***	440	EPAP	Xylene-m
B19	ACETILE	PPB	10	2	2 ***	.		Acetonitrile
B20	ACETOPH	PPB	10	2	2 ***	.		Acetophenone
B21	WARFRIN	PPB	10	2	2 ***	.		Warfarin
B22	ACEFENE	PPB	10	2	2 ***	.		2-acetylaminofluorene
B23	AMINOYL	PPB	10	2	2 ***	.		4-aminobyphenyl
B24	AMIISOX	PPB	10	2	2 ***	.		5-(aminomethyl)-3-isoxazolol
B25	AMITROL	PPB	10	2	2 ***	.		Amitrole
B26	ANILINE	PPB	10	2	2 ***	.		Aniline
B27	ARAMITE	PPB	10	2	2 ***	.		Aramite
B28	AURAMIN	PPB	10	2	2 ***	.		Auramine
B29	BENZCAC	PPB	10	2	2 ***	.		Benz[c]acridine
B30	BENZAAN	PPB	10	2	2 ***	.		Benz[a]anthracene
B31	BENDICM	PPB	10	2	2 ***	.		Benzene, dichloromethyl
B32	BENTHOL	PPB	10	2	2 ***	.		Benzenethoil
B33	BENDINE	PPB	10	2	2 ***	.		Benzidine
B34	BENZBFL	PPB	10	2	2 ***	.		Benzo[b]fluoranthene
B35	BENZJFL	PPB	10	2	2 ***	.		Benzo[j]fluoranthene

TABLE 2.5. (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
B36	PBENZQU	PPB	10	2	2 ***	.		P benzoquinone
B37	BENZCHL	PPB	10	2	2 ***	.		Benzyl chloride
B38	BIS2CHM	PPB	10	2	2 ***	.		Bis(2-chloroethoxy) methane
B39	BIS2CHE	PPB	10	2	2 ***	.		Bis(2-chloroethyl) ether
B40	BIS2EPH	PPB	10	2	2 ***	.		Bis(2-ethylhexyl) phthalate
B41	BROPHEN	PPB	10	2	2 ***	.		4-bromophenyl phenyl ether
B42	BUTBENP	PPB	10	2	2 ***	.		Butyl benzyl phthalate
B43	BUTDINP	PPB	10	2	2 ***	.		2-sec-butyl-4,6-dinitrophenol
B44	CHALETH	PPB	10	2	2 ***	.		Chloroalkyl ethers
B45	CHLANIL	PPB	10	2	2 ***	.		P-chloroaniline
B46	CHLCRES	PPB	10	2	2 ***	.		P-chloro-m-cresol
B47	CHLEPOX	PPB	10	2	2 ***		0 EPAP	1-chloro-2,3-epoxypropane
B48	CHLNAPH	PPB	10	2	2 ***	.		2-chloronaphthalene
B49	CHLPHEN	PPB	10	2	2 ***	.		2-chlorophenol
B50	CHRYSEN	PPB	10	2	2 ***	.		Chrysene
B51	CRESOLS	PPB	10	2	2 ***	.		Cresols
B52	CYCHDIN	PPB	10	2	2 ***	.		2-cyclohexyl-4,6-dinitrophenol
B53	DIBAHAC	PPB	10	2	2 ***	.		Dibenz[a,h]acridine
B54	DIBAJAC	PPB	10	2	2 ***	.		Dibenz[a,j]acridine
B55	DIBAHAN	PPB	10	2	2 ***	.		Dibenz[a,h]anthracene
B56	DIBCGCA	PPB	10	2	2 ***	.		7H-dibenzo[c,g]carbazole
B57	DIBAEPY	PPB	10	2	2 ***	.		Dibenzo[a,e]pyrene
B58	DIBAHPY	PPB	10	2	2 ***	.		Dibenzo[a,h]pyrene
B59	DIBAIPY	PPB	10	2	2 ***	.		Dibenzo[a,i]pyrene
B60	DIBPHTH	PPB	10	2	2 ***	.		Di-n-butyl phthalate
B61	12-dben	PPB	10	2	2 ***	.		1,2-dichlorobenzene
B62	13-dben	PPB	10	2	2 ***	.		1,3-dichlorobenzene
B63	14-dben	PPB	10	2	2 ***		75 EPA	p-Dichlorobenzene
B64	DICHBEN	PPB	10	2	2 ***	.		3,3'-dichlorobenzidine
B65	24-dchp	PPB	10	2	2 ***	.		2,4-dichlorophenol
B66	26-dchp	PPB	10	2	2 ***	.		2,6-dichlorophenol
B67	DIEPHTH	PPB	10	2	2 ***	.		Diethyl phthalate
B68	DIHYSAF	PPB	10	2	2 ***	.		Dihydrosafrole
B69	DIMETHB	PPB	10	2	2 ***	.		3,3'-dimethoxybenzidine
B70	DIMEAMB	PPB	10	2	2 ***	.		P-dimethylaminoazobenzene
B71	DIMBENZ	PPB	10	2	2 ***	.		7,12-dimethylbenz[a]anthracene
B72	DIMEYLB	PPB	10	2	2 ***	.		3,3'-dimethylbenzidine
B73	THIONOX	PPB	10	2	2 ***	.		Thiofanox
B74	DIMPHAM	PPB	10	2	2 ***	.		Alpha,alpha-dimethylphenethylamine
B76	DIMPHTH	PPB	10	2	2 ***	.		Dimethyl phthalate
B77	DINBENZ	PPB	10	2	2 ***	.		Dinitrobenzene
B78	DINCRES	PPB	10	2	2 ***	.		4,6-dinitro-o-cresol and salts
B79	DINPHEN	PPB	10	2	2 ***	.		2,4-dinitrophenol
B80	24-dint	PPB	10	2	2 ***	.		2,4-dinitrotoluene

TABLE 2.5. (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
B81	26-dint	PPB	10	2	2 ***	.		2,6-dinitrotoluene
B82	DIOPHTH	PPB	10	2	2 ***	.		Di-n-octyl phthalate
B83	DIPHAMI	PPB	10	2	2 ***	.		Diphenylamine
B84	DIPHHYD	PPB	10	2	2 ***	.		1,2-diphenylhydrazine
B85	DIPRNIT	PPB	10	2	2 ***	.		Di-n-propylnitrosamine
B86	ETHWINE	PPB	10	2	2 ***	.		Ethyleneimine
B87	ETHMETS	PPB	10	2	2 ***	.		Ethyl methanesulfonate
B88	FLUORAN	PPB	10	2	2 ***	.		Fluoranthene
B89	HEXCBEN	PPB	10	2	2 ***	.		Hexachlorobenzene
B90	HEXCBUT	PPB	10	2	2 ***	.		Hexachlorobutadiene
B91	HEXCCYC	PPB	10	2	2 ***	.		Hexachlorocyclopentadiene
B92	HEXCETH	PPB	10	2	2 ***	.		Hexachloroethane
B93	INDENOP	PPB	10	2	2 ***	.		Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	PPB	10	2	2 ***	.		Isosafrole
B95	MALOILE	PPB	10	2	2 ***	.		Malononitrile
B96	MELPHAL	PPB	10	2	2 ***	.		Melphalan
B97	METHAPY	PPB	10	2	2 ***	.		Methapyrilene
B98	METHNYL	PPB	10	2	2 ***	.		Methiolonyl
B99	METAZIR	PPB	10	2	2 ***	.		2-methylaziridine
C01	METCHAN	PPB	10	2	2 ***	.		3-methylcholanthrene
C02	METBISC	PPB	10	2	2 ***	.		4,4'-methylenebis(2-chloroaniline)
C03	METACTO	PPB	10	2	2 ***	.		2-methyllactonitrile
C04	METACRY	PPB	10	2	2 ***	.		Methyl methacrylate
C05	METMSUL	PPB	10	2	2 ***	.		Methyl methanesulfonate
C06	METPROP	PPB	10	2	2 ***	.		2-methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	PPB	10	2	2 ***	.		Methylthiouracil
C08	NAPHQUI	PPB	10	2	2 ***	.		1,4-naphthoquinone
C09	1-napha	PPB	10	2	2 ***	.		1-naphthylamine
C10	2-napha	PPB	10	2	2 ***	.		2-naphthylamine
C11	NITRANI	PPB	10	2	2 ***	.		P-nitroaniline
C12	NITBENZ	PPB	10	2	2 ***	.		Nitrobenzine
C13	NITPHEN	PPB	10	2	2 ***	.		p-Nitrophenol
C14	NNIBUTY	PPB	10	2	2 ***	.		N-nitrosodi-n-butylamine
C15	NNIDIEA	PPB	10	2	2 ***	.		N-nitrosodiethanolamine
C16	NNIDIEY	PPB	10	2	2 ***	.		N-nitrosodiethylamine
C17	NNIDIME	PPB	10	2	2 ***	.		N-nitrosodimethylamine
C18	NNIMETH	PPB	10	2	2 ***	.		N-nitrosomethylethylamine
C19	NNIURET	PPB	10	2	2 ***	.		N-nitroso-N-methylurethane
C20	NNIVINY	PPB	10	2	2 ***	.		N-nitrosomethylvinylamine
C21	NNIMORP	PPB	10	2	2 ***	.		N-nitrosomorpholine
C22	NNINICO	PPB	10	2	2 ***	.		N-nitrosonornicotine
C23	NNIPIPE	PPB	10	2	2 ***	.		N-nitrosopiperidine
C24	NITRPYR	PPB	10	2	2 ***	.		Nitrosopyrrolidine
C25	NITRTOL	PPB	10	2	2 ***	.		5-nitro-o-toluidine

TABLE 2.5. (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
C26	PENTCHB	PPB	10	2	2 ***	.		Pentachlorobenzene
C27	PENTCHN	PPB	10	2	2 ***	.		Pentachloronitrobenzene
C28	PENTCHP	PPB	50	2	2 ***	220	EPAP	Pentachlorophenol
C29	PHENTIN	PPB	10	2	2 ***	.		Phenacetin
C30	PHENINE	PPB	10	2	2 ***	.		Phenylenediamine
C31	PHTHEST	PPB	10	2	2 ***	.		Phthalic acid esters
C32	PICOLIN	PPB	10	2	2 ***	.		2-picoline
C33	PRONIDE	PPB	10	2	2 ***	.		Pronamide
C34	RESERPI	PPB	10	2	2 ***	.		Reserpine
C35	RESORCI	PPB	10	2	2 ***	.		Resorcinol
C36	SAFROL	PPB	10	2	2 ***	.		Safrol
C37	TETRCHB	PPB	10	2	2 ***	.		1,2,4,5-tetrachlorobenzene
C39	TETRCHP	PPB	10	2	2 ***	.		2,3,4,6-tetrachlorophenol
C40	THIURAM	PPB	10	2	2 ***	.		Thiuram
C41	TOLUDIA	PPB	10	2	2 ***	.		Toluenediamine
C42	OTOLHYD	PPB	10	2	2 ***	.		O-toluidine hydrochloride
C43	TRICHLB	PPB	10	2	2 ***	.		1,2,4-trichlorobenzene
C44	245-trp	PPB	10	2	2 ***	.		2,4,5-trichlorophenol
C45	246-trp	PPB	10	2	2 ***	.		2,4,6-trichlorophenol
C46	TRIPHOS	PPB	10	2	2 ***	.		O,O,O-triethyl phosphorothioate
C47	SYMTRIN	PPB	10	2	2 ***	.		Sym-trinitrobenzene
C48	TRISPHO	PPB	10	2	2 ***	.		Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	PPB	10	2	2 ***	.		Benzo[a]pyrene
C50	CHLNAPZ	PPB	10	2	2 ***	.		Chlornaphazine
C51	BIS2ETH	PPB	10	2	2 ***	.		Bis(2-chloroisopropyl)ether
C52	HEXAENE	PPB	10	2	2 ***	.		Hexachloropropene
C54	HEXACHL	PPB	10	2	2 ***	.		Hexachlorophene
C55	NAPHTHA	PPB	10	2	2 ***	.		Naphthalene
C56	123TRI	PPB	10	2	2 ***	.		1,2,3-trichlorobenzene
C58	135TRI	PPB	10	2	2 ***	.		1,3,5-trichlorobenzene
C59	1234TE	PPB	10	2	2 ***	.		1,2,3,4-tetrachlorobenzene
C60	1235TE	PPB	10	2	2 ***	.		1,2,3,5-tetrachlorobenzene
C61	TETEPYR	PPB	2	2	2 ***	.		Tetraethylpyrophosphate
C62	CHLLATE	PPB	300	2	2 ***	.		Chlorobenzilate
C63	CARBPHT	PPB	2	2	2 ***	.		Carbophenothion
C64	DISULFO	PPB	2	2	2 ***	.		Disulfoton
C65	DIMETHO	PPB	2	2	2 ***	.		Dimethoate
C66	METHPAR	PPB	2	2	2 ***	.		Methyl parathion
C67	PARATHI	PPB	2	2	2 ***	.		Parathion
C70	CYANIDE	PPB	10	2	2 ***	.		Cyanide
C71	FORMALN	PPB	500	2	2 ***	.		Formalin
C77	PERCHLO	PPB	500	2	2 ***	.		Perchlorate
C78	SULFIDE	PPB	1000	2	2 ***	.		Sulfide
C79	KEROSEN	PPB	10000	2	2 ***	.		Kerosene

TABLE 2.5. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full Name
C80	AMMONIU	PPB	50	2	2 ***	.		Ammonium ion
C87	CITRUSR	PPB	1000	2	2 ***	.		Citrus red
C90	PARALDE	PPB	10000	2	2 ***	.		Paraldehyde
C91	STRYCHN	PPB	50	2	2 ***	.		Strychnine
C92	MALHYDR	PPB	500	2	2 ***	.		Maleic hydrizide
C93	NICOTIN	PPB	100	2	2 ***	.		Nicotinic acid
C94	ACRYIDE	PPB	10000	2	2 ***		0 EPAP	Acrylamide
C95	ALLYLAL	PPB	10000	2	2 ***	.		Allyl alcohol
C98	CHLPROP	PPB	10000	2	2 ***	.		3-chloropropionitrile
D01	PCDD's	PPB	.0100	2	2 ***	.		Pcdd's
D02	PCDF's	PPB	.0100	2	2 ***	.		Pcdf's
D03	2378TCD	PPB	.0100	2	2 ***	.		2,3,7,8 TCDD
H03	ETHCARB	PPB	10000	2	2 ***	.		Ethyl carbamate
H04	ETHCYAN	PPB	10000	2	2 ***	.		Ethyl cyanide
H05	ETHOXID	PPB	10	2	2 ***	.		Ethylene oxide
H06	ETHMETH	PPB	10	2	2 ***	.		Ethyl methacrylate
H09	ISOBUTY	PPB	10000	2	2 ***	.		Isobutyl alcohol
H11	PROPYLA	PPB	10000	2	2 ***	.		N-propylamine
H12	PROPYNO	PPB	10000	2	2 ***	.		2-propyn-1-ol
H15	2,4,5-T	PPB	2	2	2 ***	.		2,4,5-T
H40	FTHALLI	PPB	5	2	2 ***	.		Thallium, filtered
H62	LHYDRAZ	PPB	30	2	2 ***	.		Hydrazine, Low Detection Level
H68	HEXONE	PPB	10	16	16 ***	.		Methyl Isobutyl Ketone
I01	ACETONE	PPB	10	16	15	.		Acetone by VOA
I06	ISOPHER	PPB	10	2	2 ***	.		Isopherone
I09	BUTANOL	PPB	10000	2	2 ***	.		1-Butanol
I21	TRIBUPH	PPB	10	2	2 ***	.		Tributylphosphoric Acid
I28	TAF	PPB	10	16	16 ***	.		Tetrahydrofuran
I29	ACENAPH	PPB	10	2	2 ***	.		Acenaphthene
I30	FLRENE	PPB	10	2	2 ***	.		Fluorene
I31	ANTHRA	PPB	10	2	2 ***	.		Anthracene
I32	PYRENE	PPB	10	2	2 ***	.		Pyrene
I33	ETHBENZ	PPB	5	2	2 ***	680	EPAP	Ethyl benzene
I34	STYRENE	PPB	5	2	2 ***	140	EPAP	Styrene
I42	BDCM	PPB	5	2	2 ***	100	EPA	Bromodichloromethane
I43	CDBM	PPB	5	2	2 ***	100	EPA	Chlorodibromomethane
I64	2NITPH	PPB	10	2	2 ***	.		o-Nitrophenol
I67	ETHANOL	PPB	10000	2	2 ***	.		Ethanol
I75	2MENAPH	PPB	10	2	2 ***	.		2-Methylnaphthalene
I82	PHENANT	PPB	10	2	2 ***	.		Phenanthrene
J43	BENZALC	PPB	10	2	2 ***	.		Benzyl Alcohol
J69	2HEXANO	PPB	50	2	2 ***	.		2-Hexanone
J71	BNZKFLU	PPB	10	2	2 ***	.		Benzo(k)Fluoranthene
J83	BGHIPER	PPB	10	2	2 ***	.		Benzo(Ghi)Perylene

TABLE 2.5. (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
J89	DINOSEB	PPB	10	2	2 ***	.		Dinoseb
J91	DIALLAT	PPB	10	2	2 ***	.		Diallate
K52	NNDIPHA	PPB	10	2	2 ***	.		N-NITROSODIPHENYLAMINE
K56	DIBENFR	PPB	10	2	2 ***	.		DIBENZOFURAN
K58	ACENATL	PPB	10	2	2 ***	.		ACENAPHTHYLENE
L20	MBP	PPB	10000	2	2 ***	.		Monobutyl Phosphate
L21	DBP	PPB	10000	2	2 ***	.		Dibutyl Phosphate
L45	ALLYLCL	PPB	100	2	2 ***	.		Allyl Chloride
L46	CLETHAN	PPB	10	2	2 ***	.		Chloroethane
L48	PROPCN	PPB	5	2	2 ***	.		Propionitrile
L49	VINYLAC	PPB	5	2	2 ***	.		Vinyl Acetate
L50	B2CLMEE	PPB	10	2	2 ***	.		Bis(2-chloro-1-methylethyl)ether
L52	DIPHOS	PPB	10	2	2 ***	.		0,0-Diethyl-0,2-pyrazinyl phosphorothion
L53	ISODRIN	PPB	10	2	2 ***	.		Isodrin
L54	ONITANI	PPB	10	2	2 ***	.		o-Nitroaniline
L55	MNITANI	PPB	10	2	2 ***	.		m-Nitroaniline
L56	4NITQUI	PPB	10	2	2 ***	.		4-Nitroquinoline 1-oxide
L57	ETHGLYC	PPB	10000	2	2 ***	.		Ethylene Glycol
L59	1PROPAN	PPB	10000	2	2 ***	.		1-Propanol
L60	1BUTYN	PPB	10000	2	2 ***	.		1-Butynol
L62	ACETONE	PPB	10	2	2 ***	.		Acetone - by ABN
L63	14DBEN	PPB	5	16	16 ***	75	EPA	p-Dichlorobenzene
L64	CHLROB	PPB	10	2	2 ***	60	EPAP	Chlorobenzene (by ABN)

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 2.6. Constituents with at Least One Detected Value for the 300 Area Process Trenches, September Through November 1989

Contamination Indicator Parameters

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
3-1-3	21NOV89		244	233	7.10	7.36	1700	36
3-1-7	21NOV89		242	230	7.30	7.40	1900	37
3-1-8	21NOV89		331	.	.	7.88	.	.
3-1-11	13SEP89		162	.	.	7.40	.	.
	27SEP89		169	.	.	7.81	.	.
3-1-17A	13SEP89		173	.	.	7.30	.	.
	27SEP89		196	.	.	7.65	.	.
	04OCT89		188	.	.	8.31	.	.
	10OCT89		190	.	.	7.04	.	.
	17OCT89		202	.	.	6.86	.	.
	24OCT89		197	.	.	7.45	.	.
	31OCT89		172	.	.	7.22	.	.
	07NOV89		357	.	.	7.81	.	.
	14NOV89		175	.	.	6.93	.	.
	21NOV89		354	.	.	6.96	.	.
	28NOV89		180	.	.	7.04	.	.
3-1-18A	27SEP89		470	.	.	7.77	.	.

TABLE 2.6. (contd)

Regular Monitoring Data

Well name	Collection date	Duplicate sample number	FPOTASS PPB 100/.	FSTRONT PPB 10/.	ACETONE PPB 10/.	ALKALIN 20000/.	ALPHAHI PCI/L 4/15	BARIUM PPB 6/1000	FBARIUM PPB 6/1000	BETA PCI/L 8/50
3-1-3	21NOV89		2520	104	<10	56000	82.8	22	21	22
3-1-7	21NOV89		2600	103	<10	56000	63.9	22	21	18.4
3-1-11	13SEP89		.	.	<10	.	.	.	.	.
	27SEP89		.	.	<10	.	.	.	.	.
3-1-17A	13SEP89		.	.	<10	.	.	.	.	.
	27SEP89		.	.	13(a)	.	.	.	.	.
	04OCT89		.	.	#8	.	.	.	.	.
	10OCT89		.	.	<10	.	.	.	.	.
	17OCT89		.	.	<10	.	.	.	.	.
	24OCT89		.	.	<10	.	.	.	.	.
	31OCT89		.	.	#5	.	.	.	.	.
	07NOV89		.	.	<10	.	.	.	.	.
	14NOV89		.	.	<10	.	.	.	.	.
	21NOV89		.	.	<10	.	.	.	.	.
	28NOV89		.	.	<10	.	.	.	.	.
3-1-18A	27SEP89		.	.	<10	.	.	.	.	.

Well name	Collection date	Duplicate sample number	BORON PPB 10/.	FBORON PPB 10/.	CALCIUM PPB 50/.	FCALCIU PPB 50/.	CHLFORM PPB 5/100	CHLORID PPB 500/250000s	CO-60 PCI/L 22.5/100r	COLIMF PPB 1/1
3-1-3	21NOV89		17	18	23400	22200	17	24600	*3.24	4
3-1-7	21NOV89		19	17	23600	22000	17	22500	*-0.189	<1
3-1-11	13SEP89		.	.	.	.	20	6200	.	.
	27SEP89		.	.	.	.	22	6100	.	.
3-1-17A	13SEP89		.	.	.	.	18	7000	.	.
	27SEP89		.	.	.	.	18	6000	.	.
	04OCT89		.	.	.	.	20	15000	.	.
	10OCT89		.	.	.	.	17	12000	.	.
	17OCT89		.	.	.	.	18	17000	.	.
	24OCT89		.	.	.	.	18	17000	.	.
	31OCT89		.	.	.	.	16	8000	.	.
	07NOV89		.	.	.	.	21	57400	.	.
	14NOV89		.	.	.	.	18	7400	.	.
	21NOV89		.	.	.	.	16	58500	.	.
	28NOV89		.	.	.	.	17	7800	.	.
3-1-18A	27SEP89		.	.	.	.	<5	18000	.	.

TABLE 2.6. (contd)

Well name	Collection date	Duplicate sample number	CS-137 PCI/L 20/200r	IRON PPB 30/300s	LITHIUM PPB 10/.	FLITHIU PPB 10/.	MAGNES PPB 50/.	FMAGNES PPB 50/.	METHONE PPB 10/.	METHYCH PPB 5/.
3-1-3	21NOV89		*-7.01	135	16	15	4430	4220	<10	<5
3-1-7	21NOV89		*-4.71	53	14	14	4420	4250	<10	<5
3-1-11	13SEP89		.	.	.	.	.	.	<10	<5
	27SEP89		.	.	.	.	.	.	<10	#4
3-1-17A	13SEP89		.	.	.	.	.	.	<10	<5
	27SEP89		.	.	.	.	.	.	11 (a)	#3
	04OCT89		.	.	.	.	.	.	#9	<5
	10OCT89		.	.	.	.	.	.	<10	<5
	17OCT89		.	.	.	.	.	.	<10	<5
	24OCT89		.	.	.	.	.	.	<10	<5
	31OCT89		.	.	.	.	.	.	<10	<5
	07NOV89		.	.	.	.	.	.	<10	<5
	14NOV89		.	.	.	.	.	.	<10	<5
	21NOV89		.	.	.	.	.	.	<10	<5
	28NOV89		.	.	.	.	.	.	<10	<5
3-1-18A	27SEP89		.	.	.	.	.	.	#9	<5

Well name	Collection date	Duplicate sample number	NITRATE PPB 500/45000	POTASUM PPB 100/.	RADIUM PCI/L 1/5	RU-106 PCI/L 172.5/30r	SILICON PPB 50/.	FSILICO PPB 50/.	SODIUM PPB 200/.	FSODIUM PPB 200/.
3-1-3	21NOV89		1100	2680	*.0437	*19.9	6380	6020	11700	11100
3-1-7	21NOV89		1200	2740	*.00832	*34.8	6710	6320	12300	12000
3-1-11	13SEP89		1300	.	.	.	.	.	.	.
	27SEP89		1700	.	.	.	.	.	.	.
3-1-17A	13SEP89		1000	.	.	.	.	.	.	.
	27SEP89		1000	.	.	.	.	.	.	.
	04OCT89		2000	.	.	.	.	.	.	.
	10OCT89		1200	.	.	.	.	.	.	.
	17OCT89		1000	.	.	.	.	.	.	.
	24OCT89		1200	.	.	.	.	.	.	.
	31OCT89		1200	.	.	.	.	.	.	.
	07NOV89		800	.	.	.	.	.	.	.
	14NOV89		1100	.	.	.	.	.	.	.
	21NOV89		1200	.	.	.	.	.	.	.
	28NOV89		1100	.	.	.	.	.	.	.
3-1-18A	27SEP89		21200	.	.	.	.	.	.	.

TABLE 2.6. (contd)

Well name	Collection date	Duplicate sample number	SR 90 PCI/L 5/8	STRONUM PPB 10/.	SULFATE PPB 500/250000s	TC-99 PCI/L 15/900r	TDS 5000/500000s	TRICENE PPB 5/5	TRITIUM PCI/L 500/20000	TURBID NTU .10/1
3-1-3	21NOV89		*.476	109	17000	80.5	138000	<5	*211	.300
3-1-7	21NOV89		*-0.223	108	17000	71.8	115000	#3	*200	.100
3-1-11	13SEP89		.	.	16800	.	.	<5	.	.
	27SEP89		.	.	16700	.	.	<5	.	.
3-1-17A	13SEP89		.	.	17100	.	.	<5	.	.
	27SEP89		.	.	17000	.	.	<5	.	.
	04OCT89		.	.	18200	.	.	<5	.	.
	10OCT89		.	.	19300	.	.	<5	.	.
	17OCT89		.	.	17800	.	.	<5	.	.
	24OCT89		.	.	17500	.	.	<5	.	.
	31OCT89		.	.	16600	.	.	<5	.	.
	07NOV89		.	.	21200	.	.	<5	.	.
	14NOV89		.	.	16000	.	.	<5	.	.
	21NOV89		.	.	26400	.	.	<5	.	.
	28NOV89		.	.	18100	.	.	<5	.	.
3-1-18A	27SEP89		.	.	47000	.	.	<5	.	.

Well name	Collection date	Duplicate sample number	U PCI/L .50/600d	ZINC PPB 5/5000s	FZINC PPB 5/5000s
3-1-3	21NOV89		66.4	6	6
3-1-7	21NOV89		56.1	<5	<5
3-1-11	13SEP89		13.2	.	.
	27SEP89		11.4	.	.
3-1-17A	13SEP89		49.6	.	.
	27SEP89		54.6	.	.
	04OCT89		40.1	.	.
	10OCT89		51.4	.	.
	17OCT89		57.4	.	.
	24OCT89		67.8	.	.
	31OCT89		89.4	.	.
	07NOV89		102	.	.
	14NOV89		92	.	.
	21NOV89		94.4	.	.
	28NOV89		125	.	.
3-1-18A	27SEP89		4.03	.	.

TABLE 2.6. (contd)

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-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 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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 approximately equal amounts for this constituent as was found in the sample.

THIS PAGE INTENTIONALLY
LEFT BLANK

3.0 183-H SOLAR EVAPORATION BASINS

S. H. Hall
Pacific Northwest Laboratory

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

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

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

9 2 1 2 6 4 2 1 6 3 7

There are 23 wells in the monitoring network for the 183-H Solar Evaporation Basins (see Figure 3.1). Wells 199-H3-1, 199-H3-2A, 199-H3-2B, 199-H3-2C, 199-H4-6, 199-H4-7, 199-H4-8, 199-H4-14, and 199-H4-17 are considered to be upgradient from the basins. Wells 199-H4-3, 199-H4-4, 199-H4-5, 199-H4-9, 199-H4-10, 199-H4-11, 199-H4-12A, 199-H4-12B, 199-H4-12C, 199-H4-13, 199-H4-15A, 199-H4-15B, 199-H4-16, and 199-H4-18 are considered to be downgradient. Well 199-H4-2 was used only for hydrogeologic characterization and is capped. Table 3.1 shows the sampling schedule for wells in this monitoring network.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or aquifer testing was conducted during the report period. Pertinent site characterization information can be found in Liikala et al. (1988). In addition, an evaluation of the chemistry and migration rate of the contaminant plume can be found in Hall (1989). Bladder pumps in wells 199-H4-3, 199-H4-5, and 199-H4-6 were replaced with HydroStar®[a] pumps this quarter.

WATER LEVELS

Monthly water-table measurements made during the period are listed in Table 3.2. Figure 3.2 represents river-stage data collected from September 26 to January 3, 1990. Table 3.3 lists water-level measurements taken before sample collection.

WATER CHEMISTRY DATA

Ground water in the vicinity of the 183-H Solar Evaporation Basins has been routinely sampled and analyzed since 1985. Well 199-H4-3 was sampled in September (well 199-H4-9 was also scheduled for sampling, but the water level was too low). Quarterly sampling (10 wells) was performed in October. In November and December, wells 199-H3-3, 199-H3-4, and 199-H3-9 were scheduled for sampling. However, in November, well 199-H4-7 was substituted for

---

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

well 199-H4-9 because the latter's water level was still too low for sample collection. The results of analysis of samples collected in September, October, and November are summarized in Tables 3.4 and 3.5 (data for December are not yet available). Table 3.4 summarizes analytical data for each of the sampled wells.

Table 3.5 shows the constituents for which concentrations in 183-H monitoring wells exceed drinking water standards. These constituents include one contamination indicator (specific conductance), six interim primary drinking water parameters (gross beta, gross alpha, cadmium, chromium, nitrate, and turbidity), two water quality parameters (manganese and iron), and one site-specific constituent (technetium-99). Both gross beta and technetium-99 exceeded standards (EPA 1976) of 50 and 900 pCi/L, respectively. Gross alpha concentrations also exceeded the EPA standard of 15 pCi/L, but this alpha concentration is predominantly caused by the presence of uranium, which is excluded from the gross alpha standard.

9 2 1 2 6 4 2 1 6 3 9

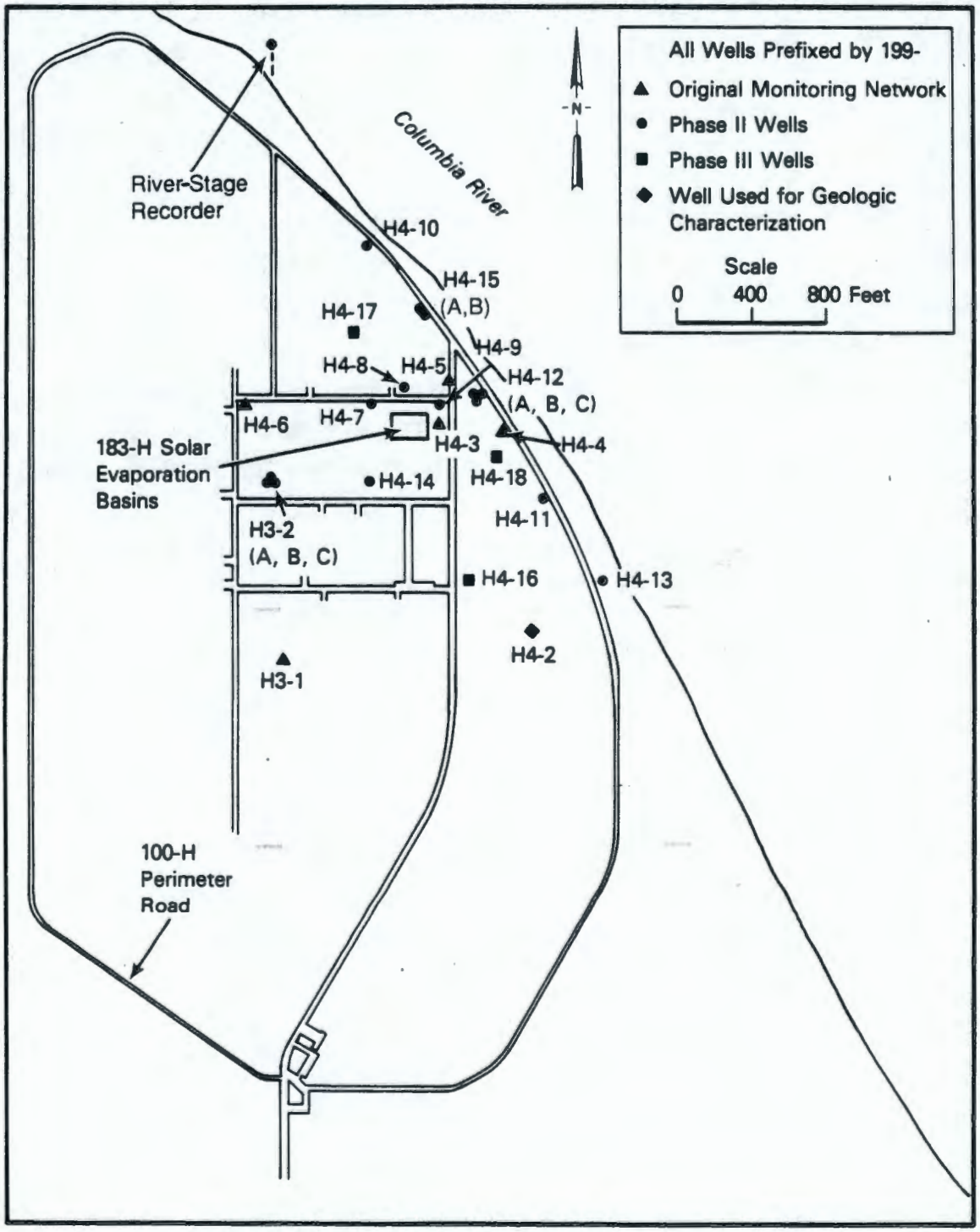

FIGURE 3.1. Monitoring Well Locations for the 183-H Solar Evaporation Basins

9 2 1 2 6 4 2 1 6 4 0

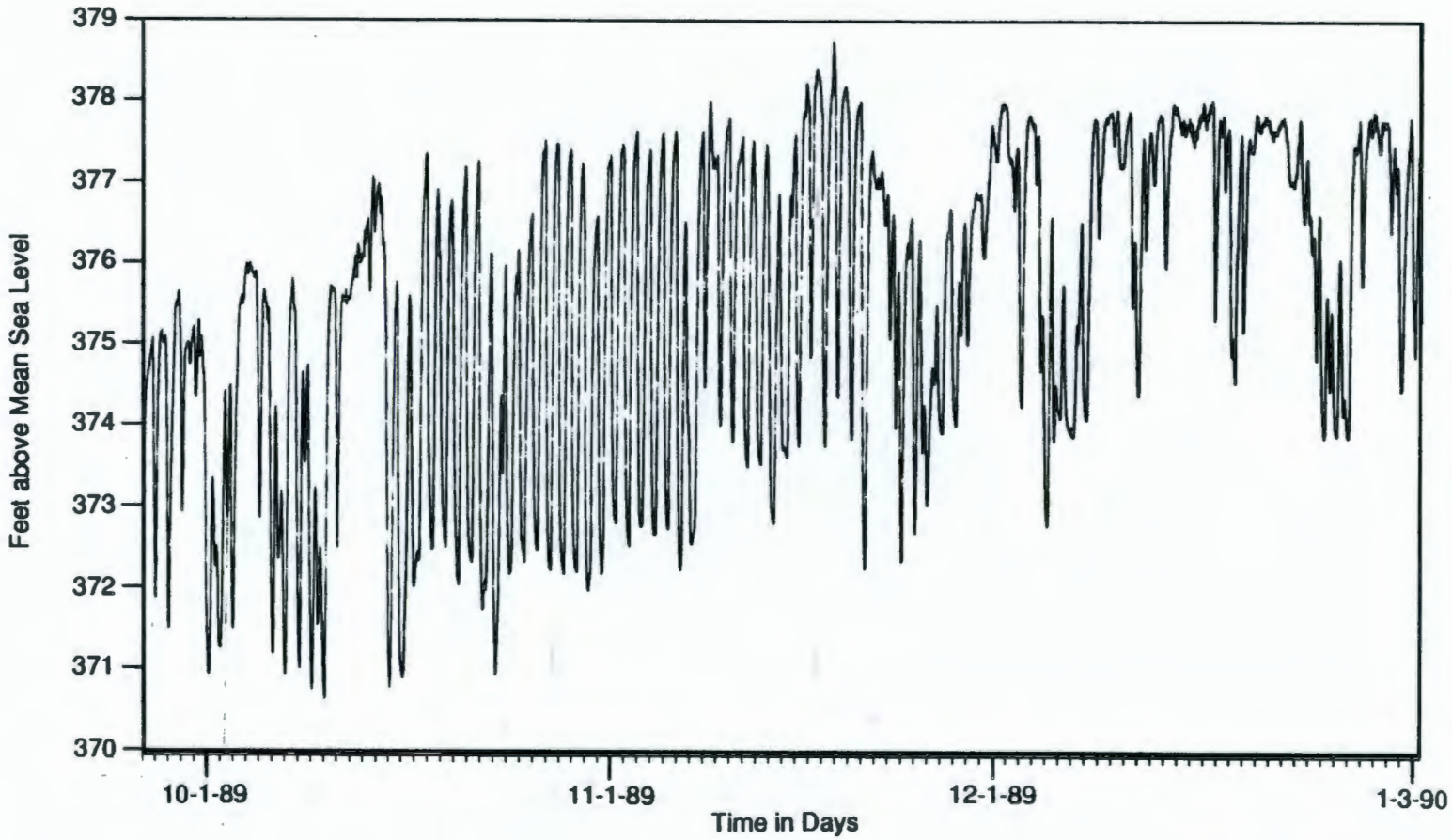

FIGURE 3.2. Columbia River Elevation (in feet above mean sea level) at the 100-H Area, September 26, 1989, to January 3, 1990

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

	1989[a]			1990								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
199-H3-1							X					
199-H3-2A	X			X			X			X		X
199-H3-2B							XRV					
199-H3-2C							X					
199-H4-3	XRV	A	A	X	A	A	X	A	A	X	A	X
199-H4-4	X	A	A	X	A	A	X	A	A	X	A	X
199-H4-5	X			XRV			X			X		X
199-H4-6	X			X			X			XRV		X
199-H4-7	X						X					X
199-H4-8							X					
199-H4-9		A	A	X	A	A	X	A	A	X	A	
199-H4-10							X					
199-H4-11							X					
199-H4-12A	X			X			X			X		X
199-H4-12B				X			X			X		
199-H4-12C	X			X			X			X		X
199-H4-13							X					
199-H4-14	X						X					X
199-H4-15A							X					
199-H4-15B							X					
199-H4-16							X					
199-H4-17							X					
199-H4-18	X			X			X			X		X

(a) The following notations are used in this table:
A = abbreviated list of constituents (see Table 3.4 for wells 199-H4-3, 199-H4-4, and 199-H4-9).
R = sampled for quality control replicates.
V = sampled for volatile organic analyses blanks.
X = sampled for the regular list of constituents (Smith, Bates, and Lundgren 1989c).

TABLE 3.2. Monthly Water-Level Data for Wells Near the 183-H Solar Evaporation Basins

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-H3-1	421.48	10/17/89	1120	46.09	375.39
		10/30/89	1401	46.14	375.34
		11/14/89	1126	46.14	375.34
		11/29/89	1330	46.10	375.38
		12/14/89	1451	46.03	375.45
		12/29/89	1352	45.94	375.54
199-H3-2A	417.83	10/17/89	1126	42.95	374.88
		10/30/89	1406	42.97	374.86
		11/14/89	1131	42.84	374.99
		11/29/89	1336	42.77	375.06
		12/14/89	1457	42.64	375.19
		12/29/89	1356	42.51	375.32
199-H3-2B	418.42	10/17/89	1129	43.54	374.88
		10/30/89	1409	43.56	374.86
		11/14/89	1134	43.42	375.00
		11/29/89	1339	43.36	375.06
		12/14/89	1501	43.23	375.19
		12/29/89	1359	43.10	375.32
199-H3-2C	418.22	10/17/89	1132	43.48	374.74
		10/30/89	1412	43.46	374.76
		11/14/89	1137	43.34	374.88
		11/29/89	1342	43.22	375.00
		12/14/89	1505	43.03	375.19
		12/29/89	1402	42.93	375.29
199-H4-3	420.29	10/17/89	1232	47.11	373.18
		10/30/89	1457	46.88	373.41
		11/14/89	1215	46.54	373.75
		11/29/89	1424	46.50	373.79
		12/14/89	1550	45.93	374.36
		12/29/89	1443	45.96	374.33
199-H4-4	413.70	10/17/89	1020	40.92	372.78
		10/30/89	1259	40.68	373.02
		11/14/89	1034	40.24	373.46
		11/29/89	1231	39.89	373.81
		12/14/89	1352	39.17	374.53
		12/29/89	1256	39.22	374.48

9 2 1 2 6 4 2 1 6 4 3

TABLE 3.2. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-H4-5	416.21	10/17/89	1227	43.33	372.88
		10/30/89	1452	42.99	373.22
		11/14/89	1211	42.58	373.63
		11/29/89	1419	42.56	373.65
		12/14/89	1545	41.76	374.45
		12/29/89	1439	41.88	374.33
199-H4-6	419.58	10/17/89	1200	44.72	374.86
		10/30/89	1426	44.73	374.85
		11/14/89	1147	44.59	374.99
		11/29/89	1353	44.52	375.06
		12/14/89	1517	44.38	375.20
		12/29/89	1412	44.25	375.33
199-H4-7	420.59	10/17/89	1206	46.63	373.96
		10/30/89	1431	46.55	374.04
		11/14/89	1151	46.30	374.29
		11/29/89	1358	46.25	374.34
		12/14/89	1522	45.95	374.64
		12/29/89	1417	45.85	374.74
199-H4-8	420.00	10/17/89	1218	46.49	373.51
		10/30/89	1441	46.37	373.63
		11/14/89	1200	45.98	374.02
		11/29/89	1408	45.98	374.02
		12/14/89	1534	45.56	374.44
		12/29/89	1430	45.48	374.52
199-H4-9	418.08	10/17/89	1222	44.96	373.12
		10/30/89	1447	44.71	373.37
		11/14/89	1206	44.27	373.81
		11/29/89	1414	44.27	373.81
		12/14/89	1540	43.67	374.41
		12/29/89	1435	43.69	374.39
199-H4-10	404.44	10/17/89	1058	31.36	373.08
		10/30/89	1340	31.04	373.40
		11/14/89	1107	30.60	373.84
		11/29/89	1309	30.45	373.99
		12/14/89	1431	29.68	374.76
		12/29/89	1329	29.78	374.66

TABLE 3.2. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-H4-11	416.84	10/17/89	1010	44.45	372.39
		10/30/89	1254	44.15	372.69
		11/14/89	1029	43.65	373.19
		11/29/89	1227	43.11	373.73
		12/14/89	1348	42.39	374.45
		12/29/89	1252	42.48	374.36
199-H4-12A	413.50	10/17/89	1025	40.57	372.93
		10/30/89	1304	40.30	373.20
		11/14/89	1037	39.90	373.60
		11/29/89	1236	39.63	373.87
		12/14/89	1357	38.91	374.59
		12/29/89	1300	38.97	374.53
199-H4-12B	413.52	10/17/89	1028	40.58	372.94
		10/30/89	1307	40.32	373.20
		11/14/89	1040	39.90	373.62
		11/29/89	1239	39.64	373.88
		12/14/89	1401	38.92	374.60
		12/29/89	1304	38.99	374.53
199-H4-12C	413.52	10/17/89	1032	40.32	373.20
		10/30/89	1311	40.74	372.78
		11/14/89	1044	39.91	373.61
		11/29/89	1243	39.34	374.18
		12/14/89	1405	38.85	374.67
		12/29/89	1308	39.01	374.51
199-H4-13	418.20	10/17/89	1005	45.94	372.26
		10/30/89	1249	45.79	372.41
		11/14/89	1024	45.18	373.02
		11/29/89	1222	44.58	373.62
		12/14/89	1342	43.96	374.24
		12/29/89	1248	44.07	374.13
199-H4-14	420.59	10/17/89	1138	46.08	374.51
		10/30/89	1420	46.06	374.53
		11/14/89	1142	45.89	374.70
		11/29/89	1347	45.82	374.77
		12/14/89	1511	45.67	374.92
		12/29/89	1407	45.52	375.07

9 2 1 2 6 4 2 1 6 4 5

TABLE 3.2. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-H4-15A	407.21	10/17/89	1038	34.09	373.12
		10/30/89	1319	33.86	373.35
		11/14/89	1049	33.39	373.82
		11/29/89	1249	33.21	374.00
		12/14/89	1411	32.47	374.74
		12/29/89	1314	32.58	374.63
199-H4-15B	406.92	10/17/89	1041	33.81	373.11
		10/30/89	1322	33.57	373.35
		11/14/89	1052	33.11	373.81
		11/29/89	1253	32.92	374.00
		12/14/89	1415	32.18	374.74
		12/29/89	1316	32.29	374.63
199-H4-15CQ	407.27	10/17/89	1045	18.32	388.95
		10/30/89	1325	17.70	389.57
		11/14/89	1055	17.39	389.88
		11/29/89	1256	17.13	390.14
		12/14/89	1418	16.63	390.64
		12/29/89	1319	16.69	390.58
199-H4-15CR	407.37	10/17/89	1050	34.59	372.78
		10/30/89	1330	34.56	372.81
		11/14/89	1058	34.36	373.01
		11/29/89	1259	34.20	373.17
		12/14/89	1421	33.99	373.38
		12/29/89	1322	33.86	373.51
199-H4-15CS	407.44	10/17/89	1053	34.24	373.20
		10/30/89	1334	34.35	373.09
		11/14/89	1102	33.74	373.70
		11/29/89	1302	33.21	374.23
		12/14/89	1424	32.64	374.80
		12/29/89	1324	32.85	374.59
199-H4-16	424.23	10/17/89	1243	50.30	373.93
		10/30/89	1506	50.27	373.96
		11/14/89	1224	50.06	374.17
		11/29/89	1435	49.99	374.24
		12/14/89	1600	49.78	374.45
		12/29/89	1452	49.64	374.59

TABLE 3.2. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-H4-17	419.09	10/17/89	1212	45.67	373.42
		10/30/89	1436	45.48	373.61
		11/14/89	1156	45.09	374.00
		11/29/89	1404	45.11	373.98
		12/14/89	1527	44.49	374.60
		12/29/89	1426	44.53	374.56
199-H4-18	421.82	10/17/89	1237	48.46	373.36
		10/30/89	1502	48.27	373.55
		11/14/89	1219	47.96	373.86
		11/29/89	1429	47.88	373.94
		12/14/89	1555	47.39	374.43
		12/29/89	1448	47.36	374.46
699-88-41	416.04	10/17/89	0921	33.78	382.26
		10/30/89	1206	33.78	382.26
		11/14/89	0950	33.79	382.25
		11/29/89	1127	33.79	382.25
		12/14/89	1258	33.79	382.25
		12/29/89	1200	33.79	382.25
699-89-35	397.46	10/17/89	0944	27.32	370.14
		10/30/89	1228	27.25	370.21
		11/14/89	1006	27.00	370.46
		11/29/89	1147	26.83	370.63
		12/14/89	1316	26.41	371.05
		12/29/89	1220	26.36	371.10
699-90-34	329.39	10/17/89	0951	Dry	--
		10/30/89	1234	Dry	--
		11/14/89	1012	Dry	--
		11/29/89	1155	Dry	--
		12/14/89	1325	21.57	370.82
		12/29/89	1229	21.56	370.83
699-90-45	422.15	10/17/89	0934	37.48	384.67
		10/30/89	1216	37.49	384.66
		11/14/89	1000	37.50	384.65
		11/29/89	1138	37.50	384.65
		12/14/89	1308	37.50	384.65
		12/14/89	1212	37.51	384.64

9 2 1 2 6 4 2 1 6 4 7

TABLE 3.2. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
699-91-37	422.93	10/17/89	0959	50.43	372.50
		10/30/89	1243	50.45	372.48
		11/14/89	1019	50.39	372.54
		11/29/89	1202	50.33	372.60
		12/14/89	1335	50.24	372.69
		12/29/89	1237	50.13	372.80
699-97-43	421.81	10/17/89	1110	43.19	378.62
		10/30/89	1352	43.24	378.57
		11/14/89	1117	43.29	378.52
		11/29/89	1321	43.32	378.49
		12/14/89	1442	43.31	378.50
		12/29/89	1343	43.27	378.54
699-99-42	412.88	10/17/89	1104	Dry	--
		10/30/89	1347	Dry	--
		11/14/89	1112	Dry	--
		11/29/89	1314	Dry	--
		12/14/89	1436	Dry	--
		12/29/89	1336	Dry	--

(a) MSL = mean sea level.

TABLE 3.3. Water-Level Data Collected Before Sampling from Wells Near the 183-H Solar Evaporation Basins

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-H4-2A	417.83	10/11/89	42.96	374.87
199-H4-3	420.29	10/11/89	46.32	373.97
		11/28/89	46.82	373.47
199-H4-4	413.70	10/11/89	41.19	372.51
		11/28/89	40.16	373.54
199-H4-5	416.21	10/11/89	43.60	372.61
199-H4-6	419.58	10/11/89	44.73	374.85
199-H4-7	420.59	10/18/89	46.64	373.95
		11/30/89	46.23	374.36
199-H4-12A	413.50	10/11/89	40.85	372.65
199-H4-12C	413.52	10/11/89	40.56	372.96
199-H4-14	420.59	10/17/89	46.07	374.52
199-H4-18	421.82	10/11/89	48.63	373.19

(a) MSL = mean sea level.

9 2 1 2 6 4 2 1 6 4 9

TABLE 3.4. Constituent List and Summary of Sampling Results for the 183-H Solar Evaporation Basins, September to November 1989

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
191	CONDFLD	UMHO	1	14	0	700	WDOE	xxx	Specific conductance
199	PHFIELD		.100	14	0	6.5-8.5	EPAS		pH, Field Measurement
207	PH-LAB		.0100	10	0	6.5-8.5	EPAS		pH, Laboratory Measurement
H42	TOXLDL	PPB	10	11	2	.			Total Organic Halogen, Low Det. Level

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
111	BETA	PCI/L	8	14	0	50	EPA	xxx	Gross beta
112	ALPHAHI	PCI/L	4	14	0	15	EPA	xxx	Alpha, High Detection Level
A06	BARIUM	PPB	6	15	0	1000	EPA		Barium
A07	CADMIUM	PPB	2	15	13	10	EPA	xxx	Cadmium
A08	CHROMUM	PPB	10	15	0	50	EPA	xxx	Chromium
A10	SILVER	PPB	10	15	15 ***	50	EPA		Silver
C72	NITRATE	PPB	500	15	0	45000	EPA	xxx	Nitrate
C74	FLUORID	PPB	500	15	11	4000	EPA		Fluoride
H20	FBARIUM	PPB	6	15	0	1000	EPA		Barium, filtered
H21	FCADMIU	PPB	2	15	14	10	EPA		Cadmium, filtered
H22	FCHROMI	PPB	10	15	0	50	EPA	xxx	Chromium, filtered
H23	FSILVER	PPB	10	15	15 ***	50	EPA		Silver, filtered
H60	TURBID	NTU	.100	10	0	1	EPA	xxx	Turbidity

---------- 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	15	0	.			Sodium
A17	MANGESE	PPB	5	15	9	50	EPAS	xxx	Manganese
A19	IRON	PPB	30	15	3	300	EPAS	xxx	Iron
C73	SULFATE	PPB	500	15	0	250000	EPAS		Sulfate
C75	CHLORID	PPB	500	15	0	250000	EPAS		Chloride
H24	FSODIUM	PPB	200	15	0	.			Sodium, filtered
H29	FMANGAN	PPB	5	15	10	50	EPAS	xxx	Manganese, filtered
H31	FIRON	PPB	30	15	12	300	EPAS	xxx	Iron, filtered

TABLE 3.4. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Standards Agency	Exceeded	Full Name
104	U	PCI/L	.500	10	0	600	DOE		Uranium
197	TC-99	PCI/L	15	10	5	900	EPAR	xxx	Technetium-99
A01	BERYLUM	PPB	5	15	15 ***	.			Beryllium
A03	STRONUM	PPB	10	15	0	.			Strontium
A04	ZINC	PPB	5	15	9	5000	EPAS		Zinc
A05	CALCIUM	PPB	50	15	0	.			Calcium
A12	NICKEL	PPB	10	15	11	.			Nickel
A13	COPPER	PPB	10	15	14	1300	EPAP		Copper
A14	VANADUM	PPB	5	15	0	.			Vanadium
A15	ANTIONY	PPB	100	15	15 ***	.			Antimony
A16	ALUMNUM	PPB	150	15	12	.			Aluminum
A18	POTASUM	PPB	100	15	0	.			Potassium
A50	MAGNES	PPB	50	15	0	.			Magnesium
C76	PHOSPHA	PPB	1000	15	15 ***	.			Phosphate
H18	FZINC	PPB	5	15	7	5000	EPAS		Zinc, filtered
H19	FCALCIU	PPB	50	15	0	.			Calcium, filtered
H25	FNICKEL	PPB	10	15	12	.			Nickel, filtered
H26	FCOPPER	PPB	10	15	15 ***	1300	EPAP		Copper, filtered
H27	FVANADI	PPB	5	15	4	.			Vanadium, filtered
H28	FALUMIN	PPB	150	15	14	.			Aluminum, filtered
H30	FPOTASS	PPB	100	15	0	.			Potassium, filtered
H32	FMAGNES	PPB	50	15	0	.			Magnesium, filtered
H33	FBERYLL	PPB	5	15	14	.			Beryllium, filtered
H35	FSTRONT	PPB	10	15	0	.			Strontium, filtered
H36	FANTIMO	PPB	100	15	15 ***	.			Antimony, filtered
H58	ALKALIN		20000	11	0	.			Alkalinity
H66	BROMIDE	PPB	1000	15	15 ***	.			Bromide
H67	NITRITE	PPB	1000	15	15 ***	.			Nitrite
H86	FBORON	PPB	10	15	1	.			Boron, filtered
H87	FCOBALT	PPB	20	15	15 ***	.			Cobalt, filtered
H88	FLITHIU	PPB	10	15	15 ***	.			Lithium, filtered
H89	FMOLY	PPB	40	15	15 ***	.			Molybdenum, filtered
H90	FSILICO	PPB	50	15	0	.			Silicon, filtered
H91	FTIN	PPB	30	15	15 ***	.			Tin, filtered
H92	FTITAN	PPB	60	15	14	.			Titanium, filtered
H93	FZIRCON	PPB	50	15	15 ***	.			Zirconium, filtered
P01	BORON	PPB	10	15	0	.			Boron
P02	COBALT	PPB	20	15	15 ***	.			Cobalt
P03	LITHIUM	PPB	10	15	15 ***	.			Lithium
P04	MOLY	PPB	40	15	15 ***	.			Molybdenum

TABLE 3.4. (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
P05	SILICON	PPB	50	15	0		.		Silicon
P06	TIN	PPB	30	15	15 ***		.		Tin
P07	TITAN	PPB	60	15	14		.		Titanium
P08	ZIRCON	PPB	50	15	15 ***		.		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

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 3.5. Constituents with at Least One Detected Value for the 183-H Solar Evaporation Basins, September Through November 1989

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOXLDL PPB 10/.
1-H3-2A	11OCT89		360	8	8.03	18
1-H4-3	29SEP89		883	.	7.62	.
	11OCT89		833	8	7.99	18
	11OCT89	1	.	.	.	25
	28NOV89		858	.	8	.
1-H4-4	11OCT89		1085	7.90	8.10	16
	28NOV89		887	.	7.61	.
1-H4-5	11OCT89		541	7.80	7.43	13
1-H4-6	11OCT89		559	8.10	7.87	#9
1-H4-7	18OCT89		515	7.90	7.22	12
	30NOV89		513	.	7.75	.
1-H4-12A	11OCT89		536	7.90	7.86	14
1-H4-12C	11OCT89		268	8	8.02	#8
1-H4-14	17OCT89		358	7.80	7.40	28
1-H4-18	11OCT89		381	7.80	7.68	35

TABLE 3.5. (contd)

Well name	Collection date	Duplicate sample number	FLUORID PPB 500/4000	FCHROMI PPB 10/50	FMANGAN PPB 5/50s	FALUMIN PPB 150/.	FPOTASS PPB 100/.	FBERYLL PPB 5/.	FSTRONT PPB 10/.	ALKALIN 20000/.
1-H3-2A	11OCT89		<500	39	5	<150	4490	<5	243	112000
1-H4-3	29SEP89		600	208	51	1390	4900	<5	141	.
	11OCT89		600	117	<5	<150	3630	<5	94	156000
	11OCT89	1	600	123	<5	<150	3570	<5	95	156000
	28NOV89		<500	129	7	<150	4730	<5	118	.
1-H4-4	11OCT89		600	164	<5	<150	6140	<5	291	140000
	28NOV89		<500	137	<5	<150	6050	<5	245	.
1-H4-5	11OCT89		<500	81	<5	<150	5330	<5	374	147000
1-H4-6	11OCT89		<500	83	86	<150	6370	<5	368	145000
1-H4-7	18OCT89		<500	109	8	<150	5360	<5	313	140000
	30NOV89		<500	114	<5	<150	5860	<5	317	.
1-H4-12A	11OCT89		<500	63	<5	<150	4650	7	307	150000
1-H4-12C	11OCT89		<500	295	<5	<150	4080	<5	204	102000
1-H4-14	17OCT89		<500	420	<5	<150	4450	<5	253	104000
1-H4-18	11OCT89		<500	179	<5	<150	3860	<5	236	121000

Well name	Collection date	Duplicate sample number	ALPHAHI PCI/L 4/15	ALUMNUM PPB 150/.	BARIUM PPB 6/1000	FBARIUM PPB 6/1000	BETA PCI/L 8/50	BORON PPB 10/.	FBORON PPB 10/.	CADMIUM PPB 2/10
1-H3-2A	11OCT89		1.96	<150	24	24	5.57	30	14	<2
1-H4-3	29SEP89		87.1	2040	119	42	133	49	65	11
	11OCT89		82.3	478	24	19	83	56	47	<2
	11OCT89	1	84.6	285	25	19	85	56	53	<2
	28NOV89		42.3	<150	22	22	62.2	54	64	<2
1-H4-4	11OCT89		73.5	<150	76	71	202	45	30	<2
	28NOV89		41.1	<150	59	59	134	40	35	<2
1-H4-5	11OCT89		.	<150	69	77	.	88	55	<2
1-H4-6	11OCT89		5	<150	45	49	9.18	56	51	<2
1-H4-7	18OCT89		3.02	<150	43	46	4.45	34	30	<2
	30NOV89		3.74	<150	45	44	6.37	51	40	<2
1-H4-12A	11OCT89		11.1	<150	67	60	16.1	39	39	2
1-H4-12C	11OCT89		1.09	<150	9	7	4.72	12	<10	<2
1-H4-14	17OCT89		3.16	<150	23	30	5.93	19	13	<2
1-H4-18	11OCT89		3.42	<150	32	32	9.05	27	20	<2

TABLE 3.5. (contd)

Well name	Collection date	Duplicate sample number	FCADMIU PPB 2/10	CALCIUM PPB 50/.	FCALCIU PPB 50/.	CHLORID PPB 500/250000s	CHROMUM PPB 10/50	COPPER PPB 10/1300p	IRON PPB 30/300s	FIRON PPB 30/300
1-H3-2A	11OCT89		<2	41600	44300	6900	46	<10	59	<30
1-H4-3	29SEP89		3	41100	23800	10000	789	34	37400	7210
	11OCT89		<2	19300	17400	10000	149	<10	984	<30
	11OCT89	1	<2	20200	17900	11000	147	<10	708	<30
	28NOV89		<2	20300	21400	9700	137	<10	118	<30
1-H4-4	11OCT89		<2	53800	54200	8000	177	<10	201	<30
	28NOV89		<2	43200	44300	7600	142	<10	112	<30
1-H4-5	11OCT89		<2	75500	78000	8000	90	<10	120	<30
1-H4-6	11OCT89		<2	64000	65700	13000	109	<10	176	41
1-H4-7	18OCT89		<2	60600	61900	11000	113	<10	202	93
	30NOV89		<2	63600	67200	13100	122	<10	129	<30
1-H4-12A	11OCT89		<2	72700	65500	8800	72	<10	<30	<30
1-H4-12C	11OCT89		<2	29200	29400	2700	299	<10	33	<30
1-H4-14	17OCT89		<2	44600	49600	5800	375	<10	<30	<30
1-H4-18	11OCT89		<2	50000	48600	6200	191	<10	<30	<30

Well name	Collection date	Duplicate sample number	MAGNES PPB 50/.	FMAGNES PPB 50/.	MANGESE PPB 5/50s	NICKEL PPB 10/.	FNICKEL PPB 10/.	NITRATE PPB 500/45000	POTASUM PPB 100/.	SILICON PPB 50/.
1-H3-2A	11OCT89		9340	9760	<5	<10	<10	18100	4450	14000
1-H4-3	29SEP89		7270	4600	480	21	12	242000	5750	23800
	11OCT89		3520	3090	11	<10	<10	172000	3980	15900
	11OCT89	1	3620	3120	10	10	<10	176000	4040	16100
	28NOV89		3660	3890	6	<10	<10	127000	4820	15400
1-H4-4	11OCT89		8140	8230	<5	17	10	368000	6080	14300
	28NOV89		6730	6880	<5	<10	<10	253000	6040	13900
1-H4-5	11OCT89		12700	13400	<5	<10	<10	39000	5120	14400
1-H4-6	11OCT89		14600	14800	83	<10	<10	38000	6320	14500
1-H4-7	18OCT89		11900	12500	8	<10	<10	36000	5080	14100
	30NOV89		12400	12600	<5	<10	<10	35300	5710	14300
1-H4-12A	11OCT89		11500	10400	<5	<10	<10	59000	5160	13800
1-H4-12C	11OCT89		10300	10300	<5	18	16	6300	4320	29000
1-H4-14	17OCT89		8650	9550	<5	<10	<10	21700	4130	13400
1-H4-18	11OCT89		8810	8500	<5	<10	<10	23500	4130	13800

TABLE 3.5. (contd)

Well name	Collection date	Duplicate sample number	FSILICO PPB 50/.	SODIUM PPB 200/.	FSODIUM PPB 200/.	STRONUM PPB 10/.	SULFATE PPB 500/250000s	TC-99 PCI/L 15/900r	TITAN PPB 60/.	FTITAN PPB 60/.
1-H3-2A	11OCT89		15400	13100	13700	221	38000	*3.54	<60	<60
1-H4-3	29SEP89		18300	176000	165000	233	92000	.	92	68
	11OCT89		13400	133000	132000	104	88000	844	<60	<60
	11OCT89	1	13800	146000	133000	110	89000	830	<60	<60
	28NOV89		15400	138000	140000	112	80900	.	<60	<60
1-H4-4	11OCT89		14300	153000	158000	295	78000	2440	<60	<60
	28NOV89		14200	134000	133000	242	70700	.	<60	<60
1-H4-5	11OCT89		15200	12600	13500	343	74000	.	<60	<60
1-H4-6	11OCT89		14600	24800	25800	352	87000	*3.36	<60	<60
1-H4-7	18OCT89		14600	14300	15500	287	76000	*1.49	<60	<60
	30NOV89		13700	15700	16100	316	73700	.	<60	<60
1-H4-12A	11OCT89		12700	17100	15200	346	61000	154	<60	<60
1-H4-12C	11OCT89		29200	3910	3820	204	23900	*1.73	<60	<60
1-H4-14	17OCT89		14900	7940	8790	221	44000	*.804	<60	<60
1-H4-18	11OCT89		13400	9810	9510	235	43000	20.1	<60	<60

Well name	Collection date	Duplicate sample number	TURBID NTU .10/1	U PCI/L .50/600d	VANADUM PPB 5/.	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000s
1-H3-2A	11OCT89		.200	2.08	13	<5	<5	9
1-H4-3	29SEP89		.	.	20	16	25	9
	11OCT89		10	40.4	7	<5	9	<5
	11OCT89	1	.	52.3	9	6	<5	<5
	28NOV89		.	.	10	9	<5	<5
1-H4-4	11OCT89		2	64.1	7	<5	60	41
	28NOV89		.	.	8	8	39	32
1-H4-5	11OCT89		.500	.	8	8	48	53
1-H4-6	11OCT89		1.50	4.24	11	6	43	56
1-H4-7	18OCT89		5.10	3.26	12	11	<5	8
	30NOV89		.	.	9	8	<5	<5
1-H4-12A	11OCT89		.200	7.07	6	<5	<5	<5
1-H4-12C	11OCT89		.200	.891	35	33	<5	<5
1-H4-14	17OCT89		.700	1.72	12	11	<5	<5
1-H4-18	11OCT89		.500	2.11	14	6	<5	6

TABLE 3.5. (contd)

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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

4.0 200 AREAS LOW-LEVEL BURIAL GROUNDS

G. V. Last
Pacific Northwest Laboratory

The ground water beneath the 200 Areas Low-Level Burial Grounds (LLBGs) has been monitored by four RCRA interim-status well networks since September 1988. This project recently completed the background stage of monitoring and has now entered the indicator evaluation phase of monitoring. Five complete sample sets have been collected for each network. A revised ground-water monitoring plan has been prepared for this site (Last and Bjornstad 1989).

The LLBGs are located in the 200-East and 200-West Areas in the central portion of the Hanford Site (see Figure 1.1). The revised ground-water monitoring plan discusses expansion of the ground-water monitoring program for the LLBGs. The expansion is from four waste management areas (WMAs) to five WMAs, covering all or portions of eight burial grounds. The fifth waste management area (WMA-5) is not yet active and thus is currently not being monitored. 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 off-site wastes (e.g., submarine reactor compartments, Three-Mile Island Reactor cleanup wastes). These wastes are buried in unlined trenches and pits from 15 to 60 ft deep. Disposal to these LLBGs has been ongoing since 1960.

The current monitoring networks for the LLBGs consist of 35 wells installed in 1987 (Figures 4.1, 4.2, 4.3, 4.4, and 4.5). Table 4.1 lists the monitoring wells at each WMA, and Table 4.2 gives the sampling schedule for these wells. The monitoring network is being expanded. Ten additional monitoring wells were recently completed and will be added to the current monitoring networks next quarter. In addition, 7 wells are planned to be installed in 1990. This will bring the total number of monitoring wells to 52 by the end of 1990.

9 2 1 2 6 4 2 1 6 5 8

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Drilling and monitoring well installation were completed for the 10 new monitoring wells that were to be constructed during 1989 (Last and Bjornstad 1989). All of these wells were visually inspected with a downhole video camera, developed, and fitted with sampling pumps. Geologists' logs, drillers' logs, borehole geophysical logs, as-built diagrams, and well completion/inspection reports for these wells are currently being reviewed and will be included in the next quarterly report. Three of the six additional wells originally planned for completion in 1990 (Last and Bjornstad 1989) are in various stages of progress:

- Well 299-W7-9 is structurally complete but has not been slug tested, visually inspected, developed, or fitted with a sample pump.
- Well 299-W7-10 has been drilled to approximately 20% of its total depth.
- Well 299-W15-23 has been drilled to total depth.

Table 4.3 summarizes the drilling and construction status of the 16 wells being added to the monitoring networks (10 in 1989 and 6 in 1990). A seventh well (299-W15-21), temporarily abandoned because of a break in the temporary casing, will also be completed in 1990. This completion awaits a decision on how best to continue.

WATER LEVELS

Water levels at each well were measured three times during this quarter and at the time of sample collection; results are listed in Tables 4.4 and 4.5, respectively.

WATER CHEMISTRY DATA

Analytical results were received from the fifth set (September 1989) of quarterly samples. Analytical results for the September 1989 quarterly samples are summarized in Tables 4.6, 4.8, 4.10, and 4.12 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 4.7, 4.9, 4.11, and 4.13 for WMA-1,

WMA-2, WMA-3, and WMA-4, respectively. This was to be the last set of quarterly samples before moving to semiannual sampling.

The indicator parameter concentrations from this last set of samples were statistically compared to their critical mean values established from the previous year's analyses from the upgradient (background) wells of each WMA. Tables 4.14, 4.16, 4.18, and 4.20 list the critical means for the background indicator parameters at WMA-1, WMA-2, WMA-3, and WMA-4, respectively, and Tables 4.15, 4.17, 4.19, and 4.21 provide the replicate averages for the indicator parameters from the September 1989 samples at WMA-1, WMA-2, WMA-3 and WMA-4, respectively. Comparison of the September 1989 replicate averages to the critical means for the indicator parameters indicates that WMA-1 and WMA-3 yield significantly higher conductivity and total organic halogen (TOX) concentrations in their respective downgradient wells.

The suspect wells were resampled in November. Analyses of these samples confirmed the previous results. Table 4.15 lists the replicate averages of analytical results from the resampling of wells 299-E28-26, 299-W7-4, 299-W7-5, 299-W8-1, and 299-W10-13.

Westinghouse Hanford Company was notified on December 21 and 22, 1989, that WMA-1 and WMA-3 may be affecting the ground-water quality. Ground-water quality assessment plans were initiated immediately.

Major observations of the September 1989 analytical results from each WMA are discussed below.

- <u>Waste Management Area 1</u>

  - Chromium (unfiltered) exceeded its 40 CFR 141 standard of 50 ppb in wells 299-E32-29 (71 ppb) and 299-E33-30 (68 ppb).

  - Iron exceeded its 40 CFR 143 standard of 300 ppb in wells 299-E32-4 (399 ppb), 299-E33-29 (697 ppb), and 299-E33-30 (310 ppb).

  - Tritium exceeded the 20,000-pCi/L standard (40 CFR 141) in samples from wells 299-E28-26 (122,000 pCi/L), 299-E28-27 (417,000 pCi/L), 299-E32-2 (220,000 pCi/L), and 299-E32-3 (652,700 pCi/L).

  - Nitrate exceeded the 45,000-ppb standard (40 CFR 141) in well 299-E32-3 (54,000 ppb).

9 2 1 2 6 4 2 1 6 6 0

- The standard of 1 nephelometric turbidity unit (NTU) (40 CFR 141) was exceeded in wells 299-E28-27 (2.2 NTU), 299-E32-2 (1.1 NTU), 299-E32-3 (1.5 NTU), 299-E32-4 (4.4 NTU), 299-E33-29 (6.4 NTU), and 299-E33-30 (2.1 NTU).

- Waste Management Area 2

  Note: Ground-water samples were not collected from well 299-E34-4 because this well is dry. Well 299-E34-2 was sampled in September and November; those values are also reported here.

  - Chromium exceeded the 50-ppb standard (40 CFR 141) in filtered and unfiltered samples from well 299-E34-2.

  - Iron exceeded the 300-ppb standard (40 CFR 143) in unfiltered samples from wells 299-E34-2 (930 and 948 ppb) and 299-E34-6 (2890 ppb). Filtered samples exceeded this standard in only one sample from well 299-E34-2 (1560 ppb).

  - Manganese exceeded the 50-ppb standard (40 CFR 143) in unfiltered samples from well 299-E34-6 (78 ppb).

  - The 1-NTU standard (40 CFR 141) was exceeded in wells 299-E27-8 (1.1 NTU), 299-E27-9 (1.6 NTU), 299-E27-10 (1.5 NTU), 299-E34-2 (11.2 and 5.0 NTU), and 299-E34-6 (24.0 NTU).

- Waste Management Area 3

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

  - Field and laboratory pH exceeded the standard of 8.5 (40 CFR 143) in samples from well 299-W7-6 (9.15 average and 8.7 average, respectively).

  - Gross alpha and total radium exceeded their respective 15-pCi/L and 5-pCi/L standards (40 CFR 141) in well 299-W7-6 (24.4 and 7.72 pCi/L, respectively).

  - Lead exceeded the 50-ppb standard (40 CFR 141) in well 299-W7-6 (104 ppb). This value is likely due to the high particulate content (see note above).

  - Nitrate exceed the 45-ppm standard (40 CFR 141) in samples from well 299-W7-4 (74 ppm).

- The 1-NTU standard (40 CFR 141) was exceeded in wells 299-W7-2 (1.2 NTU), 299-W7-3 (2.0 NTU), 299-W7-6 (>200 NTU), 299-W8-1 (1.3 NTU), 299-W9-1 (3.0 NTU), and 299-W10-13 (1.1 NTU).

- Coliform (membrane filter) exceeded the standard (40 CFR 141) in samples from well 299-W8-1 (84 MPN).

- Both filtered and unfiltered manganese exceeded the 50-ppb standard (40 CFR 143) in samples from well 299-W7-3 (150 and 154 ppb, respectively). Unfiltered manganese exceeded the standard in samples from well 299-W7-6 (501 ppb).

- Iron exceeded the 300-ppb standard (40 CFR 143) in samples from wells 299-W7-3 (409 ppb), 299-W7-6 (29,200 ppb), and 299-W9-1 (857 ppb).

- Ruthenium-106 may have exceeded the 30-pCi/L standard (EPA 1976) in wells 299-W7-2, 299-W7-5, 299-W10-13, and 299-W10-14.

- Tetrachloromethane (carbon tetrachloride) exceeded the 5-ppb standard (40 CFR 141) in samples from wells 299-W6-2 (113 ppb), 299-W7-4 (189 ppb), 299-W7-5 (29 ppb), and 299-W10-13 (10 and 12 ppb).

- <u>Waste Management Area 4</u>

  Note: Ground-water samples were collected from well 299-W15-17 using a teplon-bailer; thus, quadruplicate indicator parameter samples were not collected, and no filtered samples were collected.

  - Gross alpha exceeded the 15-pCi/L standard (40 CFR 141) in well 299-W18-21 (21.5 pCi/L).

  - Cadmium exceeded the 10-ppb standard (40 CFR 141) in well 299-W15-17 (49 ppb).

  - Chromium exceeded the 50-ppb standard (40 CFR 141) in unfiltered samples from wells 299-W15-16 (142 ppb), 299-W15-17 (85 ppb), 299-W18-21 (55 ppb), 299-W18-22 (106 ppb), and 299-W18-23 (68 ppb).

  - Lead exceeded the 50-ppb standard (40 CFR 141) in well 299-W15-17 (82 ppb).

  - Manganese exceeded the 50-ppb standard (40 CFR 143) in unfiltered samples from well 299-W15-17 (109 ppb).

  - Nitrate exceeded the 45-ppm standard (40 CFR 141) in samples from wells 299-W15-16 (67 ppm) and 299-W15-18 (72 ppm).

9 2 1 2 6 4 2 1 6 6 2

- Ruthenium-106 may have exceeded the 30-pCi/L standard (EPA 1976) in wells 299-W15-16 and 299-W15-17.

- The 1-NTU standard (40 CFR 141) was exceeded in wells 299-W15-15 (2.1 NTU), 299-W15-16 (1.7 NTU), 299-W15-17 (27 NTU), 299-W15-18 (3.2 NTU), 299-W18-21 (2.1 NTU), 299-W18-22 (3.6 NTU), and 299-W18-23 (1.8 NTU).

- Iron exceeded the 300-ppb standard (40 CFR 143) in samples from wells 299-W15-16 (666 ppb), 299-W15-17 (4150 ppb), 299-W15-18 (363 ppb), 299-W18-21 (431 ppb), 299-W18-22 (905 ppb), and 299-W18-23 (318 ppb).

- Tritium exceeded the 20,000-pCi/L standard (40 CFR 141) in samples from well 299-W15-16 (33,700 pCi/L).

- Tetrachloromethane (carbon tetrachloride) exceeded the 5-ppb standard (40 CFR 141) in samples from wells 299-W15-15 (543 ppb), 299-W15-16 (7100 ppb), 299-W15-18 (189 ppb), 299-W18-21 (138 ppb), 299-W18-23 (611 ppb), and 299-W18-24 (737 ppb).

- 1,1,2-trichloroethene exceeded the 5-ppb standard (40 CFR 141) in samples from well 299-W15-16 (7 ppb).

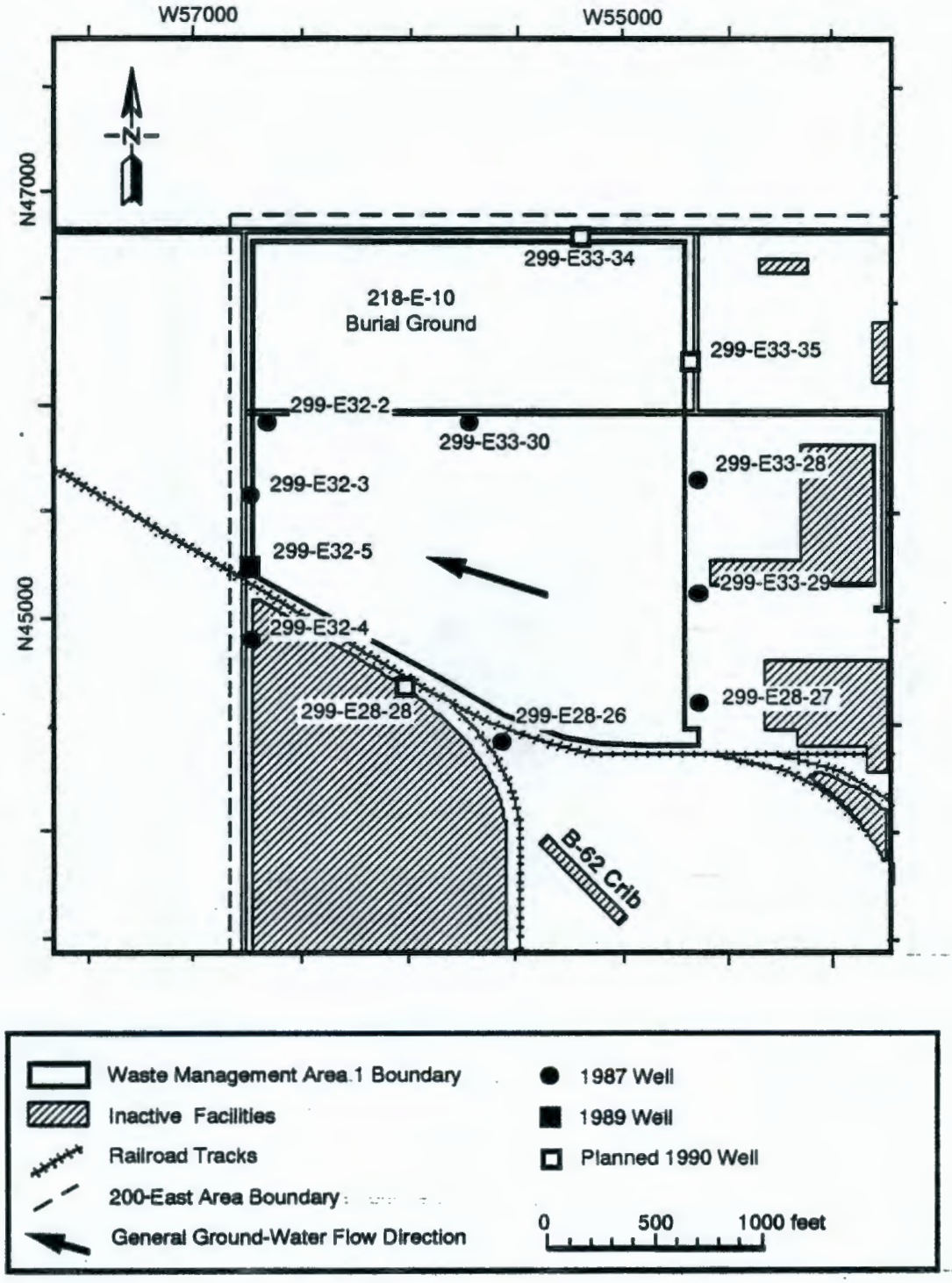

FIGURE 4.1. Monitoring Well Locations for Waste Management Area 1, 200-East Area

9 2 1 2 6 4 2 1 6 6 4

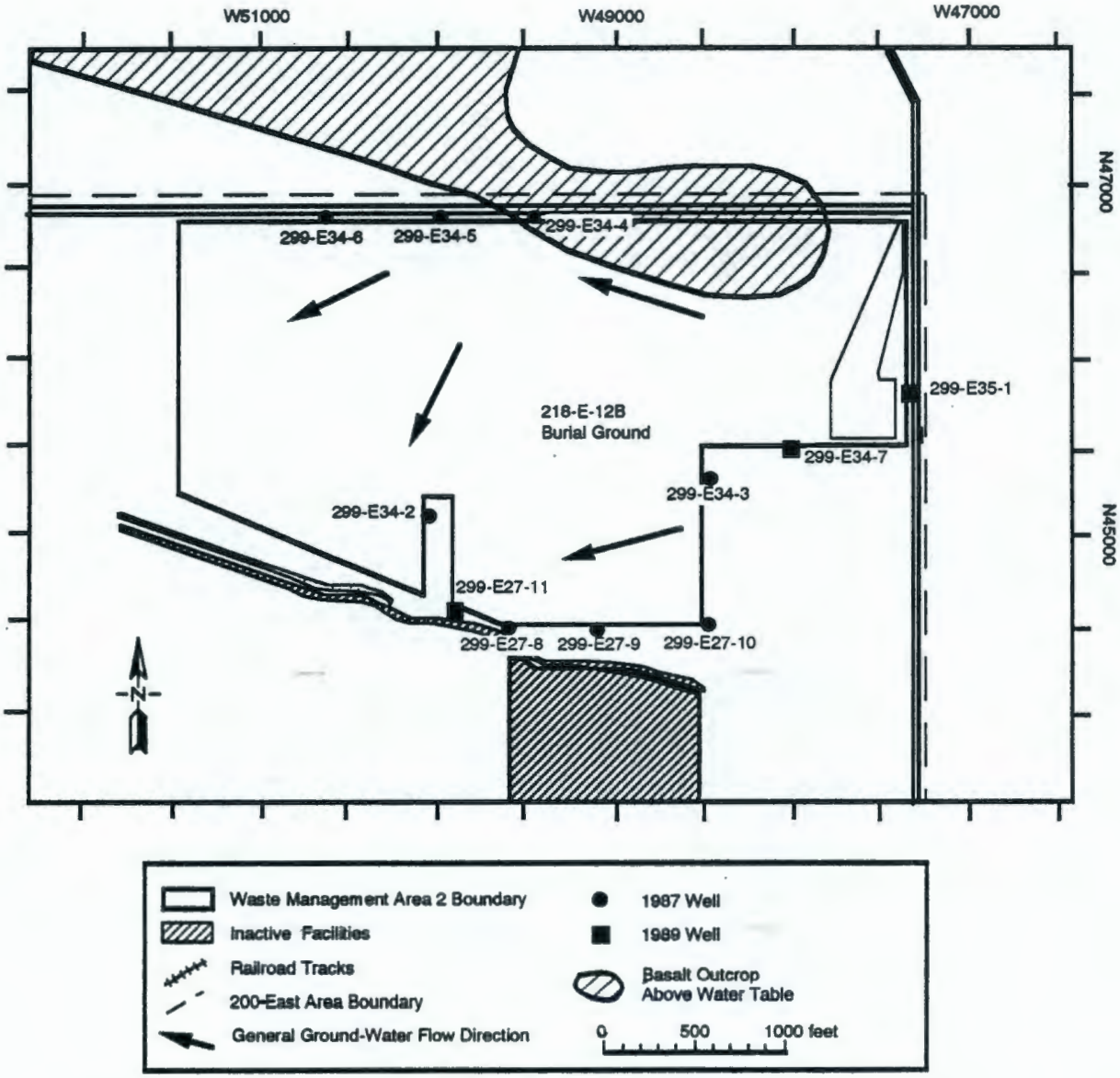

FIGURE 4.2. Monitoring Well Locations for Waste Management Area 2, 200-East Area

9 2 1 2 6 4 2 1 6 6 5

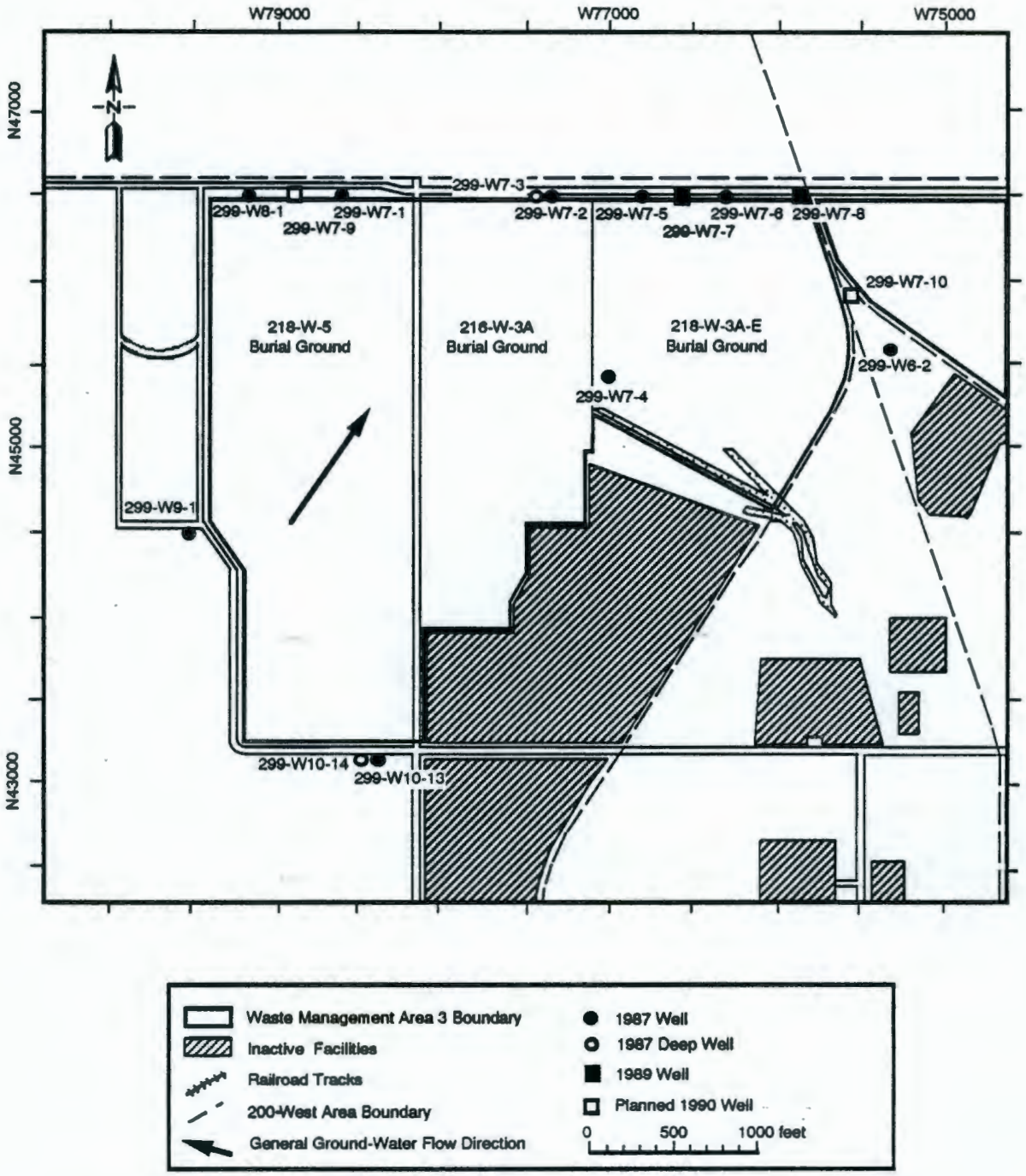

FIGURE 4.3. Monitoring Well Locations for Waste Management Area 3, 200-West Area

9 2 1 2 6 4 2 1 6 6 6

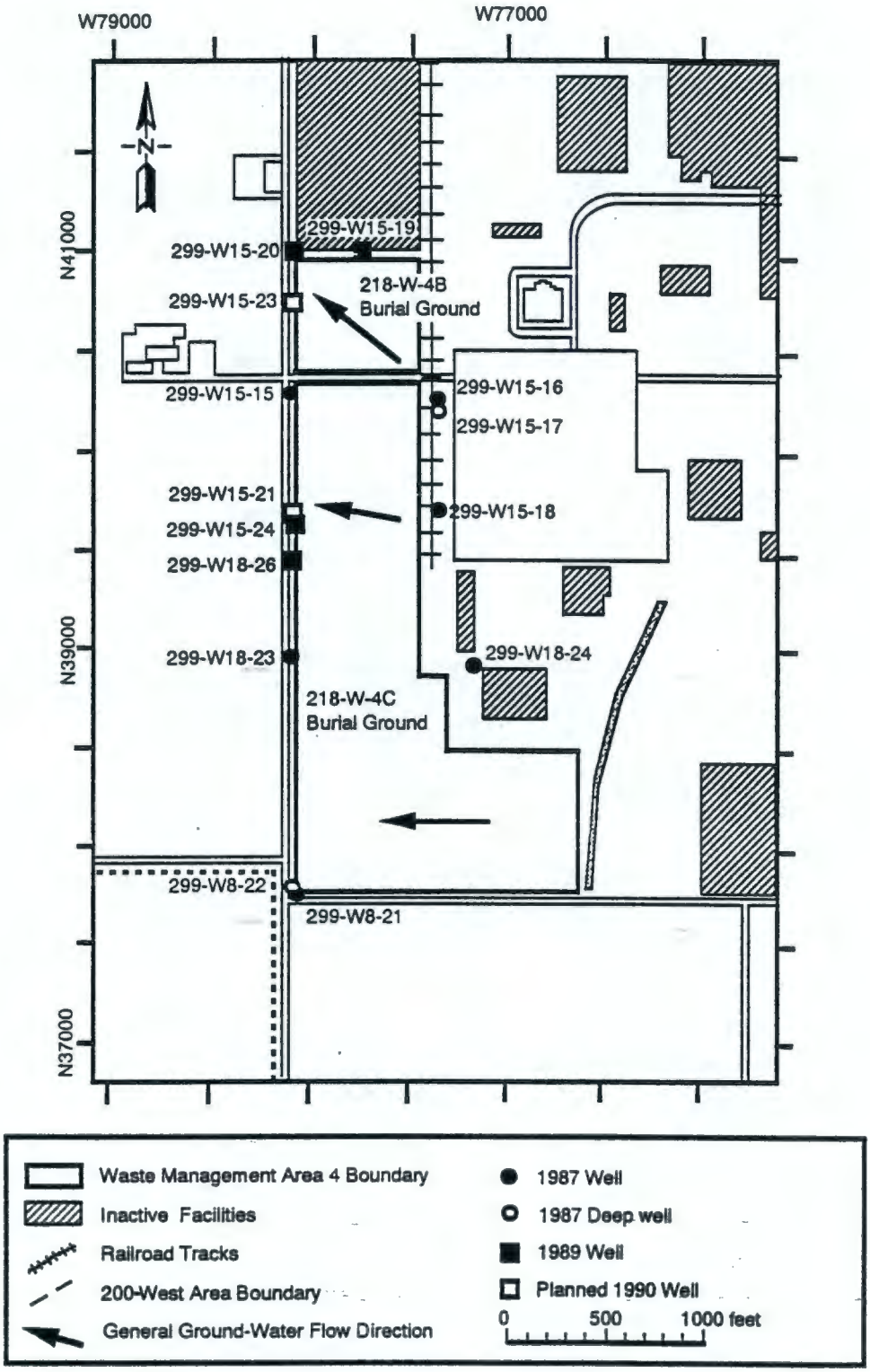

FIGURE 4.4. Monitoring Well Locations for Waste Management Area 4, 200-West Area

9 2 1 2 6 4 2 1 6 6 7

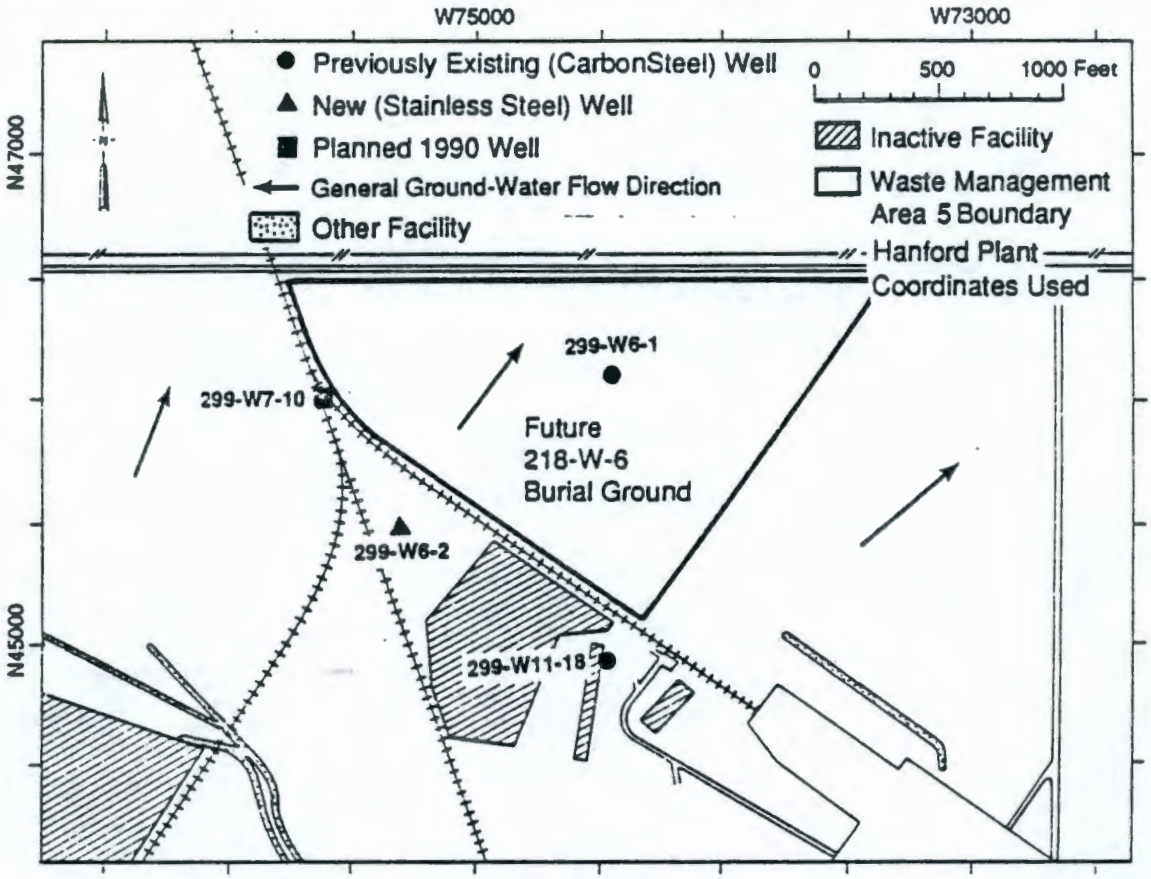

FIGURE 4.5. Monitoring Well Locations for Waste Management Area 5, 200-West Area

9 2 1 2 6 4 2 1 6 6 8

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	WMA-5
Shallow Wells (Top of Aquifer)	299-E28-27 299-E33-28 299-E33-29	299-E27-10 299-E34-3	299-W9-1 299-W10-13	299-W15-16 299-W15-18 299-W18-24	299-W6-2[a]
Deep Wells (Bottom of Aquifer)	None	None	299-W10-14	299-W15-17	None
Downgradient Wells					
Shallow Wells (Top of Aquifer)	299-E28-26 299-E32-2 299-E32-3 299-E32-4 299-E33-30	299-E27-8 299-E27-9 299-E34-2 299-E34-4[b] 299-E34-5 299-E34-6	299-W6-2[a] 299-W7-1 299-W7-2 299-W7-4 299-W7-5 299-W7-6 299-W8-1	299-W15-15 299-W18-21 299-W18-23	None
Deep Wells (Bottom of Aquifer)	None	None	299-W7-3	299-W18-22	None

(a) Common well.
(b) Well is dry.

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

	1989[a]			1990								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E26-1						X				X		
299-E27-8						X				X		
299-E27-9						X				X		
299-E27-10						X				X		
299-E27-11						X				L		
299-E28-26				L						X		
299-E28-27				X			X			X		
299-E32-1				X			X			X		
299-E32-2				X			X			X		
299-E32-3				X			X			X		
299-E32-4				X			X			X		
299-E32-5				X			X			L		
299-E33-28				X			X			X		
299-E33-29				X			X			X		
299-E33-30				X			X			X		
299-E34-2	L*					X				X		
299-E34-3						X				X		
299-E34-4						X				X		
299-E34-5						X				X		
299-E34-6						X				X		
299-E34-7						X				L		
299-E35-1						X				L		
299-W6-1						X				X		
299-W6-2				X			X			X		
299-W7-1				X			X			X		
299-W7-2				X			X			X		
299-W7-3				XRV			X			X		
299-W7-4				L						X		
299-W7-5				L						X		
299-W7-6				X			X			X		
299-W7-7				X			X			L		
299-W7-8				X			X			L		
299-W8-1				L						X		
299-W9-1				X			X			X		
299-W10-13				L						X		
299-W10-14				X			X			X		
299-W15-15						X				X		
299-W15-16						X				X		
299-W15-17						X				X		
299-W15-18						X				X		
299-W15-19						X				L		
299-W15-20						X				L		
299-W15-24						X				X		
299-W18-21						X				X		
299-W18-22						X				X		
299-W18-23						XRV				X		
299-W18-24						X				X		
299-W18-26						X				L		

(a) The following notations are used in this table:
L = sampled for the long list of constituents (WAC 173-303-9905).
R = sampled for quality control replicates.
V = sampled for volatile organic analyses blanks.
X = sampled for the constituents listed in Tables 4.6, 4.8, 4.10, and 4.12.
* = sampled for the liquid effluent study (see Section 1.0, Introduction).

9 2 1 2 6 4 2 1 6 7 0

TABLE 4.3. 1989 Drilling Summary for the 200 Areas Low-Level Burial Ground Wells[a]

Well Number	Former Number	Drilling Information: Start Date	End Date	Total Depth, ft	Completion Information: Screened Interval, ft	Screen Slot Size, in.	Screen Type[b]	Comments
WMA-1								
299-E28-28	E10-MW1	01/02/90	--[c]	--	--	--	--	--
299-E32-5	E10-MW2	09/27/89	10/19/89	292	270-291	10	C	--
299-E33-34	E10-MW7	01/02/90	--	--	--	--	--	--
299-E33-35	E10-MW8	01/02/90	--					
WMA-2								
299-E27-11	E12-MW8	06/27/89	07/21/89	265	232-252	10	C	Basalt at 262'
299-E34-7	E12-MW9	08/04/89	08/21/89	206	194-204	10	S	Basalt at 205'
299-E35-1	E12-MW10	08/07/89	08/25/89	195	182-192	20	S	Basalt at 192'
WMA-3								
299-W7-7	W3-MW2	10/23/89	11/15/89	230	207-228	10	C	--
299-W7-8	W3-MW3	10/20/89	11/16/89	244	220-241	10	C	--
299-W7-9	W5-MW1	10/03/89	11/09/89	252	219-241	10	C	--
299-W7-10	W3-MW4	12/18/89	--	--	--	--		--
WMA-4								
299-W15-19	W4-MW1	08/09/89	09/01/89	245	215-236	10	C	--
299-W15-20	W4-MW2	09/27/89	10/12/89	245	220-241	10	C	Shoe off @ 60'
299-W15-21	W4-MW4	09/05/89	09/27/89	245	--	10	C	Waiting for remediation
299-W15-23	W4-MW3	11/21/89	12/19/89	240	218-239	10	C	--
299-W15-24	W4-MW4a	11/20/89	12/06/89	242	220-241	10	C	Replacement well
299-W18-26	W4-MW5	09/11/89	09/26/89	245	222-243	10	C	Shoe off @ 220'

(a) Only well 299-E27-11 was developed this quarter. Development information will be reported in future quarterly reports.
(b) S = standard pipe size; C = channel pack.
(c) No data available this quarter.

TABLE 4.4. Monthly Water-Level Data for Wells Near the Low-Level Burial Grounds

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E27-8	637.83	10/20/89	232.86	404.97
		11/15/89	233.06	404.77
		12/18/89	233.15	404.68
299-E27-9	629.21	10/20/89	224.07	405.14
		11/15/89	224.32	404.89
		12/13/89	224.38	404.83
		12/18/89	224.40	404.81
299-E27-10	624.47	10/20/89	218.96	405.51
		11/15/89	219.19	405.28
		12/18/89	NM[b]	
299-E28-26	687.26	10/20/89	282.52	404.74
		11/15/89	282.70	404.56
		12/18/89	282.77	404.49
299-E28-27	680.37	10/20/89	275.77	404.60
		11/15/89	275.85	404.52
		12/13/89	275.93	404.44
		12/18/89	275.94	404.43
299-E32-2	670.06	10/20/89	265.62	404.44
		11/15/89	265.71	404.35
		12/13/89	265.79	404.27
		12/18/89	265.81	404.25
299-E32-3	676.51	10/20/89	271.98	404.53
		11/15/89	272.08	404.43
		12/18/89	272.19	404.32
299-E32-4	685.88	10/20/89	281.43	404.45
		11/15/89	281.57	404.31
		12/18/89	281.67	404.21
299-E33-28	664.23	10/20/89	259.57	404.66
		11/15/89	259.66	404.57
		12/18/89	259.75	404.48
299-E33-29	673.77	10/20/89	269.12	404.65
		11/15/89	269.22	404.55
		12/18/89	269.31	404.46

9 2 1 2 6 4 2 1 6 7 2

TABLE 4.4. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E33-30	663.70	10/20/89	259.05	404.65
		11/15/89	259.17	404.53
		12/18/89	259.26	404.44
299-E34-2	630.80	10/20/89	225.83	404.97
		11/15/89	226.06	404.74
		12/13/89	226.10	404.70
		12/18/89	226.12	404.68
299-E34-3	611.52	10/20/89	206.00	405.52
		11/15/89	206.19	405.33
		12/18/89	NM	
299-E34-4	587.56	10/20/89	Dry	--
		11/15/89	Dry	--
		12/18/89	Dry	--
299-E34-5	590.79	10/20/89	185.04	405.75
		11/15/89	185.15	405.64
		12/18/89	185.21	405.58
299-E34-6	597.83	10/20/89	192.90	404.93
		11/15/89	193.15	404.68
		12/18/89	193.19	404.64
299-W6-2	692.45	10/20/89	230.72	461.73
		11/15/89	231.19	461.26
		12/18/89	231.00	461.45
299-W7-1	690.71	10/20/89	229.09	461.62
		11/15/89	229.63	461.08
		12/18/89	229.40	461.31
299-W7-2	675.59	10/20/89	214.95	460.64
		11/15/89	215.36	460.23
		12/18/89	215.21	460.38
299-W7-3	676.14	10/20/89	216.69	459.45
		11/15/89	217.22	458.92
		12/18/89	216.98	459.16
299-W7-4	671.69	10/20/89	208.85	462.84
		11/15/89	209.13	462.56
		12/18/89	209.08	462.61

TABLE 4.4. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-W7-5	673.03	10/20/89	212.83	460.20
		11/15/89	213.25	459.78
		12/18/89	213.08	459.95
299-W7-6	678.64	10/20/89	218.52	460.12
		11/15/89	218.97	459.67
		12/18/89	218.78	459.86
299-W8-1	701.33	10/20/89	239.28	462.05
		11/15/89	239.93	461.40
		12/18/89	239.64	461.69
299-W9-1	737.73	10/20/89	272.65	465.08
		11/15/89	273.33	464.40
		12/18/89	273.01	464.72
299-W10-13	699.04	10/20/89	232.53	466.51
		11/15/89	233.15	465.89
		12/18/89	232.90	466.14
299-W10-14	699.43	10/20/89	233.30	466.13
		11/15/89	233.97	465.46
		12/18/89	233.69	465.74
299-W15-15	697.96	10/20/89	228.93	469.03
		11/15/89	229.61	468.35
		12/18/89	229.35	468.61
299-W15-16	684.89	10/20/89	214.97	469.92
		11/15/89	215.63	469.26
		12/18/89	215.41	469.48
299-W15-17	684.64	10/20/89	215.17	469.47
		11/15/89	215.86	468.78
		12/18/89	215.60	469.04
299-W15-18	685.71	10/20/89	215.48	470.23
		11/15/89	216.15	469.56
		12/18/89	215.91	469.80
299-W18-21	668.62	10/20/89	199.30	469.32
		11/15/89	200.03	468.59
		12/18/89	199.76	468.86

9 2 1 2 6 4 2 1 6 7 4

TABLE 4.4. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-W18-22	668.49	10/20/89	200.01	468.48
		11/15/89	200.82	467.67
		12/18/89	200.45	468.04
299-W18-23	696.81	10/20/89	227.48	469.33
		11/15/89	228.20	468.61
		12/18/89	227.95	468.86
299-W18-24	684.35	10/20/89	213.88	470.47
		11/15/89	214.51	469.84
		12/18/89	214.31	470.04

(a) MSL = mean sea level.
(b) NM = no measurement could be made.

TABLE 4.5. Water-Level Data Collected Before Sampling from Wells Near the Low-Level Burial Grounds

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E28-26	687.26	11/07/89	282.78	404.48
		11/30/89	282.72	404.54
299-E34-2	630.80	11/27/89	226.18	404.62
299-W7-4	671.69	11/20/89	209.04	462.65
299-W7-5	673.03	11/20/89	213.42	459.61
299-W8-1	701.33	11/20/89	231.59	469.74
299-W10-13	699.04	11/20/89	232.87	466.17

(a) MSL = mean sea level.

9 2 1 2 6 4 2 1 6 7 6

TABLE 4.6. Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-1 September Through December 1989

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
088	CONDLAB	UMHO	.	36	0	700	WDOE		Conductivity, Laboratory
191	CONDFLD	UMHO	1	37	0	700	WDOE		Specific conductance
199	PHFIELD		.100	37	0	6.5-8.5	EPAS		pH, Field Measurement
207	PH-LAB		.0100	36	0	6.5-8.5	EPAS		pH, Laboratory Measurement
C69	TOC	PPB	2000	36	36 ***	.			Total organic carbon
H42	TOXLDL	PPB	10	36	34	.			Total Organic Halogen, Low Det. Level

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
109	COLIFRM	MPN	2.20	2	2 ***	1	EPA		Coliform bacteria
111	BETA	PCI/L	8	9	0	50	EPA		Gross beta
112	ALPHAHI	PCI/L	4	9	1	15	EPA		Alpha, High Detection Level
181	RADIUM	PCI/L	1	9	5	5	EPA		Radium
A06	BARIUM	PPB	6	9	0	1000	EPA		Barium
A07	CADMIUM	PPB	2	9	9 ***	10	EPA		Cadmium
A08	CHROMUM	PPB	10	9	0	50	EPA	xxx	Chromium
A10	SILVER	PPB	10	9	9 ***	50	EPA		Silver
A20	ARSENIC	PPB	5	9	2	50	EPA		Arsenic
A21	MERCURY	PPB	.100	8	8 ***	2	EPA		Mercury
A22	SELENUM	PPB	5	9	8	10	EPA		Selenium
A33	ENDRIN	PPB	.100	9	9 ***	.200	EPA		Endrin
A34	METHLOR	PPB	3	9	9 ***	100	EPA		Methoxychlor
A35	TOXAENE	PPB	1	9	9 ***	5	EPA		Toxaphene
A36	a-BHC	PPB	.100	9	9 ***	4	EPA		Alpha-BHC
A37	b-BHC	PPB	.100	9	9 ***	4	EPA		Beta-BHC
A38	g-BHC	PPB	.100	9	9 ***	4	EPA		Gamma-BHC
A39	d-BHC	PPB	.100	9	9 ***	4	EPA		Delta-BHC
A51	LEADGF	PPB	5	9	8	50	EPA		Lead (graphite furnace)
C72	NITRATE	PPB	500	9	0	45000	EPA	xxx	Nitrate
C74	FLUORID	PPB	500	9	4	4000	EPA		Fluoride
H13	2,4-D	PPB	2	9	9 ***	100	EPA		2,4-D
H14	2,4,5TP	PPB	2	9	9 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	PPB	6	9	0	1000	EPA		Barium, filtered
H21	FCADMIU	PPB	2	9	9 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	PPB	10	9	9 ***	50	EPA		Chromium, filtered
H23	FSILVER	PPB	10	9	9 ***	50	EPA		Silver, filtered
H37	FARSENI	PPB	5	9	3	50	EPA		Arsenic, filtered

TABLE 4.6. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
H38	FMERCUR	PPB	.100	8	8 ***	2	EPA		Mercury, filtered
H39	FSELENI	PPB	5	9	9 ***	10	EPA		Selenium, filtered
H41	FLEAD	PPB	5	9	8	50	EPA		Lead, filtered
H60	TURBID	NTU	.100	8	0	1	EPA	xxx	Turbidity
P19	COLIMF	PPB	1	7	7 ***	1	EPA		Coliform (Membrane Filter)

---------- 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	9	0	.			Sodium
A17	MANGESE	PPB	5	9	6	50	EPAS		Manganese
A19	IRON	PPB	30	9	0	300	EPAS	xxx	Iron
C73	SULFATE	PPB	500	9	0	250000	EPAS		Sulfate
C75	CHLORID	PPB	500	9	0	250000	EPAS		Chloride
H24	FSODIUM	PPB	200	9	0	.			Sodium, filtered
H29	FMANGAN	PPB	5	9	9 ***	50	EPAS		Manganese, filtered
H31	FIRON	PPB	30	9	5	300	EPAS		Iron, filtered
H57	LPHENOL	PPB	10	9	9 ***	.			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	8	7	100	EPAR		Cobalt-60
024	CS-137	PCI/L	20	8	7	200	EPAR		Cesium-137
034	RU-106	PCI/L	172.5	8	8 ***	30	EPAR		Ruthenium-106
104	U	PCI/L	.500	9	0	600	DOE		Uranium
108	TRITIUM	PCI/L	500	8	0	20000	EPA	xxx	Tritium
121	SR 90	PCI/L	5	8	8 ***	8	EPA		Strontium-90
197	TC-99	PCI/L	15	8	0	900	EPAR		Technetium-99
A01	BERYLUM	PPB	5	9	8	.			Beryllium
A03	STRONUM	PPB	10	9	0	.			Strontium
A04	ZINC	PPB	5	9	4	5000	EPAS		Zinc
A05	CALCIUM	PPB	50	9	0	.			Calcium
A12	NICKEL	PPB	10	9	0	.			Nickel
A13	COPPER	PPB	10	9	9 ***	1300	EPAP		Copper
A14	VANADUM	PPB	5	9	0	.			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

TABLE 4.6. (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	9	9 ***	.		Phosphate
H16	TC	PPB	1000	8	0	.		Total carbon
H18	FZINC	PPB	5	9	6	5000	EPAS	Zinc, filtered
H19	FCALCIU	PPB	50	9	0	.		Calcium, filtered
H25	FNICKEL	PPB	10	9	3	.		Nickel, filtered
H26	FCOPPER	PPB	10	9	9 ***	1300	EPAP	Copper, filtered
H27	FVANADI	PPB	5	9	0	.		Vanadium, filtered
H28	FALUMIN	PPB	150	9	9 ***	.		Aluminum, filtered
H30	FPOTASS	PPB	100	9	0	.		Potassium, filtered
H32	FMAGNES	PPB	50	9	0	.		Magnesium, filtered
H33	FBERYLL	PPB	5	9	9 ***	.		Beryllium, filtered
H35	FSTRONT	PPB	10	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	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	9	0	.		Boron
P02	COBALT	PPB	20	9	9 ***	.		Cobalt
P03	LITHIUM	PPB	10	9	9 ***	.		Lithium
P04	MOLY	PPB	40	9	9 ***	.		Molybdenum
P05	SILICON	PPB	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 ----------

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full Name
A61	TETRANE	PPB	5	9	9 ***	5	EPA	Carbon Tetrachloride by GC/MS
A62	BENZENE	PPB	5	9	9 ***	5	EPA	Benzene
A64	METHONE	PPB	10	9	8	.		Methyl ethyl ketone
A66	TOLUENE	PPB	5	9	9 ***	2000	EPAP	Toluene
A67	1,1,1-T	PPB	5	9	9 ***	200	EPA	1,1,1-trichloroethane
A68	1,1,2-T	PPB	5	9	9 ***	.		1,1,2-trichloroethane
A69	TRICENE	PPB	5	9	9 ***	5	EPA	Trichloroethylene

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
A70	PERCENE	PPB	5	9	9 ***	.		Tetrachloroethylene
A71	OPXYLE	PPB	5	9	9 ***	440	EPAP	Xylene-o,p
A80	CHLFORM	PPB	5	9	9 ***	100	EPA	Chloroform
A89	1,1-DIC	PPB	5	9	9 ***	.		1,1-dichloroethane
A90	1,2-DIC	PPB	5	9	9 ***	5	EPA	1,2-dichloroethane
A91	TRANDCE	PPB	5	9	9 ***	70	EPAP	Trans-1,2-dichloroethene
A93	METHYCH	PPB	5	9	9 ***	.		Methylene Chloride
B13	VINYIDE	PPB	10	9	9 ***	2	EPA	Vinyl chloride
B14	M-XYLE	PPB	5	9	9 ***	440	EPAP	Xylene-m
C70	CYANIDE	PPB	10	9	9 ***	.		Cyanide
C80	AMMONIU	PPB	50	9	8	.		Ammonium ion
H15	2,4,5-T	PPB	2	9	9 ***	.		2,4,5-T
H68	HEXONE	PPB	10	9	9 ***	.		Methyl Isobutyl Ketone
I01	ACETONE	PPB	10	9	9 ***	.		Acetone by VOA
I28	TAF	PPB	10	9	9 ***	.		Tetrahydrofuran
L63	14DBEN	PPB	5	9	9 ***	75	EPA	p-Dichlorobenzene

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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-1 September Through December 1989

			Contamination Indicator Parameters					
Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
2-E28-26	07SEP89		512	488	7.60	7.53	#500	#-1
	07SEP89	1	510	489	7.60	7.54	#400	#-2
	07SEP89	2	512	488	7.60	7.50	#500	#6
	07SEP89	3	510	488	7.60	7.50	#600	#-3
	07NOV89		519	513	7.50	7.68	#400	#5
	07NOV89	1	.	516	7.50	.	#400	#1
	07NOV89	2	.	513	7.60	.	#400	#4
	07NOV89	3	.	512	7.60	.	#300	#6
	30NOV89		572	.	.	7.54	.	.
	30NOV89	1	573	.	.	7.53	.	.
	30NOV89	2	575	.	.	7.50	.	.
	30NOV89	3	577	.	.	7.49	.	.
2-E28-27	07SEP89		332	322	8.10	8.01	#600	#7
	07SEP89	1	335	321	8.10	8	#700	#3
	07SEP89	2	335	320	8.10	8	#500	#-2
	07SEP89	3	332	318	8.10	8	#500	#8
2-E32-2	06SEP89		314	303	8	7.92	#500	#4
	06SEP89	1	313	304	8	7.91	#500	#4
	06SEP89	2	315	306	8	7.91	#500	#1
	06SEP89	3	314	306	8	7.91	#500	#9
2-E32-3	06SEP89		445	416	7.80	7.18	#400	#3
	06SEP89	1	445	416	7.80	7.19	#400	#6
	06SEP89	2	443	416	7.70	7.24	#500	#8
	06SEP89	3	446	416	7.80	7.27	#500	#7
2-E32-4	08SEP89		447	427	7.90	7.72	#700	#2
	08SEP89	1	445	425	7.90	7.69	#1000	#4
	08SEP89	2	447	429	7.90	7.68	#1000	#3
	08SEP89	3	447	425	7.90	7.68	#500	#4
2-E33-28	12SEP89		274	275	8	7.70	#800	#8
	12SEP89	1	274	272	8	7.70	#600	#1
	12SEP89	2	274	273	8	7.69	#600	#7
	12SEP89	3	274	273	8	7.69	#600	#5
2-E33-29	07SEP89		301	300	8.10	8.04	#500	#8
	07SEP89	1	298	301	8.10	8.04	#500	10
	07SEP89	2	299	301	8.10	8.04	#400	#3
	07SEP89	3	298	301	8.10	8.03	#500	#5
2-E33-30	07SEP89		302	304	8.10	8.12	#500	#2
	07SEP89	1	301	305	8.10	8.10	#500	#6
	07SEP89	2	299	303	8.10	8.09	#600	13
	07SEP89	3	297	302	8.10	8.09	#600	#6

TABLE 4.7. (contd)

Regular Monitoring Data

Well name	Collection date	Duplicate sample number	FLUORID PPB 500/4000	FLEAD PPB 5/50	FPOTASS PPB 100/.	FSTRONT PPB 10/.	ACETONE PPB 10/.	ALPHAHI PCI/L 4/15	AMMONIU PPB 50/.	ARSENIC PPB 5/50
2-E28-26	07SEP89		700	<5	5280	255	<10	14.8	97	<5
2-E28-27	07SEP89		600	<5	6050	165	<10	2.58	<50	6
2-E32-2	06SEP89		600	<5	5740	142	<10	2.86	<50	6
2-E32-3	06SEP89		600	<5	5560	209	<10	8.07	<50	5
2-E32-4	08SEP89		600	<5	6250	212	<10	3	<50	<5
2-E33-28	12SEP89		<500	<5	5210	138	#5	2.62	<50	7
	12SEP89	1	<500	8	5170	135	<10	*.952	<50	8
2-E33-29	07SEP89		<500	<5	5690	152	<10	1.76	<50	7
2-E33-30	07SEP89		<500	<5	5730	148	<10	1.29	<50	7

Well name	Collection date	Duplicate sample number	FARSENI PPB 5/50	BARIUM PPB 6/1000	FBARIUM PPB 6/1000	BERYLUM PPB 5/.	BETA PCI/L 8/50	BORON PPB 10/.	FBORON PPB 10/.	CALCIUM PPB 50/.
2-E28-26	07SEP89		<5	37	40	<5	10.9	114	125	58400
2-E28-27	07SEP89		7	43	45	<5	17.7	32	31	28400
2-E32-2	06SEP89		6	32	33	<5	21	21	21	26500
2-E32-3	06SEP89		<5	47	49	<5	13.8	110	110	44600
2-E32-4	08SEP89		<5	81	71	10	6.57	23	24	42800
2-E33-28	12SEP89		7	35	31	<5	14.5	14	14	27300
	12SEP89	1	7	36	32	<5	17.1	19	10	26900
2-E33-29	07SEP89		7	40	38	<5	10.3	19	19	26600
2-E33-30	07SEP89		6	25	27	<5	12.6	27	16	28200

Well name	Collection date	Duplicate sample number	FCALCIU PPB 50/.	CHLORID PPB 500/250000s	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
2-E28-26	07SEP89		59300	9000	44	*1.24	*-0.745	192	51	<5
2-E28-27	07SEP89		29600	5400	41	*2.02	*2.25	296	<30	<5
2-E32-2	06SEP89		26200	8000	41	6.06	*-1.50	226	<30	<5
2-E32-3	06SEP89		44900	6300	36	*4.26	5.41	170	46	<5
2-E32-4	08SEP89		38200	9000	43	*4.36	*1.89	399	<30	6
2-E33-28	12SEP89		26300	8000	24	*-4.34	*-2.86	137	<30	<5
	12SEP89	1	26000	7000	26	.	.	156	<30	<5
2-E33-29	07SEP89		27200	18000	71	*-1.45	*4.47	697	50	<5
2-E33-30	07SEP89		27800	17000	68	*-1.82	*-4.51	310	32	<5

TABLE 4.7. (contd)

Well name	Collection date	Duplicate sample number	MAGNES PPB 50/.	FMAGNES PPB 50/.	MANGESE PPB 5/50s	METHONE PPB 10/.	NICKEL PPB 10/.	FNICKEL PPB 10/.	NITRATE PPB 500/45000	POTASUM PPB 100/.
2-E28-26	07SEP89		14300	14600	<5	<10	28	14	43000	5180
2-E28-27	07SEP89		8810	9350	<5	#9	33	18	29000	5660
2-E32-2	06SEP89		8210	8260	<5	<10	29	<10	21600	5730
2-E32-3	06SEP89		10800	11000	<5	<10	26	16	54000	5490
2-E32-4	08SEP89		13600	12200	13	<10	19	12	24500	6950
2-E33-28	12SEP89		8320	7980	<5	<10	12	<10	4100	5410
	12SEP89	1	8260	7930	<5	<10	21	<10	4100	5490
2-E33-29	07SEP89		8380	8800	10	10	40	13	6900	5420
2-E33-30	07SEP89		8840	8870	6	<10	40	12	6800	5640

Well name	Collection date	Duplicate sample number	RADIUM PCI/L 1/5	RU-106 PCI/L 172.5/30r	SELENUM PPB 5/10	SILICON PPB 50/.	FSILICO PPB 50/.	SODIUM PPB 200/.	FSODIUM PPB 200/.	SR 90 PCI/L 5/8
2-E28-26	07SEP89		.325	*-37.3	6	18800	19300	25600	26300	*-0.318
2-E28-27	07SEP89		*.126	*-25	<5	19900	20900	24000	25800	*.283
2-E32-2	06SEP89		.382	*-18.8	<5	19500	19500	23200	23500	*.317
2-E32-3	06SEP89		.303	*-89.4	<5	20000	20400	26200	27000	*.252
2-E32-4	08SEP89		*.101	*17	<5	18800	16500	29100	26300	*-0.353
2-E33-28	12SEP89		*.0239	*-26.1	<5	18500	17700	14700	14100	*-0.361
	12SEP89	1	*.0227	.	<5	18300	17600	14700	14000	.
2-E33-29	07SEP89		.279	*24.9	<5	18200	18800	18500	19800	*.405
2-E33-30	07SEP89		*.0446	*-18.7	<5	18800	18700	18700	18900	*-0.544

Well name	Collection date	Duplicate sample number	STRONUM PPB 10/.	SULFATE PPB 500/250000s	TC PPB 1000/.	TC-99 PCI/L 15/900r	TRITIUM PCI/L 500/20000	TURBID NTU .10/1	U PCI/L .50/600d	VANADUM PPB 5/.
2-E28-26	07SEP89		247	81000	29600	14.4	122000	.900	25	15
2-E28-27	07SEP89		153	34000	22200	99.3	417000	2.20	3.37	11
2-E32-2	06SEP89		142	31000	22100	98.8	220000	1.10	2.37	16
2-E32-3	06SEP89		203	54000	24900	59.8	652000	1.50	11.4	18
2-E32-4	08SEP89		238	62000	29000	13.8	320	4.40	2.19	22
2-E33-28	12SEP89		143	25900	23000	66	3290	1	1.59	23
	12SEP89	1	141	25900	.	.	.	.	1.45	23
2-E33-29	07SEP89		144	27600	22400	48.7	6880	6.40	1.36	21
2-E33-30	07SEP89		146	29300	22600	49.7	6740	2.10	1.54	19

TABLE 4.7. (contd)

Well name	Collection date	Duplicate sample number	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000s
2-E28-26	07SEP89		18	<5	<5
2-E28-27	07SEP89		19	<5	<5
2-E32-2	06SEP89		22	<5	<5
2-E32-3	06SEP89		19	<5	<5
2-E32-4	08SEP89		18	9	9
2-E33-28	12SEP89		20	19	10
	12SEP89	1	21	107	19
2-E33-29	07SEP89		17	6	<5
2-E33-30	07SEP89		19	6	<5

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
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 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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

TABLE 4.8. Constituents List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-2 September Through November 1989

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
088	CONDLAB	UMHO	.	29	0	700	WDOE		Conductivity, Laboratory
191	CONDFLD	UMHO	1	29	0	700	WDOE		Specific conductance
199	PHFIELD		.100	29	0	6.5-8.5	EPAS		pH, Field Measurement
207	PH-LAB		.0100	29	0	6.5-8.5	EPAS		pH, Laboratory Measurement
C69	TOC	PPB	2000	29	29 ***	.			Total organic carbon
H42	TOXLDL	PPB	10	29	29 ***	.			Total Organic Halogen, Low Det. Level

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
109	COLIFRM	MPN	2.20	3	3 ***	1	EPA		Coliform bacteria
111	BETA	PCI/L	8	8	0	50	EPA		Gross beta
112	ALPHAHI	PCI/L	4	8	1	15	EPA		Alpha, High Detection Level
181	RADIUM	PCI/L	1	8	4	5	EPA		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	xxx	Chromium
A10	SILVER	PPB	10	8	8 ***	50	EPA		Silver
A20	ARSENIC	PPB	5	8	1	50	EPA		Arsenic
A21	MERCURY	PPB	.100	8	8 ***	2	EPA		Mercury
A22	SELENUM	PPB	5	8	7	10	EPA		Selenium
A33	ENDRIN	PPB	.100	8	8 ***	.200	EPA		Endrin
A34	METHLOR	PPB	3	8	8 ***	100	EPA		Methoxychlor
A35	TOXAENE	PPB	1	8	8 ***	5	EPA		Toxaphene
A36	a-BHC	PPB	.100	8	8 ***	4	EPA		Alpha-BHC
A37	b-BHC	PPB	.100	8	8 ***	4	EPA		Beta-BHC
A38	g-BHC	PPB	.100	8	8 ***	4	EPA		Gamma-BHC
A39	d-BHC	PPB	.100	8	8 ***	4	EPA		Delta-BHC
A51	LEADGF	PPB	5	8	5	50	EPA		Lead (graphite furnace)
C72	NITRATE	PPB	500	8	0	45000	EPA		Nitrate
C74	FLUORID	PPB	500	8	4	4000	EPA		Fluoride
H13	2,4-D	PPB	2	8	8 ***	100	EPA		2,4-D
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	5	50	EPA	xxx	Chromium, filtered
H23	FSILVER	PPB	10	8	8 ***	50	EPA		Silver, filtered
H37	FARSENI	PPB	5	8	1	50	EPA		Arsenic, filtered

TABLE 4.8. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Standards Agency	Exceeded	Full Name
H38	FMERCUR	PPB	.100	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	.100	8	0	1	EPA	xxx	Turbidity
P19	COLIMF	PPB	1	5	5 ***	1	EPA		Coliform (Membrane Filter)

---------- Constituent List= Water Quality Parameters ----------

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Standards Agency	Exceeded	Full Name
A11	SODIUM	PPB	200	8	0	.			Sodium
A17	MANGESE	PPB	5	8	4	50	EPAS	xxx	Manganese
A19	IRON	PPB	30	8	0	300	EPAS	xxx	Iron
C57	PHENOL	PPB	10	1	1 ***	.			Phenol
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	4	300	EPAS	xxx	Iron, filtered
H57	LPHENOL	PPB	10	7	7 ***	.			Phenol, low DL

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Standards Agency	Exceeded	Full Name
010	CO-60	PCI/L	22.5	8	7	100	EPAR		Cobalt-60
024	CS-137	PCI/L	20	8	8 ***	200	EPAR		Cesium-137
034	RU-106	PCI/L	172.5	8	8 ***	30	EPAR		Ruthenium-106
104	U	PCI/L	.500	8	0	600	DOE		Uranium
108	TRITIUM	PCI/L	500	8	2	20000	EPA		Tritium
121	SR 90	PCI/L	5	8	8 ***	8	EPA		Strontium-90
197	TC-99	PCI/L	15	8	8 ***	900	EPAR		Technetium-99
A01	BERYLUM	PPB	5	8	8 ***	.			Beryllium
A03	STRONUM	PPB	10	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	5	.			Aluminum
A18	POTASUM	PPB	100	8	0	.			Potassium

TABLE 4.8. (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
A50	MAGNES	PPB	50	8	0	.		Magnesium
C76	PHOSPHA	PPB	1000	8	8 ***	.		Phosphate
H16	TC	PPB	1000	7	0	.		Total carbon
H17	TDS		5000	1	0	500000	EPAS	Total dissolved solids
H18	FZINC	PPB	5	8	3	5000	EPAS	Zinc, filtered
H19	FCALCIU	PPB	50	8	0	.		Calcium, filtered
H25	FNICKEL	PPB	10	8	3	.		Nickel, filtered
H26	FCOPPER	PPB	10	8	7	1300	EPAP	Copper, filtered
H27	FVANADI	PPB	5	8	0	.		Vanadium, filtered
H28	FALUMIN	PPB	150	8	7	.		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
H35	FSTRONT	PPB	10	8	0	.		Strontium, filtered
H36	FANTIMO	PPB	100	8	8 ***	.		Antimony, filtered
H58	ALKALIN		20000	1	0	.		Alkalinity
H66	BROMIDE	PPB	1000	8	8 ***	.		Bromide
H67	NITRITE	PPB	1000	8	8 ***	.		Nitrite
H86	FBORON	PPB	10	8	1	.		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	7	.		Titanium
P08	ZIRCON	PPB	50	8	8 ***	.		Zirconium
P12	ENDSFAN	PPB	.500	1	1 ***	.		Endosulfan
P13	PHORATE	PPB	2	1	1 ***	.		PHORATE

TABLE 4.8. (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
A23	THALIUM	PPB	5	1	1 ***	.		Thallium
A24	THIOURA	PPB	200	1	1 ***	.		Thiourea
A25	ACETREA	PPB	200	1	1 ***	.		1-acetyl-2-thiourea
A26	CHLOREA	PPB	200	1	1 ***	.		1-(o-chlorophenyl) thiourea
A27	DIETROL	PPB	200	1	1 ***	.		Diethylstilbesterol
A28	ETHYREA	PPB	200	1	1 ***	.		Ethylenethiourea
A29	NAPHREA	PPB	200	1	1 ***	.		1-naphthyl-2-thiourea
A32	PHENREA	PPB	500	1	1 ***	.		N-phenylthiourea
A40	DDD	PPB	.100	1	1 ***	.		DDD
A41	DDE	PPB	.100	1	1 ***	.		DDE
A42	DDT	PPB	.100	1	1 ***	.		DDT
A43	HEPTLOR	PPB	.100	1	1 ***	0	EPAP	Heptachlor
A44	HEPTIDE	PPB	.100	1	1 ***	0	EPAP	Heptchlor epoxide
A45	KEPONE	PPB	1	1	1 ***	.		Kepone
A46	DIELRIN	PPB	.100	1	1 ***	.		Dieldrin
A47	ALDRIN	PPB	.100	1	1 ***	.		Aldrin
A48	CHLOANE	PPB	1	1	1 ***	0	EPAP	Chlordane
A49	ENDO1	PPB	.100	1	1 ***	.		Endosulfan I
A52	ENDO2	PPB	.100	1	1 ***	.		Endosulfan II
A54	AR1016	PPB	1	1	1 ***	0	EPAP	Arochlor 1016
A55	AR1221	PPB	1	1	1 ***	0	EPAP	Arochlor 1221
A56	AR1232	PPB	1	1	1 ***	0	EPAP	Arochlor 1232
A57	AR1242	PPB	1	1	1 ***	0	EPAP	Arochlor 1242
A58	AR1248	PPB	1	1	1 ***	0	EPAP	Arochlor 1248
A59	AR1254	PPB	1	1	1 ***	0	EPAP	Arochlor 1254
A60	AR1260	PPB	1	1	1 ***	0	EPAP	Arochlor 1260
A61	TETRANE	PPB	5	8	8 ***	5	EPA	Carbon Tetrachloride by GC/MS
A62	BENZENE	PPB	5	8	8 ***	5	EPA	Benzene
A63	DIOXANE	PPB	500	1	1 ***	.		Dioxane
A64	METHONE	PPB	10	8	7	.		Methyl ethyl ketone
A65	PYRIDIN	PPB	500	1	1 ***	.		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
A70	PERCENE	PPB	5	8	8 ***	.		Tetrachloroethylene
A71	OPXYLE	PPB	5	8	8 ***	440	EPAP	Xylene-o,p
A72	ACROLIN	PPB	10	1	1 ***	.		Acrolein
A73	ACRYILE	PPB	10	1	1 ***	.		Acrylonitrile
A74	BISTHER	PPB	5	1	1 ***	.		Bis(chloromethyl) ether

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
A75	BROMONE	PPB	5	1	1 ***	.		Bromoacetone
A76	METHBRO	PPB	10	1	1 ***	.		Methyl bromide
A77	CARBIDE	PPB	10	1	1 ***	.		Carbon disulfide
A78	CHLBENZ	PPB	5	1	1 ***	60	EPAP	Chlorobenzene
A79	CHLTHER	PPB	5	1	1 ***	.		2-chloroethyl vinyl ether
A80	CHLFORM	PPB	5	8	8 ***	100	EPA	Chloroform
A81	METHCHL	PPB	10	1	1 ***	.		Methyl chloride
A82	CHMTHER	PPB	10	1	1 ***	.		Chloromethyl methyl ether
A83	CROTONA	PPB	10	1	1 ***	.		Crotonaldehyde
A84	DIBRCHL	PPB	10	1	1 ***	0	EPAP	1,2-dibromo-3-chloropropane
A85	DIBRETH	PPB	10	1	1 ***	.		1,2-dibromoethane
A86	DIBRMET	PPB	10	1	1 ***	.		Dibromomethane
A87	DIBUTEN	PPB	10	1	1 ***	.		1,4-dichloro-2-butene
A88	DICDIFM	PPB	10	1	1 ***	.		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	1	1 ***	7	EPA	1,1-dichloroethylene
A93	METHYCH	PPB	5	8	7	.		Methylene Chloride
A94	DICPANE	PPB	5	1	1 ***	6	EPAP	1,2-dichloropropane
A95	DICPENE	PPB	5	1	1 ***	.		1,3-dichloropropene
A96	NNDIEHY	PPB	10	1	1 ***	.		N,N-diethylhydrazine
A97	1,1-DIM	PPB	10	1	1 ***	.		1,1-dimethylhydrazine
A98	1,2-DIM	PPB	10	1	1 ***	.		1,2-dimethylhydrazine
B01	IODOMET	PPB	10	1	1 ***	.		Iodomethane
B02	METHACR	PPB	10	1	1 ***	.		Methacrylonitrile
B03	METHTHI	PPB	10	1	1 ***	.		Methanethiol
B04	PENTACH	PPB	10	1	1 ***	.		Pentachloroethane
B05	1112-tc	PPB	10	1	1 ***	.		1,1,1,2-tetrachlorethane
B06	1122-tc	PPB	5	1	1 ***	.		1,1,2,2-tetrachlorethane
B08	BROMORM	PPB	5	1	1 ***	100	EPA	Bromoform
B09	TRCMEOL	PPB	10	1	1 ***	.		Trichloromethanethiol
B10	TRCMFLM	PPB	10	1	1 ***	.		Trichloromonofluoromethane
B12	123-trp	PPB	10	1	1 ***	.		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	10	1	1 ***	.		Acetonitrile
B20	ACETOPH	PPB	10	1	1 ***	.		Acetophenone
B21	WARFRIN	PPB	10	1	1 ***	.		Warfarin
B22	ACEFENE	PPB	10	1	1 ***	.		2-acetylaminofluorene
B23	AMINOYL	PPB	10	1	1 ***	.		4-aminobyphenyl
B24	AMIISOX	PPB	10	1	1 ***	.		5-(aminomethyl)-3-isoxazolol
B25	AMITROL	PPB	10	1	1 ***	.		Amitrole
B26	ANILINE	PPB	10	1	1 ***	.		Aniline

TABLE 4.8. (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
B27	ARAMITE	PPB	10	1	1 ***	.		Aramite
B28	AURAMIN	PPB	10	1	1 ***	.		Auramine
B29	BENZCAC	PPB	10	1	1 ***	.		Benz[c]acridine
B30	BENZAAN	PPB	10	1	1 ***	.		Benz[a]anthracene
B31	BENDICM	PPB	10	1	1 ***	.		Benzene, dichloromethyl
B32	BENTHOL	PPB	10	1	1 ***	.		Benzenethoil
B33	BENDINE	PPB	10	1	1 ***	.		Benzidine
B34	BENZBFL	PPB	10	1	1 ***	.		Benzo[b]fluoranthene
B35	BENZJFL	PPB	10	1	1 ***	.		Benzo[j]fluoranthene
B36	PBENZQU	PPB	10	1	1 ***	.		P benzoquinone
B37	BENZCHL	PPB	10	1	1 ***	.		Benzyl chloride
B38	BIS2CHM	PPB	10	1	1 ***	.		Bis(2-chloroethoxy) methane
B39	BIS2CHE	PPB	10	1	1 ***	.		Bis(2-chloroethyl) ether
B40	BIS2EPH	PPB	10	1	1 ***	.		Bis(2-ethylhexyl) phthalate
B41	BROPHEN	PPB	10	1	1 ***	.		4-bromophenyl phenyl ether
B42	BUTBENP	PPB	10	1	1 ***	.		Butyl benzyl phthalate
B43	BUTDINP	PPB	10	1	1 ***	.		2-sec-butyl-4,6-dinitrophenol
B44	CHALETH	PPB	10	1	1 ***	.		Chloroalkyl ethers
B45	CHLANIL	PPB	10	1	1 ***	.		P-chloroaniline
B46	CHLCRES	PPB	10	1	1 ***	.		P-chloro-m-cresol
B47	CHLEPOX	PPB	10	1	1 ***		0 EPAP	1-chloro-2,3-epoxypropane
B48	CHLNAPH	PPB	10	1	1 ***	.		2-chloronaphthalene
B49	CHLPHEN	PPB	10	1	1 ***	.		2-chlorophenol
B50	CHRYSEN	PPB	10	1	1 ***	.		Chrysene
B51	CRESOLS	PPB	10	1	1 ***	.		Cresols
B52	CYCHDIN	PPB	10	1	1 ***	.		2-cyclohexyl-4,6-dinitrophenol
B53	DIBAHAC	PPB	10	1	1 ***	.		Dibenz[a,h]acridine
B54	DIBAJAC	PPB	10	1	1 ***	.		Dibenz[a,j]acridine
B55	DIBAHAN	PPB	10	1	1 ***	.		Dibenz[a,h]anthracene
B56	DIBCGCA	PPB	10	1	1 ***	.		7H-dibenzo[c,g]carbazole
B57	DIBAEPY	PPB	10	1	1 ***	.		Dibenzo[a,e]pyrene
B58	DIBAHPY	PPB	10	1	1 ***	.		Dibenzo[a,h]pyrene
B59	DIBAIPY	PPB	10	1	1 ***	.		Dibenzo[a,i]pyrene
B60	DIBPHTH	PPB	10	1	1 ***	.		Di-n-butyl phthalate
B61	12-dben	PPB	10	1	1 ***	.		1,2-dichlorobenzene
B62	13-dben	PPB	10	1	1 ***	.		1,3-dichlorobenzene
B63	14-dben	PPB	10	1	1 ***		75 EPA	p-Dichlorobenzene
B64	DICHBEN	PPB	10	1	1 ***	.		3,3'-dichlorobenzidine
B65	24-dchp	PPB	10	1	1 ***	.		2,4-dichlorophenol
B66	26-dchp	PPB	10	1	1 ***	.		2,6-dichlorophenol
B67	DIEPHTH	PPB	10	1	1 ***	.		Diethyl phthalate
B68	DIHYSAF	PPB	10	1	1 ***	.		Dihydrosafrole
B69	DIMETHB	PPB	10	1	1 ***	.		3,3'-dimethoxybenzidine
B70	DIMEAMB	PPB	10	1	1 ***	.		P-dimethylaminoazobenzene

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
B71	DIMBENZ	PPB	10	1	1 ***	.		7,12-dimethylbenz[a]anthracene
B72	DIMEYLB	PPB	10	1	1 ***	.		3,3'-dimethylbenzidine
B73	THIONOX	PPB	10	1	1 ***	.		Thiofanox
B74	DIMPHAM	PPB	10	1	1 ***	.		Alpha,alpha-dimethylphenethylamine
B76	DIMPHTH	PPB	10	1	1 ***	.		Dimethyl phthalate
B77	DINBENZ	PPB	10	1	1 ***	.		Dinitrobenzene
B78	DINCRES	PPB	10	1	1 ***	.		4,6-dinitro-o-cresol and salts
B79	DINPHEN	PPB	10	1	1 ***	.		2,4-dinitrophenol
B80	24-dint	PPB	10	1	1 ***	.		2,4-dinitrotoluene
B81	26-dint	PPB	10	1	1 ***	.		2,6-dinitrotoluene
B82	DIOPHTH	PPB	10	1	1 ***	.		Di-n-octyl phthalate
B83	DIPHAMI	PPB	10	1	1 ***	.		Diphenylamine
B84	DIPHHYD	PPB	10	1	1 ***	.		1,2-diphenylhydrazine
B85	DIPRNIT	PPB	10	1	1 ***	.		Di-n-propylnitrosamine
B86	ETHMINE	PPB	10	1	1 ***	.		Ethyleneimine
B87	ETHMETS	PPB	10	1	1 ***	.		Ethyl methanesulfonate
B88	FLUORAN	PPB	10	1	1 ***	.		Fluoranthene
B89	HEXCBEN	PPB	10	1	1 ***	.		Hexachlorobenzene
B90	HEXCBUT	PPB	10	1	1 ***	.		Hexachlorobutadiene
B91	HEXCCYC	PPB	10	1	1 ***	.		Hexachlorocyclopentadiene
B92	HEXCETH	PPB	10	1	1 ***	.		Hexachloroethane
B93	INDENOP	PPB	10	1	1 ***	.		Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	PPB	10	1	1 ***	.		Isosafrole
B95	MALOILE	PPB	10	1	1 ***	.		Malononitrile
B96	MELPHAL	PPB	10	1	1 ***	.		Melphalan
B97	METHAPY	PPB	10	1	1 ***	.		Methapyrilene
B98	METHNYL	PPB	10	1	1 ***	.		Methiolonyl
B99	METAZIR	PPB	10	1	1 ***	.		2-methylaziridine
C01	METCHAN	PPB	10	1	1 ***	.		3-methylcholanthrene
C02	METBISC	PPB	10	1	1 ***	.		4,4'-methylenebis(2-chloroaniline)
C03	METACTO	PPB	10	1	1 ***	.		2-methyllactonitrile
C04	METACRY	PPB	10	1	1 ***	.		Methyl methacrylate
C05	METMSUL	PPB	10	1	1 ***	.		Methyl methanesulfonate
C06	METPROP	PPB	10	1	1 ***	.		2-methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	PPB	10	1	1 ***	.		Methylthiouracil
C08	NAPHQUI	PPB	10	1	1 ***	.		1,4-naphthoquinone
C09	1-napha	PPB	10	1	1 ***	.		1-naphthylamine
C10	2-napha	PPB	10	1	1 ***	.		2-naphthylamine
C11	NITRANI	PPB	10	1	1 ***	.		P-nitroaniline
C12	NITBENZ	PPB	10	1	1 ***	.		Nitrobenzine
C13	NITPHEN	PPB	10	1	1 ***	.		p-Nitrophenol
C14	NNIBUTY	PPB	10	1	1 ***	.		N-nitrosodi-n-butylamine
C15	NNIDIEA	PPB	10	1	1 ***	.		N-nitrosodiethanolamine
C16	NNIDIEY	PPB	10	1	1 ***	.		N-nitrosodiethylamine

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
C17	NNIDIME	PPB	10	1	1 ***	.		N-nitrosodimethylamine
C18	NNIMETH	PPB	10	1	1 ***	.		N-nitrosomethylethylamine
C19	NNIURET	PPB	10	1	1 ***	.		N-nitroso-N-methylurethane
C20	NNIVINY	PPB	10	1	1 ***	.		N-nitrosomethylvinylamine
C21	NNIMORP	PPB	10	1	1 ***	.		N-nitrosomorpholine
C22	NNINICO	PPB	10	1	1 ***	.		N-nitrosonornicotine
C23	NNIPIPE	PPB	10	1	1 ***	.		N-nitrosopiperidine
C24	NITRPYR	PPB	10	1	1 ***	.		Nitrosopyrrolidine
C25	NITRTOL	PPB	10	1	1 ***	.		5-nitro-o-toluidine
C26	PENTCHB	PPB	10	1	1 ***	.		Pentachlorobenzene
C27	PENTCHN	PPB	10	1	1 ***	.		Pentachloronitrobenzene
C28	PENTCHP	PPB	50	1	1 ***	220	EPAP	Pentachlorophenol
C29	PHENTIN	PPB	10	1	1 ***	.		Phenacetin
C30	PHENINE	PPB	10	1	1 ***	.		Phenylenedismine
C31	PHTHEST	PPB	10	1	1 ***	.		Phthalic acid esters
C32	PICOLIN	PPB	10	1	1 ***	.		2-picoline
C33	PRONIDE	PPB	10	1	1 ***	.		Pronamide
C34	RESERPI	PPB	10	1	1 ***	.		Reserpine
C35	RESORCI	PPB	10	1	1 ***	.		Resorcinol
C36	SAFROL	PPB	10	1	1 ***	.		Safrol
C37	TETRCHB	PPB	10	1	1 ***	.		1,2,4,5-tetrachlorobenzene
C39	TETRCHP	PPB	10	1	1 ***	.		2,3,4,6-tetrachlorophenol
C40	THIURAM	PPB	10	1	1 ***	.		Thiuram
C41	TOLUDIA	PPB	10	1	1 ***	.		Toluenediamine
C42	OTOLHYD	PPB	10	1	1 ***	.		O-toluidine hydrochloride
C43	TRICHLB	PPB	10	1	1 ***	.		1,2,4-trichlorobenzene
C44	245-trp	PPB	10	1	1 ***	.		2,4,5-trichlorophenol
C45	246-trp	PPB	10	1	1 ***	.		2,4,6-trichlorophenol
C46	TRIPHOS	PPB	10	1	1 ***	.		O,O,O-triethyl phosphorothioate
C47	SYMTRIN	PPB	10	1	1 ***	.		Sym-trinitrobenzene
C48	TRISPHO	PPB	10	1	1 ***	.		Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	PPB	10	1	1 ***	.		Benzo[a]pyrene
C50	CHLNAPZ	PPB	10	1	1 ***	.		Chlornaphazine
C51	BIS2ETH	PPB	10	1	1 ***	.		Bis(2-chloroisopropyl)ether
C52	HEXAENE	PPB	10	1	1 ***	.		Hexachloropropene
C54	HEXACHL	PPB	10	1	1 ***	.		Hexachlorophene
C55	NAPHTHA	PPB	10	1	1 ***	.		Naphthalene
C56	123TRI	PPB	10	1	1 ***	.		1,2,3-trichlorobenzene
C58	135TRI	PPB	10	1	1 ***	.		1,3,5-trichlorobenzene
C59	1234TE	PPB	10	1	1 ***	.		1,2,3,4-tetrachlorobenzene
C60	1235TE	PPB	10	1	1 ***	.		1,2,3,5-tetrachlorobenzene
C61	TETEPYR	PPB	2	1	1 ***	.		Tetraethylpyrophosphate
C62	CHLLATE	PPB	300	1	1 ***	.		Chlorobenzilate
C63	CARBPHT	PPB	2	1	1 ***	.		Carbophenothion

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
C64	DISULFO	PPB	2	1	1 ***	.		Disulfoton
C65	DIMETHO	PPB	2	1	1 ***	.		Dimethoate
C66	METHPAR	PPB	2	1	1 ***	.		Methyl parathion
C67	PARATHI	PPB	2	1	1 ***	.		Parathion
C70	CYANIDE	PPB	10	8	8 ***	.		Cyanide
C71	FORMALN	PPB	500	1	1 ***	.		Formalin
C77	PERCHLO	PPB	500	1	1 ***	.		Perchlorate
C78	SULFIDE	PPB	1000	1	1 ***	.		Sulfide
C79	KEROSEN	PPB	10000	1	1 ***	.		Kerosene
C80	AMMONIU	PPB	50	8	8 ***	.		Ammonium ion
C87	CITRUSR	PPB	1000	1	1 ***	.		Citrus red
C90	PARALDE	PPB	10000	1	1 ***	.		Paraldehyde
C91	STRYCHN	PPB	50	1	1 ***	.		Strychnine
C92	MALHYDR	PPB	500	1	1 ***	.		Maleic hydrizide
C93	NICOTIN	PPB	100	1	1 ***	.		Nicotinic acid
C94	ACRYIDE	PPB	10000	1	1 ***	0	EPAP	Acrylamide
C95	ALLYLAL	PPB	10000	1	1 ***	.		Allyl alcohol
C98	CHLPROP	PPB	10000	1	1 ***	.		3-chloropropionitrile
D01	PCDD's	PPB	.0100	1	1 ***	.		Pcdd's
D02	PCDF's	PPB	.0100	1	1 ***	.		Pcdf's
D03	2378TCD	PPB	.0100	1	1 ***	.		2,3,7,8 TCDD
H03	ETHCARB	PPB	10000	1	1 ***	.		Ethyl carbamate
H04	ETHCYAN	PPB	10000	1	1 ***	.		Ethyl cyanide
H05	ETHOXID	PPB	10	1	1 ***	.		Ethylene oxide
H06	ETHMETH	PPB	10	1	1 ***	.		Ethyl methacrylate
H09	ISOBUTY	PPB	10000	1	1 ***	.		Isobutyl alcohol
H11	PROPYLA	PPB	10000	1	1 ***	.		N-propylamine
H12	PROPYNO	PPB	10000	1	1 ***	.		2-propyn-1-ol
H15	2,4,5-T	PPB	2	8	8 ***	.		2,4,5-T
H40	FTHALLI	PPB	5	1	1 ***	.		Thallium, filtered
H62	LHYDRAZ	PPB	30	1	1 ***	.		Hydrazine, Low Detection Level
H68	HEXONE	PPB	10	8	8 ***	.		Methyl Isobutyl Ketone
I01	ACETONE	PPB	10	8	8 ***	.		Acetone by VOA
I06	ISOPHER	PPB	10	1	1 ***	.		Isopherone
I09	BUTANOL	PPB	10000	1	1 ***	.		1-Butanol
I21	TRIBUPH	PPB	10	1	1 ***	.		Tributylphosphoric Acid
I28	TAF	PPB	10	8	8 ***	.		Tetrahydrofuran
I29	ACENAPH	PPB	10	1	1 ***	.		Acenaphthene
I30	FLRENE	PPB	10	1	1 ***	.		Fluorene
I31	ANTHRA	PPB	10	1	1 ***	.		Anthracene
I32	PYRENE	PPB	10	1	1 ***	.		Pyrene
I33	ETHBENZ	PPB	5	1	1 ***	680	EPAP	Ethyl benzene
I34	STYRENE	PPB	5	1	1 ***	140	EPAP	Styrene
I42	BDCM	PPB	5	1	1 ***	100	EPA	Bromodichloromethane

TABLE 4.8. (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
I43	CDBM	PPB	5	1	1 ***	100	EPA	Chlorodibromomethane
I64	2NITPH	PPB	10	1	1 ***	.		o-Nitrophenol
I67	ETHANOL	PPB	10000	1	1 ***	.		Ethanol
I75	2MENAPH	PPB	10	1	1 ***	.		2-Methylnaphthalene
I82	PHENANT	PPB	10	1	1 ***	.		Phenanthrene
J43	BENZALC	PPB	10	1	1 ***	.		Benzyl Alcohol
J69	2HEXANO	PPB	50	1	1 ***	.		2-Hexanone
J71	BNZKFLU	PPB	10	1	1 ***	.		Benzo(k)Fluoranthene
J83	BGHIPER	PPB	10	1	1 ***	.		Benzo(Ghi)Perylene
J89	DINOSEB	PPB	10	1	1 ***	.		Dinoseb
J91	DIALLAT	PPB	10	1	1 ***	.		Diallate
K52	NNDIPHA	PPB	10	1	1 ***	.		N-NITROSODIPHENYLAMINE
K56	DIBENFR	PPB	10	1	1 ***	.		DIBENZOFURAN
K58	ACENATL	PPB	10	1	1 ***	.		ACENAPHTHYLENE
L20	MBP	PPB	10000	1	1 ***	.		Monobutyl Phosphate
L21	DBP	PPB	10000	1	1 ***	.		Dibutyl Phosphate
L45	ALLYLCL	PPB	100	1	1 ***	.		Allyl Chloride
L46	CLETHAN	PPB	10	1	1 ***	.		Chloroethane
L48	PROPCN	PPB	5	1	1 ***	.		Propionitrile
L49	VINYLAC	PPB	5	1	1 ***	.		Vinyl Acetate
L50	B2CLMEE	PPB	10	1	1 ***	.		Bis(2-chloro-1-methylethyl)ether
L52	DIPHOS	PPB	10	1	1 ***	.		0,0-Diethyl-0,2-pyrazinyl phosphorothion
L53	ISODRIN	PPB	10	1	1 ***	.		Isodrin
L54	ONITANI	PPB	10	1	1 ***	.		o-Nitroaniline
L55	MNITANI	PPB	10	1	1 ***	.		m-Nitroaniline
L56	4NITQUI	PPB	10	1	1 ***	.		4-Nitroquinoline 1-oxide
L57	ETHGLYC	PPB	10000	1	1 ***	.		Ethylene Glycol
L59	1PROPAN	PPB	10000	1	1 ***	.		1-Propanol
L60	1BUTYN	PPB	10000	1	1 ***	.		1-Butynol
L62	ACETONE	PPB	10	1	1 ***	.		Acetone - by ABN
L63	14DBEN	PPB	5	8	8 ***	75	EPA	p-Dichlorobenzene
L64	CHLROB	PPB	10	1	1 ***	60	EPAP	Chlorobenzene (by ABN)

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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-2 September Through November 1989

			Contamination Indicator Parameters					
Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
2-E27-8	08SEP89		349	342	8	7.82	#500	#2
	08SEP89	1	348	341	8	7.81	#400	#6
	08SEP89	2	349	341	7.90	7.82	#500	#4
	08SEP89	3	348	341	8	7.82	#700	#2
2-E27-9	06SEP89		342	337	7.90	7.80	#400	#3
	06SEP89	1	342	339	7.90	7.80	#400	#3
	06SEP89	2	341	338	7.90	7.80	#500	#2
	06SEP89	3	341	339	7.90	7.80	#500	#1
2-E27-10	06SEP89		262	261	8	8.03	#400	#1
	06SEP89	1	263	261	8.10	8.02	#400	#1
	06SEP89	2	263	262	8	8.01	#800	#4
	06SEP89	3	263	261	8.10	8.02	#600	#7
2-E34-2	06SEP89		485	463	8	8	#300	#2
	06SEP89	1	483	463	8	7.99	#400	#3
	06SEP89	2	485	463	8	7.98	#300	#8
	06SEP89	3	485	462	8	7.97	#300	#4
	27NOV89		487	458	7.80	7.64	#400	#5
2-E34-3	07SEP89		290	294	8.10	7.99	#400	#4
	07SEP89	1	288	294	8.10	8	#400	#3
	07SEP89	2	290	294	8.10	8	#500	#3
	07SEP89	3	291	293	8.10	8	#500	#8
2-E34-5	06SEP89		518	492	8	8.07	#600	#2
	06SEP89	1	518	496	8	8.07	#500	#6
	06SEP89	2	518	498	8	8.07	#400	#3
	06SEP89	3	514	494	8	8.06	#300	#4
2-E34-6	06SEP89		445	442	8	8.14	#400	#2
	06SEP89	1	449	441	8	8.11	#500	#-1
	06SEP89	2	449	441	8	8.08	#500	#9
	06SEP89	3	455	442	8	8.07	#500	#1

TABLE 4.9. (contd)

Well name	Collection date	Duplicate sample number	FLUORID PPB 500/4000	FCHROMI PPB 10/50	FMANGAN PPB 5/50s	FCOPPER PPB 10/1300p	FALUMIN PPB 150/.	FPOTASS PPB 100/.	FBERYLL PPB 5/.	FSTRONT PPB 10/.
2-E27-8	08SEP89		<500	<10	<5	<10	<150	7760	<5	199
2-E27-9	06SEP89		<500	<10	<5	<10	<150	6760	<5	179
2-E27-10	06SEP89		<500	<10	<5	<10	<150	5780	7	147
2-E34-2	06SEP89		700	19	<5	<10	<150	7990	<5	239
	27NOV89		500	92	40	21	505	7000	<5	219
2-E34-3	07SEP89		<500	<10	<5	<10	<150	6590	<5	180
2-E34-5	06SEP89		500	11	<5	<10	<150	7790	<5	239
2-E34-6	06SEP89		700	<10	19	<10	<150	7510	<5	213

Well name	Collection date	Duplicate sample number	ALKALIN 20000/.	ALPHAHI PCI/L 4/15	ALUMNUM PPB 150/.	ARSENIC PPB 5/50	FARSENI PPB 5/50	BARIUM PPB 6/1000	FBARIUM PPB 6/1000	BETA PCI/L 8/50
2-E27-8	08SEP89		.	2.13	<150	8	8	36	35	7.59
2-E27-9	06SEP89		.	3.23	<150	8	8	37	36	6.74
2-E27-10	06SEP89		.	2.57	<150	7	7	31	32	5.98
2-E34-2	06SEP89		.	2.18	309	6	6	42	38	8.46
	27NOV89		97000	*1.19	329	7	6	35	42	9.66
2-E34-3	07SEP89		.	2.33	<150	8	6	49	46	7.73
2-E34-5	06SEP89		.	3.47	<150	6	6	31	27	8.59
2-E34-6	06SEP89		.	3.08	950	<5	<5	53	36	8.11

Well name	Collection date	Duplicate sample number	BORON PPB 10/.	FBORON PPB 10/.	CALCIUM PPB 50/.	FCALCIU PPB 50/.	CHLORID PPB 500/250000s	CHROMUM PPB 10/50	CO-60 PCI/L 22.5/100r	CS-137 PCI/L 20/200r
2-E27-8	08SEP89		16	17	39500	40000	8000	50	*4.97	*2.11
2-E27-9	06SEP89		14	14	36300	36200	7000	36	*3.40	*-3.89
2-E27-10	06SEP89		12	<10	27900	27700	4400	35	6.19	*.372
2-E34-2	06SEP89		18	29	48200	47600	11000	63	*-0.206	*-2.98
	27NOV89		22	23	44400	44900	11500	90	*-2.69	*2.62
2-E34-3	07SEP89		13	15	34300	33000	6500	35	*1.32	*.353
2-E34-5	06SEP89		24	17	52100	46500	21000	14	*-0.355	*3.64
2-E34-6	06SEP89		28	25	43700	39300	19000	15	*-1.70	*-1.77

TABLE 4.9. (contd)

Well name	Collection date	Duplicate sample number	IRON PPB 30/300s	FIRON PPB 30/300s	LEADGF PPB 5/50	MAGNES PPB 50/.	FMAGNES PPB 50/.	MANGESE PPB 5/50s	METHYCH PPB 5/.	NICKEL PPB 10/.
2-E27-8	08SEP89		221	<30	<5	10600	10800	7	<5	22
2-E27-9	06SEP89		158	42	46	10100	10200	<5	<5	16
2-E27-10	06SEP89		151	<30	<5	7350	7430	<5	<5	20
2-E34-2	06SEP89		930	230	10	13600	13500	29	<5	43
	27NOV89		948	1560	<5	12500	12400	24	10	46
2-E34-3	07SEP89		153	<30	<5	9530	9310	<5	<5	25
2-E34-5	06SEP89		88	47	<5	15100	13700	<5	<5	33
2-E34-6	06SEP89		2890	<30	11	12100	11000	78	<5	24

Well name	Collection date	Duplicate sample number	FNICKEL PPB 10/.	NITRATE PPB 500/45000	POTASUM PPB 100/.	RADIUM PCI/L 1/5	RU-106 PCI/L 172.5/30r	SILICON PPB 50/.	FSILICO PPB 50/.	SODIUM PPB 200/.
2-E27-8	08SEP89		<10	7600	7580	*.102	*-12.6	21400	21700	15400
2-E27-9	06SEP89		19	7600	6730	.235	*14.8	20600	20700	15500
2-E27-10	06SEP89		<10	2900	5830	*.0712	*15.6	17400	17400	12100
2-E34-2	06SEP89		21	13000	8050	.355	*-37.4	20800	20500	26600
	27NOV89		47	12000	7130	*.149	*-12	19400	20100	24100
2-E34-3	07SEP89		<10	4300	6730	.188	*14.8	20100	19400	13800
2-E34-5	06SEP89		44	13200	8720	.293	*-14.8	19600	17700	31600
2-E34-6	06SEP89		10	6500	8390	*.147	*-50.3	19900	17200	33000

Well name	Collection date	Duplicate sample number	FSODIUM PPB 200/.	SR 90 PCI/L 5/8	STRONUM PPB 10/.	SULFATE PPB 500/250000s	TC PPB 1000/.	TC-99 PCI/L 15/900r	TDS 5000/500000s	TITAN PPB 60/.
2-E27-8	08SEP89		15800	*.216	193	49000	25000	*.769	.	<60
2-E27-9	06SEP89		15700	*.144	175	50000	25200	*1.10	.	<60
2-E27-10	06SEP89		12300	*.154	145	17300	26500	*2.05	.	<60
2-E34-2	06SEP89		26800	*-0.211	238	110000	23000	*1.59	.	<60
	27NOV89		23700	*.348	216	100000	.	*2.75	286000	<60
2-E34-3	07SEP89		13700	*.0890	184	33000	24800	*2.24	.	<60
2-E34-5	06SEP89		28600	*-0.199	264	105000	24600	*1.69	.	<60
2-E34-6	06SEP89		30700	*-0.174	238	80000	25800	*1.96	.	104

Well name	Collection date	Duplicate sample number	TRITIUM PCI/L 500/20000	TURBID NTU .10/1	U PCI/L .50/600d	VANADUM PPB 5/.	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000s
2-E27-8	08SEP89		12300	1.10	2.26	33	31	7	<5
2-E27-9	06SEP89		13500	1.60	2.79	28	26	<5	11
2-E27-10	06SEP89		7220	1.50	1.90	24	20	<5	<5
2-E34-2	06SEP89		3130	11.2	1.95	21	17	21	7

TABLE 4.9. (contd)

Well name	Collection date	Duplicate sample number	TRITIUM PCI/L 500/20000	TURBID NTU .10/1	U PCI/L .50/800d	VANADUM PPB 5/.	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000s
	27NOV89		3430	5	1.74	21	23	8	25
2-E34-3	07SEP89		8270	.500	1.82	24	22	<5	5
2-E34-5	06SEP89		*164	1	3.38	18	19	12	5
2-E34-6	06SEP89		*225	24	2.65	16	8	29	<5

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
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 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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

TABLE 4.10. Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-3 September Through November 1989

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards	Agency	Exceeded	Full Name
088	CONDLAB	UMHO	.	44	0	700	WDOE		Conductivity, Laboratory
191	CONDFLD	UMHO	1	60	0	700	WDOE		Specific conductance
199	PHFIELD		.100	60	0	6.5-8.5	EPAS	xxx	pH, Field Measurement
207	PH-LAB		.0100	44	0	6.5-8.5	EPAS	xxx	pH, Laboratory Measurement
C69	TOC	PPB	2000	56	54	.			Total organic carbon
H42	TOXLDL	PPB	10	48	27	.			Total Organic Halogen, Low Det. Level

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards	Agency	Exceeded	Full Name
109	COLIFRM	MPN	2.20	2	2 ***	1	EPA		Coliform bacteria
111	BETA	PCI/L	8	12	0	50	EPA		Gross beta
112	ALPHAHI	PCI/L	4	12	2	15	EPA	xxx	Alpha, High Detection Level
181	RADIUM	PCI/L	1	12	2	5	EPA	xxx	Radium
A06	BARIUM	PPB	6	12	0	1000	EPA		Barium
A07	CADMIUM	PPB	2	12	11	10	EPA		Cadmium
A08	CHROMUM	PPB	10	12	0	50	EPA		Chromium
A10	SILVER	PPB	10	12	12 ***	50	EPA		Silver
A20	ARSENIC	PPB	5	12	11	50	EPA		Arsenic
A21	MERCURY	PPB	.100	11	11 ***	2	EPA		Mercury
A22	SELENUM	PPB	5	12	12 ***	10	EPA		Selenium
A33	ENDRIN	PPB	.100	12	12 ***	.200	EPA		Endrin
A34	METHLOR	PPB	3	12	12 ***	100	EPA		Methoxychlor
A35	TOXAENE	PPB	1	12	12 ***	5	EPA		Toxaphene
A36	a-BHC	PPB	.100	12	12 ***	4	EPA		Alpha-BHC
A37	b-BHC	PPB	.100	12	12 ***	4	EPA		Beta-BHC
A38	g-BHC	PPB	.100	12	12 ***	4	EPA		Gamma-BHC
A39	d-BHC	PPB	.100	12	12 ***	4	EPA		Delta-BHC
A51	LEADGF	PPB	5	12	11	50	EPA	xxx	Lead (graphite furnace)
C72	NITRATE	PPB	500	12	0	45000	EPA	xxx	Nitrate
C74	FLUORID	PPB	500	12	11	4000	EPA		Fluoride
H13	2,4-D	PPB	2	12	12 ***	100	EPA		2,4-D
H14	2,4,5TP	PPB	2	12	12 ***	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	8	50	EPA		Chromium, filtered
H23	FSILVER	PPB	10	11	11 ***	50	EPA		Silver, filtered
H37	FARSENI	PPB	5	11	11 ***	50	EPA		Arsenic, filtered

TABLE 4.10. (contd)

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

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
H38	FMERCUR	PPB	.100	10	10 ***	2	EPA		Mercury, filtered
H39	FSELENI	PPB	5	11	11 ***	10	EPA		Selenium, filtered
H41	FLEAD	PPB	5	11	11 ***	50	EPA		Lead, filtered
H60	TURBID	NTU	.100	11	0	1	EPA	xxx	Turbidity
P19	COLIMF	PPB	1	10	9	1	EPA	xxx	Coliform (Membrane Filter)

---------- 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	12	0	.			Sodium
A17	MANGESE	PPB	5	12	4	50	EPAS	xxx	Manganese
A19	IRON	PPB	30	12	0	300	EPAS	xxx	Iron
C57	PHENOL	PPB	10	11	11 ***	.			Phenol
C73	SULFATE	PPB	500	12	0	250000	EPAS		Sulfate
C75	CHLORID	PPB	500	12	0	250000	EPAS		Chloride
H24	FSODIUM	PPB	200	11	0	.			Sodium, filtered
H29	FMANGAN	PPB	5	11	7	50	EPAS	xxx	Manganese, filtered
H31	FIRON	PPB	30	11	7	300	EPAS		Iron, filtered
H57	LPHENOL	PPB	10	12	12 ***	.			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	10	100	EPAR		Cobalt-60
024	CS-137	PCI/L	20	11	11 ***	200	EPAR		Cesium-137
034	RU-106	PCI/L	172.5	11	11 ***	30	EPAR		Ruthenium-106
104	U	PCI/L	.500	12	0	600	DOE		Uranium
108	TRITIUM	PCI/L	500	11	5	20000	EPA		Tritium
197	TC-99	PCI/L	15	11	5	900	EPAR		Technetium-99
A01	BERYLUM	PPB	5	12	12 ***	.			Beryllium
A03	STRONUM	PPB	10	12	0	.			Strontium
A04	ZINC	PPB	5	12	2	5000	EPAS		Zinc
A05	CALCIUM	PPB	50	12	0	.			Calcium
A12	NICKEL	PPB	10	12	1	.			Nickel
A13	COPPER	PPB	10	12	11	1300	EPAP		Copper
A14	VANADUM	PPB	5	12	0	.			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

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
C76	PHOSPHA	PPB	1000	12	12 ***	.			Phosphate
H16	TC	PPB	1000	11	0	.			Total carbon
H18	FZINC	PPB	5	11	4	5000	EPAS		Zinc, filtered
H19	FCALCIU	PPB	50	11	0	.			Calcium, filtered
H25	FNICKEL	PPB	10	11	5	.			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	11 ***	.			Aluminum, filtered
H30	FPOTASS	PPB	100	11	0	.			Potassium, filtered
H32	FMAGNES	PPB	50	11	0	.			Magnesium, filtered
H33	FBERYLL	PPB	5	11	9	.			Beryllium, filtered
H35	FSTRONT	PPB	10	11	0	.			Strontium, filtered
H36	FANTIMO	PPB	100	11	11 ***	.			Antimony, filtered
H66	BROMIDE	PPB	1000	12	12 ***	.			Bromide
H67	NITRITE	PPB	1000	12	12 ***	.			Nitrite
H86	FBORON	PPB	10	11	1	.			Boron, filtered
H87	FCOBALT	PPB	20	11	11 ***	.			Cobalt, filtered
H88	FLITHIU	PPB	10	11	11 ***	.			Lithium, filtered
H89	FMOLY	PPB	40	11	11 ***	.			Molybdenum, filtered
H90	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	12	2	.			Boron
P02	COBALT	PPB	20	12	12 ***	.			Cobalt
P03	LITHIUM	PPB	10	12	11	.			Lithium
P04	MOLY	PPB	40	12	12 ***	.			Molybdenum
P05	SILICON	PPB	50	12	0	.			Silicon
P06	TIN	PPB	30	12	12 ***	.			Tin
P07	TITAN	PPB	60	12	11	.			Titanium
P08	ZIRCON	PPB	50	12	12 ***	.			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	12	7	5	EPA	xxx	Carbon Tetrachloride by GC/MS
A62	BENZENE	PPB	5	12	12 ***	5	EPA		Benzene
A64	METHONE	PPB	10	12	12 ***	.			Methyl ethyl ketone
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

TABLE 4.10. (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
A70	PERCENE	PPB	5	12	12 ***	.		Tetrachloroethylene
A71	OPXYLE	PPB	5	12	12 ***	440	EPAP	Xylene-o,p
A80	CHLFORM	PPB	5	12	11	100	EPA	Chloroform
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
A93	METHYCH	PPB	5	12	12 ***	.		Methylene Chloride
B13	VINYIDE	PPB	10	12	12 ***	2	EPA	Vinyl chloride
B14	M-XYLE	PPB	5	12	12 ***	440	EPAP	Xylene-m
B61	12-dben	PPB	10	11	11 ***	.		1,2-dichlorobenzene
B62	13-dben	PPB	10	11	11 ***	.		1,3-dichlorobenzene
B63	14-dben	PPB	10	11	11 ***	75	EPA	p-Dichlorobenzene
B89	HEXCBEN	PPB	10	11	11 ***	.		Hexachlorobenzene
C26	PENTCHB	PPB	10	11	11 ***	.		Pentachlorobenzene
C37	TETRCHB	PPB	10	11	11 ***	.		1,2,4,5-tetrachlorobenzene
C43	TRICHLB	PPB	10	11	11 ***	.		1,2,4-trichlorobenzene
C54	HEXACHL	PPB	10	11	11 ***	.		Hexachlorophene
C55	NAPHTHA	PPB	10	11	11 ***	.		Naphthalene
C56	123TRI	PPB	10	11	11 ***	.		1,2,3-trichlorobenzene
C58	135TRI	PPB	10	11	11 ***	.		1,3,5-trichlorobenzene
C59	1234TE	PPB	10	11	11 ***	.		1,2,3,4-tetrachlorobenzene
C60	1235TE	PPB	10	11	11 ***	.		1,2,3,5-tetrachlorobenzene
C79	KEROSEN	PPB	10000	11	11 ***	.		Kerosene
C80	AMMONIU	PPB	50	12	12 ***	.		Ammonium ion
C87	CITRUSR	PPB	1000	11	11 ***	.		Citrus red
H15	2,4,5-T	PPB	2	12	12 ***	.		2,4,5-T
H68	HEXONE	PPB	10	12	12 ***	.		Methyl Isobutyl Ketone
I01	ACETONE	PPB	10	12	12 ***	.		Acetone by VOA
I21	TRIBUPH	PPB	10	11	11 ***	.		Tributylphosphoric Acid
I28	TAF	PPB	10	12	12 ***	.		Tetrahydrofuran
L63	14DBEN	PPB	5	12	12 ***	75	EPA	p-Dichlorobenzene
L64	CHLROB	PPB	10	11	11 ***	60	EPAP	Chlorobenzene (by ABN)

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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-3 September Through November 1989

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
			Contamination Indicator Parameters					
2-W6-2	07SEP89		404	399	7.90	7.99	#400	70
	07SEP89	1	406	410	7.90	7.98	#400	89
	07SEP89	2	406	405	7.90	7.97	#400	96
	07SEP89	3	406	406	8	7.98	#400	96
2-W7-1	07SEP89		389	381	7.80	7.92	#300	#3
	07SEP89	1	388	384	7.80	7.91	#200	#3
	07SEP89	2	386	385	7.80	7.90	#200	#7
	07SEP89	3	387	384	7.90	7.91	#300	#7
2-W7-2	07SEP89		281	281	8	8.19	#500	#7
	07SEP89	1	283	284	8	8.18	#500	#5
	07SEP89	2	282	284	8	8.14	#300	#2
	07SEP89	3	283	284	8	8.15	#400	#5
2-W7-3	15SEP89		309	302	8	8.21	#400	<10
	15SEP89	1	298	305	8	8.11	#600	#-1
	15SEP89	2	301	307	8	8.06	#400	#2
	15SEP89	3	299	307	8	8.03	#800	#0
2-W7-4	13SEP89		454	459	7.90	7.78	#400	148
	13SEP89	1	455	461	7.90	7.79	#400	176
	13SEP89	2	454	461	7.90	7.77	#1000	205
	13SEP89	3	455	461	7.90	7.77	#600	153
	20NOV89		491	.	.	8.28	.	176
	20NOV89	1	491	.	.	8.28	.	143
	20NOV89	2	491	.	.	8.26	.	194
	20NOV89	3	490	.	.	8.26	.	211
2-W7-5	08SEP89		373	358	7.90	7.88	#1400	30
	08SEP89	1	370	359	7.90	7.88	#700	25
	08SEP89	2	369	360	7.90	7.88	#800	25
	08SEP89	3	368	361	7.90	7.90	#800	29
	20NOV89		380	.	.	8.18	#400	.
	20NOV89	1	381	.	.	8.21	#500	.
	20NOV89	2	382	.	.	8.19	#500	.
	20NOV89	3	383	.	.	8.18	#800	.
2-W7-6	08SEP89		424	354	8.70	9.15	#900	#5
	08SEP89	1	422	338	8.60	9.16	#500	#4
	08SEP89	2	425	346	8.70	9.15	#800	#6
	08SEP89	3	424	348	8.70	9.14	#600	#2
2-W8-1	12SEP89		397	400	7.90	7.83	#1500	#8
	12SEP89	1	393	394	7.90	7.83	#600	#3
	12SEP89	2	395	394	7.90	7.84	#900	#7
	12SEP89	3	397	396	8	7.84	#500	#3
	20NOV89		438	.	.	8.16	#300	.

TABLE 4.11. (contd)

Contamination Indicator Parameters

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
	20NOV89	1	435	.	.	8.14	#400	.
	20NOV89	2	438	.	.	8.10	#300	.
	20NOV89	3	435	.	.	8.09	#300	.
2-W9-1	11SEP89		375	389	8.10	8.28	#600	14
	11SEP89	1	374	389	8.10	8.27	#400	#5
	11SEP89	2	375	394	8.10	8.26	#600	#8
	11SEP89	3	376	399	8.10	8.25	#600	#7
2-W10-13	13SEP89		342	341	7.90	7.70	#1300	27
	13SEP89	1	341	341	7.90	7.67	2500	16.4
	13SEP89	2	341	341	7.90	7.66	3500	19
	13SEP89	3	341	341	7.90	7.67	#1400	20
	20NOV89		375	.	.	8.21	#300	.
	20NOV89	1	375	.	.	8.18	#300	.
	20NOV89	2	374	.	.	8.15	#400	.
	20NOV89	3	374	.	.	8.14	#400	.
2-W10-14	15SEP89		346	343	7.80	7.92	#800	#2
	15SEP89	1	347	344	7.80	7.91	#400	#2
	15SEP89	2	348	346	7.80	7.91	#300	#4
	15SEP89	3	347	348	7.80	7.91	#500	#2

TABLE 4.11. (contd)

Well name	Collection date	Duplicate sample number	FCHROMI PPB 10/50	FMANGAN PPB 5/50s	FPOTASS PPB 100/.	FBERYLL PPB 5/.	FSTRONT PPB 10/.	ALPHAHI PCI/L 4/15	ALUMNUM PPB 150/.	ARSENIC PPB 5/50
2-W6-2	07SEP89		41	<5	3480	7	244	2.69	<150	<5
2-W7-1	07SEP89		<10	11	3680	<5	163	2.10	<150	<5
2-W7-2	07SEP89		12	<5	2730	<5	161	1.59	<150	<5
2-W7-3	15SEP89		<10	150	5270	<5	153	1.58	<150	<5
2-W7-4	13SEP89		<10	<5	3850	<5	246	2.46	<150	<5
2-W7-5	08SEP89		<10	<5	3400	<5	171	1.64	<150	<5
2-W7-6	08SEP89		.	.	.	.	.	24.4 (a)	29700 (a)	10 (a)
2-W8-1	12SEP89		<10	<5	3970	<5	191	*.0421	<150	<5
2-W9-1	11SEP89		11	<5	5220	<5	196	2.23	<150	<5
2-W10-13	13SEP89		<10	7	4070	<5	166	*.531	<150	<5
	13SEP89	1	<10	7	3890	<5	160	1.57	<150	<5
2-W10-14	15SEP89		<10	<5	4830	5	183	1.46	<150	<5

Well name	Collection date	Duplicate sample number	BARIUM PPB 6/1000	FBARIUM PPB 6/1000	BETA PCI/L 8/50	BORON PPB 10/.	FBORON PPB 10/.	CADMIUM PPB 2/10	CALCIUM PPB 50/.	FCALCIU PPB 50/.
2-W6-2	07SEP89		41	37	16.4	16	<10	<2	41800	40500
2-W7-1	07SEP89		35	30	4.45	13	21	<2	48300	40100
2-W7-2	07SEP89		37	39	5.85	11	14	<2	27800	29000
2-W7-3	15SEP89		40	41	4.26	20	16	<2	28900	29300
2-W7-4	13SEP89		36	38	13.6	<10	11	<2	54000	53100
2-W7-5	08SEP89		31	34	8.21	<10	10	<2	38400	38300
2-W7-6	08SEP89		507 (b)	.	13.2	39	.	10 (a)	32500 (b)	.
2-W8-1	12SEP89		35	35	4.24	16	17	<2	46300	45200
2-W9-1	11SEP89		36	37	6.32	22	19	<2	43300	44600
2-W10-13	13SEP89		31	29	7.01	14	15	<2	40400	38700
	13SEP89	1	29	27	7.98	15	21	<2	38900	37300
2-W10-14	15SEP89		65	66	5.51	14	16	<2	32500	33100

TABLE 4.11. (contd)

Well name	Collection date	Duplicate sample number	CHLFORM PPB 5/100	CHLORID PPB 500/250000s	CHROMUM PPB 10/50	CO-60 PCI/L 22.5/100r	COLIWF PPB 1/1	COPPER PPB 10/1300p	CS-137 PCI/L 20/200r	IRON PPB 30/300s
2-W6-2	07SEP89		#4	3500	44	*-0.533	<1	<10	*5.96	75
2-W7-1	07SEP89		<5	9000	29	*2.27	<1	<10	*.353	110
2-W7-2	07SEP89		<5	9000	20	*2.22	<1	<10	*3.01	97
2-W7-3	15SEP89		<5	4200	25	*2.08	<1	<10	*2.12	409
2-W7-4	13SEP89		6	18000	33	8.29	<1	<10	*-1	100
2-W7-5	08SEP89		<5	14000	27	*-3.04	<1	<10	*4.01	123
2-W7-6	08SEP89		<5	5900	37(b)	*-1.89	.	26(a)	*-2.62	29200(b)
2-W8-1	12SEP89		<5	17000	23	*.809	84	<10	*-0.626	108
2-W9-1	11SEP89		<5	20000	35	*2.07	.	<10	*-0.869	857
2-W10-13	13SEP89		<5	23000	24	*3.40	<1	<10	*-1.30	149
	13SEP89	1	<5	23000	24	.	<1	<10	.	130
2-W10-14	15SEP89		<5	8000	34	*-2.65	<1	<10	*-0.471	159

Well name	Collection date	Duplicate sample number	FIRON PPB 30/300s	LEADGF PPB 5/50	LITHIUM PPB 10/.	MAGNES PPB 50/.	FMAGNES PPB 50/.	MANGESE PPB 5/50s	METHONE PPB 10/.	NICKEL PPB 10/.
2-W6-2	07SEP89		<30	<5	<10	17700	17400	<5	<10	<10
2-W7-1	07SEP89		<30	<5	<10	15500	13200	14	#8	28
2-W7-2	07SEP89		<30	<5	<10	13200	14000	<5	#9	18
2-W7-3	15SEP89		212	<5	<10	11500	11600	154	<10	16
2-W7-4	13SEP89		<30	<5	<10	17200	17000	6	<10	15
2-W7-5	08SEP89		<30	<5	<10	13400	13400	<5	#9	15
2-W7-6	08SEP89		.	104(a)	32	14900	.	501(b)	#8	31(b)
2-W8-1	12SEP89		<30	<5	<10	14300	13900	<5	<10	13
2-W9-1	11SEP89		<30	<5	<10	15000	15500	14	<10	33
2-W10-13	13SEP89		52	<5	<10	12200	11800	8	<10	33
	13SEP89	1	53	<5	<10	11800	11400	8	<10	36
2-W10-14	15SEP89		40	<5	<10	11500	11700	6	<10	19

Well name	Collection date	Duplicate sample number	FNICKEL PPB 10/.	NITRATE PPB 500/45000	POTASUM PPB 100/.	RADIUM PCI/L 1/5	RU-106 PCI/L 172.5/30r	SILICON PPB 50/.	FSILICO PPB 50/.	SODIUM PPB 200/.
2-W6-2	07SEP89		10	24600	3520	.148	*-28.5	19900	19200	10500
2-W7-1	07SEP89		22	43000	4340	.191	*-14.8	21700	18100	9770
2-W7-2	07SEP89		18	42000	2570	.250	*53	18700	19600	8180
2-W7-3	15SEP89		<10	3200	5360	*.125	*-2.96	20100	20400	18600
2-W7-4	13SEP89		<10	74000	3810	.363	*-5.23	17400	17200	8590
2-W7-5	08SEP89		<10	45000	3470	*.0404	*-35.9	17000	16900	9220
2-W7-6	08SEP89		.	5900	5880(b)	7.72	*-2.33	53300(b)	.	85500(b)
2-W8-1	12SEP89		<10	30000	4180	.216	*25.2	20700	20100	9990
2-W9-1	11SEP89		21	20300	5000	.280	*26.1	18300	18600	11300

TABLE 4.11. (contd)

Well name	Collection date	Duplicate sample number	FNICKEL PPB 10/.	NITRATE PPB 500/45000	POTASUM PPB 100/.	RADIUM PCI/L 1/5	RU-106 PCI/L 172.5/30r	SILICON PPB 50/.	FSILICO PPB 50/.	SODIUM PPB 200/.
2-W10-13	13SEP89		25	7700	4180	.328	*39.6	23000	22000	11100
	13SEP89	1	70	7700	3990	.414	.	22100	21300	10600
2-W10-14	15SEP89		<10	20400	4830	.194	*52.2	21300	21600	15900

Well name	Collection date	Duplicate sample number	FSODIUM PPB 200/.	STRONUM PPB 10/.	SULFATE PPB 500/250000s	TC PPB 1000/.	TC-99 PCI/L 15/900r	TETRANE PPB 5/5	TITAN PPB 60/.	TRITIUM PCI/L 500/20000
2-W6-2	07SEP89		10400	251	25700	27200	85.9	113	<60	14300
2-W7-1	07SEP89		8470	190	50000	22500	8.22	<5	<60	*-39.3
2-W7-2	07SEP89		8720	152	50000	22700	*5.41	<5	<60	*-60.9
2-W7-3	15SEP89		18300	153	23000	27400	*-0.647	<5	<60	*135
2-W7-4	13SEP89		8640	249	31000	22500	68.5	189	<60	451
2-W7-5	08SEP89		9200	171	28000	23000	26.6	29	<60	277
2-W7-6	08SEP89		.	483(b)	35000	30000	*-0.742	<5	263(a)	914
2-W8-1	12SEP89		9700	196	48000	23000	12.8	<5	<60	*112
2-W9-1	11SEP89		11700	191	52000	21000	*3.95	<5	<60	265
2-W10-13	13SEP89		10900	173	22200	23300	17.3	10	<60	285
	13SEP89	1	10400	167	22200	.	.	12	<60	.
2-W10-14	15SEP89		15800	178	23800	25200	*.938	<5	<60	*173

Well name	Collection date	Duplicate sample number	TURBID NTU .10/1	U PCI/L .50/600d	VANADUM PPB 5/.	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000s
2-W6-2	07SEP89		.500	1.11	21	22	<5	<5
2-W7-1	07SEP89		.600	.480	27	25	16	<5
2-W7-2	07SEP89		1.20	.712	23	21	<5	<5
2-W7-3	15SEP89		2	1.01	21	22	29	24
2-W7-4	13SEP89		.600	1.40	24	25	11	21
2-W7-5	08SEP89		.600	1.18	22	24	18	17
2-W7-6	08SEP89		200(a)	7.57(a)	54(b)	.	175(b)	.
2-W8-1	12SEP89		1.30	.584	28	28	14	12
2-W9-1	11SEP89		3	.884	18	21	12	<5
2-W10-13	13SEP89		1.10	.699	30	29	15	9
	13SEP89	1	.	.492	34	28	22	839
2-W10-14	15SEP89		.700	.599	33	36	9	6

TABLE 4.11. (contd)

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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 value may be high due to the presence of suspended solids.
(b) The analytical laboratory reported that the sample was cloudy or contained particulates. The higher result for the unfiltered sample (relative to the filtered sample) can be attributed to suspended solids.

TABLE 4.12. Constituent List and Summary of Sampling Results for the Low-Level Burial Grounds, WMA-4 September 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	.	32	0	700	WDOE		Conductivity, Laboratory
191	CONDFLD	UMHO	1	29	0	700	WDOE		Specific conductance
199	PHFIELD		.100	29	0	6.5-8.5	EPAS		pH, Field Measurement
207	PH-LAB		.0100	32	0	6.5-8.5	EPAS		pH, Laboratory Measurement
C69	TOC	PPB	2000	32	32 ***	.			Total organic carbon
H42	TOXLDL	PPB	10	32	5	.			Total Organic Halogen, Low Det. Level

---------- 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	2.20	2	2 ***	1	EPA		Coliform bacteria
111	BETA	PCI/L	8	8	0	50	EPA		Gross beta
112	ALPHAHI	PCI/L	4	8	1	15	EPA	xxx	Alpha, High Detection Level
181	RADIUM	PCI/L	1	8	3	5	EPA		Radium
A06	BARIUM	PPB	6	8	0	1000	EPA		Barium
A07	CADMIUM	PPB	2	8	7	10	EPA	xxx	Cadmium
A08	CHROMUM	PPB	10	8	0	50	EPA	xxx	Chromium
A10	SILVER	PPB	10	8	8 ***	50	EPA		Silver
A20	ARSENIC	PPB	5	8	8 ***	50	EPA		Arsenic
A21	MERCURY	PPB	.100	8	8 ***	2	EPA		Mercury
A22	SELENUM	PPB	5	8	8 ***	10	EPA		Selenium
A33	ENDRIN	PPB	.100	8	8 ***	.200	EPA		Endrin
A34	METHLOR	PPB	3	8	8 ***	100	EPA		Methoxychlor
A35	TOXAENE	PPB	1	8	8 ***	5	EPA		Toxaphene
A36	a-BHC	PPB	.100	8	8 ***	4	EPA		Alpha-BHC
A37	b-BHC	PPB	.100	8	8 ***	4	EPA		Beta-BHC
A38	g-BHC	PPB	.100	8	8 ***	4	EPA		Gamma-BHC
A39	d-BHC	PPB	.100	8	8 ***	4	EPA		Delta-BHC
A51	LEADGF	PPB	5	8	7	50	EPA	xxx	Lead (graphite furnace)
C72	NITRATE	PPB	500	8	0	45000	EPA	xxx	Nitrate
C74	FLUORID	PPB	500	8	5	4000	EPA		Fluoride
H13	2,4-D	PPB	2	8	8 ***	100	EPA		2,4-D
H14	2,4,5TP	PPB	2	8	8 ***	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	6	50	EPA		Chromium, filtered
H23	FSILVER	PPB	10	7	7 ***	50	EPA		Silver, filtered
H37	FARSENI	PPB	5	7	7 ***	50	EPA		Arsenic, filtered

TABLE 4.12. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
H38	FMERCUR	PPB	.100	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
H60	TURBID	NTU	.100	8	0	1	EPA	xxx	Turbidity
P19	COLIMF	PPB	1	6	6 ***	1	EPA		Coliform (Membrane Filter)

---------- Constituent List= Water Quality Parameters ----------

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
A11	SODIUM	PPB	200	8	0	.			Sodium
A17	MANGESE	PPB	5	8	0	50	EPAS	xxx	Manganese
A19	IRON	PPB	30	8	0	300	EPAS	xxx	Iron
C57	PHENOL	PPB	10	8	8 ***	.			Phenol
C73	SULFATE	PPB	500	8	0	250000	EPAS		Sulfate
C75	CHLORID	PPB	500	8	0	250000	EPAS		Chloride
H24	FSODIUM	PPB	200	7	0	.			Sodium, filtered
H29	FMANGAN	PPB	5	7	6	50	EPAS		Manganese, filtered
H31	FIRON	PPB	30	7	4	300	EPAS		Iron, filtered
H57	LPHENOL	PPB	10	8	8 ***	.			Phenol, low DL

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
010	CO-60	PCI/L	22.5	8	8 ***	100	EPAR		Cobalt-60
024	CS-137	PCI/L	20	8	8 ***	200	EPAR		Cesium-137
034	RU-106	PCI/L	172.5	8	8 ***	30	EPAR		Ruthenium-106
104	U	PCI/L	.500	8	0	600	DOE		Uranium
108	TRITIUM	PCI/L	500	8	2	20000	EPA	xxx	Tritium
197	TC-99	PCI/L	15	8	5	900	EPAR		Technetium-99
A01	BERYLUM	PPB	5	8	8 ***	.			Beryllium
A03	STRONUM	PPB	10	8	0	.			Strontium
A04	ZINC	PPB	5	8	0	5000	EPAS		Zinc
A05	CALCIUM	PPB	50	8	0	.			Calcium
A12	NICKEL	PPB	10	8	0	.			Nickel
A13	COPPER	PPB	10	8	7	1300	EPAP		Copper
A14	VANADUM	PPB	5	8	0	.			Vanadium
A15	ANTIONY	PPB	100	8	8 ***	.			Antimony
A16	ALUMNUM	PPB	150	8	6	.			Aluminum
A18	POTASUM	PPB	100	8	0	.			Potassium
A50	MAGNES	PPB	50	8	0	.			Magnesium

TABLE 4.12. (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	8	7	.			Phosphate
H16	TC	PPB	1000	8	0	.			Total carbon
H18	FZINC	PPB	5	7	0	5000	EPAS		Zinc, filtered
H19	FCALCIU	PPB	50	7	0	.			Calcium, filtered
H25	FNICKEL	PPB	10	7	6	.			Nickel, filtered
H26	FCOPPER	PPB	10	7	7 ***	1300	EPAP		Copper, filtered
H27	FVANADI	PPB	5	7	0	.			Vanadium, filtered
H28	FALUMIN	PPB	150	7	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
H35	FSTRONT	PPB	10	7	0	.			Strontium, filtered
H36	FANTIMO	PPB	100	7	7 ***	.			Antimony, filtered
H66	BROMIDE	PPB	1000	8	8 ***	.			Bromide
H67	NITRITE	PPB	1000	8	8 ***	.			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	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 ----------

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
A61	TETRANE	PPB	5	8	2	5	EPA	xxx	Carbon Tetrachloride by GC/MS
A62	BENZENE	PPB	5	8	8 ***	5	EPA		Benzene
A64	METHONE	PPB	10	8	6	.			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	xxx	Trichloroethylene

TABLE 4.12. (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
A70	PERCENE	PPB	5	8	8 ***	.		Tetrachloroethylene
A71	OPXYLE	PPB	5	8	7	440	EPAP	Xylene-o,p
A80	CHLFORM	PPB	5	8	4	100	EPA	Chloroform
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
B13	VINYIDE	PPB	10	8	8 ***	2	EPA	Vinyl chloride
B14	M-XYLE	PPB	5	8	8 ***	440	EPAP	Xylene-m
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	p-Dichlorobenzene
B89	HEXCBEN	PPB	10	8	8 ***	.		Hexachlorobenzene
C26	PENTCHB	PPB	10	8	8 ***	.		Pentachlorobenzene
C37	TETRCHB	PPB	10	8	8 ***	.		1,2,4,5-tetrachlorobenzene
C43	TRICHLB	PPB	10	8	8 ***	.		1,2,4-trichlorobenzene
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
C79	KEROSEN	PPB	10000	8	8 ***	.		Kerosene
C80	AMMONIU	PPB	50	8	8 ***	.		Ammonium ion
C87	CITRUSR	PPB	1000	8	8 ***	.		Citrus red
H15	2,4,5-T	PPB	2	8	8 ***	.		2,4,5-T
H68	HEXONE	PPB	10	8	8 ***	.		Methyl Isobutyl Ketone
I01	ACETONE	PPB	10	8	5	.		Acetone by VOA
I21	TRIBUPH	PPB	10	8	8 ***	.		Tributylphosphoric Acid
I28	TAF	PPB	10	8	8 ***	.		Tetrahydrofuran
L63	14DBEN	PPB	5	8	8 ***	75	EPA	p-Dichlorobenzene
L64	CHLROB	PPB	10	8	8 ***	60	EPAP	Chlorobenzene (by ABN)

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 4.13. Constituents with at Least One Detected Value for the Low-Level Burial Grounds, WMA-4 September 1989

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
			Contamination Indicator Parameters					
2-W15-15	12SEP89		261	268	8	7.94	#400	499
	12SEP89	1	263	268	8	7.99	#600	390
	12SEP89	2	262	268	8	7.95	#900	533
	12SEP89	3	263	268	8	7.98	#500	440
2-W15-16	22SEP89		598	643	7.90	7.88	#700	5370
	22SEP89	1	597	643	7.90	7.85	#800	5180
	22SEP89	2	595	641	7.90	7.83	#900	5330
	22SEP89	3	598	627	7.80	7.83	#600	4620
2-W15-17	27SEP89		437	414	7.80	7.58	#1900	#8
	27SEP89	1	.	413	7.80	.	#1300	12
	27SEP89	2	.	413	7.80	.	#1500	14
	27SEP89	3	.	413	7.80	.	#1300	18
2-W15-18	25SEP89		385	389	7.90	7.86	#400	1150
	25SEP89	1	385	390	7.90	7.84	#800	1170
	25SEP89	2	378	390	7.90	7.84	#500	1190
	25SEP89	3	382	388	7.90	7.84	#1100	1140
2-W18-21	12SEP89		234	230	7.90	7.68	#600	105
	12SEP89	1	233	231	7.90	7.70	#500	111
	12SEP89	2	233	232	7.90	7.72	#600	120
	12SEP89	3	233	232	7.90	7.72	#700	107
2-W18-22	22SEP89		337	354	8	7.82	#600	#5
	22SEP89	1	337	353	8	7.82	#300	#2
	22SEP89	2	337	353	8	7.82	#200	#1
	22SEP89	3	338	357	8	7.81	#500	#2
2-W18-23	22SEP89		296	253	7.80	7.93	#500	476
	22SEP89	1	294	255	7.90	7.93	#500	515
	22SEP89	2	291	255	7.90	7.93	#300	515
	22SEP89	3	289	257	8	7.94	#600	480
2-W18-24	25SEP89		258	276	7.90	8.07	#700	624
	25SEP89	1	254	277	7.90	8.03	#500	642
	25SEP89	2	253	277	7.90	8.01	#500	576
	25SEP89	3	252	276	7.90	7.99	#400	610

TABLE 4.13. (contd)

Well name	Collection date	Duplicate sample number	FLUORID PPB 500/4000	FCHROMI PPB 10/50	FMANGAN PPB 5/50s	FPOTASS PPB 100/.	FSTRONT PPB 10/.	ACETONE PPB 10/.	ALPHAHI PCI/L 4/15	ALUMNUM PPB 150/.
2-W15-15	12SEP89		<500	<10	<5	3290	99	<10	3.39	<150
2-W15-16	22SEP89		700	<10	<5	5580	262	<10	1.74	<150
2-W15-17	27SEP89		<500	.	.	.	.	23	1.73	336 (a)
2-W15-18	25SEP89		700	26	8	4160	148	22	*.967	<150
2-W18-21	12SEP89		<500	<10	<5	3230	92	<10	21.5	<150
2-W18-22	22SEP89		<500	<10	<5	4340	163	<10	1.02	202
2-W18-23	22SEP89		<500	<10	<5	3380	107	<10	1.45	<150
2-W18-24	25SEP89		600	<10	<5	3470	107	20	1.87	<150

Well name	Collection date	Duplicate sample number	BARIUM PPB 6/1000	FBARIUM PPB 6/1000	BETA PCI/L 8/50	BORON PPB 10/.	FBORON PPB 10/.	CADMIUM PPB 2/10	CALCIUM PPB 50/.	FCALCIU PPB 50/.
2-W15-15	12SEP89		29	27	3.03	34	22	<2	24900	23700
2-W15-16	22SEP89		64	65	6.70	30	25	<2	56800	58100
2-W15-17	27SEP89		70 (b)	.	8.06	30 (b)	.	49	36600 (b)	.
2-W15-18	25SEP89		44	42	8.29	23	20	<2	32900	32900
2-W18-21	12SEP89		21	25	7.28	26	23	<2	21400	22400
2-W18-22	22SEP89		58	53	4.83	16	18	<2	34800	33900
2-W18-23	22SEP89		28	28	3.46	21	24	<2	25500	25200
2-W18-24	25SEP89		29	29	7.37	21	20	<2	24700	25300

Well name	Collection date	Duplicate sample number	CHLFORM PPB 5/100	CHLORID PPB 500/250000s	CHROMUM PPB 10/50	CO-60 PCI/L 22.5/100r	COPPER PPB 10/1300p	CS-137 PCI/L 20/200r	IRON PPB 30/300s	FIRON PPB 30/300
2-W15-15	12SEP89		8	3900	26	*-2.02	<10	*4.88	162	<30
2-W15-16	22SEP89		42	22000	142	*-1.65	<10	*3.48	666	<30
2-W15-17	27SEP89		#3	16000	85 (b)	*-0.355	59 (a)	*-5.63	4150 (b)	.
2-W15-18	25SEP89		<5	4000	42	*-2.83	<10	*4.71	363	156
2-W18-21	12SEP89		#4	3400	55	*-4.98	<10	*.441	431	32
2-W18-22	22SEP89		<5	9000	106	*-0.189	<10	*-3.77	905	33
2-W18-23	22SEP89		7	3300	68	*2.07	<10	*1.99	318	<30
2-W18-24	25SEP89		17	4000	22	*-0.404	<10	*2.88	101	<30

TABLE 4.13. (contd)

Well name	Collection date	Duplicate sample number	LEADGF PPB 5/50	MAGNES PPB 50/.	FMAGNES PPB 50/.	MANGESE PPB 5/50s	METHONE PPB 10/.	METHYCH PPB 5/.	NICKEL PPB 10/.	FNICKEL PPB 10/.
2-W15-15	12SEP89		<5	7390	7060	5	<10	<5	17	<10
2-W15-16	22SEP89		<5	15700	16000	13	<10	<5	68	<10
2-W15-17	27SEP89		82(a)	13100(b)	.	109(b)	<10	<5	71	.
2-W15-18	25SEP89		<5	10100	10100	19	16(c)	8	16	13
2-W18-21	12SEP89		<5	6470	6760	8	<10	<5	28	<10
2-W18-22	22SEP89		<5	12000	11700	17	11	<5	61	<10
2-W18-23	22SEP89		<5	7370	7210	8	<10	<5	38	<10
2-W18-24	25SEP89		<5	7590	7820	12	<10	<5	13	<10

Well name	Collection date	Duplicate sample number	NITRATE PPB 500/45000	OPXYLE PPB 5/440p	PHOSPHA PPB 1000/.	POTASUM PPB 100/.	RADIUM PCI/L 1/5	RU-106 PCI/L 172.5/30r	SILICON PPB 50/.	FSILICO PPB 50/.
2-W15-15	12SEP89		15300	<5	<1000	3420	.177	*12.6	20300	19200
2-W15-16	22SEP89		67000	<5	<1000	5430	.236	*33.2	22400	22800
2-W15-17	27SEP89		16800	<5	1100(a)	5490(b)	*.0708	*-34.2	17800	.
2-W15-18	25SEP89		72000	6	<1000	4180	.335	*-11.8	22000(b)	22000
2-W18-21	12SEP89		2500	<5	<1000	3130	*.104	*-10.2	18900	19600
2-W18-22	22SEP89		15800	<5	<1000	4520	.497	*-3.94	22400	21300
2-W18-23	22SEP89		5800	<5	<1000	3530	.256	*-11.4	20400	20000
2-W18-24	25SEP89		18700	<5	<1000	3350	*.00620	*-17.6	22200	22900

Well name	Collection date	Duplicate sample number	SODIUM PPB 200/.	FSODIUM PPB 200/.	STRONUM PPB 10/.	SULFATE PPB 500/250000s	TC PPB 1000/.	TC-99 PCI/L 15/900r	TETRANE PPB 5/5	TRICENE PPB 5/5
2-W15-15	12SEP89		19000	18100	104	14900	24000	*5.43	543	<5
2-W15-16	22SEP89		39900	41600	254	67000	32000	11.9	7100	7
2-W15-17	27SEP89		24200(b)	.	202(b)	37000	32000	13.2	<5	<5
2-W15-18	25SEP89		23300	23700	147	20000	23000	10.1	189(d)	<5
2-W18-21	12SEP89		18400	19300	89	14700	23000	*.400	138	<5
2-W18-22	22SEP89		14000	13600	168	18000	28000	*2.46	<5	<5
2-W18-23	22SEP89		14200	13700	109	15000	22600	*2.19	611	<5
2-W18-24	25SEP89		16500	17100	105	19300	21000	*.564	737	<5

Well name	Collection date	Duplicate sample number	TRITIUM PCI/L 500/20000	TURBID NTU .10/1	U PCI/L .50/600d	VANADUM PPB 5/.	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000s
2-W15-15	12SEP89		267	2.10	3.17	31	29	21	17
2-W15-16	22SEP89		33700	1.70	2.01	25	24	6	6
2-W15-17	27SEP89		261	27(a)	.693	22(b)	.	642(b)	.
2-W15-18	25SEP89		*17.8	3.20	.691	24	24	14	10

TABLE 4.13. (contd)

Well name	Collection date	Duplicate sample number	TRITIUM PCI/L 500/20000	TURBID NTU .10/1	U PCI/L .50/600d	VANADUM PPB 5/.	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000s
2-W18-21	12SEP89		309	2.10	24	32	29	13	12
2-W18-22	22SEP89		1090	3.60	.875	21	24	35	16
2-W18-23	22SEP89		615	1.80	.988	25	26	12	12
2-W18-24	25SEP89		*219	.600	.709	32	33	7	11

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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 value may be high due to the presence of suspended solids.
(b) The analytical laboratory reported that the sample was cloudy or contained particulates. The higher results for the unfiltered sample (relative to the filtered sample) can be attributed to suspended solids.
(c) Suspect data. The reagent blank for the sample group showed approximately equal amounts of this constituent as found in the sample.
(d) Suspect data. The value is inconsistent with historical data. The sample container was not full, and the value may be low due to volatilization of this constituent.

TABLE 4.14. Critical Mean Values for Indicator Parameter Data at the Low-Level Burial Grounds, Waste Management Area 1, September 1989[a]

Constituent, Units[b]	n	df	tc	Average	Standard Deviation	Critical Mean
Conductivity in the field, μmho/cm	12	11	4.7244	271.29	45.061	492.87
pH, field	12	11	5.1617	8.0294	0.1437	7.2573, 8.8014
Total organic carbon, ppb	12	11	4.7244	485.79	117.62	1064.2
Total organic halogens, ppb	12	11	4.7244	5.3958	2.5639	18.003

(a) Data collected September 1988 to August 1989. Values calculated based on 32 comparisons.
(b) The following notations are used in this table:
df = degrees of freedom (n-1).
n = number of background replicate averages.
tc = Bonferroni critical t-value for appropriate df and 32 comparisons.

TABLE 4.15. Contamination Indicator Parameter Replicate Averages for the Low-Level Burial Grounds, Waste Management Area 1, September Through December 1989

Constituent Code	Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088	CONDLAB	umho	2-E28-26	07SEP89	4	488	0.50	488	489	0.1
			2-E28-26	07NOV89	4	514	1.73	512	516	0.3
			2-E28-27	07SEP89	4	320	1.71	318	322	0.5
			2-E32-2	06SEP89	4	305	1.50	303	306	0.5
			2-E32-3	06SEP89	4	416	0.00	416	416	0.0
			2-E32-4	08SEP89	4	427	1.91	425	429	0.4
			2-E33-28	12SEP89	4	273	1.26	272	275	0.5
			2-E33-29	07SEP89	4	301	0.50	300	301	0.2
			2-E33-30	07SEP89	4	304	1.29	302	305	0.4
191	CONDFLD	umho	2-E28-26	07SEP89	4	511	1.15	510	512	0.2
			2-E28-26	07NOV89	1	519	.	519	519	.
			2-E28-26	30NOV89	4	574	2.22	572	577	0.4
			2-E28-27	07SEP89	4	334	1.73	332	335	0.5
			2-E32-2	06SEP89	4	314	0.82	313	315	0.3
			2-E32-3	06SEP89	4	445	1.26	443	446	0.3
			2-E32-4	08SEP89	4	447	1.00	445	447	0.2
			2-E33-28	12SEP89	4	274	0.00	274	274	0.0
			2-E33-29	07SEP89	4	299	1.41	298	301	0.5
			2-E33-30	07SEP89	4	300	2.22	297	302	0.7
199	PHFIELD		2-E28-26	07SEP89	4	7.52	0.021	7.50	7.54	0.3
			2-E28-26	07NOV89	1	7.68	.	7.68	7.68	.
			2-E28-26	30NOV89	4	7.52	0.024	7.49	7.54	0.3
			2-E28-27	07SEP89	4	8.00	0.005	8.00	8.01	0.1
			2-E32-2	06SEP89	4	7.91	0.005	7.91	7.92	0.1
			2-E32-3	06SEP89	4	7.22	0.042	7.18	7.27	0.6
			2-E32-4	08SEP89	4	7.69	0.019	7.68	7.72	0.2
			2-E33-28	12SEP89	4	7.70	0.006	7.69	7.70	0.1
			2-E33-29	07SEP89	4	8.04	0.005	8.03	8.04	0.1
			2-E33-30	07SEP89	4	8.10	0.014	8.09	8.12	0.2
207	PH-LAB		2-E28-26	07SEP89	4	7.60	0.00	7.6	7.6	0.0
			2-E28-26	07NOV89	4	7.55	0.06	7.5	7.6	0.8
			2-E28-27	07SEP89	4	8.10	0.00	8.1	8.1	0.0
			2-E32-2	06SEP89	4	8.00	0.00	8.0	8.0	0.0
			2-E32-3	06SEP89	4	7.77	0.05	7.7	7.8	0.6
			2-E32-4	08SEP89	4	7.90	0.00	7.9	7.9	0.0
			2-E33-28	12SEP89	4	8.00	0.00	8.0	8.0	0.0
			2-E33-29	07SEP89	4	8.10	0.00	8.1	8.1	0.0
			2-E33-30	07SEP89	4	8.10	0.00	8.1	8.1	0.0

TABLE 4.15. (contd)

Constituent Code Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
C69 TOC	ppb	2-E28-26	07SEP89	4	500	81.6	400	600	16.3
		2-E28-26	07NOV89	4	375	50.0	300	400	13.3
		2-E28-27	07SEP89	4	575	95.7	500	700	16.7
		2-E32-2	06SEP89	4	500	0.0	500	500	0.0
		2-E32-3	06SEP89	4	450	57.7	400	500	12.8
		2-E32-4	06SEP89	4	800	245.0	500	1,000	30.6
		2-E33-28	12SEP89	4	650	100.0	600	800	15.4
		2-E33-29	07SEP89	4	475	50.0	400	500	10.5
		2-E33-30	07SEP89	4	550	57.7	500	600	10.5
H42 TOXLDL	ppb	2-E28-26	07SEP89	4	0.00	4.08	-3	6	.
		2-E28-26	07NOV89	4	4.00	2.16	1	6	54.0
		2-E28-27	07SEP89	4	4.00	4.55	-2	8	113.7
		2-E32-2	06SEP89	4	4.50	3.32	1	9	73.7
		2-E32-3	06SEP89	4	6.00	2.16	3	8	36.0
		2-E32-4	06SEP89	4	3.25	0.96	2	4	29.5
		2-E33-28	12SEP89	4	5.25	3.10	1	8	59.0
		2-E33-29	07SEP89	4	6.50	3.11	3	10	47.8
		2-E33-30	07SEP89	4	6.75	4.57	2	13	67.8

TABLE 4.16. Critical Mean Values for Indicator Parameter Data at the Low-Level Burial Grounds, Waste Management Area 2, September 1989[a]

Constituent, Units[b]	n	df	tc	Average	Standard Deviation	Critical Mean
Conductivity in the field, μmho/cm	8	7	5.7282	275.09	43.325	538.32
pH, field	8	7	6.4295	7.9763	0.10283	7.275, 8.6775
Total organic carbon, ppb	8	7	5.7282	465.63	117.21	1177.8
Total organic halogens, ppb	8	7	5.7282	3.9063	1.4635	12.798

(a) Data collected September 1988 to August 1989. Values calculated based on 28 comparisons.
(b) The following notations are used in this table:
df = degrees of freedom (n-1).
n = number of background replicate averages.
tc = Bonferroni critical t-value for appropriate df and 28 comparisons.

9 2 1 2 6 4 2 1 7 2 0

TABLE 4.17. Contamination Indicator Parameter Replicate Averages for the Low-Level Burial Grounds, Waste Management Area 2, September 1989

Constituent Code	Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088	CONDLAB	umho	2-E27-8	08SEP89	4	341	0.5	341	342	0.1
			2-E27-9	06SEP89	4	338	1.0	337	339	0.3
			2-E27-10	06SEP89	4	261	0.5	261	262	0.2
			2-E34-2	06SEP89	4	463	0.5	462	463	0.1
			2-E34-3	07SEP89	4	294	0.5	293	294	0.2
			2-E34-5	06SEP89	4	495	2.6	492	498	0.5
			2-E34-6	06SEP89	4	442	0.6	441	442	0.1
191	CONDFLD	umho	2-E27-8	08SEP89	4	349	0.6	348	349	0.2
			2-E27-9	06SEP89	4	342	0.6	341	342	0.2
			2-E27-10	06SEP89	4	263	0.5	262	263	0.2
			2-E34-2	06SEP89	4	485	1.0	483	485	0.2
			2-E34-3	07SEP89	4	290	1.3	288	291	0.4
			2-E34-5	06SEP89	4	517	2.0	514	518	0.4
			2-E34-6	06SEP89	4	450	4.1	445	455	0.9
199	PHFIELD		2-E27-8	08SEP89	4	7.82	0.005	7.81	7.82	0.1
			2-E27-9	06SEP89	4	7.80	0.000	7.80	7.80	0.0
			2-E27-10	06SEP89	4	8.02	0.008	8.01	8.03	0.1
			2-E34-2	06SEP89	4	7.99	0.013	7.97	8.00	0.2
			2-E34-3	07SEP89	4	8.00	0.005	7.99	8.00	0.1
			2-E34-5	06SEP89	4	8.07	0.005	8.06	8.07	0.1
			2-E34-6	06SEP89	4	8.10	0.032	8.07	8.14	0.4
207	PH-LAB		2-E27-8	08SEP89	4	7.98	0.05	7.9	8.0	0.6
			2-E27-9	06SEP89	4	7.90	0.00	7.9	7.9	0.0
			2-E27-10	06SEP89	4	8.05	0.06	8.0	8.1	0.7
			2-E34-2	06SEP89	4	8.00	0.00	8.0	8.0	0.0
			2-E34-3	07SEP89	4	8.10	0.00	8.1	8.1	0.0
			2-E34-5	06SEP89	4	8.00	0.00	8.0	8.0	0.0
			2-E34-6	06SEP89	4	8.00	0.00	8.0	8.0	0.0
C69	TOC	ppb	2-E27-8	08SEP89	4	525	126	400	700	24.0
			2-E27-9	06SEP89	4	450	58	400	500	12.8
			2-E27-10	06SEP89	4	550	191	400	800	34.8
			2-E34-2	06SEP89	4	325	50	300	400	15.4
			2-E34-3	07SEP89	4	450	58	400	500	12.8
			2-E34-5	06SEP89	4	450	129	300	600	28.7
			2-E34-6	06SEP89	4	475	50	400	500	10.5
H42	TOXLDL	ppb	2-E27-8	08SEP89	4	3.50	1.91	2	6	54.7
			2-E27-9	06SEP89	4	2.25	0.96	1	3	42.6
			2-E27-10	06SEP89	4	3.25	2.87	1	7	88.4
			2-E34-2	06SEP89	4	4.25	2.63	2	8	61.9
			2-E34-3	07SEP89	4	4.50	2.38	3	8	52.9
			2-E34-5	06SEP89	4	3.75	1.71	2	6	45.5
			2-E34-6	06SEP89	4	2.75	4.35	-1	9	158.2

TABLE 4.18. Critical Mean Values for Indicator Parameter Data at the Low-Level Burial Grounds, Waste Management Area 3, September 1989[a]

Constituent, Units[b]	n	df	tc	Average	Standard Deviation	Critical Mean
Conductivity in the field, μmho/cm	12	11	4.923	313.0	33.88	486.7
pH, field	12	11	5.369	7.76	0.265	6.28, 9.24
Total organic carbon, ppb	12	11	4.923	329.2	84.50	762.2
Total organic halogens, ppb[c]	12	11	4.923	25.9	43.34	247.9
	11	10	5.114	14.1	15.25	95.5

(a) Data collected October 1988 to July 1989. Values calculated based on 44 comparisons.

(b) The following notations are used in this table:
df = degrees of freedom (n-1).
n = number of background replicate averages.
tc = Bonferroni critical t-value for appropriate df and 44 comparisons.

(c) Second line for TOX is analysis without January 1989 data at well 299-W10-14.

9 2 1 2 6 4 2 1 7 2 2

TABLE 4.19. Contamination Indicator Parameter Replicate Averages for the Low-Level Burial Grounds, Waste Management Area 3, September Through November 1989

Constituent Code	Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088	CONDLAB	umho	2-W6-2	07SEP89	4	405	4.55	399	410	1.1
			2-W7-1	07SEP89	4	384	1.73	381	385	0.5
			2-W7-2	07SEP89	4	283	1.50	281	284	0.5
			2-W7-3	15SEP89	4	305	2.36	302	307	0.8
			2-W7-4	13SEP89	4	461	1.00	459	461	0.2
			2-W7-5	08SEP89	4	360	1.29	358	361	0.4
			2-W7-6	08SEP89	4	347	6.61	338	354	1.9
			2-W8-1	12SEP89	4	396	2.83	394	400	0.7
			2-W9-1	11SEP89	4	393	4.79	389	399	1.2
			2-W10-13	13SEP89	4	341	0.00	341	341	0.0
			2-W10-14	15SEP89	4	345	2.22	343	348	0.6
191	CONDFLD	umho	2-W6-2	07SEP89	4	406	1.00	404	406	0.2
			2-W7-1	07SEP89	4	388	1.29	386	389	0.3
			2-W7-2	07SEP89	4	282	0.96	281	283	0.3
			2-W7-3	15SEP89	4	302	4.99	298	309	1.7
			2-W7-4	13SEP89	4	455	0.58	454	455	0.1
			2-W7-4	20NOV89	4	491	0.50	490	491	0.1
			2-W7-5	08SEP89	4	370	2.16	368	373	0.6
			2-W7-5	20NOV89	4	382	1.29	380	383	0.3
			2-W7-6	08SEP89	4	424	1.26	422	425	0.3
			2-W8-1	12SEP89	4	396	1.91	393	397	0.5
			2-W8-1	20NOV89	4	437	1.73	435	438	0.4
			2-W9-1	11SEP89	4	375	0.82	374	376	0.2
			2-W10-13	13SEP89	4	341	0.50	341	342	0.1
			2-W10-13	20NOV89	4	375	0.58	374	375	0.2
			2-W10-14	15SEP89	4	347	0.82	346	348	0.2
199	PHFIELD		2-W6-2	07SEP89	4	7.98	0.008	7.97	7.99	0.1
			2-W7-1	07SEP89	4	7.91	0.008	7.90	7.92	0.1
			2-W7-2	07SEP89	4	8.17	0.024	8.14	8.19	0.3
			2-W7-3	15SEP89	4	8.10	0.079	8.03	8.21	1.0
			2-W7-4	13SEP89	4	7.78	0.010	7.77	7.79	0.1
			2-W7-4	20NOV89	4	8.27	0.012	8.26	8.28	0.1
			2-W7-5	08SEP89	4	7.89	0.010	7.88	7.90	0.1
			2-W7-5	20NOV89	4	8.19	0.014	8.18	8.21	0.2
			2-W7-6	08SEP89	4	9.15	0.008	9.14	9.16	0.1
			2-W8-1	12SEP89	4	7.84	0.006	7.83	7.84	0.1
			2-W8-1	20NOV89	4	8.12	0.033	8.09	8.16	0.4
			2-W9-1	11SEP89	4	8.27	0.013	8.25	8.28	0.2
			2-W10-13	13SEP89	4	7.68	0.017	7.66	7.70	0.2
			2-W10-13	20NOV89	4	8.17	0.032	8.14	8.21	0.4
			2-W10-14	15SEP89	4	7.91	0.005	7.91	7.92	0.1

TABLE 4.19. (contd)

Constituent Code Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
207 PH-LAB		2-W6-2	07SEP89	4	7.93	0.05	7.9	8.0	0.6
		2-W7-1	07SEP89	4	7.83	0.05	7.8	7.9	0.6
		2-W7-2	07SEP89	4	8.00	0.00	8.0	8.0	0.0
		2-W7-3	15SEP89	4	8.00	0.00	8.0	8.0	0.0
		2-W7-4	13SEP89	4	7.90	0.00	7.9	7.9	0.0
		2-W7-5	08SEP89	4	7.90	0.00	7.9	7.9	0.0
		2-W7-6	08SEP89	4	8.68	0.05	8.6	8.7	0.6
		2-W8-1	12SEP89	4	7.93	0.05	7.9	8.0	0.6
		2-W9-1	11SEP89	4	8.10	0.00	8.1	8.1	0.0
		2-W10-13	13SEP89	4	7.90	0.00	7.9	7.9	0.0
		2-W10-14	15SEP89	4	7.80	0.00	7.8	7.8	0.0
C69 TOC	ppb	2-W6-2	07SEP89	4	400	0	400	400	0.0
		2-W7-1	07SEP89	4	250	58	200	300	23.1
		2-W7-2	07SEP89	4	425	96	300	500	22.5
		2-W7-3	15SEP89	4	550	191	400	800	34.8
		2-W7-4	13SEP89	4	600	283	400	1,000	47.1
		2-W7-5	08SEP89	4	925	320	700	1,400	34.6
		2-W7-5	20NOV89	4	550	173	400	800	31.5
		2-W7-6	08SEP89	4	700	183	500	900	26.1
		2-W8-1	12SEP89	4	875	450	500	1,500	51.4
		2-W8-1	20NOV89	4	325	50	300	400	15.4
		2-W9-1	11SEP89	4	550	100	400	600	18.2
		2-W10-13	13SEP89	4	2,180	1,040	1,300	3,500	47.7
		2-W10-13	20NOV89	4	350	58	300	400	16.5
		2-W10-14	15SEP89	4	500	216	300	800	43.2
H42 TOXLDL	ppb	2-W6-2	07SEP89	4	87.80	12.30	70	96	14.0
		2-W7-1	07SEP89	4	5.00	2.31	3	7	46.2
		2-W7-2	07SEP89	4	4.75	2.06	2	7	43.4
		2-W7-3	15SEP89	4	5.00	5.35	-1	10	107.1
		2-W7-4	13SEP89	4	171.00	26.00	148	205	15.3
		2-W7-4	20NOV89	4	181.00	29.10	143	211	16.1
		2-W7-5	08SEP89	4	27.30	2.63	25	30	9.7
		2-W7-6	08SEP89	4	4.25	1.71	2	6	40.2
		2-W8-1	12SEP89	4	5.25	2.63	3	8	50.1
		2-W9-1	11SEP89	4	8.50	3.87	5	14	45.6
		2-W10-13	13SEP89	4	20.60	4.53	16	27	22.0
		2-W10-14	15SEP89	4	2.50	1.00	2	4	40.0

TABLE 4.20. Critical Mean Values for Indicator Parameter Data at the Low-Level Burial Grounds, Waste Management Area 4, September 1989[a]

Constituent, Units[b]	n	df	tc	Average	Standard Deviation	Critical Mean
Conductivity in the field, μmho/cm	15	14	4.3829	364.98	111.25	868.6
pH, field	15	14	4.7465	7.5303	0.42984	5.4232, 9.6375
Total organic carbon, ppb	15	14	4.3829	565	388.31	2322.8
Total organic halogens, ppb	15	14	4.3829	1596.8	1885.1	10,130

(a) Data collected October 1988 to July 1989. Values calculated based on 32 comparisons.
(b) The following notations are used in this table:
df = degrees of freedom (n-1).
n = number of background replicate averages.
tc = Bonferroni critical t-value for appropriate df and 32 comparisons.

TABLE 4.21. Contamination Indicator Parameter Replicate Averages for the Low-Level Burial Grounds, Waste Management Area 4, September 1989

Constituent Code	Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088	CONDLAB	umho	2-W15-15	12SEP89	4	268	0.00	268	268	0.0
			2-W15-16	22SEP89	4	639	7.72	627	643	1.2
			2-W15-17	27SEP89	4	413	0.50	413	414	0.1
			2-W15-18	26SEP89	4	389	0.96	388	390	0.2
			2-W18-21	12SEP89	4	231	0.96	230	232	0.4
			2-W18-22	22SEP89	4	354	1.89	353	357	0.5
			2-W18-23	22SEP89	4	255	1.63	253	257	0.6
			2-W18-24	26SEP89	4	277	0.58	276	277	0.2
191	CONDFLD	umho	2-W15-15	12SEP89	4	262	0.96	261	263	0.4
			2-W15-16	22SEP89	4	597	1.41	595	598	0.2
			2-W15-17	27SEP89	1	437	.	437	437	.
			2-W15-18	26SEP89	4	383	3.32	378	385	0.9
			2-W18-21	12SEP89	4	233	0.50	233	234	0.2
			2-W18-22	22SEP89	4	337	0.50	337	338	0.1
			2-W18-23	22SEP89	4	293	3.11	289	296	1.1
			2-W18-24	26SEP89	4	254	2.63	252	258	1.0
199	PHFIELD		2-W15-15	12SEP89	4	7.97	0.024	7.94	7.99	0.3
			2-W15-16	22SEP89	4	7.85	0.024	7.83	7.88	0.3
			2-W15-17	27SEP89	1	7.58	.	7.58	7.58	.
			2-W15-18	26SEP89	4	7.85	0.010	7.84	7.86	0.1
			2-W18-21	12SEP89	4	7.71	0.019	7.68	7.72	0.2
			2-W18-22	22SEP89	4	7.82	0.005	7.81	7.82	0.1
			2-W18-23	22SEP89	4	7.93	0.005	7.93	7.94	0.1
			2-W18-24	26SEP89	4	8.03	0.034	7.99	8.07	0.4
207	PH-LAB		2-W15-15	12SEP89	4	8.0	0.00	8.0	8.0	0.0
			2-W15-16	22SEP89	4	7.9	0.05	7.8	7.9	0.6
			2-W15-17	27SEP89	4	7.8	0.00	7.8	7.8	0.0
			2-W15-18	26SEP89	4	7.9	0.00	7.9	7.9	0.0
			2-W18-21	12SEP89	4	7.9	0.00	7.9	7.9	0.0
			2-W18-22	22SEP89	4	8.0	0.00	8.0	8.0	0.0
			2-W18-23	22SEP89	4	7.9	0.08	7.8	8.0	1.0
			2-W18-24	26SEP89	4	7.9	0.00	7.9	7.9	0.0
C69	TOC	ppb	2-W15-15	12SEP89	4	600	216	400	900	36.0
			2-W15-16	22SEP89	4	750	129	600	900	17.2
			2-W15-17	27SEP89	4	1,500	283	1,300	1,900	18.9
			2-W15-18	26SEP89	4	700	316	400	1,100	45.2
			2-W18-21	12SEP89	4	600	82	500	700	13.6
			2-W18-22	22SEP89	4	400	183	200	600	45.6
			2-W18-23	22SEP89	4	475	126	300	600	26.5
			2-W18-24	26SEP89	4	525	126	400	700	24.0
H42	TOXLDL	ppb	2-W15-15	12SEP89	4	466	63.3	390	533	13.6
			2-W15-16	22SEP89	4	5,130	346.0	4,620	5,370	6.8
			2-W15-17	27SEP89	4	13	4.2	8	18	32.0
			2-W15-18	26SEP89	4	1,160	22.2	1,140	1,190	1.9
			2-W18-21	12SEP89	4	111	6.7	105	120	6.0
			2-W18-22	22SEP89	4	3	1.7	1	5	69.3
			2-W18-23	22SEP89	4	497	21.4	476	515	4.3
			2-W18-24	26SEP89	4	613	27.9	576	642	4.6

THIS PAGE INTENTIONALLY
LEFT BLANK

5.0 NONRADIOACTIVE DANGEROUS WASTE LANDFILL

R. M. Fruland/F. N. Hodges
Pacific Northwest Laboratory/Westinghouse Hanford Company

The ground water beneath the Nonradioactive Dangerous Waste Landfill (NRDW) has been monitored by a RCRA interim-status well network since October 1986. This project is currently in the indicator evaluation stage of monitoring. A revised ground-water monitoring plan has been prepared for this landfill.

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

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

Planned sampling and analysis for the first quarter of FY 1990 included indicator parameters, which are determined semiannually, based on state regulations (Table 5.1).

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

9 2 1 2 6 4 2 1 7 2 7

if contamination indicators in upgradient and downgradient wells have changed significantly from background conditions measured in upgradient wells. Thus far, no statistically significant impact to the ground water from past NRDW operations has been detected.

An anomalous tritium value (2,600,000 pCi/L) has been reported for one well (699-25-34B) in the NRDW monitoring network. This well will be resampled in the second quarter to determine whether this result is erroneous, or reflects a change in the ground-water composition.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Currently, no additional drilling or hydrologic characterization work (other than measurement of water levels) is planned at the NRDW. Pertinent site characterization information can be found in Weekes, Luttrell, and Fuchs (1987).

WATER LEVELS

Because of the very low (0.0001) horizontal gradient in the immediate vicinity of the landfills, monthly water levels at the NRDW, SWL, and five nearby Hanford Site wells are being measured to augment the water levels measured just before sample collection. The water-level data indicate the gradient has not changed from what was previously determined. Measurements reported in Table 5.2 were collected at the time of sample collection; Table 5.3 water-level measurements were taken monthly. The data from the upgradient and downgradient wells are statistically indistinguishable and do not indicate or support any particular flow direction. Survey data for wells installed before 1986 are considered to be of lower quality than survey data for wells installed since 1987. Because of these differences in survey data and the low ground-water gradient, the ground-water flow direction is difficult to determine. However, water-level measurements from wells in the vicinity, but outside the SWL and NRDW networks, indicate a general west-to-east ground-water flow direction (Weekes, Luttrell, and Fuchs 1987; Fruland et al. 1989).

WATER CHEMISTRY DATA

The NRDW ground-water monitoring wells were scheduled for sampling in October for those parameters listed in Table 5.4. In addition to indicator parameters, water samples were collected and measured for turbidity, nitrate, and tritium. Because the analytical method used for nitrate automatically includes additional related anions, these results are reported in Table 5.4, along with the results for the other constituents. Constituents with at least one detected value are listed in Table 5.5. Tritium concentrations exceed the drinking water standard, but these concentrations are associated with waste discharges in the 200-East Area, not with NRDW operations. One tritium value is anomalously high: downgradient shallow well 699-25-34B has a reported value of 2,600,000 pCi/L, compared with values for surrounding shallow network wells in the range of 241,000 to 275,000 pCi/L.

Table 5.6 lists the replicate averages for indicator parameters, and Table 5.7 presents the statistical summary of field and laboratory results. The statistical method has been discussed in annual reports (Hall 1988; Fruland and Lundgren 1989). There continues to be no indication of ground-water contamination from the NRDW.

9 2 1 2 6 4 2 1 7 2 9

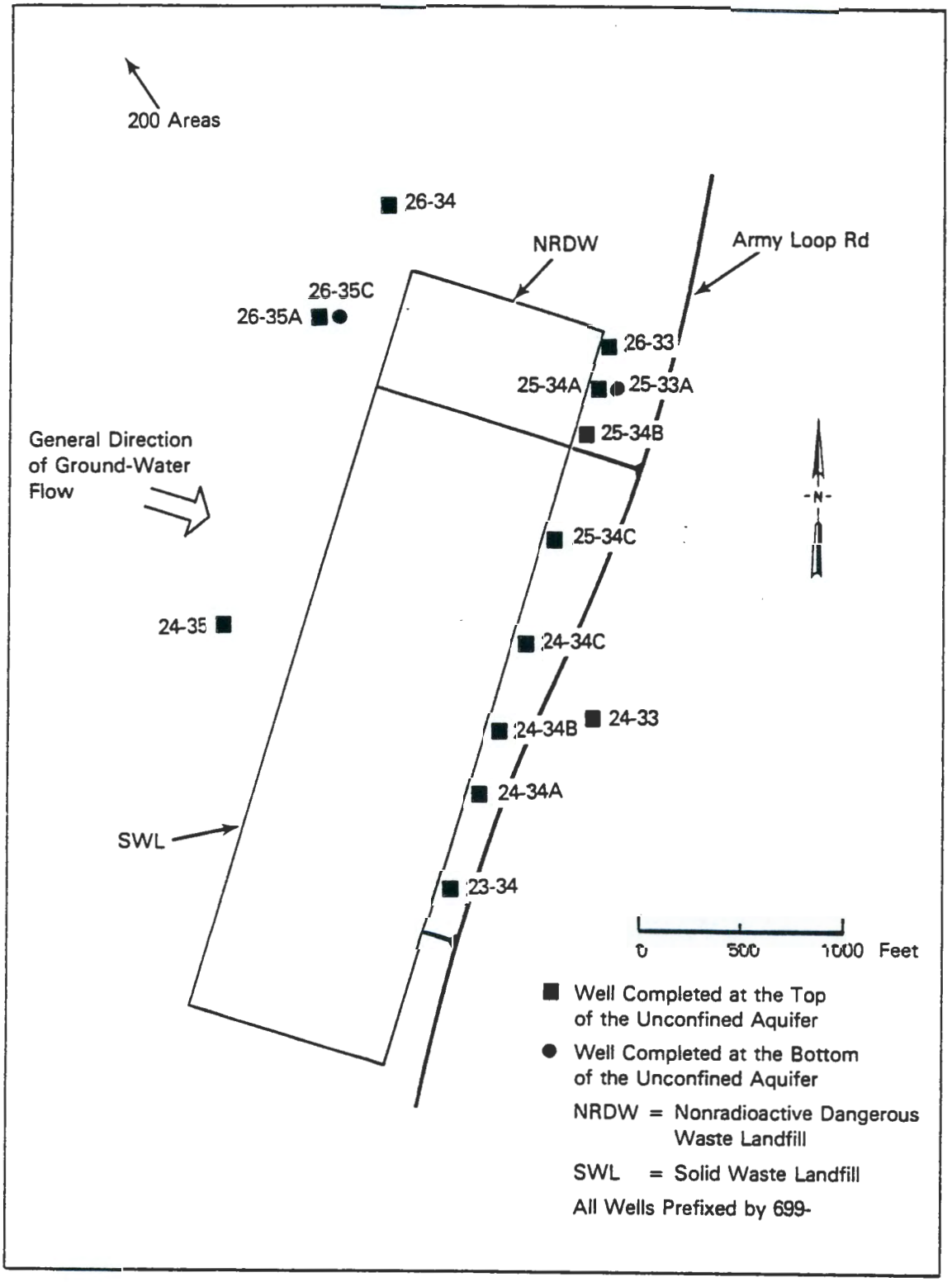

FIGURE 5.1. Monitoring Well Locations for the Solid Waste Landfill and the Nonradioactive Dangerous Waste Landfill

TABLE 5.1. Sampling Schedule for the Nonradioactive Dangerous Waste Landfill

	1989[a]			1990								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
699-25-33A	X						L					
699-25-34A	X						L					
699-25-34B	X						L					
699-26-33	X						L					
699-26-34	X						L					
699-26-35A	X						L					
699-26-35C	X						L					

(a) The following notations are used in this table:
L = sampled for the long list of constituents (WAC 173-303-9905).
X = sampled for quadruplicate indicator parameters.

9 2 1 2 6 4 2 1 7 3 1

TABLE 5.2. Water-Level Data Collected Before Sampling from Wells Near the Solid Waste Landfill and Nonradioactive Dangerous Waste Landfill

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
699-23-34	532.86	10/10/89	128.71	404.15
		10/25/89	128.76	404.10
699-24-34A	533.89	10/25/89	129.79	404.10
699-24-34B	533.50	10/10/89	129.35	404.15
		10/25/89	129.39	404.11
699-24-34C	532.58	10/10/89	128.46	404.12
		10/25/89	128.49	404.09
699-24-35	538.81	10/10/89	134.60	404.21
		10/25/89	134.67	404.14
699-24-35A	528.55	10/04/89	124.85	403.70
699-25-34A	530.01	10/04/89	125.90	404.11
699-25-34B	529.13	10/04/89	124.90	404.23
699-25-34C	535.46	10/10/89	131.34	404.12
		10/25/89	131.33	404.13
699-26-33	535.49	10/04/89	130.39	405.10
699-26-34	528.09	10/04/89	124.07	404.02
699-26-35A	532.37	10/04/89	128.32	404.05
699-26-35C	532.13	10/04/89	128.47	403.66

(a) MSL = mean sea level.

TABLE 5.3. Monthly Water-Level Data for Selected Wells Near the Solid Waste Landfill and Nonradioactive Dangerous Waste Landfill

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
699-23-34	532.86	10/30/89	128.77	404.09
		11/29/89	128.84	404.02
		12/29/89	128.88	403.98
699-24-34A	533.89	10/30/89	129.80	404.09
		11/29/89	129.87	404.02
		12/29/89	129.90	403.99
699-24-34B	533.50	10/30/89	129.39	404.11
		11/29/89	129.46	404.04
		12/29/89	129.49	404.01
699-24-34C	532.58	10/30/89	128.49	404.09
		11/29/89	128.56	404.02
		12/29/89	128.59	403.99
699-24-35	538.81	10/30/89	134.67	404.14
		11/29/89	134.75	404.06
		12/29/89	134.78	404.03
699-25-34B	529.13	10/30/89	125.03	404.10
		11/29/89	125.10	404.03
		12/29/89	125.14	403.99
699-25-34C	535.46	10/30/89	131.36	404.10
		11/29/89	131.43	404.03
		12/29/89	131.46	404.00
699-26-33	535.49	10/30/89	131.40	404.09
		11/29/89	131.47	404.02
		12/29/89	131.51	403.98
699-26-34	528.09	10/30/89	123.97	404.12
		11/29/89	124.03	404.06
		12/29/89	124.08	404.01
699-26-35A	532.37	10/30/89	128.21	404.16
		11/29/89	128.29	404.08
		12/29/89	128.32	404.05

(a) MSL = mean sea level.

9 2 1 2 6 4 2 1 7 3 3

THIS PAGE INTENTIONALLY
LEFT BLANK

TABLE 5.4. Constituent List and Summary of Sampling Results for the Nonradioactive Dangerous Waste Landfill, October 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		Conductivity, Laboratory
191	CONDFLD	UMHO	1	28	0	700	WDOE	xxx	Specific conductance
199	PHFIELD		.100	28	0	6.5-8.5	EPAS		pH, Field Measurement
207	PH-LAB		.0100	28	0	6.5-8.5	EPAS		pH, Laboratory Measurement
C69	TOC	PPB	2000	28	28 ***	.			Total organic carbon
H42	TOXLDL	PPB	10	28	23	.			Total Organic Halogen, Low Det. Level

Constituent List= Interim Primary Drinking Water Parameters

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
C72	NITRATE	PPB	500	8	0	45000	EPA		Nitrate
C74	FLUORID	PPB	500	8	0	4000	EPA		Fluoride
H60	TURBID	NTU	.100	7	3	1	EPA		Turbidity

Constituent List= Water Quality Parameters

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
C73	SULFATE	PPB	500	8	0	250000	EPAS		Sulfate
C75	CHLORID	PPB	500	8	0	250000	EPAS		Chloride

Constituent List= Site Specific and Other Constituents

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
108	TRITIUM	PCI/L	500	8	0	20000	EPA	xxx	Tritium
C76	PHOSPHA	PPB	1000	8	8 ***	.			Phosphate
H66	BROMIDE	PPB	1000	8	8 ***	.			Bromide
H67	NITRITE	PPB	1000	8	8 ***	.			Nitrite

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 5.5. Constituents with at Least One Detected Value for the Nonradioactive Dangerous Waste Landfill, October 1989

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
6-25-33A	04OCT89		3230	335	8	6.89	#400	#2
	04OCT89	1	3230	341	8	7.96	#400	#1
	04OCT89	2	3230	340	8	7.97	#300	#-2
	04OCT89	3	3230	342	8	7.95	#700	#.0100
6-25-34A	04OCT89		347	387	8	7.97	#1100	#4
	04OCT89	1	350	390	7.90	7.97	#1000	#4
	04OCT89	2	347	386	7.90	7.96	#500	13
	04OCT89	3	348	387	7.90	7.96	#400	#6
6-25-34B	04OCT89		371	415	7.90	7.91	#700	11
	04OCT89	1	371	405	7.90	7.90	#400	13
	04OCT89	2	371	404	7.80	7.90	#400	12
	04OCT89	3	371	406	7.80	7.90	#700	12
6-26-33	04OCT89		334	355	8	8.15	#600	#4
	04OCT89	1	336	353	8	8.15	#700	#7
	04OCT89	2	335	353	8	8.15	#300	#5
	04OCT89	3	336	358	8	8.15	#300	#3.30
6-26-34	04OCT89		3340	351	7.90	7.88	#600	#3
	04OCT89	1	3340	350	7.90	7.87	#500	#1
	04OCT89	2	3340	351	7.90	7.87	#700	#3
	04OCT89	3	3340	349	7.90	7.87	#400	#6
6-26-35A	04OCT89		373	386	7.70	7.82	#1300	#4
	04OCT89	1	373	404	7.80	7.82	#800	#.0100
	04OCT89	2	373	395	7.70	7.80	#500	#3
	04OCT89	3	373	389	7.80	7.82	#400	#5
6-26-35C	04OCT89		403	415	7.90	7.88	#500	#2
	04OCT89	1	402	416	8	7.86	#400	#5
	04OCT89	2	402	415	8	7.85	#400	#-2
	04OCT89	3	402	415	8	7.87	#500	#-3

TABLE 5.5. (contd)

Well name	Collection date	Duplicate sample number	FLUORID PPB 500/4000	CHLORID PPB 500/250000s	NITRATE PPB 500/45000	SULFATE PPB 500/250000s	TRITIUM PCI/L 500/20000	TURBID NTU .10/1
6-25-33A	04OCT89		500	6400	4200	25700	938	.700
	04OCT89	1	500	6400	4200	25600	1000	.
6-25-34A	04OCT89		600	5700	28800	31000	241000	.200
6-25-34B	04OCT89		600	5700	29100	32000	2600000	<.100
6-26-33	04OCT89		600	5500	28200	31000	246000	<.100
6-26-34	04OCT89		600	5400	27200	30000	248000	<.100
6-26-35A	04OCT89		600	6300	30000	35000	275000	.100
6-26-35C	04OCT89		500	8000	22300	50000	51800	.300

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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

TABLE 5.6. Contamination Indicator Parameter Replicate Averages for the Nonradioactive Dangerous Waste Landfill, October 1989

Constituent Code	Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088	CONDLAB	umho	6-25-33A	04OCT89	4	340	3.11	335	342	0.9
			6-25-34A	04OCT89	4	388	1.73	386	390	0.4
			6-25-34B	04OCT89	4	408	5.07	404	415	1.2
			6-26-33	04OCT89	4	355	2.36	353	358	0.7
			6-26-34	04OCT89	4	350	0.96	349	351	0.3
			6-26-35A	04OCT89	4	394	7.94	386	404	2.0
			6-26-35C	04OCT89	4	415	0.50	415	416	0.1
191	CONDFLD	umho	6-25-33A	04OCT89	4	323	0.00	323	323	0.0
			6-25-34A	04OCT89	4	348	1.41	347	350	0.4
			6-25-34B	04OCT89	4	371	0.00	371	371	0.0
			6-26-33	04OCT89	4	335	0.96	334	336	0.3
			6-26-34	04OCT89	4	334	0.00	334	334	0.0
			6-26-35A	04OCT89	4	373	0.00	373	373	0.0
			6-26-35C	04OCT89	4	402	0.50	402	403	0.1
199	PHFIELD		6-25-33A	04OCT89	4	7.69	0.535	6.89	7.97	7.0
			6-25-34A	04OCT89	4	7.97	0.006	7.96	7.97	0.1
			6-25-34B	04OCT89	4	7.90	0.005	7.90	7.91	0.1
			6-26-33	04OCT89	4	8.15	0.000	8.15	8.15	0.0
			6-26-34	04OCT89	4	7.87	0.005	7.87	7.88	0.1
			6-26-35A	04OCT89	4	7.82	0.010	7.80	7.82	0.1
			6-26-35C	04OCT89	4	7.87	0.013	7.85	7.88	0.2
207	PH-LAB		6-25-33A	04OCT89	4	8.00	0.00	8.0	8.0	0.0
			6-25-34A	04OCT89	4	7.93	0.05	7.9	8.0	0.6
			6-25-34B	04OCT89	4	7.85	0.06	7.8	7.9	0.7
			6-26-33	04OCT89	4	8.00	0.00	8.0	8.0	0.0
			6-26-34	04OCT89	4	7.90	0.00	7.9	7.9	0.0
			6-26-35A	04OCT89	4	7.75	0.06	7.7	7.8	0.7
			6-26-35C	04OCT89	4	7.98	0.05	7.9	8.0	0.6
C69	TOC	ppb	6-25-33A	04OCT89	4	450	173	300	700	38.5
			6-25-34A	04OCT89	4	750	351	400	1100	46.8
			6-25-34B	04OCT89	4	550	173	400	700	31.5
			6-26-33	04OCT89	4	475	206	300	700	43.4
			6-26-34	04OCT89	4	550	129	400	700	23.5
			6-26-35A	04OCT89	4	750	404	400	1300	53.9
			6-26-35C	04OCT89	4	450	58	400	500	12.8
H42	TOXLDL	ppb	6-25-33A	04OCT89	4	0.25	1.71	-2	2	683.1
			6-25-34A	04OCT89	4	6.75	4.27	4	13	63.3
			6-25-34B	04OCT89	4	12.00	0.82	11	13	6.8
			6-26-33	04OCT89	4	4.82	1.61	3	7	33.3
			6-26-34	04OCT89	4	3.25	2.06	1	6	63.4
			6-26-35A	04OCT89	4	3.00	2.16	0	5	72.0
			6-26-35C	04OCT89	4	0.50	3.70	-3	5	739.4

TABLE 5.7. Critical Mean Values for Indicator Parameter Data at the Nonradioactive Dangerous Waste Landfill, November 1989[a]

Constituent, Units[b]	n	df	tc	Average	Standard Deviation	Critical Mean
Conductivity in the field, μmho/cm	11	10	4.8087	359.57	32.561	523.11
pH, field	11	10	5.2810	7.2341	0.26769	5.7576, 8.7106
Total organic carbon, ppb	11	10	4.8087	314.8	138.62	1011
Total organic halogens, ppb	7	6	6.3510	7.0393	4.1369	35.127

(a) Data collected October 1986 to July 1987. Values calculated based on 28 comparisons.
(b) The following notations are used in this table:
df = degrees of freedom (n-1).
n = number of background replicate averages.
tc = Bonferroni critical t-value for appropriate df and 28 comparisons.

9 2 1 2 6 4 2 1 7 3 8

6.0 1301-N LIQUID WASTE DISPOSAL FACILITY

M. J. Hartman
Westinghouse Hanford Company

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

The 1301-N LWDF is located in the 100-N Area approximately 800 ft east of the Columbia River (Figure 1.1). 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 was intended to handle the overflow from the basin (Figure 6.1). The facility was used to dispose of waste streams that were generated in the N Reactor and related facilities from the startup of the N Reactor in 1963 until September 1985. Wastes discharged to the 1301-N LWDF were primarily radioactive fission and activation products, including cobalt-60, strontium-90, and cesium-137; small quantities of non-radioactive hazardous wastes were also discharged to the facility. The 1301-N LWDF is currently not in use.

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

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

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

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

WATER LEVELS

Water-level measurements are taken in most of the 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 in October, November, and December. Water-table maps for each month are shown in Figures 6.2, 6.3, and 6.4. Monthly water-table elevations are presented in Table 6.1. Table 6.2 presents water-table elevations measured at the time of sampling.

The elevation of the water table in the 100-N Area is affected by the release of effluent to nearby disposal facilities, river stage in the Columbia River, and ground water entering the 100-N Area from other parts of the Hanford Site. Waste discharged to the nearby 1325-N facility this quarter decreased from the previous quarter, and water levels in the 100-N Area began to drop as a result. The ground-water mound beneath the 1325-N LWDF has decreased by approximately 4 ft between September and December 1989. Ground-water levels beneath the 1301-N LWDF decreased by 2 ft in the same period.

WATER CHEMISTRY DATA

Results of analyses of ground-water samples collected in September were received this quarter. Another sampling event took place in November and December. Some of the wells sampled in November were part of a Hanford Site

9 2 1 2 6 4 2 1 7 4 0

liquid effluent study. These samples were analyzed for the "long" list of constituents (i.e., those listed in WAC 173-303-9905). Results of all the analyses received to date are presented in Tables 6.3 and 6.4.

A revised sampling schedule for the 1301-N LWDF is presented in Table 6.5. The "regular" and "short" lists of constituents cited in Table 6.5 are shown in Tables 6.6 and 6.7, respectively.

Constituents of note in the September and November samples include the following:

- Total organic carbon (TOC) was below the detection limit (2000 ppb) in all wells except 199-N-16, which averaged about 5400 ppb in November. These are the first TOC data available for this well. These values are higher than expected and are being investigated for possible errors.

- Specific conductance was elevated in well 199-N-16 in the September and November samples (approximately 1200 and 1500 μmho/cm, respectively). These values are higher than past analyses for this well and are higher than the WAC 248-54 drinking water standard (700 μmho/cm).

- The turbidity of samples taken from wells 199-N-3, 199-N-4, 199-N-16, 199-N-17, 199-N-21, and 199-N-66 was elevated (i.e., greater than 1 NTU) for September and November samples. The highest turbidity was observed in well 199-N-16 in September (45 NTU).

- Some samples were analyzed for total dissolved solids as part of the liquid effluent study. Values were highest in well 199-N-16 (892,000 ppb). The 40 CFR 143 secondary drinking water standard is 500,000 ppb.

- Metals concentrations were elevated in wells 199-N-16 and 199-N-17. Filtered and unfiltered iron and manganese were greater than the 40 CFR 143 drinking water standards in these wells, and relatively high concentrations of magnesium were also observed. Concentrations of iron, magnesium, and manganese reported in filtered samples from well 199-N-16 were slightly higher than the metals concentrations in the unfiltered samples in September (e.g., 983 and 1170 ppb iron in unfiltered and filtered samples, respectively). Metals concentrations in well 199-N-17 were approximately equal for filtered and unfiltered samples. Samples from wells 199-N-16 and 199-N-17 were extremely turbid. Unfiltered samples from the other wells also contained iron, some in relatively high concentrations. The filtered samples from those wells contained iron at or below the detection limit (30 ppb).

- Gross beta radiation was greater than the 40 CFR 141 drinking water standard in most of the wells tested in September through December. Gross beta concentrations in these samples reflect mainly strontium-90, which is discussed in the following bullet. The highest beta concentration was in well 199-N-67 in October (25,700 pCi/L). As in previous quarters, beta concentration in adjacent well 199-N-69 was several orders of magnitude lower (22.1 pCi/L). Well 199-N-67 is screened from the water table to a depth of 76 ft; well 199-N-69 is screened from 90 to 100 ft, at the top of a clay layer.

- Strontium-90 concentration was greater than the 40 CFR 141 drinking water standard in most of the wells sampled in September through December. The highest concentration was in well 199-N-67 in October (13,000 pCi/L). Samples from adjacent well 199-N-69 contained concentrations less than the detection limit for strontium-90.

- Tritium concentrations ranged from 3010 pCi/L in well 199-N-16 to 78,000 pCi/L in well 199-N-69. The 40 CFR 141 drinking water standard for tritium is 20,000 pCi/L.

- Ruthenium-106 was reported at 95 pCi/L in November in well 199-N-17 and at 69 pCi/L in well 199-N-69 in October. These values are greater than the EPA (1976) standard (30 pCi/L) but are less than the 2-sigma error (i.e., the concentration of ruthenium-106 present in the sample was too low for the analytical method to measure accurately).

- The nitrate concentration in well 199-N-55 in November was 93,000 ppb. The 40 CFR 141 drinking water standard for nitrate is 45,000 ppb. A sample from the same well showed 8700 ppb nitrate in October.

- Sulfate concentrations were higher than the 40 CFR 143 secondary drinking water standard in well 199-N-16 in September and November (392,000 and 283,000 ppb, respectively). Sulfate concentrations were also relatively high in wells 199-N-21 and 199-N-55 (>100,000 ppb). The standard for sulfate is 250,000 ppb.

GROUND-WATER QUALITY ASSESSMENT PROGRAM

Sampling of the wells in the assessment monitoring network continued this quarter as described above.

9 2 1 2 6 4 2 1 7 4 2

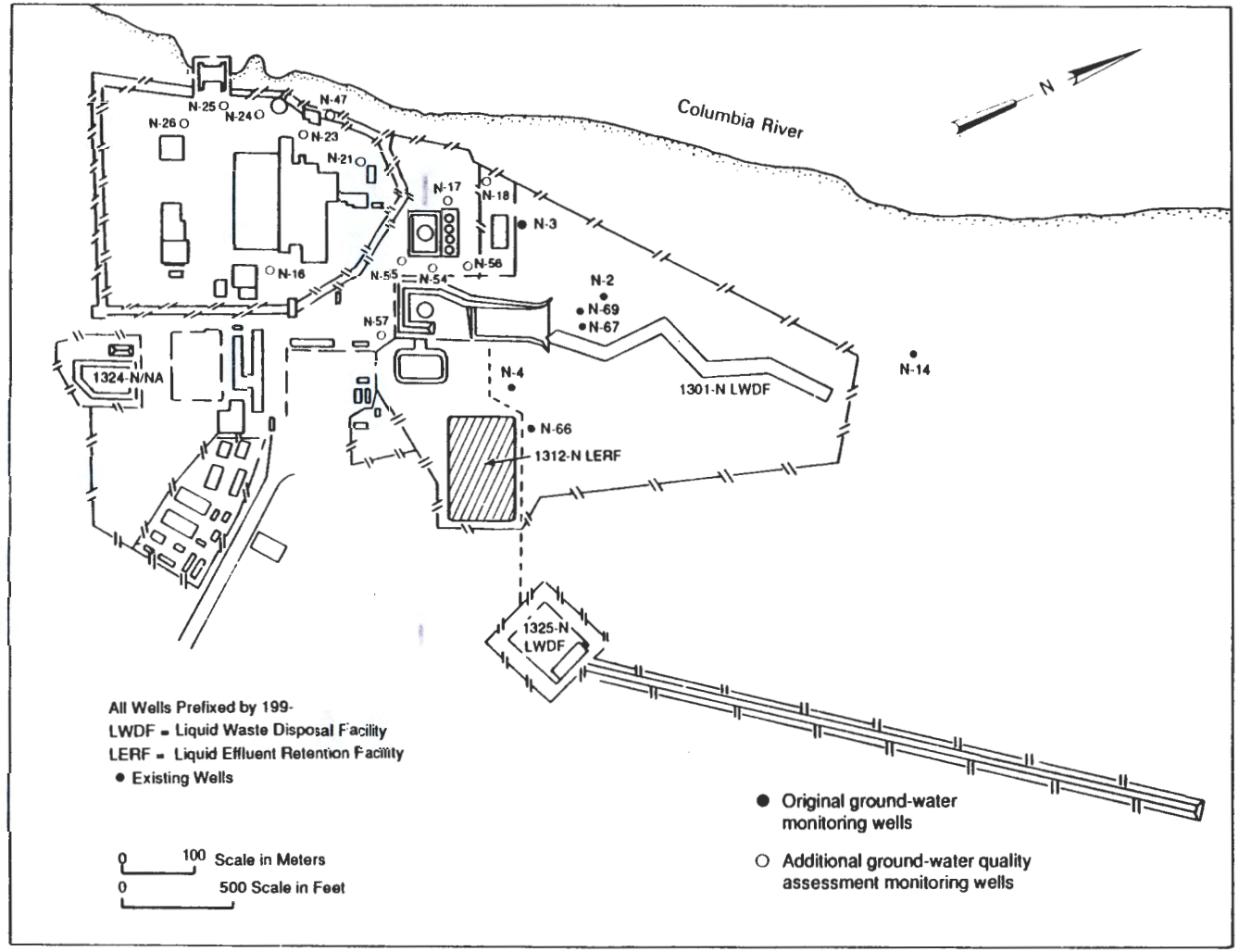

FIGURE 6.1. Monitoring Well Locations for the 1301-N Liquid Waste Disposal Facility

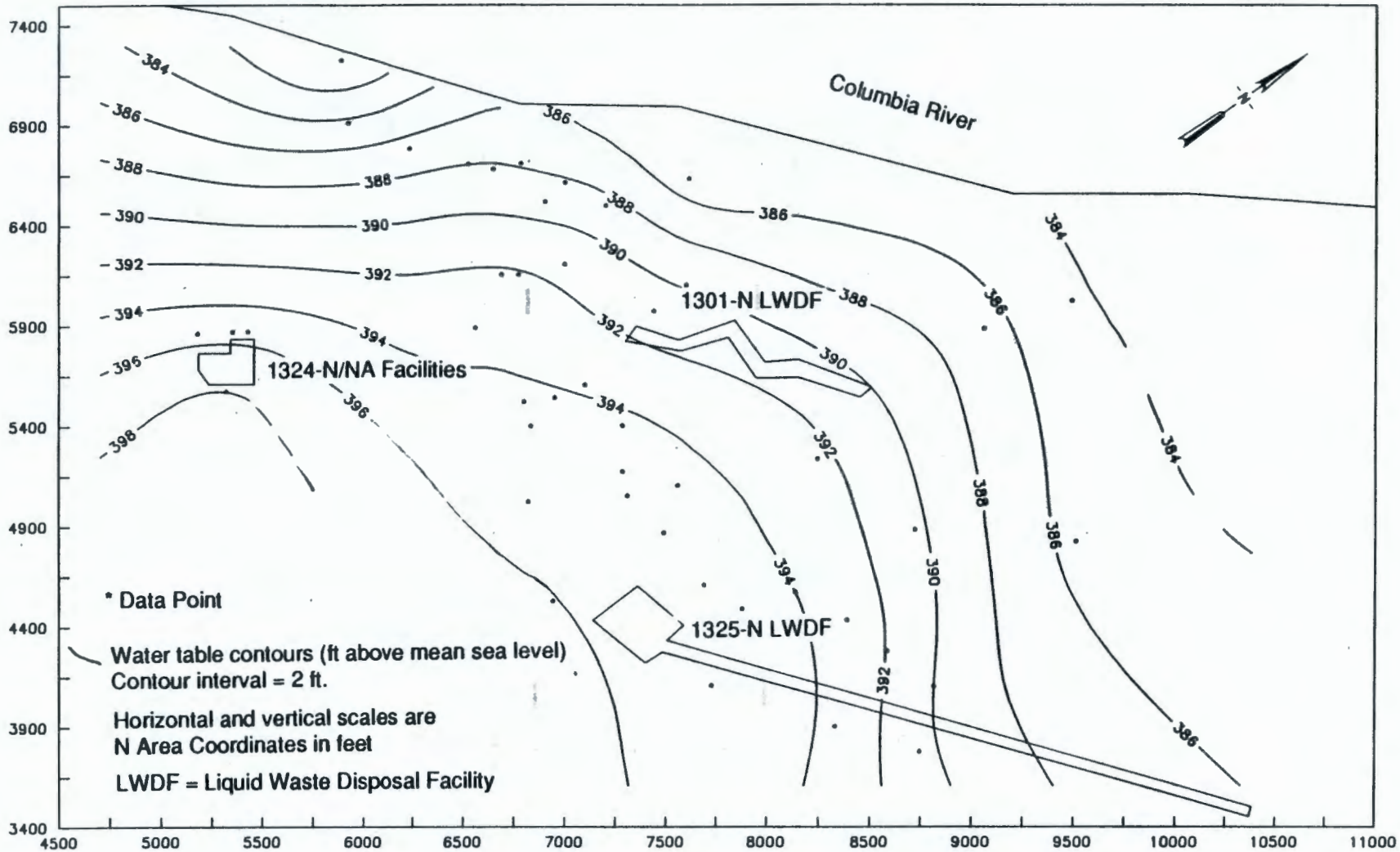

FIGURE 6.2. Water Levels in the 100-N Area, October 1989

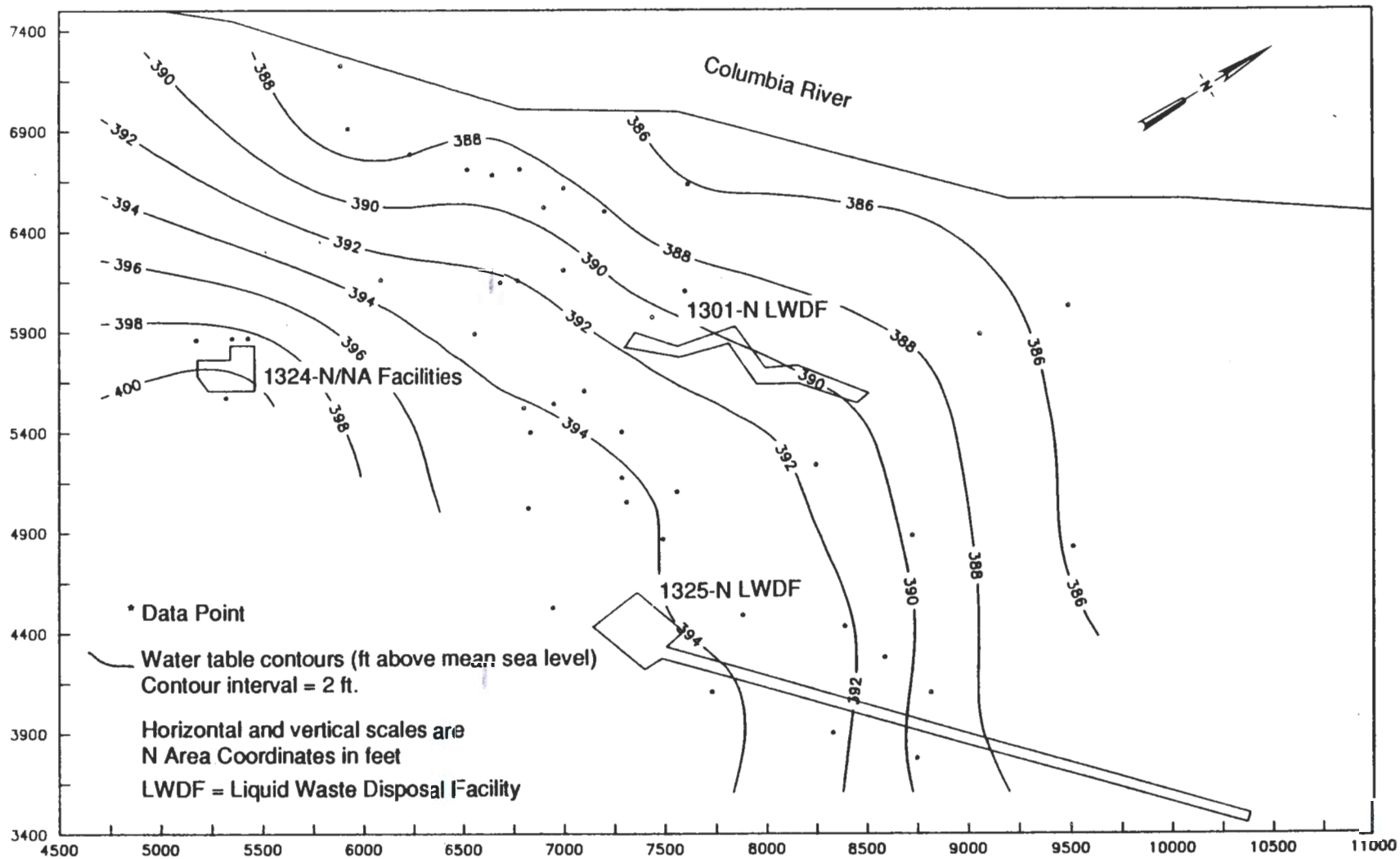

FIGURE 6.3. Water Levels in the 100-N Area, November 1989

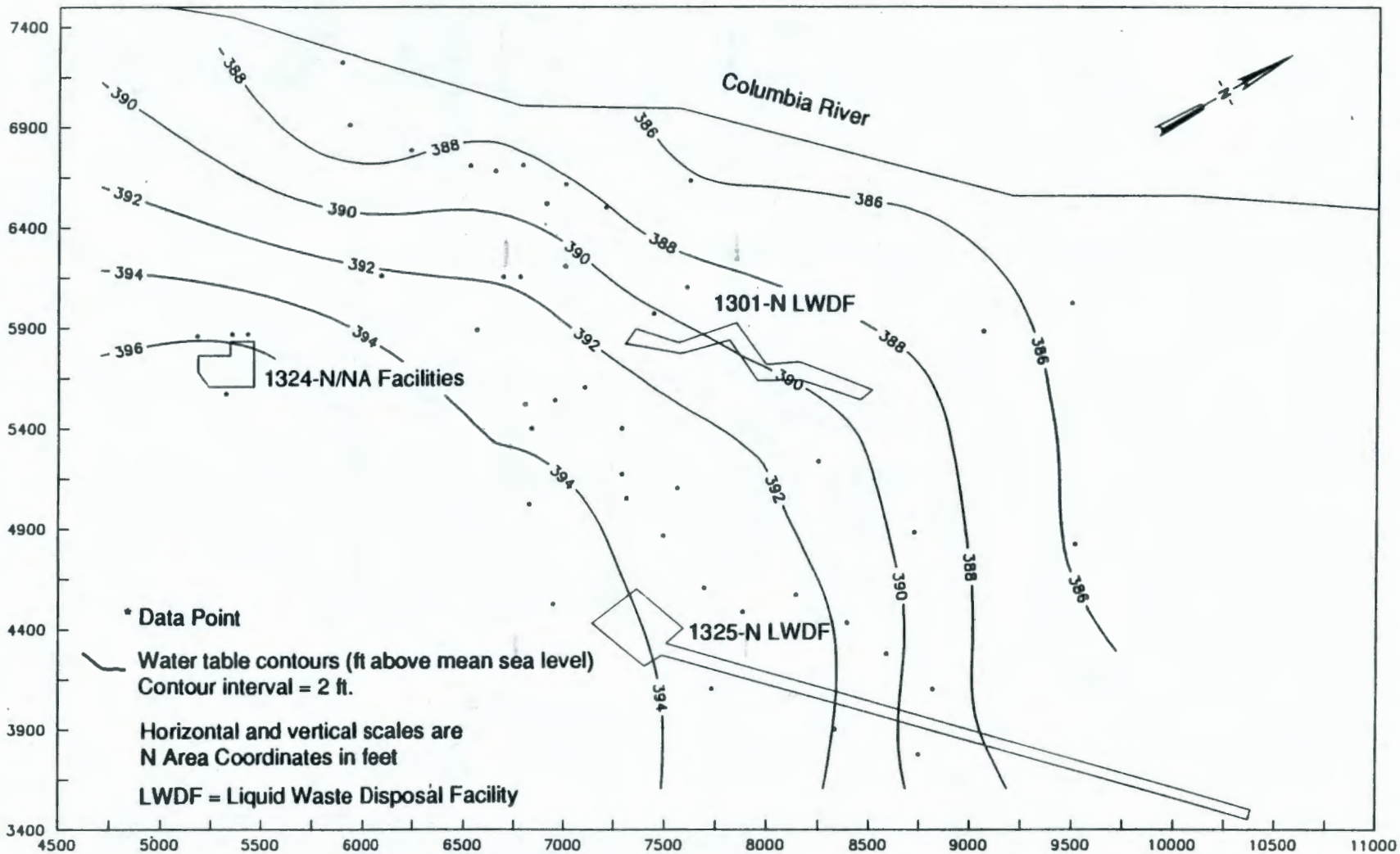

FIGURE 6.4. Water Levels in the 100-N Area, December 1989

TABLE 6.1. Monthly Water-Level Data for Wells in the 100-N Area

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-N-2	459.83	10/31/89	0946	69.39	390.44
		11/30/89	NM[b]	--	--
		12/28/89	NM	--	--
199-N-3	459.45	10/31/89	0940	70.07	389.38
		11/30/89	NM	--	--
		12/28/89	NM	--	--
199-N-4	458.73	10/31/89	1003	64.81	393.92
		11/30/89	NM	--	--
		12/28/89	NM	--	--
199-N-6	460.97	10/31/89	1009	65.28	395.69
		11/30/89	NM	--	--
		12/28/89	NM	--	--
199-N-8S	404.57	10/31/89	1434	20.74	383.83
		11/30/89	1202	18.79	385.53
		12/28/89	1349	18.67	385.65
199-N-14	453.15	10/31/89	1442	66.15	387.00
		11/30/89	1210	66.12	387.03
		12/28/89	1358	66.27	386.88
199-N-16	456.70	10/31/89	1136	64.66	392.04
		11/30/89	0927	63.73	393.05
		12/28/89	0901	64.47	392.31
199-N-17	461.20	10/31/89	1125	71.90	389.30
		11/30/89	0915	71.72	389.49
		12/28/89	1042	71.91	389.30
199-N-18	458.50	10/31/89	1115	70.79	387.71
		11/30/89	0905	70.40	388.13
		12/28/89	1032	70.50	388.03
199-N-19	453.90	10/31/89	1120	66.51	387.39
		11/30/89	0910	65.71	388.23
		12/28/89	1037	65.89	388.05
199-N-20	455.90	10/31/89	1129	67.39	388.51
		11/30/89	0920	66.64	389.21
		12/28/89	1048	66.92	388.93

TABLE 6.1. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-N-21	457.00	10/31/89	1200	68.80	388.20
		11/30/89	0948	67.94	389.03
		12/28/89	0931	68.21	388.76
199-N-23	456.30	10/31/89	1205	69.43	386.87
		11/30/89	0952	68.43	387.87
		12/28/89	0938	68.58	387.72
199-N-24	432.49	10/31/89	1151	47.19	385.30
		11/30/89	0939	45.94	386.55
		12/28/89	0924	46.03	386.46
199-N-25	425.80	10/31/89	1144	41.35	384.45
		11/30/89	0935	39.67	386.09
		12/28/89	0914	39.73	386.03
199-N-27	449.09	10/31/89	1243	53.72	395.37
		11/30/89	1020	54.75	394.34
		12/28/89	1122	55.42	393.67
199-N-28	464.24	10/31/89	1235	68.02	396.22
		11/30/89	1011	68.97	395.27
		12/28/89	1116	69.67	394.57
199-N-29	465.25	10/31/89	1311	69.17	396.08
		11/30/89	1042	70.08	395.17
		12/28/89	1151	70.76	394.49
199-N-31	462.63	10/31/89	1331	67.52	395.11
		11/30/89	1101	68.49	394.14
		12/28/89	NM	--	--
199-N-32	462.08	10/31/89	1337	66.98	395.10
		11/30/89	1107	68.97	393.11
		12/28/89	1218	68.62	393.46
199-N-33	459.87	10/31/89	1423	65.13	394.74
		11/30/89	1153	66.08	393.79
		12/28/89	1327	66.64	393.23
199-N-34	459.63	10/31/89	1417	64.38	395.25
		11/30/89	1146	65.28	394.35
		12/28/89	1321	65.88	393.75

9 2 1 2 6 4 2 1 7 4 8

TABLE 6.1. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-N-36	458.97	10/31/89	1343	64.24	394.73
		11/30/89	1113	65.25	393.72
		12/28/89	1224	65.86	393.11
199-N-37	456.12	10/31/89	1352	61.87	394.25
		11/30/89	1120	62.85	393.27
		12/28/89	1233	63.42	392.70
199-N-39	454.31	10/31/89	1359	60.99	393.32
		11/30/89	1126	61.82	392.49
		12/28/89	1257	62.41	391.90
199-N-40	456.35	10/31/89	1405	63.91	392.44
		11/30/89	1132	64.96	391.39
		12/28/89	1302	65.46	390.89
199-N-41	457.59	10/31/89	1410	68.17	389.42
		11/30/89	1139	68.84	388.75
		12/28/89	1309	69.10	388.49
199-N-42	455.14	10/31/89	1301	64.72	390.42
		11/30/89	1033	65.77	389.37
		12/28/89	1141	65.88	389.26
199-N-44	460.70	10/31/89	1252	66.76	393.94
		11/30/89	1027	67.87	392.92
		12/28/89	1132	68.49	392.30
199-N-49	450.72	10/31/89	1505	60.25	390.47
		11/30/89	1233	61.10	389.62
		12/28/89	1421	61.44	389.28
199-N-50	463.36	10/31/89	1458	78.22	385.14
		11/30/89	1224	77.82	385.54
		12/28/89	1415	77.77	385.59
199-N-51	462.18	10/31/89	1450	78.09	384.09
		11/30/89	1216	77.01	385.17
		12/28/89	1405	76.90	385.28
199-N-52	463.70	10/31/89	1229	67.73	395.97
		11/30/89	1004	68.94	394.76
		12/28/89	1108	69.62	394.08

TABLE 6.1. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-N-53	461.76	10/31/89	1429	69.10	392.66
		11/30/89	1157	70.04	391.72
		12/28/89	1337	70.53	391.23
199-N-54	457.51	10/31/89	1106	64.88	392.63
		11/30/89	0856	65.08	392.43
		12/28/89	1021	65.45	392.06
199-N-55	457.85	10/31/89	1102	65.29	392.56
		11/30/89	0851	65.40	392.45
		12/28/89	1017	65.78	392.07
199-N-56	458.09	10/31/89	1110	66.67	391.42
		11/30/89	0900	67.00	391.09
		12/28/89	1026	67.27	390.82
199-N-57	457.76	10/31/89	1057	64.09	393.67
		11/30/89	0847	64.30	393.46
		12/28/89	1013	64.78	392.98
199-N-58	462.88	10/31/89	1528	67.59	395.29
		11/30/89	1259	64.26	398.62
		12/28/89	1454	67.22	395.66
199-N-59	459.53	10/31/89	1515	64.17	395.36
		11/30/89	1245	60.87	398.66
		12/28/89	1435	63.68	395.85
199-N-60	461.94	10/31/89	1532	66.46	395.48
		11/30/89	1303	63.16	398.78
		12/28/89	1449	66.05	395.89
199-N-61	462.02	10/31/89	1521	62.82	399.20
		11/30/89	1252	59.92	402.10
		12/28/89	1443	63.77	398.25
199-N-62	463.59	10/31/89	1324	67.75	395.84
		11/30/89	1053	68.53	395.06
		12/28/89	1156	69.16	394.43
199-N-63	466.70	10/31/89	1319	71.57	395.13
		11/30/89	1048	72.21	394.49
		12/28/89	1201	72.78	393.92

9 2 1 2 6 4 2 1 7 5 0

TABLE 6.1. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-N-64	454.63	10/31/89	1024	60.22	394.41
		11/30/89	NM	--	--
		12/28/89	NM	--	--
199-N-65	456.44	10/31/89	1019	62.38	394.06
		11/30/89	NM	--	--
		12/28/89	NM	--	--
199-N-66	465.25	10/31/89	1014	70.69	394.56
		11/30/89	NM	--	--
		12/28/89	NM	--	--
199-N-67	458.46	10/31/89	0954	67.79	390.67
		11/30/89	NM	--	--
		12/28/89	NM	--	--
199-N-69	458.84	10/31/89	0950	68.43	390.41
		11/30/89	NM	--	--
		12/28/89	NM	--	--
River	378.7	10/31/89	Average[c]	0.00	378.70
		11/30/89	Average	0.00	385.27
		12/28/89	Average	0.00	385.50

(a) MSL = mean sea level.
(b) NM = no measurement could be made.
(c) River stage given is average of 0800, 1200, and 1600 readings at 100-N gaging station.

TABLE 6.2. Water-Level Data Collected Before Sampling from Wells in the 100-N Area

Well	Casing Elevation, ft above MSL[a]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
199-N-2	459.83	12/21/89	69.70	390.13
199-N-3	459.45	11/08/89	70.12	389.33
199-N-4	458.73	11/08/89	65.16	393.57
199-N-14	453.15	11/14/89	66.29	386.86
199-N-16	456.70	11/13/89	63.94	392.76
199-N-17	461.20	11/10/89	71.80	389.40
199-N-18	458.50	11/15/89	70.11	388.39
199-N-21	457.00	11/13/89	68.88	388.12
199-N-54	457.51	10/02/89	63.72	393.79
		11/01/89	65.93	391.58
199-N-55	457.85	10/02/89	63.61	394.24
		11/01/89	65.30	392.55
199-N-56	458.09	10/02/89	65.46	392.63
		11/01/89	66.70	391.39
199-N-57	457.76	10/02/89	62.81	394.95
		11/02/89	64.14	393.62
199-N-66	465.25	11/08/89	71.10	394.15
199-N-67	139.74	10/02/89	66.68	73.06
		11/08/89	68.00	71.74
199-N-69	139.85	10/02/89	67.36	72.49
		11/08/89	68.62	71.23

(a) MSL = mean sea level.

9 2 1 2 6 4 2 1 7 5 2

TABLE 6.3. Constituent List and Summary of Sampling Results for the 1301-N Liquid Waste Disposal Facility, September Through December 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	.	80	0	700	WDOE	xxx	Conductivity, Laboratory
191	CONDFLD	UMHO	1	104	0	700	WDOE	xxx	Specific conductance
199	PHFIELD		.100	105	0	6.5-8.5	EPAS	xxx	pH, Field Measurement
207	PH-LAB		.0100	80	0	6.5-8.5	EPAS		pH, Laboratory Measurement
C69	TOC	PPB	2000	67	63	.			Total organic carbon
H42	TOXLDL	PPB	10	68	52	.			Total Organic Halogen, Low Det. Level

---------- 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	2.20	6	6 ***	1	EPA		Coliform bacteria
111	BETA	PCI/L	8	22	0	50	EPA	xxx	Gross beta
112	ALPHAHI	PCI/L	4	22	19	15	EPA		Alpha, High Detection Level
181	RADIUM	PCI/L	1	22	15	5	EPA		Radium
A06	BARIUM	PPB	6	29	0	1000	EPA		Barium
A07	CADMIUM	PPB	2	29	29 ***	10	EPA		Cadmium
A08	CHROMUM	PPB	10	29	24	50	EPA		Chromium
A10	SILVER	PPB	10	29	29 ***	50	EPA		Silver
A20	ARSENIC	PPB	5	29	29 ***	50	EPA		Arsenic
A21	MERCURY	PPB	.100	29	29 ***	2	EPA		Mercury
A22	SELENUM	PPB	5	29	29 ***	10	EPA		Selenium
A33	ENDRIN	PPB	.100	22	22 ***	.200	EPA		Endrin
A34	METHLOR	PPB	3	22	22 ***	100	EPA		Methoxychlor
A35	TOXAENE	PPB	1	22	22 ***	5	EPA		Toxaphene
A36	a-BHC	PPB	.100	22	22 ***	4	EPA		Alpha-BHC
A37	b-BHC	PPB	.100	22	22 ***	4	EPA		Beta-BHC
A38	g-BHC	PPB	.100	22	22 ***	4	EPA		Gamma-BHC
A39	d-BHC	PPB	.100	22	22 ***	4	EPA		Delta-BHC
A51	LEADGF	PPB	5	29	29 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	PPB	500	29	2	45000	EPA	xxx	Nitrate
C74	FLUORID	PPB	500	29	26	4000	EPA		Fluoride
H13	2,4-D	PPB	2	22	22 ***	100	EPA		2,4-D
H14	2,4,5TP	PPB	2	22	22 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	PPB	6	29	0	1000	EPA		Barium, filtered
H21	FCADMIU	PPB	2	29	29 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	PPB	10	29	29 ***	50	EPA		Chromium, filtered
H23	FSILVER	PPB	10	29	29 ***	50	EPA		Silver, filtered
H37	FARSENI	PPB	5	29	29 ***	50	EPA		Arsenic, filtered

TABLE 6.3. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
H38	FMERCUR	PPB	.100	29	29 ***	2	EPA		Mercury, filtered
H39	FSELENI	PPB	5	29	29 ***	10	EPA		Selenium, filtered
H41	FLEAD	PPB	5	29	29 ***	50	EPA		Lead, filtered
H60	TURBID	NTU	.100	27	0	1	EPA	xxx	Turbidity
H63	LFLUORD	PPB	20	7	0	4000	EPA		Fluoride, Low Detection Level
P19	COLIMF	PPB	1	14	14 ***	1	EPA		Coliform (Membrane Filter)

---------- 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	29	0	.			Sodium
A17	MANGESE	PPB	5	29	12	50	EPAS	xxx	Manganese
A19	IRON	PPB	30	29	0	300	EPAS	xxx	Iron
C57	PHENOL	PPB	10	7	7 ***	.			Phenol
C73	SULFATE	PPB	500	29	0	250000	EPAS	xxx	Sulfate
C75	CHLORID	PPB	500	29	0	250000	EPAS		Chloride
H24	FSODIUM	PPB	200	29	0	.			Sodium, filtered
H29	FMANGAN	PPB	5	29	23	50	EPAS	xxx	Manganese, filtered
H31	FIRON	PPB	30	29	22	300	EPAS	xxx	Iron, filtered
H57	LPHENOL	PPB	10	15	15 ***	.			Phenol, low DL

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
010	CO-60	PCI/L	22.5	21	7	100	EPAR		Cobalt-60
024	CS-137	PCI/L	20	21	21 ***	200	EPAR		Cesium-137
034	RU-106	PCI/L	172.5	21	19	30	EPAR	xxx	Ruthenium-106
104	U	PCI/L	.500	22	0	600	DOE		Uranium
108	TRITIUM	PCI/L	500	21	0	20000	EPA	xxx	Tritium
121	SR 90	PCI/L	5	21	2	8	EPA	xxx	Strontium-90
A01	BERYLUM	PPB	5	29	28	.			Beryllium
A03	STRONUM	PPB	10	29	0	.			Strontium
A04	ZINC	PPB	5	29	9	5000	EPAS		Zinc
A05	CALCIUM	PPB	50	29	0	.			Calcium
A12	NICKEL	PPB	10	29	27	.			Nickel
A13	COPPER	PPB	10	29	29 ***	1300	EPAP		Copper
A14	VANADUM	PPB	5	29	8	.			Vanadium
A15	ANTIONY	PPB	100	29	29 ***	.			Antimony
A16	ALUMNUM	PPB	150	29	27	.			Aluminum
A18	POTASUM	PPB	100	29	0	.			Potassium

TABLE 6.3. (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
A50	MAGNES	PPB	50	29	0		.			Magnesium
C76	PHOSPHA	PPB	1000	29	27		.			Phosphate
H16	TC	PPB	1000	7	0		.			Total carbon
H17	TDS		5000	7	0		500000	EPAS	xxx	Total dissolved solids
H18	FZINC	PPB	5	29	15		5000	EPAS		Zinc, filtered
H19	FCALCIU	PPB	50	29	0		.			Calcium, filtered
H25	FNICKEL	PPB	10	29	29	***	.			Nickel, filtered
H26	FCOPPER	PPB	10	29	29	***	1300	EPAP		Copper, filtered
H27	FVANADI	PPB	5	29	9		.			Vanadium, filtered
H28	FALUMIN	PPB	150	29	29	***	.			Aluminum, filtered
H30	FPOTASS	PPB	100	29	0		.			Potassium, filtered
H32	FMAGNES	PPB	50	29	0		.			Magnesium, filtered
H33	FBERYLL	PPB	5	29	28		.			Beryllium, filtered
H35	FSTRONT	PPB	10	29	0		.			Strontium, filtered
H36	FANTIMO	PPB	100	29	29	***	.			Antimony, filtered
H58	ALKALIN		20000	7	0		.			Alkalinity
H66	BROMIDE	PPB	1000	29	29	***	.			Bromide
H67	NITRITE	PPB	1000	29	29	***	.			Nitrite
H86	FBORON	PPB	10	29	0		.			Boron, filtered
H87	FCOBALT	PPB	20	29	29	***	.			Cobalt, filtered
H88	FLITHIU	PPB	10	29	29	***	.			Lithium, filtered
H89	FMOLY	PPB	40	29	29	***	.			Molybdenum, filtered
H90	FSILICO	PPB	50	29	0		.			Silicon, filtered
H91	FTIN	PPB	30	29	29	***	.			Tin, filtered
H92	FTITAN	PPB	60	29	29	***	.			Titanium, filtered
H93	FZIRCON	PPB	50	29	29	***	.			Zirconium, filtered
P01	BORON	PPB	10	29	0		.			Boron
P02	COBALT	PPB	20	29	29	***	.			Cobalt
P03	LITHIUM	PPB	10	29	29	***	.			Lithium
P04	MOLY	PPB	40	29	29	***	.			Molybdenum
P05	SILICON	PPB	50	29	0		.			Silicon
P06	TIN	PPB	30	29	29	***	.			Tin
P07	TITAN	PPB	60	29	29	***	.			Titanium
P08	ZIRCON	PPB	50	29	29	***	.			Zirconium
P12	ENDSFAN	PPB	.500	14	14	***	.			Endosulfan
P13	PHORATE	PPB	2	7	7	***	.			PHORATE

TABLE 6.3. (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
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	.100	14	14 ***	.		DDD
A41	DDE	PPB	.100	14	14 ***	.		DDE
A42	DDT	PPB	.100	14	14 ***	.		DDT
A43	HEPTLOR	PPB	.100	14	14 ***	0	EPAP	Heptachlor
A44	HEPTIDE	PPB	.100	14	14 ***	0	EPAP	Heptchlor epoxide
A45	KEPONE	PPB	1	14	14 ***	.		Kepone
A46	DIELRIN	PPB	.100	14	14 ***	.		Dieldrin
A47	ALDRIN	PPB	.100	14	14 ***	.		Aldrin
A48	CHLOANE	PPB	1	14	14 ***	0	EPAP	Chlordane
A49	ENDO1	PPB	.100	14	14 ***	.		Endosulfan I
A52	ENDO2	PPB	.100	14	14 ***	.		Endosulfan II
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	22	22 ***	5	EPA	Carbon Tetrachloride by GC/MS
A62	BENZENE	PPB	5	22	22 ***	5	EPA	Benzene
A63	DIOXANE	PPB	500	7	7 ***	.		Dioxane
A64	METHONE	PPB	10	22	21	.		Methyl ethyl ketone
A65	PYRIDIN	PPB	500	7	7 ***	.		Pyridine
A66	TOLUENE	PPB	5	22	22 ***	2000	EPAP	Toluene
A67	1,1,1-T	PPB	5	22	22 ***	200	EPA	1,1,1-trichloroethane
A68	1,1,2-T	PPB	5	22	22 ***	.		1,1,2-trichloroethane
A69	TRICENE	PPB	5	22	22 ***	5	EPA	Trichloroethylene
A70	PERCENE	PPB	5	22	22 ***	.		Tetrachloroethylene
A71	OPXYLE	PPB	5	22	22 ***	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

TABLE 6.3. (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
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	22	18	100	EPA		Chloroform
A81	METHCHL	PPB	10	7	7 ***	.			Methyl chloride
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	22	22 ***	.			1,1-dichloroethane
A90	1,2-DIC	PPB	5	22	22 ***	5	EPA		1,2-dichloroethane
A91	TRANDCE	PPB	5	22	22 ***	70	EPAP		Trans-1,2-dichloroethene
A92	DICETHY	PPB	10	7	7 ***	7	EPA		1,1-dichloroethylene
A93	METHYCH	PPB	5	22	22 ***	.			Methylene Chloride
A94	DICPANE	PPB	5	7	7 ***	6	EPAP		1,2-dichloropropane
A95	DICPENE	PPB	5	7	7 ***	.			1,3-dichloropropene
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
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	22	22 ***	2	EPA		Vinyl chloride
B14	M-XYLE	PPB	5	22	22 ***	440	EPAP		Xylene-m
B19	ACETILE	PPB	10	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-aminobyphenyl
B24	AMIISOX	PPB	10	7	7 ***	.			5-(aminomethyl)-3-isoxazolol
B25	AMITROL	PPB	10	7	7 ***	.			Amitrole
B26	ANILINE	PPB	10	7	7 ***	.			Aniline

TABLE 6.3. (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
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 ***	.		Benzenethoil
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
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
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	p-Dichlorobenzene
B64	DICHBEN	PPB	10	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

TABLE 6.3. (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
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	10	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
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	10	7	7 ***	.			P-nitroaniline
C12	NITBENZ	PPB	10	7	7 ***	.			Nitrobenzine
C13	NITPHEN	PPB	10	7	7 ***	.			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

TABLE 6.3. (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
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
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	10	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	6	.		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	14	14 ***	.		Chlorobenzilate
C63	CARBPHT	PPB	2	7	7 ***	.		Carbophenothion

TABLE 6.3. (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
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
C77	PERCHLO	PPB	500	7	7 ***	.			Perchlorate
C78	SULFIDE	PPB	1000	7	7 ***	.			Sulfide
C79	KEROSEN	PPB	10000	7	7 ***	.			Kerosene
C80	AMMONIU	PPB	50	22	21	.			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 hydrizide
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	PCDD's	PPB	.0100	7	7 ***	.			Pcdd's
D02	PCDF's	PPB	.0100	7	7 ***	.			Pcdf's
D03	2378TCD	PPB	.0100	7	7 ***	.			2,3,7,8 TCDD
H03	ETHCARB	PPB	10000	7	7 ***	.			Ethyl carbamate
H04	ETHCYAN	PPB	10000	7	7 ***	.			Ethyl cyanide
H05	ETHOXID	PPB	10	7	7 ***	.			Ethylene oxide
H06	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	22	22 ***	.			2,4,5-T
H40	FTHALLI	PPB	5	7	7 ***	.			Thallium, filtered
H62	LHYDRAZ	PPB	30	29	29 ***	.			Hydrazine, Low Detection Level
H68	HEXONE	PPB	10	22	22 ***	.			Methyl Isobutyl Ketone
I01	ACETONE	PPB	10	22	22 ***	.			Acetone by VOA
I06	ISOPHER	PPB	10	7	7 ***	.			Isophorone
I09	BUTANOL	PPB	10000	7	7 ***	.			1-Butanol
I21	TRIBUPH	PPB	10	7	7 ***	.			Tributylphosphoric Acid
I28	TAF	PPB	10	22	22 ***	.			Tetrahydrofuran
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 ***	680	EPAP		Ethyl benzene
I34	STYRENE	PPB	5	7	7 ***	140	EPAP		Styrene
I42	BDCM	PPB	5	7	7 ***	100	EPA		Bromodichloromethane

TABLE 6.3. (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
I43	CDBM	PPB	5	7	7 ***	100	EPA	Chlorodibromomethane
I64	2NITPH	PPB	10	7	7 ***	.		o-Nitrophenol
I67	ETHANOL	PPB	10000	7	7 ***	.		Ethanol
I75	2MENAPH	PPB	10	7	6	.		2-Methylnaphthalene
I82	PHENANT	PPB	10	7	7 ***	.		Phenanthrene
I97	UNKARO	PPB	.	2	0	.		Unknown Aromatic Hydrocarbon
I99	UNKNOWN	PPB	0	3	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 ***	.		Monobutyl Phosphate
L21	DBP	PPB	10000	7	7 ***	.		Dibutyl Phosphate
L45	ALLYLCL	PPB	100	7	7 ***	.		Allyl Chloride
L46	CLETHAN	PPB	10	7	7 ***	.		Chloroethane
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 ***	.		0,0-Diethyl-0,2-pyrazinyl phosphorothion
L53	ISODRIN	PPB	10	7	7 ***	.		Isodrin
L54	ONITANI	PPB	10	7	7 ***	.		o-Nitroaniline
L55	MNITANI	PPB	10	7	7 ***	.		m-Nitroaniline
L56	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	ACETONE	PPB	10	7	7 ***	.		Acetone - by ABN
L63	14DBEN	PPB	5	22	22 ***	75	EPA	p-Dichlorobenzene
L64	CHLROB	PPB	10	7	7 ***	60	EPAP	Chlorobenzene (by ABN)
L68	UNKPAH	PPB	.	1	0	.		Unknown Polycyclic Aromatic Hydrocarbon
L96	SULFER	PPB	.	1	0	.		Sulfer

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 6.4. Constituents with at Least One Detected Value for the 1301-N Liquid Waste Disposal Facility, September Through December 1989

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
			Contamination Indicator Parameters					
1-N-2	21DEC89		177	177	7.90	8.30	#400	#6
	21DEC89	1	.	179	7.90	8.27	#300	#1
	21DEC89	2	187	176	7.90	8.25	#300	#5
	21DEC89	3	187	183	7.90	8.25	#300	#6
1-N-3	29SEP89		274	236	7.50	7.35	#900	#6
	29SEP89	1	269	238	7.60	7.31	#500	#5
	29SEP89	2	244	239	7.60	7.26	#700	#4
	29SEP89	3	241	246	7.60	7.24	#900	#3
	08NOV89		268	220	7.60	7.71	#600	#5
	08NOV89	1	231	220	7.60	7.70	#500	#3
	08NOV89	2	226	221	7.60	7.71	#500	#5
	08NOV89	3	225	221	7.60	7.71	#500	#5
1-N-4	29SEP89		167	179	8	7.70	#900	#7
	29SEP89	1	165	179	8	7.66	#800	#6
	29SEP89	2	167	172	8	7.63	#700	#4
	29SEP89	3	166	175	8	7.62	#800	#5
	08NOV89		161	164	8	8.21	#900	23
	08NOV89	1	161	164	8	8.20	#700	#9
	08NOV89	2	161	164	8	8.19	#600	10
	08NOV89	3	161	163	8	8.19	#600	10
1-N-14	26SEP89		184	192	8.10	7.77	#1000	#2
	26SEP89	1	184	192	8.20	7.83	#800	#4
	26SEP89	2	181	192	8.20	7.86	#500	#2
	26SEP89	3	180	190	8.20	7.85	#600	#2
	14NOV89		187	184	8.10	8.17	#400	#6
	14NOV89	1	187	185	8.20	8.15	#444	#3
	14NOV89	2	187	185	8.20	8.14	#400	#9
	14NOV89	3	187	185	8.20	8.14	#500	#6
1-N-16	28SEP89		1240	1280	7.40	7.35	.	.
	28SEP89	1	1238	1270	7.40	7.35	.	.
	28SEP89	2	1238	1280	7.40	7.34	.	.
	28SEP89	3	1238	1290	7.40	7.35	.	.
	13NOV89		1546	.	.	6.56	5500	12
	13NOV89	1	1544	.	.	6.51	5400	15
	13NOV89	2	1550	.	.	6.50	5600	#9
	13NOV89	3	1558	.	.	6.48	5000	#9
1-N-17	26SEP89		580	591	7.40	6.87	.	.
	26SEP89	1	579	600	7.40	6.85	.	.
	26SEP89	2	576	588	7.40	6.84	.	.
	26SEP89	3	571	585	7.40	6.83	.	.
	10NOV89		502	.	.	6.68	#1200	#7

TABLE 6.4. (contd)

Contamination Indicator Parameters

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
	10NOV89	1	502	.	.	6.67	#1300	#4
	10NOV89	2	502	.	.	6.67	#1100	#7
	10NOV89	3	502	.	.	6.67	.	#6
1-N-21	28SEP89		564	561	7.90	7.88	.	.
	28SEP89	1	566	556	7.90	7.88	.	.
	28SEP89	2	566	552	7.90	7.88	.	.
	28SEP89	3	565	557	7.90	7.87	.	.
	13NOV89		794	.	.	7.21	#700	17
	13NOV89	1	795	.	.	7.20	#700	10
	13NOV89	2	795	.	.	7.21	#700	#9
	13NOV89	3	797	.	.	7.22	#600	#6
1-N-54	02OCT89		345	363	7.50	7.58	.	.
	02OCT89	1	328	363	7.60	7.56	.	.
	02OCT89	2	340	364	7.50	7.58	.	.
	02OCT89	3	348	383	7.50	7.57	.	.
	01NOV89		302	.	.	7.69	#600	13
	01NOV89	1	300	.	.	7.69	.	.
	01NOV89	2	301	.	.	7.68	.	.
	01NOV89	3	302	.	.	7.67	.	.
1-N-55	02OCT89		398	433	7.70	7.90	.	.
	02OCT89	1	412	464	7.80	7.89	.	.
	02OCT89	2	407	435	7.70	7.88	.	.
	02OCT89	3	405	451	7.70	7.89	.	.
	01NOV89		443	.	.	7.76	#500	#8
	01NOV89	1	444	.	.	7.75	.	.
	01NOV89	2	444	.	.	7.75	.	.
	01NOV89	3	443	.	.	7.75	.	.
1-N-56	02OCT89		495	531	7.40	7.49	.	.
	02OCT89	1	493	546	7.40	7.47	.	.
	02OCT89	2	490	530	7.40	7.47	.	.
	02OCT89	3	491	531	7.40	7.45	.	.
	01NOV89		517	.	.	7.41	#1500	#7
	01NOV89	1	517	.	.	7.40	.	.
	01NOV89	2	517	.	.	7.40	.	.
	01NOV89	3	516	.	.	7.40	.	.
1-N-57	02OCT89		274	323	7.80	7.70	.	.
	02OCT89	1	271	324	7.80	7.71	.	.
	02OCT89	2	273	322	7.80	7.70	.	.
	02OCT89	3	275	320	7.80	7.70	.	.
	02NOV89		317	.	.	8.09	#600	#8
1-N-66	29SEP89		1764	170	8.20	8.09	#700	12

TABLE 6.4. (contd)

Contamination Indicator Parameters

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
	29SEP89	1	1741	167	8.20	8.11	#800	#7
	29SEP89	2	1735	179	8.10	8.11	#1200	12
	29SEP89	3	1740	166	8.20	8.11	#1200	16
	08NOV89		159	158	8.20	7.54	#500	15
	08NOV89	1	160	158	8.20	7.56	#800	14
	08NOV89	2	157	158	8.20	7.57	#600	12
	08NOV89	3	159	158	8.20	7.58	#500	11
1-N-67	02OCT89		218	218	7.70	7.71	#400	#7
	02OCT89	1	218	217	7.70	7.70	#500	#8
	02OCT89	2	219	216	7.70	7.69	#500	#5
	02OCT89	3	219	217	7.70	7.70	#700	#4
	08NOV89		199	205	7.60	7.86	#500	18
	08NOV89	1	200	205	7.60	7.86	#500	#6
	08NOV89	2	200	206	7.60	7.86	#500	#8
	08NOV89	3	199	206	7.60	7.85	#400	#4
1-N-69	02OCT89		197	201	8.30	8.41	#500	#4
	02OCT89	1	197	201	8.40	8.40	#500	<10
	02OCT89	2	197	201	8.40	8.40	#500	#3
	02OCT89	3	197	198	8.40	8.41	#400	<10
	08NOV89		186	189	8.30	8.10	#400	#3
	08NOV89	1	185	190	8.30	8.12	#400	#5
	08NOV89	2	186	189	8.30	8.14	#300	#9
	08NOV89	3	185	188	8.30	8.15	#300	#3

TABLE 6.4. (contd)

Regular Monitoring Data

Well name	Collection date	Duplicate sample number	FLUORID PPB 500/4000	FMANGAN PPB 5/50s	FPOTASS PPB 100/.	FBERYLL PPB 5/.	FSTRONT PPB 10/.	2MENAPH PPB 10/.	ACETONE PPB 10/.	ALKALIN 20000/.
1-N-2	21DEC89		<500	<5	1420	<5	97	.	<10	.
1-N-3	29SEP89		<500	<5	1990	<5	118	.	<10	.
	08NOV89		<500	<5	1940	<5	111	.	<10	.
1-N-4	29SEP89		<500	<5	2280	<5	103	.	<10	.
	08NOV89		<500	<5	2220	<5	94	.	<10	.
1-N-14	26SEP89		<500	<5	2030	<5	136	.	<10	.
	26SEP89	1	<500	<5	1690	<5	119	.	<10	.
	14NOV89		<500	<5	1590	<5	125	.	<10	.
	14NOV89	1	<500	<5	1660	<5	127	.	<10	.
1-N-16	28SEP89		1600	2230	9720	<5	494	.	.	236000
	13NOV89		1600	2860	9060	<5	462	<10	<10	.
	13NOV89	1	.	.	.	.	.	.	.	.
	13NOV89	2	.	.	.	.	.	.	.	.
1-N-17	26SEP89		<500	1100	4130	<5	284	.	.	222000
	10NOV89		<500	820	3390	<5	233	<10	18	.
1-N-21	28SEP89		<500	<5	4300	<5	187	.	.	119000
	13NOV89		800	<5	5190	<5	323	<10	<10	.
1-N-54	02OCT89		<500	<5	3170	<5	189	.	.	108000
	01NOV89		<500	<5	3010	<5	154	<10	<10	.
1-N-55	02OCT89		<500	<5	3710	8	245	.	.	80000
	01NOV89		<500	<5	3940	<5	248	<10	<10	.
1-N-56	02OCT89		<500	9	3420	<5	287	.	.	193000
	01NOV89		<500	6	3490	<5	297	26	<10	.
1-N-57	02OCT89		<500	<5	3240	<5	149	.	.	86000
	02NOV89		<500	<5	3530	<5	161	<10	<10	.
1-N-66	29SEP89		<500	<5	1830	<5	100	.	<10	.
	08NOV89		<500	<5	2010	<5	102	.	<10	.
1-N-67	02OCT89		<500	<5	1500	<5	109	.	<10	.
	08NOV89		<500	<5	1460	<5	109	.	<10	.
1-N-69	02OCT89		<500	<5	2090	<5	152	.	<10	.
	08NOV89		<500	<5	1950	<5	148	.	<10	.

THIS PAGE INTENTIONALLY
LEFT BLANK

TABLE 6.4. (contd)

Well name	Collection date	Duplicate sample number	ALPHAHI PCI/L 4/15	ALUMNUM PPB 150/.	AMMONIU PPB 50/.
1-N-2	21DEC89		*.310	<150	<50
1-N-3	29SEP89		1.36	354	<50
	08NOV89		*.515	<150	<50
1-N-4	29SEP89		*.243	<150	<50
	08NOV89		*.0225	<150	<50
1-N-14	26SEP89		.893	<150	<50
	26SEP89	1	*.390	<150	<50
	14NOV89		*.128	<150	<50
	14NOV89	1	*.513	<150	<50
1-N-16	28SEP89		.	<150	.
	13NOV89		*.881	<150	222
	13NOV89	1	.	.	.
	13NOV89	2	.	.	.
1-N-17	26SEP89		.	<150	.
	10NOV89		*1.13	<150	<50
1-N-21	28SEP89		.	<150	.
	13NOV89		*1.39	<150	<50
1-N-54	02OCT89		.	<150	.
	01NOV89		*.527	<150	<50
1-N-55	02OCT89		.	<150	.
	01NOV89		*1.11	<150	<50
1-N-56	02OCT89		.	<150	.
	01NOV89		*-0.158	<150	<50
1-N-57	02OCT89		.	<150	.
	02NOV89		*.414	<150	<50
1-N-66	29SEP89		1.08	<150	<50
	08NOV89		*.445	196	<50
1-N-67	02OCT89		*.377	<150	<50
	08NOV89		*.0120	<150	<50
1-N-69	02OCT89		*.0999	<150	<50
	08NOV89		*.472	<150	<50

TABLE 6.4. (contd)

Well name	Collection date	Duplicate sample number	BARIUM PPB 6/1000	FBARIUM PPB 6/1000	BETA PCI/L 8/50	BORON PPB 10/.	FBORON PPB 10/.	CALCIUM PPB 50/.
1-N-2	21DEC89		18	17	3610	20	15	25300
1-N-3	29SEP89		42	33	1010	24	18	29900
	08NOV89		28	30	1220	18	27	27200
1-N-4	29SEP89		19	18	34.4	22	18	22700
	08NOV89		14	13	30.2	21	26	21500
1-N-14	26SEP89		15	16	2030	24	22	25900
	26SEP89	1	13	11	1840	23	22	25900
	14NOV89		14	14	2140	23	31	25300
	14NOV89	1	14	15	2000	20	34	25100
1-N-16	28SEP89		146	161	.	28	31	103000
	13NOV89		152	153	8.57	28	29	109000
	13NOV89	1	.	.	.	.	.	.
	13NOV89	2	.	.	.	.	.	.
1-N-17	26SEP89		90	83	.	29	19	73900
	10NOV89		66	67	226	19	22	57300
1-N-21	28SEP89		50	43	.	23	20	32800
	13NOV89		60	54	11.6	32	21	59100
1-N-54	02OCT89		59	57	.	40	17	42500
	01NOV89		57	56	314	27	20	33000
1-N-55	02OCT89		51	53	.	21	53	49400
	01NOV89		50	44	64.2	21	18	55000
1-N-56	02OCT89		65	68	.	27	35	71000
	01NOV89		63	62	691	19	25	73800
1-N-57	02OCT89		53	46	.	28	18	34100
	02NOV89		57	52	39.1	15	13	34500
1-N-66	29SEP89		16	14	31.4	29	17	22200
	08NOV89		19	17	28.9	20	27	23100
1-N-67	02OCT89		26	25	25700	28	23	28300
	08NOV89		23	24	24100	29	27	28400
1-N-69	02OCT89		21	20	22.1	21	16	24200
	08NOV89		19	17	19.3	20	21	24500

TABLE 6.4. (contd)

Well name	Collection date	Duplicate sample number	FCALCIU PPB 50/.	CHLFORM PPB 5/100	CHLORID PPB 500/250000s	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
1-N-2	21DEC89		24400	5	1400	<10	*2.39	*-0.868	65	<30
1-N-3	29SEP89		27400	#3	3000	<10	*11.3	*-0.620	1620	<30
	08NOV89		27900	#3	2500	<10	6.07	*3.25	229	<30
1-N-4	29SEP89		21700	#4	1600	<10	11.9	*-1.30	145	<30
	08NOV89		21200	8	1700	<10	14.7	*-1.37	220	<30
1-N-14	26SEP89		27200	#3	2600	<10	17.5	*1.10	169	<30
	26SEP89	1	23900	#3	2700	<10	13.7	*1.18	158	<30
	14NOV89		24500	#4	2400	<10	11.1	*.690	61	<30
	14NOV89	1	25500	#4	2500	<10	.	.	537	<30
1-N-16	28SEP89		108000	.	30000	<10	.	.	983	1170
	13NOV89		107000	<5	19800	<10	*2.06	*.248	4560	2350
	13NOV89	1	.	.	.	.	.	.	.	.
	13NOV89	2	.	.	.	.	.	.	.	.
1-N-17	26SEP89		69000	.	7000	<10	.	.	1240	393
	10NOV89		56400	<5	5600	<10	*-3.10	*.621	551	222
1-N-21	28SEP89		33700	.	7000	<10	.	.	547	<30
	13NOV89		66300	#4	10800	<10	5.67	*3.06	432	43
1-N-54	02OCT89		42600	.	4800	<10	.	.	94	<30
	01NOV89		32800	<5	3700	<10	15.9	*1.88	38	<30
1-N-55	02OCT89		49800	.	4200	19	.	.	55	<30
	01NOV89		51500	#3	4200	<10	8.32	*-0.125	39	<30
1-N-56	02OCT89		70200	.	6000	<10	.	.	59	203
	01NOV89		72900	<5	6200	12	19.3	*0	77	<30
1-N-57	02OCT89		30100	.	3300	<10	.	.	117	<30
	02NOV89		33300	#3	3200	<10	7.31	*-2.98	39	<30
1-N-66	29SEP89		21500	6	1600	15	13.1	*5.89	186	37
	08NOV89		23300	10	1600	<10	*4.86	*-5.26	469	<30
1-N-67	02OCT89		27100	#3	5700	12	*11.9	*-1.50	102	<30
	08NOV89		28100	#3	6200	<10	*6.98	*.689	171	<30
1-N-69	02OCT89		23900	<5	1200	13	19.3	*-4.82	71	<30
	08NOV89		24300	#3	1100	<10	23.1	*-0.476	32	<30

TABLE 6.4. (contd)

Well name	Collection date	Duplicate sample number	LFLUORD PPB 20/4000	MAGNES PPB 50/.	FMAGNES PPB 50/.	MANGESE PPB 5/50s	METHONE PPB 10/.	NAPHTHA PPB 10/.	NICKEL PPB 10/.	NITRATE PPB 500/45000
1-N-2	21DEC89		.	4050	3960	<5	<10	.	<10	9300
1-N-3	29SEP89		.	5240	4750	70	11	.	<10	7500
	08NOV89		.	4590	4680	13	<10	.	<10	7100
1-N-4	29SEP89		.	3840	3640	5	<10	.	<10	2800
	08NOV89		.	3580	3530	8	<10	.	<10	3700
1-N-14	26SEP89		.	4180	4410	<5	16	.	<10	8700
	26SEP89	1	.	4230	3850	6	<10	.	<10	8800
	14NOV89		.	3970	3870	<5	<10	.	<10	8300
	14NOV89	1	.	3940	4020	<5	<10	.	<10	8500
1-N-16	28SEP89		.	17100	18500	2050	.	.	<10	<500
	13NOV89		407	18600	17800	2760	<10	<10	<10	<500
	13NOV89	1	.	.	.	.	.	.	.	.
	13NOV89	2	.	.	.	.	.	.	.	.
1-N-17	26SEP89		.	11100	10400	1160	.	.	<10	3800
	10NOV89		232	8240	8360	813	<10	<10	<10	2400
1-N-21	28SEP89		.	6350	6480	24	.	.	<10	11000
	13NOV89		299	10700	11100	15	<10	<10	<10	10600
1-N-54	02OCT89		.	6280	6250	9	.	.	<10	11900
	01NOV89		235	4830	4830	<5	<10	<10	<10	9500
1-N-55	02OCT89		.	9220	9110	6	.	.	<10	8700
	01NOV89		261	10000	9600	<5	<10	<10	<10	93000
1-N-56	02OCT89		.	10500	10400	6	.	.	<10	9000
	01NOV89		115	10500	10400	7	<10	12	11	8400
1-N-57	02OCT89		.	6470	5690	<5	.	.	<10	8100
	02NOV89		300	6600	6290	<5	<10	<10	<10	8800
1-N-66	29SEP89		.	3600	3470	8	<10	.	11	2400
	08NOV89		.	3600	3640	8	<10	.	<10	3000
1-N-67	02OCT89		.	4480	4330	<5	<10	.	<10	12100
	08NOV89		.	4380	4340	<5	<10	.	<10	10300
1-N-69	02OCT89		.	5110	5080	<5	<10	.	<10	24500
	08NOV89		.	4980	4970	<5	<10	.	<10	22900

TABLE 6.4. (contd)

Well name	Collection date	Duplicate sample number	PHOSPHA PPB 1000/.	POTASUM PPB 100/.	RADIUM PCI/L 1/5	RU-106 PCI/L 172.5/30r	SILICON PPB 50/.	FSILICO PPB 50/.	SODIUM PPB 200/.	FSODIUM PPB 200/.
1-N-2	21DEC89		<1000	1460	*-0.0468	*-11.6	7310	6950	2540	2480
1-N-3	29SEP89		<1000	2210	.182	*-23.8	11600	10100	7300	6820
	08NOV89		<1000	1910	.265	*-13.7	10700	10900	6500	6720
1-N-4	29SEP89		<1000	2530	*.0515	*28.6	10300	9800	3530	3280
	08NOV89		<1000	2260	*.0145	*43.9	10200	9980	3290	3230
1-N-14	26SEP89		<1000	1930	*.0295	*-4.63	8070	8400	3190	3380
	26SEP89	1	<1000	1960	*.0766	*-36.3	8040	7340	3280	2900
	14NOV89		<1000	1620	*.0958	*-1.18	7750	7220	3110	3020
	14NOV89	1	<1000	1630	*.0334	.	7670	7850	3020	3150
1-N-16	28SEP89		<1000	9220	.	.	18500	19800	178000	189000
	13NOV89		<1000	9300	.399	*-4.14	20700	20800	189000	179000
	13NOV89	1	.	.	.	.	.	.	.	.
	13NOV89	2	.	.	.	.	.	.	.	.
1-N-17	26SEP89		<1000	4360	.	.	15900	14800	39500	37200
	10NOV89		<1000	3370	.208	95.8	14100	14100	29900	30900
1-N-21	28SEP89		<1000	4280	.	.	13300	13400	69000	69100
	13NOV89		<1000	5120	.450	*-5.90	13900	14200	79600	88000
1-N-54	02OCT89		<1000	3260	.	.	10800	11000	17100	17500
	01NOV89		<1000	2920	.247	*5.64	10800	10600	19700	19700
1-N-55	02OCT89		<1000	3930	.	.	12400	12300	19900	19200
	01NOV89		<1000	4050	*.0691	*31.9	12700	11900	21200	20200
1-N-56	02OCT89		1300	3350	.	.	12100	12100	20800	21600
	01NOV89		1400	3540	*.0400	*19.1	12100	11600	25500	25000
1-N-57	02OCT89		<1000	3790	.	.	13000	11400	14900	13000
	02NOV89		<1000	3720	*.113	*32.8	12300	12200	16300	16400
1-N-66	29SEP89		<1000	1930	*.138	*30.2	7700	7300	2160	2040
	08NOV89		<1000	2020	.397	*35.7	7900	7840	2250	2300
1-N-67	02OCT89		<1000	1530	*.0939	*-4.22	7890	7550	2830	2760
	08NOV89		<1000	1460	*.000750	*.524	7800	7840	2730	2890
1-N-69	02OCT89		<1000	2100	*.0335	69.1	8360	8280	2950	2930
	08NOV89		<1000	1900	*.104	*-18	7640	8350	2770	2820

TABLE 6.4. (contd)

Well name	Collection date	Duplicate sample number	SR 90 PCI/L 5/8	STRONUM PPB 10/.	SULFATE PPB 500/250000s	SULFER PPB ./.	TC PPB 1000/.	TDS 5000/500000s	TRITIUM PCI/L 500/20000	TURBID NTU .10/1
1-N-2	21DEC89		1840	102	13400	.	.	.	54200	.200
1-N-3	29SEP89		629	127	26000	.	.	.	23100	6.80
	08NOV89		541	109	24800	.	.	.	22600	2
1-N-4	29SEP89		7.26	106	12700	.	.	.	22100	1.50
	08NOV89		6.92	95	12400	.	.	.	36000	3.10
1-N-14	26SEP89		1010	130	15400	.	.	.	34600	1.80
	26SEP89	1	1110	134	15400	.	.	.	34900	.
	14NOV89		1090	126	15500	.	.	.	36200	.600
	14NOV89	1	.	123	15600	.	.	.	.	.
1-N-16	28SEP89		.	456	392000	.	.	.	.	45
	13NOV89		*.389	478	283000	30	110000	892000	3010	21
	13NOV89	1	.	.	.	.	.	.	.	.
	13NOV89	2	.	.	.	.	.	.	.	.
1-N-17	26SEP89		.	301	68000	.	.	.	.	14
	10NOV89		111	229	64000	.	43600	274000	19400	3.50
1-N-21	28SEP89		.	186	129000	.	.	.	.	6.60
	13NOV89		3.21	309	213000	.	32900	463000	13600	1.80
1-N-54	02OCT89		.	188	51000	.	.	.	.	1.80
	01NOV89		171	156	42100	.	23600	158000	19700	.600
1-N-55	02OCT89		.	244	114000	.	.	.	.	.300
	01NOV89		44.1	265	122000	.	20000	270000	19700	.300
1-N-56	02OCT89		.	293	59000	.	.	.	.	.200
	01NOV89		364	308	73000	.	46400	301000	31100	.700
1-N-57	02OCT89		.	169	50000	.	.	.	.	.900
	02NOV89		18.5	172	56200	.	19800	173000	21800	.400
1-N-66	29SEP89		2.18	102	12100	.	.	.	27700	2.40
	08NOV89		1.67	98	11300	.	.	.	52400	5.80
1-N-67	02OCT89		13000	113	19900	.	.	.	45300	.400
	08NOV89		11600	110	19500	.	.	.	42600	1.50
1-N-69	02OCT89		.840	155	11500	.	.	.	75100	.400
	08NOV89		*.0617	147	11000	.	.	.	78400	.200

TABLE 6.4. (contd)

Well name	Collection date	Duplicate sample number	U PCI/L .50/600d	UNKARO PPB ./.	UNKNOWN PPB 0/.	UNKPAH PPB ./.	VANADUM PPB 5/.	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000
1-N-2	21DEC89		.148	.	.	.	<5	<5	7	<5
1-N-3	29SEP89		.276	.	.	.	13	8	10	<5
	08NOV89		.807	.	.	.	8	10	<5	<5
1-N-4	29SEP89		.345	.	.	.	18	16	13	<5
	08NOV89		.338	.	.	.	14	13	6	<5
1-N-14	26SEP89		.174	.	.	.	6	6	5	<5
	26SEP89	1	.177	.	.	.	11	<5	10	7
	14NOV89		.787	.	.	.	7	7	8	7
	14NOV89	1	.831	.	.	.	7	8	9	8
1-N-16	28SEP89		.	.	.	.	5	8	24	27
	13NOV89		1.77	25	21	.	<5	<5	25	15
	13NOV89	1	.	22	41	.	.	.	.	.
	13NOV89	2	.	.	25	.	.	.	.	.
1-N-17	26SEP89		.	.	.	.	6	<5	12	12
	10NOV89		.779	.	.	.	<5	<5	14	15
1-N-21	28SEP89		.	.	.	.	14	14	16	14
	13NOV89		1.50	.	.	.	11	11	15	13
1-N-54	02OCT89		.	.	.	.	10	7	5	7
	01NOV89		.447	.	.	.	<5	<5	7	<5
1-N-55	02OCT89		.	.	.	.	15	15	<5	8
	01NOV89		.727	.	.	.	9	10	7	<5
1-N-56	02OCT89		.	.	.	.	<5	<5	<5	30
	01NOV89		.533	.	.	28	<5	<5	12	8
1-N-57	02OCT89		.	.	.	.	8	9	<5	<5
	02NOV89		.906	.	.	.	6	9	32	<5
1-N-66	29SEP89		.586	.	.	.	16	15	<5	<5
	08NOV89		.647	.	.	.	11	13	11	7
1-N-67	02OCT89		.328	.	.	.	<5	<5	<5	<5
	08NOV89		.211	.	.	.	8	5	<5	<5
1-N-69	02OCT89		.444	.	.	.	<5	5	<5	<5
	08NOV89		.195	.	.	.	7	8	<5	<5

TABLE 6.4. (contd)

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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

TABLE 6.5. Sampling Schedule for the 1301-N Liquid Waste Disposal Facility

	1989[a]				1990								
Well	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
199-N-2				X		X			X			X	
199-N-3	X		X			X			X			X	
199-N-4	X		X			X			X			X	
199-N-14	X		X			X			X			X	
*199-N-16	X		L			S			S			S	
*199-N-17	X		L			S			S			S	
*199-N-18						S			S			S	
*199-N-21	X		L			S			S			S	
*199-N-23	S		L			S			S			S	
*199-N-24	S		L			S			S			S	
*199-N-25	S		L			S			S			S	
*199-N-26	S		L			S			S			S	
*199-N-47	S		L			S			S			S	
*199-N-54		S	L			S			S			S	
*199-N-55		S	L			S			S			S	
*199-N-56		S	L			S			S			S	
*199-N-57		S	L			S			S			S	
199-N-66	X		X			X			X			X	
199-N-67		X	X			X			X			X	
199-N-69		X	X			X			X			X	

(a) The following notations are used in this table:
L = sampled for the long list of constituents (WAC 173-303-9905) for liquid effluent study.
S = sampled for the short list of constituents (Table 6.6).
X = sampled for the regular list of constituents (Table 6.5).
* = data also used in the 1324-N/NA project.

9 2 1 2 6 4 2 1 7 7 5

TABLE 6.6. The Regular Sampling List for the 1301-N Ground-Water Quality Assessment Monitoring Network

Coliform
Total Organic Halogens
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 6.7. Short List for the 1301-N Ground-Water Quality Assessment Monitoring Network

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

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

M. J. Hartman
Westinghouse Hanford Company

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

The 1324-N/NA facilities are located in the 100-N Area approximately 1300 ft east of the Columbia River (see Figures 1.1 and 7.1). The 1324-N Surface Impoundment was a treatment facility that was in service from May 1986 to November 1988, when it was replaced with an elementary neutralization vessel. This facility is a doubly lined pond with a leachate collection system that was used to neutralize the wastes. It is currently not in use. The 1324-NA Percolation Pond is an unlined pond that was used to treat corrosive hazardous wastes from August 1977 to May 1986. These wastes contained sulfuric acid and sodium hydroxide. The 1324-NA pond is currently a disposal facility, receiving treated wastes from the elementary neutralization vessel that replaced the 1324-N facility.

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

9 2 1 2 6 4 2 1 7 7 7

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

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

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

WATER LEVELS

The elevation of the water table in the 100-N Area is affected by the release of effluents to disposal facilities, river stage in the nearby Columbia River, and ground water entering the 100-N Area from other parts of the Hanford Site. Water-level measurements are taken in most of the 100-N Area wells in conjunction with the 1301-N and 1325-N LWDF projects. Monthly water-level measurements continued this quarter, with measurements obtained in October, November, and December. Water-table maps for each month are shown in Figures 6.2, 6.3, and 6.4. The water-table elevations are presented in Tables 6.1 and 6.2.

WATER CHEMISTRY DATA

Results of the ground-water sample analyses conducted in September were received this quarter. The network was sampled again between November 15 and December 12. The assessment wells were sampled as part of a Hanford Site liquid effluent study. These samples were analyzed for the constituents listed in WAC 173-303-9905. The results of analyses received to date are listed in Tables 7.1 and 7.2.

A revised sampling schedule for the 1324-N/NA project is presented in Table 7.3. The lists of constituents cited in Table 7.3 are shown in Tables 7.4 and 7.5, respectively.

Constituents of note in the September through December samples include the following:

- Total organic carbon (TOC) concentrations for the wells in the 1324-N/NA network are usually near or below the detection limit of

2000 ppb. An exception this quarter was well 199-N-47, which showed 3900 ppb TOC. This was the first time that TOC data were available for this well.

- Specific conductance was greater than the WAC 248-54 drinking water standard (700 μmho/cm) in most of the wells in the monitoring network. The highest values were observed in the wells closest to the facility. The highest value was in well 199-N-61 in September (approximately 3700 μmho/cm).

- Total dissolved solids were measured in samples from the assessment wells as part of a waste stream characterization study. Wells 199-N-23, 199-N-25, and 199-N-47 were 580,000, 554,000, and 599,000 ppb, respectively. The 40 CFR 143 secondary drinking water standard is 500,000 ppb.

- Turbidity of samples from the assessment wells was greater than the 40 CFR 141 drinking water standard (1 NTU). The highest measured turbidity was >200 NTU in well 199-N-23 (September and December) and in well 199-N-26 (December).

- Elevated concentrations of metals were observed in the high-turbidity wells, particularly 199-N-23 and 199-N-26. The assessment wells were sampled with a bailer, and no filtered samples were collected from those wells. Metals concentrations greater than drinking water standards in one or more well in December were iron (up to 348,000 ppb), manganese (1620 ppb), barium (1010 ppb), cadmium (103 ppb), and chromium (520 ppb).

- The assessment wells were analyzed for coliform bacteria in December. All samples showed concentrations of coliform less than the detection limit except for samples from well 199-N-24, which showed 63.0 MPN. The cause of this elevated concentration is not known. The 40 CFR 141 drinking water standard for coliform is 1 MPN.

- Ruthenium-106 was reported at 47.5 pCi/L at well 199-N-61 in September, but a duplicate sample showed only 5 pCi/L. These values are less than the 2-sigma error (i.e., the concentration of ruthenium-106 present in the sample was too low for the analytical method to measure accurately). The EPA (1976) drinking water standard for ruthenium-106 is 30 pCi/L.

- As in past quarters, sulfate concentrations were extremely high in most of the wells. The highest concentrations were between 1 and 2 million ppb in the wells closest to the facility.

9 2 1 2 6 4 2 1 7 7 9

GROUND-WATER QUALITY ASSESSMENT PROGRAM

Sampling of the assessment monitoring network continued this quarter as described above.

9 2 1 2 5 4 2 1 7 3 0

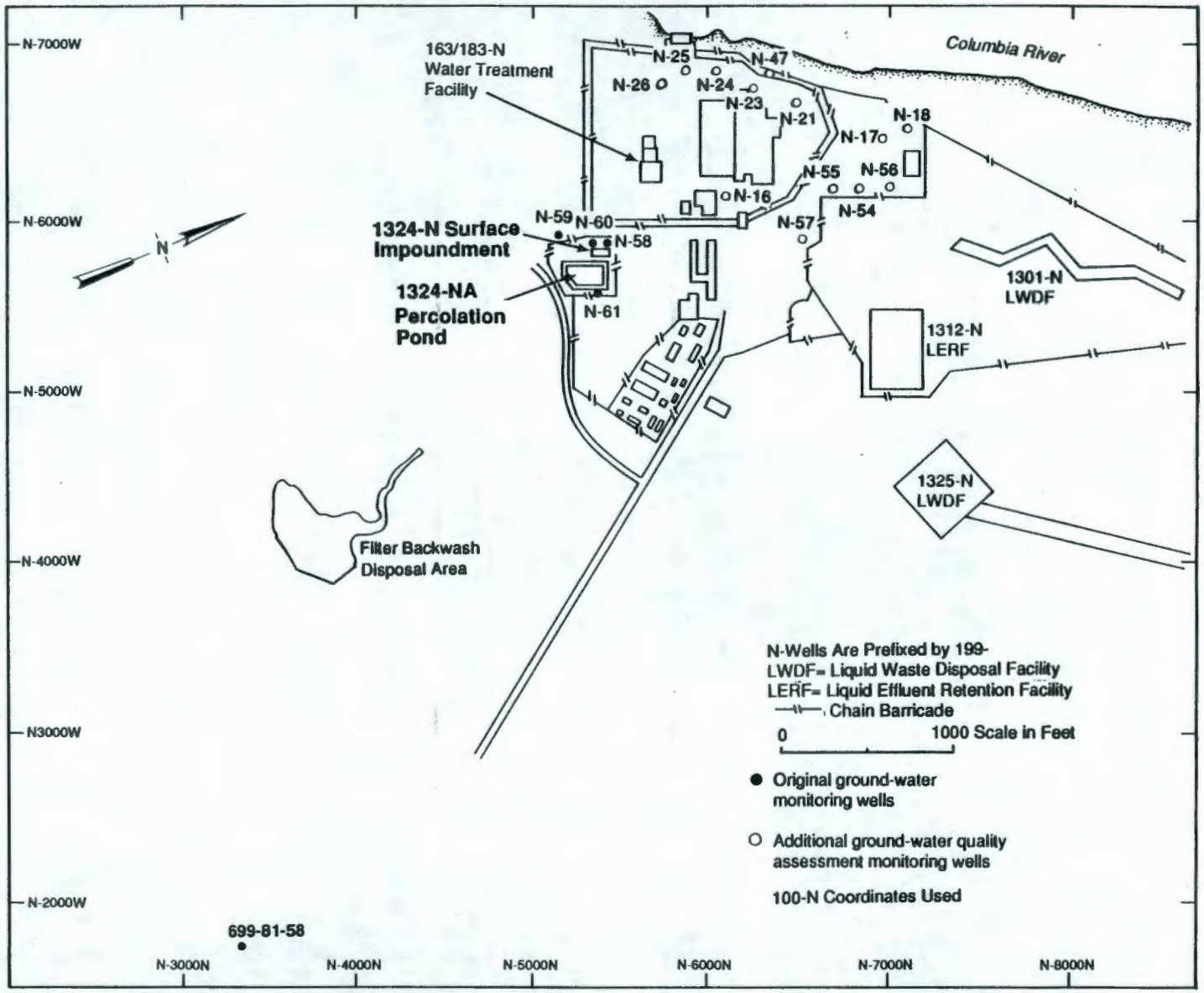

FIGURE 7.1. Monitoring Well Locations for the 1324-N and 1324-NA Facilities

TABLE 7.1. Constituent List and Summary of Sampling Results for the 1324-N Surface Impoundment and 1324-NA Percolation Pond, September Through December 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	.	46	0	700	WDOE	xxx	Conductivity, Laboratory
191	CONDFLD	UMHO	1	50	0	700	WDOE	xxx	Specific conductance
199	PHFIELD		.100	50	0	6.5-8.5	EPAS	xxx	pH, Field Measurement
207	PH-LAB		.0100	62	0	6.5-8.5	EPAS	xxx	pH, Laboratory Measurement
C69	TOC	PPB	2000	45	42	.			Total organic carbon
H42	TOXLDL	PPB	10	45	6	.			Total Organic Halogen, Low Det. Level

---------- 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	2.20	4	3	1	EPA	xxx	Coliform bacteria
111	BETA	PCI/L	8	16	1	50	EPA		Gross beta
112	ALPHAHI	PCI/L	4	16	9	15	EPA		Alpha, High Detection Level
181	RADIUM	PCI/L	1	16	7	5	EPA		Radium
A06	BARIUM	PPB	6	22	0	1000	EPA	xxx	Barium
A07	CADMIUM	PPB	2	22	16	10	EPA	xxx	Cadmium
A08	CHROMUM	PPB	10	22	9	50	EPA	xxx	Chromium
A10	SILVER	PPB	10	22	22 ***	50	EPA		Silver
A20	ARSENIC	PPB	5	22	18	50	EPA		Arsenic
A21	MERCURY	PPB	.100	21	21 ***	2	EPA		Mercury
A22	SELENUM	PPB	5	22	22 ***	10	EPA		Selenium
A33	ENDRIN	PPB	.100	16	16 ***	.200	EPA		Endrin
A34	METHLOR	PPB	3	16	16 ***	100	EPA		Methoxychlor
A35	TOXAENE	PPB	1	16	16 ***	5	EPA		Toxaphene
A36	a-BHC	PPB	.100	16	16 ***	4	EPA		Alpha-BHC
A37	b-BHC	PPB	.100	16	16 ***	4	EPA		Beta-BHC
A38	g-BHC	PPB	.100	16	16 ***	4	EPA		Gamma-BHC
A39	d-BHC	PPB	.100	16	16 ***	4	EPA		Delta-BHC
A51	LEADGF	PPB	5	22	18	50	EPA		Lead (graphite furnace)
C72	NITRATE	PPB	500	22	1	45000	EPA		Nitrate
C74	FLUORID	PPB	500	22	10	4000	EPA		Fluoride
H13	2,4-D	PPB	2	16	16 ***	100	EPA		2,4-D
H14	2,4,5TP	PPB	2	16	16 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	PPB	6	12	0	1000	EPA		Barium, filtered
H21	FCADMIU	PPB	2	12	11	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	12 ***	50	EPA		Arsenic, filtered

TABLE 7.1. (contd)

Constituent List= Interim Primary Drinking Water Parameters

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
H38	FMERCUR	PPB	.100	10	10 ***	2	EPA		Mercury, filtered
H39	FSELENI	PPB	5	12	12 ***	10	EPA		Selenium, filtered
H41	FLEAD	PPB	5	12	12 ***	50	EPA		Lead, filtered
H60	TURBID	NTU	.100	20	0	1	EPA	xxx	Turbidity
H63	LFLUORD	PPB	20	6	0	4000	EPA		Fluoride, Low Detection Level
P19	COLIMF	PPB	1	11	11 ***	1	EPA		Coliform (Membrane Filter)

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	22	0	.			Sodium
A17	MANGESE	PPB	5	22	7	50	EPAS	xxx	Manganese
A19	IRON	PPB	30	22	1	300	EPAS	xxx	Iron
C57	PHENOL	PPB	10	6	6 ***	.			Phenol
C73	SULFATE	PPB	500	22	0	250000	EPAS	xxx	Sulfate
C75	CHLORID	PPB	500	22	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
H57	LPHENOL	PPB	10	10	10 ***	.			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	16	15	100	EPAR		Cobalt-60
024	CS-137	PCI/L	20	16	16 ***	200	EPAR		Cesium-137
034	RU-106	PCI/L	172.5	16	16 ***	30	EPAR		Ruthenium-106
104	U	PCI/L	.500	16	0	600	DOE		Uranium
108	TRITIUM	PCI/L	500	16	12	20000	EPA		Tritium
121	SR 90	PCI/L	5	16	12	8	EPA		Strontium-90
A01	BERYLUM	PPB	5	22	20	.			Beryllium
A03	STRONUM	PPB	10	22	0	.			Strontium
A04	ZINC	PPB	5	22	8	5000	EPAS		Zinc
A05	CALCIUM	PPB	50	22	0	.			Calcium
A12	NICKEL	PPB	10	22	16	.			Nickel
A13	COPPER	PPB	10	22	14	1300	EPAP		Copper
A14	VANADUM	PPB	5	22	11	.			Vanadium
A15	ANTIONY	PPB	100	22	22 ***	.			Antimony
A16	ALUMNUM	PPB	150	22	17	.			Aluminum
A18	POTASUM	PPB	100	22	0	.			Potassium

TABLE 7.1. (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
A50	MAGNES	PPB	50	22	0	.			Magnesium
C76	PHOSPHA	PPB	1000	22	22 ***	.			Phosphate
H16	TC	PPB	1000	6	0	.			Total carbon
H17	TDS		5000	6	0	500000	EPAS	xxx	Total dissolved solids
H18	FZINC	PPB	5	12	7	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	10	.			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	11	.			Beryllium, filtered
H35	FSTRONT	PPB	10	12	0	.			Strontium, filtered
H36	FANTIMO	PPB	100	12	12 ***	.			Antimony, filtered
H58	ALKALIN		20000	5	0	.			Alkalinity
H66	BROMIDE	PPB	1000	22	22 ***	.			Bromide
H67	NITRITE	PPB	1000	22	22 ***	.			Nitrite
H86	FBORON	PPB	10	12	0	.			Boron, filtered
H87	FCOBALT	PPB	20	12	12 ***	.			Cobalt, filtered
H88	FLITHIU	PPB	10	12	11	.			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	22	0	.			Boron
P02	COBALT	PPB	20	22	22 ***	.			Cobalt
P03	LITHIUM	PPB	10	22	21	.			Lithium
P04	MOLY	PPB	40	22	22 ***	.			Molybdenum
P05	SILICON	PPB	50	22	0	.			Silicon
P06	TIN	PPB	30	22	22 ***	.			Tin
P07	TITAN	PPB	60	22	21	.			Titanium
P08	ZIRCON	PPB	50	22	22 ***	.			Zirconium
P12	ENDSFAN	PPB	.500	6	6 ***	.			Endosulfan
P13	PHORATE	PPB	2	6	6 ***	.			PHORATE

TABLE 7.1. (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
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	.100	6	6 ***	.		DDD
A41	DDE	PPB	.100	6	6 ***	.		DDE
A42	DDT	PPB	.100	6	6 ***	.		DDT
A43	HEPTLOR	PPB	.100	6	6 ***	0	EPAP	Heptachlor
A44	HEPTIDE	PPB	.100	6	6 ***	0	EPAP	Heptchlor epoxide
A45	KEPONE	PPB	1	6	6 ***	.		Kepone
A46	DIELRIN	PPB	.100	6	6 ***	.		Dieldrin
A47	ALDRIN	PPB	.100	6	6 ***	.		Aldrin
A48	CHLOANE	PPB	1	6	6 ***	0	EPAP	Chlordane
A49	ENDO1	PPB	.100	6	6 ***	.		Endosulfan I
A52	ENDO2	PPB	.100	6	6 ***	.		Endosulfan II
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	11	11 ***	5	EPA	Carbon Tetrachloride by GC/MS
A62	BENZENE	PPB	5	11	11 ***	5	EPA	Benzene
A63	DIOXANE	PPB	500	6	6 ***	.		Dioxane
A64	METHONE	PPB	10	11	11 ***	.		Methyl ethyl ketone
A65	PYRIDIN	PPB	500	6	6 ***	.		Pyridine
A66	TOLUENE	PPB	5	11	10	2000	EPAP	Toluene
A67	1,1,1-T	PPB	5	11	11 ***	200	EPA	1,1,1-trichloroethane
A68	1,1,2-T	PPB	5	11	11 ***	.		1,1,2-trichloroethane
A69	TRICENE	PPB	5	11	11 ***	5	EPA	Trichloroethylene
A70	PERCENE	PPB	5	11	11 ***	.		Tetrachloroethylene
A71	OPXYLE	PPB	5	11	11 ***	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

TABLE 7.1. (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
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	11	6	100	EPA		Chloroform
A81	METHCHL	PPB	10	6	6 ***	.			Methyl chloride
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	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
A92	DICETHY	PPB	10	6	6 ***	7	EPA		1,1-dichloroethylene
A93	METHYCH	PPB	5	11	11 ***	.			Methylene Chloride
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
A98	1,2-DIM	PPB	10	6	6 ***	.			1,2-dimethylhydrazine
B01	IODOMET	PPB	10	6	6 ***	.			Iodomethane
B02	METHACR	PPB	10	6	6 ***	.			Methacrylonitrile
B03	METHTHI	PPB	10	6	6 ***	.			Methanethiol
B04	PENTACH	PPB	10	6	6 ***	.			Pentachloroethane
B05	1112-tc	PPB	10	6	6 ***	.			1,1,1,2-tetrachlorethane
B06	1122-tc	PPB	5	6	6 ***	.			1,1,2,2-tetrachlorethane
B08	BROMORM	PPB	5	6	6 ***	100	EPA		Bromoform
B09	TRCMEOL	PPB	10	6	6 ***	.			Trichloromethanethiol
B10	TRCMFLM	PPB	10	6	6 ***	.			Trichloromonofluoromethane
B12	123-trp	PPB	10	6	6 ***	.			1,2,3-trichloropropane
B13	VINYIDE	PPB	10	11	11 ***	2	EPA		Vinyl chloride
B14	M-XYLE	PPB	5	11	11 ***	440	EPAP		Xylene-m
B19	ACETILE	PPB	10	6	6 ***	.			Acetonitrile
B20	ACETOPH	PPB	10	6	6 ***	.			Acetophenone
B21	WARFRIN	PPB	10	6	6 ***	.			Warfarin
B22	ACEFENE	PPB	10	6	6 ***	.			2-acetylaminofluorene
B23	AMINOYL	PPB	10	6	6 ***	.			4-aminobyphenyl
B24	AMIISOX	PPB	10	6	6 ***	.			5-(aminomethyl)-3-isoxazolol
B25	AMITROL	PPB	10	6	6 ***	.			Amitrole
B26	ANILINE	PPB	10	6	6 ***	.			Aniline

TABLE 7.1. (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
B27	ARAMITE	PPB	10	6	6 ***	.		Aramite
B28	AURAMIN	PPB	10	6	6 ***	.		Auramine
B29	BENZCAC	PPB	10	6	6 ***	.		Benz[c]acridine
B30	BENZAAN	PPB	10	6	6 ***	.		Benz[a]anthracene
B31	BENDICM	PPB	10	6	6 ***	.		Benzene, dichloromethyl
B32	BENTHOL	PPB	10	6	6 ***	.		Benzenethoil
B33	BENDINE	PPB	10	6	6 ***	.		Benzidine
B34	BENZBFL	PPB	10	6	6 ***	.		Benzo[b]fluoranthene
B35	BENZJFL	PPB	10	6	6 ***	.		Benzo[j]fluoranthene
B36	PBENZQU	PPB	10	6	6 ***	.		P benzoquinone
B37	BENZCHL	PPB	10	6	6 ***	.		Benzyl chloride
B38	BIS2CHM	PPB	10	6	6 ***	.		Bis(2-chloroethoxy) methane
B39	BIS2CHE	PPB	10	6	6 ***	.		Bis(2-chloroethyl) ether
B40	BIS2EPH	PPB	10	6	5	.		Bis(2-ethylhexyl) phthalate
B41	BROPHEN	PPB	10	6	6 ***	.		4-bromophenyl phenyl ether
B42	BUTBENP	PPB	10	6	6 ***	.		Butyl benzyl phthalate
B43	BUTDINP	PPB	10	6	6 ***	.		2-sec-butyl-4,6-dinitrophenol
B44	CHALETH	PPB	10	6	6 ***	.		Chloroalkyl ethers
B45	CHLANIL	PPB	10	6	6 ***	.		P-chloroaniline
B46	CHLCRES	PPB	10	6	6 ***	.		P-chloro-m-cresol
B47	CHLEPOX	PPB	10	6	6 ***		0 EPAP	1-chloro-2,3-epoxypropane
B48	CHLNAPH	PPB	10	6	6 ***	.		2-chloronaphthalene
B49	CHLPHEN	PPB	10	6	6 ***	.		2-chlorophenol
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	6 ***	.		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	p-Dichlorobenzene
B64	DICHBEN	PPB	10	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

TABLE 7.1. (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
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	10	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
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	10	6	6 ***	.			P-nitroaniline
C12	NITBENZ	PPB	10	6	6 ***	.			Nitrobenzine
C13	NITPHEN	PPB	10	6	6 ***	.			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

TABLE 7.1. (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
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
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	10	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

TABLE 7.1. (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
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
C77	PERCHLO	PPB	500	6	6 ***	.		Perchlorate
C78	SULFIDE	PPB	1000	6	6 ***	.		Sulfide
C79	KEROSEN	PPB	10000	6	6 ***	.		Kerosene
C80	AMMONIU	PPB	50	11	10	.		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 hydrizide
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	PCDD's	PPB	.0100	6	6 ***	.		Pcdd's
D02	PCDF's	PPB	.0100	6	6 ***	.		Pcdf's
D03	2378TCD	PPB	.0100	6	6 ***	.		2,3,7,8 TCDD
H03	ETHCARB	PPB	10000	6	6 ***	.		Ethyl carbamate
H04	ETHCYAN	PPB	10000	6	6 ***	.		Ethyl cyanide
H05	ETHOXID	PPB	10	6	6 ***	.		Ethylene oxide
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	16	16 ***	.		2,4,5-T
H40	FTHALLI	PPB	5	1	1 ***	.		Thallium, filtered
H62	LHYDRAZ	PPB	30	15	15 ***	.		Hydrazine, Low Detection Level
H68	HEXONE	PPB	10	11	11 ***	.		Methyl Isobutyl Ketone
I01	ACETONE	PPB	10	11	10	.		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	11	10	.		Tetrahydrofuran
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	Ethyl benzene
I34	STYRENE	PPB	5	6	6 ***	140	EPAP	Styrene
I42	BDCM	PPB	5	6	6 ***	100	EPA	Bromodichloromethane

TABLE 7.1. (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
I43	CDBM	PPB	5	6	6 ***	100	EPA	Chlorodibromomethane
I64	2NITPH	PPB	10	6	6 ***	.		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 ***	.		Monobutyl Phosphate
L21	DBP	PPB	10000	6	6 ***	.		Dibutyl Phosphate
L45	ALLYLCL	PPB	100	6	6 ***	.		Allyl Chloride
L46	CLETHAN	PPB	10	6	6 ***	.		Chloroethane
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 ***	.		0,0-Diethyl-0,2-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
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	ACETONE	PPB	10	6	6 ***	.		Acetone - by ABN
L63	14DBEN	PPB	5	11	11 ***	75	EPA	p-Dichlorobenzene
L64	CHLROB	PPB	10	6	6 ***	60	EPAP	Chlorobenzene (by ABN)

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 7.2. Constituents with at Least One Detected Value for the 1324-N Surface Impoundment and 1324-NA Percolation Pond, September Through December 1989

Contamination Indicator Parameters

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
1-N-23	20SEP89		894	861	7.70	6.70	.	.
	20SEP89	1	.	859	7.80	.	.	.
	20SEP89	2	.	859	7.80	.	.	.
	20SEP89	3	.	863	7.90	.	.	.
	11DEC89		1050	898	7.60	7.90	#1900	22
1-N-24	20SEP89		1051	960	8.10	6.86	.	.
	20SEP89	1	.	961	8	.	.	.
	20SEP89	2	.	966	7.80	.	.	.
	20SEP89	3	.	967	7.80	.	.	.
	06DEC89		276	350	7.80	8.03	#1300	10
1-N-25	20SEP89		1000	1010	8.70	8.70	.	.
	20SEP89	1	.	1020	8.70	.	.	.
	20SEP89	2	.	1040	8.70	.	.	.
	20SEP89	3	.	1010	8.70	.	.	.
	06DEC89		737	880	8.20	8.54	#1000	12
1-N-26	18SEP89		491	476	7.90	7.81	.	.
	18SEP89	1	.	479	7.80	.	.	.
	18SEP89	2	.	475	7.90	.	.	.
	18SEP89	3	.	473	7.90	.	.	.
	12DEC89		809	671	7.70	7.68	#900	#8
1-N-47	18SEP89		994	961	7.60	7.63	.	.
	18SEP89	1	.	966	7.60	.	.	.
	18SEP89	2	.	967	7.70	.	.	.
	18SEP89	3	.	968	7.60	.	.	.
	11DEC89		1027	926	7.70	7.67	3900	10
1-N-58	18SEP89		2570	2410	8	7.68	#1400	15
	18SEP89	1	2590	2420	8	7.66	#1400	15
	18SEP89	2	2600	2410	8	7.68	#1100	14
	18SEP89	3	2610	2420	8	7.67	#1100	22
	15NOV89		3360	.	7.50	7.76	#1600	31
	15NOV89	1	3390	.	7.40	7.76	#1700	30
	15NOV89	2	3350	.	7.40	7.74	#1700	21
	15NOV89	3	3390	.	7.50	7.68	#1600	23
1-N-59	18SEP89		3460	3310	7.90	7.59	#1200	12
	18SEP89	1	3460	3290	7.90	7.57	#1200	12
	18SEP89	2	3450	3310	7.90	7.57	#1200	65
	18SEP89	3	3460	3300	7.80	7.57	#1400	20
	16NOV89		2130	.	6.50	6.92	#1200	19
	16NOV89	1	2150	.	6.50	6.86	#1300	19
	16NOV89	2	2160	.	6.50	6.84	#1300	24
	16NOV89	3	2150	.	6.60	6.83	#1300	23

TABLE 7.2. (contd)

Contamination Indicator Parameters

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
1-N-60	18SEP89		2450	2320	8	7.80	#1200	18
	18SEP89	1	2450	2330	8	7.82	#1100	25
	18SEP89	2	2430	2330	8	7.80	#1100	37
	18SEP89	3	2450	2330	8	7.81	#1200	19
	16NOV89		3070	.	7.50	7.73	#1300	24
	16NOV89	1	2700	.	7.50	7.74	#1300	21
	16NOV89	2	2740	.	7.50	7.73	#1300	20
	16NOV89	3	2740	.	7.50	7.70	#1300	26
1-N-61	19SEP89		3740	3740	6.90	6.61	2100	39
	19SEP89	1	3690	3730	6.90	6.60	#1900	33
	19SEP89	2	3740	3720	6.90	6.59	#1800	40
	19SEP89	3	3740	3720	6.80	6.60	2300	34
	16NOV89		2060	.	6.90	6.89	#1400	29
	16NOV89	1	2060	.	6.90	6.87	#1400	26
	16NOV89	2	2070	.	6.90	6.86	#1300	26
	16NOV89	3	2070	.	6.90	6.86	#1200	25
6-81-58	18SEP89		214	223	8.20	8.45	#500	#4
	18SEP89	1	212	218	8.20	8.33	#700	13
	18SEP89	2	216	217	8.20	8.27	#700	58
	18SEP89	3	216	217	8.20	8.25	#700	#3
	28NOV89		255	216	7.90	8.14	#300	#-1
	28NOV89	1	255	.	.	8.15	#300	#-1
	28NOV89	2	254	.	.	8.15	#400	#6
	28NOV89	3	255	.	.	8.14	#200	10

TABLE 7.2. (contd)

Regular Monitoring Data

Well name	Collection date	Duplicate sample number	FLUORID PPB 500/4000	FCHROMI PPB 10/50	FMANGAN PPB 5/50s	FPOTASS PPB 100/.	FBERYLL PPB 5/.	FSTRONT PPB 10/.	2,4,5-T PPB 2/.	2,4,5TP PPB 2/10
1-N-23	20SEP89		<1000	.	.	.	.	.	.	.
	11DEC89		<500	.	.	.	.	.	<2	<2
1-N-24	20SEP89		<1000	.	.	.	.	.	.	.
	06DEC89		<500	.	.	.	.	.	<10	<10
1-N-25	20SEP89		<1000	.	.	.	.	.	.	.
	06DEC89		<500	.	.	.	.	.	<2	<2
1-N-26	18SEP89		700	.	.	.	.	.	.	.
	12DEC89		700	.	.	.	.	.	<2	<2
1-N-47	18SEP89		<1000	.	.	.	.	.	.	.
	11DEC89		<500	.	.	.	.	.	<2	<2
1-N-58	18SEP89		2900	<10	<5	4220	<5	428	<2	<2
	15NOV89		3300	<10	<5	5380	<5	704	<2	<2
1-N-59	18SEP89		3500	<10	<5	9510	6	995	<2	<2
	16NOV89		2100	<10	40	4100	<5	380	<2	<2
1-N-60	18SEP89		2700	<10	<5	6550	<5	496	<2	<2
	16NOV89		2800	<10	<5	6380	<5	569	<2	<2
	16NOV89	1	2700	<10	<5	6360	<5	606	.	.
1-N-61	19SEP89		3900	<10	<5	4600	<5	593	<2	<2
	19SEP89	1	3800	<10	<5	4630	<5	586	<2	<2
	16NOV89		2400	<10	<5	2680	<5	258	<2	<2
6-81-58	18SEP89		<500	13	<5	2520	<5	173	<2	<2
	28NOV89		<500	<10	<5	2360	<5	161	<2	<2

TABLE 7.2. (contd)

Well name	Collection date	Duplicate sample number	2,4-D PPB 2/100	ALKALIN 20000/.	ALPHAHI PCI/L 4/15	ALUMNUM PPB 150/.	AMMONIU PPB 50/.	ARSENIC PPB 5/50	BARIUM PPB 6/1000	FBARIUM PPB 6/1000
1-N-23	20SEP89		.	236000	.	195	.	5	77	.
	11DEC89		<2	.	7.51	5110	<50	14	1010	.
1-N-24	20SEP89		.	362000	.	217	.	<5	140	.
	06DEC89		<10	.	2.03	<150	79	<5	52	.
1-N-25	20SEP89		.	106000	.	<150	.	<5	41	.
	06DEC89		<2	.	*1.49	164	<50	5	67	.
1-N-26	18SEP89		.	151000	.	<150	.	<5	75	.
	12DEC89		<2	.	6.49	1060	<50	12	337	.
1-N-47	18SEP89		.	318000	.	<150	.	<5	46	.
	11DEC89		<2	.	6.40	<150	<50	<5	47	.
1-N-58	18SEP89		<2	.	*.461	<150	.	<5	35	29
	15NOV89		<2	.	*.0516	<150	<50	<5	45	46
1-N-59	18SEP89		<2	.	*.471	<150	.	<5	38	34
	16NOV89		<2	.	*.455	<150	<50	<5	15	14
1-N-60	18SEP89		<2	.	5.53	<150	.	<5	31	32
	16NOV89		<2	.	1.61	<150	<50	<5	31	32
	16NOV89	1	.	.	.	<150	<50	<5	32	34
1-N-61	19SEP89		<2	.	*-0.163	<150	.	<5	37	41
	19SEP89	1	<2	.	*1.41	<150	.	<5	41	41
	16NOV89		<2	.	*-0.0858	<150	<50	<5	51	52
6-81-58	18SEP89		<2	.	*.719	<150	.	<5	17	15
	28NOV89		<2	.	1.17	<150	<50	<5	16	14

TABLE 7.2. (contd)

Well name	Collection date	Duplicate sample number	BERYLUM PPB 5/.	BETA PCI/L 8/50	BIS2EPH PPB 10/.	BORON PPB 10/.	FBORON PPB 10/.	CADMIUM PPB 2/10	FCADMIU PPB 2/10	CALCIUM PPB 50/.
1-N-23	20SEP89		<5	.	.	27	.	8	.	73600
	11DEC89		<5	11.6	<10	26	.	102	.	74900
1-N-24	20SEP89		<5	.	.	38	.	7	.	79800
	06DEC89		<5	17.4	<10	17	.	9	.	29600
1-N-25	20SEP89		<5	.	.	19	.	<2	.	35000
	06DEC89		<5	11.1	<10	26	.	31	.	34700
1-N-26	18SEP89		<5	.	.	28	.	<2	.	41400
	12DEC89		<5	8.84	<10	33	.	103	.	63700
1-N-47	18SEP89		7	.	.	37	.	<2	.	93500
	11DEC89		<5	6.96	26	31	.	<2	.	77700
1-N-58	18SEP89		<5	3.04	.	18	26	<2	<2	130000
	15NOV89		<5	2.80	.	20	25	<2	<2	202000
1-N-59	18SEP89		<5	5.05	.	22	17	<2	3	302000
	16NOV89		<5	4.15	.	20	18	<2	<2	105000
1-N-60	18SEP89		<5	6.11	.	16	14	<2	<2	112000
	16NOV89		<5	11.7	.	23	19	<2	<2	155000
	16NOV89	1	<5	.	.	16	21	<2	<2	168000
1-N-61	19SEP89		8	*2.24	.	39	35	<2	<2	142000
	19SEP89	1	<5	5.52	.	23	27	<2	<2	155000
	16NOV89		<5	5.11	.	16	15	<2	<2	49400
6-81-58	18SEP89		<5	3.56	.	12	16	<2	<2	29800
	28NOV89		<5	2.93	<10	14	11	<2	<2	27900

TABLE 7.2. (contd)

Well name	Collection date	Duplicate sample number	FCALCIU PPB 50/.	CHLFORM PPB 5/100	CHLORID PPB 500/250000s	CHROMUM PPB 10/50	CO-60 PCI/L 22.5/100r	COLIFRM MPN 2.2/1	COPPER PPB 10/1300p	CS-137 PCI/L 20/200r
1-N-23	20SEP89		.	.	14000	<10	.	.	<10	.
	11DEC89		.	<5	17600	28	*2.49	<2.20	33	*-1.66
1-N-24	20SEP89		.	.	15000	<10	.	.	<10	.
	06DEC89		.	<5	5500	<10	*.607	63	<10	*-2.13
1-N-25	20SEP89		.	.	8000	<10	.	.	<10	.
	06DEC89		.	<5	11300	35	*-4.45	<2.20	26	*1.25
1-N-26	18SEP89		.	.	6000	<10	.	.	10	.
	12DEC89		.	#3	5900	520	*4.71	<2.20	121	*-2.52
1-N-47	18SEP89		.	.	26000	<10	.	.	74	.
	11DEC89		.	<5	17600	<10	*.827	.	29	*-4.22
1-N-58	18SEP89		130000	.	6200	13	6.07	.	12	*4.38
	15NOV89		205000	15	10500	19	*-6.90	.	<10	*2.13
1-N-59	18SEP89		292000	.	8000	14	*-4.55	.	<10	*-1.86
	16NOV89		105000	6	7700	14	*4.10	.	<10	*-5.30
1-N-60	18SEP89		123000	.	6500	<10	*.711	.	12	*1.54
	16NOV89		166000	9	9300	13	*4.55	.	<10	*-3.54
	16NOV89	1	178000	10	9200	12	.	.	<10	.
1-N-61	19SEP89		150000	.	14000	13	*2.48	.	<10	*-4.35
	19SEP89	1	136000	.	14000	15	*-3.03	.	<10	*1.30
	16NOV89		52900	10	5200	12	*-8.73	.	<10	*-1.66
6-81-58	18SEP89		27600	.	1600	12	*5.46	.	<10	*-0.376
	28NOV89		26800	<5	1500	<10	*-3.84	.	<10	*1.90

TABLE 7.2. (contd)

Well name	Collection date	Duplicate sample number	IRON PPB 30/300s	FIRON PPB 30/300s	LEADGF PPB 5/50	LFLUORD PPB 20/4000	LITHIUM PPB 10/.	FLITHIU PPB 10/.	MAGNES PPB 50/.	FMAGNES PPB 50/.
1-N-23	20SEP89		14300	.	<5	.	<10	.	14700	.
	11DEC89		348000	.	10	277	<10	.	14500	.
1-N-24	20SEP89		26700	.	<5	.	<10	.	15400	.
	06DEC89		11600	.	5	239	<10	.	5920	.
1-N-25	20SEP89		938	.	<5	.	<10	.	16600	.
	06DEC89		16300	.	8	182	<10	.	13600	.
1-N-26	18SEP89		1490	.	<5	.	<10	.	9710	.
	12DEC89		164000	.	14	729	<10	.	11000	.
1-N-47	18SEP89		2080	.	<5	.	<10	.	17300	.
	11DEC89		227	.	<5	290	<10	.	15000	.
1-N-58	18SEP89		321	<30	<5	.	<10	<10	24300	20000
	15NOV89		117	<30	<5	.	<10	<10	37900	37800
1-N-59	18SEP89		65	<30	<5	.	14	12	55000	53200
	16NOV89		46	<30	<5	.	<10	<10	17800	18100
1-N-60	18SEP89		33	<30	<5	.	<10	<10	20800	22600
	16NOV89		55	<30	<5	.	<10	<10	29200	30300
	16NOV89	1	53	<30	<5	.	<10	<10	28800	32000
1-N-61	19SEP89		<30	<30	<5	.	<10	<10	34100	36000
	19SEP89	1	68	<30	<5	.	<10	<10	37700	33000
	16NOV89		43	50	<5	.	<10	<10	11800	12400
6-81-58	18SEP89		71	<30	<5	.	<10	<10	8000	7280
	28NOV89		182	<30	<5	165	<10	<10	7280	7080

TABLE 7.2. (contd)

Well name	Collection date	Duplicate sample number	MANGESE PPB 5/50s	METHONE PPB 10/.	NICKEL PPB 10/.	NITRATE PPB 500/45000	PERCENE PPB 5/.	POTASUM PPB 100/.	RADIUM PCI/L 1/5	RU-106 PCI/L 172.5/30r
1-N-23	20SEP89		101	.	<10	<500	.	7590	.	.
	11DEC89		1620	<10	23	1700	<5	6970	.251	*-8.37
1-N-24	20SEP89		170	.	<10	1700	.	7810	.	.
	06DEC89		105	#5	<10	3700	<5	3610	*.114	*-8.39
1-N-25	20SEP89		24	.	<10	5200	.	6360	.	.
	06DEC89		183	#7	18	15300	#4	5820	*.00276	*31.4
1-N-26	18SEP89		64	.	14	25300	.	5180	.	.
	12DEC89		3230	<10	134	11600	<5	5920	1.75	*-23.4
1-N-47	18SEP89		12	.	<10	6900	.	7280	.	.
	11DEC89		10	<10	<10	3300	<5	6840	*.0991	*29.3
1-N-58	18SEP89		15	.	11	2800	.	4560	.361	*-36.7
	15NOV89		8	<10	<10	5200	<5	5380	*.0603	*-57.3
1-N-59	18SEP89		<5	.	<10	3100	.	10100	.947	*18.8
	16NOV89		42	<10	<10	4000	<5	4130	.205	*-2.81
1-N-60	18SEP89		<5	.	<10	2800	.	6780	.247	*21.3
	16NOV89		<5	<10	<10	3500	<5	6880	*.0190	*27.1
	16NOV89	1	<5	<10	<10	3600	<5	6330	.	.
1-N-61	19SEP89		<5	.	<10	4300	.	4720	.598	*-5.21
	19SEP89	1	5	.	11	4200	.	4840	.319	*47.5
	16NOV89		<5	<10	<10	1600	<5	2680	.223	*14.1
6-81-58	18SEP89		<5	.	<10	3700	.	2790	*.0303	*22
	28NOV89		9	<10	<10	4000	<5	2460	*.100	*17

TABLE 7.2. (contd)

Well name	Collection date	Duplicate sample number	SILICON PPB 50/.	FSILICO PPB 50/.	SODIUM PPB 200/.	FSODIUM PPB 200/.	SR 90 PCI/L 5/8	STRONUM PPB 10/.	SULFATE PPB 500/250000s	TAF PPB 10/.
1-N-23	20SEP89		16700	.	129000	.	.	339	221000	.
	11DEC89		50400	.	130000	.	1.96	439	222000	<10
1-N-24	20SEP89		14800	.	146000	.	.	359	180000	.
	06DEC89		9780	.	14600	.	4.55	157	37200	<10
1-N-25	20SEP89		10300	.	154000	.	.	317	408000	.
	06DEC89		13100	.	111000	.	*-0.124	305	278000	<10
1-N-26	18SEP89		19600	.	39300	.	.	194	57000	.
	12DEC89		39800	.	68400	.	*-0.482	286	190000	<10
1-N-47	18SEP89		13800	.	119000	.	.	314	164000	.
	11DEC89		13400	.	115000	.	*-0.255	297	191000	60
1-N-58	18SEP89		9870	8610	427000	427000	*.302	463	1180000	.
	15NOV89		10400	10400	588000	583000	1.11	692	1560000	<10
1-N-59	18SEP89		17100	16200	537000	513000	*.690	1050	1760000	.
	16NOV89		16000	14000	351000	331000	*.0369	382	1010000	<10
1-N-60	18SEP89		15400	15400	341000	362000	*.327	490	1100000	.
	16NOV89		14200	13500	469000	459000	*.195	570	1430000	<10
	16NOV89	1	14500	14500	429000	467000	.	591	1440000	<10
1-N-61	19SEP89		9800	9600	723000	774000	.482	594	1840000	.
	19SEP89	1	9920	9570	797000	707000	*.207	610	1850000	.
	16NOV89		8890	9240	342000	365000	*.783	252	991000	<10
6-81-58	18SEP89		9010	8400	4430	4010	*-0.144	187	15400	.
	28NOV89		8260	8030	3840	3740	*.138	165	17300	<10

TABLE 7.2. (contd)

Well name	Collection date	Duplicate sample number	TC PPB 1000/.	TDS 5000/500000s	TITAN PPB 60/.	TOLUENE PPB 5/2000p	TRITIUM PCI/L 500/20000	TURBID NTU .10/1	U PCI/L .50/600d	VANADUM PPB 5/.
1-N-23	20SEP89		.	.	<60	.	.	200	.	28
	11DEC89		56600	580000	322	<5	15000	200	6.41	218
1-N-24	20SEP89		.	.	<60	.	.	84	.	10
	06DEC89		32200	199000	<60	<5	368	17.8	1.02	7
1-N-25	20SEP89		.	.	<60	.	.	19.2	.	7
	06DEC89		28800	554000	<60	<5	*200	47	1.71	13
1-N-26	18SEP89		.	.	<60	.	.	5.40	.	<5
	12DEC89		26700	431000	<60	6	585	200	1.39	86
1-N-47	18SEP89		.	.	<60	.	.	4.30	.	7
	11DEC89		64400	599000	<60	<5	15800	1.50	4.56	<5
1-N-58	18SEP89		.	.	<60	.	*39.4	2.30	2.40	<5
	15NOV89		.	.	<60	<5	*26.9	.700	1.62	<5
1-N-59	18SEP89		.	.	<60	.	*124	.600	1.60	<5
	16NOV89		.	.	<60	<5	*153	.200	.823	<5
1-N-60	18SEP89		.	.	<60	.	*100	.300	3.01	5
	16NOV89		.	.	<60	<5	*39.2	1.80	2.65	<5
	16NOV89	1	.	.	<60	<5	.	.	.	<5
1-N-61	19SEP89		.	.	<60	.	*56.2	.400	1.89	<5
	19SEP89	1	.	.	<60	.	*157	.	2.92	<5
	16NOV89		.	.	<60	<5	*26.9	.200	.619	<5
6-81-58	18SEP89		.	.	<60	.	*88.1	.300	1.27	7
	28NOV89		22200	138000	<60	<5	*158	.400	.727	5

TABLE 7.2. (contd)

Well name	Collection date	Duplicate sample number	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000s
1-N-23	20SEP89		.	17	.
	11DEC89		.	22	.
1-N-24	20SEP89		.	9	.
	06DEC89		.	70	.
1-N-25	20SEP89		.	6	.
	06DEC89		.	27	.
1-N-26	18SEP89		.	<5	.
	12DEC89		.	37	.
1-N-47	18SEP89		.	15	.
	11DEC89		.	12	.
1-N-58	18SEP89		<5	<5	<5
	15NOV89		<5	10	8
1-N-59	18SEP89		<5	5	<5
	16NOV89		<5	13	12
1-N-60	18SEP89		<5	<5	<5
	16NOV89		<5	9	<5
	16NOV89	1	<5	<5	8
1-N-61	19SEP89		<5	<5	<5
	19SEP89	1	<5	5	<5
	16NOV89		<5	<5	7
6-81-58	18SEP89		8	<5	26
	28NOV89		6	<5	<5

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
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 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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

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

	1989[a]				1990								
Well	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
199-N-58			X			X			X			X	
199-N-59			X			X			X			X	
199-N-60			X			X			X			X	
199-N-61			X			X			X			X	
**699-81-58	X		L			X			X			X	
*199-N-23	S			L		X			X			X	
*199-N-24	S			L		S			S			S	
*199-N-25	S			L		S			S			S	
*199-N-26	S			L		S			S			S	
*199-N-47	S			L		S			S			S	
*199-N-16			L			S			S			S	
*199-N-17			L			S			S			S	
*199-N-18			L			S			S			S	
*199-N-21			L			S			S			S	
*199-N-54			L			S			S			S	
*199-N-55			L			S			S			S	
*199-N-56			L			S			S			S	
*199-N-57			L			S			S			S	

(a) The following notations are used in this table:
L = sampled for the long list of constituents (WAC 173-303-9905) for the liquid effluent study.
S = sampled for the short list of constituents (Table 7.5).
X = sampled for the regular list of constituents (Table 7.4).
* = data also used in the 1301-N project.
** = data also used in the 1325-N project.

9 2 1 2 6 4 2 1 8 0 3

TABLE 7.4. The Regular Sampling List for the 1324-N/NA Ground-Water Quality Assessment Monitoring Network

Coliform
Total Organic Halogens
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 7.5. Short List for the 1324-N/NA Ground-Water Quality Assessment Monitoring Network

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

8.0 1325-N LIQUID WASTE DISPOSAL FACILITY

M. J. Hartman
Westinghouse Hanford Company

The ground water beneath the 1325-N Liquid Waste Disposal Facility (LWDF) has been monitored by a RCRA interim-status well network since December 1987. This project is in the indicator evaluation stage of monitoring. A draft ground-water monitoring plan has been prepared for this facility.

The 1325-N LWDF is located in the 100-N Area of the Hanford Site, approximately 2200 ft east of the Columbia River (Figure 1.1). 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). The facility was the primary liquid waste disposal system for the N Reactor and began operation in 1983. Wastes discharged to the 1325-N LWDF have included primarily radioactive fission and activation products, which were formerly discharged to the 1301-N LWDF (see Section 6.0). The facility is currently in use.

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 to the 1325-N LWDF because of the ground-water mound (Smith, Bates, and Lundgren 1989b) and is now considered downgradient. All of the wells monitor the uppermost aquifer, which comprises primarily sand, gravel, and cobbles.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

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

9 2 1 2 6 4 2 1 8 0 5

WATER LEVELS

Water-level measurements are taken in most of the 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 in October, November, and December. Water-table maps for each month are shown in Figures 6.2, 6.3, and 6.4. The water-table elevations are presented in Tables 6.1 and 6.2.

The elevation of the water table in the 100-N Area is affected by the release of effluents to disposal facilities, river stage in the nearby Columbia River, and ground water entering the 100-N Area from other parts of the Hanford Site. Discharge to the 1325-N facility decreased this quarter. The ground-water mound beneath the 1325-N LWDF has responded to this decrease in artificial recharge, and water-level elevations have decreased approximately 4 ft between September and December 1989.

BACKGROUND STATISTICAL DATA

Table 8.1 lists the average background, standard deviation, and critical mean for the four contamination indicator parameters to be compared against the data collected in September 1989. The critical mean is the value to which the average of quadruplicate analytical results is compared. If the average for a parameter is greater than (and less than, in the case of pH) its critical mean, that parameter is considered statistically different from background. These values were determined based on the recommended techniques in Appendix B of the TEGD (EPA 1986a). The calculated critical mean value for pH is off the scale for pH.

WATER CHEMISTRY DATA

The monitoring wells were sampled during late November and early December. Results available to date are presented in Tables 8.2 and 8.3.

Table 8.4 lists the results of statistical analyses of indicator parameter data for samples collected September 1989. Replicate averages for each parameter are below the critical mean in all wells.

A revised sampling schedule for the 1325-N LWDF is presented in Table 8.5. The "regular" list of constituents cited in Table 8.5 is shown in Table 8.6.

An investigation into the source of Arochlor 1016 [a polychlorinated biphenyl (PCB)] in well 199-N-33 continued this quarter. The pump was pulled from the well, and a sample of fluid from the motor chassis was analyzed. The analysis showed the presence of 191 ppb Arochlor 1016. A new pump was installed in the well, and samples were collected and analyzed for PCBs. No PCBs were detected. It appears that fluid leaking from the old pump was the source of the PCBs in the ground-water samples from this well, and that the ground water itself is not contaminated with PCBs.

Constituents of note in the November and December samples include the following:

- Gross beta concentrations were above the 40 CFR 141 drinking water standard in seven wells. The highest concentration was in well 199-N-29 with 2540 pCi/L. Previous analytical results indicate that these elevated gross beta concentrations probably reflect the presence of strontium-90.

- Ruthenium-106 was reported at levels higher than the EPA (1976) drinking water standard (30 pCi/L) in several wells. The highest concentration reported was 86.80 pCi/L in well 199-N-52 in December. However, the measured concentrations were less than the 2-sigma error (i.e., the concentration of ruthenium-106 present in the sample was too low for the analytical method to measure accurately).

- Tritium concentrations were higher than the 40 CFR 141 drinking water standard in six wells. The highest concentrations were 218,000 pCi/L in well 199-N-31, 209,000 pCi/L in well 199-N-39, and 164,000 pCi/L in well 199-N-32.

- Sample turbidity was generally less than 1 NTU. An exception was well 199-N-42, which showed a turbidity of 26 NTU in November.

9 2 1 2 6 4 2 1 8 0 7

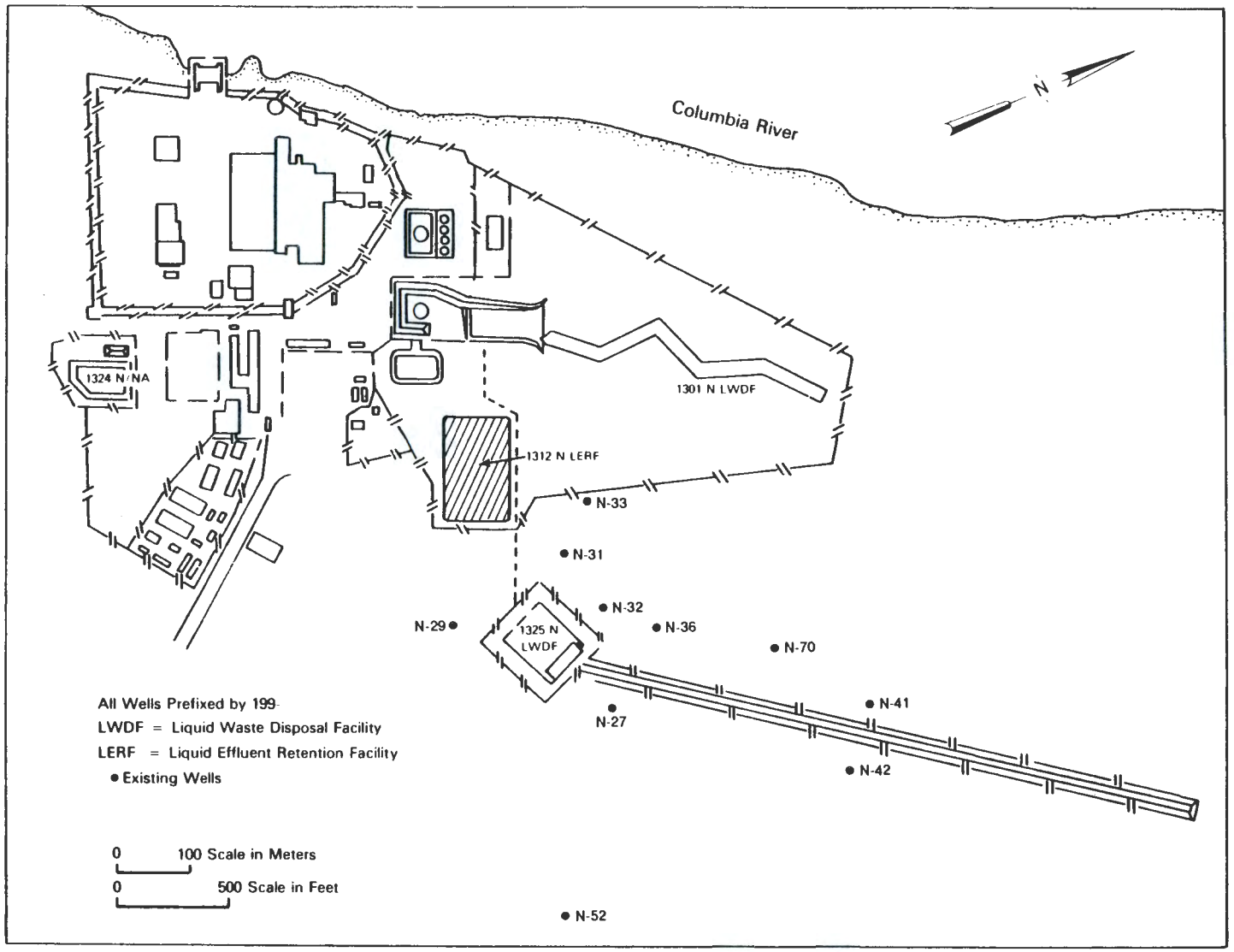

FIGURE 8.1. Monitoring Well Locations for the 1325-N Liquid Waste Disposal Facility (well 699-81-58 is also part of the network and is shown in Figure 7.1)

TABLE 8.1. Critical Mean Values for Indicator Parameter Data at the 1325-N Liquid Waste Disposal Facility, September 1989[a]

Constituent, Units[b]	n	df	tc	Average	Standard Deviation	Critical Mean
Conductivity in the field, μmho/cm	4	3	15.1451	192.38	31.933	733.09
pH, field	4	3	19.1185	8.025	0.54199	-3.56, 19.61
Total organic carbon, ppb	4	3	15.1451	267.81	88.143	1760.3
Total organic halogens, ppb	4	3	15.1451	1.0313	3.1464	54.308

(a) Data collected June 1988 to March 1989. Values calculated based on 32 comparisons.
(b) The following notations are used in this table:
df = degrees of freedom (n-1).
n = number of background replicate averages.
tc = Bonferroni critical t-value for appropriate df and 32 comparisons.

9 2 1 2 6 4 2 1 8 0 9

TABLE 8.2. Constituent List and Summary of Sampling Results for the 1325-N Liquid Waste Disposal Facility, November Through December 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	.	66	0	700	WDOE		Conductivity, Laboratory
191	CONDFLD	UMHO	1	73	0	700	WDOE		Specific conductance
199	PHFIELD		.100	72	0	6.5-8.5	EPAS		pH, Field Measurement
207	PH-LAB		.0100	66	0	6.5-8.5	EPAS		pH, Laboratory Measurement
C69	TOC	PPB	2000	81	81 ***	.			Total organic carbon
H42	TOXLDL	PPB	10	81	29	.			Total Organic Halogen, Low Det. Level

---------- 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	2.20	3	3 ***	1	EPA		Coliform bacteria
111	BETA	PCI/L	8	24	0	50	EPA	xxx	Gross beta
112	ALPHAHI	PCI/L	4	24	12	15	EPA		Alpha, High Detection Level
181	RADIUM	PCI/L	1	23	20	5	EPA		Radium
A06	BARIUM	PPB	6	24	0	1000	EPA		Barium
A07	CADMIUM	PPB	2	24	24 ***	10	EPA		Cadmium
A08	CHROMUM	PPB	10	24	20	50	EPA		Chromium
A10	SILVER	PPB	10	24	24 ***	50	EPA		Silver
A20	ARSENIC	PPB	5	24	16	50	EPA		Arsenic
A21	MERCURY	PPB	.100	22	22 ***	2	EPA		Mercury
A22	SELENUM	PPB	5	24	24 ***	10	EPA		Selenium
A33	ENDRIN	PPB	.100	23	23 ***	.200	EPA		Endrin
A34	METHLOR	PPB	3	23	23 ***	100	EPA		Methoxychlor
A35	TOXAENE	PPB	1	23	23 ***	5	EPA		Toxaphene
A36	a-BHC	PPB	.100	23	23 ***	4	EPA		Alpha-BHC
A37	b-BHC	PPB	.100	23	23 ***	4	EPA		Beta-BHC
A38	g-BHC	PPB	.100	23	23 ***	4	EPA		Gamma-BHC
A39	d-BHC	PPB	.100	23	23 ***	4	EPA		Delta-BHC
A51	LEADGF	PPB	5	24	24 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	PPB	500	24	0	45000	EPA		Nitrate
C74	FLUORID	PPB	500	24	24 ***	4000	EPA		Fluoride
H13	2,4-D	PPB	2	23	23 ***	100	EPA		2,4-D
H14	2,4,5TP	PPB	2	23	23 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	PPB	6	24	0	1000	EPA		Barium, filtered
H21	FCADMIU	PPB	2	24	24 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	PPB	10	24	22	50	EPA		Chromium, filtered
H23	FSILVER	PPB	10	24	24 ***	50	EPA		Silver, filtered
H37	FARSENI	PPB	5	24	17	50	EPA		Arsenic, filtered

TABLE 8.2. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
H38	FMERCUR	PPB	.100	21	21 ***	2	EPA		Mercury, filtered
H39	FSELENI	PPB	5	24	24 ***	10	EPA		Selenium, filtered
H41	FLEAD	PPB	5	24	24 ***	50	EPA		Lead, filtered
H60	TURBID	NTU	.100	21	0	1	EPA	xxx	Turbidity
H63	LFLUORD	PPB	20	11	0	4000	EPA		Fluoride, Low Detection Level
P19	COLIMF	PPB	1	19	19 ***	1	EPA		Coliform (Membrane Filter)

---------- 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	24	0	.			Sodium
A17	MANGESE	PPB	5	24	17	50	EPAS	xxx	Manganese
A19	IRON	PPB	30	24	5	300	EPAS	xxx	Iron
C57	PHENOL	PPB	10	12	12 ***	.			Phenol
C73	SULFATE	PPB	500	24	0	250000	EPAS		Sulfate
C75	CHLORID	PPB	500	24	0	250000	EPAS		Chloride
H24	FSODIUM	PPB	200	24	0	.			Sodium, filtered
H29	FMANGAN	PPB	5	24	24 ***	50	EPAS		Manganese, filtered
H31	FIRON	PPB	30	24	22	300	EPAS		Iron, filtered
H57	LPHENOL	PPB	10	11	11 ***	.			Phenol, low DL

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
010	CO-60	PCI/L	22.5	22	5	100	EPAR		Cobalt-60
024	CS-137	PCI/L	20	22	22 ***	200	EPAR		Cesium-137
034	RU-106	PCI/L	172.5	22	22 ***	30	EPAR		Ruthenium-106
100	PU39-40	PCI/L	17	3	3 ***	1.20	DOE		Plutonium-239/40
102	PU-238	PCI/L	17	3	3 ***	1.60	DOE		Plutonium-238
104	U	PCI/L	.500	24	0	600	DOE		Uranium
108	TRITIUM	PCI/L	500	23	2	20000	EPA	xxx	Tritium
121	SR 90	PCI/L	5	22	10	8	EPA	xxx	Strontium-90
197	TC-99	PCI/L	15	1	1 ***	900	EPAR		Technetium-99
A01	BERYLUM	PPB	5	24	22	.			Beryllium
A03	STRONUM	PPB	10	24	0	.			Strontium
A04	ZINC	PPB	5	24	14	5000	EPAS	xxx	Zinc
A05	CALCIUM	PPB	50	24	0	.			Calcium
A12	NICKEL	PPB	10	24	22	.			Nickel
A13	COPPER	PPB	10	24	23	1300	EPAP		Copper
A14	VANADUM	PPB	5	24	2	.			Vanadium

TABLE 8.2. (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
A15	ANTIONY	PPB	100	24	24 ***	.		Antimony
A16	ALUMNUM	PPB	150	24	21	.		Aluminum
A18	POTASUM	PPB	100	24	0	.		Potassium
A50	MAGNES	PPB	50	24	0	.		Magnesium
C76	PHOSPHA	PPB	1000	24	24 ***	.		Phosphate
H16	TC	PPB	1000	10	0	.		Total carbon
H17	TDS		5000	11	0	500000	EPAS	Total dissolved solids
H18	FZINC	PPB	5	24	21	5000	EPAS	Zinc, filtered
H19	FCALCIU	PPB	50	24	0	.		Calcium, filtered
H25	FNICKEL	PPB	10	24	23	.		Nickel, filtered
H26	FCOPPER	PPB	10	24	24 ***	1300	EPAP	Copper, filtered
H27	FVANADI	PPB	5	24	2	.		Vanadium, filtered
H28	FALUMIN	PPB	150	24	24 ***	.		Aluminum, filtered
H30	FPOTASS	PPB	100	24	0	.		Potassium, filtered
H32	FMAGNES	PPB	50	24	0	.		Magnesium, filtered
H33	FBERYLL	PPB	5	24	23	.		Beryllium, filtered
H35	FSTRONT	PPB	10	24	0	.		Strontium, filtered
H36	FANTIMO	PPB	100	24	24 ***	.		Antimony, filtered
H58	ALKALIN		20000	1	0	.		Alkalinity
H66	BROMIDE	PPB	1000	24	24 ***	.		Bromide
H67	NITRITE	PPB	1000	24	24 ***	.		Nitrite
H86	FBORON	PPB	10	24	0	.		Boron, filtered
H87	FCOBALT	PPB	20	24	24 ***	.		Cobalt, filtered
H88	FLITHIU	PPB	10	24	24 ***	.		Lithium, filtered
H89	FMOLY	PPB	40	24	24 ***	.		Molybdenum, filtered
H90	FSILICO	PPB	50	24	0	.		Silicon, filtered
H91	FTIN	PPB	30	24	24 ***	.		Tin, filtered
H92	FTITAN	PPB	60	24	24 ***	.		Titanium, filtered
H93	FZIRCON	PPB	50	24	24 ***	.		Zirconium, filtered
P01	BORON	PPB	10	24	0	.		Boron
P02	COBALT	PPB	20	24	24 ***	.		Cobalt
P03	LITHIUM	PPB	10	24	24 ***	.		Lithium
P04	MOLY	PPB	40	24	24 ***	.		Molybdenum
P05	SILICON	PPB	50	24	0	.		Silicon
P06	TIN	PPB	30	24	24 ***	.		Tin
P07	TITAN	PPB	60	24	23	.		Titanium
P08	ZIRCON	PPB	50	24	24 ***	.		Zirconium
P12	ENDSFAN	PPB	.500	12	12 ***	.		Endosulfan
P13	PHORATE	PPB	2	12	12 ***	.		PHORATE

TABLE 8.2. (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
A23	THALIUM	PPB	5	12	12 ***	.		Thallium
A24	THIOURA	PPB	200	11	11 ***	.		Thiourea
A25	ACETREA	PPB	200	11	11 ***	.		1-acetyl-2-thiourea
A26	CHLOREA	PPB	200	11	11 ***	.		1-(o-chlorophenyl) thiourea
A27	DIETROL	PPB	200	11	11 ***	.		Diethylstilbesterol
A28	ETHYREA	PPB	200	11	11 ***	.		Ethylenethiourea
A29	NAPHREA	PPB	200	11	11 ***	.		1-naphthyl-2-thiourea
A32	PHENREA	PPB	500	11	11 ***	.		N-phenylthiourea
A40	DDD	PPB	.100	12	12 ***	.		DDD
A41	DDE	PPB	.100	12	12 ***	.		DDE
A42	DDT	PPB	.100	12	12 ***	.		DDT
A43	HEPTLOR	PPB	.100	12	12 ***	0	EPAP	Heptachlor
A44	HEPTIDE	PPB	.100	12	12 ***	0	EPAP	Heptchlor epoxide
A45	KEPONE	PPB	1	12	12 ***	.		Kepone
A46	DIELRIN	PPB	.100	12	12 ***	.		Dieldrin
A47	ALDRIN	PPB	.100	12	12 ***	.		Aldrin
A48	CHLOANE	PPB	1	12	12 ***	0	EPAP	Chlordane
A49	ENDO1	PPB	.100	12	12 ***	.		Endosulfan I
A52	ENDO2	PPB	.100	12	12 ***	.		Endosulfan II
A54	AR1016	PPB	1	12	12 ***	0	EPAP	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
A61	TETRANE	PPB	5	23	23 ***	5	EPA	Carbon Tetrachloride by GC/MS
A62	BENZENE	PPB	5	23	23 ***	5	EPA	Benzene
A63	DIOXANE	PPB	500	12	12 ***	.		Dioxane
A64	METHONE	PPB	10	23	20	.		Methyl ethyl ketone
A65	PYRIDIN	PPB	500	12	12 ***	.		Pyridine
A66	TOLUENE	PPB	5	23	23 ***	2000	EPAP	Toluene
A67	1,1,1-T	PPB	5	23	23 ***	200	EPA	1,1,1-trichloroethane
A68	1,1,2-T	PPB	5	23	23 ***	.		1,1,2-trichloroethane
A69	TRICENE	PPB	5	23	23 ***	5	EPA	Trichloroethylene
A70	PERCENE	PPB	5	23	23 ***	.		Tetrachloroethylene
A71	OPXYLE	PPB	5	23	23 ***	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

TABLE 8.2. (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
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	23	9	100	EPA	Chloroform
A81	METHCHL	PPB	10	12	12 ***	.		Methyl chloride
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	23	23 ***	.		1,1-dichloroethane
A90	1,2-DIC	PPB	5	23	23 ***	5	EPA	1,2-dichloroethane
A91	TRANDCE	PPB	5	23	23 ***	70	EPAP	Trans-1,2-dichloroethene
A92	DICETHY	PPB	10	12	12 ***	7	EPA	1,1-dichloroethylene
A93	METHYCH	PPB	5	23	23 ***	.		Methylene Chloride
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
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
B13	VINYIDE	PPB	10	23	23 ***	2	EPA	Vinyl chloride
B14	M-XYLE	PPB	5	23	23 ***	440	EPAP	Xylene-m
B19	ACETILE	PPB	10	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-aminobyphenyl
B24	AMIISOX	PPB	10	12	12 ***	.		5-(aminomethyl)-3-isoxazolol
B25	AMITROL	PPB	10	12	12 ***	.		Amitrole
B26	ANILINE	PPB	10	12	12 ***	.		Aniline

TABLE 8.2. (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
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 ***	.		Benzenethoil
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	12 ***	.		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
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	p-Dichlorobenzene
B64	DICHBEN	PPB	10	12	12 ***	.		3,3'-dichlorobenzidine
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

TABLE 8.2. (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
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	10	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 ***			.	z-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	10	12	12 ***			.	P-nitroaniline
C12	NITBENZ	PPB	10	12	12 ***			.	Nitrobenzine
C13	NITPHEN	PPB	10	12	12 ***			.	p-Nitrophenol
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

TABLE 8.2. (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
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	10	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

TABLE 8.2. (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
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
C70	CYANIDE	PPB	10	12	12 ***	.		Cyanide
C71	FORMALN	PPB	500	12	12 ***	.		Formalin
C77	PERCHLO	PPB	500	11	11 ***	.		Perchlorate
C78	SULFIDE	PPB	1000	11	11 ***	.		Sulfide
C79	KEROSEN	PPB	10000	12	12 ***	.		Kerosene
C80	AMMONIU	PPB	50	23	23 ***	.		Ammonium ion
C87	CITRUSR	PPB	1000	11	11 ***	.		Citrus red
C90	PARALDE	PPB	10000	12	12 ***	.		Paraldehyde
C91	STRYCHN	PPB	50	12	12 ***	.		Strychnine
C92	MALHYDR	PPB	500	12	12 ***	.		Maleic hydrizide
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	PCDD's	PPB	.0100	10	10 ***	.		Pcdd's
D02	PCDF's	PPB	.0100	10	10 ***	.		Pcdf's
D03	2378TCD	PPB	.0100	10	10 ***	.		2,3,7,8 TCDD
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	23	23 ***	.		2,4,5-T
H40	FTHALLI	PPB	5	12	12 ***	.		Thallium, filtered
H62	LHYDRAZ	PPB	30	22	22 ***	.		Hydrazine, Low Detection Level
H68	HEXONE	PPB	10	23	23 ***	.		Methyl Isobutyl Ketone
I01	ACETONE	PPB	10	23	23 ***	.		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	23	23 ***	.		Tetrahydrofuran
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	Ethyl benzene
I34	STYRENE	PPB	5	12	12 ***	140	EPAP	Styrene
I42	BDCM	PPB	5	12	12 ***	100	EPA	Bromodichloromethane

TABLE 8.2. (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
I43	CDBM	PPB	5	12	12 ***	100	EPA	Chlorodibromomethane
I64	2NITPH	PPB	10	12	12 ***	.		o-Nitrophenol
I67	ETHANOL	PPB	10000	12	12 ***	.		Ethanol
I75	2MENAPH	PPB	10	12	12 ***	.		2-Methylnaphthalene
I82	PHENANT	PPB	10	12	12 ***	.		Phenanthrene
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 ***	.		Monobutyl Phosphate
L21	DBP	PPB	10000	12	12 ***	.		Dibutyl Phosphate
L45	ALLYLCL	PPB	100	12	12 ***	.		Allyl Chloride
L46	CLETHAN	PPB	10	12	12 ***	.		Chloroethane
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 ***	.		0,0-Diethyl-0,2-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	ACETONE	PPB	10	12	12 ***	.		Acetone - by ABN
L63	14DBEN	PPB	5	23	23 ***	75	EPA	p-Dichlorobenzene
L64	CHLROB	PPB	10	12	12 ***	60	EPAP	Chlorobenzene (by ABN)

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 8.3. Constituents with at Least One Detected Value for the 1325-N Liquid Waste Disposal Facility, November Through December 1989

			Contamination Indicator Parameters					
Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
1-N-27	29NOV89		138	.	.	8.45	.	.
	12DEC89		168	149	8.10	8.11	#700	10
	12DEC89	1	.	150	8.10	.	#800	11
	12DEC89	2	.	150	8.10	.	#600	10
	12DEC89	3	.	149	8.10	.	#600	13
1-N-29	29NOV89		188	161	7.90	7.98	#600	21
	29NOV89	1	188	163	8	7.97	#500	18
	29NOV89	2	185	162	8	7.95	#500	19
	29NOV89	3	183	163	8	7.97	#500	11
	03JAN90		163	168	8	8.29	#700	18
	03JAN90	1	163	167	8	8.28	#600	41
	03JAN90	2	162	164	8	8.28	#500	52
	03JAN90	3	163	164	8	8.28	#500	12
1-N-31	28SEP89		148	154	8.20	7.94	#800	22
	28SEP89	1	149	149	8.20	7.95	#1000	23
	28SEP89	2	149	152	8.20	7.95	#900	28
	28SEP89	3	150	152	8.20	7.95	#800	28
	01DEC89		155	141	8	8.47	#600	16
	01DEC89	1	158	.	.	8.45	#500	10
	01DEC89	2	158	.	.	8.44	#500	12
	01DEC89	3	158	.	.	8.43	#400	12
1-N-32	20SEP89		140	135	8.20	8.01	#800	21
	20SEP89	1	139	134	8.20	8.01	#800	18
	20SEP89	2	138	133	8.10	8.01	#1100	15
	20SEP89	3	139	132	8.20	8.02	#1000	15
	30NOV89		131	145	8	8.14	#500	13
	30NOV89	1	.	.	.	.	#500	14
	30NOV89	2	.	.	.	.	#600	24
	30NOV89	3	.	.	.	.	#600	12
1-N-33	21DEC89		161	157	8.10	8.47	#600	#8
	21DEC89	1	.	157	8.10	.	#500	10
	21DEC89	2	.	162	8.10	.	#500	#8
	21DEC89	3	.	158	8.10	.	#500	12
1-N-36	19SEP89		148	148	8.10	7.49	#900	28
	19SEP89	1	148	148	8.20	7.53	#700	17
	19SEP89	2	148	147	8.20	7.59	#800	18
	19SEP89	3	148	147	8.20	7.60	#1100	18
	01DEC89		147	147	8	7.97	#500	11
	01DEC89	1	147	148	8	7.95	#600	10
	01DEC89	2	147	147	8.10	7.97	#600	10
	01DEC89	3	147	146	8.10	7.97	#500	26

TABLE 8.3. (contd)

Contamination Indicator Parameters

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
1-N-39	21DEC89		161	168	8.10	.	#600	11
	21DEC89	1	168	169	8.10	8.36	#600	#9
	21DEC89	2	168	170	8.10	8.36	#600	10
	21DEC89	3	168	169	8.10	8.36	#600	15
1-N-41	19SEP89		155	154	8	7.99	#1500	#7
	19SEP89	1	154	155	8.10	8	#1500	#7
	19SEP89	2	153	157	8.10	7.94	#1400	#5
	19SEP89	3	154	156	8.10	7.93	#1000	11
	29NOV89		175	155	8.10	8.12	#600	#3
	29NOV89	1	174	.	.	8.13	#600	#6
	29NOV89	2	176	.	.	8.12	#600	16
	29NOV89	3	175	.	.	8.11	#600	#4
1-N-42	20SEP89		175	175	8.10	7.80	#800	<19
	20SEP89	1	176	172	8.20	7.81	#1100	<12
	20SEP89	2	175	173	8.20	7.81	#800	#3
	20SEP89	3	176	173	8.20	7.82	#1200	13
	29NOV89		201	167	8	8.02	#700	#5
	29NOV89	1	202	.	.	8.03	#700	#2
	29NOV89	2	201	.	.	8.01	#700	11
	29NOV89	3	202	.	.	8	#600	#8
1-N-52	20SEP89		175	172	8.20	8.20	#1100	#9
	20SEP89	1	169	169	8.20	8.20	#800	15
	20SEP89	2	170	169	8.10	8.20	#800	#5
	20SEP89	3	170	171	8.20	8.20	#800	#7
	01DEC89		210	215	8.10	8	#500	13
	01DEC89	1	211	210	8.10	8	#700	#5
	01DEC89	2	212	209	8.10	7.99	#500	13
	01DEC89	3	212	208	8.10	7.97	#500	10
1-N-70	29SEP89		168.2	175	8.20	8.09	#900	#9
	29SEP89	1	172.2	187	8.20	8.08	#600	#3
	29SEP89	2	175.5	176	8.20	8.10	#800	#3
	29SEP89	3	176.5	176	8.20	8.11	#600	#3
	29NOV89		138	171	7.90	8.45	#500	#2
6-81-58	18SEP89		214	223	8.20	8.45	#500	#4
	18SEP89	1	212	218	8.20	8.33	#700	13
	18SEP89	2	216	217	8.20	8.27	#700	58
	18SEP89	3	216	217	8.20	8.25	#700	#3
	28NOV89		255	216	7.90	8.14	#300	#-1
	28NOV89	1	255	.	.	8.15	#300	#-1
	28NOV89	2	254	.	.	8.15	#400	#6
	28NOV89	3	255	.	.	8.14	#200	10

TABLE 8.3. (contd)

Regular Monitoring Data

Well name	Collection date	Duplicate sample number	FCHROMI PPB 10/50	FPOTASS PPB 100/.	FBERYLL PPB 5/.	FSTRONT PPB 10/.	ACETONE PPB 10/.	ALKALIN 20000/.	ALPHAHI PCI/L 4/15
1-N-27	12DEC89		<10	2210	<5	87	<10	.	*.0407
1-N-29	29NOV89		<10	1600	<5	90	<10	.	1.19
	03JAN90		<10	1540	<5	92	<10	.	*.264
1-N-31	28SEP89		<10	2320	8	95	<10	.	1.01
	28SEP89	1	<10	2100	<5	83	<10	.	1.16
	01DEC89		<10	2030	<5	81	<10	.	*.653
1-N-32	20SEP89		<10	2670	<5	100	8	.	*.497
	30NOV89		<10	2260	<5	94	<10	.	1.70
1-N-33	21DEC89		<10	2010	<5	95	<10	.	1.10
	21DEC89	1	<10	1970	<5	95	<10	.	*.408
1-N-36	19SEP89		<10	1950	<5	99	<10	.	1.65
	01DEC89		<10	1880	<5	92	<10	.	*.148
1-N-39	21DEC89		<10	2240	<5	105	<10	.	*.787
	21DEC89	1	<10	2250	<5	108	<10	.	.997
1-N-41	19SEP89		<10	2600	<5	103	<10	.	*.589
	29NOV89		<10	2740	<5	105	<10	.	.893
1-N-42	20SEP89		<10	3680	<5	153	<10	.	1.65
	29NOV89		<10	3280	<5	132	<10	.	*.258
1-N-52	20SEP89		<10	3780	<5	121	<10	.	2.19
	01DEC89		<10	3310	<5	136	<10	.	1.12
1-N-70	29SEP89		<10	2720	<5	140	<10	.	*.595
	29NOV89		39	2770	<5	132	<10	64000	*.422
6-81-58	18SEP89		13	2520	<5	173	.	.	*.719
	28NOV89		<10	2360	<5	161	<10	.	1.17

TABLE 8.3. (contd)

Well name	Collection date	Duplicate sample number	ALUMNUM PPB 150/.	FARSENI PPB 5/50	BARIUM PPB 6/1000	FBARIUM PPB 6/1000
1-N-27	12DEC89		168	<5	16	10
1-N-29	29NOV89		<150	<5	11	10
	03JAN90		<150	<5	9	11
1-N-31	28SEP89		<150	<5	10	10
	28SEP89	1	<150	<5	10	10
	01DEC89		<150	<5	12	11
1-N-32	20SEP89		<150	<5	12	11
	30NOV89		<150	<5	11	11
1-N-33	21DEC89		<150	<5	13	12
	21DEC89	1	<150	<5	13	12
1-N-36	19SEP89		<150	<5	11	12
	01DEC89		<150	<5	11	11
1-N-39	21DEC89		<150	<5	13	13
	21DEC89	1	<150	<5	14	13
1-N-41	19SEP89		<150	7	14	12
	29NOV89		<150	7	13	12
1-N-42	20SEP89		5550	6	71	14
	29NOV89		772	7	21	13
1-N-52	20SEP89		<150	7	20	20
	01DEC89		<150	6	21	20
1-N-70	29SEP89		<150	<5	21	20
	29NOV89		<150	6	17	17
6-81-58	18SEP89		<150	<5	17	15
	28NOV89		<150	<5	16	14

TABLE 8.3. (contd)

Well name	Collection date	Duplicate sample number	BERYLUM PPB 5/.	BETA PCI/L 8/50	BORON PPB 10/.	FBORON PPB 10/.	CALCIUM PPB 50/.	FCALCIU PPB 50/.
1-N-27	12DEC89		<5	580	36	36	20100	19600
1-N-29	29NOV89		<5	2540	27	27	23800	22700
	03JAN90		<5	2320	26	29	20900	23000
1-N-31	28SEP89		<5	137	22	26	20000	22200
	28SEP89	1	7	138	20	26	20000	20000
	01DEC89		<5	130	48	45	18000	19100
1-N-32	20SEP89		<5	75.1	15	16	18400	19700
	30NOV89		<5	83.8	31	38	17100	18100
1-N-33	21DEC89		<5	380	29	33	21600	21300
	21DEC89	1	<5	395	33	31	19900	21200
1-N-36	19SEP89		6	388	27	23	18100	19800
	01DEC89		<5	408	37	38	18300	19400
1-N-39	21DEC89		<5	952	18	15	21600	21600
	21DEC89	1	<5	971	20	17	21900	21900
1-N-41	19SEP89		<5	9.44	20	26	18400	17600
	29NOV89		<5	11.2	16	16	17800	19000
1-N-42	20SEP89		<5	11.5	22	23	25900	21600
	29NOV89		<5	15.7	18	16	19700	20000
1-N-52	20SEP89		<5	15.9	14	23	19800	21100
	01DEC89		<5	17.4	18	19	21900	22100
1-N-70	29SEP89		<5	18.1	25	24	19400	18500
	29NOV89		<5	15.4	22	23	18800	18600
6-81-58	18SEP89		<5	3.56	12	16	29800	27600
	28NOV89		<5	2.93	14	11	27900	26800

TABLE 8.3. (contd)

Well name	Collection date	Duplicate sample number	CHROMUM PPB 10/50	CO-60 PCI/L 22.5/100r	COPPER PPB 10/1300p	CS-137 PCI/L 20/200r	IRON PPB 30/300s	FIRON PPB 30/300s
1-N-27	12DEC89		<10	20.3	<10	*-5.71	374	<30
1-N-29	29NOV89		<10	*11.7	<10	*3.17	105	<30
	03JAN90		<10	29	<10	*-2.77	<30	<30
1-N-31	28SEP89		<10	8.67	<10	*.124	<30	<30
	28SEP89	1	<10	13	<10	*2.98	<30	<30
	01DEC89		<10	18.1	<10	*.825	40	<30
1-N-32	20SEP89		<10	16.9	<10	*3.97	40	<30
	30NOV89		<10	17.8	<10	*-0.501	<30	<30
1-N-33	21DEC89		<10	27.4	<10	*4.76	155	<30
	21DEC89	1	<10	.	<10	.	356	<30
1-N-36	19SEP89		<10	21.3	<10	*-14.6	189	<30
	01DEC89		<10	21.9	<10	*-3.45	72	<30
1-N-39	21DEC89		<10	17.1	<10	*-3.97	44	<30
	21DEC89	1	<10	.	<10	.	75	<30
1-N-41	19SEP89		<10	13.4	<10	*4.88	223	<30
	29NOV89		<10	*6.14	<10	*-1.39	1020	<30
1-N-42	20SEP89		16	25.2	17	*3.31	13500	<30
	29NOV89		<10	12.1	<10	*5.89	4790	<30
1-N-52	20SEP89		<10	*9.70	<10	*5.01	99	<30
	01DEC89		<10	12.9	<10	*-3.38	<30	<30
1-N-70	29SEP89		16	14.9	<10	*-7.82	103	33
	29NOV89		12	24.8	<10	*3.97	80	174
6-81-58	18SEP89		12	*5.46	<10	*-0.376	71	<30
	28NOV89		<10	*-3.84	<10	*1.90	182	<30

TABLE 8.3. (contd)

Well name	Collection date	Duplicate sample number	LFLUORD PPB 20/4000	MAGNES PPB 50/.	FMAGNES PPB 50/.	MANGESE PPB 5/50s	NICKEL PPB 10/.	FNICKEL PPB 10/.	NITRATE PPB 500/45000
1-N-27	12DEC89		167	3810	3650	42	<10	<10	6100
1-N-29	29NOV89		155	3610	3400	<5	<10	<10	6700
	03JAN90		.	3180	3420	<5	<10	<10	7100
1-N-31	28SEP89		.	3180	3480	<5	<10	<10	2400
	28SEP89	1	.	3150	3150	<5	<10	<10	2400
	01DEC89		199	2910	2980	<5	<10	<10	4900
1-N-32	20SEP89		.	3310	3560	<5	479	<10	1400
	30NOV89		189	3380	3500	<5	<10	<10	3400
1-N-33	21DEC89		175	3510	3520	<5	<10	<10	5600
	21DEC89	1	173	3280	3480	11	<10	<10	5500
1-N-36	19SEP89		.	3240	3510	<5	<10	<10	2300
	01DEC89		185	3260	3360	<5	<10	<10	4900
1-N-39	21DEC89		.	4050	3960	<5	<10	<10	6500
	21DEC89	1	.	4050	3990	<5	<10	<10	6500
1-N-41	19SEP89		.	3880	3810	<5	<10	<10	1000
	29NOV89		231	3960	4150	10	<10	<10	1000
1-N-42	20SEP89		.	8430	5280	240	<10	<10	3300
	29NOV89		280	5060	4750	48	<10	<10	1100
1-N-52	20SEP89		.	4990	5360	<5	<10	<10	7700
	01DEC89		259	5980	5950	<5	<10	<10	9800
1-N-70	29SEP89		.	5450	5270	5	13	<10	9100
	29NOV89		.	5350	5270	<5	<10	19	10200
6-81-58	18SEP89		.	8000	7280	<5	<10	<10	3700
	28NOV89		165	7280	7080	9	<10	<10	4000

TABLE 8.3. (contd)

Well name	Collection date	Duplicate sample number	POTASUM PPB 100/.	PU-238 PCI/L 17/1.6d	PU39-40 PCI/L 17/1.2d	RADIUM PCI/L 1/5
1-N-27	12DEC89		2280	.	.	.204
1-N-29	29NOV89		1740	.	.	*.0492
	03JAN90		1450	.	.	*-0.00911
1-N-31	28SEP89		2150	.	.	*-0.0237
	28SEP89	1	2100	.	.	*.0358
	01DEC89		2040	.	.	*-0.0419
1-N-32	20SEP89		2480	.	.	*.0817
	30NOV89		2170	.	.	*-0.0171
1-N-33	21DEC89		2000	.	.	*.0629
	21DEC89	1	1990	.	.	*.0399
1-N-36	19SEP89		1760	.	.	*-0.0369
	01DEC89		1830	.	.	*-0.0415
1-N-39	21DEC89		2310	.	.	*.00712
	21DEC89	1	2290	.	.	.
1-N-41	19SEP89		2680	.	.	*.101
	29NOV89		2710	*-0.00144	*-0.000165	*.0817
1-N-42	20SEP89		4650	.	.	.467
	29NOV89		3390	*.000784	*.00206	*.134
1-N-52	20SEP89		3520	.	.	*.0226
	01DEC89		3300	.	.	*-0.00652
1-N-70	29SEP89		2890	.	.	.268
	29NOV89		2760	*-0.00522	*.00361	*.117
6-81-58	18SEP89		2790	.	.	*.0303
	28NOV89		2460	.	.	*.100

TABLE 8.3. (contd)

Well name	Collection date	Duplicate sample number	RU-106 PCI/L 172.5/30r	SILICON PPB 50/.	FSILICO PPB 50/.	SODIUM PPB 200/.	FSODIUM PPB 200/.	SR 90 PCI/L 5/8	STRONUM PPB 10/.
1-N-27	12DEC89		*-30.3	6760	6430	2940	2890	253	90
1-N-29	29NOV89		*1.16	6070	5700	2110	1960	1670	95
	03JAN90		*.991	5160	5670	1850	2000	1220	83
1-N-31	28SEP89		*13.5	7210	7950	2100	2270	56.4	85
	28SEP89	1	*3.11	7160	7170	2050	2040	59.5	86
	01DEC89		*48.4	7080	7400	2000	1960	50.6	77
1-N-32	20SEP89		*26.8	6800	7340	2580	2810	25.7	94
	30NOV89		*-32.4	7600	8040	2440	2540	26.1	90
1-N-33	21DEC89		*65.4	7670	7710	2200	2230	209	96
	21DEC89	1	.	6960	7630	2360	2190	.	88
1-N-36	19SEP89		*12.5	6560	6950	2490	2610	183	90
	01DEC89		*-3.98	6740	7060	2360	2400	224	88
1-N-39	21DEC89		*42.1	7940	7870	2960	2850	454	111
	21DEC89	1	.	8030	7990	2960	2880	.	112
1-N-41	19SEP89		*17.8	12700	12300	5320	5160	*-0.416	104
	29NOV89		*-10.6	11900	12400	4660	4750	*.0627	100
1-N-42	20SEP89		*-50.8	27300	15100	6130	5740	*.0770	185
	29NOV89		*1.05	16300	14800	5140	5170	*.223	133
1-N-52	20SEP89		*48	13700	14600	6910	7380	*.177	115
	01DEC89		*-86.8	13000	13300	6010	6030	*-0.184	137
1-N-70	29SEP89		*1.04	12700	12100	5080	4890	*-0.346	146
	29NOV89		*11.5	12400	12300	5190	5130	*.0100	134
6-81-58	18SEP89		*22	9010	8400	4430	4010	*-0.144	187
	28NOV89		*17	8260	8030	3840	3740	*.138	165

TABLE 8.3. (contd)

Well name	Collection date	Duplicate sample number	SULFATE PPB 500/250000s	TC PPB 1000/.	TC-99 PCI/L 15/900r	TDS 5000/500000s	TITAN PPB 60/.
1-N-27	12DEC89		8200	14100	.	82000	<60
1-N-29	29NOV89		11300	14900	.	75000	<60
	03JAN90		10900	.	.	.	<60
1-N-31	28SEP89		11500	.	.	.	<60
	28SEP89	1	11500	.	.	.	<60
	01DEC89		7300	22700	.	81000	<60
1-N-32	20SEP89		11100	.	.	.	<60
	30NOV89		8700	13500	.	70000	<60
1-N-33	21DEC89		8500	14800	.	79500	<60
	21DEC89	1	8500	.	.	.	<60
1-N-36	19SEP89		11700	.	.	.	<60
	01DEC89		8000	13400	.	88000	<60
1-N-39	21DEC89		10800	.	.	.	<60
	21DEC89	1	10800	.	.	.	<60
1-N-41	19SEP89		12700	.	.	.	<60
	29NOV89		12100	15100	.	84000	<60
1-N-42	20SEP89		19400	.	.	.	420
	29NOV89		14800	16000	.	99000	<60
1-N-52	20SEP89		14500	.	.	.	<60
	01DEC89		17900	16600	.	137000	<60
1-N-70	29SEP89		11900	.	.	.	<60
	29NOV89		11400	.	*4.69	100000	<60
6-81-58	18SEP89		15400	.	.	.	<60
	28NOV89		17300	22200	.	138000	<60

TABLE 8.3. (contd)

Well name	Collection date	Duplicate sample number	TRITIUM PCI/L 500/20000	TURBID NTU .10/1	U PCI/L .50/600d	VANADUM PPB 5/.	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000
1-N-27	12DEC89		189000	2.90	.555	8	7	<5	<5
1-N-29	29NOV89		67200	.100	.603	9	8	<5	<5
	03JAN90		81100	.100	.573	<5	<5	<5	<5
1-N-31	28SEP89		87400	.100	.396	9	<5	<5	<5
	28SEP89	1	85800	.	.455	10	6	<5	<5
	01DEC89		218000	.200	.359	8	9	<5	<5
1-N-32	20SEP89		30600	.300	.713	9	9	8800	<5
	30NOV89		164000	.300	.416	13	12	<5	<5
1-N-33	21DEC89		170000	1.30	.678	9	8	<5	<5
	21DEC89	1	163000	.	.505	<5	7	59	<5
1-N-36	19SEP89		60600	.600	.595	12	10	<5	<5
	01DEC89		209000	.300	.435	9	11	<5	<5
1-N-39	21DEC89		51300	.300	.519	14	12	7	<5
	21DEC89	1	.	.	.492	12	12	<5	<5
1-N-41	19SEP89		7280	2.10	.412	24	27	11	<5
	29NOV89		7650	1.70	.401	32	29	50	<5
1-N-42	20SEP89		9820	64	.724	58	25	48	<5
	29NOV89		8880	26	.381	40	33	16	<5
1-N-52	20SEP89		16000	4.80	.771	25	27	9	40
	01DEC89		24400	.100	.680	26	27	<5	<5
1-N-70	29SEP89		37200	.600	.322	25	25	16	<5
	29NOV89		32500	.700	.316	25	23	7	6
6-81-58	18SEP89		*88.1	.300	1.27	7	8	<5	26
	28NOV89		*158	.400	.727	5	6	<5	<5

TABLE 8.3. (contd)

Well name	Collection date	Duplicate sample number	CHLFORM PPB 5/100	CHLORID PPB 500/250000s
1-N-27	12DEC89		9	1000
1-N-29	29NOV89		14	1500
	03JAN90		9	1400
1-N-31	28SEP89		21	1800
	28SEP89	1	20	1800
	01DEC89		9	800
1-N-32	20SEP89		8	1700
	30NOV89		8	1000
1-N-33	21DEC89		11	1000
	21DEC89	1	11	1000
1-N-36	19SEP89		15	1800
	01DEC89		8	900
1-N-39	21DEC89		11	1400
	21DEC89	1	9	1400
1-N-41	19SEP89		<5	2100
	29NOV89		<5	1600
1-N-42	20SEP89		<5	3500
	29NOV89		#3	1800
1-N-52	20SEP89		#3	1800
	01DEC89		#4	2100
1-N-70	29SEP89		<5	1300
	29NOV89		#3	1200
6-81-58	18SEP89		.	1600
	28NOV89		<5	1500

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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

TABLE 8.4. Contamination Indicator Parameter Replicate Averages for the 1325-N Liquid Waste Disposal Facility, November Through December 1989

Constituent Code	Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088	CONDLAB	umho	1-N-31	28SEP89	4	152	2.06	149	154	1.4
			1-N-32	20SEP89	4	134	1.29	132	135	1.0
			1-N-36	19SEP89	4	148	0.58	147	148	0.4
			1-N-41	19SEP89	4	156	1.29	154	157	0.8
			1-N-42	20SEP89	4	173	1.26	172	175	0.7
			1-N-52	20SEP89	4	170	1.50	169	172	0.9
			1-N-70	29SEP89	4	179	5.69	175	187	3.2
			6-81-58	18SEP89	4	219	2.87	217	223	1.3
191	CONDFLD	umho	1-N-31	28SEP89	4	149	0.82	148	150	0.5
			1-N-32	20SEP89	4	139	0.82	138	140	0.6
			1-N-36	19SEP89	4	148	0.00	148	148	0.0
			1-N-41	19SEP89	4	154	0.82	153	155	0.5
			1-N-42	20SEP89	4	176	0.58	175	176	0.3
			1-N-52	20SEP89	4	171	2.71	169	175	1.6
			1-N-70	29SEP89	4	173	3.75	168	177	2.2
			6-81-58	18SEP89	4	215	1.91	212	216	0.9
199	PHFIELD		1-N-31	28SEP89	4	7.95	0.005	7.94	7.95	0.1
			1-N-32	20SEP89	4	8.01	0.005	8.01	8.02	0.1
			1-N-36	19SEP89	4	7.55	0.052	7.49	7.60	0.7
			1-N-41	19SEP89	4	7.97	0.035	7.93	8.00	0.4
			1-N-42	20SEP89	4	7.81	0.008	7.80	7.82	0.1
			1-N-52	20SEP89	4	8.20	0.000	8.20	8.20	0.0
			1-N-70	29SEP89	4	8.10	0.013	8.08	8.11	0.2
			6-81-58	18SEP89	4	8.33	0.090	8.25	8.45	1.1
207	PH-LAB		1-N-31	28SEP89	4	8.20	0.00	8.2	8.2	0.0
			1-N-32	20SEP89	4	8.18	0.05	8.1	8.2	0.6
			1-N-36	19SEP89	4	8.18	0.05	8.1	8.2	0.6
			1-N-41	19SEP89	4	8.08	0.05	8.0	8.1	0.6
			1-N-42	20SEP89	4	8.18	0.05	8.1	8.2	0.6
			1-N-52	20SEP89	4	8.18	0.05	8.1	8.2	0.6
			1-N-70	29SEP89	4	8.20	0.00	8.2	8.2	0.0
			6-81-58	18SEP89	4	8.20	0.00	8.2	8.2	0.0
C69	TOC	ppb	1-N-31	28SEP89	4	875	96	800	1,000	10.9
			1-N-32	20SEP89	4	925	150	800	1,100	16.2
			1-N-36	19SEP89	4	875	171	700	1,100	19.5
			1-N-41	19SEP89	4	1,350	238	1,000	1,500	17.6
			1-N-42	20SEP89	4	975	206	800	1,200	21.1
			1-N-52	20SEP89	4	875	150	800	1,100	17.1
			1-N-70	29SEP89	4	725	150	600	900	20.7
			6-81-58	18SEP89	4	650	100	500	700	15.4
H42	TOXLDL	ppb	1-N-31	28SEP89	4	25.3	3.20	22	28	12.7
			1-N-32	20SEP89	4	17.3	2.87	15	21	16.7
			1-N-36	19SEP89	4	20.3	5.19	17	28	25.6
			1-N-41	19SEP89	4	7.5	2.52	5	11	33.6
			1-N-42	20SEP89	4	11.8	6.60	3	19	56.2
			1-N-52	20SEP89	4	9.0	4.32	5	15	48.0
			1-N-70	29SEP89	4	4.5	3.00	3	9	66.7
			6-81-58	18SEP89	4	19.5	26.10	3	58	133.

TABLE 8.5. Sampling Schedule for the 1325-N Liquid Waste Disposal Facility

	1989[a]			1990								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
199-N-27			L		X			X			X	
199-N-29		L			X			X			X	
199-N-31			L		X			X			X	
199-N-32		L			X			X			X	
199-N-33			L		X			X			X	
199-N-36			L		X			X			X	
199-N-41		L			X			X			X	
199-N-42		L			X			X			X	
199-N-52			L		X			X			X	
199-N-70		X			X			X			X	
*699-81-58		L			X			X			X	

(a) The following notations are used in this table:
L = sampled for the long list of constituents (WAC 173-303-9905) for the liquid effluent study.
X = sampled for the regular list of constituents (Table 8.6).
* = data also used in the 1324-N/NA project.

9 2 1 2 6 4 2 1 8 3 3

TABLE 8.6. The Regular Sampling List for the 1325-N Ground-Water Quality Assessment Monitoring Network

Coliform
Total Organic Halogens
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

9.0 216-A-10 CRIB

S. P. Luttrell
Pacific Northwest Laboratory

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

The 216-A-10 Crib is located in the 200-East Area in the central portion of the Hanford Site (see Figure 1.1). It is a V-shaped crib in cross section, approximately 45 ft deep and 275 ft long. 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. It has not been used since 1987.

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

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

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

9 2 1 2 6 4 2 1 8 3 5

WATER LEVELS

Water-level measurements were made in well 299-E25-36 when a sample was collected from the well in October. Supplemental water-level measurements were made in all 216-A-10 Crib network wells on December 21, 1989 (Table 9.2).

WATER CHEMISTRY DATA

A ground-water sample was collected from well 299-E25-36 on October 24, 1989. A sample had inadvertently not been collected from this well in August when the other wells were sampled. The analyses for this sample are completed. The analytical results are summarized in Table 9.3. The results for constituents with at least one detected value are provided in Table 9.4. The results from well 299-E25-36 were consistent with previous results, and no constituent exceeded screening levels. A review of the results and field record form revealed that quadruplicate measurements of pH and specific conductivity were not made. Therefore, subsequent statistical analyses for background, which will likely be presented next quarter, will be conducted using only one pH and one specific conductivity measurement for the fourth-quarter sample.

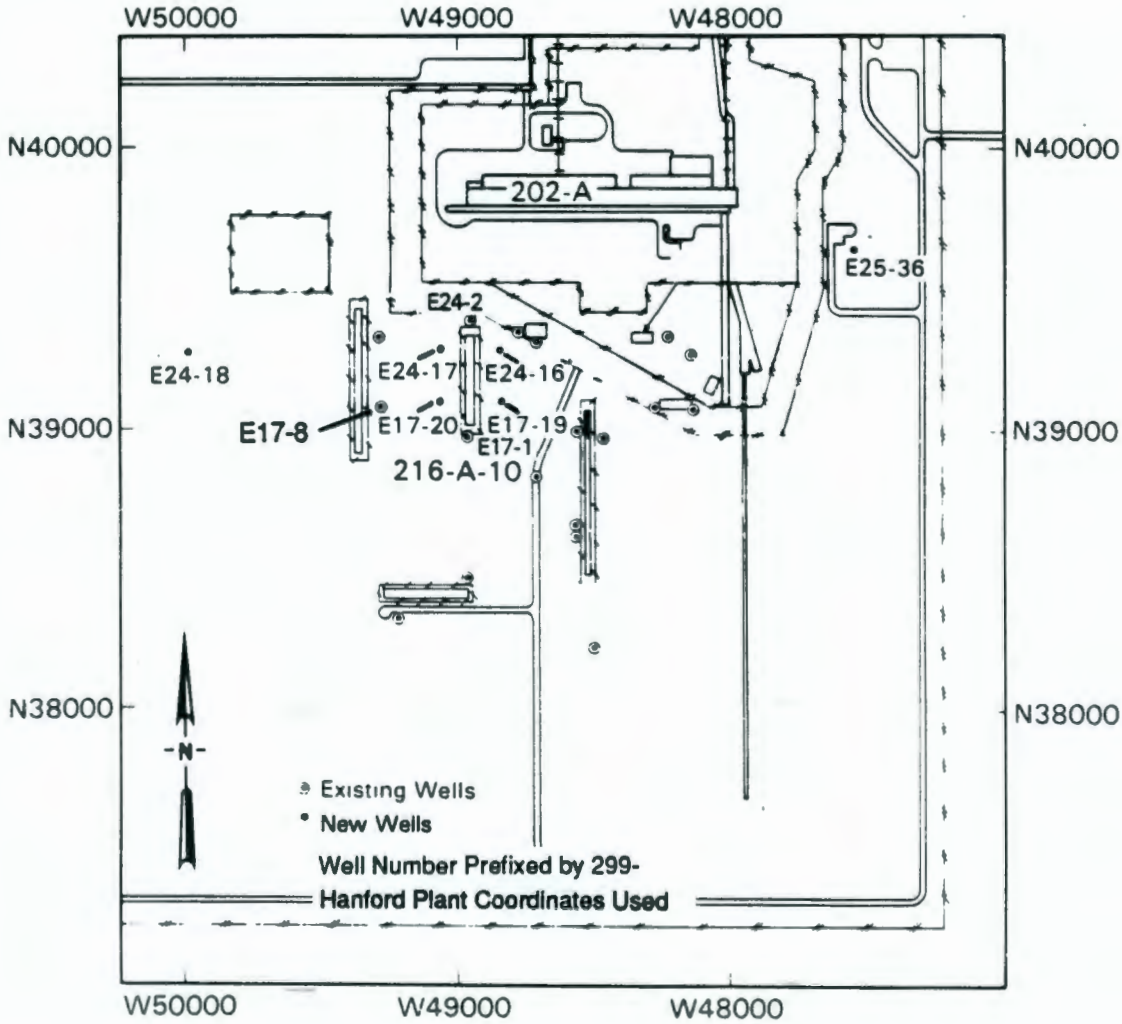

FIGURE 9.1. Monitoring Well Locations for the 216-A-10 Crib

9 2 1 2 6 4 2 1 8 3 7

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

	1989[a]			1990								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E17-1				X						X		
299-E17-19				X						X		
299-E17-20				X						X		
299-E24-2				X						X		
299-E24-16				X						X		
299-E24-17				X						X		
299-E24-18				X						X		
299-E25-36				X						X		

(a) The following notation is used in this table:
X = sampled for the regular list of constituents (Table 9.3).

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

Well	Casing Elevation, ft above MSL[b]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E17-1	719.17	12/21/89	1038	314.88	404.29
299-E17-8	718.38	12/21/89	0948	314.26	404.12
299-E17-19	719.33	12/21/89	1113	315.18	404.15
299-E17-20	719.23	12/21/89	1028	314.52	404.71
299-E24-2	717.47	12/21/89	1046	312.85	404.62
299-E24-16	718.27	12/21/89	1058	313.60	404.67
299-E24-17	718.69	NM[c]	--	--	--
299-E24-18	719.28	12/21/89	0935	314.69	404.59
299-E25-36	707.39	10/24/89	1010	302.55	404.84[d]
		12/21/89	1323	302.75	404.69

(a) Except where noted, these are supplemental measurements.
(b) MSL = mean sea level.
(c) NM = no measurement could be made.
(d) Water level was measured during sample collection.

9 2 1 2 6 4 2 1 8 3 9

TABLE 9.3. Constituent List and Summary of Sampling Results for the 216-A-10 Crib, October 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	.	1	0	700	WDOE	Conductivity, Laboratory
191	CONDFLD	UMHO	1	1	0	700	WDOE	Specific conductance
199	PHFIELD		.100	1	0	6.5-8.5	EPAS	pH, Field Measurement
207	PH-LAB		.0100	1	0	6.5-8.5	EPAS	pH, Laboratory Measurement
C69	TOC	PPB	2000	4	4 ***	.		Total organic carbon
H42	TOXLDL	PPB	10	4	4 ***	.		Total Organic Halogen, Low Det. Level

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full Name
111	BETA	PCI/L	8	1	0	50	EPA	Gross beta
112	ALPHAHI	PCI/L	4	1	1 ***	15	EPA	Alpha, High Detection Level
181	RADIUM	PCI/L	1	1	1 ***	5	EPA	Radium
A06	BARIUM	PPB	6	1	0	1000	EPA	Barium
A07	CADMIUM	PPB	2	1	1 ***	10	EPA	Cadmium
A08	CHROMUM	PPB	10	1	0	50	EPA	Chromium
A10	SILVER	PPB	10	1	1 ***	50	EPA	Silver
A20	ARSENIC	PPB	5	1	0	50	EPA	Arsenic
A21	MERCURY	PPB	.100	1	1 ***	2	EPA	Mercury
A22	SELENUM	PPB	5	1	1 ***	10	EPA	Selenium
A33	ENDRIN	PPB	.100	1	1 ***	.200	EPA	Endrin
A34	METHLOR	PPB	3	1	1 ***	100	EPA	Methoxychlor
A35	TOXAENE	PPB	1	1	1 ***	5	EPA	Toxaphene
A36	a-BHC	PPB	.100	1	1 ***	4	EPA	Alpha-BHC
A37	b-BHC	PPB	.100	1	1 ***	4	EPA	Beta-BHC
A38	g-BHC	PPB	.100	1	1 ***	4	EPA	Gamma-BHC
A39	d-BHC	PPB	.100	1	1 ***	4	EPA	Delta-BHC
A51	LEADGF	PPB	5	1	1 ***	50	EPA	Lead (graphite furnace)
C72	NITRATE	PPB	500	1	0	45000	EPA	Nitrate
C74	FLUORID	PPB	500	1	1 ***	4000	EPA	Fluoride
H13	2,4-D	PPB	2	1	1 ***	100	EPA	2,4-D
H14	2,4,5TP	PPB	2	1	1 ***	10	EPA	2,4,5-TP silvex
H20	FBARIUM	PPB	6	1	0	1000	EPA	Barium, filtered
H21	FCADMIU	PPB	2	1	1 ***	10	EPA	Cadmium, filtered
H22	FCHROMI	PPB	10	1	1 ***	50	EPA	Chromium, filtered
H23	FSILVER	PPB	10	1	1 ***	50	EPA	Silver, filtered
H37	FARSENI	PPB	5	1	0	50	EPA	Arsenic, filtered
H38	FMERCUR	PPB	.100	1	1 ***	2	EPA	Mercury, filtered

TABLE 9.3. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
H39	FSELENI	PPB	5	1	1 ***	10	EPA		Selenium, filtered
H41	FLEAD	PPB	5	1	1 ***	50	EPA		Lead, filtered
H60	TURBID	NTU	.100	1	0	1	EPA	xxx	Turbidity
P19	COLIMF	PPB	1	1	1 ***	1	EPA		Coliform (Membrane Filter)

---------- 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	1	0	.			Sodium
A17	MANGESE	PPB	5	1	0	50	EPAS		Manganese
A19	IRON	PPB	30	1	0	300	EPAS		Iron
C57	PHENOL	PPB	10	1	1 ***	.			Phenol
C73	SULFATE	PPB	500	1	0	250000	EPAS		Sulfate
C75	CHLORID	PPB	500	1	0	250000	EPAS		Chloride
H24	FSODIUM	PPB	200	1	0	.			Sodium, filtered
H29	FMANGAN	PPB	5	1	1 ***	50	EPAS		Manganese, filtered
H31	FIRON	PPB	30	1	1 ***	300	EPAS		Iron, filtered
H57	LPHENOL	PPB	10	1	1 ***	.			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
104	U	PCI/L	.500	1	0	600	DOE		Uranium
108	TRITIUM	PCI/L	500	1	0	20000	EPA		Tritium
A01	BERYLUM	PPB	5	1	1 ***	.			Beryllium
A03	STRONUM	PPB	10	1	0	.			Strontium
A04	ZINC	PPB	5	1	1 ***	5000	EPAS		Zinc
A05	CALCIUM	PPB	50	1	0	.			Calcium
A12	NICKEL	PPB	10	1	0	.			Nickel
A13	COPPER	PPB	10	1	1 ***	1300	EPAP		Copper
A14	VANADUM	PPB	5	1	0	.			Vanadium
A15	ANTIONY	PPB	100	1	1 ***	.			Antimony
A16	ALUMNUM	PPB	150	1	1 ***	.			Aluminum
A18	POTASUM	PPB	100	1	0	.			Potassium
A50	MAGNES	PPB	50	1	0	.			Magnesium
C76	PHOSPHA	PPB	1000	1	1 ***	.			Phosphate
H16	TC	PPB	1000	1	0	.			Total carbon
H18	FZINC	PPB	5	1	1 ***	5000	EPAS		Zinc, filtered
H19	FCALCIU	PPB	50	1	0	.			Calcium, filtered
H25	FNICKEL	PPB	10	1	1 ***	.			Nickel, filtered

TABLE 9.3. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full Name
H26	FCOPPER	PPB	10	1	1 ***	1300	EPAP	Copper, filtered
H27	FVANADI	PPB	5	1	0	.		Vanadium, filtered
H28	FALUMIN	PPB	150	1	1 ***	.		Aluminum, filtered
H30	FPOTASS	PPB	100	1	0	.		Potassium, filtered
H32	FMAGNES	PPB	50	1	0	.		Magnesium, filtered
H33	FBERYLL	PPB	5	1	1 ***	.		Beryllium, filtered
H35	FSTRONT	PPB	10	1	0	.		Strontium, filtered
H36	FANTIMO	PPB	100	1	1 ***	.		Antimony, filtered
H66	BROMIDE	PPB	1000	1	1 ***	.		Bromide
H67	NITRITE	PPB	1000	1	1 ***	.		Nitrite
H86	FBORON	PPB	10	1	0	.		Boron, filtered
H87	FCOBALT	PPB	20	1	1 ***	.		Cobalt, filtered
H88	FLITHIU	PPB	10	1	1 ***	.		Lithium, filtered
H89	FMOLY	PPB	40	1	1 ***	.		Molybdenum, filtered
H90	FSILICO	PPB	50	1	0	.		Silicon, filtered
H91	FTIN	PPB	30	1	1 ***	.		Tin, filtered
H92	FTITAN	PPB	60	1	1 ***	.		Titanium, filtered
H93	FZIRCON	PPB	50	1	1 ***	.		Zirconium, filtered
P01	BORON	PPB	10	1	0	.		Boron
P02	COBALT	PPB	20	1	1 ***	.		Cobalt
P03	LITHIUM	PPB	10	1	1 ***	.		Lithium
P04	MOLY	PPB	40	1	1 ***	.		Molybdenum
P05	SILICON	PPB	50	1	0	.		Silicon
P06	TIN	PPB	30	1	1 ***	.		Tin
P07	TITAN	PPB	60	1	1 ***	.		Titanium
P08	ZIRCON	PPB	50	1	1 ***	.		Zirconium

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full Name
A61	TETRANE	PPB	5	1	1 ***	5	EPA	Carbon Tetrachloride by GC/MS
A62	BENZENE	PPB	5	1	1 ***	5	EPA	Benzene
A64	METHONE	PPB	10	1	0	.		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
A70	PERCENE	PPB	5	1	1 ***	.		Tetrachloroethylene
A71	OPXYLE	PPB	5	1	1 ***	440	EPAP	Xylene-o,p
A80	CHLFORM	PPB	5	1	1 ***	100	EPA	Chloroform
A89	1,1-DIC	PPB	5	1	1 ***	.		1,1-dichloroethane
A90	1,2-DIC	PPB	5	1	1 ***	5	EPA	1,2-dichloroethane

TABLE 9.3. (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
A91	TRANDCE	PPB	5	1	1 ***	70	EPAP	Trans-1,2-dichloroethene
A93	METHYCH	PPB	5	1	1 ***	.		Methylene Chloride
B13	VINYIDE	PPB	10	1	1 ***	2	EPA	Vinyl chloride
B14	M-XYLE	PPB	5	1	1 ***	440	EPAP	Xylene-m
B61	12-dben	PPB	10	1	1 ***	.		1,2-dichlorobenzene
B62	13-dben	PPB	10	1	1 ***	.		1,3-dichlorobenzene
B63	14-dben	PPB	10	1	1 ***	75	EPA	p-Dichlorobenzene
B89	HEXCBEN	PPB	10	1	1 ***	.		Hexachlorobenzene
C26	PENTCHB	PPB	10	1	1 ***	.		Pentachlorobenzene
C37	TETRCHB	PPB	10	1	1 ***	.		1,2,4,5-tetrachlorobenzene
C43	TRICHLB	PPB	10	1	1 ***	.		1,2,4-trichlorobenzene
C54	HEXACHL	PPB	10	1	1 ***	.		Hexachlorophene
C55	NAPHTHA	PPB	10	1	1 ***	.		Naphthalene
C56	123TRI	PPB	10	1	1 ***	.		1,2,3-trichlorobenzene
C58	135TRI	PPB	10	1	1 ***	.		1,3,5-trichlorobenzene
C59	1234TE	PPB	10	1	1 ***	.		1,2,3,4-tetrachlorobenzene
C60	1235TE	PPB	10	1	1 ***	.		1,2,3,5-tetrachlorobenzene
C79	KEROSEN	PPB	10000	1	1 ***	.		Kerosene
C90	PARALDE	PPB	10000	1	1 ***	.		Paraldehyde
C94	ACRYIDE	PPB	10000	1	1 ***	0	EPAP	Acrylamide
C95	ALLYLAL	PPB	10000	1	1 ***	.		Allyl alcohol
C98	CHLPROP	PPB	10000	1	1 ***	.		3-chloropropionitrile
H03	ETHCARB	PPB	10000	1	1 ***	.		Ethyl carbamate
H04	ETHCYAN	PPB	10000	1	1 ***	.		Ethyl cyanide
H09	ISOBUTY	PPB	10000	1	1 ***	.		Isobutyl alcohol
H11	PROPYLA	PPB	10000	1	1 ***	.		N-propylamine
H12	PROPYNO	PPB	10000	1	1 ***	.		2-propyn-1-ol
H15	2,4,5-T	PPB	2	1	1 ***	.		2,4,5-T
H68	HEXONE	PPB	10	1	1 ***	.		Methyl Isobutyl Ketone
I01	ACETONE	PPB	10	1	1 ***	.		Acetone by VOA
I09	BUTANOL	PPB	10000	1	1 ***	.		1-Butanol
I21	TRIBUPH	PPB	10	1	1 ***	.		Tributylphosphoric Acid
I28	TAF	PPB	10	1	1 ***	.		Tetrahydrofuran
I67	ETHANOL	PPB	10000	1	1 ***	.		Ethanol
L20	MBP	PPB	10000	1	1 ***	.		Monobutyl Phosphate
L21	DBP	PPB	10000	1	1 ***	.		Dibutyl Phosphate
L57	ETHGLYC	PPB	10000	1	1 ***	.		Ethylene Glycol
L59	1PROPAN	PPB	10000	1	1 ***	.		1-Propanol
L60	1BUTYN	PPB	10000	1	1 ***	.		1-Butynol
L63	14DBEN	PPB	5	1	1 ***	75	EPA	p-Dichlorobenzene
L64	CHLROB	PPB	10	1	1 ***	60	EPAP	Chlorobenzene (by ABN)

TABLE 9.3. (contd)

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 9.4. Constituents with at Least One Detected Value for the 216-A-10 Crib, October 1989

Contamination Indicator Parameters

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
2-E25-36	24OCT89		239	245	8	7.63	#600	#5
	24OCT89	1	.	.	.	.	#900	#2
	24OCT89	2	.	.	.	.	#600	#5
	24OCT89	3	.	.	.	.	#900	#4

Regular Monitoring Data

Well name	Collection date	Duplicate sample number	FPOTASS PPB 100/.	FSTRONT PPB 10/.	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
2-E25-36	24OCT89		3780	99	*.836	6	9	17	15	7.04

Well name	Collection date	Duplicate sample number	BORON PPB 10/.	FBORON PPB 10/.	CALCIUM PPB 50/.	FCALCIU PPB 50/.	CHLORID PPB 500/250000s	CHROMUM PPB 10/50	IRON PPB 30/300s	MAGNES PPB 50/.
2-E25-36	24OCT89		18	21	22700	20300	3800	30	242	6060

Well name	Collection date	Duplicate sample number	FMAGNES PPB 50/.	MANGESE PPB 5/50s	NICKEL PPB 10/.	NITRATE PPB 500/45000	POTASUM PPB 100/.	RADIUM PCI/L 1/5	SILICON PPB 50/.	FSILICO PPB 50/.
2-E25-36	24OCT89		5440	6	17	6200	4230	*.0862	17500	15800

Well name	Collection date	Duplicate sample number	SODIUM PPB 200/.	FSODIUM PPB 200/.	STRONUM PPB 10/.	SULFATE PPB 500/250000s	TC PPB 1000/.	TRITIUM PCI/L 500/20000	TURBID NTU .10/1	U PCI/L .50/600d
2-E25-36	24OCT89		13100	11800	110	24300	20000	5360	1.20	.982

Well name	Collection date	Duplicate sample number	VANADUM PPB 5/.	FVANADI PPB 5/.
2-E25-36	24OCT89		33	25

TABLE 9.4. (contd)

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-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 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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

10.0 216-A-29 DITCH

S. P. Luttrell
Pacific Northwest Laboratory

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

The 216-A-29 Ditch is located east of the 200-East Area in the central portion of the Hanford Site (Figures 1.1 and 10.1). It is an earthen ditch, approximately 6 ft wide and 6500 ft long. The ditch receives discharge from the Plutonium-Uranium Extraction (PUREX) Plant chemical sewer line. It has been in use since 1955.

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

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

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

WATER LEVELS

Water-level measurements were made in October/November when wells were sampled in support of a Hanford liquid effluent study (Table 10.2).

9 2 1 2 6 4 2 1 8 4 7

Supplemental water-level measurements were made on November 16, 1989, in support of this project, and water-level measurements were made on December 13, 1989, in three of the wells for the Ground-Water Environmental Surveillance Project conducted by PNL (Table 10.3).

WATER CHEMISTRY DATA

Ground-water samples were collected from wells around the 216-A-29 Ditch between October 27 and November 1, 1989, in support of a liquid effluent study. Analytical results for the samples are summarized in Table 10.4. Results for constituents with at least one detected value are provided in Table 10.5. These results will not be used for statistical analyses.

Major observations from sample analyses are as follows:

- Specific conductance was elevated in well 299-E25-35 in relation to the other wells. Major ion concentrations were also elevated in this well and were likely the cause of the elevated specific conductance values.
- Tritium was reported as 60,300 pCi/L in well 299-E25-35. This value exceeds the 40 CFR 141 standard of 20,000 pCi/L for tritium.
- Chromium (unfiltered) exceeded the 40 CFR 265, Appendix III, standard of 50 ppb in well 299-E25-34 (76 ppb). Chromium (filtered) was reported to be below the detection level of 10 ppb in all wells.

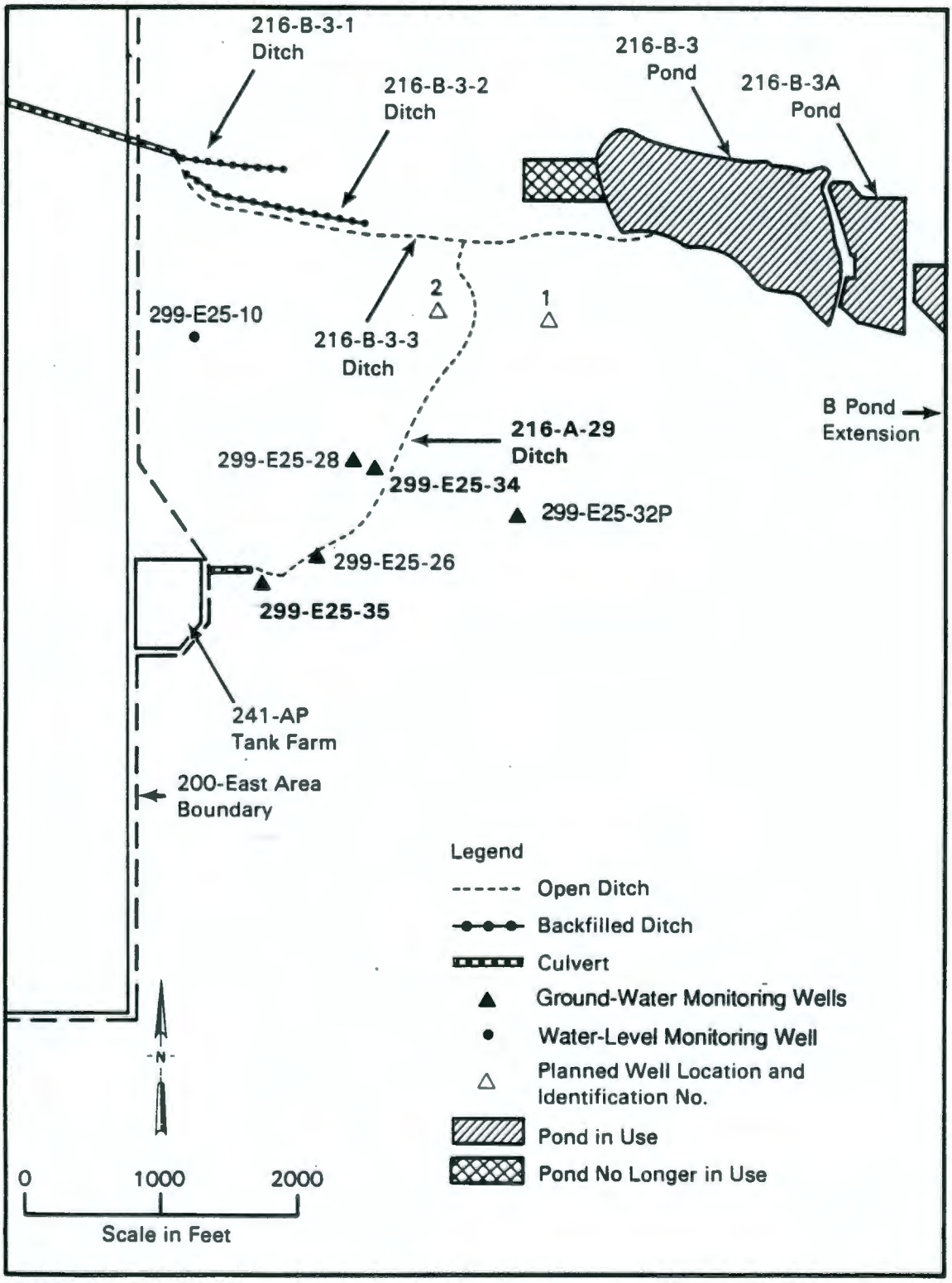

FIGURE 10.1. Monitoring Well Locations for the 216-A-29 Ditch

9 2 1 2 6 4 2 1 8 4 9

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

	1989[a]			1990								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E25-26		*		S						S		
299-E25-28	*			S						S		
299-E25-32P	*			S						S		
299-E25-34	*			S						XRV		
299-E25-35	*			S						X		

(a) The following notations are used in this table:
R = sampled for quality control replicates.
S = sampled for the short list of constituents (overlap with another project).
V = sampled for volatile organic analyses blanks.
X = sampled for the regular list of constituents (Table 10.4).
* = sampled for the long list of constituents (WAC 173-303-9905) for the Hanford liquid effluent study.

9 2 1 2 6 4 2 1 8 5 0

TABLE 10.2. Water-Level Data for Wells Near the 216-A-29 Ditch Sampled in Support of the Hanford Liquid Effluent Study

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E25-26	668.55	11/01/89	0840	262.81	405.74
299-E25-28	662.44	10/27/89	0800	256.80	405.64
299-E25-32P	670.04[b]	10/31/89	0900	264.12	405.92
299-E25-34	662.87	10/31/89	1050	257.16	405.71
299-E25-35	674.39	10/30/89	1040	269.19	405.20

(a) MSL = mean sea level.
(b) This elevation is the top of the 12-in. protective casing, which was the measuring point used when this measurement was made.

TABLE 10.3. Supplemental Water-Level Data for Wells Near the 216-A-29 Ditch

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E25-10	655.84	11/16/89	1056	250.60	405.24
299-E25-26	668.55	11/16/89	1024	262.87	405.68
299-E25-28	662.44	11/16/89	1116	256.67	405.77
299-E25-32P	669.19	11/16/89	1044	263.33	405.86
		12/13/89	0839	263.59	405.60
299-E25-34	662.87	11/16/89	1108	257.20	405.67
		12/13/89	0854	257.41	405.46
299-E25-35	674.39	11/16/89	1008	269.22	405.17
		12/13/89	0938	269.41	404.98

(a) MSL = mean sea level.

9 2 1 2 6 4 2 1 8 5 1

TABLE 10.4. Constituent List and Summary of Sampling Results for the 216-A-29 Ditch, October Through November 1989

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
191	CONDFLD	UMHO	1	5	0	700	WDOE		Specific conductance
199	PHFIELD		.100	5	0	6.5-8.5	EPAS		pH, Field Measurement
C69	TOC	PPB	2000	5	5 ***	.			Total organic carbon
H42	TOXLDL	PPB	10	5	4	.			Total Organic Halogen, Low Det. Level

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
109	COLIFRM	MPN	2.20	2	2 ***	1	EPA		Coliform bacteria
111	BETA	PCI/L	8	5	0	50	EPA		Gross beta
112	ALPHAHI	PCI/L	4	5	1	15	EPA		Alpha, High Detection Level
181	RADIUM	PCI/L	1	5	4	5	EPA		Radium
A06	BARIUM	PPB	6	5	0	1000	EPA		Barium
A07	CADMIUM	PPB	2	5	5 ***	10	EPA		Cadmium
A08	CHROMUM	PPB	10	5	2	50	EPA	xxx	Chromium
A10	SILVER	PPB	10	5	5 ***	50	EPA		Silver
A20	ARSENIC	PPB	5	5	1	50	EPA		Arsenic
A21	MERCURY	PPB	.100	5	5 ***	2	EPA		Mercury
A22	SELENUM	PPB	5	5	5 ***	10	EPA		Selenium
A33	ENDRIN	PPB	.100	5	5 ***	.200	EPA		Endrin
A34	METHLOR	PPB	3	5	5 ***	100	EPA		Methoxychlor
A35	TOXAENE	PPB	1	5	5 ***	5	EPA		Toxaphene
A36	a-BHC	PPB	.100	5	5 ***	4	EPA		Alpha-BHC
A37	b-BHC	PPB	.100	5	5 ***	4	EPA		Beta-BHC
A38	g-BHC	PPB	.100	5	5 ***	4	EPA		Gamma-BHC
A39	d-BHC	PPB	.100	5	5 ***	4	EPA		Delta-BHC
A51	LEADGF	PPB	5	5	5 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	PPB	500	5	0	45000	EPA		Nitrate
C74	FLUORID	PPB	500	5	4	4000	EPA		Fluoride
H13	2,4-D	PPB	2	5	5 ***	100	EPA		2,4-D
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	5 ***	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	.100	5	5 ***	2	EPA		Mercury, filtered
H39	FSELENI	PPB	5	5	5 ***	10	EPA		Selenium, filtered

TABLE 10.4. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
H41	FLEAD	PPB	5	5	5 ***	50	EPA		Lead, filtered
H60	TURBID	NTU	.100	5	0	1	EPA	xxx	Turbidity
P19	COLIMF	PPB	1	3	3 ***	1	EPA		Coliform (Membrane Filter)

---------- 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	3	50	EPAS		Manganese
A19	IRON	PPB	30	5	0	300	EPAS	xxx	Iron
C57	PHENOL	PPB	10	5	5 ***	.			Phenol
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	5 ***	50	EPAS		Manganese, filtered
H31	FIRON	PPB	30	5	4	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	5 ***	100	EPAR		Cobalt-60
024	CS-137	PCI/L	20	5	5 ***	200	EPAR		Cesium-137
034	RU-106	PCI/L	172.5	5	5 ***	30	EPAR		Ruthenium-106
100	PU39-40	PCI/L	17	5	4	1.20	DOE		Plutonium-239/40
102	PU-238	PCI/L	17	5	5 ***	1.60	DOE		Plutonium-238
104	U	PCI/L	.500	5	0	600	DOE		Uranium
105	AM-241	PCI/L	.100	5	4	30	DOE		Americium-241
108	TRITIUM	PCI/L	500	5	0	20000	EPA	xxx	Tritium
121	SR 90	PCI/L	5	5	5 ***	8	EPA		Strontium-90
A01	BERYLUM	PPB	5	5	5 ***	.			Beryllium
A03	STRONUM	PPB	10	5	0	.			Strontium
A04	ZINC	PPB	5	5	2	5000	EPAS		Zinc
A05	CALCIUM	PPB	50	5	0	.			Calcium
A12	NICKEL	PPB	10	5	2	.			Nickel
A13	COPPER	PPB	10	5	5 ***	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

TABLE 10.4. (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	5	5 ***	.		Phosphate
H16	TC	PPB	1000	5	0	.		Total carbon
H17	TDS		5000	5	0	500000	EPAS	Total dissolved solids
H18	FZINC	PPB	5	5	3	5000	EPAS	Zinc, filtered
H19	FCALCIU	PPB	50	5	0	.		Calcium, filtered
H25	FNICKEL	PPB	10	5	5 ***	.		Nickel, filtered
H26	FCOPPER	PPB	10	5	5 ***	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	10	5	0	.		Strontium, filtered
H36	FANTIMO	PPB	100	5	5 ***	.		Antimony, filtered
H66	BROMIDE	PPB	1000	5	5 ***	.		Bromide
H67	NITRITE	PPB	1000	5	5 ***	.		Nitrite
H86	FBORON	PPB	10	5	3	.		Boron, filtered
H87	FCOBALT	PPB	20	5	5 ***	.		Cobalt, filtered
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	4	.		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
P12	ENDSFAN	PPB	.500	5	5 ***	.		Endosulfan
P13	PHORATE	PPB	2	5	5 ***	.		PHORATE

TABLE 10.4. (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
A23	THALIUM	PPB	5	5	5 ***	.		Thallium
A24	THIOURA	PPB	200	5	5 ***	.		Thiourea
A25	ACETREA	PPB	200	5	5 ***	.		1-acetyl-2-thiourea
A26	CHLOREA	PPB	200	5	5 ***	.		1-(o-chlorophenyl) thiourea
A27	DIETROL	PPB	200	5	5 ***	.		Diethylstilbesterol
A28	ETHYREA	PPB	200	5	5 ***	.		Ethylenethiourea
A29	NAPHREA	PPB	200	5	5 ***	.		1-naphthyl-2-thiourea
A32	PHENREA	PPB	500	5	5 ***	.		N-phenylthiourea
A40	DDD	PPB	.100	5	5 ***	.		DDD
A41	DDE	PPB	.100	5	5 ***	.		DDE
A42	DDT	PPB	.100	5	5 ***	.		DDT
A43	HEPTLOR	PPB	.100	5	5 ***	0	EPAP	Heptachlor
A44	HEPTIDE	PPB	.100	5	5 ***	0	EPAP	Heptchlor epoxide
A45	KEPONE	PPB	1	5	5 ***	.		Kepone
A46	DIELRIN	PPB	.100	5	5 ***	.		Dieldrin
A47	ALDRIN	PPB	.100	5	5 ***	.		Aldrin
A48	CHLOANE	PPB	1	5	5 ***	0	EPAP	Chlordane
A49	ENDO1	PPB	.100	5	5 ***	.		Endosulfan I
A52	ENDO2	PPB	.100	5	5 ***	.		Endosulfan II
A54	AR1016	PPB	1	5	5 ***	0	EPAP	Arochlor 1016
A55	AR1221	PPB	1	5	5 ***	0	EPAP	Arochlor 1221
A56	AR1232	PPB	1	5	5 ***	0	EPAP	Arochlor 1232
A57	AR1242	PPB	1	5	5 ***	0	EPAP	Arochlor 1242
A58	AR1248	PPB	1	5	5 ***	0	EPAP	Arochlor 1248
A59	AR1254	PPB	1	5	5 ***	0	EPAP	Arochlor 1254
A60	AR1260	PPB	1	5	5 ***	0	EPAP	Arochlor 1260
A61	TETRANE	PPB	5	5	5 ***	5	EPA	Carbon Tetrachloride by GC/MS
A62	BENZENE	PPB	5	5	5 ***	5	EPA	Benzene
A63	DIOXANE	PPB	500	5	5 ***	.		Dioxane
A64	METHONE	PPB	10	5	5 ***	.		Methyl ethyl ketone
A65	PYRIDIN	PPB	500	5	5 ***	.		Pyridine
A66	TOLUENE	PPB	5	5	5 ***	2000	EPAP	Toluene
A67	1,1,1-T	PPB	5	5	5 ***	200	EPA	1,1,1-trichloroethane
A68	1,1,2-T	PPB	5	5	5 ***	.		1,1,2-trichloroethane
A69	TRICENE	PPB	5	5	5 ***	5	EPA	Trichloroethylene
A70	PERCENE	PPB	5	5	5 ***	.		Tetrachloroethylene
A71	OPXYLE	PPB	5	5	5 ***	440	EPAP	Xylene-o,p
A72	ACROLIN	PPB	10	5	5 ***	.		Acrolein
A73	ACRYILE	PPB	10	5	5 ***	.		Acrylonitrile
A74	BISTHER	PPB	5	5	5 ***	.		Bis(chloromethyl) ether

TABLE 10.4. (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
A75	BROMONE	PPB	5	5	5 ***	.		Bromoacetone
A76	METHBRO	PPB	10	5	5 ***	.		Methyl bromide
A77	CARBIDE	PPB	10	5	5 ***	.		Carbon disulfide
A78	CHLBENZ	PPB	5	5	5 ***	60	EPAP	Chlorobenzene
A79	CHLTHER	PPB	5	5	5 ***	.		2-chloroethyl vinyl ether
A80	CHLFORM	PPB	5	5	5 ***	100	EPA	Chloroform
A81	METHCHL	PPB	10	5	5 ***	.		Methyl chloride
A82	CHMTHER	PPB	10	5	5 ***	.		Chloromethyl methyl ether
A83	CROTONA	PPB	10	5	5 ***	.		Crotonaldehyde
A84	DIBRCHL	PPB	10	5	5 ***	0	EPAP	1,2-dibromo-3-chloropropane
A85	DIBRETH	PPB	10	5	5 ***	.		1,2-dibromoethane
A86	DIBRMET	PPB	10	5	5 ***	.		Dibromomethane
A87	DIBUTEN	PPB	10	5	5 ***	.		1,4-dichloro-2-butene
A88	DICDIFM	PPB	10	5	5 ***	.		Dichlorodifluoromethane
A89	1,1-DIC	PPB	5	5	5 ***	.		1,1-dichloroethane
A90	1,2-DIC	PPB	5	5	5 ***	5	EPA	1,2-dichloroethane
A91	TRANDCE	PPB	5	5	5 ***	70	EPAP	Trans-1,2-dichloroethene
A92	DICETHY	PPB	10	5	5 ***	7	EPA	1,1-dichloroethylene
A93	METHYCH	PPB	5	5	5 ***	.		Methylene Chloride
A94	DICPANE	PPB	5	5	5 ***	6	EPAP	1,2-dichloropropane
A95	DICPENE	PPB	5	5	5 ***	.		1,3-dichloropropene
A96	NNDIEHY	PPB	10	5	5 ***	.		N,N-diethylhydrazine
A97	1,1-DIM	PPB	10	5	5 ***	.		1,1-dimethylhydrazine
A98	1,2-DIM	PPB	10	5	5 ***	.		1,2-dimethylhydrazine
B01	IODOMET	PPB	10	5	5 ***	.		Iodomethane
B02	METHACR	PPB	10	5	5 ***	.		Methacrylonitrile
B03	METHTHI	PPB	10	5	5 ***	.		Methanethiol
B04	PENTACH	PPB	10	5	5 ***	.		Pentachloroethane
B05	1112-tc	PPB	10	5	5 ***	.		1,1,1,2-tetrachloroethane
B06	1122-tc	PPB	5	5	5 ***	.		1,1,2,2-tetrachloroethane
B08	BROMORM	PPB	5	5	5 ***	100	EPA	Bromoform
B09	TRCMEOL	PPB	10	5	5 ***	.		Trichloromethanethiol
B10	TRCMFLM	PPB	10	5	5 ***	.		Trichloromonofluoromethane
B12	123-trp	PPB	10	5	5 ***	.		1,2,3-trichloropropane
B13	VINYIDE	PPB	10	5	5 ***	2	EPA	Vinyl chloride
B14	M-XYLE	PPB	5	5	5 ***	440	EPAP	Xylene-m
B19	ACETILE	PPB	10	5	5 ***	.		Acetonitrile
B20	ACETOPH	PPB	10	5	5 ***	.		Acetophenone
B21	WARFRIN	PPB	10	5	5 ***	.		Warfarin
B22	ACEFENE	PPB	10	5	5 ***	.		2-acetylaminofluorene
B23	AMINOYL	PPB	10	5	5 ***	.		4-aminobyphenyl
B24	AMIISOX	PPB	10	5	5 ***	.		5-(aminomethyl)-3-isoxazolol
B25	AMITROL	PPB	10	5	5 ***	.		Amitrole
B26	ANILINE	PPB	10	5	5 ***	.		Aniline

TABLE 10.4. (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
B27	ARAMITE	PPB	10	5	5 ***	.		Aramite
B28	AURAMIN	PPB	10	5	5 ***	.		Auramine
B29	BENZCAC	PPB	10	5	5 ***	.		Benz[c]acridine
B30	BENZAAN	PPB	10	5	5 ***	.		Benz[a]anthracene
B31	BENDICM	PPB	10	5	5 ***	.		Benzene, dichloromethyl
B32	BENTHOL	PPB	10	5	5 ***	.		Benzenethoil
B33	BENDINE	PPB	10	5	5 ***	.		Benzidine
B34	BENZBFL	PPB	10	5	5 ***	.		Benzo[b]fluoranthene
B35	BENZJFL	PPB	10	5	5 ***	.		Benzo[j]fluoranthene
B36	PBENZQU	PPB	10	5	5 ***	.		P benzoquinone
B37	BENZCHL	PPB	10	5	5 ***	.		Benzyl chloride
B38	BIS2CHM	PPB	10	5	5 ***	.		Bis(2-chloroethoxy) methane
B39	BIS2CHE	PPB	10	5	5 ***	.		Bis(2-chloroethyl) ether
B40	BIS2EPH	PPB	10	5	5 ***	.		Bis(2-ethylhexyl) phthalate
B41	BROPHEN	PPB	10	5	5 ***	.		4-bromophenyl phenyl ether
B42	BUTBENP	PPB	10	5	5 ***	.		Butyl benzyl phthalate
B43	BUTDINP	PPB	10	5	5 ***	.		2-sec-butyl-4,6-dinitrophenol
B44	CHALETH	PPB	10	5	5 ***	.		Chloroalkyl ethers
B45	CHLANIL	PPB	10	5	5 ***	.		P-chloroaniline
B46	CHLCRES	PPB	10	5	5 ***	.		P-chloro-m-cresol
B47	CHLEPOX	PPB	10	5	5 ***		0 EPAP	1-chloro-2,3-epoxypropane
B48	CHLNAPH	PPB	10	5	5 ***	.		2-chloronaphthalene
B49	CHLPHEN	PPB	10	5	5 ***	.		2-chlorophenol
B50	CHRYSEN	PPB	10	5	5 ***	.		Chrysene
B51	CRESOLS	PPB	10	5	5 ***	.		Cresols
B52	CYCHDIN	PPB	10	5	5 ***	.		2-cyclohexyl-4,6-dinitrophenol
B53	DIBAHAC	PPB	10	5	5 ***	.		Dibenz[a,h]acridine
B54	DIBAJAC	PPB	10	5	5 ***	.		Dibenz[a,j]acridine
B55	DIBAHAN	PPB	10	5	5 ***	.		Dibenz[a,h]anthracene
B56	DIBCGCA	PPB	10	5	5 ***	.		7H-dibenzo[c,g]carbazole
B57	DIBAEPY	PPB	10	5	5 ***	.		Dibenzo[a,e]pyrene
B58	DIBAHPY	PPB	10	5	5 ***	.		Dibenzo[a,h]pyrene
B59	DIBAIPY	PPB	10	5	5 ***	.		Dibenzo[a,i]pyrene
B60	DIBPHTH	PPB	10	5	5 ***	.		Di-n-butyl phthalate
B61	12-dben	PPB	10	5	5 ***	.		1,2-dichlorobenzene
B62	13-dben	PPB	10	5	5 ***	.		1,3-dichlorobenzene
B63	14-dben	PPB	10	5	5 ***		75 EPA	p-Dichlorobenzene
B64	DICHBEN	PPB	10	5	5 ***	.		3,3'-dichlorobenzidine
B65	24-dchp	PPB	10	5	5 ***	.		2,4-dichlorophenol
B66	26-dchp	PPB	10	5	5 ***	.		2,6-dichlorophenol
B67	DIEPHTH	PPB	10	5	5 ***	.		Diethyl phthalate
B68	DIHYSAF	PPB	10	5	5 ***	.		Dihydrosafrole
B69	DIMETHB	PPB	10	5	5 ***	.		3,3'-dimethoxybenzidine
B70	DIMEAMB	PPB	10	5	5 ***	.		P-dimethylaminoazobenzene

TABLE 10.4. (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
B71	DIMBENZ	PPB	10	5	5 ***	.		7,12-dimethylbenz[a]anthracene
B72	DIMEYLB	PPB	10	5	5 ***	.		3,3'-dimethylbenzidine
B73	THIONOX	PPB	10	5	5 ***	.		Thiofanox
B74	DIMPHAM	PPB	10	5	5 ***	.		Alpha,alpha-dimethylphenethylamine
B76	DIMPHTH	PPB	10	5	5 ***	.		Dimethyl phthalate
B77	DINBENZ	PPB	10	5	5 ***	.		Dinitrobenzene
B78	DINCRES	PPB	10	5	5 ***	.		4,6-dinitro-o-cresol and salts
B79	DINPHEN	PPB	10	5	5 ***	.		2,4-dinitrophenol
B80	24-dint	PPB	10	5	5 ***	.		2,4-dinitrotoluene
B81	26-dint	PPB	10	5	5 ***	.		2,6-dinitrotoluene
B82	DIOPHTH	PPB	10	5	5 ***	.		Di-n-octyl phthalate
B83	DIPHAMI	PPB	10	5	5 ***	.		Diphenylamine
B84	DIPHHYD	PPB	10	5	5 ***	.		1,2-diphenylhydrazine
B85	DIPRNIT	PPB	10	5	5 ***	.		Di-n-propylnitrosamine
B86	ETHMINE	PPB	10	5	5 ***	.		Ethyleneimine
B87	ETHMETS	PPB	10	5	5 ***	.		Ethyl methanesulfonate
B88	FLUORAN	PPB	10	5	5 ***	.		Fluoranthene
B89	HEXCBEN	PPB	10	5	5 ***	.		Hexachlorobenzene
B90	HEXCBUT	PPB	10	5	5 ***	.		Hexachlorobutadiene
B91	HEXCCYC	PPB	10	5	5 ***	.		Hexachlorocyclopentadiene
B92	HEXCETH	PPB	10	5	5 ***	.		Hexachloroethane
B93	INDENOP	PPB	10	5	5 ***	.		Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	PPB	10	5	5 ***	.		Isosafrole
B95	MALOILE	PPB	10	5	5 ***	.		Malononitrile
B96	MELPHAL	PPB	10	5	5 ***	.		Melphalan
B97	METHAPY	PPB	10	5	5 ***	.		Methapyrilene
B98	METHNYL	PPB	10	5	5 ***	.		Metholonyl
B99	METAZIR	PPB	10	5	5 ***	.		2-methylaziridine
C01	METCHAN	PPB	10	5	5 ***	.		3-methylcholanthrene
C02	METBISC	PPB	10	5	5 ***	.		4,4'-methylenebis(2-chloroaniline)
C03	METACTO	PPB	10	5	5 ***	.		2-methyllactonitrile
C04	METACRY	PPB	10	5	5 ***	.		Methyl methacrylate
C05	METMSUL	PPB	10	5	5 ***	.		Methyl methanesulfonate
C06	METPROP	PPB	10	5	5 ***	.		2-methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	PPB	10	5	5 ***	.		Methylthiouracil
C08	NAPHQUI	PPB	10	5	5 ***	.		1,4-naphthoquinone
C09	1-napha	PPB	10	5	5 ***	.		1-naphthylamine
C10	2-napha	PPB	10	5	5 ***	.		2-naphthylamine
C11	NITRANI	PPB	10	5	5 ***	.		P-nitroaniline
C12	NITBENZ	PPB	10	5	5 ***	.		Nitrobenzine
C13	NITPHEN	PPB	10	5	5 ***	.		p-Nitrophenol
C14	NNIBUTY	PPB	10	5	5 ***	.		N-nitrosodi-n-butylamine
C15	NNIDIEA	PPB	10	5	5 ***	.		N-nitrosodiethanolamine
C16	NNIDIEY	PPB	10	5	5 ***	.		N-nitrosodiethylamine

TABLE 10.4. (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
C17	NNIDIME	PPB	10	5	5 ***	.		N-nitrosodimethylamine
C18	NNIMETH	PPB	10	5	5 ***	.		N-nitrosomethylethylamine
C19	NNIURET	PPB	10	5	5 ***	.		N-nitroso-N-methylurethane
C20	NNIVINY	PPB	10	5	5 ***	.		N-nitrosomethylvinylamine
C21	NNIMORP	PPB	10	5	5 ***	.		N-nitrosomorpholine
C22	NNINICO	PPB	10	5	5 ***	.		N-nitrosonornicotine
C23	NNIPIPE	PPB	10	5	5 ***	.		N-nitrosopiperidine
C24	NITRPYR	PPB	10	5	5 ***	.		Nitrosopyrrolidine
C25	NITRTOL	PPB	10	5	5 ***	.		5-nitro-o-toluidine
C26	PENTCHB	PPB	10	5	5 ***	.		Pentachlorobenzene
C27	PENTCHN	PPB	10	5	5 ***	.		Pentachloronitrobenzene
C28	PENTCHP	PPB	50	5	5 ***	220	EPAP	Pentachlorophenol
C29	PHENTIN	PPB	10	5	5 ***	.		Phenacetin
C30	PHENINE	PPB	10	5	5 ***	.		Phenylenediamine
C31	PHTHEST	PPB	10	5	5 ***	.		Phthalic acid esters
C32	PICOLIN	PPB	10	5	5 ***	.		2-picoline
C33	PRONIDE	PPB	10	5	5 ***	.		Pronamide
C34	RESERPI	PPB	10	5	5 ***	.		Reserpine
C35	RESORCI	PPB	10	5	5 ***	.		Resorcinol
C36	SAFROL	PPB	10	5	5 ***	.		Safrol
C37	TETRCHB	PPB	10	5	5 ***	.		1,2,4,5-tetrachlorobenzene
C39	TETRCHP	PPB	10	5	5 ***	.		2,3,4,6-tetrachlorophenol
C40	THIURAM	PPB	10	5	5 ***	.		Thiuram
C41	TOLUDIA	PPB	10	5	5 ***	.		Toluenediamine
C42	OTOLHYD	PPB	10	5	5 ***	.		O-toluidine hydrochloride
C43	TRICHLB	PPB	10	5	5 ***	.		1,2,4-trichlorobenzene
C44	245-trp	PPB	10	5	5 ***	.		2,4,5-trichlorophenol
C45	246-trp	PPB	10	5	5 ***	.		2,4,6-trichlorophenol
C46	TRIPHOS	PPB	10	5	5 ***	.		O,O,O-triethyl phosphorothioate
C47	SYMTRIN	PPB	10	5	5 ***	.		Sym-trinitrobenzene
C48	TRISPHO	PPB	10	5	5 ***	.		Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	PPB	10	5	5 ***	.		Benzo[a]pyrene
C50	CHLNAPZ	PPB	10	5	5 ***	.		Chlornaphazine
C51	BIS2ETH	PPB	10	5	5 ***	.		Bis(2-chloroisopropyl)ether
C52	HEXAENE	PPB	10	5	5 ***	.		Hexachloropropene
C54	HEXACHL	PPB	10	5	5 ***	.		Hexachlorophene
C55	NAPHTHA	PPB	10	5	5 ***	.		Naphthalene
C56	123TRI	PPB	10	5	5 ***	.		1,2,3-trichlorobenzene
C58	135TRI	PPB	10	5	5 ***	.		1,3,5-trichlorobenzene
C59	1234TE	PPB	10	5	5 ***	.		1,2,3,4-tetrachlorobenzene
C60	1235TE	PPB	10	5	5 ***	.		1,2,3,5-tetrachlorobenzene
C61	TETEPYR	PPB	2	5	5 ***	.		Tetraethylpyrophosphate
C62	CHLLATE	PPB	300	5	5 ***	.		Chlorobenzilate
C63	CARBPHT	PPB	2	5	5 ***	.		Carbophenothion

TABLE 10.4. (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
C64	DISULFO	PPB	2	5	5 ***	.		Disulfoton
C65	DIMETHO	PPB	2	5	5 ***	.		Dimethoate
C66	METHPAR	PPB	2	5	5 ***	.		Methyl parathion
C67	PARATHI	PPB	2	5	5 ***	.		Parathion
C70	CYANIDE	PPB	10	5	5 ***	.		Cyanide
C71	FORMALN	PPB	500	5	5 ***	.		Formalin
C77	PERCHLO	PPB	500	5	5 ***	.		Perchlorate
C78	SULFIDE	PPB	1000	5	5 ***	.		Sulfide
C79	KEROSEN	PPB	10000	5	5 ***	.		Kerosene
C80	AMMONIU	PPB	50	5	5 ***	.		Ammonium ion
C87	CITRUSR	PPB	1000	5	5 ***	.		Citrus red
C90	PARALDE	PPB	10000	5	5 ***	.		Paraldehyde
C91	STRYCHN	PPB	50	5	5 ***	.		Strychnine
C92	MALHYDR	PPB	500	5	5 ***	.		Maleic hydrizide
C93	NICOTIN	PPB	100	5	5 ***	.		Nicotinic acid
C94	ACRYIDE	PPB	10000	5	5 ***		0 EPAP	Acrylamide
C95	ALLYLAL	PPB	10000	5	5 ***	.		Allyl alcohol
C98	CHLPROP	PPB	10000	5	5 ***	.		3-chloropropionitrile
D01	PCDD's	PPB	.0100	5	5 ***	.		Pcdd's
D02	PCDF's	PPB	.0100	5	5 ***	.		Pcdf's
D03	2378TCD	PPB	.0100	5	5 ***	.		2,3,7,8 TCDD
H03	ETHCARB	PPB	10000	5	5 ***	.		Ethyl carbamate
H04	ETHCYAN	PPB	10000	5	5 ***	.		Ethyl cyanide
H05	ETHOXID	PPB	10	5	5 ***	.		Ethylene oxide
H06	ETHMETH	PPB	10	5	5 ***	.		Ethyl methacrylate
H09	ISOBUTY	PPB	10000	5	5 ***	.		Isobutyl alcohol
H11	PROPYLA	PPB	10000	5	5 ***	.		N-propylamine
H12	PROPYNO	PPB	10000	5	5 ***	.		2-propyn-1-ol
H15	2,4,5-T	PPB	2	5	5 ***	.		2,4,5-T
H40	FTHALLI	PPB	5	5	5 ***	.		Thallium, filtered
H62	LHYDRAZ	PPB	30	5	5 ***	.		Hydrazine, Low Detection Level
H68	HEXONE	PPB	10	5	5 ***	.		Methyl Isobutyl Ketone
I01	ACETONE	PPB	10	5	5 ***	.		Acetone by VOA
I06	ISOPHER	PPB	10	5	5 ***	.		Isopherone
I09	BUTANOL	PPB	10000	5	5 ***	.		1-Butanol
I21	TRIBUPH	PPB	10	5	5 ***	.		Tributylphosphoric Acid
I28	TAF	PPB	10	5	5 ***	.		Tetrahydrofuran
I29	ACENAPH	PPB	10	5	5 ***	.		Acenaphthene
I30	FLRENE	PPB	10	5	5 ***	.		Fluorene
I31	ANTHRA	PPB	10	5	5 ***	.		Anthracene
I32	PYRENE	PPB	10	5	5 ***	.		Pyrene
I33	ETHBENZ	PPB	5	5	5 ***	680	EPAP	Ethyl benzene
I34	STYRENE	PPB	5	5	5 ***	140	EPAP	Styrene
I42	BDCM	PPB	5	5	5 ***	100	EPA	Bromodichloromethane

TABLE 10.4. (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
I43	CDBM	PPB	5	5	5 ***	100	EPA	Chlorodibromomethane
I64	2NITPH	PPB	10	5	5 ***	.		o-Nitrophenol
I67	ETHANOL	PPB	10000	5	5 ***	.		Ethanol
I75	2MENAPH	PPB	10	5	5 ***	.		2-Methylnaphthalene
I82	PHENANT	PPB	10	5	5 ***	.		Phenanthrene
J43	BENZALC	PPB	10	5	5 ***	.		Benzyl Alcohol
J69	2HEXANO	PPB	50	5	5 ***	.		2-Hexanone
J71	BNZKFLU	PPB	10	5	5 ***	.		Benzo(k)Fluoranthene
J83	BGHIPER	PPB	10	5	5 ***	.		Benzo(Ghi)Perylene
J89	DINOSEB	PPB	10	5	5 ***	.		Dinoseb
J91	DIALLAT	PPB	10	5	5 ***	.		Diallate
K52	NNDIPHA	PPB	10	5	5 ***	.		N-NITROSODIPHENYLAMINE
K56	DIBENFR	PPB	10	5	5 ***	.		DIBENZOFURAN
K58	ACENATL	PPB	10	5	5 ***	.		ACENAPHTHYLENE
L20	MBP	PPB	10000	5	5 ***	.		Monobutyl Phosphate
L21	DBP	PPB	10000	5	5 ***	.		Dibutyl Phosphate
L45	ALLYLCL	PPB	100	5	5 ***	.		Allyl Chloride
L46	CLETHAN	PPB	10	5	5 ***	.		Chloroethane
L48	PROPCN	PPB	5	5	5 ***	.		Propionitrile
L49	VINYLAC	PPB	5	5	5 ***	.		Vinyl Acetate
L50	B2CLMEE	PPB	10	5	5 ***	.		Bis(2-chloro-1-methylethyl)ether
L52	DIPHOS	PPB	10	5	5 ***	.		0,0-Diethyl-0,2-pyrazinyl phosphorothion
L53	ISODRIN	PPB	10	5	5 ***	.		Isodrin
L54	ONITANI	PPB	10	5	5 ***	.		o-Nitroaniline
L55	MNITANI	PPB	10	5	5 ***	.		m-Nitroaniline
L56	4NITQUI	PPB	10	5	5 ***	.		4-Nitroquinoline 1-oxide
L57	ETHGLYC	PPB	10000	5	5 ***	.		Ethylene Glycol
L59	1PROPAN	PPB	10000	5	5 ***	.		1-Propanol
L60	1BUTYN	PPB	10000	5	5 ***	.		1-Butynol
L62	ACETONE	PPB	10	5	5 ***	.		Acetone - by ABN
L63	14DBEN	PPB	5	5	5 ***	75	EPA	p-Dichlorobenzene
L64	CHLROB	PPB	10	5	5 ***	60	EPAP	Chlorobenzene (by ABN)

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 10.5. Constituents with at Least One Detected Value for the 216-A-29 Ditch, October Through November 1989

			Contamination Indicator Parameters			
Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
2-E25-26	01NOV89		188	8.26	#800	16
2-E25-28	27OCT89		191	7.97	#600	#4
2-E25-32P	31OCT89		166	7.01	#800	#4
2-E25-34	31OCT89		198	7.68	#700	#2
2-E25-35	30OCT89		682	7.77	#800	#3

TABLE 10.5. (contd)

Regular Monitoring Data

Well name	Collection date	Duplicate sample number	FLUORID PPB 500/4000	FPOTASS PPB 100/.	FSTRONT PPB 10/.	ALPHAHI PCI/L 4/15	AM-241 PCI/L .10/30d	ARSENIC PPB 5/50	FARSENI PPB 5/50	BARIUM PPB 8/1000
2-E25-26	01NOV89		<500	4200	110	1.14	*.00128	6	7	12
2-E25-28	27OCT89		<500	3610	99	1.06	*0	9	8	13
2-E25-32P	31OCT89		<500	4060	115	*.213	*.00272	<5	<5	13
2-E25-34	31OCT89		<500	4190	121	1.98	.0241	8	8	20
2-E25-35	30OCT89		700	5420	307	1.91	*.00741	10	10	30

Well name	Collection date	Duplicate sample number	FBARIUM PPB 8/1000	BETA PCI/L 8/50	BORON PPB 10/.	FBORON PPB 10/.	CALCIUM PPB 50/.	FCALCIU PPB 50/.	CHLORID PPB 500/250000s	CHROMUM PPB 10/50
2-E25-26	01NOV89		12	3.02	<10	22	20100	19600	2900	<10
2-E25-28	27OCT89		13	14.1	<10	<10	17700	17600	3100	<10
2-E25-32P	31OCT89		13	2.62	<10	<10	17200	19300	2900	33
2-E25-34	31OCT89		20	4.66	<10	<10	20900	21600	3100	76
2-E25-35	30OCT89		29	9.38	19	37	51800	55800	6900	38

Well name	Collection date	Duplicate 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/.	MANGESE PPB 5/50s	NICKEL PPB 10/.
2-E25-26	01NOV89		*-0.379	*2	78	<30	5560	5400	<5	<10
2-E25-28	27OCT89		*-3.46	*-4.52	38	<30	5490	5440	<5	<10
2-E25-32P	31OCT89		*-2.03	*3.51	196	<30	5060	5570	<5	22
2-E25-34	31OCT89		*-7.05	*-2.73	385	<30	6130	6260	9	39
2-E25-35	30OCT89		*-0.355	*-0.662	244	40	20000	21400	9	17

Well name	Collection date	Duplicate sample number	NITRATE PPB 500/45000	POTASUM PPB 100/.	PU-238 PCI/L 17/1.6d	PU39-40 PCI/L 17/1.2d	RADIUM PCI/L 1/5	RU-106 PCI/L 172.5/30r	SILICON PPB 50/.	FSILICO PPB 50/.
2-E25-26	01NOV89		1100	4350	*-0.00144	*.00431	*-0.00775	*-1.01	13500	13000
2-E25-28	27OCT89		1600	3670	*-0.00144	*.00168	*-0.00975	*6.97	16000	15900
2-E25-32P	31OCT89		1100	3710	*-0.00484	*-0.000165	*.00330	*-17	9710	10900
2-E25-34	31OCT89		1200	4200	*-0.00499	*-0.000165	*.00139	*-29.7	15700	16300
2-E25-35	30OCT89		6800	5280	*-0.00397	.0125	.379	*4.60	17300	18900

Well name	Collection date	Duplicate sample number	SODIUM PPB 200/.	FSODIUM PPB 200/.	SR 90 PCI/L 5/8	STRONUM PPB 10/.	SULFATE PPB 500/250000s	TC PPB 1000/.	TDS 5000/500000s	TRITIUM PCI/L 500/20
2-E25-26	01NOV89		9060	8790	*-0.245	113	12900	18900	95000	2730

TABLE 10.5. (contd)

Well name	Collection date	Duplicate sample number	SODIUM PPB 200/.	FSODIUM PPB 200/.	SR 90 PCI/L 5/8	STRONUM PPB 10/.	SULFATE PPB 500/250000s	TC PPB 1000/.	TDS 5000/500000s	TRITIUM PCI/L 500/20
2-E25-28	27OCT89		9780	9700	*-0.143	99	12500	19000	129000	1350
2-E25-32P	31OCT89		5390	5870	*-0.192	104	11700	17100	25000	1040
2-E25-34	31OCT89		9500	9590	*-0.534	119	12600	20000	117000	1570
2-E25-35	30OCT89		45000	45900	*.000982	297	19000	33700	444000	60300

Well name	Collection date	Duplicate sample number	TURBID NTU .10/1	U PCI/L .50/600d	VANADUM PPB 5/.	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000s
2-E25-26	01NOV89		.200	1.04	24	19	15	5
2-E25-28	27OCT89		.200	.925	37	38	16	12
2-E25-32P	31OCT89		.700	.683	13	14	<5	<5
2-E25-34	31OCT89		.800	.832	35	34	<5	<5
2-E25-35	30OCT89		2.30	2.56	20	23	6	<5

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
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 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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

11.0 216-A-36B CRIB

S. P. Luttrell
Pacific Northwest Laboratory

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

The 216-A-36B Crib is located in the 200-East Area in the central portion of the Hanford Site (Figure 1.1). It 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 Plutonium-Uranium Extraction (PUREX) Plant from September 1965 to 1972. After 10 years of retirement, the crib was reactivated from November 1982 until October 1987 with the same waste stream as before. It has not been used since 1987.

Five monitoring wells, installed in 1988, and two pre-existing wells near the crib make up the ground-water monitoring system (see Figure 11.1). Well 299-E17-17 is the upgradient monitoring well; wells 299-E17-5, 299-E17-9, 299-E17-14, 299-E17-15, 299-E17-16, and 299-E17-18 are the downgradient monitoring wells. Because of its long (~150-ft) perforated interval, well 299-E17-6 is used only to characterize the ground-water chemistry and is not used to determine water potentials or for statistical comparisons against background. Comparison of ground-water analyses from this well and nearby well 299-E17-18, completed in the upper 15 ft of the aquifer, provides an indication of the vertical extent of contaminants in the aquifer. Well 299-E17-10 will be sampled after remediation is complete. Also, water levels are measured at nearby well 299-E17-13. The sampling schedule for the wells in the monitoring network for the 216-A-36B Crib is shown in Table 11.1.

9 2 1 2 6 4 2 1 8 6 5

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

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

WATER LEVELS

Supplemental water-level measurements were made on December 21, 1989 (Table 11.2), in all the wells except 299-E17-15, in which the water level could not be measured because of difficulty lowering the steel tape into the well.

WATER CHEMISTRY DATA

A set of ground-water samples was collected last quarter, and the results are presented and summarized in this report. Analytical results are summarized in Table 11.3. Results for constituents with at least one detected value are provided in Table 11.4.

Major observations from sample analyses are as follows:

- Nitrate exceeded the 40 CFR 265, Appendix III, screening level of 45,000 ppb in wells 299-E17-5 (76,000 ppb), 299-E17-6 (82,000 ppb), 299-E17-9 (109,000 ppb), 299-E17-14 (165,000 ppb), 299-E17-15 (354,000 ppb), and 299-E17-17 (53,000 ppb). These results are lower than for the previous quarter, with the exception of those for well 299-E17-15, which have increased from the previous quarter.

- Total beta was reported as 126 pCi/L in well 299-E17-14, 456 pCi/L in well 299-E17-15, and 93.8 pCi/L in well 299-E17-17. All results exceeded the 40 CFR 265, Appendix III, screening level of 50 pCi/L. These results are all lower than the results from the previous quarter.

- Tritium was reported as 1,230,000 pCi/L in well 299-E17-5, 3,710,000 pCi/L in well 299-E17-9, 264,000 pCi/L in well 299-E17-14, 1,300,000 pCi/L in well 299-E17-15, 27,400 pCi/L in well 299-E17-16, 201,000 pCi/L in well 299-E17-17, and 36,400 pCi/L and 35,600 pCi/L in well 299-E17-18 (duplicate samples were collected from this well). All results exceeded the 40 CFR 141 standard of 20,000 pCi/L for tritium.

- Ruthenium-106 was reported as 65.5 pCi/L in well 299-E17-14, 257 pCi/L in well 299-E17-15, and 58.1 pCi/L in well 299-E17-16. These results exceeded the EPA (1976) standard of 30 pCi/L for ruthenium-106.

Background statistics and critical mean values were calculated for the 216-A-36B Crib last quarter and were presented in the previous quarterly report using data collected from the first through fourth quarters. The background statistics have been recalculated using the second through fifth quarters because the data from the first quarter may not represent true ground-water conditions. The revised background statistics are presented in Table 11.5. The replicate averages of the indicator parameters for samples collected in September 1989 are presented in Table 11.6. These data were statistically compared against background, and none of the indicator parameters for any of the wells had a statistical increase (or pH decrease) over background.

9 2 1 2 6 4 2 1 8 6 7

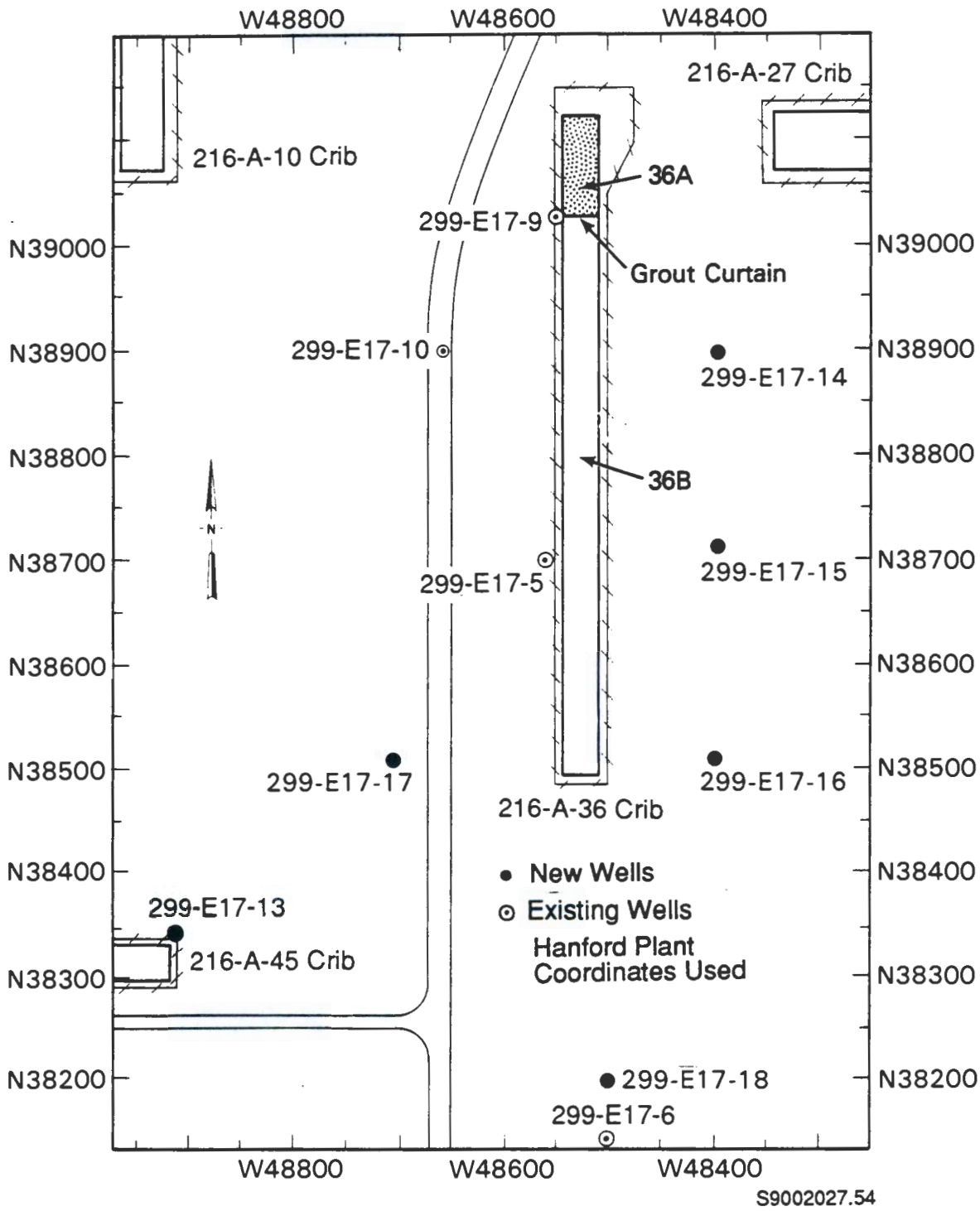

FIGURE 11.1. Monitoring Well Locations for the 216-A-36B Crib

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

	1989[a]			1990								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E17-5				X						X		
299-E17-6				S						S		
299-E17-9				X						X		
299-E17-10[b]				-						-		
299-E17-14				X						X		
299-E17-15				X						X		
299-E17-16				X						X		
299-E17-17				XRV						X		
299-E17-18				X						X		

(a) The following notations are used in this table:
R = sampled for quality control replicates.
S = sampled for the short list of constituents (overlap with another project).
V = sampled for volatile organic analyses blanks.
X = sampled for the regular list of constituents (Table 11.3).

(b) Planned, pending remediation.

9 2 1 2 6 4 2 1 8 6 9

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

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E17-5	718.69	12/21/89	1014	314.68	404.01
299-E17-6	720.10	12/21/89	1258	315.55	404.55
299-E17-9	717.64	12/21/89	1124	313.31	404.33
299-E17-10	714.74	12/21/89	1216	310.13	404.61
299-E17-13	719.25	12/21/89	1226	314.78	404.47
299-E17-14	722.18	12/21/89	1203	317.55	404.63
299-E17-15	721.78	NM[b]	--	--	--
299-E17-16	720.58	12/21/89	1135	316.21	404.37
299-E17-17	719.92	12/21/89	1236	315.44	404.48
299-E17-18	720.65	12/21/89	1248	316.02	404.63

(a) MSL = mean sea level.
(b) NM = no measurement could be made.

TABLE 11.3. Constituent List and Summary of Sampling Results for the 216-A-36B Crib, September 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	Conductivity, Laboratory
191	CONDFLD	UMHO	1	32	0	700	WDOE		Specific conductance
199	PHFIELD		.100	32	0	6.5-8.5	EPAS		pH, Field Measurement
207	PH-LAB		.0100	8	0	6.5-8.5	EPAS		pH, Laboratory Measurement
C69	TOC	PPB	2000	32	32 ***	.			Total organic carbon
H42	TOXLDL	PPB	10	32	29	.			Total Organic Halogen, Low Det. Level

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
111	BETA	PCI/L	8	9	0	50	EPA	xxx	Gross beta
112	ALPHAHI	PCI/L	4	9	0	15	EPA		Alpha, High Detection Level
181	RADIUM	PCI/L	1	8	2	5	EPA		Radium
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	.100	9	9 ***	2	EPA		Mercury
A22	SELENUM	PPB	5	9	8	10	EPA		Selenium
A33	ENDRIN	PPB	.100	8	8 ***	.200	EPA		Endrin
A34	METHLOR	PPB	3	8	8 ***	100	EPA		Methoxychlor
A35	TOXAENE	PPB	1	8	8 ***	5	EPA		Toxaphene
A36	a-BHC	PPB	.100	8	8 ***	4	EPA		Alpha-BHC
A37	b-BHC	PPB	.100	8	8 ***	4	EPA		Beta-BHC
A38	g-BHC	PPB	.100	8	8 ***	4	EPA		Gamma-BHC
A39	d-BHC	PPB	.100	8	8 ***	4	EPA		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	2	4000	EPA		Fluoride
H13	2,4-D	PPB	2	8	8 ***	100	EPA		2,4-D
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	9 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	PPB	10	9	9 ***	50	EPA		Chromium, filtered
H23	FSILVER	PPB	10	9	9 ***	50	EPA		Silver, filtered
H37	FARSENI	PPB	5	9	1	50	EPA		Arsenic, filtered
H38	FMERCUR	PPB	.100	9	9 ***	2	EPA		Mercury, filtered

TABLE 11.3. (contd)

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

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
H39	FSELENI	PPB	5	9	9 ***	10	EPA		Selenium, filtered
H41	FLEAD	PPB	5	9	9 ***	50	EPA		Lead, filtered
H60	TURBID	NTU	.100	8	0	1	EPA	xxx	Turbidity
P19	COLIMF	PPB	1	8	8 ***	1	EPA		Coliform (Membrane Filter)

---------- 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	9	0	.			Sodium
A17	MANGESE	PPB	5	9	6	50	EPAS	xxx	Manganese
A19	IRON	PPB	30	9	1	300	EPAS		Iron
C73	SULFATE	PPB	500	9	0	250000	EPAS		Sulfate
C75	CHLORID	PPB	500	9	0	250000	EPAS		Chloride
H24	FSODIUM	PPB	200	9	0	.			Sodium, filtered
H29	FMANGAN	PPB	5	9	7	50	EPAS	xxx	Manganese, filtered
H31	FIRON	PPB	30	9	8	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 Water Standards Standard	Agency	Exceeded	Full Name
010	CO-60	PCI/L	22.5	8	4	100	EPAR		Cobalt-60
024	CS-137	PCI/L	20	8	8 ***	200	EPAR		Cesium-137
034	RU-106	PCI/L	172.5	8	5	30	EPAR	xxx	Ruthenium-106
108	TRITIUM	PCI/L	500	8	0	20000	EPA	xxx	Tritium
A01	BERYLUM	PPB	5	9	9 ***	.			Beryllium
A03	STRONUM	PPB	10	9	0	.			Strontium
A04	ZINC	PPB	5	9	1	5000	EPAS		Zinc
A05	CALCIUM	PPB	50	9	0	.			Calcium
A12	NICKEL	PPB	10	9	3	.			Nickel
A13	COPPER	PPB	10	9	7	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	1	5000	EPAS		Zinc, filtered
H19	FCALCIU	PPB	50	9	0	.			Calcium, filtered

TABLE 11.3. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full Name
H25	FNICKEL	PPB	10	9	7	.		Nickel, filtered
H26	FCOPPER	PPB	10	9	7	1300	EPAP	Copper, filtered
H27	FVANADI	PPB	5	9	1	.		Vanadium, filtered
H28	FALUMIN	PPB	150	9	9 ***	.		Aluminum, filtered
H30	FPOTASS	PPB	100	9	0	.		Potassium, filtered
H32	FMAGNES	PPB	50	9	0	.		Magnesium, filtered
H33	FBERYLL	PPB	5	9	9 ***	.		Beryllium, filtered
H35	FSTRONT	PPB	10	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 ----------

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full Name
C80	AMMONIU	PPB	50	8	8 ***	.		Ammonium ion
H15	2,4,5-T	PPB	2	8	8 ***	.		2,4,5-T

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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, September 1989

Contamination Indicator Parameters

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
2-E17-5	21SEP89		394	386	8	7.87	#500	#-1
	21SEP89	1	392	.	.	7.87	#600	#3
	21SEP89	2	389	.	.	7.87	#800	#1
	21SEP89	3	389	.	.	7.88	#700	#3
2-E17-6	25SEP89		434	453	7.80	7.47	#900	#1
	25SEP89	1	434	.	.	7.45	#900	#2
	25SEP89	2	438	.	.	7.43	#400	#5
	25SEP89	3	437	.	.	7.47	#700	#5
2-E17-9	28SEP89		490	504	7.90	7.98	#600	11
	28SEP89	1	481	.	.	7.96	#600	#6
	28SEP89	2	481	.	.	7.95	#500	#3
	28SEP89	3	481	.	.	7.96	#500	#7
2-E17-14	27SEP89		560	571	7.70	7.39	#700	#.0100
	27SEP89	1	562	.	.	7.39	#600	#5
	27SEP89	2	562	.	.	7.38	#700	#3
	27SEP89	3	560	.	.	7.37	#1000	#.0100
2-E17-15	21SEP89		672	834	7.90	7.60	#700	12
	21SEP89	1	675	.	.	7.60	#700	13
	21SEP89	2	673	.	.	7.60	#600	#6
	21SEP89	3	674	.	.	7.61	#600	#9
2-E17-16	25SEP89		370	390	7.90	7.43	#600	#8
	25SEP89	1	362	.	.	7.48	#800	#.0100
	25SEP89	2	359	.	.	7.47	#800	#1
	25SEP89	3	363	.	.	7.47	#900	#1
2-E17-17	21SEP89		343	347	7.70	7.64	#900	#5
	21SEP89	1	342	.	.	7.64	#700	#7
	21SEP89	2	342	.	.	7.63	#700	#9
	21SEP89	3	343	.	.	7.64	#600	#8
2-E17-18	27SEP89		257	260	8	7.79	#1400	#1
	27SEP89	1	257	.	.	7.76	#900	#3
	27SEP89	2	256	.	.	7.78	#700	#3
	27SEP89	3	255	.	.	7.78	#700	#-2

TABLE 11.4. (contd)

Regular Monitoring Data

Well name	Collection date	Duplicate sample number	FLUORID PPB 500/4000	FMANGAN PPB 5/50s	FPOTASS PPB 100/.	FSTRONT PPB 10/.	ALPHAHI PCI/L 4/15	ARSENIC PPB 5/50	FARSENI PPB 5/50	BARIUM PPB 6/1000
2-E17-5	21SEP89		600	<5	6210	201	2.18	7	7	37
2-E17-6	25SEP89		<500	54	7470	251	1.15	<5	<5	82
2-E17-9	28SEP89		700	<5	7220	286	2.85	13	9	62
2-E17-14	27SEP89		700	6	6390	323	3.62	7	6	48
2-E17-15	21SEP89		<1000	<5	8030	445	6.18	7	7	57
2-E17-16	25SEP89		500	<5	5850	180	4.07	11	9	31
2-E17-17	21SEP89		600	<5	6040	187	5.24	7	6	43
2-E17-18	27SEP89		500	<5	4560	114	1.17	11	10	35
	27SEP89	1	500	<5	4690	118	2.79	10	9	30

Well name	Collection date	Duplicate sample number	FBARIUM PPB 6/1000	BETA PCI/L 8/50	BORON PPB 10/.	FBORON PPB 10/.	CALCIUM PPB 50/.	FCALCIU PPB 50/.	CHLORID PPB 500/250000s	CHROMUM PPB 10/50
2-E17-5	21SEP89		36	46.7	17	18	35600	34900	3900	<10
2-E17-6	25SEP89		78	37.9	22	18	40700	38800	3600	<10
2-E17-9	28SEP89		65	20.9	29	28	45300	47400	5800	<10
2-E17-14	27SEP89		50	126	17	20	54400	54800	4100	18
2-E17-15	21SEP89		70	456	17	18	70700	90400	4000	29
2-E17-16	25SEP89		30	20	15	23	34600	34200	11100	33
2-E17-17	21SEP89		41	93.8	16	17	30100	29500	3800	31
2-E17-18	27SEP89		29	9.31	19	11	23600	21200	3500	29
	27SEP89	1	30	8.74	21	22	21900	21700	3400	29

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	IRON PPB 30/300s	FIRON PPB 30/300s	LITHIUM PPB 10/.	FLITHIU PPB 10/.
2-E17-5	21SEP89		*5.78	<10	<10	*-2.73	<30	<30	<10	<10
2-E17-6	25SEP89		.	<10	<10	.	56	<30	11	11
2-E17-9	28SEP89		*-1.89	<10	12	*-0.942	60	<30	<10	<10
2-E17-14	27SEP89		19.8	<10	10	*-2.86	66	<30	<10	<10
2-E17-15	21SEP89		43.7	11	<10	*4.47	183	<30	<10	<10
2-E17-16	25SEP89		22.4	13	<10	*5.13	154	<30	<10	<10
2-E17-17	21SEP89		13	<10	<10	*-0.593	141	<30	<10	<10
2-E17-18	27SEP89		*4.54	<10	<10	*-0.118	101	<30	<10	<10
	27SEP89	1	*4.09	<10	<10	*-6.29	120	34	<10	<10

TABLE 11.4. (contd)

Well name	Collection date	Duplicate sample number	MAGNES PPB 50/.	FMAGNES PPB 50/.	MANGESE PPB 5/50s	NICKEL PPB 10/.	FNICKEL PPB 10/.	NITRATE PPB 500/45000	POTASUM PPB 100/.	RADIUM PCI/L 1/5
2-E17-5	21SEP89		10700	10400	<5	<10	<10	76000	6470	*.148
2-E17-6	25SEP89		14200	13700	57	<10	<10	82000	7690	.
2-E17-9	28SEP89		13800	14100	6	<10	<10	109000	7130	.232
2-E17-14	27SEP89		16300	16400	<5	10	<10	165000	6320	.517
2-E17-15	21SEP89		16500	22500	<5	18	<10	354000	6840	.217
2-E17-16	25SEP89		11500	12200	6	22	12	32000	5600	.189
2-E17-17	21SEP89		9090	8890	<5	22	<10	53000	6140	*.119
2-E17-18	27SEP89		6990	6350	<5	15	12	11100	5080	.405
	27SEP89	1	6480	6470	<5	19	<10	10700	4690	.580

Well name	Collection date	Duplicate sample number	RU-106 PCI/L 172.5/30r	SELENUM PPB 5/10	SILICON PPB 50/.	FSILICO PPB 50/.	SODIUM PPB 200/.	FSODIUM PPB 200/.	STRONUM PPB 10/.	SULFATE PPB 500/25000
2-E17-5	21SEP89		*-52	<5	19000	18600	20300	19600	205	26900
2-E17-6	25SEP89		.	<5	23400	22100	22400	21900	261	24600
2-E17-9	28SEP89		*-38.5	<5	20700	21600	27200	27900	277	39000
2-E17-14	27SEP89		65.5	<5	18700	18900	22000	22100	317	30000
2-E17-15	21SEP89		257	<5	18000	18700	25000	34500	349	35000
2-E17-16	25SEP89		58.1	6	18000	18900	21200	23000	181	60000
2-E17-17	21SEP89		*3.66	<5	18600	18200	20300	19800	171	26400
2-E17-18	27SEP89		*-11.9	<5	20100	18200	17900	16300	128	23200
	27SEP89	1	*-0.923	<5	18800	18600	16600	16800	119	23200

Well name	Collection date	Duplicate sample number	TC PPB 1000/.	TRITIUM PCI/L 500/20000	TURBID NTU .10/1	VANADUM PPB 5/.	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000s
2-E17-5	21SEP89		19600	1230000	.200	21	21	12	8
2-E17-6	25SEP89		24700	.	.300	<5	<5	7	7
2-E17-9	28SEP89		23000	3710000	1.10	27	22	9	14
2-E17-14	27SEP89		23000	264000	.900	25	21	<5	6
2-E17-15	21SEP89		21000	1300000	1.20	19	20	18	6
2-E17-16	25SEP89		17000	27400	1.10	24	28	15	6
2-E17-17	21SEP89		20300	201000	.900	20	20	9	5
2-E17-18	27SEP89		21000	36400	.600	36	31	10	<5
	27SEP89	1	21000	35600	.	30	30	5	6

TABLE 11.4. (contd)

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-78-003
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 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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

TABLE 11.5. Critical Mean Values for Indicator Parameter Data at the 216-A-36B Crib, September 1989[a]

Constituent, Units[b]	n	df	tc	Average	Standard Deviation	Critical Mean
Conductivity in the laboratory, µmho/cm	2	1	891.2673	355	25.456	28, 142
Conductivity in the field, µmho/cm	4	3	14.4787	298.31	51.291	1128.6
pH, laboratory	2	1	1782.54	8	0	8
pH, field	4	3	18.2806	7.8106	0.17472	4.2397, 11.382
Total organic carbon, ppb	4	3	14.4787	558.63	149.13	2972.7
Total organic halogens, lower detection limit, ppb	4	3	14.4787	3.2875	3.2499	55.896

(a) Data collected September 1988 to June 1989. Values calculated based on 28 comparisons.
(b) The following notations are used in this table:
df = degrees of freedom (n-1).
n = number of background replicate averages.
tc = Bonferroni critical t-value for appropriate df and 28 comparisons.

TABLE 11.6. Contamination Indicator Parameter Replicate Averages for the 216-A-36B Crib, September 1989

Constituent Code	Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088	CONDLAB	umho	2-E17-5	21SEP89	1	386	.	386	386	.
			2-E17-6	25SEP89	1	453	.	453	453	.
			2-E17-9	28SEP89	1	504	.	504	504	.
			2-E17-14	27SEP89	1	571	.	571	571	.
			2-E17-15	21SEP89	1	834	.	834	834	.
			2-E17-16	25SEP89	1	390	.	390	390	.
			2-E17-17	21SEP89	1	347	.	347	347	.
			2-E17-18	27SEP89	1	260	.	260	260	.
191	CONDFLD	umho	2-E17-5	21SEP89	4	391	2.45	389	394	0.6
			2-E17-6	25SEP89	4	436	2.06	434	438	0.5
			2-E17-9	28SEP89	4	483	4.50	481	490	0.9
			2-E17-14	27SEP89	4	561	1.15	560	562	0.2
			2-E17-15	21SEP89	4	674	1.29	672	675	0.2
			2-E17-16	25SEP89	4	364	4.65	359	370	1.3
			2-E17-17	21SEP89	4	343	0.58	342	343	0.2
			2-E17-18	27SEP89	4	256	0.96	255	257	0.4
199	PHFIELD		2-E17-5	21SEP89	4	7.87	0.005	7.87	7.88	0.1
			2-E17-6	25SEP89	4	7.46	0.019	7.43	7.47	0.3
			2-E17-9	28SEP89	4	7.96	0.013	7.95	7.98	0.2
			2-E17-14	27SEP89	4	7.38	0.010	7.37	7.39	0.1
			2-E17-15	21SEP89	4	7.60	0.005	7.60	7.61	0.1
			2-E17-16	25SEP89	4	7.46	0.022	7.43	7.48	0.3
			2-E17-17	21SEP89	4	7.64	0.005	7.63	7.64	0.1
			2-E17-18	27SEP89	4	7.76	0.013	7.76	7.79	0.2
207	PH-LAB		2-E17-5	21SEP89	1	8.0	.	8.0	8.0	.
			2-E17-6	25SEP89	1	7.8	.	7.8	7.8	.
			2-E17-9	28SEP89	1	7.9	.	7.9	7.9	.
			2-E17-14	27SEP89	1	7.7	.	7.7	7.7	.
			2-E17-15	21SEP89	1	7.9	.	7.9	7.9	.
			2-E17-16	25SEP89	1	7.9	.	7.9	7.9	.
			2-E17-17	21SEP89	1	7.7	.	7.7	7.7	.
			2-E17-18	27SEP89	1	8.0	.	8.0	8.0	.
C69	TOC	ppb	2-E17-5	21SEP89	4	650	129	500	800	19.9
			2-E17-6	25SEP89	4	725	236	400	900	32.6
			2-E17-9	28SEP89	4	550	58	500	600	10.5
			2-E17-14	27SEP89	4	750	173	600	1,000	23.1
			2-E17-15	21SEP89	4	650	58	600	700	8.9
			2-E17-16	25SEP89	4	775	126	600	900	16.2
			2-E17-17	21SEP89	4	725	126	600	900	17.4
			2-E17-18	27SEP89	4	925	330	700	1,400	35.7
H42	TOXLDL	ppb	2-E17-5	21SEP89	4	1.50	1.91	-1	3	127.7
			2-E17-6	25SEP89	4	3.25	2.06	1	5	63.4
			2-E17-9	28SEP89	4	6.75	3.30	3	11	48.9
			2-E17-14	27SEP89	4	2.00	2.45	0	5	122.5
			2-E17-15	21SEP89	4	10.00	3.16	6	13	31.6
			2-E17-16	25SEP89	4	2.50	3.70	0	8	147.9
			2-E17-17	21SEP89	4	7.25	1.71	5	9	23.6
			2-E17-18	27SEP89	4	1.25	2.36	-2	3	189.0

TABLE 11.6. (contd)

C69 TOC	ppb	2-E17-5	21SEP89	4	650	129	500	800	19.9
		2-E17-6	25SEP89	4	725	236	400	900	32.6
		2-E17-9	28SEP89	4	550	57.7	500	600	10.5
		2-E17-14	27SEP89	4	750	173	600	1000	23.1
		2-E17-15	21SEP89	4	650	57.7	600	700	8.9
		2-E17-16	25SEP89	4	775	126	600	900	16.2
		2-E17-17	21SEP89	4	725	126	600	900	17.4
		2-E17-18	27SEP89	4	925	330	700	1400	35.7
H42 TOXLDL	ppb	2-E17-5	21SEP89	4	1.5	1.91	-1	3	127.7
		2-E17-6	25SEP89	4	3.25	2.06	1	5	63.4
		2-E17-9	28SEP89	4	6.75	3.3	3	11	48.9
		2-E17-14	27SEP89	4	2	2.45	0	5	122.5
		2-E17-15	21SEP89	4	10	3.16	6	13	31.6
		2-E17-16	25SEP89	4	2.5	3.7	0	8	147.9
		2-E17-17	21SEP89	4	7.25	1.71	5	9	23.6
		2-E17-18	27SEP89	4	1.25	2.36	-2	3	189.0

12.0 216-B-3 POND

S. P. Luttrell
Pacific Northwest Laboratory

The ground water beneath the 216-B-3 Pond (B Pond) has been monitored by a RCRA interim-status well network since November 1988. The background stage of monitoring was completed for this project; four sample sets were collected and analyzed. Indicator evaluation monitoring and statistical evaluations of the data will commence when the fifth-quarter sample is collected. A ground-water monitoring plan has been prepared for this site (Luttrell, Chamness, and Dudziak 1989).

B Pond is located east of the 200-East Area in the central portion of the Hanford Site (see Figure 1.1). It consists of a series of interconnected surface ponds covering an area of approximately 102 acres. The pond has received large volumes (e.g., approximately 6 x 10^9 gal in 1987) of waste water from facilities in the 200-East Area. B Pond is currently in use.

The current monitoring network for B Pond (Figure 12.1) is made up of 13 wells: six wells installed in 1989, four wells installed in 1988, two wells that are part of other RCRA monitoring projects, and one older well. The upgradient monitoring wells are 299-E18-1 and 299-E32-4. The down-gradient wells are 699-42-40A, 699-42-42B, 699-43-42J, 699-43-43, 699-44-42, 699-40-39 (formerly BP-5), 699-41-40 (formerly BP-6), 699-43-41E (formerly BP-4), 699-43-41F (formerly BP-9), 699-43-45 (formerly BP-1), and 699-44-43B (formerly BP-2). The last six wells, installed in 1989, have been completed and developed and have sampling pumps. In addition, wells 299-E25-32P, 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 part of the monitoring network for the 2101-M Pond, and well 299-E32-4 is part of the monitoring network for the 200 Areas Low-Level Burial Grounds. The sampling schedule for the wells in the 216-B-3 Pond monitoring network is shown in Table 12.1.

9 2 1 2 6 4 2 1 8 8 1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Drilling and hydrogeologic characterization activities were completed in October 1989 at the six new wells around B Pond.

Well Drilling, Completion, Development, and Pump Installation

HydroStar pumps were installed in each of the wells started and completed in 1989.

Hydrogeologic Characterization

No hydrogeologic characterization activities were conducted this quarter, with the exception of water-level measurements made in several wells.

WATER LEVELS

Water levels were measured in seven wells that were sampled in December for a Hanford liquid effluent study (Table 12.2). Supplemental water-level measurements were made on October 24 and November 16, 1989, for this project, and measurements were made in some of the wells in December in support of the Ground-Water Environmental Surveillance Project conducted by PNL (Table 12.3).

WATER CHEMISTRY DATA

Ground-water samples were collected from the six new B Pond monitoring wells (699-40-39, 699-41-40, 699-43-41E, 699-43-41F, 699-43-45, and 699-44-43B) in December 1989 in support of a Hanford liquid effluent study. The analytical results for these samples, which are being analyzed for the WAC 173-303-9905 list of constituents, are not yet available. These results will not be used for statistical evaluations of ground-water quality beneath B Pond.

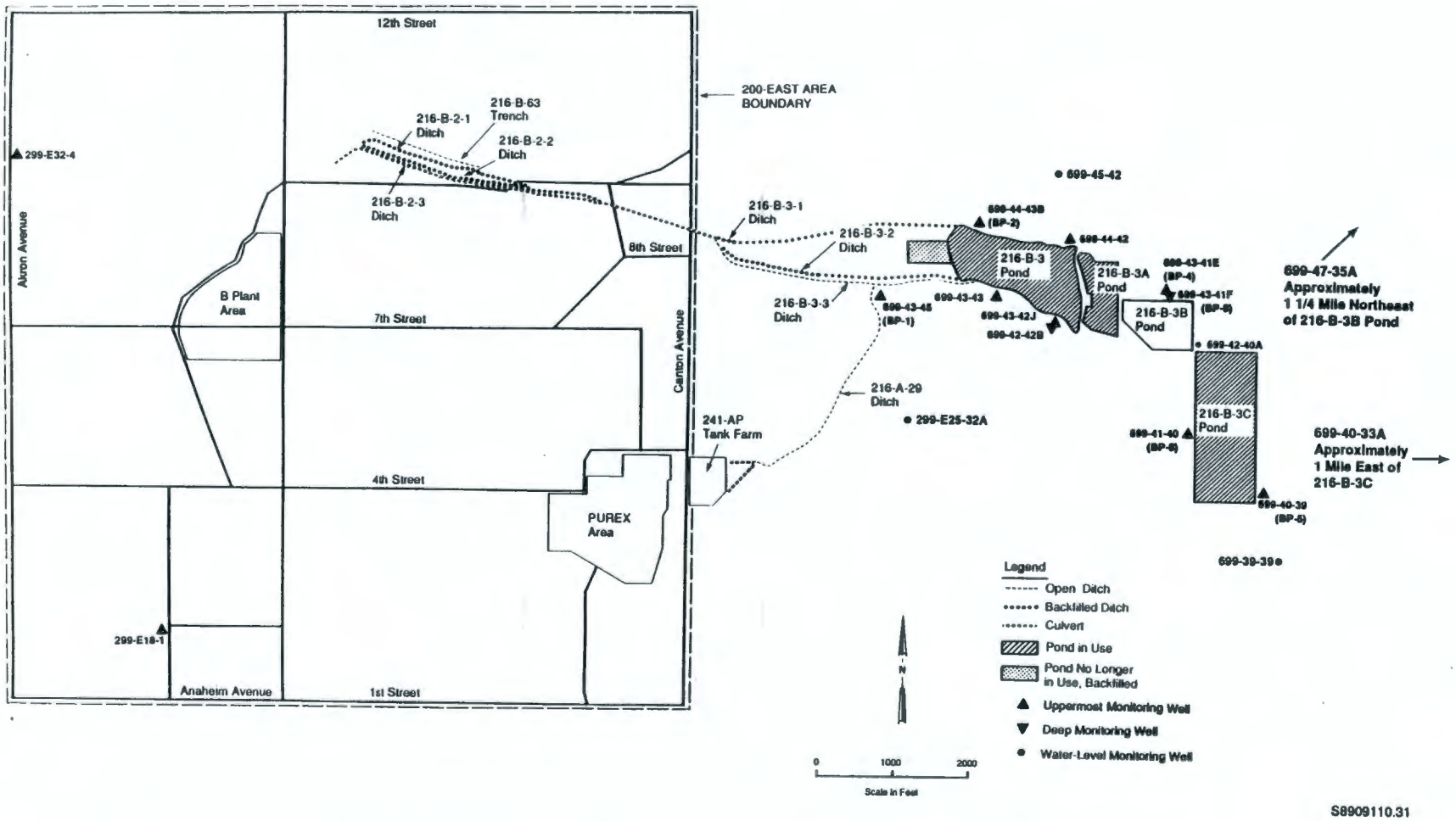

FIGURE 12.1. Monitoring Well Locations for the 216-B-3 Pond

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

	1989[a]			1990								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E18-1				SRV						S		
299-E32-4				S						S		
699-42-40A				X						X		
699-42-42B				X						X		
699-43-42J				X						X		
699-43-43				X						X		
699-44-42				X						X		
699-43-45			*	X			X			X		
699-44-43B			*	XRV			X			X		
699-43-41E			*	X			X			X		
699-40-39			*	X			X			X		
699-41-40			*	X			X			X		
699-43-41F			*	X			X			X		

(a) The following notations are used in this table:
R = sampled for quality control replicates.
S = sampled for the short list of constituents (overlap with another project).
V = sampled for volatile organic analyses blanks.
X = sampled for the regular list of constituents (Smith, Bates, and Lundgren 1989c).
* = sampled for the long list of constituents (WAC 173-303-9905) for a Hanford liquid effluent study.

TABLE 12.2. Water-Level Data for Wells Near the 216-B-3 Pond Sampled in Support of the Hanford Liquid Effluent Study

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
699-40-39	541.84	12/05/89	0900	127.62	414.22
699-41-40	545.94	12/05/89	0830	127.33	418.61
699-42-40B	546.46	12/11/89	(b)	124.02	422.44
699-43-41E	550.86	12/05/89	0930	129.22	421.64
699-43-41F	551.01	12/05/89	1030	129.37	421.64
699-43-45	597.68	12/06/89	0910	191.39	406.29
699-44-43B	580.12	12/20/89	1000	164.50	415.62

(a) MSL = mean sea level.
(b) Time of measurement is unknown.

9 2 1 2 6 4 2 1 8 3 5

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

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E25-32P	669.19	10/24/89	0809	263.16	406.03
		11/16/89	1044	263.33	405.86
		12/21/89	1346	263.65	405.54
699-39-39	536.65	10/24/89	0923	123.14	413.51
		11/16/89	1224	123.66	412.99
		12/21/89	1443	121.44	415.21
699-40-33A	518.05	10/24/89	0737	106.69	411.36
		11/16/89	0927	106.87	411.18
		12/22/89	1006	106.87	411.18
699-40-39	541.84	10/24/89	0931	127.53	414.31
		11/16/89	1242	127.69	414.15
		12/21/89	1451	127.89	413.95
699-41-40	545.94	10/24/89	0912	128.70	417.24
		11/16/89	1210	128.88	417.06
		12/21/89	1432	129.39	416.55
699-42-40B[b]	546.46	10/24/89	0939	123.71	422.75
		11/16/89	1250	123.78	422.68
		12/21/89	1505	124.42	422.04
699-42-42B	583.23	11/16/89	1201	165.43	417.80
699-43-41E	550.86	10/24/89	0953	128.88	421.98
		11/16/89	1305	128.97	421.89
		12/21/89	1522	129.56	421.30
699-43-41F	551.01	10/24/89	1007	128.79	422.22
		11/16/89	1313	128.86	422.15
699-43-42J	581.68	10/24/89	0847	161.56	420.12
		11/16/89	1155	161.84	419.84
		12/21/89	1424	162.35	419.33
699-43-43	579.37	10/24/89	0905	163.48	415.89
		11/16/89	1148	163.77	415.60
		12/21/89	1418	164.24	415.13
699-43-45	597.68	10/24/89	0857	190.99	406.69
		11/16/89	1137	191.16	406.52
		12/21/89	1409	191.50	406.18

TABLE 12.3. (contd)

Well	Casing Elevation, ft above MSL[a]	Date	Time, hr	Depth to Water, ft	Water-Level Elevation, ft above MSL
699-44-42	579.22	10/24/89	1015	157.56	421.66
		11/16/89	1321	157.80	421.42
		12/21/89	1534	158.22	421.00
699-44-43B	580.12	10/24/89	1026	164.10	416.02
		11/16/89	1331	164.21	415.91
		12/21/89	1544	164.54	415.58
699-45-42	577.33	10/24/89	1038	158.81	418.52
		11/16/89	1339	158.95	418.38
		12/21/89	1553	159.40	417.93
699-47-35A	476.36	10/24/89	1135	62.16	414.20
		11/16/89	1405	62.10	414.26
		12/16/89	1616	62.33	414.03

(a) MSL = mean sea level.
(b) The water level in well 699-42-40A is usually measured rather than in well 699-42-40B; however, water levels were measured in well 699-42-40B by mistake. Well 699-42-40B is adjacent to and completed in essentially the same zone as well 699-42-40A, and the interpretations using data from well 699-42-40B rather than well 699-42-40A will not be significantly affected.

9 2 1 2 6 4 2 1 8 8 7

THIS PAGE INTENTIONALLY
LEFT BLANK

13.0 2101-M POND

M. A. Chamness
Pacific Northwest Laboratory

The ground water beneath the 2101-M Pond has been monitored by a RCRA interim-status well network since August 1988. This project completed the first year of background sampling, background values for the ground-water contamination indicator parameters were established, and a sixth sample set was collected. This last sampling period is the first of a semiannual schedule for FY 1990. The hydrogeologic characterization report for this site is being written.

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

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

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No further drilling activities are currently planned for this site.

WATER LEVELS

In addition to quarterly ground-water sampling intervals, water levels are measured periodically in the four monitoring wells. Table 13.2 provides the water-level data collected at times other than during ground-water sampling. Table 13.3 provides the water-level data collected just before

9 2 1 2 6 4 2 1 8 8 8

ground-water sampling. The data in Table 13.2 are considered more accurate than the data in Table 13.3 because all of the wells are measured on the same day and usually within an hour of each other. Consequently, only the data in Table 13.2 have been used in interpretations of ground-water flow direction.

WATER CHEMISTRY DATA

Samples for the long list of constituents provided in WAC 173-303-9905 and Appendix IX of 40 CFR 264 were collected from each of the four monitoring wells between October 31 and November 29, 1989. Samples from well 299-E18-1 were collected after approximately three borehole volumes of water had been purged from the well, while the other three wells were purged of approximately six borehole volumes before sampling. The additional purge volumes in three of the wells were in an effort to bring the level of turbidity down. The samples were collected using dedicated HydroStar sampling pumps.

The constituent list and summary data from the wells are provided in Table 13.4. Data for constituents that had at least one value reported above the detection limit are presented in Table 13.5. Ground-water chemistry is discussed below.

- Iron was above the 40 CFR 143 standard of 300 ppb only in the unfiltered samples from wells 299-E18-1 (802 ppb), 299-E18-3 (407 ppb), and 299-E18-4 (323 ppb). Filtered iron was near or below detection limits of 30 ppb in all wells.

- Chromium was above the 40 CFR 141 standard of 50 ppb only in the unfiltered samples from wells 299-E18-3 (58 ppb) and 299-E18-4 (64 ppb). Filtered chromium was below detection limits of 10 ppb in all wells.

- Turbidity was above the 40 CFR 141 standard of 1 NTU in samples from wells 299-E18-1 (11 NTU), 299-E18-3 (2.1 NTU), and 299-E18-4 (1.1 NTU). Monitoring for turbidity is required only for surface water, but was measured in this case as an indicator of particulate content because of the elevated concentrations of iron and chromium found in unfiltered samples.

- Analytical results for sulfate and chloride were not received from the laboratory for well 299-E18-2. This problem is being investigated.

- In addition, bromodichloromethane (<3 ppb, which is below the detection limit of 5 ppb), chloroform (25 ppb), and methylene chloride (75 ppb) were identified in the duplicate sample only from well 299-E18-3, and methylene chloride may have been detected (at levels below the contractual detection limit of 5 ppb) in the sample from well 299-E18-2. A request for data review has been initiated to determine whether these constituents represent actual ground-water conditions or are due to laboratory or field contamination.

Background data for contamination indicator parameters consist of quadruplicate measurements for field conductivity and pH, total organic carbon, and total organic halogens for the first four quarters sampled. Laboratory conductivity and pH are also collected in quadruplicate for additional information but are not used in the statistical analysis. Statistical analyses required by 40 CFR 265.93(b) were performed on the background samples obtained during the first four quarters, and the results are presented in Table 13.6. This table lists the average background standard deviation and critical mean for the four contamination indicator parameters from the upgradient well. The critical mean is the value to which future averages of quadruplicate measurements are compared. If the average for a parameter is greater than (and less than, in the case of pH) its critical mean, that parameter is considered statistically different from background. Some of these critical mean values, especially pH, are outside the range that would be reasonably expected or possible but must be used nonetheless. The results from the August sample analyses were the first to be statistically compared to the established background values as required by 40 CFR 265.93(b). The replicate average, standard deviation, and coefficient of variation for the November contamination indicator parameters are provided in Table 13.7 and can be compared to the critical mean values given in Table 13.6. No groundwater indicator parameters were statistically different from background.

9 2 1 2 6 4 2 1 8 9 0

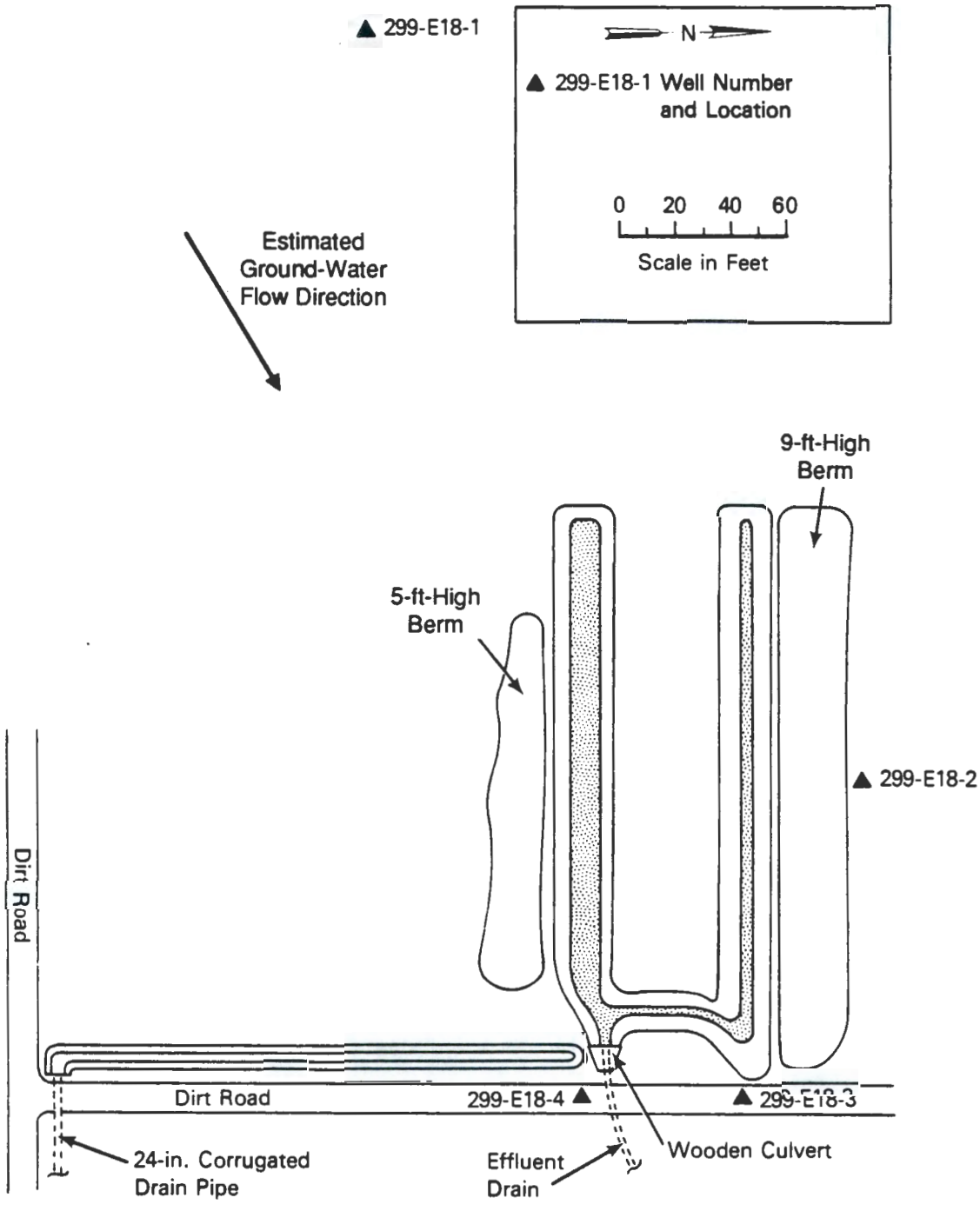

FIGURE 13.1. Monitoring Well Locations for the 2101-M Pond

TABLE 13.1. Sampling Schedule for the 2101-M Pond

	1989[a]			1990								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E18-1		L						X				
299-E18-2		L						XRV				
299-E18-3		LRV						X				
299-E18-4		L						X				

(a) The following notations are used in this table:
L = sampled for the long list of constituents (WAC 173-303-9905).
R = sampled for quality control replicates.
V = sampled for volatile organic analyses blanks.
X = sampled for the regular list of constituents (see Table 13.3).

9 2 1 1 2 6 4 2 1 8 9 2

TABLE 13.2. Water-Level Data at Times Other Than at Sampling for Wells Near the 2101-M Pond[a]

Well	Casing Elevation, ft above MSL[b]	Correction Factor[c]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E18-1	720.24	+0.06	10/06/88	314.29	406.01
			10/14/88	314.24	406.06
			10/26/88	314.32	405.98
			11/14/88	314.49	405.81
			12/08/88	314.21	406.09
			02/09/89	314.47	405.83
			02/21/89	314.56	405.74
			04/24/89	314.70	405.60
			07/13/89	315.10	405.20
			10/13/89	315.25	405.05
299-E18-2	721.21	+0.22	10/06/88	315.52	405.91
			10/14/88	315.52	405.91
			10/26/88	315.55	405.88
			11/14/88[d]	315.69	405.74
			12/08/88	315.47	405.96
			02/09/89	315.75	405.68
			02/21/89	315.84	405.59
			04/24/89	316.01	405.42
			07/13/89	316.37	405.06
			10/13/89	316.51	404.92
299-E18-3	722.04	+0.03	10/06/88	NM[e]	--
			10/14/88	316.13	405.94
			10/26/88	316.10	405.97
			11/14/88	316.21	405.86
			12/08/88[d]	316.02	406.05
			02/09/89[d]	316.31	405.76
			02/21/89	316.39	405.68
			04/24/89	316.58	405.49
			07/13/89	316.91	405.16
			10/13/89	317.06	405.01
299-E18-4	721.57	+0.0	10/06/88	315.59	405.98
			10/14/88	315.66	405.91
			10/26/88	315.62	405.95
			11/14/88	315.74	405.83
			12/08/88	315.53	406.04
			02/09/89	315.81	405.76
			02/21/89	315.91	405.66
			04/24/89	316.08	405.49
			07/13/89	316.43	405.14
			10/13/89	316.57	405.00

(a) 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) NM = no measurement could be made.

TABLE 13.3. Water-Level Data Collected Before Sampling from Wells Near the 2101-M Pond[a]

Well	Casing Elevation, ft above MSL[b]	Correction Factor[c]	Date	Depth to Water, ft	Water-Level Elevation, ft above MSL
299-E18-1	720.24	+0.06	08/16/88	NM[d]	--
			11/10/88	314.61	405.69
			02/15/89	314.65	405.65
			05/26/89	314.94	405.36
			08/08/89	315.98	404.32
			10/31/89	315.90	404.40
			11/29/89	315.33	404.97
299-E18-2	721.21	+0.22	08/16/88	NM	--
			11/10/88	316.33	405.10
			02/16/89	315.00	406.43
			06/01/89	316.21	405.22
			08/11/89	316.60	404.83
			11/27/89	316.72	404.71
299-E18-3	722.04	+0.03	08/16/88	NM	--
			11/10/89	316.16	405.91
			02/15/89	316.22	405.85
			06/01/89	316.78	405.29
			08/08/89	316.99	405.08
			11/27/89	317.3	404.77
299-E18-4	721.57	+0.0	08/16/88	NM	--
			11/09/89	315.69	405.88
			02/15/89	315.85	405.72
			05/26/89	316.29	405.28
			08/08/89	316.49	405.08
			11/21/89	317.45	404.12

(a) 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) NM = no measurement could be made.

9 2 1 2 6 4 2 1 8 9 4

TABLE 13.4. Constituent List and Summary of Sampling Results for the 2101-M Pond for August 1989

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
088	CONDLAB	UMHO	.	12	0	700	WDOE		Conductivity, Laboratory
191	CONDFLD	UMHO	1	17	0	700	WDOE		Specific conductance
199	PHFIELD		.100	17	0	6.5-8.5	EPAS		pH, Field Measurement
207	PH-LAB		.0100	12	0	6.5-8.5	EPAS		pH, Laboratory Measurement
C69	TOC	PPB	2000	17	17 ***	.			Total organic carbon
H42	TOXLDL	PPB	10	17	16	.			Total Organic Halogen, Low Det. Level

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Standard	Water Standards Agency	Exceeded	Full Name
109	COLIFRM	MPN	2.20	1	1 ***	1	EPA		Coliform bacteria
111	BETA	PCI/L	8	5	0	50	EPA		Gross beta
112	ALPHAHI	PCI/L	4	5	0	15	EPA		Alpha, High Detection Level
181	RADIUM	PCI/L	1	5	2	5	EPA		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	xxx	Chromium
A10	SILVER	PPB	10	5	5 ***	50	EPA		Silver
A20	ARSENIC	PPB	5	5	1	50	EPA		Arsenic
A21	MERCURY	PPB	.100	5	5 ***	2	EPA		Mercury
A22	SELENUM	PPB	5	5	4	10	EPA		Selenium
A33	ENDRIN	PPB	.100	5	5 ***	.200	EPA		Endrin
A34	METHLOR	PPB	3	5	5 ***	100	EPA		Methoxychlor
A35	TOXAENE	PPB	1	5	5 ***	5	EPA		Toxaphene
A36	a-BHC	PPB	.100	5	5 ***	4	EPA		Alpha-BHC
A37	b-BHC	PPB	.100	5	5 ***	4	EPA		Beta-BHC
A38	g-BHC	PPB	.100	5	5 ***	4	EPA		Gamma-BHC
A39	d-BHC	PPB	.100	5	5 ***	4	EPA		Delta-BHC
A61	LEADGF	PPB	5	5	5 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	PPB	500	4	1	45000	EPA		Nitrate
C74	FLUORID	PPB	500	4	3	4000	EPA		Fluoride
H13	2,4-D	PPB	2	5	5 ***	100	EPA		2,4-D
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	5 ***	50	EPA		Chromium, filtered
H23	FSILVER	PPB	10	5	5 ***	50	EPA		Silver, filtered
H37	FARSENI	PPB	5	5	2	50	EPA		Arsenic, filtered

TABLE 13.4. (contd)

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency	Exceeded	Full Name
H38	FMERCUR	PPB	.100	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	.100	4	0	1	EPA	xxx	Turbidity
P19	COLIMF	PPB	1	2	2 ***	1	EPA		Coliform (Membrane Filter)

---------- 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	2	50	EPAS		Manganese
A19	IRON	PPB	30	5	0	300	EPAS	xxx	Iron
C57	PHENOL	PPB	10	5	5 ***	.			Phenol
C73	SULFATE	PPB	500	4	0	250000	EPAS		Sulfate
C75	CHLORID	PPB	500	4	0	250000	EPAS		Chloride
H24	FSODIUM	PPB	200	5	0	.			Sodium, filtered
H29	FMANGAN	PPB	5	5	5 ***	50	EPAS		Manganese, filtered
H31	FIRON	PPB	30	5	4	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	1	1 ***	100	EPAR		Cobalt-60
024	CS-137	PCI/L	20	1	1 ***	200	EPAR		Cesium-137
034	RU-106	PCI/L	172.5	1	1 ***	30	EPAR		Ruthenium-106
100	PU39-40	PCI/L	17	1	1 ***	1.20	DOE		Plutonium-239/40
102	PU-238	PCI/L	17	1	1 ***	1.60	DOE		Plutonium-238
104	U	PCI/L	.500	1	0	600	DOE		Uranium
105	AM-241	PCI/L	.100	1	0	30	DOE		Americium-241
108	TRITIUM	PCI/L	500	1	1 ***	20000	EPA		Tritium
121	SR 90	PCI/L	5	1	1 ***	8	EPA		Strontium-90
A01	BERYLUM	PPB	5	5	5 ***	.			Beryllium
A03	STRONUM	PPB	10	5	0	.			Strontium
A04	ZINC	PPB	5	5	0	5000	EPAS		Zinc
A05	CALCIUM	PPB	50	5	0	.			Calcium
A12	NICKEL	PPB	10	5	1	.			Nickel
A13	COPPER	PPB	10	5	5 ***	1300	EPAP		Copper
A14	VANADUM	PPB	5	5	0	.			Vanadium
A15	ANTIONY	PPB	100	5	5 ***	.			Antimony
A16	ALUMNUM	PPB	150	5	4	.			Aluminum

TABLE 13.4. (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
A18	POTASUM	PPB	100	5	0	.		Potassium
A50	MAGNES	PPB	50	5	0	.		Magnesium
C76	PHOSPHA	PPB	1000	4	4 ***	.		Phosphate
H16	TC	PPB	1000	5	0	.		Total carbon
H17	TDS		5000	1	0	500000	EPAS	Total dissolved solids
H18	FZINC	PPB	5	5	4	5000	EPAS	Zinc, filtered
H19	FCALCIU	PPB	50	5	0	.		Calcium, filtered
H25	FNICKEL	PPB	10	5	5 ***	.		Nickel, filtered
H26	FCOPPER	PPB	10	5	5 ***	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	10	5	0	.		Strontium, filtered
H36	FANTIMO	PPB	100	5	5 ***	.		Antimony, filtered
H58	ALKALIN		20000	5	0	.		Alkalinity
H66	BROMIDE	PPB	1000	4	4 ***	.		Bromide
H67	NITRITE	PPB	1000	4	4 ***	.		Nitrite
H86	FBORON	PPB	10	5	0	.		Boron, filtered
H87	FCOBALT	PPB	20	5	5 ***	.		Cobalt, filtered
H88	FLITHIU	PPB	10	5	5 ***	.		Lithium, filtered
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
P12	ENDSFAN	PPB	.500	5	5 ***	.		Endosulfan
P13	PHORATE	PPB	2	5	5 ***	.		PHORATE

TABLE 13.4. (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
A23	THALIUM	PPB	5	5	5 ***	.			Thallium
A24	THIOURA	PPB	200	5	5 ***	.			Thiourea
A25	ACETREA	PPB	200	5	5 ***	.			1-acetyl-2-thiourea
A26	CHLOREA	PPB	200	5	5 ***	.			1-(o-chlorophenyl) thiourea
A27	DIETROL	PPB	200	5	5 ***	.			Diethylstilbesterol
A28	ETHYREA	PPB	200	5	5 ***	.			Ethylenethiourea
A29	NAPHREA	PPB	200	5	5 ***	.			1-naphthyl-2-thiourea
A32	PHENREA	PPB	500	5	5 ***	.			N-phenylthiourea
A40	DDD	PPB	.100	5	5 ***	.			DDD
A41	DDE	PPB	.100	5	5 ***	.			DDE
A42	DDT	PPB	.100	5	5 ***	.			DDT
A43	HEPTLOR	PPB	.100	5	5 ***	0	EPAP		Heptachlor
A44	HEPTIDE	PPB	.100	5	5 ***	0	EPAP		Heptchlor epoxide
A45	KEPONE	PPB	1	5	5 ***	.			Kepone
A46	DIELRIN	PPB	.100	5	5 ***	.			Dieldrin
A47	ALDRIN	PPB	.100	5	5 ***	.			Aldrin
A48	CHLOANE	PPB	1	5	5 ***	0	EPAP		Chlordane
A49	END01	PPB	.100	5	5 ***	.			Endosulfan I
A52	END02	PPB	.100	5	5 ***	.			Endosulfan II
A54	AR1016	PPB	1	5	5 ***	0	EPAP		Arochlor 1016
A55	AR1221	PPB	1	5	5 ***	0	EPAP		Arochlor 1221
A56	AR1232	PPB	1	5	5 ***	0	EPAP		Arochlor 1232
A57	AR1242	PPB	1	5	5 ***	0	EPAP		Arochlor 1242
A58	AR1248	PPB	1	5	5 ***	0	EPAP		Arochlor 1248
A59	AR1254	PPB	1	5	5 ***	0	EPAP		Arochlor 1254
A60	AR1260	PPB	1	5	5 ***	0	EPAP		Arochlor 1260
A61	TETRANE	PPB	5	5	5 ***	5	EPA		Carbon Tetrachloride by GC/MS
A62	BENZENE	PPB	5	5	5 ***	5	EPA		Benzene
A63	DIOXANE	PPB	500	5	5 ***	.			Dioxane
A64	METHONE	PPB	10	5	5 ***	.			Methyl ethyl ketone
A65	PYRIDIN	PPB	500	5	5 ***	.			Pyridine
A66	TOLUENE	PPB	5	5	5 ***	2000	EPAP		Toluene
A67	1,1,1-T	PPB	5	5	5 ***	200	EPA		1,1,1-trichloroethane
A68	1,1,2-T	PPB	5	5	5 ***	.			1,1,2-trichloroethane
A69	TRICENE	PPB	5	5	5 ***	5	EPA		Trichloroethylene
A70	PERCENE	PPB	5	5	5 ***	.			Tetrachloroethylene
A71	OPXYLE	PPB	5	5	5 ***	440	EPAP		Xylene-o,p
A72	ACROLIN	PPB	10	5	5 ***	.			Acrolein
A73	ACRYILE	PPB	10	5	5 ***	.			Acrylonitrile
A74	BISTHER	PPB	5	5	5 ***	.			Bis(chloromethyl) ether

TABLE 13.4. (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
A75	BROMONE	PPB	5	5	5 ***	.		Bromoacetone
A76	METHBRO	PPB	10	5	5 ***	.		Methyl bromide
A77	CARBIDE	PPB	10	5	5 ***	.		Carbon disulfide
A78	CHLBENZ	PPB	5	5	5 ***	60	EPAP	Chlorobenzene
A79	CHLTHER	PPB	5	5	5 ***	.		2-chloroethyl vinyl ether
A80	CHLFORM	PPB	5	5	4	100	EPA	Chloroform
A81	METHCHL	PPB	10	5	5 ***	.		Methyl chloride
A82	CHMTHER	PPB	10	5	5 ***	.		Chloromethyl methyl ether
A83	CROTONA	PPB	10	5	5 ***	.		Crotonaldehyde
A84	DIBRCHL	PPB	10	5	5 ***	0	EPAP	1,2-dibromo-3-chloropropane
A85	DIBRETH	PPB	10	5	5 ***	.		1,2-dibromoethane
A86	DIBRMET	PPB	10	5	5 ***	.		Dibromomethane
A87	DIBUTEN	PPB	10	5	5 ***	.		1,4-dichloro-2-butene
A88	DICDIFM	PPB	10	5	5 ***	.		Dichlorodifluoromethane
A89	1,1-DIC	PPB	5	5	5 ***	.		1,1-dichloroethane
A90	1,2-DIC	PPB	5	5	5 ***	5	EPA	1,2-dichloroethane
A91	TRANDCE	PPB	5	5	5 ***	70	EPAP	Trans-1,2-dichloroethene
A92	DICETHY	PPB	10	5	5 ***	7	EPA	1,1-dichloroethylene
A93	METHYCH	PPB	5	5	3	.		Methylene Chloride
A94	DICPANE	PPB	5	5	5 ***	6	EPAP	1,2-dichloropropane
A95	DICPENE	PPB	5	5	5 ***	.		1,3-dichloropropene
A96	NNDIEHY	PPB	10	5	5 ***	.		N,N-diethylhydrazine
A97	1,1-DIM	PPB	10	5	5 ***	.		1,1-dimethylhydrazine
A98	1,2-DIM	PPB	10	5	5 ***	.		1,2-dimethylhydrazine
B01	IODOMET	PPB	10	5	5 ***	.		Iodomethane
B02	METHACR	PPB	10	5	5 ***	.		Methacrylonitrile
B03	METHTHI	PPB	10	5	5 ***	.		Methanethiol
B04	PENTACH	PPB	10	5	5 ***	.		Pentachloroethane
B05	1112-tc	PPB	10	5	5 ***	.		1,1,1,2-tetrachloroethane
B06	1122-tc	PPB	5	5	5 ***	.		1,1,2,2-tetrachloroethane
B08	BROMORM	PPB	5	5	5 ***	100	EPA	Bromoform
B09	TRCMEOL	PPB	10	5	5 ***	.		Trichloromethanethiol
B10	TRCMFLM	PPB	10	5	5 ***	.		Trichloromonofluoromethane
B12	123-trp	PPB	10	5	5 ***	.		1,2,3-trichloropropane
B13	VINYIDE	PPB	10	5	5 ***	2	EPA	Vinyl chloride
B14	M-XYLE	PPB	5	5	5 ***	440	EPAP	Xylene-m
B19	ACETILE	PPB	10	5	5 ***	.		Acetonitrile
B20	ACETOPH	PPB	10	5	5 ***	.		Acetophenone
B21	WARFRIN	PPB	10	5	5 ***	.		Warfarin
B22	ACEFENE	PPB	10	5	5 ***	.		2-acetylaminofluorene
B23	AMINOYL	PPB	10	5	5 ***	.		4-aminobyphenyl
B24	AMIISOX	PPB	10	5	5 ***	.		5-(aminomethyl)-3-isoxazolol
B25	AMITROL	PPB	10	5	5 ***	.		Amitrole
B26	ANILINE	PPB	10	5	5 ***	.		Aniline

TABLE 13.4. (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
A75	BROMONE	PPB	5	5	5 ***	.		Bromoacetone
A76	METHBRO	PPB	10	5	5 ***	.		Methyl bromide
A77	CARBIDE	PPB	10	5	5 ***	.		Carbon disulfide
A78	CHLBENZ	PPB	5	5	5 ***	60	EPAP	Chlorobenzene
A79	CHLTHER	PPB	5	5	5 ***	.		2-chloroethyl vinyl ether
A80	CHLFORM	PPB	5	5	4	100	EPA	Chloroform
A81	METHCHL	PPB	10	5	5 ***	.		Methyl chloride
A82	CHMTHER	PPB	10	5	5 ***	.		Chloromethyl methyl ether
A83	CROTONA	PPB	10	5	5 ***	.		Crotonaldehyde
A84	DIBRCHL	PPB	10	5	5 ***	0	EPAP	1,2-dibromo-3-chloropropane
A85	DIBRETH	PPB	10	5	5 ***	.		1,2-dibromoethane
A86	DIBRMET	PPB	10	5	5 ***	.		Dibromomethane
A87	DIBUTEN	PPB	10	5	5 ***	.		1,4-dichloro-2-butene
A88	DICDIFM	PPB	10	5	5 ***	.		Dichlorodifluoromethane
A89	1,1-DIC	PPB	5	5	5 ***	.		1,1-dichloroethane
A90	1,2-DIC	PPB	5	5	5 ***	5	EPA	1,2-dichloroethane
A91	TRANDCE	PPB	5	5	5 ***	70	EPAP	Trans-1,2-dichloroethene
A92	DICETHY	PPB	10	5	5 ***	7	EPA	1,1-dichloroethylene
A93	METHYCH	PPB	5	5	3	.		Methylene Chloride
A94	DICPANE	PPB	5	5	5 ***	6	EPAP	1,2-dichloropropane
A95	DICPENE	PPB	5	5	5 ***	.		1,3-dichloropropene
A96	NNDIEHY	PPB	10	5	5 ***	.		N,N-diethylhydrazine
A97	1,1-DIM	PPB	10	5	5 ***	.		1,1-dimethylhydrazine
A98	1,2-DIM	PPB	10	5	5 ***	.		1,2-dimethylhydrazine
B01	IODOMET	PPB	10	5	5 ***	.		Iodomethane
B02	METHACR	PPB	10	5	5 ***	.		Methacrylonitrile
B03	METHTHI	PPB	10	5	5 ***	.		Methanethiol
B04	PENTACH	PPB	10	5	5 ***	.		Pentachloroethane
B05	1112-tc	PPB	10	5	5 ***	.		1,1,1,2-tetrachlorethane
B06	1122-tc	PPB	5	5	5 ***	.		1,1,2,2-tetrachlorethane
B08	BROMORM	PPB	5	5	5 ***	100	EPA	Bromoform
B09	TRCMEOL	PPB	10	5	5 ***	.		Trichloromethanethiol
B10	TRCMFLM	PPB	10	5	5 ***	.		Trichloromonofluoromethane
B12	123-trp	PPB	10	5	5 ***	.		1,2,3-trichloropropane
B13	VINYIDE	PPB	10	5	5 ***	2	EPA	Vinyl chloride
B14	M-XYLE	PPB	5	5	5 ***	440	EPAP	Xylene-m
B19	ACETILE	PPB	10	5	5 ***	.		Acetonitrile
B20	ACETOPH	PPB	10	5	5 ***	.		Acetophenone
B21	WARFRIN	PPB	10	5	5 ***	.		Warfarin
B22	ACEFENE	PPB	10	5	5 ***	.		2-acetylaminofluorene
B23	AMINOYL	PPB	10	5	5 ***	.		4-aminobyphenyl
B24	AMIISOX	PPB	10	5	5 ***	.		5-(aminomethyl)-3-isoxazolol
B25	AMITROL	PPB	10	5	5 ***	.		Amitrole
B26	ANILINE	PPB	10	5	5 ***	.		Aniline

TABLE 13.4. (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
B27	ARAMITE	PPB	10	5	5 ***	.		Aramite
B28	AURAMIN	PPB	10	5	5 ***	.		Auramine
B29	BENZCAC	PPB	10	5	5 ***	.		Benz[c]acridine
B30	BENZAAN	PPB	10	5	5 ***	.		Benz[a]anthracene
B31	BENDICM	PPB	10	5	5 ***	.		Benzene, dichloromethyl
B32	BENTHOL	PPB	10	5	5 ***	.		Benzenethoil
B33	BENDINE	PPB	10	5	5 ***	.		Benzidine
B34	BENZBFL	PPB	10	5	5 ***	.		Benzo[b]fluoranthene
B35	BENZJFL	PPB	10	5	5 ***	.		Benzo[j]fluoranthene
B36	PBENZQU	PPB	10	5	5 ***	.		P benzoquinone
B37	BENZCHL	PPB	10	5	5 ***	.		Benzyl chloride
B38	BIS2CHM	PPB	10	5	5 ***	.		Bis(2-chloroethoxy) methane
B39	BIS2CHE	PPB	10	5	5 ***	.		Bis(2-chloroethyl) ether
B40	BIS2EPH	PPB	10	5	5 ***	.		Bis(2-ethylhexyl) phthalate
B41	BROPHEN	PPB	10	5	5 ***	.		4-bromophenyl phenyl ether
B42	BUTBENP	PPB	10	5	5 ***	.		Butyl benzyl phthalate
B43	BUTDINP	PPB	10	5	5 ***	.		2-sec-butyl-4,6-dinitrophenol
B44	CHALETH	PPB	10	5	5 ***	.		Chloroalkyl ethers
B45	CHLANIL	PPB	10	5	5 ***	.		P-chloroaniline
B46	CHLCRES	PPB	10	5	5 ***	.		P-chloro-m-cresol
B47	CHLEPOX	PPB	10	5	5 ***		0 EPAP	1-chloro-2,3-epoxypropane
B48	CHLNAPH	PPB	10	5	5 ***	.		2-chloronaphthalene
B49	CHLPHEN	PPB	10	5	5 ***	.		2-chlorophenol
B50	CHRYSEN	PPB	10	5	5 ***	.		Chrysene
B51	CRESOLS	PPB	10	5	5 ***	.		Cresols
B52	CYCHDIN	PPB	10	5	5 ***	.		2-cyclohexyl-4,6-dinitrophenol
B53	DIBAHAC	PPB	10	5	5 ***	.		Dibenz[a,h]acridine
B54	DIBAJAC	PPB	10	5	5 ***	.		Dibenz[a,j]acridine
B55	DIBAHAN	PPB	10	5	5 ***	.		Dibenz[a,h]anthracene
B56	DIBCGCA	PPB	10	5	5 ***	.		7H-dibenzo[c,g]carbazole
B57	DIBAEPY	PPB	10	5	5 ***	.		Dibenzo[a,e]pyrene
B58	DIBAHPY	PPB	10	5	5 ***	.		Dibenzo[a,h]pyrene
B59	DIBAIPY	PPB	10	5	5 ***	.		Dibenzo[a,i]pyrene
B60	DIBPHTH	PPB	10	5	5 ***	.		Di-n-butyl phthalate
B61	12-dben	PPB	10	5	5 ***	.		1,2-dichlorobenzene
B62	13-dben	PPB	10	5	5 ***	.		1,3-dichlorobenzene
B63	14-dben	PPB	10	5	5 ***		75 EPA	p-Dichlorobenzene
B64	DICHBEN	PPB	10	5	5 ***	.		3,3'-dichlorobenzidine
B65	24-dchp	PPB	10	5	5 ***	.		2,4-dichlorophenol
B66	26-dchp	PPB	10	5	5 ***	.		2,6-dichlorophenol
B67	DIEPHTH	PPB	10	5	5 ***	.		Diethyl phthalate
B68	DIHYSAF	PPB	10	5	5 ***	.		Dihydrosafrole
B69	DIMETHB	PPB	10	5	5 ***	.		3,3'-dimethoxybenzidine
B70	DIMEAMB	PPB	10	5	5 ***	.		P-dimethylaminoazobenzene

TABLE 13.4. (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
B71	DIMBENZ	PPB	10	5	5 ***	.		7,12-dimethylbenz[a]anthracene
B72	DIMEYLB	PPB	10	5	5 ***	.		3,3'-dimethylbenzidine
B73	THIONOX	PPB	10	5	5 ***	.		Thiofanox
B74	DIMPHAM	PPB	10	5	5 ***	.		Alpha,alpha-dimethylphenethylamine
B76	DIMPHTH	PPB	10	5	5 ***	.		Dimethyl phthalate
B77	DINBENZ	PPB	10	5	5 ***	.		Dinitrobenzene
B78	DINCRES	PPB	10	5	5 ***	.		4,6-dinitro-o-cresol and salts
B79	DINPHEN	PPB	10	5	5 ***	.		2,4-dinitrophenol
B80	24-dint	PPB	10	5	5 ***	.		2,4-dinitrotoluene
B81	26-dint	PPB	10	5	5 ***	.		2,6-dinitrotoluene
B82	DIOPHTH	PPB	10	5	5 ***	.		Di-n-octyl phthalate
B83	DIPHAMI	PPB	10	5	5 ***	.		Diphenylamine
B84	DIPHHYD	PPB	10	5	5 ***	.		1,2-diphenylhydrazine
B85	DIPRNIT	PPB	10	5	5 ***	.		Di-n-propylnitrosamine
B86	ETHMINE	PPB	10	5	5 ***	.		Ethyleneimine
B87	ETHMETS	PPB	10	5	5 ***	.		Ethyl methanesulfonate
B88	FLUORAN	PPB	10	5	5 ***	.		Fluoranthene
B89	HEXCBEN	PPB	10	5	5 ***	.		Hexachlorobenzene
B90	HEXCBUT	PPB	10	5	5 ***	.		Hexachlorobutadiene
B91	HEXCCYC	PPB	10	5	5 ***	.		Hexachlorocyclopentadiene
B92	HEXCETH	PPB	10	5	5 ***	.		Hexachloroethane
B93	INDENOP	PPB	10	5	5 ***	.		Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	PPB	10	5	5 ***	.		Isosafrole
B95	MALOILE	PPB	10	5	5 ***	.		Malononitrile
B96	MELPHAL	PPB	10	5	5 ***	.		Melphalan
B97	METHAPY	PPB	10	5	5 ***	.		Methapyrilene
B98	METHNYL	PPB	10	5	5 ***	.		Metholonyl
B99	METAZIR	PPB	10	5	5 ***	.		2-methylaziridine
C01	METCHAN	PPB	10	5	5 ***	.		3-methylcholanthrene
C02	METBISC	PPB	10	5	5 ***	.		4,4'-methylenebis(2-chloroaniline)
C03	METACTO	PPB	10	5	5 ***	.		2-methyllactonitrile
C04	METACRY	PPB	10	5	5 ***	.		Methyl methacrylate
C05	METMSUL	PPB	10	5	5 ***	.		Methyl methanesulfonate
C06	METPROP	PPB	10	5	5 ***	.		2-methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	PPB	10	5	5 ***	.		Methylthiouracil
C08	NAPHQUI	PPB	10	5	5 ***	.		1,4-naphthoquinone
C09	1-napha	PPB	10	5	5 ***	.		1-naphthylamine
C10	2-napha	PPB	10	5	5 ***	.		2-naphthylamine
C11	NITRANI	PPB	10	5	5 ***	.		P-nitroaniline
C12	NITBENZ	PPB	10	5	5 ***	.		Nitrobenzine
C13	NITPHEN	PPB	10	5	5 ***	.		p-Nitrophenol
C14	NNIBUTY	PPB	10	5	5 ***	.		N-nitrosodi-n-butylamine
C15	NNIDIEA	PPB	10	5	5 ***	.		N-nitrosodiethanolamine
C16	NNIDIEY	PPB	10	5	5 ***	.		N-nitrosodiethylamine

TABLE 13.4. (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
C17	NNIDIME	PPB	10	5	5	***	.		N-nitrosodimethylamine
C18	NNIMETH	PPB	10	5	5	***	.		N-nitrosomethylethylamine
C19	NNIURET	PPB	10	5	5	***	.		N-nitroso-N-methylurethane
C20	NNIVINY	PPB	10	5	5	***	.		N-nitrosomethylvinylamine
C21	NNIMORP	PPB	10	5	5	***	.		N-nitrosomorpholine
C22	NNINICO	PPB	10	5	5	***	.		N-nitrosonornicotine
C23	NNIPIPE	PPB	10	5	5	***	.		N-nitrosopiperidine
C24	NITRPYR	PPB	10	5	5	***	.		Nitrosopyrrolidine
C25	NITRTOL	PPB	10	5	5	***	.		5-nitro-o-toluidine
C26	PENTCHB	PPB	10	5	5	***	.		Pentachlorobenzene
C27	PENTCHN	PPB	10	5	5	***	.		Pentachloronitrobenzene
C28	PENTCHP	PPB	50	5	5	***	220	EPAP	Pentachlorophenol
C29	PHENTIN	PPB	10	5	5	***	.		Phenacetin
C30	PHENINE	PPB	10	5	5	***	.		Phenylenediamine
C31	PHTHEST	PPB	10	5	5	***	.		Phthalic acid esters
C32	PICOLIN	PPB	10	5	5	***	.		2-picoline
C33	PRONIDE	PPB	10	5	5	***	.		Pronamide
C34	RESERPI	PPB	10	5	5	***	.		Reserpine
C35	RESORCI	PPB	10	5	5	***	.		Resorcinol
C36	SAFROL	PPB	10	5	5	***	.		Safrol
C37	TETRCHB	PPB	10	5	5	***	.		1,2,4,5-tetrachlorobenzene
C39	TETRCHP	PPB	10	5	5	***	.		2,3,4,6-tetrachlorophenol
C40	THIURAM	PPB	10	5	5	***	.		Thiuram
C41	TOLUDIA	PPB	10	5	5	***	.		Toluenediamine
C42	OTOLHYD	PPB	10	5	5	***	.		O-toluidine hydrochloride
C43	TRICHLB	PPB	10	5	5	***	.		1,2,4-trichlorobenzene
C44	245-trp	PPB	10	5	5	***	.		2,4,5-trichlorophenol
C45	246-trp	PPB	10	5	5	***	.		2,4,6-trichlorophenol
C46	TRIPHOS	PPB	10	5	5	***	.		O,O,O-triethyl phosphorothioate
C47	SYMTRIN	PPB	10	5	5	***	.		Sym-trinitrobenzene
C48	TRISPHO	PPB	10	5	5	***	.		Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	PPB	10	5	5	***	.		Benzo[a]pyrene
C50	CHLNAPZ	PPB	10	5	5	***	.		Chlornaphazine
C51	BIS2ETH	PPB	10	5	5	***	.		Bis(2-chloroisopropyl)ether
C52	HEXAENE	PPB	10	5	5	***	.		Hexachloropropene
C54	HEXACHL	PPB	10	5	5	***	.		Hexachlorophene
C55	NAPHTHA	PPB	10	5	5	***	.		Naphthalene
C56	123TRI	PPB	10	5	5	***	.		1,2,3-trichlorobenzene
C58	135TRI	PPB	10	5	5	***	.		1,3,5-trichlorobenzene
C59	1234TE	PPB	10	5	5	***	.		1,2,3,4-tetrachlorobenzene
C60	1235TE	PPB	10	5	5	***	.		1,2,3,5-tetrachlorobenzene
C61	TETEPYR	PPB	2	5	5	***	.		Tetraethylpyrophosphate
C62	CHLLATE	PPB	300	5	5	***	.		Chlorobenzilate
C63	CARBPHT	PPB	2	5	5	***	.		Carbophenothion

TABLE 13.4. (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
C64	DISULFO	PPB	2	5	5 ***	.		Disulfoton
C65	DIMETHO	PPB	2	5	5 ***	.		Dimethoate
C66	METHPAR	PPB	2	5	5 ***	.		Methyl parathion
C67	PARATHI	PPB	2	5	5 ***	.		Parathion
C70	CYANIDE	PPB	10	5	5 ***	.		Cyanide
C71	FORMALN	PPB	500	5	5 ***	.		Formalin
C77	PERCHLO	PPB	500	5	5 ***	.		Perchlorate
C78	SULFIDE	PPB	1000	5	5 ***	.		Sulfide
C79	KEROSEN	PPB	10000	5	5 ***	.		Kerosene
C80	AMMONIU	PPB	50	5	5 ***	.		Ammonium ion
C87	CITRUSR	PPB	1000	5	5 ***	.		Citrus red
C90	PARALDE	PPB	10000	5	5 ***	.		Paraldehyde
C91	STRYCHN	PPB	50	5	5 ***	.		Strychnine
C92	MALHYDR	PPB	500	5	5 ***	.		Maleic hydrizide
C93	NICOTIN	PPB	100	5	5 ***	.		Nicotinic acid
C94	ACRYIDE	PPB	10000	5	5 ***	0	EPAP	Acrylamide
C95	ALLYLAL	PPB	10000	5	5 ***	.		Allyl alcohol
C98	CHLPROP	PPB	10000	5	5 ***	.		3-chloropropionitrile
D01	PCDD's	PPB	.0100	5	5 ***	.		Pcdd's
D02	PCDF's	PPB	.0100	5	5 ***	.		Pcdf's
D03	2378TCD	PPB	.0100	5	5 ***	.		2,3,7,8 TCDD
H03	ETHCARB	PPB	10000	5	5 ***	.		Ethyl carbamate
H04	ETHCYAN	PPB	10000	5	5 ***	.		Ethyl cyanide
H05	ETHOXID	PPB	10	5	5 ***	.		Ethylene oxide
H06	ETHMETH	PPB	10	5	5 ***	.		Ethyl methacrylate
H09	ISOBUTY	PPB	10000	5	5 ***	.		Isobutyl alcohol
H11	PROPYLA	PPB	10000	5	5 ***	.		N-propylamine
H12	PROPYNO	PPB	10000	5	5 ***	.		2-propyn-1-ol
H15	2,4,5-T	PPB	2	5	5 ***	.		2,4,5-T
H40	FTHALLI	PPB	5	5	5 ***	.		Thallium, filtered
H62	LHYDRAZ	PPB	30	5	5 ***	.		Hydrazine, Low Detection Level
H68	HEXONE	PPB	10	5	5 ***	.		Methyl Isobutyl Ketone
I01	ACETONE	PPB	10	5	5 ***	.		Acetone by VOA
I06	ISOPHER	PPB	10	5	5 ***	.		Isopherone
I09	BUTANOL	PPB	10000	5	5 ***	.		1-Butanol
I21	TRIBUPH	PPB	10	5	5 ***	.		Tributylphosphoric Acid
I28	TAF	PPB	10	5	5 ***	.		Tetrahydrofuran
I29	ACENAPH	PPB	10	5	5 ***	.		Acenaphthene
I30	FLRENE	PPB	10	5	5 ***	.		Fluorene
I31	ANTHRA	PPB	10	5	5 ***	.		Anthracene
I32	PYRENE	PPB	10	5	5 ***	.		Pyrene
I33	ETHBENZ	PPB	5	5	5 ***	680	EPAP	Ethyl benzene
I34	STYRENE	PPB	5	5	5 ***	140	EPAP	Styrene
I42	BDCM	PPB	5	5	5 ***	100	EPA	Bromodichloromethane

TABLE 13.4. (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
I43	CDBM	PPB	5	5	5 ***	100	EPA	Chlorodibromomethane
I64	2NITPH	PPB	10	5	5 ***	.		o-Nitrophenol
I67	ETHANOL	PPB	10000	5	5 ***	.		Ethanol
I75	2MENAPH	PPB	10	5	5 ***	.		2-Methylnaphthalene
I82	PHENANT	PPB	10	5	5 ***	.		Phenanthrene
J43	BENZALC	PPB	10	5	5 ***	.		Benzyl Alcohol
J69	2HEXANO	PPB	50	5	5 ***	.		2-Hexanone
J71	BNZKFLU	PPB	10	5	5 ***	.		Benzo(k)Fluoranthene
J83	BGHIPER	PPB	10	5	5 ***	.		Benzo(Ghi)Perylene
J89	DINOSEB	PPB	10	5	5 ***	.		Dinoseb
J91	DIALLAT	PPB	10	5	5 ***	.		Diallate
K52	NNDIPHA	PPB	10	5	5 ***	.		N-NITROSODIPHENYLAMINE
K56	DIBENFR	PPB	10	5	5 ***	.		DIBENZOFURAN
K58	ACENATL	PPB	10	5	5 ***	.		ACENAPHTHYLENE
L20	MBP	PPB	10000	5	5 ***	.		Monobutyl Phosphate
L21	DBP	PPB	10000	5	5 ***	.		Dibutyl Phosphate
L45	ALLYLCL	PPB	100	5	5 ***	.		Allyl Chloride
L46	CLETHAN	PPB	10	5	5 ***	.		Chloroethane
L48	PROPCN	PPB	5	5	5 ***	.		Propionitrile
L49	VINYLAC	PPB	5	5	5 ***	.		Vinyl Acetate
L50	B2CLMEE	PPB	10	5	5 ***	.		Bis(2-chloro-1-methylethyl)ether
L52	DIPHOS	PPB	10	5	5 ***	.		0,0-Diethyl-0,2-pyrazinyl phosphorothion
L53	ISODRIN	PPB	10	5	5 ***	.		Isodrin
L54	ONITANI	PPB	10	5	5 ***	.		o-Nitroaniline
L55	MNITANI	PPB	10	5	5 ***	.		m-Nitroaniline
L56	4NITQUI	PPB	10	5	5 ***	.		4-Nitroquinoline 1-oxide
L57	ETHGLYC	PPB	10000	5	5 ***	.		Ethylene Glycol
L59	1PROPAN	PPB	10000	5	5 ***	.		1-Propanol
L60	1BUTYN	PPB	10000	5	5 ***	.		1-Butynol
L62	ACETONE	PPB	10	5	5 ***	.		Acetone - by ABN
L63	14DBEN	PPB	5	5	5 ***	75	EPA	p-Dichlorobenzene
L64	CHLROB	PPB	10	5	5 ***	60	EPAP	Chlorobenzene (by ABN)

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 13.5. Constituents with at Least One Detected Value for the 2101-M Pond, August 1989

Contamination Indicator Parameters

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	CONDLAB UMHO ./700w	PH-LAB .01/6.5-8.5s	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
2-E18-1	31OCT89		552	.	.	7.95	#500	#1
	29NOV89		563	542	7.30	8.09	#200	#3
	29NOV89	1	562	543	7.80	8.08	#300	#5
	29NOV89	2	561	550	7.80	8.09	#300	#4
	29NOV89	3	560	552	7.80	8.10	#300	#8
2-E18-2	27NOV89		278	.	.	8.14	#400	#6
	27NOV89	1	283	.	.	8.12	#700	#8
	27NOV89	2	285	.	.	8.13	#400	#8
	27NOV89	3	281	.	.	8.11	#600	#7
2-E18-3	27NOV89		238	247	8	8.08	#700	#7
	27NOV89	1	233	245	8	8.09	#400	#7
	27NOV89	2	235	247	8	8.09	#400	#5
	27NOV89	3	230	248	8.10	8.12	#500	#6
2-E18-4	21NOV89		236	278	7.90	8.09	#400	#8
	21NOV89	1	239	286	8	8.11	#600	#4
	21NOV89	2	234	287	8	8.10	#700	11
	21NOV89	3	236	285	8	8.10	#600	#7

TABLE 13.5. (contd)

Well name	Collection date	Duplicate sample number	FSELENI PPB 5/10	FPOTASS PPB 100/.	FSTRONT PPB 10/.	ALKALIN 20000/.	ALPHAHI PCI/L 4/15	ALUMNUM PPB 150/.	AM-241 PCI/L .10/30d	ARSENIC PPB 5/50
2-E18-1	31OCT89		6	5790	265	.	4.52	244	.0298	<5
	29NOV89		.	.	.	102000	.	.	.	.
2-E18-2	27NOV89		<5	4850	149	91000	1.32	<150	.	7
2-E18-3	27NOV89		<5	5030	147	104000	2.81	<150	.	13
	27NOV89	1	<5	4780	147	105000	2.28	<150	.	14
2-E18-4	21NOV89		<5	5450	154	98000	3.77	<150	.	10

Well name	Collection date	Duplicate sample number	FARSENI PPB 5/50	BARIUM PPB 6/1000	FBARIUM PPB 6/1000	BDCM PPB 5/100	BETA PCI/L 8/50	BORON PPB 10/.	FBORON PPB 10/.	CALCIUM PPB 50/.
2-E18-1	31OCT89		<5	29	28	<5	8.50	31	30	56900
	29NOV89		.	.	.	.	.	.	.	.
2-E18-2	27NOV89		<5	57	57	<5	4.71	18	19	27100
2-E18-3	27NOV89		11	57	56	<5	4.71	11	12	29200
	27NOV89	1	12	56	57	#3	5.95	14	14	28400
2-E18-4	21NOV89		9	57	57	<5	4.92	14	14	30200

Well name	Collection date	Duplicate sample number	FCALCIU PPB 50/.	CHLFORM PPB 5/100	CHLORID PPB 500/250000s	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
2-E18-1	31OCT89		64400	<5	8000	39	*.759	*1.18	802	35
	29NOV89		.	.	.	.	.	.	.	.
2-E18-2	27NOV89		27100	<5	.	16	.	.	77	<30
2-E18-3	27NOV89		29100	<5	5400	58	.	.	407	<30
	27NOV89	1	29000	25	5400	33	.	.	185	<30
2-E18-4	21NOV89		29100	<5	9800	64	.	.	323	<30

Well name	Collection date	Duplicate sample number	MAGNES PPB 50/.	FMAGNES PPB 50/.	MANGESE PPB 5/50s	METHYCH PPB 5/.	NICKEL PPB 10/.	NITRATE PPB 500/45000	POTASUM PPB 100/.	PU-238 PCI/L 17/1.6d
2-E18-1	31OCT89		14700	15500	18	<5	22	12200	5460	*-0.00144
	29NOV89		.	.	.	.	.	.	.	.
2-E18-2	27NOV89		7510	7280	<5	5	<10	.	5080	.
2-E18-3	27NOV89		7960	7910	12	#3	30	600	4850	.
	27NOV89	1	7670	7800	<5	75	19	500	4660	.
2-E18-4	21NOV89		8100	7970	8	<5	33	<500	5510	.

TABLE 13.5. (contd)

Well name	Collection date	Duplicate sample number	PU39-40 PCI/L 17/1.2d	RADIUM PCI/L 1/5	RU-106 PCI/L 172.5/30r	SELENUM PPB 5/10	SILICON PPB 50/.	FSILICO PPB 50/.	SODIUM PPB 200/.	FSODIUM PPB 200/.
2-E18-1	31OCT89		*.00308	.248	*-26.2	6	16200	16900	25900	27800
	29NOV89		.	.	.	.	.	.	.	.
2-E18-2	27NOV89		.	.367	.	<5	18200	18400	17100	16300
2-E18-3	27NOV89		.	*.0742	.	<5	17200	17200	5410	5700
	27NOV89	1	.	*.0598	.	<5	17000	17400	5550	5710
2-E18-4	21NOV89		.	.199	.	<5	17500	17300	10600	9260

Well name	Collection date	Duplicate sample number	SR 90 PCI/L 5/8	STRONUM PPB 10/.	SULFATE PPB 500/250000s	TC PPB 1000/.	TDS 5000/500000s	TRITIUM PCI/L 500/20000	TURBID NTU .10/1	U PCI/L .50/600d
2-E18-1	31OCT89		*.429	250	148000	24600	347000	*86.3	11	4.56
	29NOV89		.	.	.	.	.	.	.	.
2-E18-2	27NOV89		.	153	.	21500	.	.	.700	.
2-E18-3	27NOV89		.	150	15500	24800	.	.	2.10	.
	27NOV89	1	.	146	15500	25000	.	.	.	.
2-E18-4	21NOV89		.	158	23900	23800	.	.	1.10	.

Well name	Collection date	Duplicate sample number	VANADUM PPB 5/.	FVANADI PPB 5/.	ZINC PPB 5/5000s	FZINC PPB 5/5000s
2-E18-1	31OCT89		9	8	25	7
	29NOV89		.	.	.	.
2-E18-2	27NOV89		20	22	5	<5
2-E18-3	27NOV89		28	27	15	<5
	27NOV89	1	27	28	6	<5
2-E18-4	21NOV89		27	28	6	<5

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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

TABLE 13.6. Critical Mean Values for Indicator Parameter Data at the 2101-M Pond, November 1989[a]

Constituent, Units[b]	n	df	tc	Average	Standard Deviation	Critical Mean
Conductivity in the field, µmho/cm	4	3	11.984	528.4	39.1	1,052.9
pH, field	4	3	15.145	7.804	0.657	3.316, 18.923
Total organic carbon, ppb	4	3	11.984	387.6	156.2	2,480.5
Total organic halogens, ppb	4	3	11.984	3.59	0.99	16.8

(a) Data collected August 1988 to June 1989. Values calculated based on 16 comparisons.
(b) The following notations are used in this table:
df = degrees of freedom (n-1).
n = number of background replicate averages.
tc = Bonferroni critical t-value for appropriate df and 16 comparisons.

TABLE 13.7. Contamination Indicator Parameter Replicate Averages for the 2101-M Pond, November 1989

Constituent Code	Name	Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088	CONDLAB	umho	2-E18-1	29NOV89	4	547	4.99	542	552	0.9
			2-E18-3	27NOV89	4	247	1.26	245	248	0.5
			2-E18-4	21NOV89	4	284	4.08	278	287	1.4
191	CONDFLD	umho	2-E18-1	29NOV89	4	562	1.29	560	563	0.2
			2-E18-2	27NOV89	4	282	2.99	278	285	1.1
			2-E18-3	27NOV89	4	234	3.37	230	238	1.4
			2-E18-4	21NOV89	4	236	2.06	234	239	0.9
199	PHFIELD		2-E18-1	29NOV89	4	8.09	0.008	8.08	8.10	0.1
			2-E18-2	27NOV89	4	8.13	0.013	8.11	8.14	0.2
			2-E18-3	27NOV89	4	8.10	0.017	8.08	8.12	0.2
			2-E18-4	21NOV89	4	8.10	0.008	8.09	8.11	0.1
207	PH-LAB		2-E18-1	29NOV89	4	7.68	0.25	7.3	7.8	3.3
			2-E18-3	27NOV89	4	8.02	0.05	8.0	8.1	0.6
			2-E18-4	21NOV89	4	7.98	0.05	7.9	8.0	0.6
C69	TOC	ppb	2-E18-1	29NOV89	4	275	50	200	300	18.2
			2-E18-2	27NOV89	4	525	150	400	700	28.6
			2-E18-3	27NOV89	4	500	141	400	700	28.3
			2-E18-4	21NOV89	4	575	126	400	700	21.9
H42	TOXLDL	ppb	2-E18-1	29NOV89	4	5.0	2.16	3	8	43.2
			2-E18-2	27NOV89	4	7.3	0.96	6	8	13.2
			2-E18-3	27NOV89	4	6.3	0.96	5	7	15.3
			2-E18-4	21NOV89	4	7.5	2.89	4	11	38.5

THIS PAGE INTENTIONALLY
LEFT BLANK

14.0 GROUT TREATMENT FACILITY

S. S. Teel
Pacific Northwest Laboratory

The ground water beneath the Grout Treatment Facility (GTF) has been monitored by a RCRA background well network since 1988. Contamination indicator evaluation began with the samples collected during June/July 1989. A Part B Permit Application was submitted to the Washington State Department of Ecology in November 1988 (DOE 1988b). A ground-water monitoring plan has been prepared for this facility (Teel, Bjornstad, and Newcomer 1989).

The GTF is located east of the 200-East Area in the central portion of the Hanford Site (Figure 1.1) and 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 the waste mixture will solidify. Field data collection in support of this project began in 1984. Treatment and disposal of a nondangerous mixture of phosphate/ sulfate-rich wastes from the N Reactor began in August 1988 (DOE 1988b). The site is scheduled to begin processing mixed wastes in 1991.

There are currently seven wells in the RCRA monitoring network for the GTF. Wells 299-E25-25 and 299-E25-32P are upgradient wells; wells 299-E25-29P, 299-E25-31, 299-E25-33, 299-E25-37, and 299-E25-38 are downgradient wells. The latter two wells were installed during the past quarter. Ground-water samples have also previously been 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-E25-30P. These additional wells were sampled to monitor the effects of nearby waste disposal facilities and to monitor the base of the unconfined aquifer (well 299-E25-28). These site characterization wells are not being sampled at the present time. The locations of the wells in the monitoring network are shown in Figure 14.1. The sampling schedule for these wells is shown in Table 14.1.

9 2 1 2 6 4 2 1 9 1 1

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Well construction activities at the two additional ground-water monitoring wells installed during FY 1989 (wells 299-E25-37 and 299-E25-38) consisted of installing and testing the HydroStar sampling pumps. The HydroStar pump was installed on October 12, 1989, at well 299-E25-38 and on October 13, 1989, at well 299-E25-37. The pumps at both wells were tested on December 5, 1989; both pumps worked. This completes the monitoring well installation activities planned for FY 1989. Well construction documentation (i.e., drill logs) not provided in the previous quarterly report can be found in Volume 2 of this report, Appendix A.

WATER LEVELS

Water-level measurements are collected on a quarterly basis, before sample collection. Table 14.2 lists the water-level data collected before sample collection for the GTF monitoring project. Measurements were made at each well that was sampled. Semiannual water-level measurements are also obtained from all of the GTF ground-water monitoring wells in December and June; these data are shown in Table 14.3.

WATER CHEMISTRY DATA

Quarterly sampling is being conducted for indicator parameter evaluation. The first quarter FY 1990 sampling occurred at all seven RCRA monitoring wells in December; however, the results of the December sampling have not been received yet. All of the samples were collected after approximately three borehole volumes of water had been purged.

Upgradient well 299-E25-32P and site characterization wells 299-E25-26 and 299-E25-28 were sampled in late October/early November for the constituents listed in WAC 173-303-9905 and 40 CRF 264, Appendix IX. The sampling was conducted for a Hanford liquid effluent study; data are shown in Tables 14.4 and 14.5. None of the constituents were elevated except for total organic halogens at well 299-E25-26 (16 ppb), which was slightly over the 10-ppb detection limit.

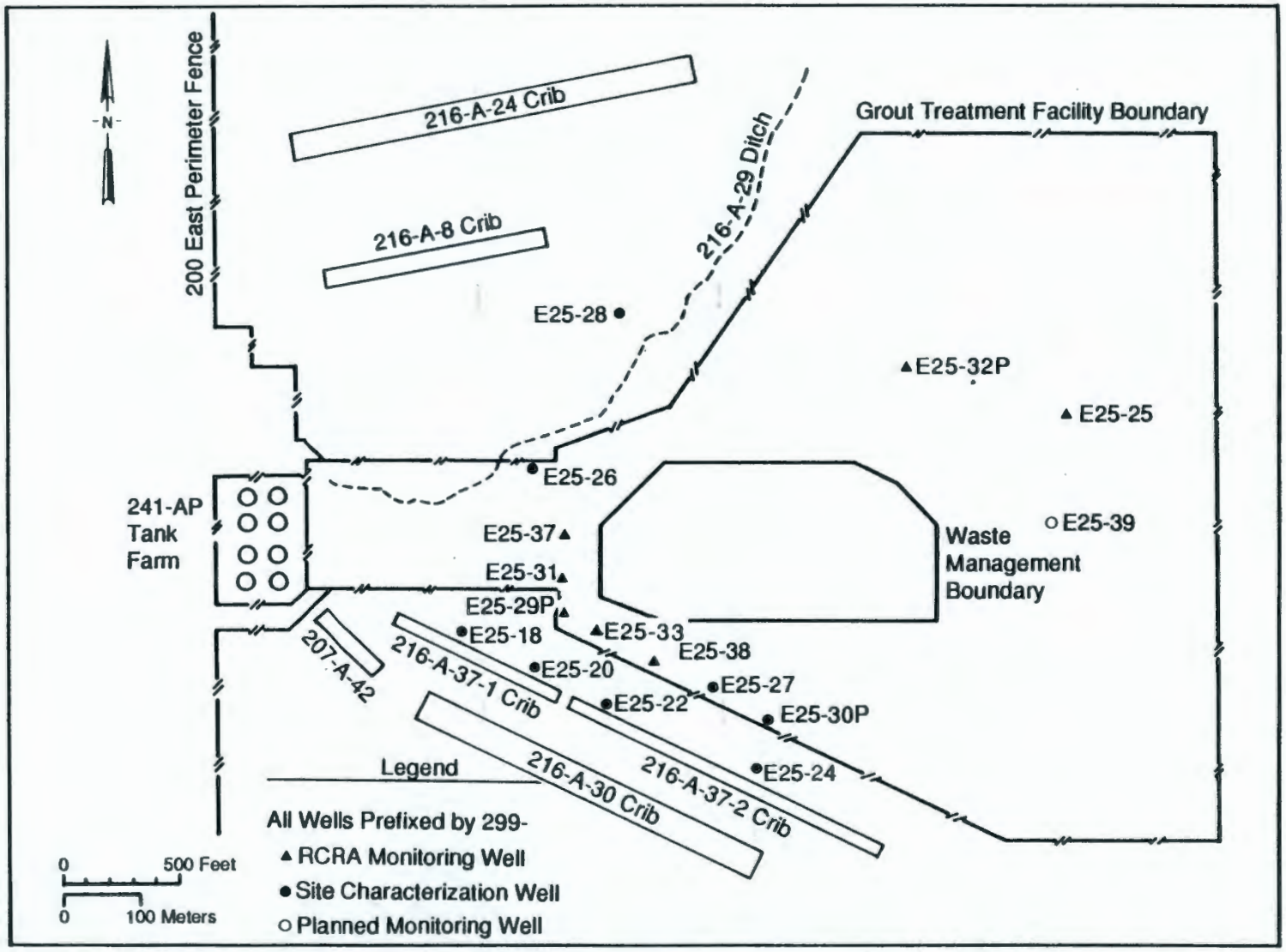

FIGURE 14.1. Monitoring Well Locations for the Grout Treatment Facility

TABLE 14.1. Sampling Schedule for the Grout Treatment Facility

	1989[a]			1990								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep
299-E25-25			X		X			X			X	
299-E25-29P			XERV		XE			XE			XE	
299-E25-31			XE		XE			XE			XE	
299-E25-32P			X		X			X			X	
299-E25-33			X		X			XRV			X	
299-E25-37			X		XRV			L			X	
299-E25-38			X		X			L			XRV	

(a) The following notations are used in this table:
E = all wells sampled for constituents discussed in X and wells 299-E25-29 and 299-E25-31 sampled for phosphorus pesticides.
L = sampled for the constituents listed in X and in 40 CFR 264, Appendix IX.
R = sampled for quality control replicates.
V = sampled for volatile organic analyses blanks.
X = sampled for the 40 CFR 265 constituents; and quadruplicate measurements of chromium, arsenic, selenium, and technetium-99 (site-specific contamination indicator parameters).

TABLE 14.2. Water-Level Data Collected Before Sampling from Wells Near the Grout Treatment Facility

Well	Casing Elevation, ft above MSL[a]	Date	Water-Level Elevation, ft above MSL
299-E25-25	669.42	12/13/89	406.99
299-E25-29P	672.86	12/12/89	405.36
299-E25-31	672.53	12/12/89	405.83
299-E25-32P	670.04	12/12/89	408.94
299-E25-33	650.03	12/12/89	405.07
299-E25-37	673.29	12/21/89	404.82
299-E25-38	673.52	12/20/89	405.08

(a) MSL = mean sea level.

TABLE 14.3. Semiannual Water-Level Data for Wells Near the Grout Treatment Facility

Well	Casing Elevation, ft above MSL[a]	Date	Water-Level Elevation, ft above MSL
299-E25-18	679.05	12/13/89	404.95
299-E25-20	676.30	12/13/89	404.79
299-E25-22	674.05	12/13/89	404.87
299-E25-24	679.55	12/13/89	405.27
299-E25-25	669.42	12/13/89	405.90
299-E25-26	668.52	12/13/89	405.30
299-E25-27	676.08	12/14/89	405.38
299-E25-28	662.44	12/13/89	405.49
299-E25-29P	672.86	12/13/89	405.06
299-E25-30P	678.20	12/13/89	NM[b]
299-E25-31	672.53	12/13/89	405.07
299-E25-32P	670.04	12/13/89	NM
299-E25-33	650.03	12/13/89	405.23

(a) MSL = mean sea level.
(b) NM = no measurement could be made because of obstruction or condensation in well.

9 2 1 2 6 4 2 1 9 1 5

TABLE 14.4. Constituent List and Summary of Sampling Results for the Grout Treatment Facility, October Through November 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	3	0	700	WDOE		Specific conductance
199	PHFIELD		.100	3	0	6.5-8.5	EPAS		pH, Field Measurement
C69	TOC	PPB	2000	3	3 ***	.			Total organic carbon
H42	TOXLDL	PPB	10	3	2	.			Total Organic Halogen, Low Det. Level

---------- 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	2.20	1	1 ***	1	EPA		Coliform bacteria
111	BETA	PCI/L	8	3	0	50	EPA		Gross beta
112	ALPHAHI	PCI/L	4	3	1	15	EPA		Alpha, High Detection Level
181	RADIUM	PCI/L	1	3	3 ***	5	EPA		Radium
A06	BARIUM	PPB	6	3	0	1000	EPA		Barium
A07	CADMIUM	PPB	2	3	3 ***	10	EPA		Cadmium
A08	CHROMUM	PPB	10	3	2	50	EPA		Chromium
A10	SILVER	PPB	10	3	3 ***	50	EPA		Silver
A20	ARSENIC	PPB	5	3	1	50	EPA		Arsenic
A21	MERCURY	PPB	.100	3	3 ***	2	EPA		Mercury
A22	SELENUM	PPB	5	3	3 ***	10	EPA		Selenium
A33	ENDRIN	PPB	.100	3	3 ***	.200	EPA		Endrin
A34	METHLOR	PPB	3	3	3 ***	100	EPA		Methoxychlor
A35	TOXAENE	PPB	1	3	3 ***	5	EPA		Toxaphene
A36	a-BHC	PPB	.100	3	3 ***	4	EPA		Alpha-BHC
A37	b-BHC	PPB	.100	3	3 ***	4	EPA		Beta-BHC
A38	g-BHC	PPB	.100	3	3 ***	4	EPA		Gamma-BHC
A39	d-BHC	PPB	.100	3	3 ***	4	EPA		Delta-BHC
A51	LEADGF	PPB	5	3	3 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	PPB	500	3	0	45000	EPA		Nitrate
C74	FLUORID	PPB	500	3	3 ***	4000	EPA		Fluoride
H13	2,4-D	PPB	2	3	3 ***	100	EPA		2,4-D
H14	2,4,5TP	PPB	2	3	3 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	PPB	6	3	0	1000	EPA		Barium, filtered
H21	FCADMIU	PPB	2	3	3 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	PPB	10	3	3 ***	50	EPA		Chromium, filtered
H23	FSILVER	PPB	10	3	3 ***	50	EPA		Silver, filtered
H37	FARSENI	PPB	5	3	1	50	EPA		Arsenic, filtered
H38	FMERCUR	PPB	.100	3	3 ***	2	EPA		Mercury, filtered
H39	FSELENI	PPB	5	3	3 ***	10	EPA		Selenium, filtered

TABLE 14.4. (contd)

Constituent List= Interim Primary Drinking Water Parameters

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full Name
H41	FLEAD	PPB	5	3	3 ***	50	EPA	Lead, filtered
H60	TURBID	NTU	.100	3	0	1	EPA	Turbidity
P19	COLIMF	PPB	1	2	2 ***	1	EPA	Coliform (Membrane Filter)

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	3	0	.		Sodium
A17	MANGESE	PPB	5	3	3 ***	50	EPAS	Manganese
A19	IRON	PPB	30	3	0	300	EPAS	Iron
C57	PHENOL	PPB	10	3	3 ***	.		Phenol
C73	SULFATE	PPB	500	3	0	250000	EPAS	Sulfate
C75	CHLORID	PPB	500	3	0	250000	EPAS	Chloride
H24	FSODIUM	PPB	200	3	0	.		Sodium, filtered
H29	FMANGAN	PPB	5	3	3 ***	50	EPAS	Manganese, filtered
H31	FIRON	PPB	30	3	3 ***	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	3	3 ***	100	EPAR	Cobalt-60
024	CS-137	PCI/L	20	3	3 ***	200	EPAR	Cesium-137
034	RU-106	PCI/L	172.5	3	3 ***	30	EPAR	Ruthenium-106
100	PU39-40	PCI/L	17	3	3 ***	1.20	DOE	Plutonium-239/40
102	PU-238	PCI/L	17	3	3 ***	1.60	DOE	Plutonium-238
104	U	PCI/L	.500	3	0	600	DOE	Uranium
105	AM-241	PCI/L	.100	3	3 ***	30	DOE	Americium-241
108	TRITIUM	PCI/L	500	3	0	20000	EPA	Tritium
121	SR 90	PCI/L	5	3	3 ***	8	EPA	Strontium-90
A01	BERYLUM	PPB	5	3	3 ***	.		Beryllium
A03	STRONUM	PPB	10	3	0	.		Strontium
A04	ZINC	PPB	5	3	1	5000	EPAS	Zinc
A05	CALCIUM	PPB	50	3	0	.		Calcium
A12	NICKEL	PPB	10	3	2	.		Nickel
A13	COPPER	PPB	10	3	3 ***	1300	EPAP	Copper
A14	VANADUM	PPB	5	3	0	.		Vanadium
A15	ANTIONY	PPB	100	3	3 ***	.		Antimony
A16	ALUMNUM	PPB	150	3	3 ***	.		Aluminum
A18	POTASUM	PPB	100	3	0	.		Potassium
A50	MAGNES	PPB	50	3	0	.		Magnesium

TABLE 14.4. (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	3	3 ***	.		Phosphate
H16	TC	PPB	1000	3	0	.		Total carbon
H17	TDS		5000	3	0	500000	EPAS	Total dissolved solids
H18	FZINC	PPB	5	3	1	5000	EPAS	Zinc, filtered
H19	FCALCIU	PPB	50	3	0	.		Calcium, filtered
H25	FNICKEL	PPB	10	3	3 ***	.		Nickel, filtered
H26	FCOPPER	PPB	10	3	3 ***	1300	EPAP	Copper, filtered
H27	FVANADI	PPB	5	3	0	.		Vanadium, filtered
H28	FALUMIN	PPB	150	3	3 ***	.		Aluminum, filtered
H30	FPOTASS	PPB	100	3	0	.		Potassium, filtered
H32	FMAGNES	PPB	50	3	0	.		Magnesium, filtered
H33	FBERYLL	PPB	5	3	3 ***	.		Beryllium, filtered
H35	FSTRONT	PPB	10	3	0	.		Strontium, filtered
H36	FANTIMO	PPB	100	3	3 ***	.		Antimony, filtered
H66	BROMIDE	PPB	1000	3	3 ***	.		Bromide
H67	NITRITE	PPB	1000	3	3 ***	.		Nitrite
H86	FBORON	PPB	10	3	2	.		Boron, filtered
H87	FCOBALT	PPB	20	3	3 ***	.		Cobalt, filtered
H88	FLITHIU	PPB	10	3	3 ***	.		Lithium, filtered
H89	FMOLY	PPB	40	3	3 ***	.		Molybdenum, filtered
H90	FSILICO	PPB	50	3	0	.		Silicon, filtered
H91	FTIN	PPB	30	3	3 ***	.		Tin, filtered
H92	FTITAN	PPB	60	3	3 ***	.		Titanium, filtered
H93	FZIRCON	PPB	50	3	3 ***	.		Zirconium, filtered
P01	BORON	PPB	10	3	3 ***	.		Boron
P02	COBALT	PPB	20	3	3 ***	.		Cobalt
P03	LITHIUM	PPB	10	3	3 ***	.		Lithium
P04	MOLY	PPB	40	3	3 ***	.		Molybdenum
P05	SILICON	PPB	50	3	0	.		Silicon
P06	TIN	PPB	30	3	3 ***	.		Tin
P07	TITAN	PPB	60	3	3 ***	.		Titanium
P08	ZIRCON	PPB	50	3	3 ***	.		Zirconium
P12	ENDSFAN	PPB	.500	3	3 ***	.		Endosulfan
P13	PHORATE	PPB	2	3	3 ***	.		PHORATE

TABLE 14.4. (contd)

TABLE Constituent List and Summary of Results for GROUT TREATMENT FACILITY
OCTOBER 1989 through NOVEMBER 1989

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

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full Name
A23	THALIUM	PPB	5	3	3 ***	.		Thallium
A24	THIOURA	PPB	200	3	3 ***	.		Thiourea
A25	ACETREA	PPB	200	3	3 ***	.		1-acetyl-2-thiourea
A26	CHLOREA	PPB	200	3	3 ***	.		1-(o-chlorophenyl) thiourea
A27	DIETROL	PPB	200	3	3 ***	.		Diethylstilbesterol
A28	ETHYREA	PPB	200	3	3 ***	.		Ethylenethiourea
A29	NAPHREA	PPB	200	3	3 ***	.		1-naphthyl-2-thiourea
A32	PHENREA	PPB	500	3	3 ***	.		N-phenylthiourea
A40	DDD	PPB	.100	3	3 ***	.		DDD
A41	DDE	PPB	.100	3	3 ***	.		DDE
A42	DDT	PPB	.100	3	3 ***	.		DDT
A43	HEPTLOR	PPB	.100	3	3 ***	0	EPAP	Heptachlor
A44	HEPTIDE	PPB	.100	3	3 ***	0	EPAP	Heptchlor epoxide
A45	KEPONE	PPB	1	3	3 ***	.		Kepone
A46	DIELRIN	PPB	.100	3	3 ***	.		Dieldrin
A47	ALDRIN	PPB	.100	3	3 ***	.		Aldrin
A48	CHLOANE	PPB	1	3	3 ***	0	EPAP	Chlordane
A49	ENDO1	PPB	.100	3	3 ***	.		Endosulfan I
A52	ENDO2	PPB	.100	3	3 ***	.		Endosulfan II
A54	AR1016	PPB	1	3	3 ***	0	EPAP	Arochlor 1016
A55	AR1221	PPB	1	3	3 ***	0	EPAP	Arochlor 1221
A56	AR1232	PPB	1	3	3 ***	0	EPAP	Arochlor 1232
A57	AR1242	PPB	1	3	3 ***	0	EPAP	Arochlor 1242
A58	AR1248	PPB	1	3	3 ***	0	EPAP	Arochlor 1248
A59	AR1254	PPB	1	3	3 ***	0	EPAP	Arochlor 1254
A60	AR1260	PPB	1	3	3 ***	0	EPAP	Arochlor 1260
A61	TETRANE	PPB	5	3	3 ***	5	EPA	Carbon Tetrachloride by GC/MS
A62	BENZENE	PPB	5	3	3 ***	5	EPA	Benzene
A63	DIOXANE	PPB	500	3	3 ***	.		Dioxane
A64	METHONE	PPB	10	3	3 ***	.		Methyl ethyl ketone
A65	PYRIDIN	PPB	500	3	3 ***	.		Pyridine
A66	TOLUENE	PPB	5	3	3 ***	2000	EPAP	Toluene
A67	1,1,1-T	PPB	5	3	3 ***	200	EPA	1,1,1-trichloroethane
A68	1,1,2-T	PPB	5	3	3 ***	.		1,1,2-trichloroethane
A69	TRICENE	PPB	5	3	3 ***	5	EPA	Trichloroethylene
A70	PERCENE	PPB	5	3	3 ***	.		Tetrachloroethylene
A71	OPXYLE	PPB	5	3	3 ***	440	EPAP	Xylene-o,p
A72	ACROLIN	PPB	10	3	3 ***	.		Acrolein
A73	ACRYILE	PPB	10	3	3 ***	.		Acrylonitrile
A74	BISTHER	PPB	5	3	3 ***	.		Bis(chloromethyl) ether

TABLE 14.4. (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
A75	BROMONE	PPB	5	3	3 ***	.			Bromoacetone
A76	METHBRO	PPB	10	3	3 ***	.			Methyl bromide
A77	CARBIDE	PPB	10	3	3 ***	.			Carbon disulfide
A78	CHLBENZ	PPB	5	3	3 ***	60	EPAP		Chlorobenzene
A79	CHLTHER	PPB	5	3	3 ***	.			2-chloroethyl vinyl ether
A80	CHLFORM	PPB	5	3	3 ***	100	EPA		Chloroform
A81	METHCHL	PPB	10	3	3 ***	.			Methyl chloride
A82	CHMTHER	PPB	10	3	3 ***	.			Chloromethyl methyl ether
A83	CROTONA	PPB	10	3	3 ***	.			Crotonaldehyde
A84	DIBRCHL	PPB	10	3	3 ***	0	EPAP		1,2-dibromo-3-chloropropane
A85	DIBRETH	PPB	10	3	3 ***	.			1,2-dibromoethane
A86	DIBRMET	PPB	10	3	3 ***	.			Dibromomethane
A87	DIBUTEN	PPB	10	3	3 ***	.			1,4-dichloro-2-butene
A88	DICDIFM	PPB	10	3	3 ***	.			Dichlorodifluoromethane
A89	1,1-DIC	PPB	5	3	3 ***	.			1,1-dichloroethane
A90	1,2-DIC	PPB	5	3	3 ***	5	EPA		1,2-dichloroethane
A91	TRANDCE	PPB	5	3	3 ***	70	EPAP		Trans-1,2-dichloroethene
A92	DICETHY	PPB	10	3	3 ***	7	EPA		1,1-dichloroethylene
A93	METHYCH	PPB	5	3	3 ***	.			Methylene Chloride
A94	DICPANE	PPB	5	3	3 ***	6	EPAP		1,2-dichloropropane
A95	DICPENE	PPB	5	3	3 ***	.			1,3-dichloropropene
A96	NNDIEHY	PPB	10	3	3 ***	.			N,N-diethylhydrazine
A97	1,1-DIM	PPB	10	3	3 ***	.			1,1-dimethylhydrazine
A98	1,2-DIM	PPB	10	3	3 ***	.			1,2-dimethylhydrazine
B01	IODOMET	PPB	10	3	3 ***	.			Iodomethane
B02	METHACR	PPB	10	3	3 ***	.			Methacrylonitrile
B03	METHTHI	PPB	10	3	3 ***	.			Methanethiol
B04	PENTACH	PPB	10	3	3 ***	.			Pentachloroethane
B05	1112-tc	PPB	10	3	3 ***	.			1,1,1,2-tetrachlorethane
B06	1122-tc	PPB	5	3	3 ***	.			1,1,2,2-tetrachlorethane
B08	BROMORM	PPB	5	3	3 ***	100	EPA		Bromoform
B09	TRCMEOL	PPB	10	3	3 ***	.			Trichloromethanethiol
B10	TRCMFLM	PPB	10	3	3 ***	.			Trichloromonofluoromethane
B12	123-trp	PPB	10	3	3 ***	.			1,2,3-trichloropropane
B13	VINYIDE	PPB	10	3	3 ***	2	EPA		Vinyl chloride
B14	M-XYLE	PPB	5	3	3 ***	440	EPAP		Xylene-m
B19	ACETILE	PPB	10	3	3 ***	.			Acetonitrile
B20	ACETOPH	PPB	10	3	3 ***	.			Acetophenone
B21	WARFRIN	PPB	10	3	3 ***	.			Warfarin
B22	ACEFENE	PPB	10	3	3 ***	.			2-acetylaminofluorene
B23	AMINOYL	PPB	10	3	3 ***	.			4-aminobyphenyl
B24	AMIISOX	PPB	10	3	3 ***	.			5-(aminomethyl)-3-isoxazolol
B25	AMITROL	PPB	10	3	3 ***	.			Amitrole
B26	ANILINE	PPB	10	3	3 ***	.			Aniline

TABLE 14.4. (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
B27	ARAMITE	PPB	10	3	3 ***	.		Aramite
B28	AURAMIN	PPB	10	3	3 ***	.		Auramine
B29	BENZCAC	PPB	10	3	3 ***	.		Benz[c]acridine
B30	BENZAAN	PPB	10	3	3 ***	.		Benz[a]anthracene
B31	BENDICM	PPB	10	3	3 ***	.		Benzene, dichloromethyl
B32	BENTHOL	PPB	10	3	3 ***	.		Benzenethoil
B33	BENDINE	PPB	10	3	3 ***	.		Benzidine
B34	BENZBFL	PPB	10	3	3 ***	.		Benzo[b]fluoranthene
B35	BENZJFL	PPB	10	3	3 ***	.		Benzo[j]fluoranthene
B36	PBENZQU	PPB	10	3	3 ***	.		P benzoquinone
B37	BENZCHL	PPB	10	3	3 ***	.		Benzyl chloride
B38	BIS2CHM	PPB	10	3	3 ***	.		Bis(2-chloroethoxy) methane
B39	BIS2CHE	PPB	10	3	3 ***	.		Bis(2-chloroethyl) ether
B40	BIS2EPH	PPB	10	3	3 ***	.		Bis(2-ethylhexyl) phthalate
B41	BROPHEN	PPB	10	3	3 ***	.		4-bromophenyl phenyl ether
B42	BUTBENP	PPB	10	3	3 ***	.		Butyl benzyl phthalate
B43	BUTDINP	PPB	10	3	3 ***	.		2-sec-butyl-4,6-dinitrophenol
B44	CHALETH	PPB	10	3	3 ***	.		Chloroalkyl ethers
B45	CHLANIL	PPB	10	3	3 ***	.		P-chloroaniline
B46	CHLCRES	PPB	10	3	3 ***	.		P-chloro-m-cresol
B47	CHLEPOX	PPB	10	3	3 ***	0	EPAP	1-chloro-2,3-epoxypropane
B48	CHLNAPH	PPB	10	3	3 ***	.		2-chloronaphthalene
B49	CHLPHEN	PPB	10	3	3 ***	.		2-chlorophenol
B50	CHRYSEN	PPB	10	3	3 ***	.		Chrysene
B51	CRESOLS	PPB	10	3	3 ***	.		Cresols
B52	CYCHDIN	PPB	10	3	3 ***	.		2-cyclohexyl-4,6-dinitrophenol
B53	DIBAHAC	PPB	10	3	3 ***	.		Dibenz[a,h]acridine
B54	DIBAJAC	PPB	10	3	3 ***	.		Dibenz[a,j]acridine
B55	DIBAHAN	PPB	10	3	3 ***	.		Dibenz[a,h]anthracene
B56	DIBCGCA	PPB	10	3	3 ***	.		7H-dibenzo[c,g]carbazole
B57	DIBAEPY	PPB	10	3	3 ***	.		Dibenzo[a,e]pyrene
B58	DIBAHPY	PPB	10	3	3 ***	.		Dibenzo[a,h]pyrene
B59	DIBAIPY	PPB	10	3	3 ***	.		Dibenzo[a,i]pyrene
B60	DIBPHTH	PPB	10	3	3 ***	.		Di-n-butyl phthalate
B61	12-dben	PPB	10	3	3 ***	.		1,2-dichlorobenzene
B62	13-dben	PPB	10	3	3 ***	.		1,3-dichlorobenzene
B63	14-dben	PPB	10	3	3 ***	75	EPA	p-Dichlorobenzene
B64	DICHBEN	PPB	10	3	3 ***	.		3,3'-dichlorobenzidine
B65	24-dchp	PPB	10	3	3 ***	.		2,4-dichlorophenol
B66	26-dchp	PPB	10	3	3 ***	.		2,6-dichlorophenol
B67	DIEPHTH	PPB	10	3	3 ***	.		Diethyl phthalate
B68	DIHYSAF	PPB	10	3	3 ***	.		Dihydrosafrole
B69	DIMETHB	PPB	10	3	3 ***	.		3,3'-dimethoxybenzidine
B70	DIMEAMB	PPB	10	3	3 ***	.		P-dimethylaminoazobenzene

TABLE 14.4. (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
B71	DIMBENZ	PPB	10	3	3 ***	.			7,12-dimethylbenz[a]anthracene
B72	DIMEYLB	PPB	10	3	3 ***	.			3,3'-dimethylbenzidine
B73	THIONOX	PPB	10	3	3 ***	.			Thiofanox
B74	DIMPHAM	PPB	10	3	3 ***	.			Alpha,alpha-dimethylphenethylamine
B76	DIMPHTH	PPB	10	3	3 ***	.			Dimethyl phthalate
B77	DINBENZ	PPB	10	3	3 ***	.			Dinitrobenzene
B78	DINCRES	PPB	10	3	3 ***	.			4,6-dinitro-o-cresol and salts
B79	DINPHEN	PPB	10	3	3 ***	.			2,4-dinitrophenol
B80	24-dint	PPB	10	3	3 ***	.			2,4-dinitrotoluene
B81	26-dint	PPB	10	3	3 ***	.			2,6-dinitrotoluene
B82	DIOPHTH	PPB	10	3	3 ***	.			Di-n-octyl phthalate
B83	DIPHAMI	PPB	10	3	3 ***	.			Diphenylamine
B84	DIPHHYD	PPB	10	3	3 ***	.			1,2-diphenylhydrazine
B85	DIPRNIT	PPB	10	3	3 ***	.			Di-n-propylnitrosamine
B86	ETHMINE	PPB	10	3	3 ***	.			Ethyleneimine
B87	ETHMETS	PPB	10	3	3 ***	.			Ethyl methanesulfonate
B88	FLUORAN	PPB	10	3	3 ***	.			Fluoranthene
B89	HEXCBEN	PPB	10	3	3 ***	.			Hexachlorobenzene
B90	HEXCBUT	PPB	10	3	3 ***	.			Hexachlorobutadiene
B91	HEXCCYC	PPB	10	3	3 ***	.			Hexachlorocyclopentadiene
B92	HEXCETH	PPB	10	3	3 ***	.			Hexachloroethane
B93	INDENOP	PPB	10	3	3 ***	.			Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	PPB	10	3	3 ***	.			Isosafrole
B95	MALOILE	PPB	10	3	3 ***	.			Malononitrile
B96	MELPHAL	PPB	10	3	3 ***	.			Melphalan
B97	METHAPY	PPB	10	3	3 ***	.			Methapyrilene
B98	METHNYL	PPB	10	3	3 ***	.			Metholonyl
B99	METAZIR	PPB	10	3	3 ***	.			2-methylaziridine
C01	METCHAN	PPB	10	3	3 ***	.			3-methylcholanthrene
C02	METBISC	PPB	10	3	3 ***	.			4,4'-methylenebis(2-chloroaniline)
C03	METACTO	PPB	10	3	3 ***	.			2-methyllactonitrile
C04	METACRY	PPB	10	3	3 ***	.			Methyl methacrylate
C05	METMSUL	PPB	10	3	3 ***	.			Methyl methanesulfonate
C06	METPROP	PPB	10	3	3 ***	.			2-methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	PPB	10	3	3 ***	.			Methylthiouracil
C08	NAPHQUI	PPB	10	3	3 ***	.			1,4-naphthoquinone
C09	1-napha	PPB	10	3	3 ***	.			1-naphthylamine
C10	2-napha	PPB	10	3	3 ***	.			2-naphthylamine
C11	NITRANI	PPB	10	3	3 ***	.			P-nitroaniline
C12	NITBENZ	PPB	10	3	3 ***	.			Nitrobenzine
C13	NITPHEN	PPB	10	3	3 ***	.			p-Nitrophenol
C14	NNIBUTY	PPB	10	3	3 ***	.			N-nitrosodi-n-butylamine
C15	NNIDIEA	PPB	10	3	3 ***	.			N-nitrosodiethanolamine
C16	NNIDIEY	PPB	10	3	3 ***	.			N-nitrosodiethylamine

TABLE 14.4. (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
C17	NNIDIME	PPB	10	3	3 ***	.		N-nitrosodimethylamine
C18	NNIMETH	PPB	10	3	3 ***	.		N-nitrosomethylethylamine
C19	NNIURET	PPB	10	3	3 ***	.		N-nitroso-N-methylurethane
C20	NNIVINY	PPB	10	3	3 ***	.		N-nitrosomethylvinylamine
C21	NNIMORP	PPB	10	3	3 ***	.		N-nitrosomorpholine
C22	NNINICO	PPB	10	3	3 ***	.		N-nitrosonornicotine
C23	NNIPIPE	PPB	10	3	3 ***	.		N-nitrosopiperidine
C24	NITRPYR	PPB	10	3	3 ***	.		Nitrosopyrrolidine
C25	NITRTOL	PPB	10	3	3 ***	.		5-nitro-o-toluidine
C26	PENTCHB	PPB	10	3	3 ***	.		Pentachlorobenzene
C27	PENTCHN	PPB	10	3	3 ***	.		Pentachloronitrobenzene
C28	PENTCHP	PPB	50	3	3 ***	220	EPAP	Pentachlorophenol
C29	PHENTIN	PPB	10	3	3 ***	.		Phenacetin
C30	PHENINE	PPB	10	3	3 ***	.		Phenylenediamine
C31	PHTHEST	PPB	10	3	3 ***	.		Phthalic acid esters
C32	PICOLIN	PPB	10	3	3 ***	.		2-picoline
C33	PRONIDE	PPB	10	3	3 ***	.		Pronamide
C34	RESERPI	PPB	10	3	3 ***	.		Reserpine
C35	RESORCI	PPB	10	3	3 ***	.		Resorcinol
C36	SAFROL	PPB	10	3	3 ***	.		Safrol
C37	TETRCHB	PPB	10	3	3 ***	.		1,2,4,5-tetrachlorobenzene
C39	TETRCHP	PPB	10	3	3 ***	.		2,3,4,6-tetrachlorophenol
C40	THIURAM	PPB	10	3	3 ***	.		Thiuram
C41	TOLUDIA	PPB	10	3	3 ***	.		Toluenediamine
C42	OTOLHYD	PPB	10	3	3 ***	.		O-toluidine hydrochloride
C43	TRICHLB	PPB	10	3	3 ***	.		1,2,4-trichlorobenzene
C44	245-trp	PPB	10	3	3 ***	.		2,4,5-trichlorophenol
C45	246-trp	PPB	10	3	3 ***	.		2,4,6-trichlorophenol
C46	TRIPHOS	PPB	10	3	3 ***	.		O,O,O-triethyl phosphorothioate
C47	SYMTRIN	PPB	10	3	3 ***	.		Sym-trinitrobenzene
C48	TRISPHO	PPB	10	3	3 ***	.		Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	PPB	10	3	3 ***	.		Benzo[a]pyrene
C50	CHLNAPZ	PPB	10	3	3 ***	.		Chlornaphazine
C51	BIS2ETH	PPB	10	3	3 ***	.		Bis(2-chloroisopropyl)ether
C52	HEXAENE	PPB	10	3	3 ***	.		Hexachloropropene
C54	HEXACHL	PPB	10	3	3 ***	.		Hexachlorophene
C55	NAPHTHA	PPB	10	3	3 ***	.		Naphthalene
C56	123TRI	PPB	10	3	3 ***	.		1,2,3-trichlorobenzene
C58	135TRI	PPB	10	3	3 ***	.		1,3,5-trichlorobenzene
C59	1234TE	PPB	10	3	3 ***	.		1,2,3,4-tetrachlorobenzene
C60	1235TE	PPB	10	3	3 ***	.		1,2,3,5-tetrachlorobenzene
C61	TETEPYR	PPB	2	3	3 ***	.		Tetraethylpyrophosphate
C62	CHLLATE	PPB	300	3	3 ***	.		Chlorobenzilate
C63	CARBPHT	PPB	2	3	3 ***	.		Carbophenothion

TABLE 14.4. (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
C64	DISULFO	PPB	2	3	3 ***	.			Disulfoton
C65	DIMETHO	PPB	2	3	3 ***	.			Dimethoate
C66	METHPAR	PPB	2	3	3 ***	.			Methyl parathion
C67	PARATHI	PPB	2	3	3 ***	.			Parathion
C70	CYANIDE	PPB	10	3	3 ***	.			Cyanide
C71	FORMALN	PPB	500	3	3 ***	.			Formalin
C77	PERCHLO	PPB	500	3	3 ***	.			Perchlorate
C78	SULFIDE	PPB	1000	3	3 ***	.			Sulfide
C79	KEROSEN	PPB	10000	3	3 ***	.			Kerosene
C80	AMMONIU	PPB	50	3	3 ***	.			Ammonium ion
C87	CITRUSR	PPB	1000	3	3 ***	.			Citrus red
C90	PARALDE	PPB	10000	3	3 ***	.			Paraldehyde
C91	STRYCHN	PPB	50	3	3 ***	.			Strychnine
C92	MALHYDR	PPB	500	3	3 ***	.			Maleic hydrizide
C93	NICOTIN	PPB	100	3	3 ***	.			Nicotinic acid
C94	ACRYIDE	PPB	10000	3	3 ***	0	EPAP		Acrylamide
C95	ALLYLAL	PPB	10000	3	3 ***	.			Allyl alcohol
C98	CHLPROP	PPB	10000	3	3 ***	.			3-chloropropionitrile
D01	PCDD's	PPB	.0100	3	3 ***	.			Pcdd's
D02	PCDF's	PPB	.0100	3	3 ***	.			Pcdf's
D03	2378TCD	PPB	.0100	3	3 ***	.			2,3,7,8 TCDD
H03	ETHCARB	PPB	10000	3	3 ***	.			Ethyl carbamate
H04	ETHCYAN	PPB	10000	3	3 ***	.			Ethyl cyanide
H05	ETHOXID	PPB	10	3	3 ***	.			Ethylene oxide
H06	ETHMETH	PPB	10	3	3 ***	.			Ethyl methacrylate
H09	ISOBUTY	PPB	10000	3	3 ***	.			Isobutyl alcohol
H11	PROPYLA	PPB	10000	3	3 ***	.			N-propylamine
H12	PROPYNO	PPB	10000	3	3 ***	.			2-propyn-1-ol
H15	2,4,5-T	PPB	2	3	3 ***	.			2,4,5-T
H40	FTHALLI	PPB	5	3	3 ***	.			Thallium, filtered
H62	LHYDRAZ	PPB	30	3	3 ***	.			Hydrazine, Low Detection Level
H68	HEXONE	PPB	10	3	3 ***	.			Methyl Isobutyl Ketone
I01	ACETONE	PPB	10	3	3 ***	.			Acetone by VOA
I06	ISOPHER	PPB	10	3	3 ***	.			Isopherone
I09	BUTANOL	PPB	10000	3	3 ***	.			1-Butanol
I21	TRIBUPH	PPB	10	3	3 ***	.			Tributylphosphoric Acid
I28	TAF	PPB	10	3	3 ***	.			Tetrahydrofuran
I29	ACENAPH	PPB	10	3	3 ***	.			Acenaphthene
I30	FLRENE	PPB	10	3	3 ***	.			Fluorene
I31	ANTHRA	PPB	10	3	3 ***	.			Anthracene
I32	PYRENE	PPB	10	3	3 ***	.			Pyrene
I33	ETHBENZ	PPB	5	3	3 ***	680	EPAP		Ethyl benzene
I34	STYRENE	PPB	5	3	3 ***	140	EPAP		Styrene
I42	BDCM	PPB	5	3	3 ***	100	EPA		Bromodichloromethane

TABLE 14.4. (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
I43	CDBM	PPB	5	3	3 ***	100	EPA	Chlorodibromomethane
I64	2NITPH	PPB	10	3	3 ***	.		o-Nitrophenol
I67	ETHANOL	PPB	10000	3	3 ***	.		Ethanol
I75	2MENAPH	PPB	10	3	3 ***	.		2-Methylnaphthalene
I82	PHENANT	PPB	10	3	3 ***	.		Phenanthrene
J43	BENZALC	PPB	10	3	3 ***	.		Benzyl Alcohol
J69	2HEXANO	PPB	50	3	3 ***	.		2-Hexanone
J71	BNZKFLU	PPB	10	3	3 ***	.		Benzo(k)Fluoranthene
J83	BGHIPER	PPB	10	3	3 ***	.		Benzo(Ghi)Perylene
J89	DINOSEB	PPB	10	3	3 ***	.		Dinoseb
J91	DIALLAT	PPB	10	3	3 ***	.		Diallate
K52	NNDIPHA	PPB	10	3	3 ***	.		N-NITROSODIPHENYLAMINE
K56	DIBENFR	PPB	10	3	3 ***	.		DIBENZOFURAN
K58	ACENATL	PPB	10	3	3 ***	.		ACENAPHTHYLENE
L20	MBP	PPB	10000	3	3 ***	.		Monobutyl Phosphate
L21	DBP	PPB	10000	3	3 ***	.		Dibutyl Phosphate
L45	ALLYLCL	PPB	100	3	3 ***	.		Allyl Chloride
L46	CLETHAN	PPB	10	3	3 ***	.		Chloroethane
L48	PROPCN	PPB	5	3	3 ***	.		Propionitrile
L49	VINYLAC	PPB	5	3	3 ***	.		Vinyl Acetate
L50	B2CLMEE	PPB	10	3	3 ***	.		Bis(2-chloro-1-methylethyl)ether
L52	DIPHOS	PPB	10	3	3 ***	.		0,0-Diethyl-0,2-pyrazinyl phosphorothion
L53	ISODRIN	PPB	10	3	3 ***	.		Isodrin
L54	ONITANI	PPB	10	3	3 ***	.		o-Nitroaniline
L55	MNITANI	PPB	10	3	3 ***	.		m-Nitroaniline
L56	4NITQUI	PPB	10	3	3 ***	.		4-Nitroquinoline 1-oxide
L57	ETHGLYC	PPB	10000	3	3 ***	.		Ethylene Glycol
L59	1PROPAN	PPB	10000	3	3 ***	.		1-Propanol
L60	1BUTYN	PPB	10000	3	3 ***	.		1-Butynol
L62	ACETONE	PPB	10	3	3 ***	.		Acetone - by ABN
L63	14DBEN	PPB	5	3	3 ***	75	EPA	p-Dichlorobenzene
L64	CHLROB	PPB	10	3	3 ***	60	EPAP	Chlorobenzene (by ABN)

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
EPAR - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 National Secondary Drinking Water Regulations
DOE - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
WDOE - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

TABLE 14.5. Constituents with at Least One Detected Value for the Grout Treatment Facility, October Through November 1989

Well name	Collection date	Duplicate sample number	FPOTASS PPB 100/.	FSTRONT PPB 10/.	FBORON PPB 10/.	ALPHAHI PCI/L 4/15	AM-241 PCI/L .10/30d	ARSENIC PPB 5/50	FARSENI PPB 5/50	BARIUM PPB 6/1000
2-E25-26	01NOV89		4200	110	22	1.14	*.00128	6	7	12
2-E25-28	27OCT89		3610	99	<10	1.06	*0	9	8	13
2-E25-32P	31OCT89		4060	115	<10	*.213	*.00272	<5	<5	13

Well name	Collection date	Duplicate sample number	FBARIUM PPB 6/1000	BETA PCI/L 8/50	CALCIUM PPB 50/.	FCALCIU PPB 50/.	CHLORID PPB 500/250000s	CHROMUM PPB 10/50	CO-60 PCI/L 22.5/100r	CS-137 PCI/L 20/200r
2-E25-26	01NOV89		12	3.02	20100	19600	2900	<10	*-0.379	*2
2-E25-28	27OCT89		13	14.1	17700	17600	3100	<10	*-3.46	*-4.52
2-E25-32P	31OCT89		13	2.62	17200	19300	2900	33	*-2.03	*3.51

Well name	Collection date	Duplicate sample number	IRON PPB 30/300s	MAGNES PPB 50/.	FMAGNES PPB 50/.	NICKEL PPB 10/.	NITRATE PPB 500/45000	POTASUM PPB 100/.	PU-238 PCI/L 17/1.6d	PU39-40 PCI/L 17/1.2d
2-E25-26	01NOV89		78	5560	5400	<10	1100	4350	*-0.00144	*.00431
2-E25-28	27OCT89		38	5490	5440	<10	1600	3670	*-0.00144	*.00168
2-E25-32P	31OCT89		196	5060	5570	22	1100	3710	*-0.00484	*-0.000165

Well name	Collection date	Duplicate sample number	RADIUM PCI/L 1/5	RU-106 PCI/L 172.5/30r	SILICON PPB 50/.	FSILICO PPB 50/.	SODIUM PPB 200/.	FSODIUM PPB 200/.	SR 90 PCI/L 5/8	STRONUM PPB 10/.
2-E25-26	01NOV89		*-0.00775	*-1.01	13500	13000	9060	8790	*-0.245	113
2-E25-28	27OCT89		*-0.00975	*6.97	16000	15900	9780	9700	*-0.143	99
2-E25-32P	31OCT89		*.00330	*-17	9710	10900	5390	5870	*-0.192	104

Well name	Collection date	Duplicate sample number	SULFATE PPB 500/250000s	TC PPB 1000/.	TDS 5000/500000s	TRITIUM PCI/L 500/20000	TURBID NTU .10/1	U PCI/L .50/600d	VANADUM PPB 5/.	FVANADI PPB 5/.
2-E25-26	01NOV89		12900	18900	95000	2730	.200	1.04	24	19
2-E25-28	27OCT89		12500	19000	129000	1350	.200	.925	37	38
2-E25-32P	31OCT89		11700	17100	25000	1040	.700	.683	13	14

TABLE 14.5. (contd)

Well name	Collection date	Duplicate sample number	CONDFLD UMHO 1/700w	PHFIELD .10/6.5-8.5s	TOC PPB 2000/.	TOXLDL PPB 10/.
2-E25-26	01NOV89		188	8.26	#800	16
2-E25-28	27OCT89		191	7.97	#600	#4
2-E25-32P	31OCT89		166	7.01	#800	#4

Well name	Collection date	Duplicate sample number	ZINC PPB 5/5000s	FZINC PPB 5/5000s
2-E25-26	01NOV89		15	5
2-E25-28	27OCT89		16	12
2-E25-32P	31OCT89		<5	<5

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

Suffix
none - based on Maximum Contaminant Levels in 40 CFR Part 141, National Primary Drinking Water Regulations
r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
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 National Secondary Drinking Water Regulations
d - based on Derived Concentration Guides, Draft DOE Order 5400.xx, October 10, 1988
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

15.0 SINGLE-SHELL TANKS

E. J. Jensen
Pacific Northwest Laboratory

The ground water beneath the Single-Shell Tanks (SSTs) will be monitored by a RCRA interim-status well network beginning in February 1990. Installation of the network began in June 1989.

A ground-water monitoring plan has been prepared for this facility (Jensen et al. 1989).

There are 149 underground SSTs, located in 7 waste management areas in the 200-East and 200-West Areas on the Hanford Site (see Figure 1.1). These tanks were constructed between 1943 and 1964, and each consists of a single-walled carbon steel liner in a concrete tank. They were constructed to store mixed, radioactive, and hazardous wastes that were a result of Hanford defense operations. These tanks are no longer in active service, and there is an ongoing program to pump the supernate and interstitial liquids from the SSTs to double-shell tanks. This program is scheduled for completion in 1995.

There are 51 existing ground-water monitoring wells within 1000 ft of the SSTs. These existing wells were evaluated according to the ground-water monitoring plan (Jensen et al. 1989) for use in the ground-water monitoring network around the SSTs, and 25 wells were incorporated into the monitoring network.

During this quarter, the remaining ground-water monitoring wells scheduled for 1989 were completed, and all 12 of these wells are ready for sampling during February 1990.

9 2 1 2 6 4 2 1 9 2 8

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

The following monitoring wells have been completed and are ready for ground-water sample collection:

- 299-E24-19
- 299-E25-40
- 299-E25-41
- 299-E27-12
- 299-E27-13
- 299-E27-14
- 299-E27-15
- 299-E33-31
- 299-E33-32
- 299-E33-33
- 299-W10-15
- 299-W10-16.

The locations of these wells and the waste management area that contains each well are shown in Figures 15.1 through 15.7. During construction, radiological and chemical monitoring data were collected, the geology was described, and the wells were geophysically logged with a natural gamma probe and inspected with a downhole television camera. Slug testing and development were performed on each well after it was completed.

WATER LEVELS

Water-level monitoring will begin after the wells have been surveyed for location and elevation. Water-level measurements will also be taken before sampling.

WATER CHEMISTRY DATA

The 12 new CY 1989 monitoring wells and 25 existing monitoring wells are scheduled for sample collection in February 1990 (Table 15.1).

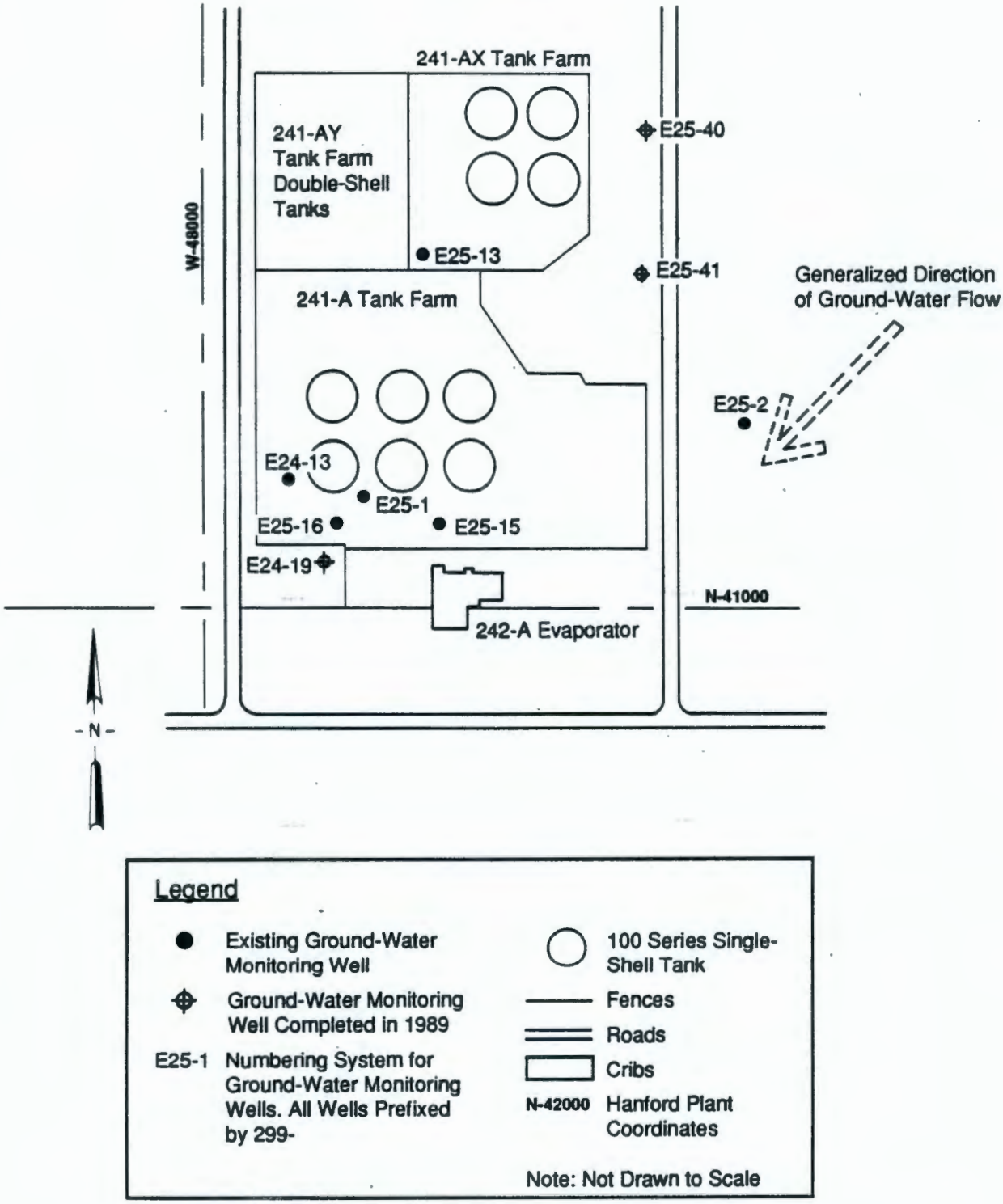

FIGURE 15.1. Monitoring Well Locations for Waste Management Area A-AX

9 2 1 2 6 4 2 1 9 3 0

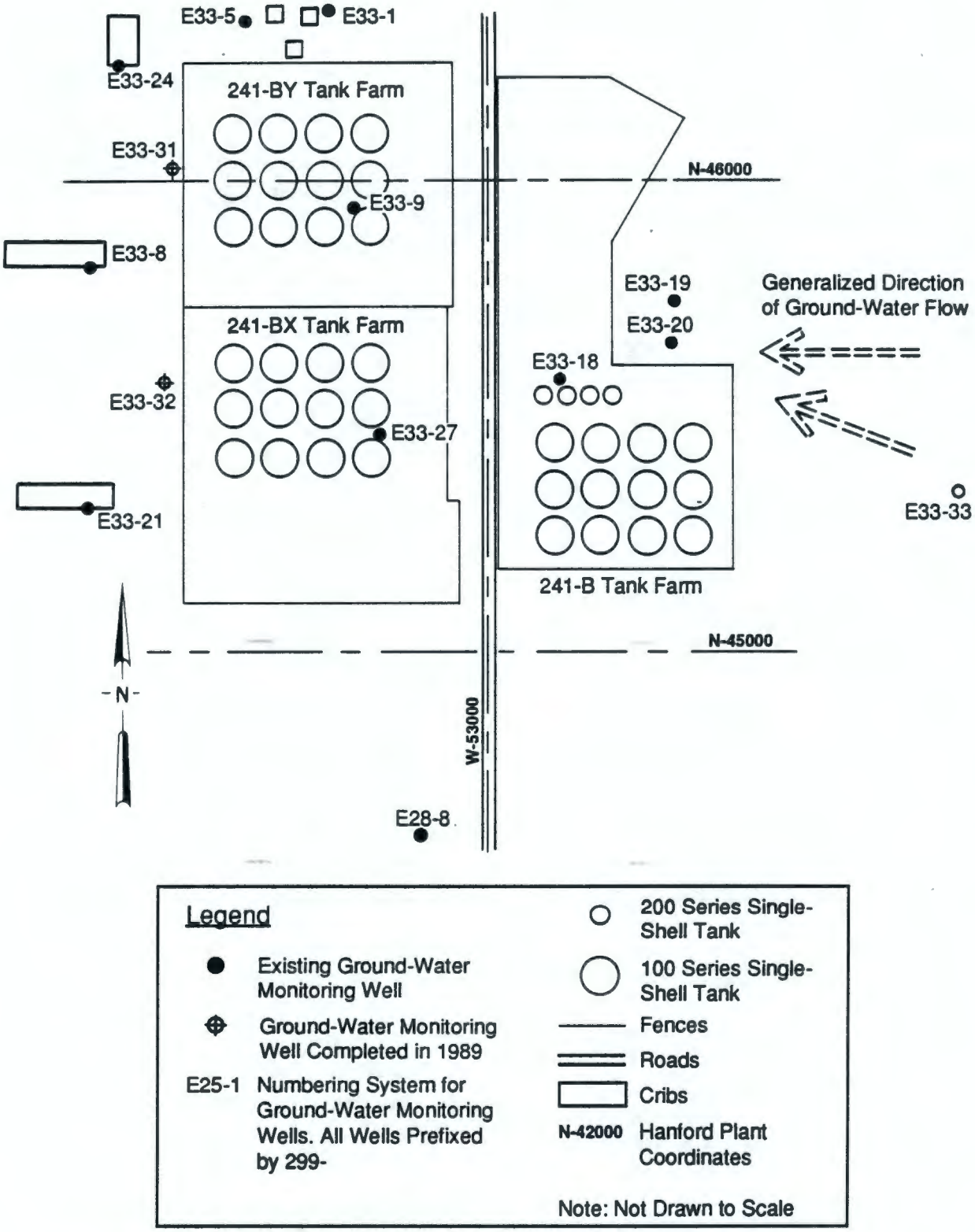

FIGURE 15.2. Monitoring Well Locations for Waste Management Area B-BX-BY

9 2 1 2 6 4 2 1 9 3 1

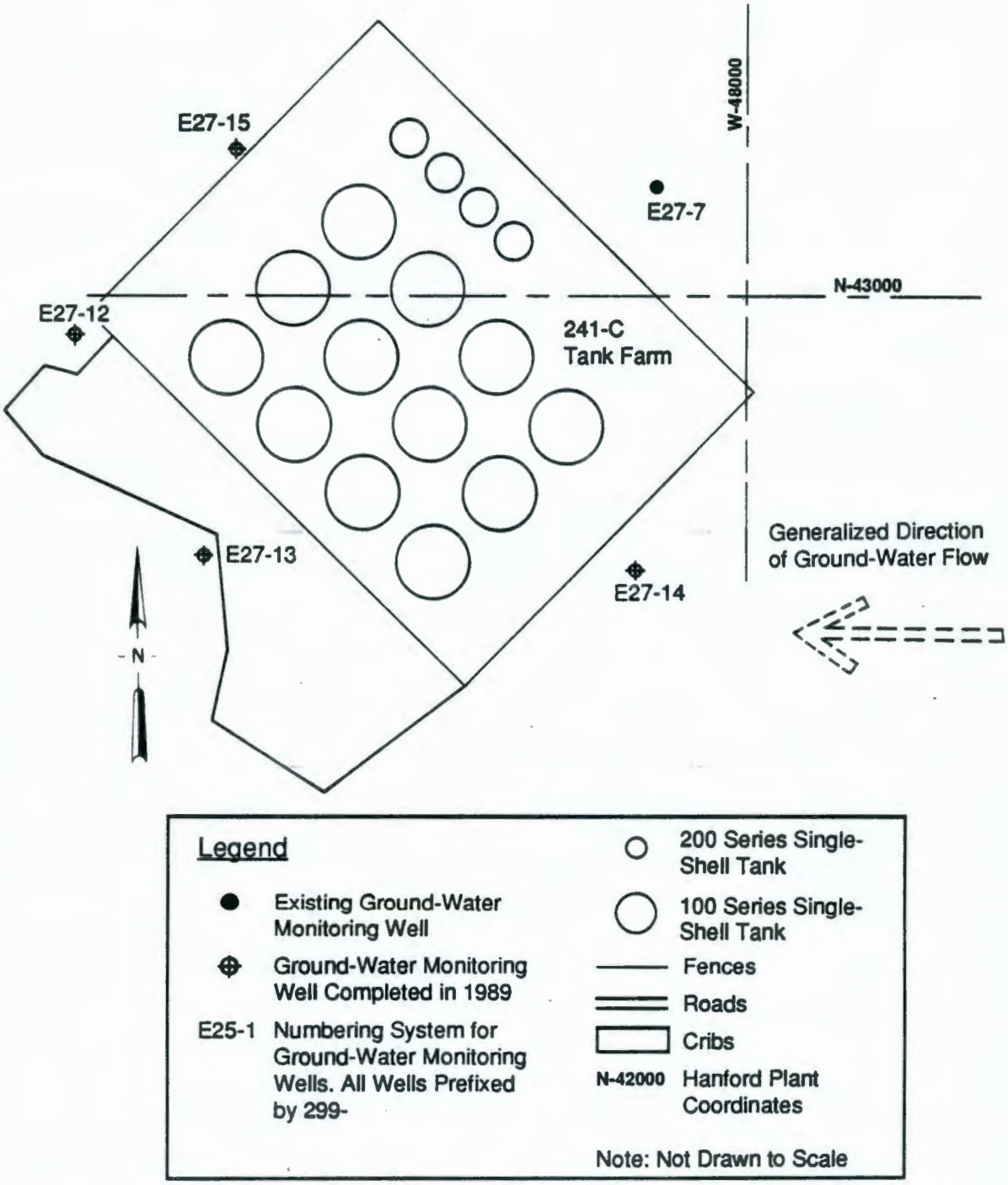

FIGURE 15.3. Monitoring Well Locations for Waste Management Area C

9 2 1 2 6 4 2 1 9 3 2

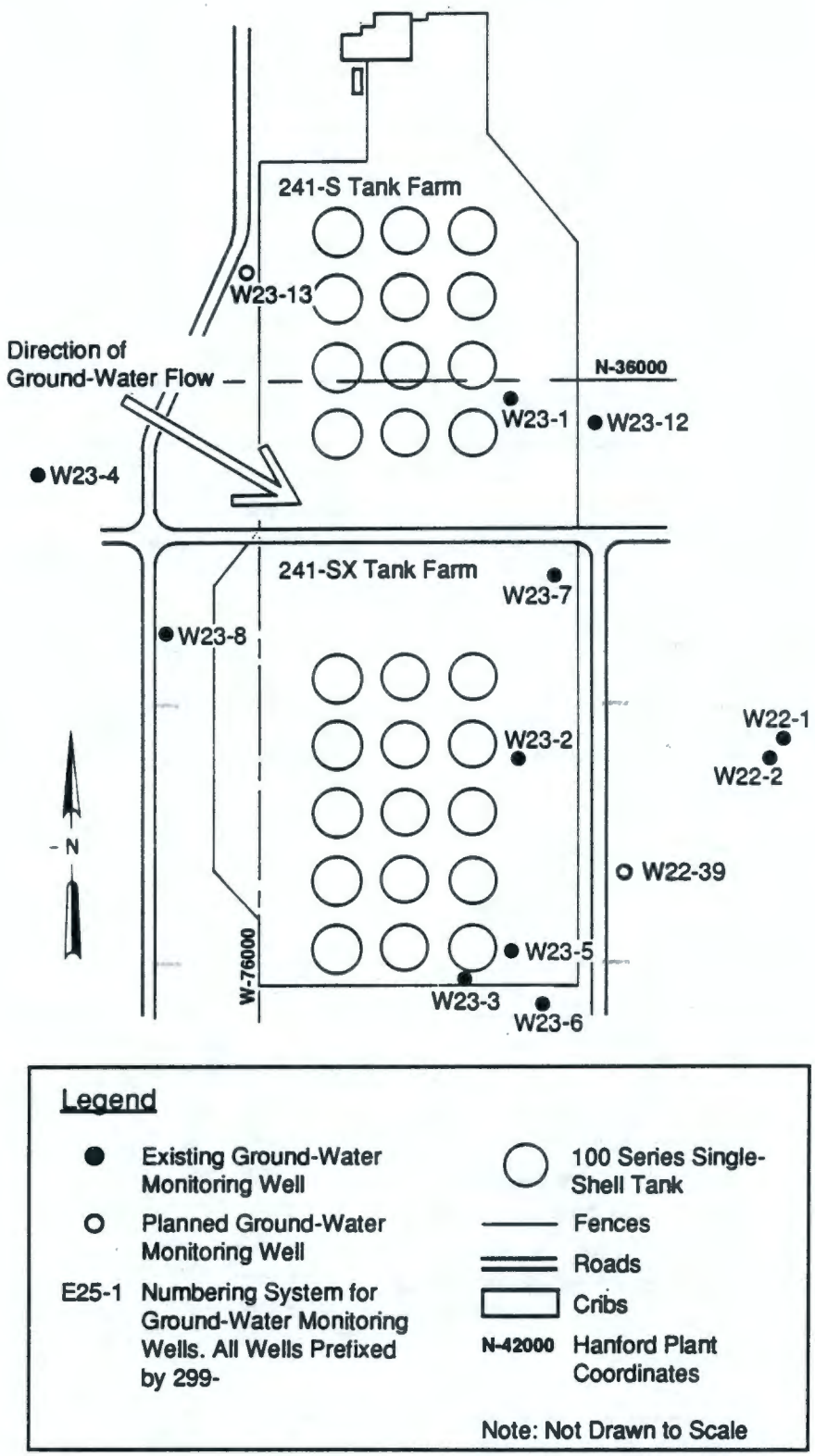

FIGURE 15.4. Monitoring Well Locations for Waste Management Area S-SX

9 2 1 2 6 4 2 1 9 3 3

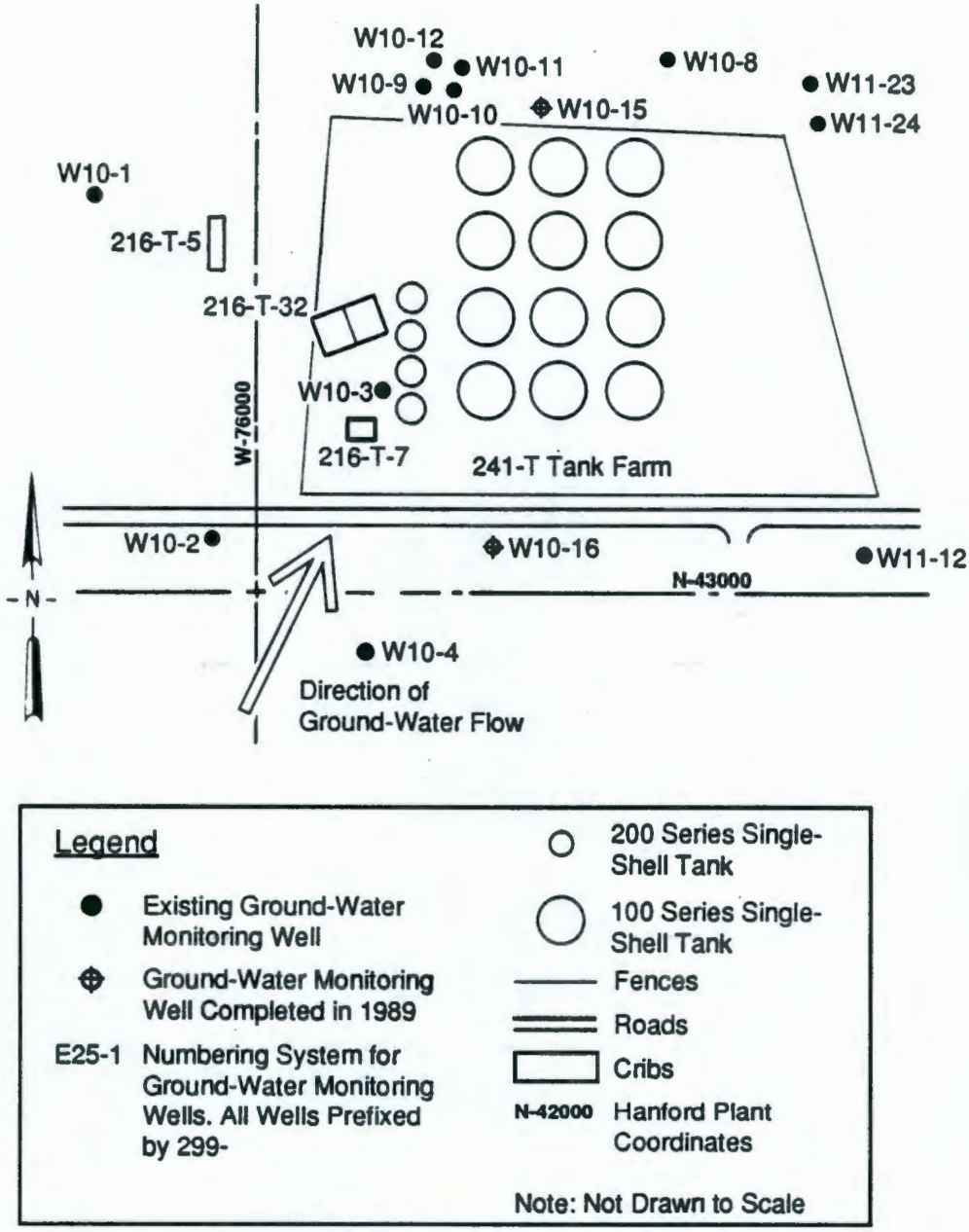

FIGURE 15.5. Monitoring Well Locations for Waste Management Area T

9 2 1 2 6 4 2 1 9 3 4

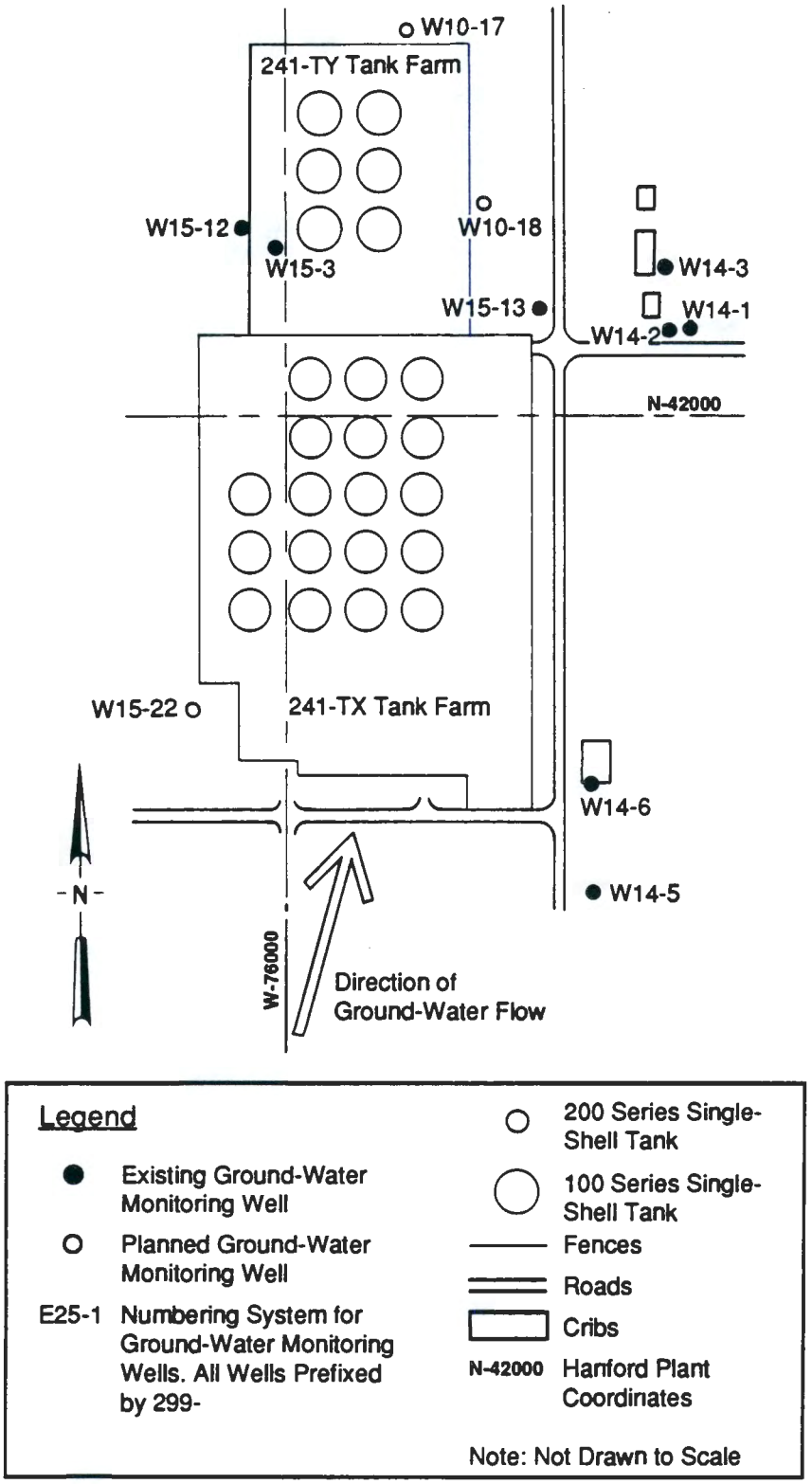

FIGURE 15.6. Monitoring Well Locations for Waste Management Area TX-TY

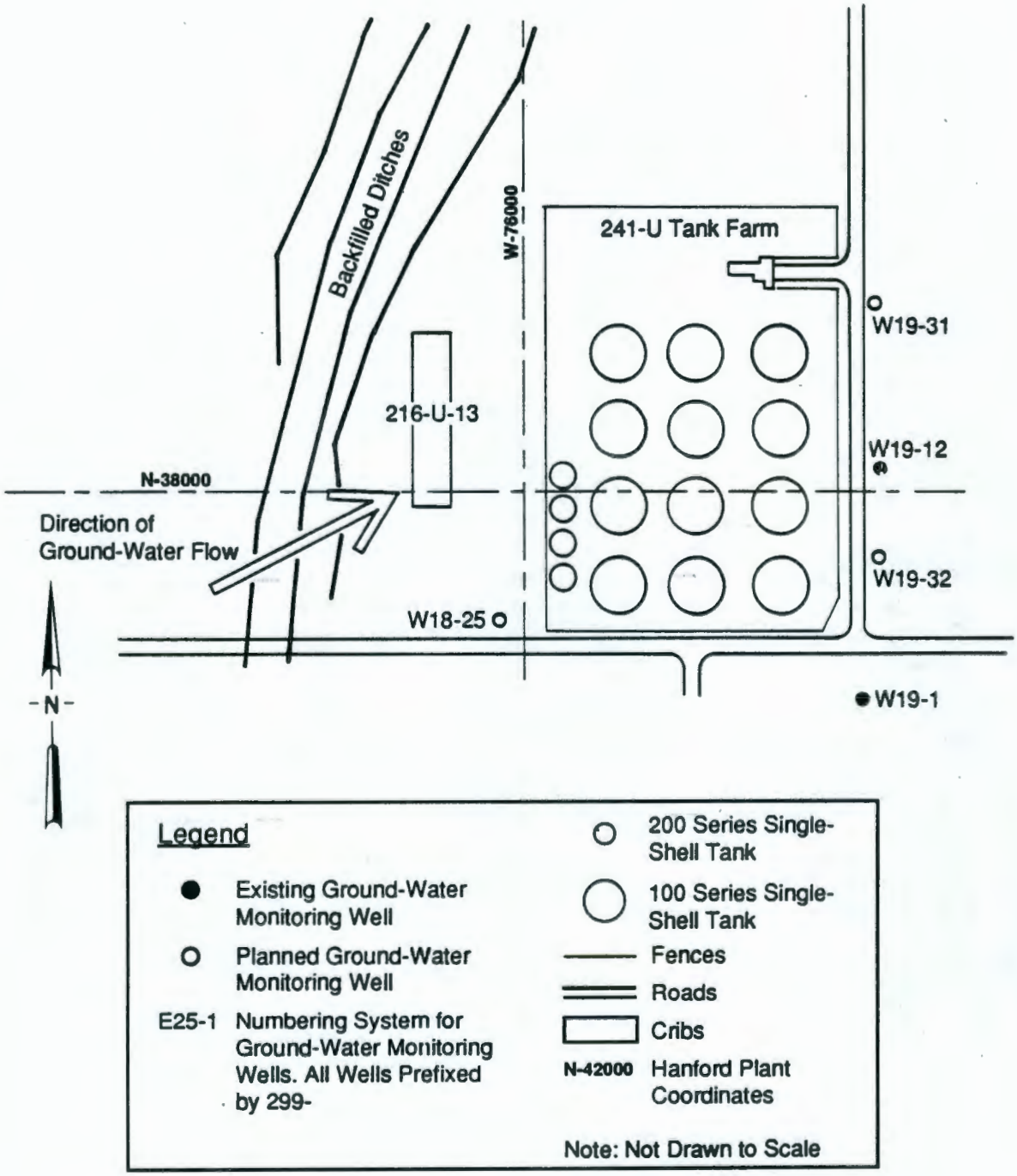

FIGURE 15.7. Monitoring Well Locations for Waste Management Area U

9 2 1 2 6 4 2 1 9 3 6

TABLE 15.1. Sampling Schedule for the Single-Shell Tanks

	1989[a]			1990								
Well	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E24-13					X			X			X	
299-E25-2					X			X			X	
299-E25-1					X			X			X	
299-E25-13					X			X			X	
299-E25-15					X			X			X	
299-E25-16					X			X			X	
299-E33-19					X			X			X	
299-E33-20					X			X			X	
299-E33-1					X			X			X	
299-E33-5					X			X			X	
299-E33-8					X			X			X	
299-E33-9					X			X			X	
299-E33-18					X			X			X	
299-E33-21					X			X			X	
299-E33-24					X			X			X	
299-E33-27					X			X			X	
299-E27-7					X			X			X	
299-W10-3					X			X			X	
299-W10-8					X			X			X	
299-W10-9					X			X			X	
299-W10-10					X			X			X	
299-W10-11					X			X			X	
299-W10-12					X			X			X	
299-W11-23					X			X			X	
299-W11-24					X			X			X	
299-E24-19					X			X			L	
299-E25-40					X			X			L	
299-E25-41					X			X			L	
299-E33-31					X			X			L	
299-E33-32					X			X			L	
299-E33-33					X			X			L	
299-E27-12					X			X			L	
299-E27-13					X			X			L	
299-E27-14					X			X			L	
299-E27-15					X			X			L	
299-W10-15					X			X			L	
299-W10-16					X			X			L	

(a) The following notations are used in this table:
L = sampled for the long constituent list (WAC 173-303-9905).
X = sampled for the regular constituent list (40 CFR 265).

16.0 216-B-63 TRENCH

B. N. Bjornstad
Pacific Northwest Laboratory

The ground water beneath the 216-B-63 Trench has yet to be monitored as a RCRA facility. The project is currently in the drilling stage, and therefore no ground-water samples have been collected. Drilling of the first three of four ground-water monitoring wells began on December 4, 1989. A revised ground-water monitoring plan has been prepared for this facility (Bjornstad and Dudziak 1989).

The 216-B-63 Trench is located in the 200-East Area in the central portion of the Hanford Site (Figure 1.1). It is an open, unlined ditch, which has received liquid effluent (100,000 to 400,000 gal/d) from the B Plant chemical sewer since March 1970. An earthen dam, located 860 ft from the west end of the trench, prevents effluent from entering the east end of the trench (Figure 16.1). Steam condensate is the primary constituent discharged to the trench. Other effluents in the waste stream have included sulfuric acid, sodium hydroxide, and nitrate, as well as unspecified organic constituents. The facility is currently in use.

There are seven wells in the planned monitoring network for 216-B-63 Trench (see Figure 16.1). Three existing wells, 299-E27-8, 299-E27-11, and 299-E34-2, are currently upgradient of the trench. Four new wells (299-E27-16, 299-E33-36, 299-E33-37, and 299-E34-8) are being installed as detection wells. At least three of these new wells will act as downgradient wells depending on ground-water flow, which currently is roughly parallel to the trench.

Ground-water chemistry and water-level data from an eighth well (299-E33-33), which is being monitored as a background well for Waste Management Area B-BX-BY (i.e., Single-Shell Tanks), may be incorporated into the 216-B-63 Trench monitoring network at a later time. Well 299-E33-33 was installed in October 1989 only 120 ft northwest of planned well 299-E34-8 (well number 1 in the ground-water monitoring plan). To maximize efficiency, well 299-E34-8 has been relocated approximately 300 ft southeast of its

9 2 1 2 6 4 2 1 9 3 8

current planned location and approximately 100 ft north of the trench. Wells 299-E27-8, 299-E27-11, and 299-E34-2 are also used to monitor Waste Management Area 2 (200 Areas LLBGs).

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Drilling of the following monitoring wells was completed this quarter:

- 299-E27-16
- 299-E33-36
- 299-E33-37.

Completion and development of these wells are in progress. Drilling of the fourth, and last, planned monitoring well (299-E34-8), is expected to begin in the first quarter of CY 1990. The locations of these wells are shown in Figure 16.1. During drilling of these wells, radiological and chemical monitoring data were collected, the geology was described, and the wells were geophysically logged with a natural gamma probe. Well installation and completion data will be provided when all wells have been completed.

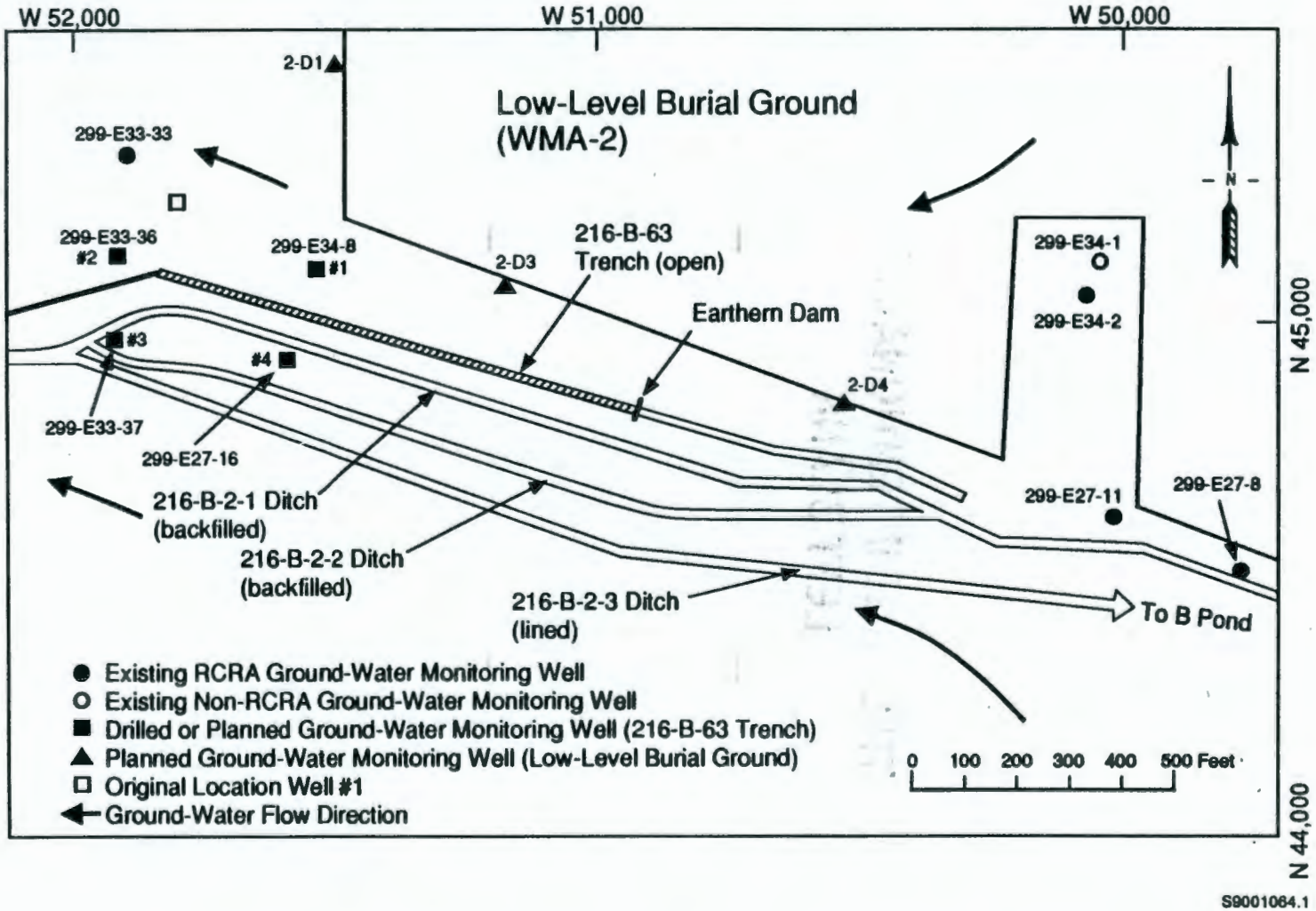

FIGURE 16.1. Monitoring Well Locations for the 216-B-63 Trench

THIS PAGE INTENTIONALLY
LEFT BLANK

17.0 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 Status 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.

Bjornstad, B. N., and S. Dudziak. 1989. 40 CFR 265 Interim Status Indicator-Evaluation Ground-Water Monitoring Plan for the 216-B-63 Trench. PNL-6862, Pacific Northwest Laboratory, Richland, Washington.

Cline, C. S., J. T. Rieger, J. R. Raymond, and P. A. Eddy. 1985. Ground-water Monitoring at the Hanford Site, January-December 1984. PNL-5408, Pacific Northwest Laboratory, Richland, Washington.

DOE Order 5400.XX. "Radiation Protection of the Public and the Environment." Draft, October 10, 1988, U.S. Department of Energy, Washington, D.C.

DOE. 1988a. Final Status Post-Closure Permit Application for the 183-H Solar Evaporation Basins. Prepared by Westinghouse Hanford Company for the U.S. Department of Energy, Richland, Washington.

DOE. 1988b. Grout Treatment Facility Dangerous Waste Permit Application. 88-27, prepared by Westinghouse Hanford Company for the U.S. Department of Energy, Richland, Washington.

DOE-RL. 1988. Hanford Site Dangerous Waste Part A Permit Application. DOE/RL-8821, EPA/State Id #WA7890008967, 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.

9 2 1 2 6 4 2 1 9 4 1

EPA. 1984. Test Method Technical Addition to Methods for Chemical Analysis of Water and Wastes. EPA-600/4-79-020, U.S. Environmental Protection Agency, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.

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 ed. U.S. Environmental Protection Agency, Washington, D.C.

Fruland, R. M., and R. E. Lundgren. 1989. RCRA Ground-Water Monitoring Projects for Hanford Facilities: Annual Progress Report for 1988. PNL-6852, Pacific Northwest Laboratory, Richland, Washington.

Fruland, R. M., D. J. Bates, and R. E. Lundgren, eds. 1989a. Resource Conservation and Recovery Act Ground-Water Monitoring Projects for Hanford Facilities: Progress Report for the Period July 1 to September 30, 1988. PNL-6789, Pacific Northwest Laboratory, Richland, Washington.

Fruland, R. M., D. J. Bates, and R. E. Lundgren, eds. 1989b. Resource Conservation and Recovery Act Ground-Water Monitoring Projects for Hanford Facilities: Progress Report for the Period October 1 to December 31, 1988. PNL-6844, Pacific Northwest Laboratory, Richland, Washington.

Fruland, R. M., R. A. Hagan, C. S. Cline, D. J. Bates, J. C. Evans, and R. L. Aaberg. 1989. Interim Site Characterization Report and Ground-Water Monitoring Program for the Hanford Site Solid Waste Landfill. PNL-6823, Pacific Northwest Laboratory, Richland, Washington.

Gilmore, T. J. 1989. Ground-Water Quality Assessment Program for the 1324-N/NA Facilities. WHC-SD-EN-AP-005, prepared by Pacific Northwest Laboratory for Westinghouse Hanford Company, Richland, Washington.

Gilmore, T. J., and E. J. Jensen. 1989. Ground-Water Quality Assessment Program for the 1301-N Liquid Waste Disposal Facility. WHC-SD-EN-AP-004, prepared by Pacific Northwest Laboratory for Westinghouse Hanford Company, Richland, Washington.

Hall, S. H. 1988. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Annual Progress Report for 1987. PNL-6678, Pacific Northwest Laboratory, Richland, Washington.

Hall, S. H. 1989. Evaluation of the Ground-Water Contaminant Plume Extending from the 183-H Solar Evaporation Basins. PNL-7130, Pacific Northwest Laboratory, Richland, Washington.

9 2 1 2 6 4 2 1 9 4 2

Jensen, E. J., S. P. Airhart, M. A. Chamness, T. J. Gilmore, D. R. Newcomer, and K. R. Oster. 1989. 40 CFR 265 Interim-Status Ground-Water Monitoring Plan for the Single-Shell Tanks. WHC-SD-EN-AP-012, Rev. 0, prepared by Pacific Northwest Laboratory for Westinghouse Hanford Company, Richland, Washington.

Last, G. V., and B. N. Bjornstad. 1989. Revised Ground-Water Monitoring Plan for the 200 Areas Low-Level Burial Grounds. WHC-SD-EN-AP-015, prepared by Pacific Northwest Laboratory for Westinghouse Hanford Company, 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.

Luttrell, S. P., M. A. Chamness, and S. Dudziak. 1989. 40 CFR 265 Interim-Status Ground-Water Monitoring Plan for the 216-B-3 Pond. WHC-SD-EN-AP-013, Rev. 0, prepared by Pacific Northwest Laboratory for Westinghouse Hanford Company, 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. PNL-6465, Vol. 1, 2, and 3, 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. PNL-6467, Vol. 1, 2, and 3, 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.

9 2 1 2 6 4 2 1 9 4 3

PNL. 1988b. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Progress Report for the Period October 1 to December 31, 1987. PNL-6536, Pacific Northwest Laboratory, Richland, Washington.

PNL. 1988c. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Progress Report for the Period January 1 to March 31, 1988. PNL-6581, Pacific Northwest Laboratory, Richland, Washington.

PNL. 1988d. Ground-Water Monitoring Compliance Projects for Hanford Site Facilities: Progress Report for the Period April 1 to June 30, 1988. PNL-6675, Pacific Northwest Laboratory, Richland, Washington.

Resource Conservation and Recovery Act of 1976. Public Law 94-580, as amended. 90 Stat. 2795 (Title 42).

Schalla, R., R. L. Aaberg, D. J. Bates, J. V. M. Carlile, M. D. Freshley, T. L. Liikala, P. J. Mitchell, K. B. Olsen, and J. T. Rieger. 1988a. Revised Ground-Water Monitoring Compliance Plan for the 300 Area Process Trenches. PNL-6671, Pacific Northwest Laboratory, Richland, Washington.

Schalla, R., R. W. Wallace, R. L. Aaberg, S. P. Airhart, D. J. Bates, J. V. M. Carlile, C. S. Cline, D. I. Dennison, M. D. Freshley, P. R. Heller, E. R. Jensen, K. B. Olsen, R. G. Parkhurst, J. T. Rieger, and E. J. Westergard. 1988b. Interim Characterization Report for the 300 Area Process Trenches. PNL-6716, Pacific Northwest Laboratory, Richland, Washington.

Smith, R. M., D. J. Bates, and R. E. Lundgren. 1989a. Resource Conservation and Recovery Act Ground-Water Monitoring Projects for Hanford Facilities: Progress Report for the Period January 1 to March 30, 1989. PNL-6957, Pacific Northwest Laboratory, Richland, Washington.

Smith, R. M., D. J. Bates, and R. E. Lundgren. 1989b. Resource Conservation and Recovery Act Ground-Water Monitoring Projects for Hanford Facilities: Progress Report for the Period April 1 to June 30, 1989. PNL-7134, Pacific Northwest Laboratory, Richland, Washington.

Smith, R. M., D. J. Bates, and R. E. Lundgren. 1989c. Resource Conservation and Recovery Act Ground-Water Monitoring Projects for Hanford Facilities: Progress Report for the Period July 1 to September 30, 1989. PNL-7222, 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.

9 2 1 2 6 4 2 1 9 4 4

Teel, S. S., B. N. Bjornstad, and D. R. Newcomer. 1989. Interim-Status Ground-Water Monitoring Plan for the Grout Treatment Facility. WHC-SD-EN-AP-006, Rev. 0, prepared by Pacific Northwest Laboratory for 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.

WHC. 1989. Waste Stream Characterization Report. WHC-EP-0287, Vol. 1-4, Westinghouse Hanford Company, Richland, Washington.

9 2 1 2 6 4 2 1 9 4 5

DISTRIBUTION

No. of Copies

OFFSITE

2 DOE/Office of Scientific and Technical Information

ONSITE

3 DOE Richland Operations Office

E. A. Bracken
R. D. Hildebrand
M. W. Tiernan

28 Westinghouse Hanford Company

M. R. Adams
J. A. Caggiano
J. W. Cammann
K. R. Fecht
B. H. Ford
C. J. Geier
M. C. Hagood
S. M. Harris
M. J. Hartman
F. N. Hodges
R. L. Jackson
V. G. Johnson
G. L. Kasza
A. G. Law
J. W. Lindberg
D. L. Lund
H. E. McGuire
R. B. Mercer
R. E. Peterson
W. H. Price
F. V. Roeck
J. S. Schmid
J. A. Serkowski
L. C. Swanson
J. E. Thrasher
J. A. Voogd
B. Williams
Public Reading Room

No. of Copies

27 Pacific Northwest Laboratory

D. J. Bates
B. N. Bjornstad
R. W. Bryce
M. A. Chamness
P. G. Doctor
J. W. Falco
R. M. Fruland
J. M. Hales
S. H. Hall
P. C. Hays
E. J. Jensen
G. V. Last
R. E. Lundgren
S. P. Luttrell
W. T. Pennell
R. Schalla
R. L. Skaggs
R. M. Smith
S. S. Teel
E. J. Westergard
J. S. Young
Publishing Coordination
Technical Report Files (5)

9 2 1 2 6 4 2 1 9 4 6