**RCRA Ground-Water Monitoring
Projects for Hanford Facilities:
Progress Report for the Period
October 1 to December 31, 1988
Volume 1 - Text**

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

April 1989

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

PREFACE

This is Volume 1 of a two-volume set of documents that describes the progress of 13 Hanford Site ground-water monitoring projects for the period October 1 to December 31, 1988. This volume discusses the projects; Volume 2 provides as-built diagrams, drilling logs, and geophysical logs for wells drilled during this period. Volume 2 can be found in microfiche form in the back pocket of Volume 1.

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

Although constituent concentrations are compared to federal drinking water standards throughout this document, no public water supplies are drawn from the aquifer from which the samples for this study were taken. Small quantities of water drawn from the sampled aquifer are used to supply drinking water to a limited number of workers on the Hanford Site. In such cases, that water is mixed with water from uncontaminated sources, and the drinking water delivered to the workers meets all regulatory standards.

SUMMARY

This report describes the progress of 13 Hanford ground-water monitoring projects for the period October 1 to December 31, 1988. There are 16 individual hazardous waste facilities covered by the 13 ground-water monitoring projects. These are the:

- 300 Area Process Trenches (300 Area)
- 183-H Solar Evaporation Basins (100-H Area)
- 200 Areas Low-Level Burial Grounds, composed of
 - Waste Management Area (WMA) 1
 - Waste Management Area (WMA) 2
 - Waste Management Area (WMA) 3
 - Waste Management Area (WMA) 4
- Nonradioactive Dangerous Waste Landfill (near the 200 Areas)
- 1301-N Liquid Waste Disposal Facility (100-N Area)
- 1324-N/NA Surface Impoundment and Percolation Ponds (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 (major waste water discharge area for PUREX and B Plant)
- 2101-M Pond (200-East Area)
- Grout Treatment Facility (200-East Area).

The Grout Treatment Facility is included in this series of quarterly reports for the first time. This report is the tenth in a series of quarterly status reports; the first nine cover the period from May 1, 1986, through September 30, 1988 (PNL 1986; 1987a,b,c,d; 1988b,c,d; Fruland, Bates, and Lundgren 1989).

The 13 projects discussed in this report were designed according to applicable interim-status ground-water monitoring requirements specified in

the Resource Conservation and Recovery Act of 1976 (RCRA) as amended, at 40 CFR 265, Subpart F, and in WAC 173-303.

During this quarter, field activities primarily consisted of sampling and analyses, and water-level monitoring. The 200 Areas Low-Level Burial Grounds section includes sediment analyses in addition to ground-water monitoring results.

Twelve new wells were installed during the previous quarter: two at the 216-A-29 Ditch, six at the 216-A-10 Crib, and four at the 216-B-3 Pond. Preliminary characterization data for these new wells include drillers' logs and other drilling and site characterization data, and are provided in Volume 2 or on microfiche in the back of Volume 1.

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1.0 INTRODUCTION

The U.S. Department of Energy-Richland Operations Office (DOE-RL) owns and operates, and Westinghouse Hanford Company currently co-operates, the Hanford facilities included in this report. The Hanford Site in southeastern Washington (Figure 1.1) is one of many DOE installations across the United States involved in a variety of activities related to energy research and development, nuclear weapons, and national security. A number of Hanford facilities use and generate hazardous materials and wastes, which must be managed so that public health and the environment are protected. The Resource Conservation and Recovery Act (RCRA) was enacted in 1976, providing a regulatory structure for the management of solid wastes, which includes hazardous wastes. The Pacific Northwest Laboratory (PNL) initiated RCRA site characterization and ground-water monitoring activities in 1985 for UNC Nuclear Industries, Westinghouse Hanford Company, and Rockwell Hanford Operations, which were Hanford operating contractors at the time. Pacific Northwest Laboratory designed ground-water monitoring programs to meet the requirements contained in RCRA, at 40 CFR 265, Subpart F, and in WAC 173-303. The analytical results of the RCRA ground-water monitoring programs are compared to drinking water standards. However, none of the facilities included in this report use the unconfined aquifer for a source of drinking water.

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

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

FIGURE 1.1. RCRA Ground-Water Monitoring Projects on the Hanford Site, December 1988

quality of the ground water, followed in subsequent years by semiannual monitoring of indicator parameters. Data obtained during indicator monitoring are compared with the background levels established during the first year of ground-water monitoring. If a statistically significant change occurs, a ground-water quality assessment program is implemented, which among other requirements, reinstitutes quarterly monitoring.

This report describes progress from October 1 through December 31, 1988, for 13 RCRA ground-water monitoring projects at 16 Hanford Site hazardous waste disposal facilities: 300 Area Process Trenches, 183-H Solar Evaporation Basins, 4 Waste Management Areas (WMAs) in the 200 Areas Low-Level Burial Grounds (LLBG), Nonradioactive Dangerous Waste Landfill, 1301-N Liquid Waste Disposal Facility (LWDF), 1324-N/NA Surface Impoundment and Percolation Ponds, 1325-N LWDF, 216-A-10 Crib, 216-A-29 Ditch, 216-A-36B Crib, 216-B-3 Pond, 2101-M Pond, and the Grout Treatment Facility. The location of each facility is shown in Figure 1.1. Information on the Grout Treatment Facility is being provided in this report for the first time.

Table 1.1 presents the regulatory status of each ground-water monitoring project. Ground-water quality assessment projects are in progress for the 300 Area Process Trenches and the 183-H Solar Evaporation Basins. All ground-water monitoring at the other facilities are background monitoring programs. Of these, the Nonradioactive Dangerous Waste Landfill is in the indicator evaluation phase, and the remaining programs are in the first year of background monitoring.

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

TABLE 1.1. Status of Hanford Site Resource Conservation and Recovery Act Interim-Status Ground-Water Monitoring Projects as of November 30, 1988

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

NONREPRESENTATIVE CONSTITUENTS

There are two constituents recorded by several projects that are currently suspected of not representing true ground-water conditions. These are chromium, listed at 40 CFR 265, Appendix III, and methylene chloride (dichloromethane), listed at WAC 173-303-9905 and 40 CFR 261, Appendix VIII.

Methylene Chloride

This constituent has been found sporadically in volatile organic compound (VOC) and total organic halogen (TOX) samples since the implementation of RCRA ground-water monitoring. Early cases were apparently caused by contaminated sample bottles; a few bladder pumps in the 100-H and 300 Area

wells may also have been contaminated by methylene chloride. Incidents of methylene chloride detection decreased to only spurious events until the summer of 1988.

Beginning in June and continuing into the fall of 1988, a number of elevated methylene chloride and TOX (as a result of methylene chloride) levels have been detected across the Site. However, the occurrence is random in time and space; thus far, resampling and analysis for each well indicated the absence of methylene chloride. A number of investigations into the problem, including resampling the wells, analysis of some materials and lubricants on field vehicles, and investigation into sampling preparations, have ruled out contamination in the field from two commonly used lubricants, contamination from sample bottles, and contamination during sample preparation. The occurrence of this constituent is being carefully monitored and evaluated to determine its true source.

Chromium

Elevated concentrations of unfiltered chromium above 50 $\mu\text{g/L}$ (U.S. Environmental Protection Agency Interim Primary Drinking Water Standards) have been observed in a number of newly constructed Hanford ground-water monitoring wells over the past year. These elevated levels have generally not been observed in filtered samples from the same wells. The chromium concentrations are associated with elevated iron and manganese concentrations and are mainly observed in unfiltered samples from recently constructed ground-water monitoring wells. Other elevated species that have been observed in unfiltered samples include barium, nickel, and aluminum. Possible sources of these constituents are natural borehole sediments and well construction materials. Although the source for some constituents may seem obvious (e.g., stainless steel casing for iron and nickel), it is not possible to limit these constituents to one particular source (e.g., iron is also a very common constituent in natural sediments), based on the present data. Field experiments on two new wells have shown that elevated metal concentrations from unfiltered samples decrease rapidly with time as the wells are developed by pumping. This evidence suggests that the contamination is of a particulate nature that can be readily purged by pumping and may therefore be an artifact of well construction rather than true ground-water

contamination. The source of these metals and practical solutions to the problem are the subjects of an ongoing investigation. Meanwhile, chromium concentrations are being carefully monitored and evaluated.

CHANGE IN SUBMISSION OF RAW DATA

Beginning this quarter, raw data from drilling operations (e.g., drillers' logs) will be put on microfiche and placed in a packet at the back of Volume 1 of these reports.

2.0 300 AREA PROCESS TRENCHES

R. Schalla

Previously issued reports (PNL 1986; 1987a,b,c,d; 1988b,c,d; Fruland, Bates, and Lundgren 1989) contain information on the progress made and the data obtained by the Resource Conservation and Recovery Act (RCRA) Interim-Status Ground-Water Quality Assessment Program for the 300 Area Process Trenches during the period from May 1, 1986, through September 30, 1988. This section includes information on subsequent activities through December 31, 1988.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Drilling activities during this quarter included installation of a multiport Westbay research well (as part of the Hanford Site-Wide Ground-Water Monitoring Project) adjacent to a cluster of four monitoring wells (399-1-3, 399-1-7, 399-1-8, and 399-1-9) and abandonment of well 399-1-16D, which is in a cluster with three other wells (399-1-16A, 399-1-16B, and 399-1-16C). These are all wells downgradient from the process trenches (Figure 2.1).

The abandonment of well 399-1-16D began December 1, 1988, and the water levels and chemistry are being monitored in three adjacent wells (399-1-16A, 399-1-16B, and 399-1-16C) to assess the impact of the abandonment activities and determine whether hydraulic isolation between the confined and unconfined aquifers has been restored. Communication between the unconfined and confined aquifers is occurring because a section of broken steel casing remains in well 399-1-16D through the confining zone. Abandonment has not been completed because of difficulties in removing the existing bentonite seal and the 6-in.-dia stainless steel casing and well screen. These materials must be removed to allow access to the broken 10-in.-dia steel casing.

Hydrogeologic Characterization

Hydrogeologic characterization efforts have been suspended until additional data are collected for analysis.

FIGURE 2.1. Monitoring Well Locations and Ground-Water Flow Pattern Near the 300 Area Process Trenches (October 25, 1988)

The interim characterization report describing the 300 Area Process Trenches (Schalla et al. 1988) was published and distributed. The report contains information on the results of monitoring and characterization studies around the 300 Area Process Trenches. The interim report is primarily a compendium of currently available technical information on the 300 Area; interpretations of the ground-water monitoring data are limited to the most obvious conclusions. Final conclusions, particularly regarding the rate and extent of migration of contaminants and ground-water flow velocities, will be presented in the final characterization report following completion of site characterization in 1990.

Routine data collection has continued and includes the collection of continuous surface-water and ground-water levels using data loggers, in addition to monthly measurement of water levels in a network of 49 wells in the 300 Area (Figure 2.1). The closed 341.5-ft contour in Figure 2.1 represents a temporary gradient reversal. Such short-term reversals are caused by rapid periodic changes (on the order of 12 h) of high river stage and concomitant bank storage. For example, the river had been at a low level for more than a day before the water-level measurements were collected manually on October 25, 1988 (Figure 2.1, upper left-hand corner). Water levels in the river were at or near the daily peak when measured between 8:00 a.m. and 3:00 p.m. Table 2.1 presents the routinely collected water-level elevation data.

Continuous water-level monitoring is continuing at eight 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, 399-1-17A, and 399-1-18A. The primary surface-water station (SWS-1) was operative this quarter, but because of a problem with the data logger on the last hour of the last day of December, the stored data for December may have been lost. Currently, all eight data loggers record measurements every half hour. These data are essential for setting the spatial and temporal boundary conditions for models of the 300 Area and for interpreting water chemistry data.

TABLE 2.1. Water-Level Data and Vertical Control Reference Data for
300 Area Wells on October 25, 1988

<u>Well Number</u>	<u>Depth to Water(a)</u>	<u>Casing Elevation(b)</u>	<u>Elevation(b) of Water Surface</u>
399-1-1	33.52	375.90	342.38
399-1-2	42.80	384.52	341.72
399-1-3	42.99	384.75	341.76
399-1-4	38.04	380.83	342.79
399-1-5	37.78	379.82	342.04
399-1-6	31.23	373.81	342.57
399-1-7	43.91	385.63	341.72
399-1-10	31.10	373.65	342.55
399-1-11	34.13	377.79	343.66
399-1-12	42.46	384.45	341.99
399-1-13	46.55	388.62	342.07
399-1-14	40.68	383.23	342.55
399-1-15	36.94	379.59	342.65
399-1-16A	39.72	381.51	341.79
399-1-17A	35.73	377.47	341.74
399-1-18A	47.87	390.83	342.96
399-1-19	32.74	374.64	341.90
399-2-1	33.35	375.26	341.91
399-2-2	33.67	375.53	341.86
399-2-3	33.60	375.44	341.84
399-3-1	42.68	384.43	341.75
399-3-2	50.80	392.36	341.50
399-3-6	51.17	392.85	341.68
399-3-7	52.57	394.22	341.65
399-3-9	45.65	387.31	341.60
399-3-10	43.79	385.40	341.61
399-3-12	44.81	386.38	341.57
399-4-1	53.60	395.00	341.40
399-4-7	35.49	376.99	341.50
399-4-9	39.81	381.40	341.59
399-4-10	36.00	377.59	341.59
399-4-11	63.03	404.53	341.50
399-5-1	53.83	395.60	341.77
399-6-1	44.82	386.93	342.11
399-8-1	52.73	394.88	342.15
399-8-2	53.35	396.06	342.71
399-8-3	50.64	393.11	342.47
699-S19-E13	51.08	394.51	343.43

TABLE 2.1. (contd)

<u>Well Number</u>	<u>Depth to Water(a)</u>	<u>Casing Elevation(b)</u>	<u>Elevation(b) of Water Surface</u>
699-S27-E14	58.41	399.76	341.35
699-S29-E12	42.39	387.95	345.56
699-S30-E15A	58.57	400.14	341.57

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

GROUND-WATER SAMPLING AND ANALYSIS

In addition to the semiannual sampling of 27 wells conducted in December (for which the data are not yet available), the ground water near the 300 Area Process Trenches has been sampled on a biweekly basis from three wells adjacent to the process trenches (399-1-11, 399-1-17A, and 399-1-19) and one upgradient well (399-1-18A). Wells 399-1-16A, 399-1-16B, and 399-1-16C were sampled three times to monitor abandonment of well 399-1-16D. Available results are discussed later in this section.

Collection and Analysis

The semiannual sampling network consists of 27 wells. Although the number of wells is somewhat smaller, this network is spatially more comprehensive than the 34 monitoring well network used earlier in 1988 because the 27 wells focus on an area only two-thirds the size of the previous study area. Nine of the quarterly sampling wells used in the past either provided essentially duplicate data or did not provide adequate information for differentiating contaminants from sources other than the process trenches. Two other existing wells (399-2-2 and 399-3-9) were added to the remaining 25 wells to more fully differentiate and define the distribution of contaminants (Figure 2.2).

Before this quarter, three wells (399-1-11, 399-1-17A, and 399-1-19) near the 300 Area Process Trenches had been sampled weekly for a limited set

of specific constituents (i.e., volatile chlorinated hydrocarbons, anions, and uranium). Based on an analysis of historical data, biweekly sampling replaced weekly sampling this quarter. Sampling this set of wells every 2 weeks would detect releases of even the most mobile contaminants (e.g., nitrate) migrating from the process trenches.

Monitoring results have been reviewed to determine whether concentrations of mobile chemical constituents in the wells were changing with concentrations of mobile chemical constituents in the process trenches and with water-table elevation. The results of the analyses for the most mobile constituents indicate that the wells closest to the process trenches (e.g., 399-1-4 and 399-1-5) had their highest correlation for the same week the trench sample (well 399-1-19) was collected, and wells slightly more distant (e.g., 399-1-2, 399-1-3, and 399-1-7) from the trenches had their highest correlations with the process trenches 2 to 5 weeks later. Therefore, sampling continued on a biweekly basis at the closest well, 399-1-19, which is between the two trenches at the southern end; at well 399-1-11, which is close to the east side of the east trench; and at well 399-1-17A, which is more distant and southeast of the process trenches. To help differentiate between contamination emanating from the 300 Area Process Trenches and contamination from upgradient sources, a background well (399-1-18A) was added to the biweekly network.

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

Discussion of Results

Results from December's semiannual sampling of the 27-well network will be presented in the next quarterly report. Analytical data collected through early December from the biweekly network and the three wells adjacent to well 399-1-16D are available. A summary of sampling results for these wells is presented in Table 2.2. The constituent dichloroethene was inadvertently not included in this table, but was sampled for this quarter. Table 2.3 presents the sampling schedule for the trenches.

TABLE 2.2. Constituent List and Summary of Sampling Results for the 300 Area Process Trenches, October and November 1988

Constituent List=Contamination Indicators						
Constituent Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
191	CONDFLD	umho	1	19	0	700 WDOE Specific conductance, field
199	PHFIELD		0.1	19	0	6.5-8.5 EPAS pH, field
207	PH-LAB		0.01	3	0	6.5-8.5 EPAS pH, laboratory
C89	TOC	ppb	1000	3	0	Total organic carbon
H42	TOXLDL	ppb	20	3	0	Total organic halogens, low DL

Constituent List=Drinking Water Standards						
Constituent Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
A06	BARIUM	ppb	6	3	0	1000 EPA Barium
A07	CADMIUM	ppb	2	3	3 ***	10 EPA Cadmium
A08	CHROMIUM	ppb	10	3	3 ***	60 EPA Chromium
A10	SILVER	ppb	10	3	3 ***	60 EPA Silver
A81	TETRANE	ppb	5	18	18 ***	5 EPA Tetrachloromethane [Carbon Tetrachloride]
A87	1,1,1-T	ppb	5	18	18 ***	200 EPA 1,1,1-Trichloroethane
A89	TRICENE	ppb	5	18	14 ***	5 EPA Trichloroethylene [1,1,2-Trichloroethene]
A80	CHLFORM	ppb	6	18	4	100 EPA Chloroform [Trichloromethane]
C72	NITRATE	ppb	500	19	1	45000 EPA Nitrate
C74	FLUORIO	ppb	500	19	17	4000 EPA Fluoride
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 ***	60 EPA Chromium, filtered
H23	FSILVER	ppb	10	3	3 ***	60 EPA Silver, filtered

Constituent List=Quality Characteristics						
Constituent Code	Constituent 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	1	50 EPAS Manganese
A19	IRON	ppb	30	3	0	300 EPAS Iron
C73	SULFATE	ppb	500	19	0	250000 EPAS Sulfate
C75	CHLORID	ppb	500	19	0	250000 EPAS Chloride
H24	FSODIUM	ppb	200	3	0	. Sodium, filtered
H29	FMANGAN	ppb	5	3	1	50 EPAS Manganese, filtered
H31	FIRON	ppb	30	3	0	300 EPAS Iron, filtered

TABLE 2.2. (contd)

----- Constituent List=Site Specific -----								
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name		
104 U	pCi/L	0.5	8	0	600 DOE	Uranium		
124 U-CHEM	ug/L	0.725	8	0	.	Uranium, chemical		
A01 BERYLUM	ppb	5	3	3 ***	.	Beryllium		
A03 STRONUM	ppb	20	3	0	.	Strontium		
A04 ZINC	ppb	5	3	0	5000 EPAS	Zinc		
A05 CALCIUM	ppb	50	3	0	.	Calcium		
A12 NICKEL	ppb	10	3	2	.	Nickel		
A13 COPPER	ppb	10	3	2	1300 EPAP	Copper		
A14 VANADUM	ppb	5	3	3 ***	.	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		
A64 METHONE	ppb	10	16	16 ***	.	Methyl ethyl ketone		
A68 1,1,2-T	ppb	5	16	16 ***	.	1,1,2-Trichloroethane		
A70 PERCENE	ppb	5	16	16 ***	.	Perchloroethylene [Tetrachloroethene]		
A71 OPXYLE	ppb	5	16	16 ***	440 EPAP	Xylene-o,p		
A93 METHYCH	ppb	10	16	16 ***	.	Methylene chloride		
B14 M-XYLE	ppb	5	16	16 ***	440 EPAP	Xylene-m		
C78 PHOSPHA	ppb	1000	19	19 ***	.	Phosphate		
H16 TC	ppb	1000	3	0	.	Total carbon		
H18 FZINC	ppb	5	3	0	5000 EPAS	Zinc, filtered		
H19 FCALCIU	ppb	50	3	0	.	Calcium, filtered		
H25 FNICKEL	ppb	10	3	2	.	Nickel, filtered		
H26 FCOPPER	ppb	10	3	2	1300 EPAP	Copper, filtered		
H27 FVANADI	ppb	5	3	3 ***	.	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	20	3	0	.	Strontium, filtered		
H36 FANTIMO	ppb	100	3	3 ***	.	Antimony, filtered		
H68 HEXONE	ppb	10	16	16 ***	.	Hexone		

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

xxx - Indicates that Drinking Water Standards were exceeded

EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25690

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

EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46938

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

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

TABLE 2.3. Sampling Schedule for the 300 Area Process Trenches

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

A Well abandonment study
 AA Sampled twice for well abandonment study
 BW Biweekly samples
 L Long list (WAC 173-303-9905)
 R Quality control replicates
 V Volatile organic analyses blanks
 X Regular sample list

Biweekly Network Results

The biweekly network samples continue to show the presence of uranium, anions (i.e., chloride, nitrate, and sulfate), and low concentrations of volatile organic constituents (e.g., trichloroethene, perchloroethene) in the ground water near the process trenches. Chloroform concentrations are

following normal (e.g., seasonal) patterns and continue to be below maximum contaminant levels (Schalla et al. 1988).

Based on the results of the extensive long-term RCRA sampling program, it is thought that the ground-water mound beneath the process trenches creates an area in the upper portion of the unconfined aquifer that is dominated by the water from the process trenches. Wells 399-1-11, 399-1-17A, and 399-1-19 are screened in the area that intercepts this water. It has been demonstrated that background well 399-1-18A receives flow from areas west and north of the process trenches (Schalla et al. 1988).

Volatile organic constituents (VOCs) detected in samples collected from the four biweekly sampling wells during October and November include chloroform and trichloroethene (TCE). Neither of these VOCs was present in concentrations greater than their drinking water standards [TCE maximum contaminant level (MCL) is 5 ppb]. Trichloroethene was detected in well 399-1-11 on October 25, 1988, at a concentration of 3 ppb. Chloroform concentrations in the three wells adjacent to the trenches ranged from 12 to 25 ppb, similar to those concentrations reported in previous years for this season.

Uranium is the only constituent that shows a trend. Downgradient of the process trenches, a moderately high concentration peak of a uranium plume that migrated from the process trenches in mid-October was apparently followed by a nadir (low point) in late October, based on data for well 399-1-19, which is located between the process trenches (Figure 2.2). The plume's peak concentration was broader and flatter in well 399-1-11 and did not occur until about November 1, 1988 (Figure 2.3). The nadir occurred in wells 399-1-19 and 399-1-11 in the last week of October and near the last week of November, respectively. The peaks and nadirs in well 399-1-17A appear to closely mimic those in well 399-1-19, occurring almost simultaneously to those in well 399-1-19. The nadir in well 399-1-17A appears to occur only a few days behind and at a lesser magnitude than in 399-1-19, probably because of dispersion and other transport processes. The similar and almost simultaneous response in well 399-1-17A forms nearly parallel concentration peaks and troughs as those in well 399-1-19 for December (Figure 2.3). Well 399-1-18A is a background well and showed no response to migration of the plume.

FIGURE 2.3. Uranium Concentrations in pCi/L in the Biweekly Wells Adjacent to the 300 Area Process Trenches. (Plotting symbols are abbreviations of well names. Horizontal solid line is contractual detection level.)

Variations in uranium concentration do not appear to be related to the pattern of alternating discharge into the east or west trench (only one trench is used at a time). Process water was discharged exclusively to the west trench for the first 3 months of calendar year 1988 and exclusively to the east trench for the last 9 months of this year. Uranium concentrations for samples collected in October and November are shown in Table 2.4. Other constituents of interest are also shown in Table 2.4.

Data from Well Abandonment

The baseline samples from wells 399-1-16A, 399-1-16B, and 399-1-16C were analyzed by PNL and UST to determine the amount of residual contamination in the confined aquifer before abandonment was initiated and the impact of the activities associated with well 399-1-16D abandonment, and ultimately to demonstrate the success of abandonment. All sample data for volatile organic constituents collected on November 28, December 6, and December 13, 1988, from wells 399-1-16A, 399-1-16B, and 399-1-16C are summarized in Table 2.5. The results for other constituents and parameters are not yet available, but they will be reported in the next quarterly report.

Pacific Northwest Laboratory's equipment has a great sensitivity for analyzing low levels of volatile organic constituents (e.g., down to as low as 0.01 ppb). This greater sensitivity provides more information concerning constituent migration (plume definition and hydrogeology) and detection of a comprehensive analytical suite. For the first time in the 300 Area, the dichloroethene (DCE) isomers were isolated. Cis-1,2-DCE was the dominant isomer found, as expected based on experimental anaerobic biodegradation rates (Wood et al. 1981^(a)) and field experience at hazardous waste sites (Wilson et al. 1983a,b; Schalla et al. 1984; Schalla, Meuser, and Lilga 1986). The results for the November 28 and December 6 sampling periods (Table 2.5) were determined by PNL using the Gas Chromatography/Electron Capture Detector/Flame Ionization Detector method with attached purge and trap in PNL's mobile laboratory. Duplicate December 6 volatile organic constituent samples were analyzed by UST, and UST results are shown in

(a) Neely, W. B., Dow Chemical Company, Midland, Michigan; personal communication with R. Schalla, Pacific Northwest Laboratory, 1983.

TABLE 2.4. Constituents with at Least One Detected Value for the 300 Area Process Trenches, October/November 1988

Well name	Collection Date	Duplicate sample number	CHLFORM ppb 5/100	CHLORID ppb 500/250000s	CONDFLD umho 1/700w	FLUORID ppb 500/4000	NITRATE ppb 500/45000
3-1-11	14OCT88		25	16,400	202	<500	2,000
	25OCT88		16	10,000	159	<500	2,100
	09NOV88		12	3,900	140	<500	2,900
	23NOV88		14	14,000	187	<500	3,200
3-1-17A	14OCT88		21	17,000	201	<500	1,600
	25OCT88		15	9,600	188	<500	2,100
	09NOV88		13	4,300	158	<500	2,100
	23NOV88		13	7,100	169	<500	2,200
3-1-18A	14OCT88		<5	14,100	418	<500	20,700
	25OCT88		<5	17,900	435	<500	21,100
	09NOV88		<5	18,100	330	<500	21,300
	23NOV88		<5	16,800	423	<500	22,300
3-1-19	14OCT88		21	15,800	198	<500	2,000
	25OCT88		15	5,700	197	<500	2,300
	09NOV88		14	5,900	180	<500	2,200
	23NOV88		14	13,700	195	<500	2,200

Well name	Collection Date	Duplicate sample number	PHFIELD 0.1/8.5s	SULFATE ppb 500/250000s	TRICENE ppb 5/5	U pCi/L 0.5/600d	U-CHEM ug/L 0.725/.
3-1-11	14OCT88		7.2	15,100	<5	.	29.30
	25OCT88		7.4	20,200	#3	.	112.00
	09NOV88		7.3	15,100	<5	77.40	.
	23NOV88		7.3	15,300	<5	23.60	.
3-1-17A	14OCT88		7.0	15,100	<5	.	109.00
	25OCT88		7.1	19,100	<5	.	62.80
	09NOV88		7.2	15,400	<5	49.30	.
	23NOV88		6.9	15,900	<5	63.80	.
3-1-18A	14OCT88		7.9	49,000	<5	.	5.29
	25OCT88		7.9	50,000	<5	.	3.32
	09NOV88		7.7	48,700	<5	5.20	.
	23NOV88		7.9	51,100	<5	3.82	.
3-1-19	14OCT88		7.1	14,300	<5	.	197.00
	25OCT88		7.3	15,100	<5	.	24.60
	09NOV88		7.3	15,700	<3	24.50	.
	23NOV88		7.2	18,900	<5	86.60	.

TABLE 2.4. (contd)

Well name	Collection Date	Duplicate sample number	BARIUM ppb g/1000	FBARIUM ppb g/1000	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s	CONDFLD umho 1/700w	COPPER ppb 10/1300p		
3-1-16A	28NOV88		23	22	21,900	21,400	13,100	227	19		
3-1-16B	28NOV88		50	51	18,100	17,000	9,600	381	<10		
3-1-16C	28NOV88		55	52	20,300	18,500	12,100	374	<10		
Well name	Collection Date	Duplicate sample number	FCOPPER ppb 10/1300p	FLUORID ppb 500/4000	IRON ppb 30/300s	FIROM ppb 30/300s	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	
3-1-16A	28NOV88		13	<500	53	41	4,240	4,270	<5	<5	
3-1-16B	28NOV88		<10	1,300	108	95	8,380	8,760	72	71	
3-1-16C	28NOV88		<10	1,100	141	44	8,390	8,640	39	48	
Well name	Collection Date	Duplicate sample number	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	PH-LAB ppb 0.01/8.5s	PHFIELD ppb 0.1/8.5s	FPOTASS ppb 100/.	POTASUM ppb 100/.	SODIUM ppb 200/.	
3-1-16A	28NOV88		47	51	2,700	7.0	7.2	2,850	2,820	13,800	
3-1-16B	28NOV88		<10	<10	<500	7.8	8.3	5,740	5,360	55,600	
3-1-16C	28NOV88		<10	<10	700	7.9	8.2	6,130	6,080	48,600	
Well name	Collection Date	Duplicate sample number	FSODIUM ppb 200/.	FSTRONT ppb 20/.	STRONUM ppb 20/.	SULFATE ppb 500/250000s	TC ppb 1000/.	TOC ppb 1000/.	TOXLDL ppb 20/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
3-1-16A	28NOV88		13,300	97	97	16,100	14,800	500	28	232	17
3-1-16B	28NOV88		58,800	106	100	5,000	41,900	300	38	5	7
3-1-16C	28NOV88		48,000	115	110	18,300	32,900	400	62	39	15

The column headers consist of : Constituent Name

Analysis Units

Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-76-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
- s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 148 (July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

Data flags

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

TABLE 2.5. Results of Volatile Organic Constituents Analyses for Monitoring Abandonment of Well 399-1-16D

PNL Laboratory Results for November 28, 1988

Well Name	Trans-1,2-DCE, (a) ppb	Cis-1,2-DCE, (b) ppb	CHCl ₃ , (c) ppb	1,1,1-TCA, (d) ppb	CCl ₄ , (e) ppb	TCE, (f) ppb	PCE, (g) ppb
399-1-16A	ND ^(h)	ND	18	0.27	0.01	2.0	0.68
399-1-16B	~0.25 ⁽ⁱ⁾	~37	0.19	<0.02	<0.01	13	0.08
399-1-16C	~1.6	~41	4.5	0.04	<0.01	33	0.09

PNL (and UST in parentheses) Laboratory Results for December 6, 1988

399-1-16A	ND (<5)	ND (<5)	17 (15)	0.42 (<5)	0.02 (<5)	1.8 (<5)	0.51 (<5)
399-1-16B	0.17 ⁽ⁱ⁾ (<5)	53 (59)	0.39 (<5)	<0.02 (<5)	<0.01 (<5)	22 (16)	0.34 (<5)
399-1-16C	0.68 (<5)	23 (31)	5.9 (6)	0.06 (<5)	<0.01 (<5)	15 (14)	0.08 (<5)

UST Laboratory Results for December 13, 1988

399-1-16A	<5	<5	15	<5	<5	<5	<5
399-1-16B	<5	75	<5	<5	<5	20	<5
399-1-16C	<5	46	8	<5	<5	21	<5

(a) Trans-1,2-DCE = trans-1,2-dichloroethane.

(b) Cis-1,2-DCE = cis-1,2-dichloroethane.

(c) CHCl₃ = chloroform.

(d) 1,1,1-TCA = 1,1,1-trichloroethane.

(e) CCl₄ = carbon tetrachloride.

(f) TCE = trichloroethene.

(g) PCE = perchloroethene.

(h) ND = not detected.

(i) Trans- and cis-1,2-DCE values are estimates from previous calibrations.

Table 2.5 in parentheses under the values obtained by PNL. The December 13, 1988, volatile organic constituents sampling results are from UST, who determined the concentrations of volatile organic constituents using the gas chromatography/ mass spectrometry method without the attached purge and trap.

The close agreement of volatile organic constituent results is excellent, especially considering that the samples being compared were duplicates rather than splits and that they were analyzed by two separate laboratories on different dates using different analytical methods. All volatile organic constituent results obtained for samples collected on November 28, December 6, and December 13, 1988, from wells 399-1-16A, 399-1-16B, and 399-1-16C are summarized in Table 2.5. All inorganic analyses for November 28, 1988,

are in Table 2.1. The volatile organic constituents detected in samples collected from these three wells analyzed by PNL include trans-1,2-DCE, cis-1,2-DCE, chloroform, 1,1,1-trichloroethane (TCA), carbon tetrachloride (CCl_4), TCE, and perchloroethene (PCE). Only two volatile organic constituents were present in concentrations greater than MCLs: TCE (MCL is 5 ppb) in wells 399-1-16B and 399-1-16C with concentrations several factors above the drinking water standard and cis-1,2-DCE (MCL is 70 ppb) in well 399-1-16B, with a concentration of 75 ppb on December 13, 1988. The concentration of TCE in well 399-1-16C was much higher this quarter than in the August 1988 sampling. The quarter's results for DCE isomers in well 399-1-16C were also higher than those reported in August 1988. The intermediate-depth well, 399-1-16B, continued to show the presence of DCE in concentrations similar to those in the August 1988 sampling (59 ppb), which was down slightly from an average concentration of 67 ppb during 1987. Chloroform concentrations remained similar to those reported in previous years for the winter quarter. The concentrations of TCA, CCl_4 , and PCE continued to be very low, less than 5 ppb.

Sampling System Status

New piston pumps were installed in monitoring wells 399-1-7, 399-1-8, 399-8-1, and 399-8-3 as replacements for the old bladder and submersible sampling pumps. The status of all sampling systems in the 300 Area is listed in Table 2.6, even if the systems are not all currently used under the RCRA monitoring program.

TABLE 2.6. Well Pump Status and Water Levels for Existing Wells in the 300 Area as of October 25, 1988

Well Number	Depth to Water from	Depth of Pump from	Height of Casing ^(a)	Sampling Pump
	Top of Casing, ft	Top of Casing, ft	Above Pad, ft	
399-1-1	33.52	44.3	2.3 H	QED Bladder Model T-1200
399-1-2	42.80	49.3	1.3 H	QED Bladder Model T-1200
399-1-3	42.99	49.7	1.7 H	QED Bladder Model T-1200
399-1-4	38.04	45.5	1.5 H	QED Bladder Model T-1200
399-1-5	37.78	44.0	3.0 H,R	QED Bladder Model T-1200
399-1-6	31.23	39.0	3.0 H,R	QED Bladder Model T-1200
399-1-7	43.91	52.3	2.8	INW HydroStar Model 8000
399-1-8	43.19	52.3	1.6	INW HydroStar Model 8000
399-1-9	17.09	61.6	1.6	INW HydroStar Model 8001
399-1-10	31.10	36.7	1.7	INW HydroStar Model 8000
399-1-11	34.13	41.6	1.6	INW HydroStar Model 8000
399-1-12	42.46	52.4	2.4	INW HydroStar Model 8000
399-1-13	46.55	51.8	2.8	INW HydroStar Model 8000
399-1-14	40.68	41.8	2.8	INW HydroStar Model 8000
399-1-15	36.94	41.8	1.8	INW HydroStar Model 8000
399-1-16a	39.72	47.3	1.3	INW HydroStar Model 8000
399-1-16b	39.11	62.1	1.1	INW HydroStar Model 8000
399-1-16c	40.05	61.9	1.9	INW HydroStar Model 8001
399-1-16d	39.75	None	1.3	None, To be abandoned in 1989
399-1-17a	35.73	42.3	2.3	INW HydroStar Model 8000
399-1-17b	35.97	62.4	2.4	INW HydroStar Model 8000
399-1-17c	2.79	62.5	2.4	INW HydroStar Model 8001
399-1-18a	47.87	52.0	2.5	INW HydroStar Model 8000
399-1-18b	46.71	61.7	3.0	INW HydroStar Model 8000
399-1-18c	44.37	61.7	2.7	INW HydroStar Model 8001
399-1-19	32.74	42.5	2.5	INW HydroStar Model 8000
399-2-1	33.35	44.1	3.1 H	QED Bladder Model T-1200
399-2-2	33.67	43.0	2.0 H	Peabody Barnes 3/4 hp Submersible
399-2-3	33.60	42.1	1.1 H,R	Peabody Barnes 3/4 hp Submersible
399-3-1	42.68	48.3	2.3 H,R	Peabody Barnes 3/4 hp Submersible
399-3-2	50.80	41.6	-3.4	Peabody Barnes 3/4 hp Submersible
399-3-3	52.0 (b)	52.0	2.0	Peabody Barnes 3/4 hp Submersible
399-3-6	51.17	74.1	2.1	Peabody Barnes 3/4 hp Submersible
399-3-7	52.57	70.5	2.5	QED Bladder Model T-1200
399-3-8	43.0 (b)	None	2.0	None
399-3-9	45.65	54.0	2.0 H,R	Peabody Barnes 3/4 hp Submersible
399-3-10	43.80	49.7	2.7 H,R	QED Bladder Model T-1200
399-3-11	47.0 (b)	63.0	2.0	Peabody Barnes 3/4 hp Submersible
399-3-12	44.81	51.4	1.4 H,R	Peabody Barnes 3/4 hp Submersible
399-4-1	53.60	60.7	2.7 H	QED Bladder Model T-1200
399-4-5	50.0 (b)	None	NA ^(c)	Submersible
399-4-7	35.49	43.5	1.5 H,R	QED Bladder Model T-1200
399-4-9	39.81	48.3	2.3 H,R	Peabody Barnes 3/4 hp Submersible
399-4-10	36.00	43.9	1.9 H,R	Peabody Barnes 3/4 hp Submersible

TABLE 2.6. (contd)

<u>Well Number</u>	<u>Depth to Water from Top of Casing, ft</u>	<u>Depth of Pump from Top of Casing, ft</u>	<u>Height of Casing^(a) Above Pad, ft</u>	<u>Sampling Pump</u>
399-4-11	63.02	66.7	1.7	INW HydroStar Model 8001
399-5-1	53.83	62.6	2.6 H,R	Peabody Barnes 3/4 hp Submersible
399-5-2	40.0 (b)	None	2.0	None
399-6-1	44.82	51.2	1.2	Peabody Barnes 3/4 hp Submersible
399-8-1	52.73	62.2	2.0	INW HydroStar Model 8000
399-8-2	53.35	65.4	1.4 H	QED Bladder Model T-1200
399-8-3	50.64	62.2	1.2	INW HydroStar Model 8000
399-8-4	45.0 (b)	59.0	2.0	Peabody Barnes 3/4 hp Submersible
699-S19-E13	51.08	56.1	3.1 H,R	QED Bladder Model T-1200
699-S27-E14	58.41	71.9	0.9 H	Peabody Barnes 3/4 hp Submersible
699-S29-E12	42.39	53.5	3.5 H,R	Peabody Barnes 3/4 hp Submersible
699-S30-E15A	58.57	66.5	2.5 H,R	QED Bladder Model T-1200

- (a) Casing height is above ground surface if the well does not have a concrete pad. Also, the letters H and R after the casing height refer to holes (H) in the casing and rough (R) or irregular cut casing.
 (b) Initial Depth to water when drilled.
 (c) NA = information not available.

3.0 183-H SOLAR EVAPORATION BASINS

S. H. Hall

Previously issued reports (PNL 1986; 1987a,b,c,d; 1988b,c,d; Fruland, Bates, and Lundgren 1989) contain information on the progress made and the data obtained by the Resource Conservation and Recovery Act (RCRA) Ground-Water Quality Assessment Program for the 183-H Solar Evaporation Basins during the period May 1, 1986 through September 30, 1988. In addition, a final hydrogeologic characterization report has been published (Liikala et al. 1988). A Final Status Post-Closure Permit Application for this facility was submitted to the Washington State Department of Ecology in June 1988 (WHC 1988a).

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling was conducted during the report period. The principal effort in hydrogeologic characterization, as described below, was continued collection of water-level data from monitoring wells. Also, data from the river-stage recorder installed during the previous quarter are presented.

Hydrogeologic Characterization

Water-table elevations measured during the period are listed in Table 3.1. Well locations are shown in Figure 3.1. A water-table map is included in Liikala et al. (1988) and will be included in the next quarterly report.

Figures 3.2 through 3.4 represent river-stage data collected from September 23 to December 29, 1988. In the previous quarterly report (Fruland, Bates, and Lundgren 1989), the possibility of settling of the river-stage recorder was discussed. Comparison of the data presented in Figures 3.2 through 3.4 with river-stage data from the upstream Priest Rapids Dam (Figure 3.5 and 3.6) shows that there has been no apparent settling of the recorder at the 100-H Area relative to the variability seen in the river stage.

TABLE 3.1. Water-Level Measurements (in feet above mean sea level) for 100-H Area Wells^(a)

<u>Well Number</u>	<u>10/27/88</u>	<u>11/29/88</u>	<u>12/14/88</u>
199-H3-1	375.30	375.47	375.58
199-H3-2A	374.93	375.17	375.35
199-H3-2B	374.93	375.18	375.37
199-H3-2C	374.85	375.11	375.33
199-H4-3	373.59	374.05	374.58
199-H4-4	373.75	373.97	
199-H4-5	373.53	373.98	374.60
199-H4-6	374.93	375.19	375.39
199-H4-7	374.14	374.51	374.88
199-H4-8	373.83	374.28	374.77
199-H4-9	373.60	374.10	374.67
199-H4-10	373.98	374.24	374.78
199-H4-11	373.51	373.79	374.32
199-H4-12A	373.84	374.03	374.56
199-H4-12B	373.84	374.04	374.56
199-H4-12C	373.67	374.21	374.68
199-H4-13	373.38	373.63	374.11
199-H4-14	374.61	374.91	375.15
199-H4-15A	373.97	374.20	374.74
199-H4-15B	373.94	374.22	374.75
199-H4-16	374.04	374.38	374.72
199-H4-17	373.85	374.26	374.80
199-H4-18	373.72	374.16	374.62

(a) Note that these data are collected by Pacific Northwest Laboratory separately from the data collected before sampling, which is required by WAC 173-303.

GROUND-WATER SAMPLING AND ANALYSIS

Ground water in the vicinity of the 183-H basins has been routinely sampled and analyzed since 1985. The results of monitoring activities for this report period are presented below.

Collection and Analysis

Ten wells were sampled in October 1988, and the results of analysis are summarized in Tables 3.2 and 3.3. The sampling schedule is shown in Table 3.4. Analytical data for samples collected in September (23 wells

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

FIGURE 3.2. Columbia River Elevation (in feet above mean sea level) at the 100-H Area for the Period September 23 to October 26, 1988

FIGURE 3.3. Columbia River Elevation (in feet above mean sea level) at the 100-H Area for the Period October 26 to November 29, 1988

FIGURE 3.4. Columbia River Elevation (in feet above mean sea level) at the 100-H Area for the Period November 29 to December 29, 1988

FIGURE 3.5. Correlation of Columbia River Water Levels Between Measurements at Priest Rapids Dam (solid line) and the River Stage Recorder at the 100-H Area (dashed line), September 26 to October 1, 1988

FIGURE 3.6. Correlation of Columbia River Water Levels Between Measurements at Priest Rapids Dam (solid line) and the River Stage Recorder at the 100-H Area (dotted line), October 16 to 21, 1988

TABLE 3.2. Constituents with at Least One Detected Value for the 183-H Solar Evaporation Basins, September/October 1988

Well name	Collection Date	Duplicate sample number	ALKALIN ppb 20000/.	ALPHA pCi/L 4/16	ALUMINUM ppb 150/.	ARSENIC ppb 5/50	FARSENIC ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BETA pCi/L 5/50	FCADMIU ppb 2/10
1-H3-1	12SEP88		170,000	3.270	<150	5	<5	51.0	58	9.38	<2
1-H3-2A	08SEP88		113,000	2.810	<150	<5	<5	25.0	23	5.75	<2
	13OCT88		114,000	1.450	<150	.	.	24.1	27	9.08	<2
1-H3-2B	08SEP88		118,000	3.020	<150	<5	<5	31.0	34	5.36	<2
1-H3-2C	08SEP88		103,000	1.110	<150	8	7	19.0	15	5.15	<2
1-H4-3	07SEP88		153,000	131.000	2,950	<5	<5	55.0	26	202.00	<2
	12OCT88		151,000	101.000	311	.	.	28.7	29	148.00	<2
	12OCT88	1	154,000	110.000	411	.	.	33.8	29	150.00	<2
1-H4-4	08SEP88		134,000	95.900	<150	8	8	59.0	48	224.00	<2
	08SEP88	1	.	129.000	.	.	5	.	50	264.00	<2
	12OCT88		139,000	108.000	<150	.	.	59.5	51	214.00	<2
1-H4-5	07SEP88		143,000	1.790	<150	8	8	73.0	60	6.13	<2
	13OCT88		145,000	3.120	<150	.	.	87.5	74	12.10	<2
1-H4-6	12SEP88		145,000	4.870	<150	8	<5	60.0	54	17.30	<2
	13OCT88		150,000	2.820	<150	.	.	49.3	53	9.05	<2
1-H4-7	08SEP88		138,000	*0.217	<150	<5	<5	42.0	38	7.88	<2
1-H4-8	07SEP88		145,000	3.530	<150	<5	<5	55.0	50	11.40	<2
1-H4-9	02SEP88		159,000	8.550	<150	<5	8	71.0	59	71.60	<2
	02SEP88	1	.	8.850	.	.	7	.	83	73.40	<2
	12OCT88		159,000	7.190	<150	.	.	84.1	87	58.30	<2
1-H4-10	02SEP88		118,000	1.210	<150	<5	<5	86.0	83	5.18	<2
1-H4-11	06SEP88		112,000	3.750	<150	<5	<5	33.0	33	78.90	<2
1-H4-12A	01SEP88		148,000	13.700	<150	<5	<5	79.0	73	80.40	<2
	11OCT88		144,000	11.800	<150	.	.	78.0	70	44.20	<2
1-H4-12B	01SEP88		144,000	8.880	<150	<5	<5	122.0	103	31.40	<2
	11OCT88		145,000	5.810	<150	.	.	110.0	115	82.60	<2
1-H4-12C	01SEP88		104,000	2.250	<150	<5	5	<8.0	<8	*3.81	<2
	11OCT88		100,000	1.150	<150	.	.	<8.0	8	5.98	<2
1-H4-13	08SEP88		93,700	1.800	<150	<5	<5	23.0	21	88.80	<2
1-H4-14	13SEP88		102,000	2.320	<150	8	5	21.0	23	13.20	<2
1-H4-15A	02SEP88		130,000	1.980	<150	<5	<5	105.0	91	11.30	<2
1-H4-15B	02SEP88		130,000	2.630	<150	<5	<5	130.0	118	10.20	<2
1-H4-16	13SEP88		101,000	1.140	<150	5	<5	21.0	21	35.50	<2
1-H4-17	13SEP88		151,000	4.930	<150	<5	<5	71.0	89	14.30	6
1-H4-18	07SEP88		115,000	3.020	<150	<5	<5	30.0	28	20.10	<2
	11OCT88		114,000	1.780	<150	.	.	30.0	29	13.00	<2

TABLE 3.2. (contd)

Well name	Collection Date	Duplicate sample number	CADMIUM ppb 2/10	FCALCIU ppb 50/	CALCIUM ppb 50/	CHLFORM ppb 5/100	CHLORID ppb 500/260000*	FCHROMI ppb 10/50	CHROMIUM ppb 10/50	CO-60 pCi/L 22.5/100r
1-H3-1	12SEP88		<2	99,700	77,000	9	11,600	63	54.0	*3.41
1-H3-2A	08SEP88		<2	43,900	44,800	26	6,710	33	48.0	.
	130CT88		<2	44,400	42,700	.	6,100	42	38.7	.
1-H3-2B	08SEP88		<2	47,700	47,800	23	6,130	46	43.0	.
1-H3-2C	08SEP88		<2	24,600	29,200	<5	2,400	<10	<10.0	.
1-H4-3	07SEP88		<2	19,800	24,600	17	10,100	166	194.0	*3.79
	120CT88		<2	22,600	18,400	.	8,000	182	178.0	.
	120CT88	1	<2	20,700	20,800	.	8,700	150	199.0	.
1-H4-4	06SEP88		<2	32,700	39,700	16	6,260	163	209.0	.
	06SEP88	1	.	34,900	.	16	6,330	172	.	.
	120CT88		<2	29,900	41,500	.	7,000	176	212.0	.
1-H4-5	07SEP88		<2	58,000	74,500	15	8,500	101	123.0	.
	130CT88		<2	75,900	72,300	.	8,000	137	128.0	.
1-H4-6	12SEP88		<2	82,400	68,900	5	12,700	110	82.0	.
	130CT88		<2	72,700	68,400	.	12,400	72	72.1	.
1-H4-7	08SEP88		<2	58,000	65,000	14	8,870	90	115.0	.
1-H4-8	07SEP88		<2	69,800	77,900	9	10,100	92	114.0	.
1-H4-9	02SEP88		<2	73,400	87,600	15	9,040	94	131.0	.
	02SEP88	1	.	77,800	.	14	10,300	99	.	.
	120CT88		<2	83,700	84,000	.	9,000	108	113.0	.
1-H4-10	02SEP88		<2	39,400	40,300	<5	6,010	79	92.0	.
1-H4-11	06SEP88		<2	49,200	53,000	31	5,230	93	98.0	.
1-H4-12A	01SEP88		<2	96,900	77,300	16	8,830	130	129.0	.
	110CT88		<2	77,700	83,400	.	8,590	121	133.0	.
1-H4-12B	01SEP88		<2	85,000	75,600	18	8,300	101	137.0	.
	110CT88		<2	77,000	75,200	.	7,600	109	120.0	.
1-H4-12C	01SEP88		<2	28,700	32,000	11	2,470	260	326.0	.
	110CT88		<2	30,700	29,600	.	2,640	291	292.0	.
1-H4-13	06SEP88		<2	36,500	38,400	35	4,940	21	25.0	.
1-H4-14	13SEP88		<2	40,800	41,600	33	5,330	373	396.0	.
1-H4-15A	02SEP88		<2	50,400	59,500	12	6,820	122	164.0	.
1-H4-15B	02SEP88		<2	44,800	52,100	11	6,400	114	150.0	.
1-H4-16	13SEP88		3	46,000	51,100	31	5,010	<10	12.0	.
1-H4-17	13SEP88		<2	90,200	84,400	8	10,700	93	92.0	.
1-H4-18	07SEP88		<2	40,200	44,700	33	5,170	192	219.0	.
	110CT88		<2	48,000	48,500	.	5,000	222	229.0	.

TABLE 3.2. (contd)

Well name	Collection Date	Duplicate sample number	COLIFRM MPN 2.2/1	CONDFLD umho 1/700w	COPPER ppb 10/1300p	FCOPPER ppb 10/1300p	CS-137 pCi/L 20/200r	LFLUORD ppb 20/4000	IRON ppb 30/300s	FIRON ppb 30/300s
1-H3-1	12SEP88		<2.2	522	<10	<10	7.42	246	192.0	<30
1-H3-2A	08SEP88		<2.2	348	<10	<10	.	196	67.0	<30
	13OCT88		.	309	<10	<10	.	.	39.8	<30
1-H3-2B	08SEP88		<2.2	331	<10	13	.	188	<30.0	<30
1-H3-2C	08SEP88		<2.2	225	<10	<10	.	336	<30.0	<30
1-H4-3	07SEP88		<2.2	898	<10	<10	4.95	184	3870.0	<30
	12OCT88		.	796	<10	<10	.	.	2720.0	34
	12OCT88	1	.	.	<10	<10	.	.	3170.0	181
1-H4-4	06SEP88		<2.2	763	<10	<10	.	280	478.0	<30
	06SEP88	1	.	.	<10	<10	.	248	.	<30
	12OCT88		.	857	<10	<10	.	.	480.0	<30
1-H4-6	07SEP88		<2.2	453	<10	<10	.	169	76.0	<30
	13OCT88		.	471	<10	<10	.	.	47.3	<30
1-H4-8	12SEP88		<2.2	522	<10	<10	.	199	113.0	<30
	13OCT88		.	528	<10	<10	.	.	117.0	<30
1-H4-7	08SEP88		<2.2	444	<10	<10	.	183	58.0	<30
1-H4-8	07SEP88		<2.2	465	<10	<10	.	180	64.0	<30
1-H4-9	02SEP88		<2.2	830	<10	<10	.	174	<30.0	<30
	02SEP88	1	.	.	<10	<10	.	183	.	<30
	12OCT88		.	580	<10	<10	.	.	<30.0	<30
1-H4-10	02SEP88		<2.2	316	<10	<10	.	203	<30.0	<30
1-H4-11	06SEP88		<2.2	309	<10	<10	.	143	43.0	<30
1-H4-12A	01SEP88		<2.2	536	<10	<10	.	127	<30.0	<30
	11OCT88		.	504	<10	<10	.	.	<30.0	<30
1-H4-12B	01SEP88		<2.2	476	<10	<10	.	127	<30.0	<30
	11OCT88		.	451	<10	<10	.	.	<30.0	<30
1-H4-12C	01SEP88		<2.2	218	24	<10	.	145	46.0	<30
	11OCT88		.	239	<10	<10	.	.	43.0	<30
1-H4-13	08SEP88		<2.2	269	<10	<10	.	155	46.0	<30
1-H4-14	13SEP88		<2.2	303	<10	<10	.	199	<30.0	<30
1-H4-15A	02SEP88		<2.2	407	<10	<10	.	164	150.0	<30
1-H4-15B	02SEP88		<2.2	384	<10	<10	.	143	49.0	<30
1-H4-16	13SEP88		<2.2	263	<10	<10	.	131	<30.0	<30
1-H4-17	13SEP88		18.0	521	<10	18	.	220	230.0	<30
1-H4-18	07SEP88		<2.2	290	<10	<10	.	182	97.0	<30
	11OCT88		.	291	<10	<10	.	.	<30.0	<30

TABLE 3.2. (contd)

Well name	Collection Date	Duplicate sample number	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	METHYCH ppb 10/.	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000
1-H3-1	12SEP88		18,900	21,700	<5	8.0	<10	<10.0	<10	62,500
1-H3-2A	08SEP88		10,400	9,780	<5	<5.0	<10	<10.0	<10	19,700
	13OCT88		9,430	10,100	<5	<5.0	.	<10.0	<10	17,800
1-H3-2B	08SEP88		11,300	10,800	18	15.0	<10	<10.0	<10	22,500
1-H3-2C	08SEP88		9,510	7,810	<5	<5.0	<10	<10.0	<10	3,210
1-H4-3	07SEP88		5,540	3,670	<5	49.0	<10	13.0	<10	285,000
	12OCT88		3,890	4,270	11	27.9	.	40.1	<10	170,000
	12OCT88	1	3,830	3,860	11	38.3	.	54.1	<10	189,000
1-H4-4	06SEP88		6,000	5,090	<5	<5.0	<10	<10.0	10	258,000
	06SEP88	1	.	5,400	<5	.	<10	.	<10	254,000
	12OCT88		6,220	6,030	<5	<5.0	.	11.1	10	288,000
1-H4-5	07SEP88		13,000	10,300	<5	<5.0	<10	<10.0	<10	37,500
	13OCT88		12,200	13,200	<5	<5.0	.	<10.0	<10	37,400
1-H4-6	12SEP88		15,900	18,700	81	107.0	240	<10.0	<10	38,600
	13OCT88		14,900	16,000	109	123.0	.	<10.0	<10	39,000
1-H4-7	08SEP88		13,000	11,600	<5	<5.0	<10	<10.0	<10	35,000
1-H4-8	07SEP88		14,000	12,100	<5	<5.0	<10	<10.0	<10	39,100
1-H4-9	02SEP88		15,800	13,300	<5	<5.0	<10	<10.0	<10	98,000
	02SEP88	1	.	13,900	<5	.	<10	.	<10	102,000
	12OCT88		15,000	14,800	<5	<5.0	.	<10.0	<10	76,900
1-H4-10	02SEP88		9,890	9,280	<5	<5.0	<10	<10.0	<10	16,900
1-H4-11	06SEP88		7,130	7,100	<5	<5.0	<10	<10.0	<10	28,400
1-H4-12A	01SEP88		12,200	11,600	<5	<5.0	#5	<10.0	<10	87,700
	11OCT88		12,500	11,800	<5	<5.0	.	<10.0	<10	74,500
1-H4-12B	01SEP88		13,000	10,900	<5	<5.0	#5	<10.0	<10	57,700
	11OCT88		11,800	12,300	<5	<5.0	.	<10.0	<10	58,000
1-H4-12C	01SEP88		11,700	10,400	<5	<5.0	#5	18.0	18	8,500
	11OCT88		10,300	10,800	<5	<5.0	.	32.0	28	8,350
1-H4-13	08SEP88		6,750	6,170	<5	<5.0	<10	<10.0	<10	17,800
1-H4-14	13SEP88		7,680	8,350	<5	<5.0	<10	<10.0	<10	20,500
1-H4-15A	02SEP88		12,400	10,500	<5	<5.0	<10	<10.0	<10	29,100
1-H4-15B	02SEP88		12,000	10,500	<5	6.0	<10	22.0	17	28,900
1-H4-16	13SEP88		5,870	5,940	<5	<5.0	<10	<10.0	<10	12,600
1-H4-17	13SEP88		14,900	17,400	7	7.0	<10	<10.0	13	52,400
1-H4-18	07SEP88		8,000	6,990	<5	<5.0	<10	<10.0	<10	20,800
	11OCT88		7,980	8,240	<5	<5.0	.	<10.0	<10	20,400

TABLE 3.2. (contd)

Well name	Collection Date	Duplicate sample number	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	RU-108 pCi/L 172.5/30r	SELENIUM ppb 5/10	SODIUM ppb 200/.
1-H3-1	12SEP88		7.7	7.8	7,170	6,270	0.1730	0	<5.0	20,900
1-H3-2A	08SEP88		7.8	7.9	4,880	4,840	*0.0855	.	<5.0	14,000
	18OCT88		7.8	7.9	4,670	4,550	.	.	.	12,800
1-H3-2B	08SEP88		7.9	7.7	4,940	5,220	*0.0776	.	<5.0	11,900
1-H3-2C	08SEP88		7.8	7.8	4,250	4,940	*0.1220	.	<5.0	14,300
1-H4-3	07SEP88		8.1	7.9	4,340	5,660	0.2030	*-21	<5.0	212,000
	12OCT88		7.9	8.0	4,640	8,980	.	.	.	147,000
	12OCT88	1	7.9	.	4,180	4,530	.	.	.	162,000
1-H4-4	08SEP88		7.9	7.7	4,650	5,560	*0.0429	.	<5.0	143,000
	08SEP88	1	.	.	4,930	.	.	.	.	.
	12OCT88		7.8	7.9	5,610	5,700	.	.	.	144,000
1-H4-5	07SEP88		7.9	7.5	4,310	5,580	*0.0928	.	<5.0	14,000
	13OCT88		7.7	7.8	5,490	5,220	.	.	.	12,500
1-H4-6	12SEP88		7.8	7.7	7,240	8,920	*0.0877	.	5.2	26,800
	18OCT88		7.9	7.9	6,990	6,840	.	.	.	26,100
1-H4-7	08SEP88		7.8	7.5	4,930	5,800	0.1650	.	<5.0	13,900
1-H4-8	07SEP88		8.0	7.7	4,950	5,700	0.3280	.	<5.0	15,200
1-H4-9	02SEP88		8.0	7.8	5,020	6,030	*0.0759	.	<5.0	26,800
	02SEP88	1	.	.	5,280	.	.	.	.	.
	12OCT88		7.7	7.7	5,690	5,770	.	.	.	24,200
1-H4-10	02SEP88		7.9	8.9	4,130	4,380	*0.1590	.	<5.0	14,500
1-H4-11	06SEP88		7.8	7.5	2,590	2,660	*0.0423	.	<5.0	7,140
1-H4-12A	01SEP88		7.8	7.7	5,280	5,750	*0.1360	.	<5.0	21,200
	11OCT88		7.7	7.9	5,550	5,060	.	.	.	18,400
1-H4-12B	01SEP88		7.9	7.8	4,780	5,730	0.5030	.	<5.0	14,800
	11OCT88		7.7	7.9	5,580	4,890	.	.	.	12,000
1-H4-12C	01SEP88		8.0	7.4	4,560	5,030	0.1850	.	<5.0	4,570
	11OCT88		7.7	7.9	4,810	4,140	.	.	.	4,820
1-H4-13	08SEP88		7.5	7.1	1,900	2,100	*0.1090	.	<5.0	6,780
1-H4-14	13SEP88		7.9	7.8	4,210	3,920	*0.0338	.	<5.0	6,980
1-H4-15A	02SEP88		7.8	7.2	5,120	6,130	0.4920	.	<5.0	12,300
1-H4-15B	02SEP88		7.8	7.3	4,730	5,470	0.4340	.	<5.0	11,500
1-H4-16	13SEP88		8.0	7.8	3,150	2,960	*0.1430	.	<5.0	4,680
1-H4-17	13SEP88		7.5	7.0	7,860	6,710	0.2060	.	<5.0	15,400
1-H4-18	07SEP88		7.9	7.4	3,460	3,980	0.1500	.	<5.0	9,450
	11OCT88		7.8	7.7	4,210	3,470	.	.	.	8,330

TABLE 3.2. (contd)

Well name	Collection Date	Duplicate sample number	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONTIUM ppb 20/.	SULFATE ppb 500/250000s	TC ppb 1000/.	TC-99 pCi/L 15/900r	TDS ppb 5000/500000s
1-H3-1	12SEP88		22,800	*-0.141	510	452	78,900	37,300	*2.04	382,000
1-H3-2A	08SEP88		13,100	.	231	240	41,400	26,300	*2.21	216,000
	13OCT88		13,300	.	235	229	40,300	.	*-1.68	.
1-H3-2B	08SEP88		11,200	.	258	265	45,500	25,700	*1.09	227,000
1-H3-2C	08SEP88		11,900	.	158	188	23,800	22,300	*0.87	172,000
1-H4-3	07SEP88		173,000	*0.168	111	139	89,000	34,000	1,530.00	678,000
	12OCT88		181,000	.	128	102	83,300	.	1,110.00	.
	12OCT88	1	163,000	.	112	113	82,200	.	958.00	.
1-H4-4	06SEP88		123,000	.	178	204	69,800	30,500	1,600.00	604,000
	06SEP88	1	134,000	.	188	.	67,100	.	.	.
	12OCT88		145,000	.	197	220	73,200	.	1,770.00	.
1-H4-5	07SEP88		10,900	.	285	350	70,000	35,800	*-1.85	328,000
	13OCT88		13,300	.	352	339	69,700	.	*6.89	.
1-H4-6	12SEP88		27,900	.	399	365	89,600	32,100	*2.91	364,000
	13OCT88		27,000	.	379	374	88,400	.	*0.50	.
1-H4-7	08SEP88		12,400	.	285	314	76,100	30,700	*0.79	300,000
1-H4-8	07SEP88		13,300	.	327	367	82,200	83,000	*-3.91	348,000
1-H4-9	02SEP88		23,100	.	345	415	80,000	36,100	422.00	415,000
	02SEP88	1	24,500	.	387	.	80,800	.	.	.
	12OCT88		24,500	.	380	388	80,000	.	227.00	.
1-H4-10	02SEP88		14,000	.	200	210	41,800	27,100	*-0.09	223,000
1-H4-11	06SEP88		7,220	.	222	220	38,600	25,200	*0.74	233,000
1-H4-12A	01SEP88		19,200	.	346	374	70,800	33,100	396.00	379,000
	11OCT88		17,400	.	358	369	71,100	.	279.00	.
1-H4-12B	01SEP88		12,700	.	313	377	68,200	32,000	171.00	358,000
	11OCT88		13,800	.	354	336	68,700	.	174.00	.
1-H4-12C	01SEP88		4,170	.	203	227	25,700	23,300	*-0.14	185,000
	11OCT88		5,400	.	212	199	26,800	.	*0.85	.
1-H4-13	06SEP88		5,980	.	186	183	31,300	22,500	*-4.60	183,000
1-H4-14	13SEP88		8,190	.	212	201	42,500	22,600	*2.94	215,000
1-H4-15A	02SEP88		10,600	.	258	304	55,200	29,100	*0.83	279,000
1-H4-15B	02SEP88		10,700	.	248	280	54,500	29,400	*-0.93	273,000
1-H4-16	13SEP88		5,140	.	212	220	29,000	21,200	*1.38	195,000
1-H4-17	13SEP88		19,100	.	424	374	95,200	34,300	*1.50	379,000
1-H4-18	07SEP88		8,170	.	190	214	40,800	26,400	11.80	216,000
	11OCT88		9,570	.	224	216	38,600	.	15.50	.

TABLE 3.2. (contd)

Well name	Collection Date	Duplicate sample number	TOC ppb 1000/.	TOX ppb 100/.	TOXLDL ppb 20/.	U-CHEM ug/L 0.725/.	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
1-H3-1	12SEP88		1,960	#14.6	.	8.50	9	9.00	<5.00	<5
1-H3-2A	08SEP88		#863	#16.0	.	3.18	18	10.00	<5.00	<5
	13OCT88		.	.	58	3.34	5	<5.00	7.88	<5
1-H3-2B	08SEP88		#809	#20.0	.	2.94	11	7.00	<5.00	9
1-H3-2C	08SEP88		#482	#4.0	.	1.38	17	27.00	<5.00	<5
1-H4-3	07SEP88		1,170	#28.8	.	95.80	<5	12.00	9.00	<5
	12OCT88		.	.	98	83.80	<5	6.33	<5.00	<5
	12OCT88	1	.	.	.	91.90	5	5.54	<5.00	<5
1-H4-4	08SEP88		1,180	112.0	.	93.90	<5	<5.00	110.00	94
	08SEP88	1	.	.	.	86.30	<5	.	.	97
	12OCT88		.	.	312	107.00	<5	<5.00	127.00	52
1-H4-5	07SEP88		#949	1,510.0	.	3.69	<5	7.00	105.00	87
	13OCT88		.	.	78	4.90	<5	<5.00	101.00	84
1-H4-6	12SEP88		1,480	#81.4	.	4.57	5	<5.00	155.00	182
	13OCT88		.	.	70	5.90	<5	<5.00	157.00	132
1-H4-7	08SEP88		#798	#17.9	.	4.85	<5	9.00	5.00	9
1-H4-8	07SEP88		#807	#91.8	.	4.77	<5	7.00	<5.00	<5
1-H4-9	02SEP88		1,010	#15.2	.	10.90	<5	<5.00	5.00	<5
	02SEP88	1	.	.	.	12.70	<5	.	.	<5
	12OCT88		.	.	140	9.25	<5	<5.00	5.79	9
1-H4-10	02SEP88		#625	#0.8	.	2.18	5	<5.00	7.00	<5
1-H4-11	06SEP88		#941	#22.6	.	3.62	<5	<5.00	<5.00	<5
1-H4-12A	01SEP88		1,100	#44.8	.	2.08	<5	<5.00	<5.00	<5
	11OCT88		.	.	#12	12.30	6	5.00	6.00	<5
1-H4-12B	01SEP88		1,070	#10.1	.	9.02	<5	<5.00	7.00	<5
	11OCT88		.	.	#16	6.23	<5	<5.00	9.00	<5
1-H4-12C	01SEP88		#650	#11.1	.	0.36	22	28.00	48.00	<5
	11OCT88		.	.	#5	1.64	23	23.00	15.00	16
1-H4-13	06SEP88		#745	#34.4	.	2.07	<5	<5.00	13.00	<5
1-H4-14	13SEP88		#883	#23.9	.	2.08	5	5.00	<5.00	<5
1-H4-15A	02SEP88		#693	#9.0	.	2.59	7	8.00	<5.00	<5
1-H4-15B	02SEP88		#636	#7.4	.	3.70	5	8.00	17.00	12
1-H4-16	13SEP88		1,100	#37.9	.	1.46	<5	<5.00	<5.00	<5
1-H4-17	13SEP88		1,420	#19.1	.	4.09	7	<5.00	9.00	14
1-H4-18	07SEP88		#594	682.0	.	1.92	<5	7.00	<5.00	7
	11OCT88		.	.	#10	3.01	5	<5.00	8.00	<5

TABLE 3.2. (contd)

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
 National Primary Drinking Water Regulations as amended by 52 FR 26690
- 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
 (July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in
 WAC 248-54, Public Water Supplies

Data flags

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

TABLE 3.3. Constituent List and Summary of Sampling Results for the 183-H Solar Evaporation Basins, September/October 1988

Constituent List=Contamination Indicators							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
191	CONDFLD	umho	1	33	0	700 WODE	xxx Specific conductance, field
199	PHFIELD		0.1	33	0	8.5-8.5 EPAS	pH, field
207	PH-LAB		0.01	34	0	8.5-8.5 EPAS	pH, laboratory
C68	TOX	ppb	100	23	0	.	Total organic halogen
C69	TOC	ppb	1000	23	0	.	Total organic carbon
H42	TOXLDL	ppb	20	10	0	.	Total organic halogens, low DL
Constituent List=Primary Drinking Water S							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109	COLIFRM	MPN	2.2	23	22	1 EPA	xxx Coliform bacteria
111	BETA	pCi/L	8	36	0	50 EPA	xxx Gross beta
121	SR-90	pCi/L	5	2	0	8 EPA	Strontium-90
181	RADIUM	pCi/L	1	23	0	5 EPA	Total radium
212	ALPHA	pCi/L	4	36	0	15 EPA	xxx Gross alpha
A06	BARIIUM	ppb	6	34	2	1000 EPA	Barium
A07	CADMIUM	ppb	2	34	33	10 EPA	Cadmium
A08	CHROMIUM	ppb	10	34	1	50 EPA	xxx Chromium
A10	SILVER	ppb	10	34	34 ***	50 EPA	Silver
A20	ARSENIC	ppb	5	23	16	50 EPA	Arsenic
A21	MERCURY	ppb	0.1	23	23 ***	2 EPA	Mercury
A22	SELENIUM	ppb	5	23	22	10 EPA	Selenium
A33	ENDRIN	ppb	0.1	23	23 ***	0.2 EPA	Endrin
A34	METHLOR	ppb	8	23	23 ***	100 EPA	Methoxychlor
A35	TOXAENE	ppb	1	23	23 ***	6 EPA	Toxaphene
A36	a-BHC	ppb	0.1	23	23 ***	4 EPA	Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	23	23 ***	4 EPA	Lindane, beta-BHC
A38	g-BHC	ppb	0.1	23	23 ***	4 EPA	Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	23	23 ***	4 EPA	Lindane, delta-BHC
A61	LEADGF	ppb	5	23	23 ***	50 EPA	Lead (graphite furnace)
A61	TETRANE	ppb	5	25	25 ***	6 EPA	Tetrachloromethane [Carbon Tetrachloride]
A62	BENZENE	ppb	5	2	2 ***	6 EPA	Benzene
A67	1,1,1-T	ppb	5	25	25 ***	200 EPA	1,1,1-Trichloroethane
A69	TRICENE	ppb	5	25	25 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethene]
A90	1,2-DIC	ppb	10	2	2 ***	6 EPA	1,2-Dichloroethane
A92	DICETHY	ppb	10	2	2 ***	7 EPA	1,1-Dichloroethylene
B08	BROMORM	ppb	10	2	2 ***	100 EPA	Bromoform [Tribromomethane]
B13	VINYIDE	ppb	10	2	2 ***	2 EPA	Vinyl chloride
C72	NITRATE	ppb	500	36	0	45000 EPA	xxx Nitrate
C74	FLUORID	ppb	500	35	35 ***	4000 EPA	Fluoride
H18	2,4-D	ppb	2	23	23 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	23	23 ***	10 EPA	2,4,5-TP silvex
H20	FBARIIUM	ppb	6	36	1	1000 EPA	Barium, filtered
H21	FCADMIU	ppb	2	36	35	10 EPA	Cadmium, filtered
H22	FCHROMI	ppb	10	36	2	50 EPA	xxx Chromium, filtered
H23	FSILVER	ppb	10	36	36 ***	50 EPA	Silver, filtered
H37	FARSENI	ppb	5	25	17	50 EPA	Arsenic, filtered
H38	FMERCUR	ppb	0.1	23	23 ***	2 EPA	Mercury, filtered
H39	FSELENI	ppb	5	25	25 ***	10 EPA	Selenium, filtered
H41	FLEAD	ppb	5	25	25 ***	50 EPA	Lead, filtered
H63	LFLUORD	ppb	20	25	0	4000 EPA	Fluoride, low DL

TABLE 3.3. (contd)

----- Constituent List=Quality Characteristics -----									
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded		Full name
A11	SODIUM	ppb	200	34	0	.			Sodium
A17	MANGESE	ppb	5	34	26	60	EPAS	xxx	Manganese
A19	IRON	ppb	30	34	12	300	EPAS	xxx	Iron
C67	PHENOL	ppb	10	2	2	.			Phenol
C73	SULFATE	ppb	500	36	0	260000	EPAS		Sulfate
C76	CHLORID	ppb	500	36	0	260000	EPAS		Chloride
H24	FSODIUM	ppb	200	36	0	.			Sodium, filtered
H29	FMANGAN	ppb	5	36	30	50	EPAS	xxx	Manganese, filtered
H31	FIRON	ppb	30	36	34	300	EPAS		Iron, filtered
H57	LPHENOL	ppb	10	20	20	.			Phenol, low DL
----- Constituent List=Site Specific -----									
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded		Full name
010	CO-60	pCi/L	22.5	2	0	100	EPAR		Cobalt-60
024	CS-137	pCi/L	20	2	0	200	EPAR		Cesium-137
034	RU-106	pCi/L	172.5	2	0	30	EPAR		Ruthenium-106
124	U-CHEM	ug/L	0.725	36	0	.			Uranium, chemical
197	TC-99	pCi/L	15	34	0	900	EPAR	xxx	Technetium-99
A01	BERYLUM	ppb	5	34	34	.			Beryllium
A03	STRONTIUM	ppb	20	34	0	.			Strontium
A04	ZINC	ppb	5	34	13	5000	EPAS		Zinc
A05	CALCIUM	ppb	50	34	0	.			Calcium
A12	NICKEL	ppb	10	34	27	.			Nickel
A13	COPPER	ppb	10	34	33	1300	EPAP		Copper
A14	VANADIUM	ppb	5	34	17	.			Vanadium
A15	ANTIMONY	ppb	100	34	34	.			Antimony
A16	ALUMINUM	ppb	150	34	31	.			Aluminum
A18	POTASSIUM	ppb	100	34	0	.			Potassium
A60	MAGNESIUM	ppb	50	34	0	.			Magnesium
A84	METHONE	ppb	10	25	25	.			Methyl ethyl ketone
A88	1,1,2-T	ppb	5	25	25	.			1,1,2-Trichloroethane
A70	PERCENE	ppb	5	25	25	.			Perchloroethylene [Tetrachloroethene]
A71	OPXYLE	ppb	5	25	25	440	EPAP		Xylene-o,p
A80	CHLFORM	ppb	5	25	2	100	EPA		Chloroform [Trichloromethane]
A93	METHYCH	ppb	10	25	21	.			Methylene chloride
B14	M-XYLE	ppb	5	25	25	440	EPAP		Xylene-m
C78	PHOSPHA	ppb	1000	36	36	.			Phosphate
C80	AMMONIU	ppb	50	25	25	.			Ammonium ion
H16	TC	ppb	1000	23	0	.			Total carbon
H17	TDS	ppb	5000	23	0	500000	EPAS	xxx	Total dissolved solids
H18	FZINC	ppb	5	36	22	5000	EPAS		Zinc, filtered
H19	FCALCIU	ppb	50	36	0	.			Calcium, filtered
H25	FNICKEL	ppb	10	36	30	.			Nickel, filtered
H26	FCOPPER	ppb	10	36	34	1300	EPAP		Copper, filtered
H27	FVANADI	ppb	5	36	20	.			Vanadium, filtered
H28	FALUMIN	ppb	150	36	36	.			Aluminum, filtered
H30	FPOTASS	ppb	100	36	0	.			Potassium, filtered
H32	FMAGNES	ppb	50	36	0	.			Magnesium, filtered
H33	FBERYLL	ppb	5	36	36	.			Beryllium, filtered
H35	FSTRONT	ppb	20	36	0	.			Strontium, filtered
H36	FANTIMO	ppb	100	36	36	.			Antimony, filtered
H58	ALKALIN	ppb	20000	34	0	.			Total alkalinity, as CaCO3
H68	HEXONE	ppb	10	25	25	.			Hexone

TABLE 3.3. (contd)

----- Constituent List=WAC 173-303-9905 -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection		Drinking Water Standards		Full name
							Standard	Agency Exceeded	
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
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	0.1	2	2	***	.		DDD
A41	DDE	ppb	0.1	2	2	***	.		DDE
A42	DDT	ppb	0.1	2	2	***	.		DDT
A43	HEPTLOR	ppb	0.1	2	2	***	0	EPAP	Heptachlor
A44	HEPTIDE	ppb	0.1	2	2	***	0	EPAP	Heptachlor epoxide
A46	DIELRIN	ppb	0.1	2	2	***	.		Dieldrin
A47	ALDRIN	ppb	0.1	2	2	***	.		Aldrin
A48	CHLOANE	ppb	1	2	2	***	0	EPAP	Chlordane
A49	END01	ppb	0.1	2	2	***	.		Endosulfan I (alpha)
A52	END02	ppb	0.1	2	2	***	.		Endosulfan II (beta)
A63	DIOXANE	ppb	500	2	2	***	.		Dioxane
A65	PYRIDIN	ppb	500	2	2	***	.		Pyridine
A66	TOLUENE	ppb	5	2	2	***	2000	EPAP	Toluene
A72	ACROLIN	ppb	10	2	2	***	.		Acrolein
A73	ACRYILE	ppb	10	2	2	***	.		Acrylonitrile
A74	BISTHER	ppb	10	2	2	***	.		Bis(chloromethyl) ether
A75	BROMONE	ppb	10	2	2	***	.		Bromoacetone
A76	METHBRO	ppb	10	2	2	***	.		Methyl bromide
A77	CARBIDE	ppb	10	2	2	***	.		Carbon disulfide
A78	CHLBENZ	ppb	10	2	2	***	60	EPAP	Chlorobenzene
A79	CHLTER	ppb	10	2	2	***	.		2-Chloroethyl vinyl ether
A81	METHCHL	ppb	10	2	2	***	.		Methyl chloride [Chloromethane]
A82	CHMTER	ppb	10	2	2	***	.		Chloromethyl methyl ether
A83	CROTONA	ppb	10	2	2	***	.		Crotonaldehyde
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	10	2	2	***	.		1,1-Dichloroethane
A91	TRANDCE	ppb	10	2	2	***	70	EPAP	trans-1,2-Dichloroethene
A94	DICPANE	ppb	10	2	2	***	6	EPAP	1,2-Dichloropropane
A95	DICPENE	ppb	10	2	2	***	.		1,3-Dichloropropene
A96	NNDIEHY	ppb	10	2	2	***	.		N,N-diethylhydrazine
A99	HYDRSUL	ppb	10	2	2	***	.		Hydrogen sulfide
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	10	2	2	***	.		1,1,2,2-Tetrachlorethane
B09	TRCMEOL	ppb	10	2	2	***	.		Trichloromethanethiol

TABLE 3.3. (contd)

Constituent List=WAC 173-303-9905						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded
						Full name
B10	TRCMFLM	ppb	10	2	2 ***	.
B11	TRCPANE	ppb	10	2	2 ***	.
B12	123-trp	ppb	10	2	2 ***	.
B16	DIETHY	ppb	10	2	2 ***	.
B19	ACETILE	ppb	3000	2	2 ***	.
B20	ACETOPH	ppb	10	2	2 ***	.
B21	WARFRIN	ppb	10	2	2 ***	.
B22	ACEFENE	ppb	10	2	2 ***	.
B23	AMINOYL	ppb	10	2	2 ***	.
B24	AMIISOX	ppb	10	2	2 ***	.
B26	AMITROL	ppb	10	2	2 ***	.
B28	ANILINE	ppb	10	2	2 ***	.
B27	ARAMITE	ppb	10	2	2 ***	.
B28	AURAMIN	ppb	10	2	2 ***	.
B29	BENZCAC	ppb	10	2	2 ***	.
B30	BENZAAN	ppb	10	2	2 ***	.
B31	BENDICM	ppb	10	2	2 ***	.
B32	BENTHOL	ppb	10	2	2 ***	.
B33	BENDINE	ppb	10	2	2 ***	.
B34	BENZBFL	ppb	10	2	2 ***	.
B35	BENZJFL	ppb	10	2	2 ***	.
B36	PBENZQU	ppb	10	2	2 ***	.
B37	BENZCHL	ppb	10	2	2 ***	.
B38	BIS2CHM	ppb	10	2	2 ***	.
B39	BIS2CHE	ppb	10	2	2 ***	.
B40	BIS2EPH	ppb	10	2	2 ***	.
B41	BROPHEN	ppb	10	2	2 ***	.
B42	BUTBENP	ppb	10	2	2 ***	.
B43	BUTDINP	ppb	10	2	2 ***	.
B44	CHALETH	ppb	10	2	2 ***	.
B45	CHLANIL	ppb	10	2	2 ***	.
B46	CHLCRES	ppb	10	2	2 ***	.
B47	CHLEPOX	ppb	10	2	2 ***	0 EPAP
B48	CHLNAPH	ppb	10	2	2 ***	.
B49	CHLPHEN	ppb	10	2	2 ***	.
B50	CHRYSEN	ppb	10	2	2 ***	.
B51	CRESOLS	ppb	10	2	2 ***	.
B52	CYCHDIN	ppb	10	2	2 ***	.
B53	DIBAHAC	ppb	10	2	2 ***	.
B54	DIBAJAC	ppb	10	2	2 ***	.
B55	DIBAHAN	ppb	10	2	2 ***	.
B56	DIBCGCA	ppb	10	2	2 ***	.
B57	DIBAEPY	ppb	10	2	2 ***	.
B58	DIBAHPY	ppb	10	2	2 ***	.
B59	DIBAIPY	ppb	10	2	2 ***	.
B60	DIBPHTH	ppb	10	2	2 ***	.
B61	12-dben	ppb	10	2	2 ***	.
B62	13-dben	ppb	10	2	2 ***	.
B63	14-dben	ppb	10	2	2 ***	.
B64	DICHBEN	ppb	20	2	2 ***	.
						Trichloromonofluoromethane
						Trichloropropane
						1,2,3-Trichloropropane
						Diethylarsine
						Acetonitrile
						Acetophenone
						Warfarin
						2-Acetylenofluorene
						4-Aminobiphenyl
						5-(Aminomethyl)-3-isoxazolol
						Amitrole
						Aniline
						Aramite
						Auramine
						Benz[c]acridine
						Benz[a]anthracene
						Benzene, dichloromethyl
						Benzenethiol
						Benzidine
						Benzo[b]fluoranthene
						Benzo[j]fluoranthene
						p-Benzoquinone
						Benzyl chloride
						Bis(2-chloroethoxy) methane
						Bis(2-chloroethyl) ether
						Bis(2-ethylhexyl) phthalate
						4-Bromophenyl phenyl ether
						Butyl benzyl phthalate
						2-sec-Butyl-4,6-dinitrophenol (DNBP)
						Chloroalkyl ethers
						p-Chloroaniline
						p-Chloro-m-cresol
						1-Chloro-2,3-epoxypropane
						2-Chloronaphthalene
						2-Chlorophenol
						Chrysene
						Cresols
						2-Cyclohexyl-4,6-dinitrophenol
						Dibenz[a,h]acridine
						Dibenz[a,i]acridine
						Dibenz[a,h]anthracene
						7H-Dibenzo[c,g]carbazole
						Dibenzo[a,e]pyrene
						Dibenzo[a,h]pyrene
						Dibenzo[a,i]pyrene
						Di-n-butyl phthalate
						1,2-Dichlorobenzene
						1,3-Dichlorobenzene
						1,4-Dichlorobenzene
						3,3'-Dichlorobenzidine

TABLE 3.3. (contd)

Constituent List=WAC 173-303-9905

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
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	DIWETHB	ppb	10	2	2 ***	.	3,3'-Dimethoxybenzidine
B70	DIMEAMB	ppb	10	2	2 ***	.	p-Dimethylaminoazobenzene
B71	DIWBENZ	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
B75	DIMPHEN	ppb	10	2	2 ***	.	2,4-Dimethylphenol
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	50	2	2 ***	.	2,4-Dinitrophenol
B80	24-dint	ppb	10	2	2 ***	.	2,4-Dinitrotoluene
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	ETHMINE	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	ISSOLE	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 ***	.	Metholonyl
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	METACTD	ppb	10	2	2 ***	.	2-Methylactonitrile
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	50	2	2 ***	.	p-Nitroaniline
C12	NITBENZ	ppb	10	2	2 ***	.	Nitrobenzene
C13	NITPHEN	ppb	50	2	2 ***	.	4-Nitrophenol
C14	NNIBUTY	ppb	10	2	2 ***	.	N-nitrosodi-n-butylamine
C15	NNIDIEA	ppb	10	2	2 ***	.	N-nitrosodiethanolamine

TABLE 3.3. (contd)

Constituent List=WAC 173-303-9905									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards		Standard Agency Exceeded	Full name
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-nitrosomorpholine
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
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	50	2	2 ***	.			2,4,6-Trichlorophenol
C45	246-trp	ppb	10	2	2 ***	.			2,4,6-Trichlorophenol
C46	TRIPHOS	ppb	10	2	2 ***	.			0,0,0-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
C53	HYDRAZI	ppb	3000	2	2 ***	.			Hydrazine
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	136TRI	ppb	10	2	2 ***	.			1,3,6-Trichlorobenzene
C59	1234TE	ppb	10	2	2 ***	.			1,2,3,4-Tetrachlorobenzene
C60	1236TE	ppb	10	2	2 ***	.			1,2,3,6-Tetrachlorobenzene
C61	TETEPYR	ppb	2	2	2 ***	.			Tetraethylpyrophosphate
C62	CHLLATE	ppb	30	2	2 ***	.			Chlorobenzilate
C63	CARBPHO	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

TABLE 3.3. (contd)

----- Constituent List=WAC 173-303-9905 -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C70 CYANIDE	ppb	10	2	2 ***	.	Cyanide
C71 FORMALN	ppb	500	2	2 ***	.	Formalin
C77 PERCHLO	ppb	1000	2	2 ***	.	Perchlorate
C79 KEROSEN	ppb	10000	2	2 ***	.	Kerosene
C87 CITRUSR	ppb	1000	2	2 ***	.	Citrus red
C90 PARALDE	ppb	2000	2	2 ***	.	Paraldehyde
C91 STRYCHN	ppb	50	2	2 ***	.	Strychnine
C92 MALHYDR	ppb	500	2	2 ***	.	Maleic hydrazide
C93 NICOTIN	ppb	100	2	2 ***	.	Nicotinic acid
C94 ACRYIDE	ppb	10000	2	2 ***	0 EPAP	Acrylamide
C95 ALLYLAL	ppb	2500	2	2 ***	.	Allyl alcohol
C97 CHLACET	ppb	16000	2	2 ***	.	Chloroacetaldehyde
C98 CHLPROP	ppb	4000	2	2 ***	.	3-Chloropropionitrile
H03 ETHCARB	ppb	5000	2	2 ***	.	Ethyl carbamate
H04 ETHCYAN	ppb	2000	2	2 ***	.	Ethyl cyanide
H05 ETHOXID	ppb	3000	2	2 ***	.	Ethylene oxide
H06 ETHMETH	ppb	10	2	2 ***	.	Ethyl methacrylate
H09 ISOBUTY	ppb	1000	2	2 ***	.	Isobutyl alcohol
H11 PROPYLA	ppb	10000	2	2 ***	.	n-Propylamine
H12 PROPYNO	ppb	8000	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
I21 TRIBUPH	ppb	10	2	2 ***	.	Tributylphosphoric acid

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

xxx - Indicates that Drinking Water Standards were exceeded

EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25890

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

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

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

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

TABLE 3.4. Sampling Schedule for the 183-H Solar Evaporation Basins

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

L Long list (WAC 173-303-9905)

R Quality control replicates

V Volatile organic analyses blanks

X Regular sample list

sampled) were not available for the previous quarterly report (Fruland, Bates, and Lundgren 1989) and are included in the tables.

Discussion of Results

Table 3.2 shows that seven chemical parameters were found to exceed the standards in 40 CFR 265, Appendix III, in at least one well in the monitoring network surrounding the 183-H basins. These are gross beta, gross alpha, chromium (filtered and unfiltered sample), and nitrate. This list of contaminants is essentially the same as that presented in the previous quarterly progress report (Fruland, Bates, and Lundgren 1989). Manganese, iron, and

Manganese, iron, and total dissolved solids are based on secondary standards related to esthetic rather than health issues and are not discussed further here.

Table 3.3 summarizes analytical data for the period September through October 1988 for each of the sampled wells. Inspection of the data shows continuing strong correlations between technetium-99 and gross beta, and between uranium and gross alpha in the waste plume attributable to the 183-H basins. Contaminant plume maps will be included in the next quarterly report.

Chromium concentrations in well 199-H4-14, which is upgradient from the basins, have remained higher than those found in well 199-H4-3, which is immediately downgradient from the basins.

Traces of chloroform were found in most wells. Methylene chloride was reported to be in a sample from one upgradient well, 199-H4-6 (see Section 1.0 Introduction for a possible explanation of this constituent's appearance).

These iron and total dissolved solids are based on secondary standards related to aesthetic rather than health issues and are not discussed further here.

Table 3.3 summarizes analytical data for the period September through October 1988 for each of the sampled wells. Inspection of the data shows continuing strong correlations between technician and gross beta, and between uranium and gross alpha in the water phase attributable to the 183-R basin. Contaminant phase maps will be included in the next quarterly report. Chromium concentrations in well 192-H-3, which is upgradient from the basins, have remained higher than those found in well 189-H-3, which is immediately downgradient from the basins.

Traces of chloroform were found in most wells. Methylene chloride was reported to be in a sample from the upgradient well 192-H-3 (see 2nd flow diagram for a possible explanation of this constituent's appearance).

4.0 200 AREAS LOW-LEVEL BURIAL GROUNDS

G. V. Last

This RCRA interim-status background ground-water monitoring program for four waste management areas (WMA 1, 2, 3, and 4) includes all or portions of six low-level burial grounds (LLBG) located in the 200-East and 200-West Areas of the Hanford Site (Figure 4.1). This program includes 16 ground-water monitoring wells in the 200-East Area and 19 in the 200-West Area. The LLBG Ground-Water Monitoring Compliance Plan is based on RCRA, 40 CFR 265, Subpart F, and describes how the program objectives will be met. Westinghouse Hanford Company is currently preparing a Part B permit document for the LLBG.

Work performed in the third quarter of 1988 (Fruiland, Bates, and Lundgren 1989) focused on well redevelopment, sample pump installation, physical and mineralogical analyses of borehole samples, monthly water-level measurements, revision of the LLBG interim characterization report, and initiation of ground-water sampling. Work performed in the final quarter of 1988 included completion of the first quarterly ground-water sampling and analyses and the second draft of the interim characterization report.

FIGURE 4.1. Resource Conservation and Recovery Act Ground-Water Monitoring Projects and Landmarks in the 200 Areas, December 1988

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling was conducted this quarter. Characterization efforts centered on completion of a second draft of the interim characterization report.

Hydrogeologic Characterization

Geochemical analyses of selected borehole samples are nearly complete. All x-ray diffraction, total carbon, total inorganic carbon, and cation exchange capacity results have been received. X-ray fluorescence and petrographic results are still being received. All data received to date have been compiled into a computerized data base. Preliminary evaluation of these data suggests that the Ringold Formation has lower concentrations for a number of trace elements relative to the Hanford formation.

Water levels at each new well were measured twice during this quarter and are listed in Tables 4.1 and 4.2 for the 200-East and 200-West Areas, respectively. The measurement for well 299-E28-26 taken on December 27, 1988, was made just before ground-water sampling. The reported value is approximately 1 ft higher than that expected. Measurement of this water level on January 9, 1989, suggests that the December measurement is in error and, thus, the January 9, 1989, value was used in constructing the water-table map. Figures 4.2 and 4.3 illustrate the configuration of the water table at the end of this quarter.

A second draft of the interim characterization report for the 200 Areas LLBGs was completed and transmitted to Westinghouse Hanford Company on December 5, 1988, for their review.

GROUND-WATER SAMPLING AND ANALYSIS

The monitoring wells around the 200 Areas LLBGs were sampled for the first time during September/October 1988. The results of ground-water monitoring activities for this quarter are discussed in the next few paragraphs.

TABLE 4.1. Water-Level Data for Monitoring Wells in the 200-East Area Low-Level Burial Grounds^(a)

Well Number	Measurement Date	Casing Elevation, (b) ft above MSL	Depth to Water from Top of Casing, ft	Water-Table Elevation, ft above MSL
299-E27-8	10/26/88	637.83	231.95	405.88
	12/27/88		231.91	405.91
299-E27-9	10/26/88	629.21	223.16	406.05
	12/29/88		223.16	406.05
299-E27-10	10/26/88	624.47	217.90	406.57
	12/27/88		217.97	406.50
299-E28-26	10/26/88	687.26	281.75	405.51
	12/27/88		280.86	406.40 ^(c)
	01/09/89		281.74	405.52
299-E28-27	10/26/88	680.37	274.87	405.50
	12/27/88		274.81	405.56
299-E32-2	10/26/88	670.06	264.81	405.25
	12/27/88		264.73	405.33
299-E32-3	10/26/88	676.51	271.18	405.33
	12/27/88		271.11	405.40
299-E32-4	10/26/88	685.88	280.64	405.24
	12/27/88		280.57	405.31
299-E33-28	10/26/88	664.23	258.71	405.52
	12/27/88		258.65	405.58
299-E33-29	10/26/88	673.77	268.25	405.52
	12/27/88		268.17	405.60
299-E33-30	10/26/88	663.70	258.25	405.45
	12/27/88		258.18	405.52
299-E34-2	10/26/88	630.80	224.94	405.86
	12/27/88		224.91	405.89
299-E34-3	10/26/88	611.52	204.87	406.65
	12/27/88		204.97	406.55
299-E34-4	10/26/88	587.56	Not Measured;	--
	12/27/88		Dry; Depth to Bottom = 177	<410.56
299-E34-5	10/26/88	590.79	184.16	406.63
	12/27/88		184.11	406.68
299-E34-6	10/26/88	597.83	192.03	405.80
	12/27/88		191.95	405.88

(a) Note that these data were collected in addition to water-table measurements required at the time of sampling.

(b) MSL = mean sea level.

(c) Measured before sampling.

TABLE 4.2. Water-Level Data for Monitoring Wells in the 200-West Area Low-Level Burial Grounds^(a)

Well Number	Measurement Date	Casing Elevation, ft above MSL ^(b)	Depth to Water from Top of Casing, ft	Water-Table Elevation, ft above MSL
299-W6-2	10/27/88	692.45	230.59	461.86
	12/28/88		230.79	461.66
299-W7-1	10/27/88	690.71	228.97	461.74
	12/28/88		229.21	461.50
299-W7-2	10/27/88	675.59	214.78	460.81
	12/28/88		215.00	460.59
299-W7-3	10/27/88	676.14	216.62	459.52
	12/28/88		216.80	459.34
299-W7-4	10/27/88	671.69	208.57	463.12
	12/28/88		208.77	462.92
299-W7-5	10/27/88	673.03	212.66	460.37
	12/28/88		212.89	460.14
299-W7-6	10/27/88	678.64	218.36	460.28
	12/28/88		218.58	460.06
299-W8-1	10/27/88	701.33	239.23	462.10
	12/28/88		239.49	461.84
299-W9-1	10/27/88	737.73	272.56	465.17
	12/28/88		272.81	464.92
299-W10-13	10/27/88	699.04	232.45	466.59
	12/28/88		232.66	466.38
299-W10-14	10/27/88	699.43	233.27	466.16
	12/28/88		233.45	465.98
299-W15-15	10/27/88	697.96	228.71	469.25
	12/28/88		228.98	468.98
299-W15-16	10/27/88	684.89	214.82	470.07
	12/28/88		215.07	469.82
299-W15-17	10/27/88	684.64	215.06	469.58
	12/28/88		215.28	469.36
299-W15-18	10/27/88	685.71	215.26	470.45
	12/28/88		215.51	470.20
299-W18-21	10/27/88	668.62	199.08	469.54
	12/28/88		199.32	469.30
299-W18-22	10/27/88	668.49	199.84	468.65
	12/28/88		200.07	468.42
299-W18-23	10/27/88	696.81	227.26	469.55
	12/28/88		227.50	469.31
299-W18-24	10/27/88	684.35	213.63	470.72
	12/28/88		213.87	470.48

(a) Note that these data were collected in addition to water-table measurements required at the time of sampling.

(b) MSL = mean sea level.

FIGURE 4.2. Water-Table Map for the 200-East Area Low-Level Burial Grounds, December 27, 1988

FIGURE 4.3. Water-Table Map for the 200-West Area Low-Level Burial Grounds, December 28, 1988

Collection and Analysis

Of the 35 monitoring wells, 34 were sampled in September/October 1988 and again in December 1988. Well 299-E34-4 remains dry and, thus, has not been sampled. All samples were collected using dedicated HydroStar®(a) sampling pumps during the December sampling, except for well 299-W15-17 that was sampled using a Teflon®(b) bailer. The pump in well 299-W15-17 had been removed to allow retrieval of a wood block that had fallen into the well during measurement of the water level. The sampling schedule for all wells in the LLBG networks can be found following the discussion of sampling results.

Analyses have been received for the September/October 1988 samples. The December 1988 samples are currently being analyzed, and will be reported next quarter.

Discussion of Results

The analytical results by WMA for the September/October 1988 sampling are discussed below.

Waste Management Area 1

Table 4.3 summarizes the analytical results from the September/October 1988 set of ground-water samples, and Table 4.4 lists the analytical data for each constituent that was found to be above detection limits in at least one analysis. Two constituents were reported above the standards listed in 40 CFR 265, Appendix III, in ground-water samples from beneath this WMA, gross alpha and nitrate. In addition, tritium exceeded the standard in 40 CFR 141. Four of eight wells exceeded the standards for at least one of these constituents. Well 299-E28-26 contained high values of all three constituents, while wells 299-E28-27, 299-E32-2, and 299-E32-3 contained high values for tritium only.

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

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

TABLE 4.3. Constituent List and Summary of Sampling Results for Waste Management Area 1, September/October 1988

----- Constituent List=Contamination Indicator Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088	CONDLAB	umho	.	32	0	700 WDOE	Specific conductance, laboratory
191	CONDFO	umho	1	31	0	700 WDOE	Specific conductance, field
199	PHFIELD		0.1	32	0	8.5-8.6 EPAS	pH, field
207	PH-LAB		0.01	32	0	8.5-8.6 EPAS	pH, laboratory
C89	TOC	ppb	1000	32	0	.	Total organic carbon
H42	TOXLDL	ppb	20	32	0	.	Total organic halogens, low DL
----- Constituent List=Drinking Water Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109	COLIFRM	MPN	2.2	8	8 ***	1 EPA	Coliform bacteria
111	BETA	pCi/L	8	8	0	50 EPA	Gross beta
181	RADIUM	pCi/L	1	8	0	5 EPA	Total radium
212	ALPHA	pCi/L	4	8	0	15 EPA	Gross alpha
A08	BARIUM	ppb	8	8	0	1000 EPA	Barium
A07	CADMIUM	ppb	2	8	8 ***	10 EPA	Cadmium
A08	CHROMIUM	ppb	10	8	0	50 EPA	Chromium
A10	SILVER	ppb	10	8	8 ***	50 EPA	Silver
A20	ARSENIC	ppb	5	8	5	50 EPA	Arsenic
A21	MERCURY	ppb	0.1	8	8 ***	2 EPA	Mercury
A22	SELENIUM	ppb	5	8	5	10 EPA	Selenium
A33	ENDRIN	ppb	0.1	8	8 ***	0.2 EPA	Endrin
A34	METHLOR	ppb	3	8	8 ***	100 EPA	Methoxychlor
A35	TOXAENE	ppb	1	8	8 ***	5 EPA	Toxaphene
A36	a-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, beta-BHC
A38	g-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, delta-BHC
A51	LEADGF	ppb	5	8	8 ***	50 EPA	Lead (graphite furnace)
C72	NITRATE	ppb	500	8	0	45000 EPA	Nitrate
C74	FLUORID	ppb	500	8	8	4000 EPA	Fluoride
H13	2,4-D	ppb	2	8	8 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	8	8 ***	10 EPA	2,4,5-TP allvex
H20	FBARIUM	ppb	8	8	0	1000 EPA	Barium, filtered
H21	FCADMIU	ppb	2	8	8 ***	10 EPA	Cadmium, filtered
H22	FCHROMI	ppb	10	8	8 ***	50 EPA	Chromium, filtered
H23	FSILVER	ppb	10	8	8 ***	50 EPA	Silver, filtered
H37	FARSENI	ppb	5	8	3	50 EPA	Arsenic, filtered
H38	FMERCUR	ppb	0.1	8	8 ***	2 EPA	Mercury, filtered
H39	FSELENI	ppb	5	8	5	10 EPA	Selenium, filtered
H41	FLEAD	ppb	5	8	8 ***	50 EPA	Lead, filtered

TABLE 4.3. (contd)

----- Constituent List=Water Quality Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards Agency Exceeded	Full name	
A11	SODIUM	ppb	200	8	0	.		Sodium	
A17	MANGESE	ppb	5	8	8 ***	50	EPAS	Manganese	
A19	IRON	ppb	30	8	0	300	EPAS	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	8	0	.		Sodium, filtered	
H29	FMANGAN	ppb	5	8	8 ***	50	EPAS	Manganese, filtered	
H31	FIRON	ppb	30	8	5	300	EPAS	Iron, filtered	
----- Constituent List=Site Specific and Other Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards Agency Exceeded	Full name	
O10	CO-60	pCi/L	22.5	8	0	100	EPAR	Cobalt-60	
O24	CS-137	pCi/L	20	8	0	200	EPAR	Cesium-137	
O34	RU-106	pCi/L	172.5	8	0	30	EPAR	Ruthenium-106	
108	TRITIUM	pCi/L	500	8	0	20000	EPA	xxx	Tritium (H-3)
121	SR-90	pCi/L	5	8	0	8	EPA		Strontium-90
124	U-CHEM	ug/L	0.725	8	0	.		Uranium, chemical	
197	TC-99	pCi/L	15	8	0	900	EPAR	Technetium-99	
A01	BERYLUM	ppb	5	8	8 ***	.		Beryllium	
A03	STRONTIUM	ppb	20	8	0	.		Strontium	
A04	ZINC	ppb	5	8	3	5000	EPAS	Zinc	
A05	CALCIUM	ppb	50	8	0	.		Calcium	
A12	NICKEL	ppb	10	8	3	.		Nickel	
A13	COPPER	ppb	10	8	7	1300	EPAP	Copper	
A14	VANADIUM	ppb	5	8	0	.		Vanadium	
A15	ANTIMONY	ppb	100	8	8 ***	.		Antimony	
A16	ALUMINUM	ppb	150	8	8 ***	.		Aluminum	
A18	POTASUM	ppb	100	8	0	.		Potassium	
A50	MAGNES	ppb	50	8	0	.		Magnesium	
C76	PHOSPHA	ppb	1000	8	8 ***	.		Phosphate	
C80	AMMONIU	ppb	50	8	8	.		Ammonium ion	
H16	TC	ppb	1000	8	0	.		Total carbon	
H18	FZINC	ppb	5	8	5	5000	EPAS	Zinc, filtered	
H19	FCALCIU	ppb	50	8	0	.		Calcium, filtered	
H25	FNICKEL	ppb	10	8	7	.		Nickel, filtered	
H26	FCOPPER	ppb	10	8	8 ***	1300	EPAP	Copper, filtered	
H27	FVANADI	ppb	5	8	0	.		Vanadium, filtered	
H28	FALUMIN	ppb	150	8	8 ***	.		Aluminum, filtered	
H30	FPOTASS	ppb	100	8	0	.		Potassium, filtered	
H32	FMAGNES	ppb	50	8	0	.		Magnesium, filtered	
H33	FBERYLL	ppb	5	8	8 ***	.		Beryllium, filtered	
H35	FSTRONT	ppb	20	8	0	.		Strontium, filtered	
H36	FANTIMO	ppb	100	8	8 ***	.		Antimony, filtered	

TABLE 4.3. (contd)

----- Constituent List=WAC 173-303-9905 -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A23	THALIUM	ppb	5	8	8 ***	.	Thallium
A24	THIOURA	ppb	200	8	8 ***	.	Thiourea
A25	ACETREA	ppb	200	8	8 ***	.	1-Acetyl-2-thiourea
A26	CHLOREA	ppb	200	8	8 ***	.	1-(o-Chlorophenyl) thiourea
A27	DIETROL	ppb	200	8	8 ***	.	Diethylstilbestrol
A28	ETHYREA	ppb	200	8	8 ***	.	Ethylenethiourea
A29	NAPHREA	ppb	200	8	8 ***	.	1-Naphthyl-2-thiourea
A32	PHENREA	ppb	500	8	8 ***	.	N-phenylthiourea
A40	DDD	ppb	0.1	8	8 ***	.	DDD
A41	DDE	ppb	0.1	8	8 ***	.	DDE
A42	DDT	ppb	0.1	8	8 ***	.	DDT
A43	HEPTLOR	ppb	0.1	8	8 ***	0 EPAP	Heptachlor
A44	HEPTIDE	ppb	0.1	8	8 ***	0 EPAP	Heptachlor epoxide
A46	DIELRIN	ppb	0.1	8	8 ***	.	Dieldrin
A47	ALDRIN	ppb	0.1	8	8 ***	.	Aldrin
A48	CHLOANE	ppb	1	8	8 ***	0 EPAP	Chlordane
A49	END01	ppb	0.1	8	8 ***	.	Endosulfan I (alpha)
A52	END02	ppb	0.1	8	8 ***	.	Endosulfan II (beta)
A54	AR1018	ppb	1	8	8 ***	0 EPAP	Arochlor 1018
A55	AR1221	ppb	1	8	8 ***	0 EPAP	Arochlor 1221
A56	AR1232	ppb	1	8	8 ***	0 EPAP	Arochlor 1232
A57	AR1242	ppb	1	8	8 ***	0 EPAP	Arochlor 1242
A58	AR1248	ppb	1	8	8 ***	0 EPAP	Arochlor 1248
A59	AR1254	ppb	1	8	8 ***	0 EPAP	Arochlor 1254
A60	AR1260	ppb	1	8	8 ***	0 EPAP	Arochlor 1260
A61	TETRANE	ppb	5	8	8 ***	5 EPA	Tetrachloromethane [Carbon Tetrachloride]
A62	BENZENE	ppb	5	8	8 ***	5 EPA	Benzene
A63	DIOXANE	ppb	500	8	8 ***	.	Dioxane
A64	METHONE	ppb	10	8	8 ***	.	Methyl ethyl ketone
A65	PYRIDIN	ppb	500	8	8 ***	.	Pyridine
A66	TOLUENE	ppb	5	8	8 ***	2000 EPAP	Toluene
A67	1,1,1-T	ppb	5	8	8 ***	200 EPA	1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	8	8 ***	.	1,1,2-Trichloroethane
A69	TRICENE	ppb	5	8	8 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethane]
A70	PERCENE	ppb	5	8	8 ***	.	Perchloroethylene [Tetrachloroethane]
A71	OPXYLE	ppb	5	8	8 ***	440 EPAP	Xylene-o,p
A72	ACROLIN	ppb	10	8	8 ***	.	Acrolein
A73	ACRYILE	ppb	10	8	8 ***	.	Acrylonitrile
A74	BISTHER	ppb	10	8	8 ***	.	Bis(chloromethyl) ether
A75	BROMONE	ppb	10	8	8 ***	.	Bromoacetone
A76	METHBRO	ppb	10	8	8 ***	.	Methyl bromide
A77	CARBIDE	ppb	10	8	8 ***	.	Carbon disulfide
A78	CHLBENZ	ppb	10	8	8 ***	60 EPAP	Chlorobenzene
A79	CHLTHER	ppb	10	8	8 ***	.	2-Chloroethyl vinyl ether
A80	CHLFORM	ppb	5	8	8 ***	100 EPA	Chloroform [Trichloromethane]
A81	METHCHL	ppb	10	8	8 ***	.	Methyl chloride [Chloromethane]
A82	CHMTHER	ppb	10	8	8 ***	.	Chloromethyl methyl ether
A83	CROTONA	ppb	10	8	8 ***	.	Crotonaldehyde
A84	DIBRCHL	ppb	10	8	8 ***	0 EPAP	1,2-Dibromo-3-chloropropane
A85	DIBRETH	ppb	10	8	8 ***	.	1,2-Dibromoethane

TABLE 4.3. (contd)

----- Constituent List=WAC 173-303-9905 -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name	
A86	DIBRMET	ppb	10	8	8 ***	.	.	Dibromomethane	
A87	DIBUTEN	ppb	10	8	8 ***	.	.	1,4-Dichloro-2-butene	
A88	DICDIFM	ppb	10	8	8 ***	.	.	Dichlorodifluoromethane	
A89	1,1-DIC	ppb	10	8	8 ***	.	.	1,1-Dichloroethane	
A90	1,2-DIC	ppb	10	8	8 ***	6	EPA	1,2-Dichloroethane	
A91	TRANDE	ppb	10	8	8 ***	70	EPAP	trans-1,2-Dichloroethane	
A92	DICETHY	ppb	10	8	8 ***	7	EPA	1,1-Dichloroethylene	
A93	METHYCH	ppb	10	8	8 ***	.	.	Methylene chloride	
A94	DICPANE	ppb	10	8	8 ***	8	EPAP	1,2-Dichloropropane	
A95	DICPENE	ppb	10	8	8 ***	.	.	1,3-Dichloropropane	
A96	NDIEHY	ppb	10	8	8 ***	.	.	N,N-diethylhydrazine	
A99	HYDRSUL	ppb	10	8	8 ***	.	.	Hydrogen sulfide	
B01	IODOMET	ppb	10	8	8 ***	.	.	Iodomethane	
B02	METHACR	ppb	10	8	8 ***	.	.	Methacrylonitrile	
B03	METHTHI	ppb	10	8	8 ***	.	.	Methanethiol	
B04	PENTACH	ppb	10	8	8 ***	.	.	Pentachloroethane	
B05	1112-tc	ppb	10	8	8 ***	.	.	1,1,1,2-Tetrachloroethane	
B06	1122-tc	ppb	10	8	8 ***	.	.	1,1,2,2-Tetrachloroethane	
B08	BROMORM	ppb	10	8	8 ***	100	EPA	Bromoform [Tribromomethane]	
B09	TRCMEOL	ppb	10	8	8 ***	.	.	Trichloromethanethiol	
B10	TRCMFLM	ppb	10	8	8 ***	.	.	Trichloromonofluoromethane	
B11	TRCPANE	ppb	10	8	8 ***	.	.	Trichloropropane	
B12	123-trp	ppb	10	8	8 ***	.	.	1,2,3-Trichloropropane	
B13	VINYIDE	ppb	10	8	8 ***	2	EPA	Vinyl chloride	
B14	M-XYLE	ppb	5	8	8 ***	440	EPAP	Xylene-m	
B15	DIETHY	ppb	10	8	8 ***	.	.	Diethylarsine	
B19	ACETYLE	ppb	3000	8	8 ***	.	.	Acetonitrile	
B20	ACETOPH	ppb	10	8	8 ***	.	.	Acetophenone	
B21	WARFRIN	ppb	10	8	8 ***	.	.	Warfarin	
B22	ACEFENE	ppb	10	8	8 ***	.	.	2-Acetylaminofluorene	
B23	AMINOYL	ppb	10	8	8 ***	.	.	4-Aminobiphenyl	
B24	AMIISOX	ppb	10	8	8 ***	.	.	6-(Aminomethyl)-3-isoxazolol	
B25	AMITROL	ppb	10	8	8 ***	.	.	Amitrole	
B26	ANILINE	ppb	10	8	8 ***	.	.	Aniline	
B27	ARAMITE	ppb	10	8	8 ***	.	.	Aramite	
B28	AURAMIN	ppb	10	8	8 ***	.	.	Auramine	
B29	BENZCAC	ppb	10	8	8 ***	.	.	Benz[c]acridine	
B30	BENZAAN	ppb	10	8	8 ***	.	.	Benz[a]anthracene	
B31	BENDICM	ppb	10	8	8 ***	.	.	Benzene, dichloromethyl	
B32	BENTHOL	ppb	10	8	8 ***	.	.	Benzenethiol	
B33	BENDINE	ppb	10	8	8 ***	.	.	Benzidine	
B34	BENZBFL	ppb	10	8	8 ***	.	.	Benzo[b]fluoranthene	
B35	BENZJFL	ppb	10	8	8 ***	.	.	Benzo[j]fluoranthene	
B36	PBENZQU	ppb	10	8	8 ***	.	.	p-Benzoquinone	
B37	BENZCHL	ppb	10	8	8 ***	.	.	Benzyl chloride	
B38	BIS2CHM	ppb	10	8	8 ***	.	.	Bis(2-chloroethoxy) methane	
B39	BIS2CHE	ppb	10	8	8 ***	.	.	Bis(2-chloroethyl) ether	
B40	BIS2EPH	ppb	10	8	8 ***	.	.	Bis(2-ethylhexyl) phthalate	
B41	BROPHEN	ppb	10	8	8 ***	.	.	4-Bromophenyl phenyl ether	
B42	BUTBENP	ppb	10	8	8 ***	.	.	Butyl benzyl phthalate	

TABLE 4.3. (contd)

----- Constituent List=WAC 173-303-9905 -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards	Standard Agency Exceeded	Full name	
B43	BUTDINP	ppb	10	8	8 ***	.		2-sec-Butyl-4,6-dinitrophenol (DNBP)	
B44	CHALETH	ppb	10	8	8 ***	.		Chloroalkyl ethers	
B45	CHLANIL	ppb	10	8	8 ***	.		p-Chloroaniline	
B46	CHLCRES	ppb	10	8	8 ***	.		p-Chloro-o-cresol	
B47	CHLEPOX	ppb	10	8	8 ***	0	EPAP	1-Chloro-2,3-epoxypropane	
B48	CHLNAPH	ppb	10	8	8 ***	.		2-Chloronaphthalene	
B49	CHLPHEN	ppb	10	8	8 ***	.		2-Chlorophenol	
B50	CHRYSEN	ppb	10	8	8 ***	.		Chrysene	
B51	CRESOLS	ppb	10	8	8 ***	.		Cresols	
B52	CYCHDIN	ppb	10	8	8 ***	.		2-Cyclohexyl-4,6-dinitrophenol	
B53	DIBAHAC	ppb	10	8	8 ***	.		Dibenz[a,h]acridine	
B54	DIBAJAC	ppb	10	8	8 ***	.		Dibenz[a,i]acridine	
B55	DIBAHAN	ppb	10	8	8 ***	.		Dibenz[a,h]anthracene	
B56	DIBCGCA	ppb	10	8	8 ***	.		7H-Dibenzo[c,g]carbazole	
B57	DIBAEPY	ppb	10	8	8 ***	.		Dibenzo[a,e]pyrene	
B58	DIBAHPY	ppb	10	8	8 ***	.		Dibenzo[a,h]pyrene	
B59	DIBAIPY	ppb	10	8	8 ***	.		Dibenzo[a,i]pyrene	
B60	DIBPHTH	ppb	10	8	8 ***	.		Di-n-butyl phthalate	
B61	12-dben	ppb	10	8	8 ***	.		1,2-Dichlorobenzene	
B62	13-dben	ppb	10	8	8 ***	.		1,3-Dichlorobenzene	
B63	14-dben	ppb	10	8	8 ***	.		1,4-Dichlorobenzene	
B64	DICHBEN	ppb	20	8	8 ***	.		3,3'-Dichlorobenzidine	
B65	24-dchp	ppb	10	8	8 ***	.		2,4-Dichlorophenol	
B66	26-dchp	ppb	10	8	8 ***	.		2,6-Dichlorophenol	
B67	DIEPHTH	ppb	10	8	8 ***	.		Diethyl phthalate	
B68	DIMYSAF	ppb	10	8	8 ***	.		Dihydrosafrole	
B69	DIMETHB	ppb	10	8	8 ***	.		3,3'-Dimethoxybenzidine	
B70	DIMEAMB	ppb	10	8	8 ***	.		p-Dimethylaminoazobenzene	
B71	DIMBENZ	ppb	10	8	8 ***	.		7,12-Dimethylbenz[a]anthracene	
B72	DIMEYLB	ppb	10	8	8 ***	.		3,3'-Dimethylbenzidine	
B73	THIONOX	ppb	10	8	8 ***	.		Thiofanox	
B74	DIMPHAM	ppb	10	8	8 ***	.		alpha,alpha-Dimethylphenethylamine	
B75	DIMPHEM	ppb	10	8	8 ***	.		2,4-Dimethylphenol	
B76	DIMPHTH	ppb	10	8	8 ***	.		Dimethyl phthalate	
B77	DINBENZ	ppb	10	8	8 ***	.		Dinitrobenzene	
B78	DINCRES	ppb	10	8	8 ***	.		4,6-Dinitro-o-cresol and salts	
B79	DINPHEN	ppb	50	8	8 ***	.		2,4-Dinitrophenol	
B80	24-dint	ppb	10	8	8 ***	.		2,4-Dinitrotoluene	
B81	26-dint	ppb	10	8	8 ***	.		2,6-Dinitrotoluene	
B82	DIOPTH	ppb	10	8	8 ***	.		Di-n-octyl phthalate	
B83	DIPHAMI	ppb	10	8	8 ***	.		Diphenylamine	
B84	DIPHHYD	ppb	10	8	8 ***	.		1,2-Diphenylhydrazine	
B85	DIPRNIT	ppb	10	8	8 ***	.		Di-n-propylnitrosamine	
B86	ETHMINE	ppb	10	8	8 ***	.		Ethyleneimine	
B87	ETHMETS	ppb	10	8	8 ***	.		Ethyl methanesulfonate	
B88	FLUORAN	ppb	10	8	8 ***	.		Fluoranthene	
B89	HEXC BEN	ppb	10	8	8 ***	.		Hexachlorobenzene	
B90	HEXC BUT	ppb	10	8	8 ***	.		Hexachlorobutadiene	
B91	HEXC CYC	ppb	10	8	8 ***	.		Hexachlorocyclopentadiene	
B92	HEXC ETH	ppb	10	8	8 ***	.		Hexachloroethane	

TABLE 4.3. (contd)

----- Constituent List=WAC 173-303-9905 -----						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
B93	INDENOP	ppb	10	0	0 ***	. Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	ppb	10	0	0 ***	. Isosafrole
B95	MALOILE	ppb	10	0	0 ***	. Malononitrile
B96	MELPHAL	ppb	10	0	0 ***	. Melphalan
B97	METHAPY	ppb	10	0	0 ***	. Methapyrilene
B98	METHNYL	ppb	10	0	0 ***	. Metholonyl
B99	METAZIR	ppb	10	0	0 ***	. 2-Methylaziridine
C01	METCHAN	ppb	10	0	0 ***	. 3-Methylcholanthrene
C02	METBISC	ppb	10	0	0 ***	. 4,4'-Methylenabis(2-chloroaniline)
C03	METACTO	ppb	10	0	0 ***	. 2-Methylactonitrile
C04	METACRY	ppb	10	0	0 ***	. Methyl methacrylate
C05	METMSUL	ppb	10	0	0 ***	. Methyl methanesulfonate
C06	METPROP	ppb	10	0	0 ***	. 2-Methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	ppb	10	0	0 ***	. Methylthiouracil
C08	NAPHQUI	ppb	10	0	0 ***	. 1,4-Naphthoquinone
C09	1-napha	ppb	10	0	0 ***	. 1-Naphthylamine
C10	2-napha	ppb	10	0	0 ***	. 2-Naphthylamine
C11	NITRANI	ppb	50	0	0 ***	. p-Nitroaniline
C12	NITBENZ	ppb	10	0	0 ***	. Nitrobenzene
C13	NITPHEN	ppb	50	0	0 ***	. 4-Nitrophenol
C14	NNIBUTY	ppb	10	0	0 ***	. N-nitrosodi-n-butylamine
C15	NNIDIEA	ppb	10	0	0 ***	. N-nitrosodiethanolamine
C16	NNIDIEY	ppb	10	0	0 ***	. N-nitrosodiethylamine
C17	NNIDIME	ppb	10	0	0 ***	. N-nitrosodimethylamine
C18	NNIMETH	ppb	10	0	0 ***	. N-nitrosomethylethylamine
C19	NNIURET	ppb	10	0	0 ***	. N-nitroso-n-methylurethane
C20	NNIVINY	ppb	10	0	0 ***	. N-nitrosomethylvinylamine
C21	NNIMORP	ppb	10	0	0 ***	. N-nitrosomorpholine
C22	NNINICO	ppb	10	0	0 ***	. N-nitrosomornicotine
C23	NNIPIPE	ppb	10	0	0 ***	. N-nitrosopiperidine
C24	NITRPYR	ppb	10	0	0 ***	. Nitrosopyrrolidine
C25	NITRTOL	ppb	10	0	0 ***	. 5-Nitro-o-toluidine
C26	PENTCHB	ppb	10	0	0 ***	. Pentachlorobenzene
C27	PENTCHN	ppb	10	0	0 ***	. Pentachloronitrobenzene
C28	PENTCHP	ppb	50	0	0 ***	. 220 EPAP Pentachlorophenol
C29	PHENTIN	ppb	10	0	0 ***	. Phenacetin
C30	PHENINE	ppb	10	0	0 ***	. Phenylenediamine
C31	PHTHEST	ppb	10	0	0 ***	. Phthalic acid esters
C32	PICOLIN	ppb	10	0	0 ***	. 2-Picoline
C33	PRONIDE	ppb	10	0	0 ***	. Pronamide
C34	RESERPI	ppb	10	0	0 ***	. Reserpine
C35	RESORCI	ppb	10	0	0 ***	. Resorcinol
C36	SAFROL	ppb	10	0	0 ***	. Safrol
C37	TETRCHB	ppb	10	0	0 ***	. 1,2,4,5-Tetrachlorobenzene
C39	TETRCHP	ppb	10	0	0 ***	. 2,3,4,6-Tetrachlorophenol
C40	THIURAM	ppb	10	0	0 ***	. Thiuram
C41	TOLUDIA	ppb	10	0	0 ***	. Toluenediamine
C42	OTOLHYD	ppb	10	0	0 ***	. o-Toluidine hydrochloride
C43	TRICHLB	ppb	10	0	0 ***	. 1,2,4-Trichlorobenzene
C44	245-trp	ppb	50	0	0 ***	. 2,4,6-Trichlorophenol

TABLE 4.3. (contd)

----- Constituent List=WAC 173-803-9905 -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C45 246-trp	ppb	10	8	8 ***	.	2,4,6-Trichlorophenol
C46 TRIPHOS	ppb	10	8	8 ***	.	0,0,0-triethyl phosphorothioate
C47 SYMTRIN	ppb	10	8	8 ***	.	Sym-trinitrobenzene
C48 TRISPHO	ppb	10	8	8 ***	.	Tris(2,3-dibromopropyl) phosphate
C49 BENZOPY	ppb	10	8	8 ***	.	Benzo[a]pyrene
C50 CHLNAPZ	ppb	10	8	8 ***	.	Chloronaphazine
C61 BIS2ETH	ppb	10	8	8 ***	.	Bis(2-chloroisopropyl) ether
C62 HEXAENE	ppb	10	8	8 ***	.	Hexachloropropene
C63 HYDRAZI	ppb	3000	8	8 ***	.	Hydrazine
C64 HEXACHL	ppb	10	8	8 ***	.	Hexachlorophene
C65 NAPHTHA	ppb	10	8	8 ***	.	Naphthalene
C66 123TRI	ppb	10	8	8 ***	.	1,2,3-Trichlorobenzene
C68 135TRI	ppb	10	8	8 ***	.	1,3,5-Trichlorobenzene
C69 1234TE	ppb	10	8	8 ***	.	1,2,3,4-Tetrachlorobenzene
C60 1235TE	ppb	10	8	8 ***	.	1,2,3,5-Tetrachlorobenzene
C81 TETEPYR	ppb	2	8	8 ***	.	Tetraethylpyrophosphate
C82 CHLLATE	ppb	30	8	8 ***	.	Chlorobenzilate
C83 CARBPHT	ppb	2	8	8 ***	.	Carbophenothion
C84 DISULFO	ppb	2	8	8 ***	.	Disulfoton
C86 DIMETHO	ppb	2	8	8 ***	.	Dimethoate
C88 METHPAR	ppb	2	8	8 ***	.	Methyl parathion
C87 PARATHI	ppb	2	8	8 ***	.	Parathion
C70 CYANIDE	ppb	10	8	8 ***	.	Cyanide
C71 FORMALN	ppb	500	8	8 ***	.	Formalin
C77 PERCHLO	ppb	1000	8	8 ***	.	Perchlorate
C78 SULFIDE	ppb	1000	8	8 ***	.	Sulfide
C79 KEROSENE	ppb	10000	8	8 ***	.	Kerosene
C81 ETHYGLY	ppb	10000	8	8 ***	.	Ethylene glycol
C88 OIOXIN	ppb	0.1	8	8 ***	.	Dioxin
C87 CITRUSR	ppb	1000	8	8 ***	.	Citrus red
C90 PARALDE	ppb	2000	8	8 ***	.	Paraldehyde
C91 STRYCHN	ppb	50	8	8 ***	.	Strychnine
C92 MALHYDR	ppb	500	8	8 ***	.	Maleic hydrazide
C93 NICOTIN	ppb	100	8	8 ***	.	Nicotinic acid
C94 ACRYIDE	ppb	10000	8	8 ***	0 EPAP	Acrylamide
C95 ALLYLAL	ppb	2500	8	8 ***	.	Allyl alcohol
C97 CHLACET	ppb	16000	8	8 ***	.	Chloroacetaldehyde
C98 CHLPROP	ppb	4000	8	8 ***	.	3-Chloropropionitrile
H03 ETHCARB	ppb	5000	8	8 ***	.	Ethyl carbamate
H04 ETHCYAN	ppb	2000	8	8 ***	.	Ethyl cyanide
H05 ETHOXID	ppb	3000	8	8 ***	.	Ethylene oxide
H08 ETHMETH	ppb	10	8	8 ***	.	Ethyl methacrylate
H09 ISOBTUTY	ppb	1000	8	8 ***	.	Isobutyl alcohol
H11 PROPYLA	ppb	10000	8	8 ***	.	n-Propylamine
H12 PROPYNO	ppb	8000	8	8 ***	.	2-Propyn-1-ol
H15 2,4,6-T	ppb	2	8	8 ***	.	2,4,6-T
H40 FTHALLI	ppb	5	8	8 ***	.	Thallium, filtered
H88 HEXONE	ppb	10	8	8 ***	.	Hexone
I21 TRIBUPH	ppb	10	8	8 ***	.	Tributylphosphoric acid

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

xxx - Indicates that Drinking Water Standards were exceeded

EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1997)
National Primary Drinking Water Regulations as amended by 62 FR 25690EPAR - based on National Interim Primary Drinking Water Regulations,
Appendix IV, EPA-570/9-78-003

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

TABLE 4.4. Constituents with at Least One Detected Value for Waste Management Area 1, September/October 1988

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho . /700w	PH-LAB 0.01/8.5w	PHFIELD 0.1/8.5w	TOC ppb 1000/.	TOXLDL ppb 20/.
2-E28-26	26SEP88	1	467	548	7.5	7.6	#300	#3
		2	468	555	7.6	7.6	#500	#5
		3	468	560	7.5	7.6	#500	#4
		4	468	559	7.5	7.6	#500	#5
2-E28-27	27SEP88	1	283	293	7.8	8.1	#600	#19
		2	283	292	7.8	8.4	#400	#8
		3	283	295	7.8	8.3	#400	#3
		4	284	297	7.8	8.4	#400	#13
2-E32-2	23SEP88	1	243	324	7.9	8.0	#400	#3
		2	244	319	7.9	8.0	#400	#4
		3	244	322	7.9	8.0	#400	#7
		4	244	320	7.9	8.0	#400	#8
2-E32-3	22SEP88	1	318	379	7.6	7.7	#400	#3
		2	318	377	7.6	7.6	#500	#1
		3	318	378	7.6	7.5	#500	#3
		4	318	383	7.7	7.5	#400	389
2-E32-4	27SEP88	1	410	410	7.8	7.9	#300	35
		2	410	415	7.7	8.0	#200	#2
		3	410	411	7.8	8.1	#400	32
		4	410	412	7.7	8.1	#200	74
2-E33-28	21SEP88	1	184	265	7.9	7.8	#500	#5
		2	184	287	7.9	7.8	#600	#9
		3	184	270	8.0	7.8	#500	#6
		4	.	282	8.0	7.8	#500	#3
2-E33-29	22SEP88	1	265	305	7.8	7.9	#600	#3
		2	266	304	7.8	8.0	#400	#13
		3	266	306	7.8	8.0	#600	#7
		4	266	308	7.8	8.1	#400	#4
2-E33-30	21SEP88	1	227	320	8.0	8.0	#700	#3
		2	228	319	8.0	8.0	#400	#10
		3	228	323	8.0	8.0	#500	#6
		4	228	324	8.0	8.0	#500	#9

TABLE 4.4. (contd)

Well name	Collection Date	Duplicate sample number	ALPHA pCi/L 4/15	AMMONIU ppb 50/.	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BETA pCi/L 9/50	FCALCIU ppb 50/.	CALCIUM ppb 50/.
2-E28-26	26SEP88		20.700	1050	<5	<5	52	46	17.60	65,700	74,400
2-E28-27	27SEP88		2.010	<50	8	8	38	37	21.90	27,600	28,200
2-E32-2	23SEP88		1.990	<50	8	8	35	34	28.10	27,200	27,800
2-E32-3	22SEP88		12.600	1120	<5	<5	52	53	17.10	45,800	45,100
2-E32-4	27SEP88		4.590	<50	<5	<5	82	73	9.22	40,000	44,900
2-E33-28	21SEP88		1.720	<50	8	8	32	37	25.60	29,000	28,300
2-E33-29	22SEP88		1.300	<50	<5	5	44	48	27.60	34,900	32,400
2-E33-30	21SEP88		<0.598	<50	<5	7	26	25	31.30	30,400	30,800

Well name	Collection Date	Duplicate sample number	CHLORID ppb 500/250000s	CHROMIUM ppb 10/50	CO-60 pCi/L 22.5/100r	COPPER ppb 10/1300p	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000	IRON ppb 30/300s	FIRON ppb 30/300s
2-E28-26	26SEP88		9,010	35	*-4.370	<10	*-0.847	<500	191	88
2-E28-27	27SEP88		5,880	21	*-1.880	<10	*-3.490	522	94	<30
2-E32-2	23SEP88		9,450	20	*-1.420	13	0.000	572	97	<30
2-E32-3	22SEP88		8,490	21	*-0.873	<10	*-1.060	<500	140	61
2-E32-4	27SEP88		8,470	26	*-7.930	<10	8.590	<500	123	34
2-E33-28	21SEP88		8,350	29	*-3.780	<10	*-4.830	<500	160	<30
2-E33-29	22SEP88		17,700	47	*-4.250	<10	*-1.380	<500	291	<30
2-E33-30	21SEP88		16,400	17	*-2.830	<10	*-3.010	<500	79	<30

Well name	Collection Date	Duplicate sample number	MAGNES ppb 50/.	FMAGNES ppb 50/.	METHYCH ppb 10/.	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5
2-E28-26	26SEP88		17,900	16,100	<10	15	<10	50,100	5,860	6,490	0.2060
2-E28-27	27SEP88		8,910	8,480	<10	<10	<10	16,300	5,050	5,580	*-0.0677
2-E32-2	23SEP88		8,720	8,390	<10	<10	<10	13,800	5,450	5,800	*-0.0157
2-E32-3	22SEP88		10,900	11,300	<10	11	<10	34,500	6,640	6,150	0.1450
2-E32-4	27SEP88		14,300	12,900	<10	<10	<10	25,000	6,080	6,790	*-0.0151
2-E33-28	21SEP88		7,880	9,200	130	17	12	3,990	5,980	4,580	*-0.1240
2-E33-29	22SEP88		10,300	11,300	<10	21	<10	8,740	6,820	5,940	0.1460
2-E33-30	21SEP88		9,330	9,700	2900	15	<10	8,080	5,790	5,300	0.2120

TABLE 4.4. (contd)

Well name	Collection Date	Duplicate sample number	RU-106 pCi/L 172.5/30r	FSELENI ppb 5/10	SELENIUM ppb 5/10	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONIUM ppb 20/.	SULFATE ppb 500/250000
2-E28-26	26SEP88		*-51.80	7	10	29,100	26,100	*-0.3180	283	299	100,000
2-E28-27	27SEP88		*-11.40	<5	<5	24,900	23,000	*-0.7520	142	145	34,800
2-E32-2	23SEP88		*-30.60	<5	<5	24,800	23,100	*-0.1200	138	141	31,700
2-E32-3	22SEP88		*-30.10	5	<5	28,800	27,900	*-0.2380	209	208	53,100
2-E32-4	27SEP88		0.00	7	7	30,800	27,300	*-0.3700	214	234	59,700
2-E33-28	21SEP88		62.60	<5	<5	12,600	16,700	*-0.1570	149	129	25,100
2-E33-29	22SEP88		*-45.00	<5	<5	20,300	22,100	*-0.0221	181	188	28,400
2-E33-30	21SEP88		*-3.15	<5	5	17,200	18,600	*-0.4690	150	154	31,100

Well name	Collection Date	Duplicate sample number	TC ppb 1000/.	TC-99 pCi/L 15/900r	TRITIUM pCi/L 500/20000	U-CHEM ug/L 0.725/.	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000	FZINC ppb 5/5000
2-E28-26	26SEP88		26,800	21.500	32,800	53.30	19	25	<5	6
2-E28-27	27SEP88		21,100	159.000	65,300	4.92	81	27	<5	5
2-E32-2	23SEP88		21,100	148.000	38,300	5.32	25	28	8	5
2-E32-3	22SEP88		28,900	158.000	62,300	21.90	22	27	8	<5
2-E32-4	27SEP88		26,800	*-0.437	1,850	7.73	18	19	8	<5
2-E33-28	21SEP88		21,700	*-0.252	2,680	2.51	28	23	<5	<5
2-E33-29	22SEP88		21,100	87.900	7,150	1.88	20	23	8	<5
2-E33-30	21SEP88		21,200	112.000	5,770	2.84	23	17	11	<5

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25890
- r - based on National Interim Primary Drinking Water Regulations,
Appendix IV, EPA-570/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 48936
- s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143
(July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-54, Public Water Supplies

Data flags

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

Methylene chloride exceeded primary standards in well 299-E33-30 and in one of the quadruplicate samples from well 299-E32-3. This probably reflects the problem discussed in Section 1.0 Introduction, not actual ground-water conditions. The elevated chromium levels also may not reflect true ground-water conditions (Section 1.0 Introduction).

Waste Management Area 2

Table 4.5 summarizes the analytical results from the September/October 1988 set of ground-water samples, and Table 4.6 lists the analytical data for each constituent that was found to be above detection limits in at least one analysis. Chromium shows elevated levels, and some correlation with elevated iron and manganese (unfiltered) levels (see Section 1.0 Introduction). However, no constituents exceeded interim primary drinking water standards (40 CFR 265, Appendix III).

Waste Management Area 3

Table 4.7 summarizes the analytical results from the September/October 1988 set of ground-water samples. Nitrate and chromium were reported above the standards listed in 40 CFR 265, Appendix III. In addition, tetrachloromethane (carbon tetrachloride) was above the standards listed in 40 CFR 141. Table 4.8 lists the analytical data for each constituent that was found to be above detection limits in at least one analysis. The constituents found above standards in these wells are listed in Table 4.9. Elevated total organic halogen (TOX) levels occur in the same wells that show elevated carbon tetrachloride levels, indicating that the TOX analysis is reflecting the carbon tetrachloride contamination. Elevated chromium levels are probably not reflecting actual ground-water conditions (see Section 1.0 Introduction).

Waste Management Area 4

Table 4.10 summarizes the analytical results from the September/October 1988 set of ground-water samples collected from WMA-4. Constituents reported as exceeding standards in 40 CFR 265, Appendix III, were coliform bacteria, gross alpha, chromium, and nitrate. Tetrachloromethane (carbon tetrachloride) and trichloroethylene exceeded the standards in 40 CFR 141. Table 4.11

TABLE 4.5. Constituent List and Summary of Sampling Results for Waste Management Area 2, September/October 1988

----- Constituent List=Contamination Indicator Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088	CONDLAB	umho	.	28	0	700 WDOE	Specific conductance, laboratory
191	CONDFLD	umho	1	28	0	700 WDOE	Specific conductance, field
199	PHFIELD		0.1	28	0	6.5-8.5 EPAS	pH, field
207	PH-LAB		0.01	28	0	6.5-8.5 EPAS	pH, laboratory
C89	TOC	ppb	1000	28	0	.	Total organic carbon
H42	TOXLDL	ppb	20	28	0	.	Total organic halogens, low DL
----- Constituent List=Drinking Water Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109	COLIFRM	MPN	2.2	7	7 ***	1 EPA	Coliform bacteria
111	BETA	pCi/L	8	8	0	50 EPA	Gross beta
181	RADIUM	pCi/L	1	7	0	5 EPA	Total radium
212	ALPHA	pCi/L	4	8	0	15 EPA	Gross alpha
A06	BARIUM	ppb	6	7	0	1000 EPA	Barium
A07	CADMIUM	ppb	2	7	1 ***	10 EPA	Cadmium
A08	CHROMIUM	ppb	10	7	0	50 EPA	Chromium
A10	SILVER	ppb	10	7	7 ***	50 EPA	Silver
A20	ARSENIC	ppb	5	7	2	50 EPA	Arsenic
A21	MERCURY	ppb	0.1	7	7 ***	2 EPA	Mercury
A22	SELENIUM	ppb	5	7	5	10 EPA	Selenium
A33	ENDRIN	ppb	0.1	7	7 ***	0.2 EPA	Endrin
A34	METHLOR	ppb	3	7	7 ***	100 EPA	Methoxychlor
A36	TOXAENE	ppb	1	7	7 ***	5 EPA	Toxaphene
A36	a-BHC	ppb	0.1	7	7 ***	4 EPA	Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	7	7 ***	4 EPA	Lindane, beta-BHC
A38	g-BHC	ppb	0.1	7	7 ***	4 EPA	Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	7	7 ***	4 EPA	Lindane, delta-BHC
A51	LEADGF	ppb	5	7	7 ***	50 EPA	Lead (graphite furnace)
C72	NITRATE	ppb	500	8	1	45000 EPA	Nitrate
C74	FLUORID	ppb	500	8	8 ***	4000 EPA	Fluoride
H13	2,4-D	ppb	2	7	7 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	7	7 ***	10 EPA	2,4,5-TP silvex
H20	FBARIUM	ppb	6	8	0	1000 EPA	Barium, filtered
H21	FCADMIUM	ppb	2	8	8 ***	10 EPA	Cadmium, filtered
H22	FCHROMIUM	ppb	10	8	7	50 EPA	Chromium, filtered
H23	FSILVER	ppb	10	8	8 ***	50 EPA	Silver, filtered
H37	FARSENIC	ppb	5	8	1	50 EPA	Arsenic, filtered
H38	FMERCURY	ppb	0.1	7	7 ***	2 EPA	Mercury, filtered
H39	FSELENIUM	ppb	5	8	6	10 EPA	Selenium, filtered
H41	FLEAD	ppb	5	8	8 ***	50 EPA	Lead, filtered

TABLE 4.5. (contd)

----- Constituent List=Water Quality Parameters -----								
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards Agency Exceeded	Full name
A11	SODIUM	ppb	200	7	0	.		Sodium
A17	MANGESE	ppb	5	7	3	50	EPAS	Manganese
A19	IRON	ppb	30	7	0	300	EPAS	Iron
C57	PHENOL	ppb	10	7	7 ***	.		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	5	50	EPAS	Manganese, filtered
H31	FIRON	ppb	30	8	5	300	EPAS	Iron, filtered

----- Constituent List=Site Specific and Other Parameters -----								
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards Agency Exceeded	Full name
010	CO-60	pCi/L	22.5	7	0	100	EPAR	Cobalt-60
024	CS-137	pCi/L	20	7	0	200	EPAR	Cesium-137
034	RU-106	pCi/L	172.5	7	0	30	EPAR	Ruthenium-106
108	TRITIUM	pCi/L	500	7	0	20000	EPA	Tritium (H-3)
121	SR-90	pCi/L	5	7	0	8	EPA	Strontium-90
124	U-CHEM	ug/L	0.725	8	0	.		Uranium, chemical
197	TC-99	pCi/L	15	7	0	900	EPAR	Technetium-99
A01	BERYLUM	ppb	5	7	7 ***	.		Beryllium
A03	STRONTIUM	ppb	20	7	0	.		Strontium
A04	ZINC	ppb	5	7	0	5000	EPAS	Zinc
A05	CALCIUM	ppb	50	7	0	.		Calcium
A12	NICKEL	ppb	10	7	0	.		Nickel
A13	COPPER	ppb	10	7	7 ***	1300	EPAP	Copper
A14	VANADIUM	ppb	5	7	0	.		Vanadium
A15	ANTIMONY	ppb	100	7	7 ***	.		Antimony
A16	ALUMINUM	ppb	150	7	4	.		Aluminum
A18	POTASSIUM	ppb	100	7	0	.		Potassium
A50	MAGNES	ppb	50	7	0	.		Magnesium
C78	PHOSPHA	ppb	1000	8	8 ***	.		Phosphate
C80	AMMONIUM	ppb	50	8	8 ***	.		Ammonium ion
H16	TC	ppb	1000	7	0	.		Total carbon
H18	FZINC	ppb	5	8	1	5000	EPAS	Zinc, filtered
H19	FCALCIUM	ppb	50	8	0	.		Calcium, filtered
H25	FNICKEL	ppb	10	8	7	.		Nickel, filtered
H28	FCOPPER	ppb	10	8	8 ***	1300	EPAP	Copper, filtered
H27	FVANADIUM	ppb	5	8	0	.		Vanadium, filtered
H29	FALUMINUM	ppb	150	8	8 ***	.		Aluminum, filtered
H30	FPOTASSIUM	ppb	100	8	0	.		Potassium, filtered
H32	FMAGNESIUM	ppb	50	8	0	.		Magnesium, filtered
H33	FBERYLLIUM	ppb	5	8	8 ***	.		Beryllium, filtered
H35	FSTRONTIUM	ppb	20	8	0	.		Strontium, filtered
H36	FANTIMONY	ppb	100	8	8 ***	.		Antimony, filtered

TABLE 4.5. (contd)

----- Constituent List=WAC 173-303-9905 -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Agency Exceeded	Standards	Full name
A23	THALIUM	ppb	5	7	7 ***	.			Thallium
A24	THIOURA	ppb	200	7	7 ***	.			Thiourea
A25	ACETREA	ppb	200	7	7 ***	.			1-Acetyl-2-thiourea
A26	CHLOREA	ppb	200	7	7 ***	.			1-(o-Chlorophenyl) thiourea
A27	DIETROL	ppb	200	7	7 ***	.			Diethylstilbesterol
A28	ETHYREA	ppb	200	7	7 ***	.			Ethylenethiourea
A29	NAPHREA	ppb	200	7	7 ***	.			1-Naphthyl-2-thiourea
A32	PHENREA	ppb	500	7	7 ***	.			N-phenylthiourea
A40	DDD	ppb	0.1	7	7 ***	.			DDD
A41	DDE	ppb	0.1	7	7 ***	.			DDE
A42	DDT	ppb	0.1	7	7 ***	.			DDT
A43	HEPTLOR	ppb	0.1	7	7 ***	0	EPAP		Heptachlor
A44	HEPTIDE	ppb	0.1	7	7 ***	0	EPAP		Heptachlor epoxide
A46	DIELRIN	ppb	0.1	7	7 ***	.			Dieldrin
A47	ALDRIN	ppb	0.1	7	7 ***	.			Aldrin
A48	CHLOANE	ppb	1	7	7 ***	0	EPAP		Chlordane
A49	END01	ppb	0.1	7	7 ***	.			Endosulfan I (alpha)
A52	END02	ppb	0.1	7	7 ***	.			Endosulfan II (beta)
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	TETRAHE	ppb	5	8	8 ***	5	EPA		Tetrachloromethane [Carbon Tetrachloride]
A62	BENZENE	ppb	5	8	8 ***	5	EPA		Benzene
A63	DIOXANE	ppb	500	8	8 ***	.			Dioxane
A64	METHONE	ppb	10	8	8 ***	.			Methyl ethyl ketone
A65	PYRIDIN	ppb	500	8	8 ***	.			Pyridine
A66	TOLUENE	ppb	5	8	8 ***	2000	EPAP		Toluene
A67	1,1,1-T	ppb	5	8	8 ***	200	EPA		1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	8	8 ***	.			1,1,2-Trichloroethane
A69	TRICENE	ppb	5	8	8 ***	5	EPA		Trichloroethylene [1,1,2-Trichloroethane]
A70	PERCENE	ppb	5	8	8 ***	.			Perchloroethylene [Tetrachloroethene]
A71	OPXYLE	ppb	5	8	8 ***	440	EPAP		Xylene-o,p
A72	ACROLIN	ppb	10	8	8 ***	.			Acrolein
A73	ACRYILE	ppb	10	8	8 ***	.			Acrylonitrile
A74	BISTHER	ppb	10	8	8 ***	.			Bis(chloromethyl) ether
A75	BROMONE	ppb	10	8	8 ***	.			Bromoacetone
A76	METHBRO	ppb	10	8	8 ***	.			Methyl bromide
A77	CARBIDE	ppb	10	8	8 ***	.			Carbon disulfide
A78	CHLBENZ	ppb	10	8	8 ***	60	EPAP		Chlorobenzene
A79	CHLTHER	ppb	10	8	8 ***	.			2-Chloroethyl vinyl ether
A80	CHLFORM	ppb	5	8	8 ***	100	EPA		Chloroform [Trichloromethane]
A81	METHCHL	ppb	10	8	8 ***	.			Methyl chloride [Chloromethane]
A82	CHMTHER	ppb	10	8	8 ***	.			Chloromethyl methyl ether
A83	CROTONA	ppb	10	8	8 ***	.			Crotonaldehyde
A84	DIBRCHL	ppb	10	8	8 ***	0	EPAP		1,2-Dibromo-3-chloropropane
A85	DIBRETH	ppb	10	8	8 ***	.			1,2-Dibromoethane

TABLE 4.5. (contd)

----- Constituent List=WAC 173-303-9905 -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A86	DIBRMET	ppb	10	8	8 ***	.	Dibromomethane
A87	DIBUTEN	ppb	10	8	8 ***	.	1,4-Dichloro-2-butene
A88	DICDIFM	ppb	10	8	8 ***	.	Dichlorodifluoromethane
A89	1,1-DIC	ppb	10	8	8 ***	.	1,1-Dichloroethane
A90	1,2-DIC	ppb	10	8	8 ***	5 EPA	1,2-Dichloroethane
A91	TRANDE	ppb	10	8	8 ***	70 EPAP	trans-1,2-Dichloroethene
A92	DICETHY	ppb	10	8	8 ***	7 EPA	1,1-Dichloroethylene
A93	METHYCH	ppb	10	8	8	.	Methylene chloride
A94	DICPANE	ppb	10	8	8 ***	8 EPAP	1,2-Dichloropropane
A95	DICPENE	ppb	10	8	8 ***	.	1,3-Dichloropropane
A96	NNDIEHY	ppb	10	8	8 ***	.	N,N-diethylhydrazine
A99	HYDRSUL	ppb	10	8	8 ***	.	Hydrogen sulfide
B01	IODORET	ppb	10	8	8 ***	.	Iodomethane
B02	METHACR	ppb	10	8	8 ***	.	Methacrylonitrile
B03	METHTHI	ppb	10	8	8 ***	.	Methanethiol
B04	PENTACH	ppb	10	8	8 ***	.	Pentachloroethane
B05	1112-tc	ppb	10	8	8 ***	.	1,1,1,2-Tetrachloroethane
B06	1122-tc	ppb	10	8	8 ***	.	1,1,2,2-Tetrachloroethane
B08	BROMORM	ppb	10	8	8 ***	100 EPA	Bromoform [Tribromomethane]
B09	TRCMEOL	ppb	10	8	8 ***	.	Trichloromethanethiol
B10	TRCMFLM	ppb	10	8	8 ***	.	Trichloromonofluoromethane
B11	TRCPANE	ppb	10	8	8 ***	.	Trichloropropane
B12	123-trp	ppb	10	8	8 ***	.	1,2,3-Trichloropropane
B13	VINYIDE	ppb	10	8	8 ***	2 EPA	Vinyl chloride
B14	M-XYLE	ppb	5	8	8 ***	440 EPAP	Xylene-m
B15	DIETHY	ppb	10	8	8 ***	.	Diethylarsine
B19	ACETILE	ppb	3000	8	8 ***	.	Acetonitrile
B20	ACETOPH	ppb	10	7	7 ***	.	Acetophenone
B21	WARFRIN	ppb	10	7	7 ***	.	Warfarin
B22	ACEFENE	ppb	10	7	7 ***	.	2-Acetylaminofluorene
B23	AMINOYL	ppb	10	7	7 ***	.	4-Aminobiphenyl
B24	AMISOX	ppb	10	7	7 ***	.	5-(Aminomethyl)-3-isoxazolol
B25	AMITROL	ppb	10	7	7 ***	.	Amitrole
B26	ANILINE	ppb	10	7	7 ***	.	Aniline
B27	ARAMITE	ppb	10	7	7 ***	.	Aramite
B28	AURAMIN	ppb	10	7	7 ***	.	Auramine
B29	BENZCAC	ppb	10	7	7 ***	.	Benz[c]acridine
B30	BENZAAN	ppb	10	7	7 ***	.	Benz[a]anthracene
B31	BENDICM	ppb	10	7	7 ***	.	Benzene, dichloromethyl
B32	BENTHOL	ppb	10	7	7 ***	.	Benzenethiol
B33	BENDINE	ppb	10	7	7 ***	.	Benzidine
B34	BENZBFL	ppb	10	7	7 ***	.	Benzo[b]fluoranthene
B35	BENZJFL	ppb	10	7	7 ***	.	Benzo[j]fluoranthene
B36	PBENZQU	ppb	10	7	7 ***	.	p-Benzoquinone
B37	BENZCHL	ppb	10	7	7 ***	.	Benzyl chloride
B38	BIS2CHM	ppb	10	7	7 ***	.	Bis(2-chloroethoxy) methane
B39	BIS2CHE	ppb	10	7	7 ***	.	Bis(2-chloroethyl) ether
B40	BIS2EPH	ppb	10	7	7 ***	.	Bis(2-ethylhexyl) phthalate
B41	BROPHEN	ppb	10	7	7 ***	.	4-Bromophenyl phenyl ether
B42	BUTBENP	ppb	10	7	7 ***	.	Butyl benzyl phthalate

TABLE 4.5. (contd)

----- Constituent List=WAC 173-303-0905 -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
B43	BUTDINP	ppb	10	7	7 ***	.	2-sec-Butyl-4,6-dinitrophenol (DNBP)
B44	CHALETH	ppb	10	7	7 ***	.	Chloroalkyl ethers
B45	CHLANIL	ppb	10	7	7 ***	.	p-Chloroaniline
B46	CHLCRES	ppb	10	7	7 ***	.	p-Chloro-m-cresol
B47	CHLEPOX	ppb	10	7	7 ***	0 EPAP	1-Chloro-2,3-epoxypropane
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	CYCHOIN	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	DIBAIKY	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 ***	.	1,4-Dichlorobenzene
B64	DICHBEN	ppb	20	7	7 ***	.	3,3'-Dichlorobenzidine
B65	24-dchp	ppb	10	7	7 ***	.	2,4-Dichlorophenol
B66	26-dchp	ppb	10	7	7 ***	.	2,6-Dichlorophenol
B67	DIEPHTH	ppb	10	7	7 ***	.	Diethyl phthalate
B68	DIHYSAF	ppb	10	7	7 ***	.	Dihydrosafrole
B69	DIMETHB	ppb	10	7	7 ***	.	3,3'-Dimethoxybenzidine
B70	DIMEAMB	ppb	10	7	7 ***	.	p-Dimethylaminoazobenzene
B71	DIMBENZ	ppb	10	7	7 ***	.	7,12-Dimethylbenz[a]anthracene
B72	DIMEYLB	ppb	10	7	7 ***	.	3,3'-Dimethylbenzidine
B73	THIONOX	ppb	10	7	7 ***	.	Thiofanox
B74	DIMPHAM	ppb	10	7	7 ***	.	alpha,alpha-Dimethylphenethylamine
B75	DIMPHEN	ppb	10	7	7 ***	.	2,4-Dimethylphenol
B76	OIMPHTH	ppb	10	7	7 ***	.	Dimethyl phthalate
B77	DINBENZ	ppb	10	7	7 ***	.	Dinitrobenzene
B78	DINCRES	ppb	10	7	7 ***	.	4,6-Dinitro-o-cresol and salts
B79	DINPHEN	ppb	50	7	7 ***	.	2,4-Dinitrophenol
B80	24-dint	ppb	10	7	7 ***	.	2,4-Dinitrotoluene
B81	26-dint	ppb	10	7	7 ***	.	2,6-Dinitrotoluene
B82	DIOPHTH	ppb	10	7	7 ***	.	Di-n-octyl phthalate
B83	DIPHAMI	ppb	10	7	7 ***	.	Diphenylamine
B84	DIPHNYD	ppb	10	7	7 ***	.	1,2-Diphenylhydrazine
B85	DIPRNIT	ppb	10	7	7 ***	.	Di-n-propylnitrosamine
B86	ETHMIHE	ppb	10	7	7 ***	.	Ethyleneimine
B87	ETHMETS	ppb	10	7	7 ***	.	Ethyl methanesulfonate
B88	FLUORAN	ppb	10	7	7 ***	.	Fluoranthene
B89	HEXC BEN	ppb	10	7	7 ***	.	Hexachlorobenzene
B90	HEXC BUT	ppb	10	7	7 ***	.	Hexachlorobutadiene
B91	HEXC CYC	ppb	10	7	7 ***	.	Hexachlorocyclopentadiene
B92	HEXC ETH	ppb	10	7	7 ***	.	Hexachloroethane

TABLE 4.5. (contd)

----- Constituent List=WAC 173-303-9905 -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
B93	INDENOP	ppb	10	7	7 ***	.	Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	ppb	10	7	7 ***	.	Isosafrole
B95	MALOILE	ppb	10	7	7 ***	.	Malononitrile
B96	MELPHAL	ppb	10	7	7 ***	.	Melphalan
B97	METHAPY	ppb	10	7	7 ***	.	Methapyrilene
B98	METHNYL	ppb	10	7	7 ***	.	Metholonyl
B99	METAZIR	ppb	10	7	7 ***	.	2-Methylaziridine
C01	METCHAN	ppb	10	7	7 ***	.	3-Methylcholanthrene
C02	METBISC	ppb	10	7	7 ***	.	4,4'-Methylenebis(2-chloroaniline)
C03	METACTO	ppb	10	7	7 ***	.	2-Methylacetonitrile
C04	METACRY	ppb	10	8	8 ***	.	Methyl methacrylate
C05	METMSUL	ppb	10	7	7 ***	.	Methyl methanesulfonate
C06	METPROP	ppb	10	7	7 ***	.	2-Methyl-2-(methylthio) propionaldehyde
C07	METHIOU	ppb	10	7	7 ***	.	Methylthiouracil
C08	NAPHQUI	ppb	10	7	7 ***	.	1,4-Naphthoquinone
C09	1-napha	ppb	10	7	7 ***	.	1-Naphthylamine
C10	2-napha	ppb	10	7	7 ***	.	2-Naphthylamine
C11	NITRANI	ppb	50	7	7 ***	.	p-Nitroaniline
C12	NITBENZ	ppb	10	7	7 ***	.	Nitrobenzene
C13	NITPHEN	ppb	50	7	7 ***	.	4-Nitrophenol
C14	NNIBUTY	ppb	10	7	7 ***	.	N-nitrosodi-n-butylamine
C15	NNIDIEA	ppb	10	7	7 ***	.	N-nitrosodiethanolamine
C16	NNIDIEY	ppb	10	7	7 ***	.	N-nitrosodiethylamine
C17	NNIDIME	ppb	10	7	7 ***	.	N-nitrosodimethylamine
C18	NNIMETH	ppb	10	7	7 ***	.	N-nitrosomethylethylamine
C19	NNIURET	ppb	10	7	7 ***	.	N-nitroso-n-methylurethane
C20	NNIVINY	ppb	10	7	7 ***	.	N-nitrosomethylvinylamine
C21	NNIMORP	ppb	10	7	7 ***	.	N-nitrosomorpholine
C22	NNINICO	ppb	10	7	7 ***	.	N-nitrosornicotine
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 ***	.	1,2,4,6-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	50	7	7 ***	.	2,4,5-Trichlorophenol

TABLE 4.5. (contd)

----- Constituent List=WAC 173-303-9905 -----						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
C45	246-trp	ppb	10	7	7 ***	. 2,4,6-Trichlorophenol
C46	TRIPHOS	ppb	10	7	7 ***	. 0,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
C60	CHLNAPZ	ppb	10	7	7 ***	. Chloronaphazine
C61	BIS2ETH	ppb	10	7	7 ***	. Bis(2-chloroisopropyl) ether
C62	HEXAENE	ppb	10	7	7 ***	. Hexachloropropene
C63	HYDRAZI	ppb	3000	7	7 ***	. Hydrazine
C64	HEXACHL	ppb	10	7	7 ***	. Hexachlorophene
C65	NAPHTHA	ppb	10	7	7 ***	. Naphthalene
C66	123TRI	ppb	10	7	7 ***	. 1,2,3-Trichlorobenzene
C68	135TRI	ppb	10	7	7 ***	. 1,3,5-Trichlorobenzene
C69	1234TE	ppb	10	7	7 ***	. 1,2,3,4-Tetrachlorobenzene
C60	1235TE	ppb	10	7	7 ***	. 1,2,3,5-Tetrachlorobenzene
C81	TETEPYR	ppb	2	7	7 ***	. Tetraethylpyrophosphate
C82	CHLLATE	ppb	30	7	7 ***	. Chlorobenzilate
C83	CARBPHT	ppb	2	7	7 ***	. Carbophenothion
C84	DISULFO	ppb	2	7	7 ***	. Disulfoton
C85	DIMETHO	ppb	2	7	7 ***	. Dimethoate
C86	METHPAR	ppb	2	7	7 ***	. Methyl parathion
C87	PARATHI	ppb	2	7	7 ***	. Parathion
C70	CYANIDE	ppb	10	7	7 ***	. Cyanide
C71	FORMALN	ppb	500	8	8 ***	. Formalin
C77	PERCHLO	ppb	1000	8	8 ***	. Perchlorate
C78	SULFIDE	ppb	1000	7	7 ***	. Sulfide
C79	KEROSEN	ppb	10000	7	7 ***	. Kerosene
C81	ETHYGLY	ppb	10000	7	7 ***	. Ethylene glycol
C86	DIOXIN	ppb	0.1	7	7 ***	. Dioxin
C87	CITRUSR	ppb	1000	7	7 ***	. Citrus red
C90	PARALDE	ppb	2000	7	7 ***	. Paraaldehyde
C91	STRYCHN	ppb	50	7	7 ***	. Strychnine
C92	MALHYDR	ppb	500	7	7 ***	. Maleic hydrazide
C93	NICOTIN	ppb	100	7	7 ***	. Nicotinic acid
C94	ACRYIDE	ppb	10000	7	7 ***	. Acrylamide
C95	ALLYLAL	ppb	2500	7	7 ***	. Allyl alcohol
C97	CHLACET	ppb	18000	7	7 ***	. Chloroacetaldehyde
C98	CHLPROP	ppb	4000	7	7 ***	. 3-Chloropropionitrile
H03	ETHCARB	ppb	5000	7	7 ***	. Ethyl carbamate
H04	ETHCYAN	ppb	2000	7	7 ***	. Ethyl cyanide
H06	ETHOXID	ppb	3000	8	8 ***	. Ethylene oxide
H08	ETHMETH	ppb	10	8	8 ***	. Ethyl methacrylate
H09	ISOBUTY	ppb	1000	7	7 ***	. Isobutyl alcohol
H11	PROPYLA	ppb	10000	7	7 ***	. n-Propylamine
H12	PROPYNO	ppb	8000	7	7 ***	. 2-Propyn-1-ol
H15	2,4,5-T	ppb	2	7	7 ***	. 2,4,5-T
H40	FTHALLI	ppb	5	8	8 ***	. Thallium, filtered
H88	HEXONE	ppb	10	8	8 ***	. Hexone
I21	TRIBUPH	ppb	10	7	7 ***	. Tributylphosphoric acid
I99	UNKNOWN	ppb	0	1	0	. Unknown

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

xxx - Indicates that Drinking Water Standards were exceeded

EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)

National Primary Drinking Water Regulations as amended by 52 FR 25690

EPAR - based on National Interim Primary Drinking Water Regulations,

Appendix IV, EPA-670/P-78-003

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

EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143

National Secondary Drinking Water Regulations

WDOE - based on additional Secondary Maximum Contaminant Levels given in

WAC 248-54, Public Water Supplies

TABLE 4.6. Constituents with at Least One Detected Value for Waste Management Area 2, September/October 1988

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho .7/700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 1000/.	TOXLDL ppb 20/.
2-E27-8	22SEP88	1	272	331	7.8	7.9	#700	#4
		2	272	335	7.8	7.9	#600	#7
		3	272	334	7.8	7.9	#500	#5
		4	272	330	7.8	7.9	#400	#4
2-E27-9	22SEP88	1	350	334	7.9	7.9	#700	#10
		2	351	339	7.9	7.9	#800	#4
		3	351	330	7.9	7.9	#400	#10
		4	351	335	7.9	7.9	#700	#2
2-E27-10	22SEP88	1	239	262	8.0	7.9	#400	#3
		2	239	260	8.0	7.9	#500	#2
		3	239	267	8.0	7.9	#500	#2
		4	239	262	8.0	7.9	#500	#8
2-E34-2	23SEP88	1	438	555	7.8	8.0	#400	#4
		2	438	557	7.9	8.0	#500	#6
		3	438	556	7.9	8.0	#300	#7
		4	438	553	7.9	8.0	#400	#4
2-E34-3	23SEP88	1	326	333	7.8	7.9	#400	#8
		2	326	335	7.8	7.8	#400	#5
		3	326	334	7.8	7.9	#500	#5
		4	327	333	7.8	7.8	#400	#6
2-E34-5	23SEP88	1	427	535	7.8	8.0	#400	#3
		2	423	540	7.8	8.1	#400	#6
		3	429	545	7.8	8.0	#400	#9
		4	428	542	7.8	8.2	#300	#9
2-E34-6	23SEP88	1	410	495	7.9	8.3	#300	#9
		2	409	491	7.9	8.3	#400	#7
		3	409	493	7.9	8.3	#700	#18
		4	408	495	7.9	8.3	#300	#19

TABLE 4.6. (contd)

Well name	Collection Date	Duplicate sample number	ALPHA pCi/L 4/15	ALUMINUM ppb 150/.	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 8/1000	FBARIUM ppb 8/1000	BETA pCi/L 8/50	FCALCIU ppb 50/.	CALCIUM ppb 50/.
2-E27-8	22SEP88	1	2.470	<150	5	8	40	39	10.20	39,800	88,800
	22SEP88		1.480	.	.	8	.	41	10.60	41,600	.
2-E27-9	22SEP88		*0.693	<150	6	7	42	46	8.31	39,500	36,600
2-E27-10	22SEP88		1.440	152	<5	10	41	42	9.93	34,200	32,600
2-E34-2	23SEP88		*1.500	470	6	6	58	41	10.60	56,500	62,300
2-E34-3	23SEP88		1.270	<150	<5	5	49	52	14.30	37,700	35,800
2-E34-5	23SEP88		2.660	<150	5	5	35	31	8.27	52,100	58,600
2-E34-6	23SEP88		3.370	491	6	<5	44	40	14.70	45,500	41,600

Well name	Collection Date	Duplicate sample number	CHLORID ppb 500/250000s	FCHROMI ppb 10/50	CHROMIUM ppb 10/50	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/.
2-E27-8	22SEP88	1	8,010	<10	28	6.40	*-0.993	248	<30	10,600	11,100
	22SEP88		6,370	<10	.	.	.	.	<30	.	11,600
2-E27-9	22SEP88		8,010	<10	32	*2.84	*1.300	191	37	10,300	11,100
2-E27-10	22SEP88		4,430	<10	30	*3.59	*-5.640	461	<30	8,740	9,340
2-E34-2	23SEP88		11,400	<10	49	*-3.97	*-4.710	1,250	<30	17,100	18,000
2-E34-3	23SEP88		6,480	10	25	*-4.92	*-1.890	147	45	9,890	10,600
2-E34-5	23SEP88		20,100	<10	36	*-2.02	0.000	232	<30	17,100	15,100
2-E34-6	23SEP88		1,030	<10	49	*4.62	*-2.650	1,480	<30	11,800	12,400

Well name	Collection Date	Duplicate sample number	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	METHYCH ppb 10/.	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5
2-E27-8	22SEP88	1	<5	<5	85	11	<10	7,430	7,600	7,000	0.1460
	22SEP88		<5	.	87	.	<10	7,310	7,930	.	.
2-E27-9	22SEP88		<5	<5	<10	13	<10	7,350	7,440	6,900	0.2950
2-E27-10	22SEP88		8	8	<10	16	11	3,020	7,220	6,500	0.2080
2-E34-2	23SEP88		<5	30	<10	22	<10	11,800	8,170	8,860	*0.1390
2-E34-3	23SEP88		<5	<5	<10	12	<10	5,160	6,830	6,320	*-0.0327
2-E34-5	23SEP88		<5	6	<10	19	<10	14,800	8,020	9,350	*0.1140
2-E34-6	23SEP88		79	91	<10	25	<10	<500	7,610	7,750	*0.1720

TABLE 4.6. (contd)

Well name	Collection Date	Duplicate sample number	RU-108 pCi/L 172.5/30r	FSELENI ppb 5/10	SELENIUM ppb 5/10	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONTIUM ppb 20/.	SULFATE ppb 500/250000s
2-E27-8	22SEP88	1	*-11.10	<5	<5	15,600	18,500	*0.0902	192	186	46,200
	22SEP88		.	<5	.	.	16,900	.	198	.	47,300
2-E27-9	22SEP88		*-42.60	<5	<5	18,400	19,600	*0.1440	187	173	47,100
2-E27-10	22SEP88		*-38.60	<5	<5	14,700	16,000	*0.5760	174	163	18,300
2-E34-2	23SEP88		*-2.97	8	9	33,300	31,300	*0.1740	267	283	150,000
2-E34-3	23SEP88		*5.94	<5	<5	13,500	14,300	*-0.1980	194	182	42,700
2-E34-5	23SEP88		*-21.90	8	8	36,300	31,300	*0.6080	248	281	109,000
2-E34-6	23SEP88		*24.90	<5	<5	33,300	33,100	*0.5070	230	220	5,170

Well name	Collection Date	Duplicate sample number	TC ppb 1000/.	TC-99 pCi/L 15/900r	TRITIUM pCi/L 500/20000	U-CHEM ug/L 0.725/.	UNKNOWN ppb 0/.	FVANADI ppb 5/.	VANADIUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-E27-8	22SEP88	1	19,900	*1.130	10,500	2.85	.	32	28	28	20
	22SEP88		.	.	.	2.60	.	29	.	.	17
2-E27-9	22SEP88		23,500	*1.050	10,800	3.19	14	30	30	16	6
2-E27-10	22SEP88		24,600	*0.351	9,080	2.60	.	27	28	25	9
2-E34-2	23SEP88		20,900	*-3.630	2,100	3.45	.	22	27	19	<5
2-E34-3	23SEP88		22,400	*-2.840	9,080	2.49	.	28	27	11	6
2-E34-5	23SEP88		22,900	*-4.810	617	4.43	.	20	25	27	29
2-E34-6	23SEP88		24,900	*-4.160	478	3.67	.	19	19	12	6

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 26690
- 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 48938
- s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143
(July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-54, Public Water Supplies

Data flags

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

TABLE 4.7. Constituent List and Summary of Sampling Results for Waste Management Area 3, September/October 1988

----- Constituent List=Contamination Indicator Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency	Exceeded	Full name
088	CONDLAB	umho	.	44	0	700	WDOE		Specific conductance, laboratory
191	CONDFLD	umho	1	44	0	700	WDOE		Specific conductance, field
199	PHFIELD		0.1	44	0	6.5-8.5	EPAS		pH, field
207	PH-LAB		0.01	44	0	6.5-8.5	EPAS		pH, laboratory
C89	TOC	ppb	1000	44	0	.			Total organic carbon
H42	TOXLDL	ppb	20	44	0	.			Total organic halogens, low DL
----- Constituent List=Drinking Water Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency	Exceeded	Full name
109	COLIFRM	MPN	2.2	11	11 ***	1	EPA		Coliform bacteria
111	BETA	pCi/L	8	11	0	50	EPA		Gross beta
191	RADIUM	pCi/L	1	11	0	5	EPA		Total radium
212	ALPHA	pCi/L	4	11	0	15	EPA		Gross alpha
A06	BARIUM	ppb	6	11	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	11	8	10	EPA		Cadmium
A08	CHROMIUM	ppb	10	11	0	50	EPA	xxx	Chromium
A10	SILVER	ppb	10	11	11 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	11	11 ***	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	11	11 ***	2	EPA		Mercury
A22	SELENIUM	ppb	5	11	5	10	EPA		Selenium
A33	ENDRIN	ppb	0.1	11	11 ***	0.2	EPA		Endrin
A34	METHLOR	ppb	3	11	11 ***	100	EPA		Methoxychlor
A36	TOXAENE	ppb	1	11	11 ***	5	EPA		Toxaphene
A36	a-BHC	ppb	0.1	11	11 ***	4	EPA		Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	11	11 ***	4	EPA		Lindane, beta-BHC
A38	g-BHC	ppb	0.1	11	11 ***	4	EPA		Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	11	11 ***	4	EPA		Lindane, delta-BHC
A51	LEADGF	ppb	5	11	10	50	EPA		Lead (graphite furnace)
C72	NITRATE	ppb	500	11	0	45000	EPA	xxx	Nitrate
C74	FLUORID	ppb	500	11	11 ***	4000	EPA		Fluoride
H13	2,4-D	ppb	2	11	11 ***	100	EPA		2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	11	11 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	ppb	8	10	0	1000	EPA		Barium, filtered
H21	FCADMIUM	ppb	2	10	10 ***	10	EPA		Cadmium, filtered
H22	FCHROMIUM	ppb	10	10	2	50	EPA		Chromium, filtered
H23	FSILVER	ppb	10	10	10 ***	50	EPA		Silver, filtered
H37	FARSENIC	ppb	5	10	10 ***	50	EPA		Arsenic, filtered
H38	FMERCURY	ppb	0.1	10	10 ***	2	EPA		Mercury, filtered
H39	FSELENIUM	ppb	5	10	10 ***	10	EPA		Selenium, filtered
H41	FLEAD	ppb	5	10	10 ***	50	EPA		Lead, filtered

TABLE 4.7. (contd)

Constituent List=Water Quality Parameters							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A11	SODIUM	ppb	200	11	0	.	Sodium
A17	MANGENE	ppb	5	11	0	50 EPAS xxx	Manganese
A19	IRON	ppb	30	11	0	300 EPAS xxx	Iron
C57	PHENOL	ppb	10	11	11 ***	.	Phenol
C73	SULFATE	ppb	500	11	0	250000 EPAS	Sulfate
C75	CHLORID	ppb	500	11	0	250000 EPAS	Chloride
H24	FSODIUM	ppb	200	10	0	.	Sodium, filtered
H29	FMANGAN	ppb	5	10	7	50 EPAS xxx	Manganese, filtered
H31	FIRON	ppb	30	10	8	300 EPAS	Iron, filtered
Constituent List=Site Specific and Other Parameters							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
010	CO-60	pCi/L	22.5	11	0	100 EPAR	Cobalt-60
024	CS-137	pCi/L	20	11	0	200 EPAR	Cesium-137
034	RU-106	pCi/L	172.5	11	0	30 EPAR	Ruthenium-106
100	PU239-40	pCi/L	17	11	0	30 DOE	Plutonium-239,240
102	PU-238	pCi/L	17	11	0	40 DOE	Plutonium-238
106	AM-241	pCi/L	0.1	11	0	30 DOE	Americium-241
108	TRITIUM	pCi/L	500	11	0	20000 EPA	Tritium (H-3)
121	SR-90	pCi/L	5	11	0	8 EPA	Strontium-90
124	U-CHEM	ug/L	0.725	11	0	.	Uranium, chemical
197	TC-99	pCi/L	15	11	0	900 EPAR	Technetium-99
A01	BERYLLIUM	ppb	5	11	11 ***	.	Beryllium
A08	STRONTIUM	ppb	20	11	0	.	Strontium
A04	ZINC	ppb	5	11	0	5000 EPAS	Zinc
A05	CALCIUM	ppb	50	11	0	.	Calcium
A12	NICKEL	ppb	10	11	0	.	Nickel
A13	COPPER	ppb	10	11	9	1300 EPAP	Copper
A14	VANADIUM	ppb	5	11	0	.	Vanadium
A15	ANTIMONY	ppb	100	11	11 ***	.	Antimony
A16	ALUMINUM	ppb	150	11	9	.	Aluminum
A18	POTASSIUM	ppb	100	11	0	.	Potassium
A50	MAGNESIUM	ppb	50	11	0	.	Magnesium
A61	TETRANE	ppb	5	11	5	5 EPA xxx	Tetrachloromethane [Carbon Tetrachloride]
A62	BENZENE	ppb	5	11	11 ***	5 EPA	Benzene
A64	METHONE	ppb	10	11	11 ***	.	Methyl ethyl ketone
A67	1,1,1-T	ppb	5	11	11 ***	200 EPA	1,1,1-Trichloroethane
A68	1,1,2-T	ppb	5	11	11 ***	.	1,1,2-Trichloroethane
A69	TRICENE	ppb	5	11	11 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethane]
A70	PERCENE	ppb	5	11	11 ***	.	Perchloroethylene [Tetrachloroethane]
A71	OPXYLE	ppb	5	11	11 ***	440 EPAP	Xylene-o,p
A80	CHLFORM	ppb	5	11	10	100 EPA	Chloroform [Trichloromethane]
A90	1,2-DIC	ppb	10	11	11 ***	5 EPA	1,2-Dichloroethane
A92	DICETHY	ppb	10	11	11 ***	7 EPA	1,1-Dichloroethylene
A93	METHYCH	ppb	10	11	11 ***	.	Methylene chloride
B08	BROMORM	ppb	10	11	11 ***	100 EPA	Bromoform [Tribromomethane]
B13	VINYIDE	ppb	10	11	11 ***	2 EPA	Vinyl chloride
B14	M-XYLE	ppb	5	11	11 ***	440 EPAP	Xylene-m

TABLE 4.7. (contd)

----- Constituent List=Site Specific and Other Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C76	PHOSPHA	ppb	1000	11	11 ***	.	Phosphate
C80	AMMONIU	ppb	60	11	10	.	Ammonium ion
H16	TC	ppb	1000	11	0	.	Total carbon
H18	FZINC	ppb	5	10	0	6000 EPAS	Zinc, filtered
H19	FCALCIU	ppb	60	10	0	.	Calcium, filtered
H25	FNICKEL	ppb	10	10	10 ***	.	Nickel, filtered
H26	FCOPPER	ppb	10	10	10 ***	1300 EPAP	Copper, filtered
H27	FVANADI	ppb	5	10	0	.	Vanadium, filtered
H29	FALUMIN	ppb	150	10	10 ***	.	Aluminum, filtered
H30	FPOTASS	ppb	100	10	0	.	Potassium, filtered
H32	FMAGNES	ppb	50	10	0	.	Magnesium, filtered
H33	FBERYLL	ppb	5	10	10 ***	.	Beryllium, filtered
H35	FSTROMT	ppb	20	10	0	.	Strontium, filtered
H36	FANTIMO	ppb	100	10	10 ***	.	Antimony, filtered
H68	HEXONE	ppb	10	11	11 ***	.	Hexone

----- Constituent List=WAC 173-303-0906 -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A23	THALIUM	ppb	5	11	11 ***	.	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 ***	.	Diethylstilbestrol
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	0.1	11	11 ***	.	DDD
A41	DDE	ppb	0.1	11	11 ***	.	DDE
A42	DDT	ppb	0.1	11	11 ***	.	DDT
A43	HEPTLOR	ppb	0.1	11	11 ***	0 EPAP	Heptachlor
A44	HEPTIDE	ppb	0.1	11	11 ***	0 EPAP	Heptachlor epoxide
A46	DIELRIN	ppb	0.1	11	11 ***	.	Dieldrin
A47	ALDRIN	ppb	0.1	11	11 ***	.	Aldrin
A48	CHLOANE	ppb	1	11	11 ***	0 EPAP	Chlordane
A49	END01	ppb	0.1	11	11 ***	.	Endosulfan I (alpha)
A52	END02	ppb	0.1	11	11 ***	.	Endosulfan II (beta)
A54	AR1016	ppb	1	11	11 ***	0 EPAP	Arochlor 1016
A55	AR1221	ppb	1	11	11 ***	0 EPAP	Arochlor 1221
A56	AR1232	ppb	1	11	11 ***	0 EPAP	Arochlor 1232
A57	AR1242	ppb	1	11	11 ***	0 EPAP	Arochlor 1242
A58	AR1248	ppb	1	11	11 ***	0 EPAP	Arochlor 1248
A59	AR1254	ppb	1	11	11 ***	0 EPAP	Arochlor 1254
A60	AR1260	ppb	1	11	11 ***	0 EPAP	Arochlor 1260
A63	DIOXANE	ppb	500	11	11 ***	.	Dioxane
A65	PYRIDIN	ppb	500	11	11 ***	.	Pyridine
A66	TOLUENE	ppb	5	11	11 ***	2000 EPAP	Toluene

TABLE 4.7. (contd)

----- Constituent List=WAC 173-303-9905 -----						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
A72	ACROLIN	ppb	10	11	11 ***	. Acrolein
A73	ACRYILE	ppb	10	11	11 ***	. Acrylonitrile
A74	BISTHER	ppb	10	11	11 ***	. Bis(chloromethyl) ether
A75	BROMONE	ppb	10	11	11 ***	. Bromoacetone
A76	METHBRO	ppb	10	11	11 ***	. Methyl bromide
A77	CARBIDE	ppb	10	11	11 ***	. Carbon disulfide
A78	CHLBENZ	ppb	10	11	11 ***	60 EPAP Chlorobenzene
A79	CHLTHER	ppb	10	11	11 ***	. 2-Chloroethyl vinyl ether
A81	METHCHL	ppb	10	11	11 ***	. Methyl chloride [Chloromethane]
A82	CHMTHER	ppb	10	11	11 ***	. Chloromethyl methyl ether
A83	CROTONA	ppb	10	11	11 ***	. Crotonaldehyde
A84	DIBRCHL	ppb	10	11	11 ***	0 EPAP 1,2-Dibromo-3-chloropropane
A85	DIBRETH	ppb	10	11	11 ***	. 1,2-Dibromoethane
A86	DIBRMET	ppb	10	11	11 ***	. Dibromomethane
A87	DIBUTEN	ppb	10	11	11 ***	. 1,4-Dichloro-2-butene
A88	DICDIFM	ppb	10	11	11 ***	. Dichlorodifluoromethane
A89	1,1-DIC	ppb	10	11	11 ***	. 1,1-Dichloroethane
A91	TRANDCE	ppb	10	11	11 ***	70 EPAP trans-1,2-Dichloroethene
A94	DICPANE	ppb	10	11	11 ***	6 EPAP 1,2-Dichloropropane
A95	DICPENE	ppb	10	11	11 ***	. 1,3-Dichloropropene
A96	NNDIEHY	ppb	10	11	11 ***	. N,N-diethylhydrazine
A99	HYDRSUL	ppb	10	11	11 ***	. Hydrogen sulfide
B01	IODOMET	ppb	10	11	11 ***	. Iodomethane
B02	METHACR	ppb	10	11	11 ***	. Methacrylonitrile
B03	METHTHI	ppb	10	11	11 ***	. Methanethiol
B04	PENTACH	ppb	10	11	11 ***	. Pentachloroethane
B06	1112-tc	ppb	10	11	11 ***	. 1,1,1,2-Tetrachloroethane
B08	1122-tc	ppb	10	11	11 ***	. 1,1,2,2-Tetrachloroethane
B09	TRCMEOL	ppb	10	11	11 ***	. Trichloromethanethiol
B10	TRCMFLM	ppb	10	11	11 ***	. Trichloromonofluoromethane
B11	TRCPANE	ppb	10	11	11 ***	. Trichloropropane
B12	123-trp	ppb	10	11	11 ***	. 1,2,3-Trichloropropane
B15	DIETHY	ppb	10	11	11 ***	. Diethylarsine
B19	ACETILE	ppb	3000	11	11 ***	. Acetonitrile
B20	ACETOPH	ppb	10	11	11 ***	. Acetophenone
B21	WARFRIN	ppb	10	11	11 ***	. Warfarin
B22	ACEFENE	ppb	10	11	11 ***	. 2-Acetylaminofluorene
B23	AMINOYL	ppb	10	11	11 ***	. 4-Aminobiphenyl
B24	AMIISOX	ppb	10	11	11 ***	. 5-(Aminomethyl)-3-isoxazolol
B25	AMITROL	ppb	10	11	11 ***	. Amitrole
B26	ANILINE	ppb	10	11	11 ***	. Aniline
B27	ARAMITE	ppb	10	11	11 ***	. Aramite
B28	AURAMIN	ppb	10	11	11 ***	. Auramine
B29	BENZCAC	ppb	10	11	11 ***	. Benz[c]acridine
B30	BENZAAN	ppb	10	11	11 ***	. Benz[a]anthracene
B31	BENDICM	ppb	10	11	11 ***	. Benzene, dichloromethyl
B32	BENTHOL	ppb	10	11	11 ***	. Benzenethiol
B33	BENDINE	ppb	10	11	11 ***	. Benzidine
B34	BENZBFL	ppb	10	11	11 ***	. Benzo[b]fluoranthene
B35	BENZJFL	ppb	10	11	11 ***	. Benzo[j]fluoranthene

TABLE 4.7. (contd)

Constituent List=WAC 173-303-9905						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
B36	PBENZQU	ppb	10	11	11 ***	p-Benzoquinone
B37	BENZCHL	ppb	10	11	11 ***	Benzyl chloride
B38	BIS2CHM	ppb	10	11	11 ***	Bis(2-chloroethoxy) methane
B39	BIS2CHE	ppb	10	11	11 ***	Bis(2-chloroethyl) ether
B40	BIS2EPH	ppb	10	11	11 ***	Bis(2-ethylhexyl) phthalate
B41	BROPHEN	ppb	10	11	11 ***	4-Bromophenyl phenyl ether
B42	BUTBENP	ppb	10	11	11 ***	Butyl benzyl phthalate
B43	BUTDINP	ppb	10	11	11 ***	2-sec-Butyl-4,6-dinitrophenol (DNBP)
B44	CHALETH	ppb	10	11	11 ***	Chloroalkyl ethers
B45	CHLANIL	ppb	10	11	11 ***	p-Chloroaniline
B46	CHLCRES	ppb	10	11	11 ***	p-Chloro-m-cresol
B47	CHLEPOX	ppb	10	11	11 ***	1-Chloro-2,3-epoxypropane
B48	CHLNAPH	ppb	10	11	11 ***	2-Chloronaphthalene
B49	CHLPHEN	ppb	10	11	11 ***	2-Chlorophenol
B50	CHRYSEN	ppb	10	11	11 ***	Chrysene
B51	CRESOLS	ppb	10	11	11 ***	Cresols
B52	CYCHDIN	ppb	10	11	11 ***	2-Cyclohexyl-4,6-dinitrophenol
B53	DIBAHAC	ppb	10	11	11 ***	Dibenz[a,h]acridine
B54	DIBAJAC	ppb	10	11	11 ***	Dibenz[a,i]acridine
B55	DIBAHAN	ppb	10	11	11 ***	Dibenz[a,h]anthracene
B56	DIBCGCA	ppb	10	11	11 ***	7H-Dibenzo[c,g]carbazole
B57	DIBAEPY	ppb	10	11	11 ***	Dibenzo[a,e]pyrene
B58	DIBAHFY	ppb	10	11	11 ***	Dibenzo[a,h]pyrene
B59	DIBAIKY	ppb	10	11	11 ***	Dibenzo[a,i]pyrene
B60	DIBPHTH	ppb	10	11	11 ***	Di-n-butyl phthalate
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 ***	1,4-Dichlorobenzene
B64	DICHBEN	ppb	20	11	11 ***	3,3'-Dichlorobenzidine
B65	24-dchp	ppb	10	11	11 ***	2,4-Dichlorophenol
B66	26-dchp	ppb	10	11	11 ***	2,6-Dichlorophenol
B67	DIEPHTH	ppb	10	11	11 ***	Diethyl phthalate
B68	DIHYSAF	ppb	10	11	11 ***	Dihydroxafrole
B69	DIMETHB	ppb	10	11	11 ***	3,3'-Dimethoxybenzidine
B70	DIMEAMB	ppb	10	11	11 ***	p-Dimethylaminoazobenzene
B71	DIMBENZ	ppb	10	11	11 ***	7,12-Dimethylbenz[a]anthracene
B72	DIMEYLB	ppb	10	11	11 ***	3,3'-Dimethylbenzidine
B73	THIONOX	ppb	10	11	11 ***	Thiofanox
B74	DIMPHAM	ppb	10	11	11 ***	alpha,alpha-Dimethylphenethylamine
B75	DIMPHEN	ppb	10	11	11 ***	2,4-Dimethylphenol
B76	DIMPHTH	ppb	10	11	11 ***	Dimethyl phthalate
B77	DINBENZ	ppb	10	11	11 ***	Dinitrobenzene
B78	DINCRES	ppb	10	11	11 ***	4,6-Dinitro-o-cresol and salts
B79	DINPHEN	ppb	50	11	11 ***	2,4-Dinitrophenol
B80	24-dint	ppb	10	11	11 ***	2,4-Dinitrotoluene
B81	26-dint	ppb	10	11	11 ***	2,6-Dinitrotoluene
B82	DIOPHTH	ppb	10	11	11 ***	Di-n-octyl phthalate
B83	DIPHAMI	ppb	10	11	11 ***	Diphenylamine
B84	DIPHHYD	ppb	10	11	11 ***	1,2-Diphenylhydrazine
B85	DIPRNIT	ppb	10	11	11 ***	Di-n-propylnitrosamine

TABLE 4.7. (contd)

Constituent List=WAC 173-303-9905

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
B86 ETHMINE	ppb	10	11	11 ***	.	Ethyleneimine
B87 ETHMETS	ppb	10	11	11 ***	.	Ethyl methanesulfonate
B88 FLUORAN	ppb	10	11	11 ***	.	Fluoranthene
B89 HEXCBEN	ppb	10	11	11 ***	.	Hexachlorobenzene
B90 HEXCBUT	ppb	10	11	11 ***	.	Hexachlorobutadiene
B91 HEXCCYC	ppb	10	11	11 ***	.	Hexachlorocyclopentadiene
B92 HEXCETH	ppb	10	11	11 ***	.	Hexachloroethane
B93 INDENOP	ppb	10	11	11 ***	.	Indeno(1,2,3-cd)pyrene
B94 ISOSOLE	ppb	10	11	11 ***	.	Isosafrole
B95 MALOILE	ppb	10	11	11 ***	.	Malononitrile
B96 MELPHAL	ppb	10	11	11 ***	.	Melphalan
B97 METHAPY	ppb	10	11	11 ***	.	Methapyrilene
B98 METHNYL	ppb	10	11	11 ***	.	Metholonyl
B99 METAZIR	ppb	10	11	11 ***	.	2-Methylaziridine
C01 METCHAN	ppb	10	11	11 ***	.	3-Methylcholanthrene
C02 METBISC	ppb	10	11	11 ***	.	4,4'-Methylenbis(2-chloroaniline)
C03 METACTO	ppb	10	11	11 ***	.	2-Methylactonitrile
C04 METACRY	ppb	10	11	11 ***	.	Methyl methacrylate
C05 METMSUL	ppb	10	11	11 ***	.	Methyl methanesulfonate
C06 METPROP	ppb	10	11	11 ***	.	2-Methyl-2-(methylthio) propionaldehyde
C07 METHIOU	ppb	10	11	11 ***	.	Methylthiouracil
C08 NAPHQUI	ppb	10	11	11 ***	.	1,4-Naphthoquinone
C09 1-napha	ppb	10	11	11 ***	.	1-Naphthylamine
C10 2-napha	ppb	10	11	11 ***	.	2-Naphthylamine
C11 NITRANI	ppb	50	11	11 ***	.	p-Nitroaniline
C12 NITBENZ	ppb	10	11	11 ***	.	Nitrobenzene
C13 NITPHEN	ppb	50	11	11 ***	.	4-Nitrophenol
C14 NNIBUTY	ppb	10	11	11 ***	.	N-nitrosodi-n-butylamine
C15 NNIDIEA	ppb	10	11	11 ***	.	N-nitrosodiethanolamine
C16 NNIDIEY	ppb	10	11	11 ***	.	N-nitrosodiethylamine
C17 NNIDIME	ppb	10	11	11 ***	.	N-nitrosodimethylamine
C18 NNIMETH	ppb	10	11	11 ***	.	N-nitrosomethylethylamine
C19 NNIURET	ppb	10	11	11 ***	.	N-nitroso-n-methylurethane
C20 NNIVINY	ppb	10	11	11 ***	.	N-nitrosomethylvinylamine
C21 NNIMORP	ppb	10	11	11 ***	.	N-nitrosomorpholine
C22 NNINICO	ppb	10	11	11 ***	.	N-nitrosornicotine
C23 NNIPPE	ppb	10	11	11 ***	.	N-nitrosopiperidine
C24 NITRPYR	ppb	10	11	11 ***	.	Nitrosopyrrolidine
C26 NITRTOL	ppb	10	11	11 ***	.	6-Nitro-o-toluidine
C26 PENTCHB	ppb	10	11	11 ***	.	Pentachlorobenzene
C27 PENTCHN	ppb	10	11	11 ***	.	Pentachloronitrobenzene
C28 PENTCHP	ppb	50	11	11 ***	220 EPAP	Pentachlorophenol
C29 PHENTIN	ppb	10	11	11 ***	.	Phenacetin
C30 PHENINE	ppb	10	11	11 ***	.	Phenylenediamine
C31 PHTHEST	ppb	10	11	11 ***	.	Phthalic acid esters
C32 PICOLIN	ppb	10	11	11 ***	.	2-Picoline
C33 PRONIDE	ppb	10	11	11 ***	.	Pronamide
C34 RESERPI	ppb	10	11	11 ***	.	Reserpine
C35 RESORCI	ppb	10	11	11 ***	.	Resorcinol
C36 SAFROL	ppb	10	11	11 ***	.	Safrol

TABLE 4.7. (contd)

Constituent List=WAC 173-303-9905						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded
						Full name
C37	TETRCHB	ppb	10	11	11 ***	1,2,4,5-Tetrachlorobenzene
C39	TETRCHP	ppb	10	11	11 ***	2,3,4,6-Tetrachlorophenol
C40	THIURAM	ppb	10	11	11 ***	Thiuram
C41	TOLUDIA	ppb	10	11	11 ***	Toluenediamine
C42	OTOLHYD	ppb	10	11	11 ***	o-Toluidine hydrochloride
C43	TRICHLB	ppb	10	11	11 ***	1,2,4-Trichlorobenzene
C44	246-trp	ppb	50	11	11 ***	2,4,6-Trichlorophenol
C45	246-trp	ppb	10	11	11 ***	2,4,6-Trichlorophenol
C46	TRIPHOS	ppb	10	11	11 ***	O,O,O-triethyl phosphorothioate
C47	SYMTRIN	ppb	10	11	11 ***	Sym-trinitrobenzene
C48	TRISPHO	ppb	10	11	11 ***	Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	ppb	10	11	11 ***	Benzo[a]pyrene
C50	CHLNAPZ	ppb	10	11	11 ***	Chlornaphazine
C51	BIS2ETH	ppb	10	11	11 ***	Bis(2-chloroisopropyl) ether
C52	HEXAENE	ppb	10	11	11 ***	Hexachloropropene
C53	HYDRAZI	ppb	3000	11	11 ***	Hydrazine
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
C61	TETEPYR	ppb	2	11	11 ***	Tetraethylpyrophosphate
C62	CHLLATE	ppb	30	11	11 ***	Chlorobenzilate
C63	CARBPHT	ppb	2	11	11 ***	Carbophenothion
C64	DISULFO	ppb	2	11	11 ***	Disulfoton
C65	DIMETHO	ppb	2	11	11 ***	Dimethoate
C66	METHPAR	ppb	2	11	11 ***	Methyl parathion
C67	PARATHI	ppb	2	11	11 ***	Parathion
C70	CYANIDE	ppb	10	11	11 ***	Cyanide
C71	FORMALN	ppb	500	11	11 ***	Formalin
C77	PERCHLO	ppb	1000	11	11 ***	Perchlorate
C78	SULFIDE	ppb	1000	11	11 ***	Sulfide
C79	KEROSEN	ppb	10000	11	11 ***	Kerosene
C86	DIOXIN	ppb	0.1	11	11 ***	Dioxin
C87	CITRUSR	ppb	1000	11	10	Citrus red
C90	PARALDE	ppb	2000	11	11 ***	Paraldehyde
C91	STRYCHN	ppb	50	11	11 ***	Strychnine
C92	MALHYDR	ppb	500	11	11 ***	Maleic hydrazide
C93	NICOTIN	ppb	100	11	11 ***	Nicotinic acid
C94	ACRYIDE	ppb	10000	11	11 ***	Acrylamide
C95	ALLYLAL	ppb	2500	11	11 ***	Allyl alcohol
C97	CHLACET	ppb	18000	11	11 ***	Chloroacetaldehyde
C98	CHLPROP	ppb	4000	11	11 ***	3-Chloropropionitrile
H03	ETHCARB	ppb	6000	11	11 ***	Ethyl carbamate
H04	ETHCYAN	ppb	2000	11	11 ***	Ethyl cyanide
H05	ETHOXID	ppb	3000	11	11 ***	Ethylene oxide
H06	ETHMETH	ppb	10	11	11 ***	Ethyl methacrylate
H09	ISOBUTY	ppb	1000	11	11 ***	Isobutyl alcohol
H11	PROPYLA	ppb	10000	11	11 ***	n-Propylamine

TABLE 4.7. (contd)

----- Constituent List=WAC 173-303-9906 -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H12 PROPYN0	ppb	8000	11	11 ***	.	2-Propyn-1-ol
H16 2,4,5-T	ppb	2	11	11 ***	.	2,4,5-T
H40 FTHALLI	ppb	5	10	10 ***	.	Thallium, filtered
I21 TRIBUPH	ppb	10	11	11 ***	.	Tributylphosphoric acid

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

xxx - Indicates that Drinking Water Standards were exceeded

EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25690

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

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

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

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

TABLE 4.8. Constituents with at Least One Detected Value for Waste Management Area 3, September/October 1988

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho . /700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.6s	TOC ppb 1000/.	TOXLDL ppb 20/.
2-W6-2	070CT88	1	353	441	7.7	7.9	#400	72.8
		2	353	445	7.8	8.0	#400	67
		3	353	442	7.8	7.9	#300	73
		4	354	444	7.8	7.9	#300	73
2-W7-1	040CT88	1	352	408	7.7	7.8	#300	#11
		2	352	404	7.7	7.7	#300	#1
		3	352	408	7.8	7.8	#300	#4
		4	352	405	7.7	7.8	#300	#5
2-W7-2	040CT88	1	288	318	7.8	8.1	#300	#5
		2	288	313	7.8	8.1	#400	#2
		3	287	312	7.8	8.1	#300	#8
		4	287	310	7.9	8.1	#400	#11
2-W7-3	030CT88	1	243	294	8.0	7.8	#300	#11
		2	243	298	8.0	7.8	#400	#15
		3	243	297	8.0	7.9	#300	#17
		4	245	298	8.1	7.9	#400	#11
2-W7-4	030CT88	1	278	436	7.9	8.0	#300	138
		2	278	442	7.9	7.9	#300	125
		3	277	432	7.8	8.0	#400	140
		4	280	437	7.9	8.0	#300	149
2-W7-5	030CT88	1	268	359	7.8	8.1	#300	38
		2	268	358	7.8	8.1	#300	#9
		3	267	358	7.8	8.2	#300	37
		4	268	352	7.8	8.2	#300	29
2-W7-6	030CT88	1	211	296	8.1	8.5	#400	33
		2	214	297	8.1	8.4	#400	#6
		3	215	298	8.1	8.5	#400	#4
		4	214	299	8.1	8.5	#300	#18
2-W8-1	040CT88	1	359	400	7.7	7.7	#200	#7
		2	359	415	7.7	7.7	#300	#8
		3	360	417	7.7	7.7	#300	#18
		4	360	412	7.7	7.7	#300	#8
2-W9-1	070CT88	1	348	415	7.7	8.0	#400	#12
		2	351	429	7.7	8.0	#300	#7
		3	351	419	7.7	8.0	#400	#5
		4	352	412	7.7	8.0	#300	#13

TABLE 4.8. (contd)

Quadruplicate Contamination Indicator Parameters

2-W10-13	040CT88		288	360	7.7	7.6	#300	#10
		1	288	358	7.7	7.6	#300	#5
		2	286	356	7.7	7.6	#300	#10
		3	288	355	7.7	7.6	#300	#12
2-W10-14	040CT88		292	359	7.7	7.3	#200	#11
		1	287	361	7.7	7.3	#200	#4
		2	288	358	7.7	7.3	#200	#11
		3	288	355	7.7	7.3	#200	#4

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25890
- r - based on National Interim Primary Drinking Water Regulations,
Appendix IV, EPA-570/9-76-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
- s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143
(July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-54, Public Water Supplies

Data flags

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

TABLE 4.8. (contd)

Well name	Collection Date	Duplicate sample number	ALPHA pCi/L 4/15	ALUMINUM ppb 150/.	AM-241 pCi/L 0.1/30d	AMMONIUM ppb 50/.	BARIUM ppb 6/1000	FBARIUM ppb 6/1000	BETA pCi/L 8/50	CADMIUM ppb 2/10	FCALCIUM ppb 50/.
2-W6-2	070CT88		2.1800	<150	*-0.00403	<50	42	39	14.00	<2	44,400
2-W7-1	040CT88		*0.0181	<150	*-0.00104	<50	35	34	7.12	<2	46,000
2-W7-2	040CT88		*0.0410	<150	*0.00074	<50	32	26	4.68	<2	30,000
2-W7-3	030CT88		*1.0700	<150	*-0.00714	50	50	46	8.75	<2	30,300
2-W7-4	030CT88		1.3500	<150	*-0.00237	<50	34	35	14.30	3	48,900
2-W7-5	030CT88		1.1800	<150	*-0.00179	<50	38	35	7.81	4	39,400
2-W7-6	030CT88		8.8800	2,890	*0.00990	<50	92	.	11.10	<2	.
2-W8-1	040CT88		1.8100	<150	*0.03490	<50	48	37	7.00	<2	43,400
2-W9-1	070CT88		1.7700	228	*0.00324	<50	43	38	10.90	<2	41,900
2-W10-13	040CT88		*-0.3670	<150	*0.00248	<50	30	31	10.20	<2	39,300
2-W10-14	040CT88		1.3500	<150	*-0.01370	<50	76	73	7.50	<2	36,400

Well name	Collection Date	Duplicate sample number	CALCIUM ppb 50/.	CHLFORM ppb 5/100	CHLORIO ppb 500/2600000	FCHROMI ppb 10/50	CHROMIUM ppb 10/50	CITRUSR ppb 1000/.	CO-60 pCi/L 22.6/100r	COPPER ppb 10/1300p
2-W6-2	070CT88		48,100	<5	5,800	38	103	<1000	*1.880	<10
2-W7-1	040CT88		48,800	<5	7,250	18	35	<1000	*-5.110	<10
2-W7-2	040CT88		35,900	<5	4,430	17	25	<1000	*5.670	<10
2-W7-3	030CT88		32,000	<5	3,650	<10	34	<1000	*3.530	<10
2-W7-4	030CT88		52,300	5	15,800	18	33	<1000	*-8.380	<10
2-W7-5	030CT88		39,900	<5	12,200	15	44	<1000	*-0.204	<10
2-W7-6	030CT88		24,900	<5	5,850	.	59	6940	8.590	11
2-W8-1	040CT88		52,400	<5	13,400	14	29	<1000	*2.890	<10
2-W9-1	070CT88		45,300	<5	17,700	<10	18	<1000	*2.240	10
2-W10-13	040CT88		39,300	<5	20,800	15	41	<1000	*0.202	<10
2-W10-14	040CT88		37,200	<5	7,640	12	51	<1000	*-4.290	<10

Well name	Collection Date	Duplicate sample number	CS-137 pCi/L 20/200r	IRON ppb 30/300s	FIROM ppb 30/300s	LEADGF ppb 5/50	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	NICKEL ppb 10/.
2-W6-2	070CT88		*2.230	368	47	<5	19,400	19,200	<5	11	38
2-W7-1	040CT88		*2.590	141	<30	<5	15,800	15,700	8	18	21
2-W7-2	040CT88		*-0.752	202	65	<5	17,100	15,100	<5	13	13
2-W7-3	030CT88		*0.722	790	122	<5	12,800	12,700	233	268	24
2-W7-4	030CT88		*1.390	128	<30	<5	17,000	16,800	<5	10	18
2-W7-5	030CT88		*3.400	188	<30	<5	13,900	14,400	<5	10	19
2-W7-6	030CT88		*-1.390	4,870	.	22	9,490	.	.	187	68
2-W8-1	040CT88		*2.880	142	<30	<5	18,300	14,200	<5	7	15
2-W9-1	070CT88		*1.890	1,490	<30	<5	15,100	13,700	<5	38	17
2-W10-13	040CT88		*-0.752	234	<30	<5	11,900	12,300	<5	13	26
2-W10-14	040CT88		*4.030	255	34	<5	13,200	13,400	14	25	33

TABLE 4.8. (contd)

Well name	Collection Date	Duplicate sample number	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	PU-238 pCi/L 17/40d	PU39-40 pCi/L 17/30d	RADIUM pCi/L 1/5	RU-108 pCi/L 172.5/30r	SELENUM ppb 5/10
2-W6-2	070CT88		80,700	3,810	3,250	*-0.00144	*0.005000	0.299	*-8.83	<5
2-W7-1	040CT88		42,800	4,400	4,100	*-0.00144	*0.004100	0.640	*5.97	7
2-W7-2	040CT88		27,300	2,830	3,180	*0.00083	*0.002100	0.210	*3.15	8
2-W7-3	030CT88		2,040	5,620	5,450	*-0.00144	0.009490	0.363	*-10.10	<5
2-W7-4	030CT88		72,300	3,840	3,670	*-0.00144	*0.001790	0.238	*-31.80	5
2-W7-5	030CT88		42,400	3,890	3,400	*-0.00144	*-0.000165	0.241	45.60	<5
2-W7-6	030CT88		5,690	.	3,850	*0.00107	*0.002340	1.750	*4.24	<5
2-W8-1	040CT88		29,400	4,230	4,440	*-0.00144	*0.001870	0.426	*-3.14	7
2-W9-1	070CT88		19,100	4,260	4,720	*0.00035	*-0.003740	0.208	*-12.60	5
2-W10-13	040CT88		7,940	3,850	3,820	*-0.00144	*-0.000165	0.345	*-22.00	<5
2-W10-14	040CT88		20,800	5,070	5,030	*-0.00144	*0.010100	0.372	*-8.35	5

Well name	Collection Date	Duplicate sample number	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONUM ppb 20/.	SULFATE ppb 500/250000s	TC ppb 1000/.	TC-99 pCi/L 15/900r
2-W6-2	070CT88		10,400	11,200	*-0.2430	251	256	28,800	24,200	107.000
2-W7-1	040CT88		9,900	10,500	*-0.5200	181	184	49,500	20,800	*7.070
2-W7-2	040CT88		10,900	9,800	*0.5570	162	189	28,200	20,900	8.170
2-W7-3	030CT88		20,000	20,500	*0.3450	164	169	29,800	28,200	*0.008
2-W7-4	030CT88		8,730	8,990	*0.0557	229	235	31,800	23,000	79.900
2-W7-5	030CT88		9,640	10,800	*0.9540	171	188	27,500	21,500	38.100
2-W7-6	030CT88		46,800	.	*0.6420	.	178	29,900	23,700	*-0.191
2-W8-1	040CT88		11,400	10,800	*-0.2490	183	215	45,100	22,500	15.100
2-W9-1	070CT88		12,000	10,300	*0.0085	161	180	49,800	21,800	19.200
2-W10-13	040CT88		10,800	10,900	*0.0255	165	163	22,800	24,000	24.900
2-W10-14	040CT88		17,800	17,800	*0.2790	194	195	24,900	26,400	*1.700

Well name	Collection Date	Duplicate sample number	TETRANE ppb 5/5	TRITIUM pCi/L 500/20000	U-CHEM ug/L 0.725/.	RYANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-W6-2	070CT88		100	15,200.0	1.270	23	28	44	24
2-W7-1	040CT88		<5	*175.0	0.603	30	27	75	59
2-W7-2	040CT88		<5	*397.0	0.891	27	28	41	18
2-W7-3	030CT88		<5	*40.5	1.490	16	14	1,000	115
2-W7-4	030CT88		220	850.0	2.070	24	21	105	92
2-W7-5	030CT88		23	888.0	1.520	22	20	90	74
2-W7-6	030CT88		<5	1,050.0	4.530	.	27	98	.
2-W8-1	040CT88		<5	*384.0	0.854	20	21	45	30
2-W9-1	070CT88		#4	*-123.0	1.120	13	12	94	13
2-W10-13	040CT88		13	*382.0	0.772	30	29	38	25
2-W10-14	040CT88		<5	*-88.2	0.846	39	32	44	31

TABLE 4.9. Wells and Constituents Exceeding Standards at Waste Management Area 3

<u>Number</u>	<u>Chromium(a)</u>	<u>Nitrate(a)</u>	<u>Carbon Tetrachloride(b)</u>
Shallow Wells			
299-W6-2	X	X	X
299-W7-4		X	X
299-W7-5			X
299-W7-6	X		
299-W9-1			
299-W10-13			X
Deep Wells			
299-W7-3			
299-W10-14	X		

(a) Exceeds standards listed in 40 CFR 265, Appendix III.

(b) Exceeds standards listed in 40 CFR 141.

lists the analytical data for each constituent that was found to be above detection limits in at least one analysis. The constituents found above standards are listed by well in Table 4.12. Elevated TOX and carbon tetrachloride levels show some correlation; elevated chromium levels coincide with elevated iron and manganese levels, and are probably an artifact of well construction (see Section 1.0 Introduction).

TABLE 4.10. Constituent List and Summary of Sampling Results for Waste Management Area 4, September/October 1988

----- Constituent List=Contamination Indicator Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088	CONDLAB	umho	.	32	0	700 WDOE	Specific conductance, laboratory
191	CONDFLD	umho	1	32	0	700 WDOE	Specific conductance, field
199	PHFIELD		0.1	32	0	8.5-8.6 EPAS	pH, field
207	PH-LAB		0.01	32	0	8.5-8.6 EPAS	pH, laboratory
C69	TOC	ppb	1000	32	0	.	Total organic carbon
H42	TOXLDL	ppb	20	32	0	.	Total organic halogens, low DL

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

TABLE 4.10. (contd)

Constituent List=Water Quality Parameters							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A11	SODIUM	ppb	200	8	0	.	Sodium
A17	MANGANESE	ppb	5	8	0	50 EPAS xxx	Manganese
A19	IRON	ppb	30	8	0	300 EPAS xxx	Iron
C67	PHENOL	ppb	10	8	***	.	Phenol
C73	SULFATE	ppb	500	9	0	250000 EPAS	Sulfate
C76	CHLORIDE	ppb	500	9	0	250000 EPAS	Chloride
H24	SODIUM	ppb	200	9	0	.	Sodium, filtered
H29	MANGANESE	ppb	5	9	7	50 EPAS	Manganese, filtered
H31	IRON	ppb	30	9	5	300 EPAS	Iron, filtered
Constituent List=Site Specific and Other Parameters							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
010	CO-60	pCi/L	22.5	8	0	100 EPAR	Cobalt-60
024	CS-137	pCi/L	20	8	0	200 EPAR	Cesium-137
034	RU-106	pCi/L	172.5	8	0	30 EPAR	Ruthenium-106
100	PU239-40	pCi/L	17	8	0	80 DOE	Plutonium-239,240
102	PU-238	pCi/L	17	8	0	40 DOE	Plutonium-238
105	AM-241	pCi/L	0.1	8	0	30 DOE	Americium-241
108	TRITIUM	pCi/L	500	8	0	20000 EPA	Tritium (H-3)
121	SR-90	pCi/L	5	8	0	8 EPA	Strontium-90
124	U-CHEM	ug/L	0.725	9	0	.	Uranium, chemical
197	TC-99	pCi/L	15	8	0	900 EPAR	Technetium-99
A01	BERYLLIUM	ppb	5	8	8	.	Beryllium
A03	STRONTIUM	ppb	20	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	8	1300 EPAP	Copper
A14	VANADIUM	ppb	5	8	0	.	Vanadium
A15	ANTIMONY	ppb	100	8	8	.	Antimony
A16	ALUMINUM	ppb	150	8	7	.	Aluminum
A18	POTASSIUM	ppb	100	8	0	.	Potassium
A50	MAGNESIUM	ppb	50	8	0	.	Magnesium
A61	TETRANE	ppb	5	9	2	5 EPA xxx	Tetrachloromethane [Carbon Tetrachloride]
A62	BENZENE	ppb	5	9	9	5 EPA	Benzene
A64	METHONE	ppb	10	9	9	.	Methyl ethyl ketone
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	7	5 EPA xxx	Trichloroethylene [1,1,2-Trichloroethene]
A70	PERCENE	ppb	5	9	9	.	Perchloroethylene [Tetrachloroethene]
A71	OPXYLE	ppb	5	9	9	440 EPAP	Xylene-o,p
A80	CHLFORM	ppb	5	9	3	100 EPA	Chloroform [Trichloromethane]
A90	1,2-DIC	ppb	10	9	9	5 EPA	1,2-Dichloroethane
A92	DICETHY	ppb	10	9	9	7 EPA	1,1-Dichloroethylene
A93	METHYCH	ppb	10	9	9	.	Methylene chloride
B08	BROMORM	ppb	10	9	9	100 EPA	Bromoform [Tribromomethane]
B13	VINYIDE	ppb	10	9	9	2 EPA	Vinyl chloride
B14	M-XYLE	ppb	5	9	9	440 EPAP	Xylene-m

TABLE 4.10. (contd)

----- Constituent List=Site Specific and Other Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C76	PHOSPHA	ppb	1000	9	9 ***	.	Phosphate
C80	AMMONIU	ppb	50	9	9 ***	.	Ammonium ion
H16	TC	ppb	1000	8	0	.	Total carbon
H18	FZINC	ppb	5	9	0	5000 EPAS	Zinc, filtered
H19	FCALCIU	ppb	50	9	0	.	Calcium, filtered
H25	FNICKEL	ppb	10	9	9 ***	.	Nickel, filtered
H26	FCOPPER	ppb	10	9	8	1300 EPAP	Copper, filtered
H27	FVANADI	ppb	5	9	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	20	9	0	.	Strontium, filtered
H36	FANTIMO	ppb	100	9	9 ***	.	Antimony, filtered
H88	HEXONE	ppb	10	9	9 ***	.	Hexone

----- Constituent List=WAC 173-303-9906 -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A23	THALIUM	ppb	5	8	8 ***	.	Thallium
A24	THIOURA	ppb	200	8	8 ***	.	Thiourea
A25	ACETREA	ppb	200	8	8 ***	.	1-Acetyl-2-thiourea
A26	CHLOREA	ppb	200	8	8 ***	.	1-(o-Chlorophenyl) thiourea
A27	DIETROL	ppb	200	8	8 ***	.	Diethylstilbestrol
A28	ETHYREA	ppb	200	8	8 ***	.	Ethylenethiourea
A29	NAPHREA	ppb	200	8	8 ***	.	1-Naphthyl-2-thiourea
A32	PHENREA	ppb	500	8	8 ***	.	N-phenylthiourea
A40	DDD	ppb	0.1	8	8 ***	.	DDD
A41	DDE	ppb	0.1	8	8 ***	.	DDE
A42	DDT	ppb	0.1	8	8 ***	.	DDT
A43	HEPTLOR	ppb	0.1	8	8 ***	0 EPAP	Heptachlor
A44	HEPTIDE	ppb	0.1	8	8 ***	0 EPAP	Heptachlor epoxide
A46	DIELRIN	ppb	0.1	8	8 ***	.	Dieldrin
A47	ALDRIN	ppb	0.1	8	8 ***	.	Aldrin
A48	CHLOANE	ppb	1	8	8 ***	0 EPAP	Chlordane
A49	ENDO1	ppb	0.1	8	8 ***	.	Endosulfan I (alpha)
A52	ENDO2	ppb	0.1	8	8 ***	.	Endosulfan II (beta)
A54	AR1016	ppb	1	8	8 ***	0 EPAP	Arochlor 1016
A55	AR1221	ppb	1	8	8 ***	0 EPAP	Arochlor 1221
A56	AR1232	ppb	1	8	8 ***	0 EPAP	Arochlor 1232
A57	AR1242	ppb	1	8	8 ***	0 EPAP	Arochlor 1242
A58	AR1248	ppb	1	8	8 ***	0 EPAP	Arochlor 1248
A59	AR1254	ppb	1	8	8 ***	0 EPAP	Arochlor 1254
A60	AR1260	ppb	1	8	8 ***	0 EPAP	Arochlor 1260
A63	DIOXANE	ppb	500	9	9 ***	.	Dioxane
A65	PYRIDIN	ppb	500	9	9 ***	.	Pyridine
A66	TOLUENE	ppb	5	9	9 ***	2000 EPAP	Toluene

TABLE 4.10. (contd)

----- Constituent List=WAC 173-303-9905 -----						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
A72	ACROLIN	ppb	10	9	9 ***	. Acrolein
A73	ACRYILE	ppb	10	9	9 ***	. Acrylonitrile
A74	BISTHER	ppb	10	9	9 ***	. Bis(chloromethyl) ether
A75	BROMONE	ppb	10	9	9 ***	. Bromoacetone
A76	METHBRO	ppb	10	9	9 ***	. Methyl bromide
A77	CARBIDE	ppb	10	9	9 ***	. Carbon disulfide
A78	CHLBENZ	ppb	10	9	9 ***	60 EPAP Chlorobenzene
A79	CHLTHER	ppb	10	9	9 ***	. 2-Chloroethyl vinyl ether
A81	METHCHL	ppb	10	9	9 ***	. Methyl chloride [Chloromethane]
A82	CHMTHER	ppb	10	9	9 ***	. Chloromethyl methyl ether
A83	CROTONA	ppb	10	9	9 ***	. Crotonaldehyde
A84	DIBRCHL	ppb	10	9	9 ***	0 EPAP 1,2-Dibromo-3-chloropropane
A85	DIBRETH	ppb	10	9	9 ***	. 1,2-Dibromoethane
A86	DIBRMET	ppb	10	9	9 ***	. Dibromomethane
A87	DIBUTEN	ppb	10	9	9 ***	. 1,4-Dichloro-2-butene
A88	DICDIFW	ppb	10	9	9 ***	. Dichlorodifluoromethane
A89	1,1-DIC	ppb	10	9	9 ***	. 1,1-Dichloroethane
A91	TRANDE	ppb	10	9	9 ***	70 EPAP trans-1,2-Dichloroethane
A94	DICPANE	ppb	10	9	9 ***	6 EPAP 1,2-Dichloropropane
A95	DICPENE	ppb	10	9	9 ***	. 1,3-Dichloropropane
A98	NNDIEHY	ppb	10	9	9 ***	. N,N-diethylhydrazine
A99	HYDRSUL	ppb	10	9	9 ***	. Hydrogen sulfide
B01	IODOMET	ppb	10	9	9 ***	. Iodomethane
B02	METHACR	ppb	10	9	9 ***	. Methacrylonitrile
B03	METHTHI	ppb	10	9	9 ***	. Methanethiol
B04	PENTACH	ppb	10	9	9 ***	. Pentachloroethane
B05	1112-tc	ppb	10	9	9 ***	. 1,1,1,2-Tetrachloroethane
B06	1122-tc	ppb	10	9	9 ***	. 1,1,2,2-Tetrachloroethane
B09	TRCMEOL	ppb	10	9	9 ***	. Trichloromethanethiol
B10	TRCMFLW	ppb	10	9	9 ***	. Trichloromonofluoromethane
B11	TRCPANE	ppb	10	9	9 ***	. Trichloropropane
B12	123-trp	ppb	10	9	9 ***	. 1,2,3-Trichloropropane
B16	DIETHY	ppb	10	9	9 ***	. Diethylarsine
B19	ACETILE	ppb	3000	9	9 ***	. Acetonitrile
B20	ACETOPH	ppb	10	8	8 ***	. Acetophenone
B21	WARFRIN	ppb	10	8	8 ***	. Warfarin
B22	ACEFENE	ppb	10	8	8 ***	. 2-Acetylaminofluorene
B23	AMINOYL	ppb	10	8	8 ***	. 4-Aminobiphenyl
B24	AMIISOX	ppb	10	8	8 ***	. 6-(Aminomethyl)-3-isoxazolo
B25	AMITROL	ppb	10	8	8 ***	. Amitrole
B26	ANILINE	ppb	10	8	8 ***	. Aniline
B27	ARAMITE	ppb	10	8	8 ***	. Aramite
B28	AURAMIN	ppb	10	8	8 ***	. Auramine
B29	BENZCAC	ppb	10	8	8 ***	. Benz[c]acridine
B30	BENZAAN	ppb	10	8	8 ***	. Benz[a]anthracene
B31	BENDICM	ppb	10	8	8 ***	. Benzene, dichloromethyl
B32	BENTHOL	ppb	10	8	8 ***	. Benzenethiol
B33	BENDINE	ppb	10	8	8 ***	. Benzidine
B34	BENZBFL	ppb	10	8	8 ***	. Benzo[b]fluoranthene
B35	BENZJFL	ppb	10	8	8 ***	. Benzo[j]fluoranthene

TABLE 4.10. (contd)

----- Constituent List=WAC 173-303-9905 -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name	
B36	PBENZQU	ppb	10	8	8 ***	.	.	p-Benzoquinone	
B37	BENZCHL	ppb	10	8	8 ***	.	.	Benzyl chloride	
B38	BIS2CHM	ppb	10	8	8 ***	.	.	Bis(2-chloroethoxy) methane	
B39	BIS2CHE	ppb	10	8	8 ***	.	.	Bis(2-chloroethyl) ether	
B40	BIS2EPH	ppb	10	8	8 ***	.	.	Bis(2-ethylhexyl) phthalate	
B41	BROPHEN	ppb	10	8	8 ***	.	.	4-Bromophenyl phenyl ether	
B42	BUTBENP	ppb	10	8	8 ***	.	.	Butyl benzyl phthalate	
B43	BUTDINP	ppb	10	8	8 ***	.	.	2-sec-Butyl-4,6-dinitrophenol (DNBP)	
B44	CHALETH	ppb	10	8	8 ***	.	.	Chloroalkyl ethers	
B45	CHLANIL	ppb	10	8	8 ***	.	.	p-Chloroaniline	
B46	CHLCRES	ppb	10	8	8 ***	.	.	p-Chloro-m-cresol	
B47	CHLEPOX	ppb	10	8	8 ***	0	EPAP	1-Chloro-2,3-epoxypropane	
B48	CHLNAPH	ppb	10	8	8 ***	.	.	2-Chloronaphthalene	
B49	CHLPHEN	ppb	10	8	8 ***	.	.	2-Chlorophenol	
B50	CHRYSEN	ppb	10	8	8 ***	.	.	Chrysene	
B51	CRESOLS	ppb	10	8	8 ***	.	.	Cresols	
B52	CYCHDIN	ppb	10	8	8 ***	.	.	2-Cyclohexyl-4,6-dinitrophenol	
B53	DIBAHAC	ppb	10	8	8 ***	.	.	Dibenz[a,h]acridine	
B54	DIBAJAC	ppb	10	8	8 ***	.	.	Dibenz[a,j]acridine	
B55	DIBAHAN	ppb	10	8	8 ***	.	.	Dibenz[a,h]anthracene	
B56	DIBCGCA	ppb	10	8	8 ***	.	.	7H-Dibenzo[c,g]carbazole	
B57	DIBAEPY	ppb	10	8	8 ***	.	.	Dibenzo[a,e]pyrene	
B58	DIBAHFY	ppb	10	8	8 ***	.	.	Dibenzo[a,h]pyrene	
B59	DIBAIPY	ppb	10	8	8 ***	.	.	Dibenzo[a,i]pyrene	
B60	DIBPHTH	ppb	10	8	8 ***	.	.	Di-n-butyl phthalate	
B61	12-dben	ppb	10	8	8 ***	.	.	1,2-Dichlorobenzene	
B62	13-dben	ppb	10	8	8 ***	.	.	1,3-Dichlorobenzene	
B63	14-dben	ppb	10	8	8 ***	.	.	1,4-Dichlorobenzene	
B64	DICHBEN	ppb	20	8	8 ***	.	.	3,3'-Dichlorobenzidine	
B65	24-dchp	ppb	10	8	8 ***	.	.	2,4-Dichlorophenol	
B66	26-dchp	ppb	10	8	8 ***	.	.	2,6-Dichlorophenol	
B67	DIEPHTH	ppb	10	8	8 ***	.	.	Diethyl phthalate	
B68	DIHYSAF	ppb	10	8	8 ***	.	.	Dihydrosafrole	
B69	DIMETHB	ppb	10	8	8 ***	.	.	3,3'-Dimethoxybenzidine	
B70	DIMEAMB	ppb	10	8	8 ***	.	.	p-Dimethylaminoazobenzene	
B71	DIMBENZ	ppb	10	8	8 ***	.	.	7,12-Dimethylbenz[a]anthracene	
B72	DIMEYLB	ppb	10	8	8 ***	.	.	3,3'-Dimethylbenzidine	
B73	THIONOX	ppb	10	8	8 ***	.	.	Thiofanox	
B74	DIMPAM	ppb	10	8	8 ***	.	.	alpha,alpha-Dimethylphenethylamine	
B75	DIMPEN	ppb	10	8	8 ***	.	.	2,4-Dimethylphenol	
B76	DIMPHTH	ppb	10	8	8 ***	.	.	Dimethyl phthalate	
B77	DINBENZ	ppb	10	8	8 ***	.	.	Dinitrobenzene	
B78	DINCRES	ppb	10	8	8 ***	.	.	4,6-Dinitro-o-cresol and salts	
B79	DINPHEN	ppb	50	8	8 ***	.	.	2,4-Dinitrophenol	
B80	24-dint	ppb	10	8	8 ***	.	.	2,4-Dinitrotoluene	
B81	26-dint	ppb	10	8	8 ***	.	.	2,6-Dinitrotoluene	
B82	DIOPTH	ppb	10	8	8 ***	.	.	Di-n-octyl phthalate	
B83	DIPHAMI	ppb	10	8	8 ***	.	.	Diphenylamine	
B84	DIPHHYD	ppb	10	8	8 ***	.	.	1,2-Diphenylhydrazine	
B85	DIPRNT	ppb	10	8	8 ***	.	.	Di-n-propylnitrosamine	

TABLE 4.10. (contd)

Constituent List=WAC 173-303-9905						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
B86	ETHMINE	ppb	10	8	8 ***	. Ethyleneimine
B87	ETHMETS	ppb	10	8	8 ***	. Ethyl methanesulfonate
B88	FLUORAN	ppb	10	8	8 ***	. Fluoranthene
B89	HEXC BEN	ppb	10	8	8 ***	. Hexachlorobenzene
B90	HEXC BUT	ppb	10	8	8 ***	. Hexachlorobutadiene
B91	HEXC CYC	ppb	10	8	8 ***	. Hexachlorocyclopentadiene
B92	HEXC ETH	ppb	10	8	8 ***	. Hexachloroethane
B93	INDENOP	ppb	10	8	8 ***	. Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	ppb	10	8	8 ***	. Isosafrole
B95	MALOILE	ppb	10	8	8 ***	. Malononitrile
B96	MELPHAL	ppb	10	8	8 ***	. Melphalan
B97	METHAPY	ppb	10	8	8 ***	. Methapyrilene
B98	METHNYL	ppb	10	8	8 ***	. Metholonyl
B99	METAZIR	ppb	10	8	8 ***	. 2-Methylaziridine
C01	METCHAN	ppb	10	8	8 ***	. 3-Methylcholanthrene
C02	METBISC	ppb	10	8	8 ***	. 4,4'-Methylenebis(2-chloroaniline)
C03	METACTO	ppb	10	8	8 ***	. 2-Methylactonitrile
C04	METACRY	ppb	10	8	8 ***	. Methyl methacrylate
C05	METMSUL	ppb	10	8	8 ***	. Methyl methanesulfonate
C06	METPROP	ppb	10	8	8 ***	. 2-Methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	ppb	10	8	8 ***	. Methylthiouracil
C08	NAPHQUI	ppb	10	8	8 ***	. 1,4-Naphthoquinone
C09	1-napha	ppb	10	8	8 ***	. 1-Naphthylamine
C10	2-napha	ppb	10	8	8 ***	. 2-Naphthylamine
C11	NITRANI	ppb	50	8	8 ***	. p-Nitroaniline
C12	NITBENZ	ppb	10	8	8 ***	. Nitrobenzene
C13	NITPHEN	ppb	50	8	8 ***	. 4-Nitrophenol
C14	NNIBUTY	ppb	10	8	8 ***	. N-nitrosodi-n-butylamine
C15	NNIDIEA	ppb	10	8	8 ***	. N-nitrosodiethanolamine
C16	NNIOIEY	ppb	10	8	8 ***	. N-nitrosodiethylamine
C17	NNIDIME	ppb	10	8	8 ***	. N-nitrosodimethylamine
C18	NNIMETH	ppb	10	8	8 ***	. N-nitrosomethylethylamine
C19	NNIURET	ppb	10	8	8 ***	. N-nitroso-n-methylurethane
C20	NNIVINY	ppb	10	8	8 ***	. N-nitrosomethylvinylamine
C21	NNIMORP	ppb	10	8	8 ***	. N-nitrosomorpholine
C22	NNINICO	ppb	10	8	8 ***	. N-nitrosomornicotine
C23	NNIPIPE	ppb	10	8	8 ***	. N-nitrosopiperidine
C24	NITRPYR	ppb	10	8	8 ***	. Nitrosopyrrolidine
C25	NITRTOL	ppb	10	8	8 ***	. 5-Nitro-o-toluidine
C26	PENTCHO	ppb	10	8	8 ***	. Pentachlorobenzene
C27	PENTCHN	ppb	10	8	8 ***	. Pentachloronitrobenzene
C28	PENTCHP	ppb	50	8	8 ***	. 220 EPAP Pentachlorophenol
C29	PHENTIN	ppb	10	8	8 ***	. Phenacetin
C30	PHENINE	ppb	10	8	8 ***	. Phenylenediamine
C31	PHTHEST	ppb	10	8	8 ***	. Phthalic acid esters
C32	PICOLIN	ppb	10	8	8 ***	. 2-Picoline
C33	PROMIDE	ppb	10	8	8 ***	. Pronamide
C34	RESERPI	ppb	10	8	8 ***	. Reserpine
C35	RESORCI	ppb	10	8	8 ***	. Resorcinol
C36	SAFROL	ppb	10	8	8 ***	. Safrol

TABLE 4.10. (contd).

Constituent List=WAC 173-303-9905						
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
C37	TETRCHB	ppb	10	8	8 ***	. 1,2,4,5-Tetrachlorobenzene
C39	TETRCHP	ppb	10	8	8 ***	. 2,3,4,6-Tetrachlorophenol
C40	THIURAM	ppb	10	8	8 ***	. Thiuram
C41	TOLUDIA	ppb	10	8	8 ***	. Toluenediamine
C42	OTOLHYD	ppb	10	8	8 ***	. o-Toluidine hydrochloride
C43	TRICHLB	ppb	10	8	8 ***	. 1,2,4-Trichlorobenzene
C44	246-trp	ppb	50	8	8 ***	. 2,4,6-Trichlorophenol
C45	248-trp	ppb	10	8	8 ***	. 2,4,8-Trichlorophenol
C46	TRIPHOS	ppb	10	8	8 ***	. O,O,O-triethyl phosphorothioate
C47	SYMTRIN	ppb	10	8	8 ***	. Sym-trinitrobenzene
C48	TRISPHO	ppb	10	8	8 ***	. Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	ppb	10	8	8 ***	. Benzo[a]pyrene
C50	CHLNAPZ	ppb	10	8	8 ***	. Chlornaphazine
C51	BIS2ETH	ppb	10	8	8 ***	. Bis(2-chloroisopropyl) ether
C52	HEXAENE	ppb	10	8	8 ***	. Hexachloropropene
C53	HYDRAZI	ppb	3000	8	8 ***	. Hydrazine
C54	HEXACHL	ppb	10	8	8 ***	. Hexachlorophene
C55	NAPHTHA	ppb	10	8	8 ***	. Naphthalene
C56	123TRI	ppb	10	8	8 ***	. 1,2,3-Trichlorobenzene
C58	135TRI	ppb	10	8	8 ***	. 1,3,5-Trichlorobenzene
C59	1234TE	ppb	10	8	8 ***	. 1,2,3,4-Tetrachlorobenzene
C60	1235TE	ppb	10	8	8 ***	. 1,2,3,5-Tetrachlorobenzene
C61	TETEPYR	ppb	2	8	8 ***	. Tetraethylpyrophosphate
C62	CHLLATE	ppb	30	8	8 ***	. Chlorobenzilate
C63	CARBPHI	ppb	2	8	8 ***	. Carbophenothion
C64	DISULFO	ppb	2	8	8 ***	. Disulfoton
C65	DIMETHO	ppb	2	8	8 ***	. Dimethoate
C66	METHPAR	ppb	2	8	8 ***	. Methyl parathion
C67	PARATHI	ppb	2	8	8 ***	. Parathion
C70	CYANIDE	ppb	10	8	8 ***	. Cyanide
C71	FORMALN	ppb	500	9	9 ***	. Formalin
C77	PERCHLO	ppb	1000	9	9 ***	. Perchlorate
C78	SULFIDE	ppb	1000	8	8 ***	. Sulfide
C79	KEROSEN	ppb	10000	8	8 ***	. Kerosene
C86	DIOXIN	ppb	0.1	8	8 ***	. Dioxin
C87	CITRUSR	ppb	1000	8	8 ***	. Citrus red
C90	PARALDE	ppb	2000	8	8 ***	. Paraldehyde
C91	STRYCHN	ppb	50	8	8 ***	. Strychnine
C92	MALHYDR	ppb	500	8	8 ***	. Maleic hydrazide
C93	NICOTIN	ppb	100	8	8 ***	. Nicotinic acid
C94	ACRYIDE	ppb	10000	8	8 ***	. Acrylamide
C95	ALLYLAL	ppb	2500	8	8 ***	. Allyl alcohol
C97	CHLACET	ppb	16000	8	8 ***	. Chloroacetaldehyde
C98	CHLPROP	ppb	4000	8	8 ***	. 3-Chloropropionitrile
H03	ETHCARB	ppb	5000	8	8 ***	. Ethyl carbamate
H04	ETHCYAN	ppb	2000	8	8 ***	. Ethyl cyanide
H05	ETHOXID	ppb	3000	9	9 ***	. Ethylene oxide
H06	ETHMETH	ppb	10	9	9 ***	. Ethyl methacrylate
H09	ISOBUTY	ppb	1000	8	8 ***	. Isobutyl alcohol
H11	PROPYLA	ppb	10000	8	8 ***	. n-Propylamine

TABLE 4.10. (contd)

----- Constituent List=WAC 173-303-9905 -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H12 PROPYNO	ppb	8000	8	8 ***	.	2-Propyn-1-ol
H16 2,4,6-T	ppb	2	8	8 ***	.	2,4,6-T
H40 FTHALLI	ppb	5	8	8 ***	.	Thallium, filtered
I21 TRIBUPH	ppb	10	8	8 ***	.	Tributylphosphoric acid

*** - Indicates all samples were reported as below contractual detection limits
 xxx - Indicates that Drinking Water Standards were exceeded
 EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
 National Primary Drinking Water Regulations as amended by 52 FR 25890
 EPAR - based on National Interim Primary Drinking Water Regulations,
 Appendix IV, EPA-570/9-78-003
 EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46938
 EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143
 National Secondary Drinking Water Regulations
 WDOE - based on additional Secondary Maximum Contaminant Levels given in
 WAC 248-54, Public Water Supplies

TABLE 4.11. Constituents with at Least One Detected Value for Waste Management Area 4, September/October 1988

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho . /700w	PH-LAB 0.01/8.5a	PHFIELD 0.1/8.5a	TOC ppb 1000/.	TOXLDL ppb 20/.
2-W15-15	07OCT88	1	197	283	7.7	7.8	#300	201
		2	197	259	7.7	7.8	#300	297
		3	197	258	7.7	7.8	#400	234
		4	197	255	7.7	7.8	#300	235
2-W15-16	08OCT88	1	551	808	7.8	7.7	#500	2,030
		2	551	804	7.8	7.7	#500	1,510
		3	552	807	7.8	7.7	#600	98
		4	552	810	7.8	7.7	#500	2,760
2-W15-17	05OCT88	1	298	390	7.7	7.8	#300	#6
		2	298	405	7.7	7.8	#200	#3
		3	299	408	7.7	7.8	#200	#3
		4	299	398	7.7	7.8	#300	#4
2-W15-18	08OCT88	1	357	401	7.7	7.7	#400	1,610
		2	357	406	7.7	7.7	#400	1,490
		3	357	398	7.7	7.7	#300	1,310
		4	357	400	7.7	7.7	#400	1,280
2-W18-21	06OCT88	1	172	242	7.8	7.8	#300	83
		2	172	242	7.7	7.8	#300	39
		3	173	244	7.8	7.8	#300	#18
		4	173	239	7.8	7.8	#300	86
2-W18-22	05OCT88	1	285	352	7.8	7.8	#200	#-1
		2	284	358	7.8	7.6	#200	#5
		3	285	355	7.8	7.6	#200	#4
		4	288	350	7.8	7.6	#200	#7
2-W18-23	06OCT88	1	245	253	7.7	8.1	#300	400
		2	245	258	7.7	8.1	#300	381
		3	245	255	7.7	8.1	#300	171
		4	245	252	7.7	8.1	#400	522
2-W18-24	07OCT88	1	217	297	7.6	7.8	#400	266
		2	218	297	7.6	7.8	#400	30
		3	218	293	7.8	7.8	#400	168
		4	218	295	7.6	7.8	#400	28

TABLE 4.11. (contd)

Well name	Collection Date	Duplicate sample number	ALPHA pCi/L 4/15	ALUMINUM ppb 150/.	AM-241 pCi/L 0.1/30d	BARIUM ppb 6/1000	FBARIUM ppb 6/1000	BETA pCi/L 8/50	FCADMIU ppb 2/10	FCALCIU ppb 60/.	CALCIUM ppb 60/.	CHLFORM ppb 6/100
2-W15-16	07OCT88	1	2.180	<150	*-0.00323	30	28	3.79	<2	23,700	23,400	#3
	07OCT88		2.680	.	.	.	26	5.68	<2	22,300	.	#3
2-W15-16	06OCT88		3.580	<150	*-0.00440	75	61	11.30	<2	55,400	64,200	38
2-W15-17	05OCT88		1.280	<150	*-0.00714	89	85	7.68	<2	39,800	42,800	<5
2-W15-18	06OCT88		1.480	<150	*-0.00372	54	43	7.04	<2	36,300	41,600	13
2-W18-21	06OCT88		19.700	657	*-0.02850	35	28	8.82	<2	19,800	23,900	<5
2-W18-22	06OCT88		*1.140	<150	*-0.01000	64	58	8.00	<2	38,400	40,100	<5
2-W18-23	06OCT88		*0.721	<150	*-0.00380	37	28	*3.00	<2	25,000	29,200	5
2-W18-24	07OCT88		*1.180	<150	*-0.00423	46	31	3.73	4	27,700	27,400	15

Well name	Collection Date	Duplicate sample number	CHLORID ppb 500/250000s	FCHROMI ppb 10/50	CHROMIUM ppb 10/50	CO-60 pCi/L 22.5/100r	COLIFRM MPN 2.2/1	FCOPPER ppb 10/1300p	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000
2-W15-16	07OCT88	1	2,940	<10	58	10.300	16.0	<10	*-5.590	<500
	07OCT88		2,980	<10	.	.	.	<10	.	<500
2-W15-18	08OCT88		17,600	11	64	*2.150	<2.2	<10	*0.601	660
2-W15-17	05OCT88		13,700	<10	38	*0.405	<2.2	<10	*-0.378	<500
2-W15-18	08OCT88		3,780	13	55	*3.930	<2.2	10	*-2.610	598
2-W18-21	06OCT88		2,950	<10	90	*-3.200	<2.2	<10	*2.320	<500
2-W18-22	06OCT88		9,190	<10	37	*0.202	<2.2	<10	*1.130	<500
2-W18-23	06OCT88		2,840	<10	53	*1.020	<2.2	<10	*-1.510	<500
2-W18-24	07OCT88		3,460	<10	34	*-4.800	<2.2	<10	0.000	577

Well name	Collection Date	Duplicate sample number	IRON ppb 30/300s	FIRON ppb 30/300s	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	NICKEL ppb 10/.	NITRATE ppb 500/45000
2-W15-16	07OCT88	1	379	38	7,140	7,140	<5	19	35	4,490
	07OCT88		.	<30	.	6,710	<5	.	.	4,540
2-W15-16	06OCT88		521	42	17,100	15,400	<5	16	31	70,300
2-W15-17	05OCT88		377	<30	15,200	14,700	6	24	22	23,200
2-W15-18	06OCT88		323	<30	12,700	10,900	<5	24	28	76,400
2-W18-21	06OCT88		2,200	<30	7,570	6,330	<5	39	48	2,230
2-W18-22	06OCT88		274	<30	13,700	12,900	<5	13	26	17,300
2-W18-23	06OCT88		634	36	8,360	7,280	8	21	33	6,620
2-W18-24	07OCT88		178	32	8,830	8,720	<5	55	19	23,700

TABLE 4.11. (contd)

Well name	Collection Date	Duplicate sample number	FPOTASS ppb 100/.	POTASUM ppb 100/.	PU-238 pCi/L 17/40d	PU39-40 pCi/L 17/30d	RADIUM pCi/L 1/5	RU-106 pCi/L 172.5/30r	SELENIUM ppb 5/10	FSILVER ppb 10/50
2-W15-16	07OCT88	1	3,230	3,280	*-0.00144	*0.00202	*0.065	*-3.12	<5	<10
	07OCT88		3,030							<10
2-W15-16	06OCT88		5,060	5,610	*-0.00144	*0.00180	0.619	*37.30	5	<10
2-W15-17	05OCT88		5,080	5,300	*-0.00144	*0.00198	0.360	*15.70	7	<10
2-W15-18	08OCT88		4,180	4,610	*0.00086	*-0.00017	*0.128	*-21.90	<5	<10
2-W18-21	05OCT88		2,860	3,310	*0.00191	*-0.00362	0.203	*-5.58	<5	<10
2-W18-22	05OCT88		4,620	4,650	*-0.00144	*0.00242	0.331	*-75.50	<5	25
2-W18-23	08OCT88		3,220	3,570	*-0.00144	*0.00174	0.265	*-20.00	<5	<10
2-W18-24	07OCT88		3,490	3,600	*0.00077	*0.00425	0.158	*11.10	<5	<10
Well name	Collection Date	Duplicate sample number	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONTIUM ppb 20/.	SULFATE ppb 500/250000*	TC ppb 1000/.	TC-99 pCi/L 15/900r
2-W15-16	07OCT88	1	19,400	18,900	*0.1540	98	98	14,400	22,900	*2.35
	07OCT88			17,500		89		14,500		
2-W15-16	06OCT88		46,900	42,000	*-0.0548	241	279	64,500	33,500	18.70
2-W15-17	05OCT88		18,500	17,600	*-0.1850	208	222	33,600	27,200	17.00
2-W15-18	08OCT88		29,700	26,300	*-0.0050	153	163	22,600	23,400	10.80
2-W18-21	05OCT88		21,100	18,200	*-0.3530	82	100	16,200	21,800	*1.92
2-W18-22	05OCT88		18,000	15,700	*0.1450	177	191	20,100	28,800	*1.39
2-W18-23	08OCT88		15,900	14,000	*0.0288	103	123	16,800	23,100	*4.18
2-W18-24	07OCT88		19,800	18,900	*0.2890	118	118	21,800	21,400	*2.29
Well name	Collection Date	Duplicate sample number	TETRANE ppb 5/5	TRICENE ppb 5/5	TRITIUM pCi/L 500/20000	U-CHEM ug/L 0.725/.	FVANADI ppb 5/.	VANADIUM ppb 5/.	ZINC ppb 5/5000*	FZINC ppb 5/5000*
2-W15-16	07OCT88	1	440	<5	680.00	4.750	29	28	52	34
	07OCT88		430	<5		4.620	26			29
2-W15-16	06OCT88		8100	6	*-13.50	2.650	25	31	30	8
2-W15-17	05OCT88		<5	<5	*-138.00	0.783	33	29	93	32
2-W15-18	08OCT88		2600	3	472.00	0.749	27	31	108	63
2-W18-21	05OCT88		130	<5	*360.00	31.900	30	35	107	50
2-W18-22	05OCT88		<5	<5	*9.34	0.544	26	27	137	99
2-W18-23	08OCT88		640	<5	*16.60	1.180	27	31	55	34
2-W18-24	07OCT88		1400	<5	*51.90	1.280	33	30	29	24

TABLE 4.11. (contd)

RCRA Ground-Water Monitoring Project
200 Area Low Level Burial Grounds, Waste Management Area 4
Interim Status Detection Level Program
TABLE WMA4.1 Constituents with at least one detected value for October, 1988

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 62 FR 26690
- 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 60 FR 46936
- s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143
(July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-64, 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 4.12. Wells and Constituents Exceeding Standards
at Waste Management Area 4**

<u>Well Number</u>	<u>Alpha^(a)</u>	<u>Chromium^(a)</u>	<u>Coliform^(a)</u>	<u>Nitrate^(a)</u>	<u>Carbon Tetra- chloride^(b)</u>	<u>Trichloro- ethylene^(b)</u>
Shallow Wells						
299-W15-15		X	X		X	
299-W15-16		X		X	X	X
299-W15-18		X		X	X	
299-W18-21	X	X			X	
299-W18-23		X			X	
299-W18-24					X	
Deep Wells						
299-W15-17						

(a) Exceeds the standards listed in 40 CFR 265, Appendix III.

(b) Exceeds the standards listed in 40 CFR 141.

TABLE 4.13. Sampling Schedule for the 200 Area Low-Level Burial Grounds

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

L Long list (WAC 173-303-9905)
 R Quality control replicates
 V Volatile organic analyses blanks
 X Regular sample list

Sampling schedule for the 500 Area low-level burial grounds

Well	0.1 day	1 day	5 days	10 days	15 days	20 days	25 days	30 days	35 days	40 days	45 days	50 days	55 days	60 days	65 days	70 days	75 days	80 days	85 days	90 days	95 days	100 days
200-227-0																						
200-227-8																						
200-227-10																						
200-228-10																						
200-228-12																						
200-227-14																						
200-227-16																						
200-227-18																						
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200-227-86																						
200-227-88																						
200-227-90																						
200-227-92																						
200-227-94																						
200-227-96																						
200-227-98																						
200-227-100																						

1. Low level (MAC 100-1000)
 2. Quality control (MAC 100-1000)
 3. Waste site organic residues (MAC 100-1000)
 4. Regular sample (MAC 100-1000)

5.0 NONRADIOACTIVE DANGEROUS WASTE LANDFILL

R. M. Fruland

The RCRA interim-status indicator parameter ground-water monitoring program at the Nonradioactive Dangerous Waste Landfill (NRDW) is based on the ground-water monitoring plan.^(a) The NRDW interim characterization report (Weekes, Luttrell, and Fuchs 1987) describes the site hydrogeology and the monitoring network, which includes three upgradient wells and four down-gradient wells. The first year's sampling and analysis to obtain background data on the quality of the ground water was completed in 1988, and implementation of the indicator evaluation program is under way. Thus far, no significant impact to the ground water from NRDW operations has been detected.

Ground-water samples were collected quarterly for the first 2 years. Beginning in 1989, and continuing unless an impact to the ground water is detected, indicator parameters will be sampled for semiannually, and a comprehensive suite of constituents (based on WAC 173-303-9905) will be sampled for annually. This section includes results from the ninth round of ground-water sampling and analysis for the five shallow wells completed in the top of the unconfined aquifer, and the eighth sampling for the two deep monitoring wells completed just above the first confining layer.

The data presented here have been statistically analyzed using the first year's data from the upgradient wells in accordance with 40 CFR 265.93(b) to determine if contamination indicators in upgradient and downgradient wells have changed significantly from background conditions. The NRDW is next to the Solid Waste Landfill (SWL). The proximity of these two facilities warrants inclusion of data from both facilities in NRDW discussions. The locations of the wells monitoring both the NRDW and SWL are shown in Figure 5.1.

(a) The ground-water monitoring plan was prepared by Westinghouse Hanford Company and provided to DOE for transmittal to the Washington State Department of Ecology in 1986.

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

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No additional drilling is planned at the NRDW. Monthly water-level measurements were taken from April through September 1988 to augment the water-level measurements collected before sample collection. Because of the very low (0.0001) gradient in the immediate vicinity of the landfills, the monthly water-level measurements included nearby Hanford Site wells, in an effort to more accurately determine the ground-water flow direction.

Hydrogeologic Characterization

Water levels were measured monthly in all six SWL wells, four shallow NRDW wells, and six nearby Hanford Site wells from April through September 1988. These data, which are still being evaluated, show an extremely flat gradient in the vicinity of the NRDW and SWL and continue to support the previously determined general ground-water flow direction of northwest to southeast. There are apparently minor inconsistencies in some of the casing elevations from which water levels are calculated; however, these small inconsistencies in such a low-gradient situation cause problems in interpreting the data. In particular, the casing elevations of the older wells may not be as accurate or precise as those of the newer SWL and NRDW wells. The six sets of water-level data are being evaluated to determine if the older Hanford wells (and possibly the newer wells) need to be resurveyed to interpret the ground-water flow direction. The water-level data will be reported as soon as the new survey data are available.

GROUND-WATER SAMPLING AND ANALYSIS

The seven ground-water monitoring wells at the NRDW were sampled on either October 19 or 21, 1988. Field measurements, including water-table elevation, conductivity, and pH, were made immediately before sample collection. Samples were collected for laboratory conductivity, laboratory pH, total organic carbon (TOC), and total organic halogens (TOX). A "lower" detection limit of 20 ppb is reported for TOX, and therefore the heading "TOXLDL" is used in the data tables discussed below.

Collection and Analysis

The field and laboratory measurements for pH and conductivity, along with TOC and TOXLDL, were collected in quadruplicate, and together they are referred to as the "contamination indicator parameters" [40 CFR 265.92(b)(3)].

Discussion of Results

Table 5.1 presents the data for the quadruplicate contamination indicator parameters. The data for the downgradient wells are given first; these wells include two shallow and one deep monitoring wells. Data from the four upgradient wells are listed next; these include three shallow and one deep monitoring wells.

Table 5.2 presents the statistical summaries of the indicator parameter data to be compared against the critical background means established during the first year of data collection (PNL 1988a). The statistical evaluation based on the NRDW ground-water monitoring program results at this time indicates that there is no significant impact to the ground water from NRDW operations.

Table 5.3 shows the sampling schedule for the NRDW wells.

TABLE 5.1. Results of Analysis of Quadruplicate Samples for Contamination Indicator Parameters for the Nonradioactive Dangerous Waste Landfill, October 1988

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho .7/700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 1000/.	TOXLDL ppb 20/.
6-25-33A	21OCT88		283	354	8.2	8.4	#200	#3
		1	282	363	8.2	8.4	#300	#10
		2	281	380	8.2	8.4	#300	#-2
		3	283	364	8.2	8.4	#300	#0
6-25-34A	19OCT88		280	428	7.7	8.0	#500	#7
		1	280	430	7.7	8.0	#500	#4
		2	280	431	7.7	8.0	#400	#7
		3	280	423	7.7	8.0	#400	#4
6-25-34B	19OCT88		290	415	7.8	7.8	#300	#6
		1	290	419	7.7	7.8	#400	#6
		2	290	423	7.8	7.8	#500	#5
		3	290	418	7.8	7.8	#400	#1
6-26-33	21OCT88		326	392	8.0	8.0	#400	#5
		1	327	391	8.0	8.1	#400	#8
		2	328	395	8.0	8.0	#400	#8
		3	327	394	8.0	8.1	#400	#12
6-26-34	19OCT88		250	374	7.8	8.1	#300	#6
		1	250	380	7.7	8.1	#300	#4
		2	250	383	7.8	8.1	#300	#0
		3	250	378	7.8	8.1	#400	#4
6-26-35A	19OCT88		280	418	7.8	8.0	#300	#3
		1	280	420	7.8	8.0	#400	#3
		2	280	415	7.8	8.1	#300	#7
		3	280	411	7.8	8.1	#300	#4
6-26-35C	19OCT88		270	418	7.9	8.3	#400	#2
		1	270	424	7.9	8.3	#300	#4
		2	270	423	7.9	8.3	#300	#4
		3	270	421	7.9	8.3	#300	#8

The column headers consist of : Constituent Name

Analysis Units

Contractual Detection Limit/Drinking Water Standard(suffix)

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987) National Primary Drinking Water Regulations as amended by 52 FR 25690
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-570/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 48938
- s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

Data flags

- < - Less than Contractual Detection Limit, reported as Limit
- # - Less than Contractual Detection Limit, measured value reported

TABLE 5.2. Replicate Averages for the Indicator Parameters for the Nonradioactive Dangerous Waste Landfill, October 1988

Constituent Code Name Units	Well Name	Sample Date	Reps	Replicate Average	Standard Deviation	Minimum	Maximum	Coefficient of Variation
088 CONDLAB umho	8-25-33A	21OCT88	4	360	4.60	354	364	1.2
	8-25-34A	19OCT88	4	428	3.56	423	431	0.8
	8-25-34B	19OCT88	4	419	3.30	415	423	0.8
	8-28-33	21OCT88	4	393	1.83	391	395	0.6
	8-28-34	19OCT88	4	379	3.77	374	383	1.0
	8-28-35A	19OCT88	4	416	3.92	411	420	0.9
	8-28-35C	19OCT88	4	422	2.65	418	424	0.8
191 CONDFLD umho	8-25-33A	21OCT88	4	282	0.96	281	283	0.3
	8-25-34A	19OCT88	4	280	0	280	280	0.0
	8-25-34B	19OCT88	4	290	0	290	290	0.0
	8-28-33	21OCT88	4	327	0.82	328	328	0.2
	8-28-34	19OCT88	4	250	0	250	250	0.0
	8-28-35A	19OCT88	4	280	0	280	280	0.0
	8-28-35C	19OCT88	4	270	0	270	270	0.0
199 PHFIELD	8-25-33A	21OCT88	4	8.40	0	8.4	8.4	0.0
	8-25-34A	19OCT88	4	8.00	0	8.0	8.0	0.0
	8-25-34B	19OCT88	4	7.80	0	7.8	7.8	0.0
	8-28-33	21OCT88	4	8.05	0.06	8.0	8.1	0.7
	8-28-34	19OCT88	4	8.10	0	8.1	8.1	0.0
	8-28-35A	19OCT88	4	8.05	0.06	8.0	8.1	0.7
	8-28-35C	19OCT88	4	8.30	0	8.3	8.3	0.0
207 PH-LAB	8-25-33A	21OCT88	4	8.20	0	8.2	8.2	0.0
	8-25-34A	19OCT88	4	7.70	0	7.7	7.7	0.0
	8-25-34B	19OCT88	4	7.77	0.05	7.7	7.8	0.6
	8-28-33	21OCT88	4	8.00	0	8.0	8.0	0.0
	8-28-34	19OCT88	4	7.77	0.05	7.7	7.8	0.6
	8-28-35A	19OCT88	4	7.80	0	7.8	7.8	0.0
	8-28-35C	19OCT88	4	7.90	0	7.9	7.9	0.0
C69 TOC ppb	8-25-33A	21OCT88	4	275	50.0	200	300	18.2
	8-25-34A	19OCT88	4	450	57.7	400	500	12.8
	8-25-34B	19OCT88	4	400	81.6	300	500	20.4
	8-28-33	21OCT88	4	400	0	400	400	0.0
	8-28-34	19OCT88	4	325	50.0	300	400	15.4
	8-28-35A	19OCT88	4	325	50.0	300	400	15.4
	8-28-35C	19OCT88	4	325	50.0	300	400	15.4
H42 TOXLDL ppb	8-25-33A	21OCT88	4	2.75	5.25	-2	10	191.0
	8-25-34A	19OCT88	4	5.50	1.73	4	7	31.5
	8-25-34B	19OCT88	4	4.50	2.38	1	6	52.9
	8-28-33	21OCT88	4	8.25	2.87	5	12	34.8
	8-28-34	19OCT88	4	3.50	2.52	0	6	71.9
	8-28-35A	19OCT88	4	4.25	1.89	3	7	44.5
	8-28-35C	19OCT88	4	4.00	1.63	2	6	40.8

TABLE 5.3. Sampling Schedule for the Nonradioactive Dangerous Waste Landfill

<u>Well</u>	<u>1988</u>			<u>1989</u>								
	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>
699-25-33A	X			X						L		
699-25-34A	X			X						L		
699-25-34B	X			X						L		
699-26-33	X			X						L		
699-26-34	X			X						L		
699-26-35A	X			X						L		
699-26-35C	X			X						L		

L Long list (WAC 173-303-9905)
X Regular sample list

TABLE 2.3. Sampling schedule for the North Atlantic Ocean

Well	Dec	Nov	Oct	Sept	Aug	July	June	May	April	March	Feb	Jan
600-25-25A	X											
600-25-25B	X											
600-25-25C	X											
600-25-25D	X											
600-25-25E	X											
600-25-25F	X											
600-25-25G	X											
600-25-25H	X											
600-25-25I	X											

Long term (1975-1985) Regular sample 1.2

6.0 1301-N LIQUID WASTE DISPOSAL FACILITY

T. J. Gilmore

Progress on the RCRA interim-status background ground-water monitoring program at the 1301-N Liquid Waste Disposal Facility (LWDF) from October 1 to December 31, 1988, is discussed below. The ground-water monitoring activities are based on RCRA requirements as described in 40 CFR 265.91. This first year of the program will establish the background ground-water quality by quarterly sampling. Previously issued reports have reported progress in the first, second, and third quarters of 1988 (PNL 1988c,d; Fruland, Bates, and Lundgren 1989).

The 1301-N LWDF was used to dispose of waste streams that were generated in the N Reactor and related facilities from the start up of the N Reactor in 1963 until September 1985. The facility is located approximately 200 ft east of the Columbia River. It consists of a 52- by 12-ft concrete trough connected to a 125- by 250-ft rectangular basin. The basin bottom is covered with a 3-ft-thick layer of large stones. Adjacent to the basin is an excavated ditch 1600 ft long, 50 ft wide, and 12 ft deep, which extends to the north in a zigzag pattern and is intended to handle the overflow from the basin (Figure 6.1).

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or characterization work was performed during the period of this report. Ground-water samples were collected from six out of seven wells in the monitoring network around the 1301-N facility this quarter. One well (199-N-49) could not be sampled because of low water levels. A change in the monitoring network was required to compensate for a declining water table in the 100-N Area. Water-level measurements were obtained monthly, and the associated water-table maps were constructed.

Water-level measurements are taken in most of the existing 100-N Area wells (Figure 6.2) to monitor the water table near the 1301-N LWDF. Monthly water-level measurements continued this quarter, with measurements obtained from 33 wells in October, 41 wells in November, and 43 wells in December.

FIGURE 6.1. Monitoring Well Locations for the 1301-N Liquid Waste Disposal Facility as of October 1988. (Well 199-N-66 replaced well 199-N-49 in September 1988.)

FIGURE 6.2. Monitoring Well Locations in the 100-N Area

The number of wells in which water levels are obtained each month is dependent on the accessibility and condition of each well. Water-table maps for each month are shown in Figures 6.3, 6.4 and 6.5. The water-table elevations are presented in Table 6.1.

GROUND-WATER SAMPLING AND ANALYSIS

The 1301-N and nearby 1325-N facilities are not currently receiving a substantial amount of liquid wastes because the N Reactor has been placed on cold standby. This decrease in artificial recharge to the ground water has resulted in a decline in the water table in the 100-N Area. With a lower water table, the reliability of several of the sampling wells in the 1301-N monitoring network has been compromised. Until October 1988, the RCRA ground-water monitoring network included five wells (see Table 6.2). In September, two of these wells were not sampled because of low water levels, wells 199-N-3 and 199-N-49. Well 199-N-49 cannot be easily modified (it would need to be deepened) and therefore will be replaced with well 199-N-66 during the first sampling in 1989. Well 199-N-3 can be remediated for future sampling.

The ground-water elevation changes caused by the decline in artificial recharge appear to have stabilized, and the water table is not expected to drop significantly in the next year around the 1301-N facility as long as the N Reactor operating status does not change. Therefore, to provide adequate coverage at this time, two new wells, 199-N-67 and 199-N-69, were added to the network beginning in December 1988. During this quarter of sampling, six wells were sampled for the 1301-N facility (199-N-2, 199-N-3, 199-N-4, 199-N-14, 199-N-67, and 199-N-69).

Collection and Analysis

In the fourth quarter, six wells (199-N-2, 199-N-3, 199-N-4, 199-N-14, 199-N-67, and 199-N-69) were sampled for radiological and hazardous constituents at the 1301-N LWDF. Two wells constructed in 1988, 199-N-67 and 199-N-69, were added this quarter to the network for sampling. Well 199-N-49, which was in the original monitoring network and is to be replaced

FIGURE 6.3. Computer-Generated Water-Table Map of the 100-N Area, October 1988. Contour intervals are 1 ft. (The vertical and horizontal axes are 100-N Area coordinates, in ft.)

FIGURE 6.4. Computer-Generated Water-Table Map of 100-N Area, November 1988. Contour intervals are 1 ft. (The vertical and horizontal axes are 100-N Area coordinates, in ft.)

FIGURE 6.5. Computer-Generated Water-Table Map of 100-N Area, December 1988. Contour intervals are 1 ft. (Vertical and horizontal axes are 100-N Area coordinates, in ft.)

TABLE 6.1. Water-Level Data for Wells in the 100-N Area,
October Through December 1988

<u>Well Number</u>	<u>Date</u>	<u>Elevation, ft above MSL</u>
199-N-2	10/28/88	388.66
199-N-2	11/30/88	389.12
199-N-2	12/29/88	390.13
199-N-3	10/28/88	387.60
199-N-3	11/30/88	388.16
199-N-3	12/29/88	389.44
199-N-4	10/28/88	391.41
199-N-4	11/30/88	391.77
199-N-4	12/29/88	392.73
199-N-6	10/28/88	393.65
199-N-6	11/30/88	393.93
199-N-6	12/29/88	394.64
199-N-14	10/28/88	385.71
199-N-14	11/30/88	386.38
199-N-14	12/29/88	387.55
199-N-15	10/28/88	391.97
199-N-15	11/30/88	392.08
199-N-15	12/29/88	392.95
199-N-17	11/30/88	388.12
199-N-17	12/29/88	389.42
199-N-18	12/29/88	388.14
199-N-19	10/28/88	386.38
199-N-19	11/30/88	387.13
199-N-19	12/29/88	388.53
199-N-20	11/30/88	387.95
199-N-20	12/29/88	389.31
199-N-27	10/28/88	393.25
199-N-27	11/30/88	393.64
199-N-27	12/29/88	394.11
199-N-28	10/28/88	394.13
199-N-28	11/30/88	394.44
199-N-28	12/29/88	394.96
199-N-29	10/28/88	394.15
199-N-29	11/30/88	394.97
199-N-29	12/29/88	395.12
199-N-30	10/28/88	393.49
199-N-30	12/29/88	394.48
199-N-31	10/28/88	393.08
199-N-31	11/30/88	393.69
199-N-31	12/29/88	396.48
199-N-32	10/28/88	393.13
199-N-32	11/30/88	393.82
199-N-32	12/29/88	394.18
199-N-33	10/28/88	392.66
199-N-33	11/30/88	393.02
199-N-34	10/28/88	393.28

TABLE 6.1. (contd)

<u>Well Number</u>	<u>Date</u>	<u>Elevation, ft above MSL</u>
199-N-34	11/30/88	393.61
199-N-34	12/29/88	394.25
199-N-36	10/28/88	392.58
199-N-36	11/30/88	392.97
199-N-36	12/29/88	393.59
199-N-37	10/28/88	392.08
199-N-37	11/30/88	392.25
199-N-37	12/29/88	393.09
199-N-39	10/28/88	391.02
199-N-39	11/30/88	391.17
199-N-39	12/29/88	392.13
199-N-40	10/28/88	389.90
199-N-40	11/30/88	390.04
199-N-40	12/29/88	390.99
199-N-41	10/28/88	387.44
199-N-41	11/30/88	387.68
199-N-41	12/29/88	388.65
199-N-42	10/28/88	388.18
199-N-42	11/30/88	388.38
199-N-42	12/29/88	389.27
199-N-44	10/28/88	391.43
199-N-44	11/30/88	391.46
199-N-44	12/29/88	392.30
199-N-49	10/28/88	388.18
199-N-49	11/30/88	388.47
199-N-49	12/29/88	389.44
199-N-50	10/28/88	384.65
199-N-50	11/30/88	385.24
199-N-50	12/29/88	386.28
199-N-51	10/28/88	384.15
199-N-51	11/30/88	385.10
199-N-51	12/29/88	386.37
199-N-52	10/28/88	393.15
199-N-52	11/30/88	392.88
199-N-52	12/29/88	393.66
199-N-53	10/28/88	389.84
199-N-53	11/30/88	390.20
199-N-53	12/29/88	391.50
199-N-54	11/30/88	390.65
199-N-54	12/29/88	391.81
199-N-55	11/30/88	390.64
199-N-55	12/29/88	391.80
199-N-56	11/30/88	389.59
199-N-56	12/29/88	390.74
199-N-57	11/30/88	391.82
199-N-57	12/29/88	392.76
199-N-58	11/30/88	394.21

TABLE 6.1. (contd)

<u>Well Number</u>	<u>Date</u>	<u>Elevation, ft. above MSL</u>
199-N-58	12/29/88	397.86
199-N-59	11/30/88	394.35
199-N-59	12/29/88	398.09
199-N-60	11/30/88	394.47
199-N-60	12/29/88	398.34
199-N-61	11/30/88	399.27
199-N-61	12/29/88	405.10
199-N-62	10/28/88	393.70
199-N-62	11/30/88	393.81
199-N-62	12/29/88	394.52
199-N-63	10/28/88	393.08
199-N-63	11/30/88	393.17
199-N-63	12/29/88	393.88
199-N-64	10/28/88	392.30
199-N-64	11/30/88	392.43
199-N-64	12/29/88	393.25
199-N-65	10/28/88	391.95
199-N-65	11/30/88	392.10
199-N-65	12/29/88	392.98
199-N-66	10/28/88	392.35
199-N-66	11/30/88	392.53
199-N-66	12/29/88	393.44
199-N-85	10/28/88	383.64
199-N-85	12/29/88	386.88

by well 199-N-66, cannot be sampled because of low water levels. Well 199-N-49 has been eliminated from the network and replaced with well 199-N-66.

The sampling schedule for the wells is listed in Table 6.2. An "X" under an individual month indicates that the well was sampled during that month. Each sample was analyzed for constituents listed in 40 CFR 265, Appendix III, and specific dangerous waste constituents known to have been discharged to the facility. The radionuclides tritium, strontium-90, natural uranium, cobalt-60, cesium-137, and ruthenium-106 were added to the list of analyses during the June 1988 sampling and were continued for the September and December samplings. However, in well 199-N-14 the radionuclides tritium, strontium-90, natural uranium, cobalt-60, cesium-137, and ruthenium-106 were inadvertently not included in the September 1988 sample. Phenols, ammonia, and hydrazine were also added beginning with the June 1988 sampling. These

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

<u>Well Number</u>	<u>1987 Dec</u>	<u>1988 Mar</u>	<u>Jun</u>	<u>Sep</u>	<u>Dec</u>	<u>Projected 1989 Mar</u>
199-N-2	X	X	X	X	X	XL (a)
199-N-3	X	X	X	(b)	X	XL
199-N-4	X	X	X	X	X	XL
199-N-14	X	X	X	X	X	XL
199-N-49	X	X	X	(c)	(c)	(c)
199-N-66						XL (d)
199-N-67					X	XL
199-N-69					X	XL

(a) XL = sampled and analyzed for the "long list" of constituents (WAC 173-303-9905).

(b) Well not sampled as a result of low water table.

(c) Well deleted from schedule as a result of falling water table.

(d) Well added to schedule to replace well 199-N-49.

radioactive and hazardous constituents may have been discharged to the facility in the past. An analytical method providing a lower detection limit for total organic halogens (TOX) was also used beginning in June 1988 and continued in the September and December 1988 samplings.

Discussion of Results

The analytical results from the sampling conducted in September were received this quarter and are presented in Tables 6.3, 6.4, and 6.5. Three wells were sampled in September. In the two wells that had the beta analysis run, both 199-N-2 and 199-N-4 showed beta concentrations above the standard in 40 CFR 265, Appendix III, and 40 CFR 141 (Table 6.2). The highest activity was found in well 199-N-2 at 3750 pCi/L, 75 times the screening level of 50 pCi/L. Strontium-90 levels exceeded the 40 CFR 141 standards in both wells (199-N-2 and 199-N-4). Coliform was detected in well 199-N-2. Tritium also exceeded the 40 CFR 141 standards in wells 199-N-2 and 199-N-4.

TABLE 6.3. Constituent List and Summary of Sampling Results for the 1301-N Liquid Waste Disposal Facility, September 1988

----- Constituent List=Contamination Indicator Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency	Exceeded	Full name
191	CONDFLD	umho	1	12	0	700	WDOE		Specific conductance, field
199	PHFIELD		0.1	12	0	6.5-8.5	EPAS	xxx	pH, field
C69	TOC	ppb	1000	12	0	.			Total organic carbon
H42	TOXLDL	ppb	20	12	0	.			Total organic halogens, low DL
----- Constituent List=Drinking Water Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency	Exceeded	Full name
109	COLIFRM	MPN	2.2	3	2	1	EPA	xxx	Coliform bacteria
111	BETA	pCi/L	8	2	0	50	EPA	xxx	Gross beta
121	SR-90	pCi/L	5	2	0	8	EPA	xxx	Strontium-90
181	RADIUM	pCi/L	1	3	0	5	EPA		Total radium
212	ALPHA	pCi/L	4	3	0	15	EPA		Gross alpha
A06	BARIUM	ppb	8	3	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	3	3 ***	10	EPA		Cadmium
A08	CHROMIUM	ppb	10	3	3 ***	50	EPA		Chromium
A10	SILVER	ppb	10	3	3 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	3	3 ***	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	3	3 ***	2	EPA		Mercury
A22	SELENIUM	ppb	5	3	3 ***	10	EPA		Selenium
A33	ENDRIN	ppb	0.1	3	3 ***	0.2	EPA		Endrin
A34	METHLOR	ppb	3	3	3 ***	100	EPA		Methoxychlor
A35	TOXAENE	ppb	1	3	3 ***	5	EPA		Toxaphene
A36	a-BHC	ppb	0.1	3	3 ***	4	EPA		Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	3	3 ***	4	EPA		Lindane, beta-BHC
A38	g-BHC	ppb	0.1	3	3 ***	4	EPA		Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	3	3 ***	4	EPA		Lindane, 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 [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	3	3 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	ppb	8	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	3 ***	50	EPA		Arsenic, filtered
H38	FMERCUR	ppb	0.1	3	3 ***	2	EPA		Mercury, filtered
H39	FSELENI	ppb	5	3	3 ***	10	EPA		Selenium, filtered
H41	FLEAD	ppb	5	3	3 ***	50	EPA		Lead, filtered

TABLE 6.3. (contd)

----- Constituent List=Water Quality Parameters -----								
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name
A11	SODIUM	ppb	200	3	0	.		Sodium
A17	MANGENESE	ppb	5	3	1	50	EPAS	Manganese
A19	IRON	ppb	30	3	1	300	EPAS	Iron
C78	SULFATE	ppb	500	3	0	250000	EPAS	Sulfate
C76	CHLORID	ppb	500	3	0	250000	EPAS	Chloride
H24	FSODIUM	ppb	200	3	0	.		Sodium, filtered
H29	FMANGAN	ppb	5	3	2	50	EPAS	Manganese, filtered
H31	FIRON	ppb	30	3	2	300	EPAS	Iron, filtered
H67	LPHENOL	ppb	10	3	3	.		Phenol, low DL
----- Constituent List=Site Specific and Other Parameters -----								
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name
010	CO-60	pCi/L	22.5	2	0	100	EPAR	Cobalt-60
024	CS-137	pCi/L	20	2	0	200	EPAR	Cesium-137
034	RU-106	pCi/L	172.5	2	0	30	EPAR	Ruthenium-106
108	TRITIUM	pCi/L	500	2	0	20000	EPA	Tritium (H-3)
124	U-CHEM	ug/L	0.725	2	0	.		Uranium, chemical
A04	ZINC	ppb	5	3	0	5000	EPAS	Zinc
A05	CALCIUM	ppb	50	3	0	.		Calcium
A12	NICKEL	ppb	10	3	3	.		Nickel
A13	COPPER	ppb	10	3	3	1300	EPAP	Copper
A14	VANADIUM	ppb	5	3	1	.		Vanadium
A16	ALUMINUM	ppb	150	3	2	.		Aluminum
A18	POTASSIUM	ppb	100	3	0	.		Potassium
A50	MAGNESIUM	ppb	50	3	0	.		Magnesium
A61	TETRANE	ppb	5	3	3	5	EPA	Tetrachloromethane [Carbon Tetrachloride]
A64	METHONE	ppb	10	3	3	.		Methyl ethyl ketone
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 [1,1,2-Trichloroethene]
A70	PERCENE	ppb	5	3	3	.		Perchloroethylene [Tetrachloroethene]
A71	OPXYLE	ppb	5	3	3	440	EPAP	Xylene-o,p
A80	CHLFORM	ppb	5	3	2	100	EPA	Chloroform [Trichloromethane]
A93	METHYCH	ppb	10	3	3	.		Methylene chloride
B14	M-XYLE	ppb	5	3	3	440	EPAP	Xylene-m
C76	PHOSPHA	ppb	1000	3	3	.		Phosphate
C80	AMMONIU	ppb	50	3	3	.		Ammonium ion
H18	FZINC	ppb	5	3	3	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	1	.		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
H62	LHYDRAZ	ppb	30	3	3	.		Hydrazine, low DL
H66	HEXONE	ppb	10	3	3	.		Hexone

TABLE 6.3. (contd)

*** - Indicates all samples were reported as below contractual detection limits
xxx - Indicates that Drinking Water Standards were exceeded
EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25890
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 60 FR 46986
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143
National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-54, Public Water Supplies

TABLE 6.4. Constituents with at Least One Detected Value for the 1301-N Liquid Waste Disposal Facility, September 1988

Well name	Collection Date	Duplicate sample number	ALPHA pCi/L 4/15	ALUMNUM ppb 150/.	BARIUM ppb 8/1000	FBARIUM ppb 8/1000	BETA pCi/L 8/50	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLFORM ppb 5/100
1-N-2	16SEP88		*0.338	202	26	24	3,750.0	31,700	29,300	#3
1-N-4	16SEP88		*0.322	<150	36	28	97.8	36,200	37,700	<5
1-N-14	16SEP88		*0.415	<150	24	21	.	34,100	33,100	<5

Well name	Collection Date	Duplicate sample number	CHLORID ppb 500/250000s	CO-60 pCi/L 22.5/100r	COLIFRM MPN 2.2/1	CS-137 pCi/L 20/200r	IRON ppb 30/300s	FIRON ppb 30/300s	MAGNES ppb 50/.	FMAGNES ppb 50/.
1-N-2	16SEP88		928	37.2	<2.2	*4.460	315	<30	5,180	5,230
1-N-4	16SEP88		1,770	48.4	<2.2	*-0.912	703	48	8,480	5,840
1-N-14	16SEP88		797	.	9.2	.	<30	<30	3,630	3,550

Well name	Collection Date	Duplicate sample number	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	RU-108 pCi/L 172.5/30r	SODIUM ppb 200/.
1-N-2	16SEP88		<5	8	31,900	1,870	1,990	0.1730	*28.70	3,090
1-N-4	16SEP88		10	26	26,700	3,290	3,590	*0.0331	*-2.67	5,370
1-N-14	16SEP88		<5	<5	33,600	2,160	2,180	*-0.0220	.	3,690

Well name	Collection Date	Duplicate sample number	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	SULFATE ppb 500/250000s	TRITIUM pCi/L 500/20000	U-CHEM ug/L 0.725/.	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s
1-N-2	16SEP88		2,970	1,340.0	10,600	86,200	0.311	<5	<5	14
1-N-4	16SEP88		4,760	15.1	28,100	73,400	0.444	13	14	33
1-N-14	16SEP88		3,670	.	9,940	.	.	9	11	6

TABLE 6.5. Results of Quadruplicate Contamination Indicator Parameter Analyses for the 1301-N Liquid Waste Disposal Facility, September 1988

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	PHFIELD 0.1/8.5s	TOC ppb 1000/.	TOXLDL ppb 20/.
1-N-2	16SEP88		189	7.9	#400	#2
		1	188	7.8	#400	#7
		2	188	7.9	#300	20
		3	188	7.8	#300	#1
1-N-4	16SEP88		298	7.9	#600	#7
		1	297	7.9	#500	#3
		2	298	7.8	#500	#5
		3	298	7.9	#600	#6
1-N-14	16SEP88		160	9.5	#300	#4
		1	159	9.4	#300	#7
		2	157	9.4	#400	#5
		3	157	9.4	#400	#7

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987) National Primary Drinking Water Regulations as amended by 62 FR 25890
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-670/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 60 FR 48936
- s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in WAC 248-64, 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

Nitrate values continued for the second quarter to be below the U.S. Environmental Protection Agency (EPA) standards in all wells sampled. The high TOX values in the March sampling in well 199-N-3 could not be verified because the water level in the well was too low for sampling in September.

7.0 1324-N/NA SURFACE IMPOUNDMENT AND PERCOLATION PONDS

T. J. Gilmore

Progress on the RCRA interim-status background ground-water monitoring program at the 1324-N/NA Surface Impoundment and Percolation Ponds for the period from October 1 to December 31, 1988, is discussed below. The ground-water monitoring activities at this site are based on RCRA requirements as described in 40 CFR 265.91. Previously issued reports have reported progress in the first, second, and third quarters of 1988 (PNL 1988c,d; Fruland, Bates, and Lundgren 1989).

The 1324-NA percolation pond is an unlined pond that was used to treat corrosive hazardous wastes from August 1977 to May 1986. In May 1986, the 1324-N surface impoundment was put into service to treat the corrosive wastes. This facility is a double-lined pond with a leachate collection system used to neutralize the wastes before discharge into the 1324-NA percolation pond (Figure 7.1).

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

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or characterization work was performed during this reporting period. An additional existing upgradient well outside the influence of a ground-water mound under the facility was added to the monitoring network. Water-level measurements were obtained on a monthly basis, and associated water-table maps were constructed.

Water-level measurements are taken in most of the usable 100-N Area existing wells to characterize the ground-water system near the 1324N/NA

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

facilities. Monthly water-level measurements continued this quarter, with measurements obtained from 33 wells in October, 41 wells in November, and 43 wells in December (Table 6.1). The number of wells in which water levels are obtained each month is dependent on the accessibility and condition of each well. Water-table maps for each month are shown in Figures 6.3, 6.4 and 6.5. The water-level elevations show a significant ground-water mound under the 1324-N/NA facilities.

GROUND-WATER SAMPLING AND ANALYSIS

Five ground-water wells (199-N-58, 199-N-59, 199-N-60, 199-N-61, and 699-81-58) are currently sampled for radiological and hazardous constituents. Originally, well 199-N-61 was designated as the upgradient well with wells 199-N-58, 199-N-59, and 199-N-60 sampled as downgradient wells; however, all four wells are affected by the ground-water mound under the facility. Well 699-81-58 will be added as the upgradient well in future samplings on this monitoring program (Figure 7.1). Existing wells in the 100-N Area are shown in Figure 6.2.

Collection and Analysis

The ground water around the 1324-N/NA facilities was sampled and analyzed monthly for 3 months starting in December 1987 and sampled quarterly thereafter. The four wells used in the monitoring network were drilled in 1987. No new wells have been drilled at the site. Table 7.1 shows the sample collection schedule for 1988. An "X" under an individual month indicates that the sample was collected during that month. Each sample was analyzed for the interim primary drinking water standards given in Appendix III of 40 CFR 265, water quality parameters and contamination indicators (40 CFR 265.92), and specific dangerous waste constituents known to have been discharged to the facility. The radionuclides tritium, strontium-90, natural uranium, cobalt-60, cesium-137, and ruthenium-106 were added to the list of analyses for the June 1988 sampling. Phenols, ammonia, and hydrazine were also added at this time. These radioactive and hazardous constituents have not been discharged to the 1324-N/NA facilities, but may have been discharged to other facilities in the vicinity.

TABLE 7.1. Sample Collection Schedule for the 1324-N/NA Facilities

<u>Well Number</u>	<u>1987 Dec</u>	<u>Jan</u>	<u>Feb</u>	<u>1988 Mar</u>	<u>Jun(a)</u>	<u>Sep</u>	<u>Projected 1989 Mar</u>
199-N-58	X	X	X	X	XL(b)	X	XL
199-N-59	X	X	X	X	XL	X	XL
199-N-60	X	X	X	X	XL	X	XL
199-N-61	X	X	X	X	XL	X	XL
699-81-58(c)					(d)	XL	XL

- (a) Samples collected in July because unscheduled sample collection at 1301-N and 1325-N facilities pre-empted it.
- (b) Sampled and analyzed for the "long list" of constituents (WAC 173-303-9905).
- (c) Data available for well 699-81-58 collected before this schedule will be used for statistical evaluations.
- (d) Included in the 1324-N/NA facilities monitoring network for the first time.

Discussion of Results

The analytical results from the sampling that was conducted in September were received this quarter and are presented in Tables 7.2 and 7.3. Four wells (199-N-58, 199-N-59, 199-N-60, and 199-N-61) were sampled in September on this project. Well 699-81-58 is sampled for the Hanford Site-wide Ground-Water Monitoring Project, and the results have been combined with the 1324-N/NA results and included in the tables.

Several ground-water constituents have stabilized in the past year of sampling. Aluminum, manganese, nickel, chromium, and zinc were initially above detection limits in December 1987, but are now below the detection limits and have been stable the last two quarterly samplings. The source of these constituents is most likely from well construction materials (see Section 1.0 Introduction). The construction of the wells included the use of stainless steel materials that would contain these metals.

No primary drinking water standards were exceeded. Sodium, which is a ground-water quality parameter (40 CFR 265.92), was exceptionally high in wells 199-N-58, 199-N-59, 199-N-60, and 199-N-61. Sodium concentrations in these wells ranged from 248,000 to 396,000 ppb. Another ground-water constituent that was notably high was sulfate, which ranged from 799,000 to 1,020,000 ppb in wells 199-N-58, 199-N-59, 199-N-60, and 199-N-61.

TABLE 7.2. Constituent List and Summary of Sampling Results for the 1324-N/NA Facilities, September 1988

----- Constituent List=Contamination Indicator Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency	Exceeded	Full name
088	CONDLAB	umho	.	16	0	700	WDOE	xxx	Specific conductance, laboratory
191	CONDFLD	umho	1	20	0	700	WDOE	xxx	Specific conductance, field
199	PHFIELD		0.1	20	0	6.5-8.5	EPAS		pH, field
207	PH-LAB		0.01	16	0	6.5-8.5	EPAS		pH, laboratory
C69	TOC	ppb	1000	20	0	.			Total organic carbon
H42	TOXLDL	ppb	20	20	2	.			Total organic halogens, low DL
----- Constituent List=Drinking Water Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency	Exceeded	Full name
109	COLIFRM	MPN	2.2	5	4	1	EPA		Coliform bacteria
111	BETA	pCi/L	8	5	0	50	EPA		Gross beta
181	RADIUM	pCi/L	1	5	0	5	EPA		Total radium
212	ALPHA	pCi/L	4	5	0	15	EPA		Gross alpha
A06	BARIUM	ppb	5	5	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	5	5 ***	10	EPA		Cadmium
A08	CHROMIUM	ppb	10	5	1	50	EPA		Chromium
A10	SILVER	ppb	10	5	5 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	5	5 ***	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	5	5 ***	2	EPA		Mercury
A22	SELENIUM	ppb	5	5	5 ***	10	EPA		Selenium
A33	ENDRIN	ppb	0.1	5	5 ***	0.2	EPA		Endrin
A34	METHLOR	ppb	3	5	5 ***	100	EPA		Methoxychlor
A35	TOXAENE	ppb	1	5	5 ***	5	EPA		Toxaphene
A36	a-BHC	ppb	0.1	5	5 ***	4	EPA		Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	5	5 ***	4	EPA		Lindane, beta-BHC
A38	g-BHC	ppb	0.1	5	5 ***	4	EPA		Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	5	5 ***	4	EPA		Lindane, delta-BHC
A51	LEADGF	ppb	5	5	5 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	ppb	500	9	0	45000	EPA		Nitrate
C74	FLUORID	ppb	500	9	3	4000	EPA		Fluoride
H13	2,4-D	ppb	2	5	5 ***	100	EPA		2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	5	5 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	ppb	5	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	5 ***	50	EPA		Arsenic, filtered
H38	FMERCUR	ppb	0.1	5	5 ***	2	EPA		Mercury, filtered
H39	FSELENI	ppb	5	5	5 ***	10	EPA		Selenium, filtered
H41	FLEAD	ppb	5	5	5 ***	50	EPA		Lead, filtered

TABLE 7.2. (contd)

----- Constituent List=Water Quality Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards 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
C67	PHENOL	ppb	10	1	1 ***	.			Phenol
C73	SULFATE	ppb	500	9	0	250000	EPAS	xxx	Sulfate
C75	CHLORID	ppb	500	9	0	250000	EPAS		Chloride
H24	FSODIUM	ppb	200	6	0	.			Sodium, filtered
H29	FMANGAN	ppb	5	6	4	50	EPAS		Manganese, filtered
H31	FIRON	ppb	30	6	3	300	EPAS		Iron, filtered
H67	LPHENOL	ppb	10	4	4 ***	.			Phenol, low DL

TABLE 7.2. (contd)

----- Constituent List=Site Specific and Other Parameters -----								
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name
010	CO-60	pCi/L	22.5	5	0	100	EPAR	Cobalt-60
024	CS-137	pCi/L	20	5	0	200	EPAR	Cesium-137
034	RU-106	pCi/L	172.5	5	0	30	EPAR	Ruthenium-106
108	TRITIUM	pCi/L	500	5	0	20000	EPA	Tritium (H-3)
121	SR-90	pCi/L	5	5	0	8	EPA	Strontium-90
124	U-CHEM	ug/L	0.725	8	0	.	.	Uranium, chemical
A01	BERYLUM	ppb	5	1	1 ***	.	.	Beryllium
A03	STRONTIUM	ppb	20	1	0	.	.	Strontium
A04	ZINC	ppb	5	5	1	5000	EPAS	Zinc
A06	CALCIUM	ppb	50	5	0	.	.	Calcium
A12	NICKEL	ppb	10	5	4	.	.	Nickel
A13	COPPER	ppb	10	5	5 ***	1300	EPAP	Copper
A14	VANADIUM	ppb	5	5	1	.	.	Vanadium
A16	ANTIMONY	ppb	100	1	1 ***	.	.	Antimony
A18	ALUMINUM	ppb	150	5	5 ***	.	.	Aluminum
A18	POTASSIUM	ppb	100	5	0	.	.	Potassium
A50	MAGNESIUM	ppb	50	5	0	.	.	Magnesium
A64	METHONE	ppb	10	1	1 ***	.	.	Methyl ethyl ketone
A68	1,1,2-T	ppb	5	1	1 ***	.	.	1,1,2-Trichloroethane
A70	PERCENE	ppb	5	1	1 ***	.	.	Perchloroethylene [Tetrachloroethane]
A71	OPXYLE	ppb	5	1	1 ***	440	EPAP	Xylene-o,p
A80	CHLFORM	ppb	5	1	1 ***	100	EPA	Chloroform [Trichloromethane]
A93	METHYCH	ppb	10	1	1 ***	.	.	Methylene chloride
B14	M-XYLE	ppb	5	1	1 ***	440	EPAP	Xylene-m
C76	PHOSPHA	ppb	1000	9	9 ***	.	.	Phosphate
C80	AMMONIU	ppb	50	1	1 ***	.	.	Ammonium ion
H16	TC	ppb	1000	5	0	.	.	Total carbon
H17	TDS	ppb	5000	1	0	500000	EPAS	Total dissolved solids
H18	FZINC	ppb	5	5	5	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	3	.	.	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	1	1 ***	.	.	Beryllium, filtered
H35	FSTRONT	ppb	20	1	0	.	.	Strontium, filtered
H36	FANTIMO	ppb	100	1	1 ***	.	.	Antimony, filtered
H58	ALKALIN	ppb	20000	5	0	.	.	Total alkalinity, as CaCO3
H68	HEXONE	ppb	10	1	1 ***	.	.	Hexone

TABLE 7.2. (contd)

----- Constituent List=WAC 173-303-9905 -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water 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 ***	.		Diethylstilbestrol	
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	0.1	1	1 ***	.		DDD	
A41	DDE	ppb	0.1	1	1 ***	.		DDE	
A42	DDT	ppb	0.1	1	1 ***	.		DDT	
A43	HEPTLOR	ppb	0.1	1	1 ***	0	EPAP	Heptachlor	
A44	HEPTIDE	ppb	0.1	1	1 ***	0	EPAP	Heptachlor epoxide	
A46	DIELRIN	ppb	0.1	1	1 ***	.		Dieldrin	
A47	ALDRIN	ppb	0.1	1	1 ***	.		Aldrin	
A48	CHLOANE	ppb	1	1	1 ***	0	EPAP	Chlordane	
A49	END01	ppb	0.1	1	1 ***	.		Endosulfan I (alpha)	
A52	END02	ppb	0.1	1	1 ***	.		Endosulfan II (beta)	
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	1	1 ***	5	EPA	Tetrachloromethane [Carbon Tetrachloride]	
A62	BENZENE	ppb	5	1	1 ***	5	EPA	Benzene	
A63	DIOXANE	ppb	500	1	1 ***	.		Dioxane	
A65	PYRIDIN	ppb	500	1	1 ***	.		Pyridine	
A68	TOLUENE	ppb	5	1	1 ***	2000	EPAP	Toluene	
A67	1,1,1-T	ppb	5	1	1 ***	200	EPA	1,1,1-Trichloroethane	
A69	TRICENE	ppb	5	1	1 ***	5	EPA	Trichloroethylene [1,1,2-Trichloroethene]	
A72	ACROLIN	ppb	10	1	1 ***	.		Acrolein	
A73	ACRYLE	ppb	10	1	1 ***	.		Acrylonitrile	
A74	BISTHER	ppb	10	1	1 ***	.		Bis(chloromethyl) ether	
A75	BROMONE	ppb	10	1	1 ***	.		Bromoacetone	
A76	METHBRO	ppb	10	1	1 ***	.		Methyl bromide	
A77	CARBIDE	ppb	10	1	1 ***	.		Carbon disulfide	
A78	CHLBENZ	ppb	10	1	1 ***	60	EPAP	Chlorobenzene	
A79	CHLTHER	ppb	10	1	1 ***	.		2-Chloroethyl vinyl ether	
A81	METHCHL	ppb	10	1	1 ***	.		Methyl chloride [Chloromethane]	
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	10	1	1 ***	.		1,1-Dichloroethane	
A90	1,2-DIC	ppb	10	1	1 ***	5	EPA	1,2-Dichloroethane	
A91	TRANDE	ppb	10	1	1 ***	70	EPAP	trans-1,2-Dichloroethene	

TABLE 7.2. (contd)

----- Constituent List=WAC 173-303-9905 -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Agency Exceeded	Standards	Full name
A92	DICETHY	ppb	10	1	1 ***	7	EPA		1,1-Dichloroethylene
A94	DICPANE	ppb	10	1	1 ***	8	EPAP		1,2-Dichloropropane
A95	DICPENE	ppb	10	1	1 ***	.			1,3-Dichloropropane
A98	NDIEHY	ppb	10	1	1 ***	.			N,N-diethylhydrazine
A99	HYDRSUL	ppb	10	1	1 ***	.			Hydrogen sulfide
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-Tetrachloroethane
B06	1122-tc	ppb	10	1	1 ***	.			1,1,2,2-Tetrachloroethane
B08	BROMORM	ppb	10	1	1 ***	100	EPA		Bromoform [Tribromomethane]
B09	TRCMEOL	ppb	10	1	1 ***	.			Trichloromethanethiol
B10	TRCMFLM	ppb	10	1	1 ***	.			Trichloromonofluoromethane
B11	TRCPANE	ppb	10	1	1 ***	.			Trichloropropane
B12	123-trp	ppb	10	1	1 ***	.			1,2,3-Trichloropropane
B13	VINYIDE	ppb	10	1	1 ***	2	EPA		Vinyl chloride
B15	DIETHY	ppb	10	1	1 ***	.			Diethylarsine
B19	ACETILE	ppb	3000	1	1 ***	.			Acetonitrile
B20	ACETOPH	ppb	10	1	1 ***	.			Acetophenone
B21	WARFRIN	ppb	10	1	1 ***	.			Warfarin
B22	ACEFEHE	ppb	10	1	1 ***	.			2-Acetylaminofluorene
B23	AMINDYL	ppb	10	1	1 ***	.			4-Aminobiphenyl
B24	AMIISOX	ppb	10	1	1 ***	.			5-(Aminomethyl)-3-isoxazolo
B25	AMITROL	ppb	10	1	1 ***	.			Amitrole
B26	ANILINE	ppb	10	1	1 ***	.			Aniline
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 ***	.			Benzenethiol
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 (DNBP)
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

TABLE 7.2. (contd)

----- Constituent List=WAC 178-303-9906 -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
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 DIBAHFY	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 ***	.	1,4-Dichlorobenzene
B64 DICHBEN	ppb	20	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
B71 DIMBENZ	ppb	10	1	1 ***	.	7,12-Dimethylbenz[a]anthracene
B72 DIMEYLB	ppb	10	1	1 ***	.	3,8'-Dimethylbenzidine
B73 THIONOX	ppb	10	1	1 ***	.	Thiofanox
B74 DIMPHAM	ppb	10	1	1 ***	.	alpha,alpha-Dimethylphenethylamine
B75 DIMPHEN	ppb	10	1	1 ***	.	2,4-Dimethylphenol
B76 DIMPHTH	ppb	10	1	1 ***	.	Dimethyl phthalate
B77 DINBENZ	ppb	10	1	1 ***	.	Dinitrobenzene
B78 DINCREB	ppb	10	1	1 ***	.	4,6-Dinitro-o-cresol and salts
B79 DINPHEN	ppb	50	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 DIPHYD	ppb	10	1	1 ***	.	1,2-Diphenylhydrazine
B85 DIPRNT	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 ***	.	Metholonyl
B99 METAZIR	ppb	10	1	1 ***	.	2-Methylaziridine

TABLE 7.2. (contd)

----- Constituent List=WAC 173-303-9905 -----						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded
C01	METCHAN	ppb	10	1	1 ***	.
C02	METBISC	ppb	10	1	1 ***	.
C03	METACTO	ppb	10	1	1 ***	.
C04	METACRY	ppb	10	1	1 ***	.
C05	METMSUL	ppb	10	1	1 ***	.
C06	METPROP	ppb	10	1	1 ***	.
C07	METHIOU	ppb	10	1	1 ***	.
C08	NAPHQUI	ppb	10	1	1 ***	.
C09	1-napha	ppb	10	1	1 ***	.
C10	2-napha	ppb	10	1	1 ***	.
C11	NITRANI	ppb	50	1	1 ***	.
C12	NITBENZ	ppb	10	1	1 ***	.
C13	NITPHEN	ppb	50	1	1 ***	.
C14	NNIBUTY	ppb	10	1	1 ***	.
C16	NNIDIEA	ppb	10	1	1 ***	.
C16	NNIDIEY	ppb	10	1	1 ***	.
C17	NNIDIME	ppb	10	1	1 ***	.
C18	NNIMETH	ppb	10	1	1 ***	.
C19	NNIURET	ppb	10	1	1 ***	.
C20	NNIVINY	ppb	10	1	1 ***	.
C21	NNIMORP	ppb	10	1	1 ***	.
C22	NNINICO	ppb	10	1	1 ***	.
C23	NNIPIE	ppb	10	1	1 ***	.
C24	NITRPYR	ppb	10	1	1 ***	.
C25	NITRTOL	ppb	10	1	1 ***	.
C26	PENTCHB	ppb	10	1	1 ***	.
C27	PENTCHN	ppb	10	1	1 ***	.
C28	PENTCHP	ppb	50	1	1 ***	220 EPAP
C29	PHENTIN	ppb	10	1	1 ***	.
C30	PHENINE	ppb	10	1	1 ***	.
C31	PHTHEST	ppb	10	1	1 ***	.
C32	PICOLIN	ppb	10	1	1 ***	.
C33	PRONIDE	ppb	10	1	1 ***	.
C34	RESERPI	ppb	10	1	1 ***	.
C35	RESORCI	ppb	10	1	1 ***	.
C36	SAFROL	ppb	10	1	1 ***	.
C37	TETRCHB	ppb	10	1	1 ***	.
C39	TETRCHP	ppb	10	1	1 ***	.
C40	THIURAM	ppb	10	1	1 ***	.
C41	TOLUDIA	ppb	10	1	1 ***	.
C42	OTOLHYD	ppb	10	1	1 ***	.
C43	TRICHLB	ppb	10	1	1 ***	.
C44	246-trp	ppb	50	1	1 ***	.
C45	246-trp	ppb	10	1	1 ***	.
C46	TRIPHOS	ppb	10	1	1 ***	.
C47	SYMTRIN	ppb	10	1	1 ***	.
C48	TRISPHO	ppb	10	1	1 ***	.
C49	BENZOPY	ppb	10	1	1 ***	.
C50	CHLNAP2	ppb	10	1	1 ***	.
C51	BIS2ETH	ppb	10	1	1 ***	.
C52	HEXAENE	ppb	10	1	1 ***	.
						3-Methylcholanthrene
						4,4'-Methylenebis(2-chloroaniline)
						2-Methyl lactonitrile
						Methyl methacrylate
						Methyl methanesulfonate
						2-Methyl-2-(methylthio) propionaldehyde-
						Methylthiouracil
						1,4-Naphthoquinone
						1-Naphthylamine
						2-Naphthylamine
						p-Nitroaniline
						Nitrobenzene
						4-Nitrophenol
						N-nitrosodi-n-butylamine
						N-nitrosodiethanolamine
						N-nitrosodiethylamine
						N-nitrosodimethylamine
						N-nitrosomethylethylamine
						N-nitroso-n-methylurethane
						N-nitrosomethylvinylamine
						N-nitrosomorpholine
						N-nitrosornicotine
						N-nitrosopiperidine
						Nitrosopyrrolidine
						5-Nitro-o-toluidine
						Pentachlorobenzene
						Pentachloronitrobenzene
						Pentachlorophenol
						Phenacetin
						Phenylenediamine
						Phthalic acid esters
						2-Picoline
						Pronamide
						Reserpine
						Resorcinol
						Safrol
						1,2,4,5-Tetrachlorobenzene
						2,3,4,6-Tetrachlorophenol
						Thiuram
						Toluenediamine
						o-Toluidine hydrochloride
						1,2,4-Trichlorobenzene
						2,4,6-Trichlorophenol
						2,4,6-Trichlorophenol
						O,o,o-triethyl phosphorothioate
						Sym-trinitrobenzene
						Tris(2,3-dibromopropyl) phosphate
						Benzo[a]pyrene
						Chlornaphazine
						Bis(2-chloroisopropyl) ether
						Hexachlorepropene

TABLE 7.2. (contd)

Constituent List=WAC 173-303-9905						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
C63	HYDRAZI	ppb	3000	1	1 ***	. Hydrazine
C64	HEXACHL	ppb	10	1	1 ***	. Hexachlorophene
C65	NAPHTHA	ppb	10	1	1 ***	. Naphthalene
C66	123TRI	ppb	10	1	1 ***	. 1,2,3-Trichlorobenzene
C68	136TRI	ppb	10	1	1 ***	. 1,3,6-Trichlorobenzene
C69	1234TE	ppb	10	1	1 ***	. 1,2,3,4-Tetrachlorobenzene
C80	1236TE	ppb	10	1	1 ***	. 1,2,3,6-Tetrachlorobenzene
C81	TETEPYR	ppb	2	1	1 ***	. Tetraethylpyrophosphate
C82	CHLLATE	ppb	80	1	1 ***	. Chlorobenzilate
C83	CARBPHT	ppb	2	1	1 ***	. Carbophenothion
C84	DISULFO	ppb	2	1	1 ***	. Disulfoton
C85	DIMETHO	ppb	2	1	1 ***	. Dimethoate
C88	METHPAR	ppb	2	1	1 ***	. Methyl parathion
C87	PARATHI	ppb	2	1	1 ***	. Parathion
C70	CYANIDE	ppb	10	1	1 ***	. Cyanide
C71	FORMALN	ppb	500	1	1 ***	. Formalin
C77	PERCHLO	ppb	1000	1	1 ***	. Perchlorate
C78	SULFIDE	ppb	1000	1	1 ***	. Sulfide
C79	KEROSEN	ppb	10000	1	1 ***	. Kerosene
C81	ETHYGLY	ppb	10000	1	1 ***	. Ethylene glycol
C86	DIOXIN	ppb	0.1	1	1 ***	. Dioxin
C87	CITRUSR	ppb	1000	1	1 ***	. Citrus red
C90	PARALDE	ppb	2000	1	1 ***	. Paraldehyde
C91	STRYCHN	ppb	50	1	1 ***	. Strychnine
C92	MALHYDR	ppb	500	1	1 ***	. Maleic hydrazide
C93	NICOTIN	ppb	100	1	1 ***	. Nicotinic acid
C94	ACRYIDE	ppb	10000	1	1 ***	0 EPAP Acrylamide
C96	ALLYLAL	ppb	2500	1	1 ***	. Allyl alcohol
C97	CHLACET	ppb	18000	1	1 ***	. Chloroacetaldehyde
C98	CHLPROP	ppb	4000	1	1 ***	. 3-Chloropropionitrile
H03	ETHCARB	ppb	5000	1	1 ***	. Ethyl carbamate
H04	ETHCYAN	ppb	2000	1	1 ***	. Ethyl cyanide
H06	ETHOXID	ppb	3000	1	1 ***	. Ethylene oxide
H08	ETHMETH	ppb	10	1	1 ***	. Ethyl methacrylate
H09	ISOBUTY	ppb	1000	1	1 ***	. Isobutyl alcohol
H11	PROPYLA	ppb	10000	1	1 ***	. n-Propylamine
H12	PROPYNO	ppb	8000	1	1 ***	. 2-Propyn-1-ol
H16	2,4,6-T	ppb	2	1	1 ***	. 2,4,6-T
H40	FTHALLI	ppb	6	1	1 ***	. Thallium, filtered
I21	TRIBUPH	ppb	10	1	1 ***	. Tributylphosphoric acid

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

xxx - Indicates that Drinking Water Standards were exceeded

EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 26890

EPAP - based on National Interim Primary Drinking Water Regulations,
Appendix IV, EPA-670/9-78-003

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

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

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

TABLE 7.3. Constituents with at Least One Detected Value for the 1324-N/NA Facilities, September 1988

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho . /700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 1000/.	TOXLDL ppb 20/.
1-N-58	14SEP88		1,711	1,990	7.1	6.7	#994	#15
		1	1,713	2,070	7.1	6.6	1,200	#9
		2	1,713	2,020	7.3	6.8	#996	#19
		3	1,715	1,990	7.2	6.7	1,020	24
1-N-59	14SEP88		1,034	1,310	7.9	7.4	#800	20
		1	1,032	1,300	8.0	7.6	#768	21
		2	1,035	1,300	7.9	7.6	#900	21
		3	1,036	1,300	7.9	7.6	#900	#9
1-N-60	14SEP88		1,221	1,380	7.4	7.1	#800	#7
		1	1,219	1,370	7.4	7.0	#800	#13
		2	1,218	1,380	7.4	7.0	1,100	#16
		3	1,218	1,370	7.4	7.0	1,300	#16
1-N-61	14SEP88		1,534	1,640	6.6	6.3	1,800	32
		1	1,536	1,640	6.6	6.2	1,400	31
		2	1,535	1,650	6.6	6.2	1,400	31
		3	1,535	1,640	6.6	6.3	1,400	30
6-61-58	19SEP88		179	.	.	7.9	#400	#-1
		1	180	.	.	7.8	#400	#14
		2	179	.	.	7.9	#400	#0
		3	180	.	.	7.8	#300	#0

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25690
- r - based on National Interim Primary Drinking Water Regulations,
Appendix IV, EPA-670/9-78-003
- 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
(July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-54, Public Water Supplies

Data flags

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

TABLE 7.3. (contd)

Well name	Collection Date	Duplicate sample number	ALKALIN ppb 20000/.	ALPHA pCi/L 4/15	BARIUM ppb 6/1000	FBARIUM ppb 6/1000	BETA pCi/L 8/60	FCADMIU ppb 2/10	FCALCIU ppb 60/.	CALCIUM ppb 60/.
1-N-58	14SEP88		89,100	*1.400	79	78	9.48	2	146,000	135,000
	14SEP88	1		*9.340		79	16.20	<2	144,000	
1-N-59	14SEP88		85,600	*-2.400	28	27	16.70	<2	47,800	51,800
	14SEP88	1								
1-N-60	14SEP88		65,000	*0.328	48	49	12.90	<2	79,200	78,800
	14SEP88	1								
1-N-61	14SEP88		29,800	*-2.080	34	32	<4.31	<2	45,800	46,800
	14SEP88	1								
6-81-58	19SEP88		92,900	1.430	16	17	3.70	<2	28,400	28,400

Well name	Collection Date	Duplicate sample number	CHLORIO ppb 500/250000s	FCHROMI ppb 10/50	CHROMIUM ppb 10/50	CO-60 pCi/L 22.6/100r	COLIFRM MPN 2.2/1	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000	IRON ppb 30/300s
1-N-58	14SEP88		10,300	<10	24	*4.850	<2.2	*-8.390	<500	111
	14SEP88	1	10,300	<10					<500	
1-N-59	14SEP88		6,310	<10	18	*-0.809	<2.2	*3.510	870	122
	14SEP88	1	6,350						703	
1-N-60	14SEP88		6,180	<10	16	*-4.540	<2.2	*1.590	858	60
	14SEP88	1	6,340						835	
1-N-61	14SEP88		7,810	<10	<10	*-0.336	2.2	*0.318	942	128
	14SEP88	1	7,990						898	
6-81-58	19SEP88		1,150	11	15	*0.534	<2.2	*-3.310	<500	497

Well name	Collection Date	Duplicate sample number	FIRON ppb 30/300s	MAGNES ppb 60/.	FMAGNES ppb 60/.	FMANGAN ppb 6/50s	MANGESE ppb 6/50s	NICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.
1-N-58	14SEP88		31	23,700	26,000	<6	<6	12	3,850	6,310	6,950
	14SEP88	1	34		24,600	<6			3,810	6,710	
1-N-59	14SEP88		270	9,980	8,810	6	<6	<10	1,730	5,020	5,870
	14SEP88	1							1,770		
1-N-60	14SEP88		<30	12,100	12,700	<6	<6	<10	2,010	5,550	5,770
	14SEP88	1							2,030		
1-N-61	14SEP88		<30	10,400	9,760	13	11	<10	1,120	2,610	2,920
	14SEP88	1							1,090		
6-81-58	19SEP88		<30	7,400	7,900	<6	7	<10	2,480	2,950	2,510

TABLE 7.3. (contd)

Well name	Collection Date	Duplicate sample number	RADIUM pCi/L 1/5	RU-106 pCi/L 172.5/30r	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONIUM ppb 20/.	SULFATE ppb 500/250000#
1-N-58	14SEP88		0.2470	*50.1	387,000	398,000	1.1300	.	.	1,010,000
	14SEP88	1	.	.	.	382,000	.	.	.	1,020,000
1-N-59	14SEP88		*0.0821	*-37.8	283,000	251,000	*0.2020	.	.	581,000
	14SEP88	1	.	.	.	.	.	.	.	584,000
1-N-60	14SEP88		0.2080	*17.8	283,000	248,000	*-0.0379	.	.	641,000
	14SEP88	1	.	.	.	.	.	.	.	643,000
1-N-61	14SEP88		*0.1430	*30.0	385,000	342,000	*0.1010	.	.	794,000
	14SEP88	1	.	.	.	.	.	.	.	799,000
6-81-58	19SEP88		*0.0835	*-19.8	4,240	5,110	*-0.0851	173	185	14,900

Well name	Collection Date	Duplicate sample number	TC ppb 1000/.	TDS ppb 6000/500000#	TRITIUM pCi/L 500/20000	U-CHEM ug/L 0.726/.	FVANADI ppb 5/.	VANADIUM ppb 5/.	ZINC ppb 5/5000#	FZINC ppb 5/5000#
1-N-58	14SEP88		18,600	.	*73.5	1.910	<5	<5	9	<5
	14SEP88	1	.	.	.	1.920	<5	.	.	7
1-N-59	14SEP88		18,800	.	*210.0	1.150	13	9	14	<5
	14SEP88	1	.	.	.	.	.	.	.	.
1-N-60	14SEP88		15,200	.	*207.0	0.772	8	10	7	<5
	14SEP88	1	.	.	.	.	.	.	.	.
1-N-61	14SEP88		8,470	.	*358.0	1.230	<5	8	12	<5
	14SEP88	1	.	.	.	.	.	.	.	.
6-81-58	19SEP88		20,200	128,000	535.0	2.930	10	8	<5	<5

8.0 1325-N LIQUID WASTE DISPOSAL FACILITY

T. J. Gilmore

Progress on the RCRA interim-status background ground-water monitoring program at the 1325-N Liquid Waste Disposal Facility (LWDF) from October 1 to December 31, 1988, is presented below. The project scope is outlined in the draft Closure/Post-Closure Plan for the 1325-N LWDF presented to Westinghouse Hanford Company by Pacific Northwest Laboratory (PNL) in June 1987 and in the draft Interim Status Detection-Level Ground-Water Monitoring Plan for the 1325-N Liquid Waste Disposal Facility presented to Westinghouse Hanford by PNL in March 1988. Previously issued reports have reported progress in the first, second, and third quarters of 1988 (PNL 1988c,d; Fruland, Bates, and Lundgren 1989).

The 1325-N LWDF was the primary liquid waste disposal system for the N Reactor. The facility began operation in 1983 and was in use until the N Reactor went on cold standby early in 1988. The facility is located approximately 900 ft east of the Columbia River. It consists of a concrete 240- by 250-ft basin with an extension trench that is approximately 3000 ft long, 55 ft wide, and 7 ft deep (Figure 8.1).

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or characterization work was performed during the period of this report. A change in the monitoring network was required to compensate for a declining water table in the 100-N Area. Water-level measurements were obtained monthly, and associated water-table maps were constructed.

Water-level measurements are taken in most of the existing 100-N Area wells to monitor the water table near the 1325-N LWDF. Monthly water-level measurements continued this quarter, with measurements obtained from 33 wells in October, 41 wells in November, and 43 wells in December (Table 6.1). The number of wells in which water levels are obtained is dependent on the accessibility and condition of each well. Water-table maps for each month are shown in Figures 6.3, 6.4, and 6.5. The 1301-N and nearby 1325-N LWDFs are not currently receiving a substantial amount of liquid wastes because

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

the N Reactor has been placed on cold standby. This decrease in artificial recharge to the ground water has resulted in an overall decline in the water table in the 100-N Area, particularly near the 1325-N LWDF. A decrease of nearly 5 ft occurred following the decrease in effluent discharge to the 1325-N LWDF in early 1988. Current ground-water fluctuations are attributed to seasonal variations.

GROUND-WATER SAMPLING AND ANALYSIS

Collection and Analysis

This quarter samples were collected from 11 wells in the immediate vicinity of the 1325-N LWDF (Figure 8.1). One new well, 199-N-70, was added to the network sampling in September; however, one older well, 199-N-39, was eliminated from the network in September because of low water levels. The 1301-N and nearby 1325-N LWDFs are not currently receiving a substantial amount of liquid wastes because the N Reactor has been placed on cold standby. The removal of artificial recharge to the ground water has resulted in a drop in the water table in the 100-N Area of nearly 5 ft. This compromised the reliability of several of the sampling wells in the 1325-N monitoring network. This 5-ft drop, coupled with seasonal fluctuations that further lower the water level, have affected well 199-N-39 to the extent that the water level is too low to be reliably sampled. Because of the manner in which this well was constructed, it cannot be easily modified and therefore has been eliminated from the monitoring network.

Discussion of Results

The analytical results from the sampling (Table 8.1) conducted in September were received this quarter and are presented in Tables 8.2 and 8.3. Eleven wells were sampled in September for this program. One of these wells, 699-81-58, is also included in the Hanford Site-Wide Ground-Water Monitoring Project, and the results are combined with the analyses of the 1325-N program in Tables 8.2 and 8.3. On the 1325-N program, each sample was analyzed for the interim primary drinking water standards given in Appendix III of 40 CFR 265, water quality parameters and contamination indicators

TABLE 8.1. Sample Collection Schedule for the 1325-N Liquid Waste Disposal Facility

<u>Well Number</u>	<u>1987 Dec</u>	<u>Mar</u>	<u>1988 Jun</u>	<u>Sept</u>	<u>Dec</u>	<u>Projected 1989 Mar</u>
199-N-27	X	X	X	X	X	XL(a)
199-N-29		X	X	X	X	XL
199-N-31	X	X	X	X	X	XL
199-N-32	X	X	X	X	X	XL
199-N-33		X	X	X	X	XL
199-N-36	X	X	X	X	X	XL
199-N-39	X	X	X	(b)	(b)	(b)
199-N-41	X	X	X	X	X	XL
199-N-42	X	X	X	X	X	XL
199-N-52	X	X	X	X	X	XL
199-N-70					X	XL
699-81-58	(d)	X	(c)	XL	X	XL

(a) XL=sampled and analyzed for the "long list" of constituents (WAC 173-303-9905).

(b) Well deleted from network.

(c) Well added to network.

(d) Well sampled for another project.

(40 CFR 265.92), and specific dangerous waste constituents known to have been discharged to the facility. The radionuclides tritium, strontium-90, natural uranium, cobalt-60, cesium-137, and ruthenium-106 were added to the list of analyses beginning with the June 1988 sampling and were continued for the September sampling. However, in wells 199-N-29, 199-N-31, and 199-N-41, the radionuclides tritium, strontium-90, natural uranium, cobalt-60, cesium-137, ruthenium-106, and total beta were inadvertently not included in the September 1988 sample. Phenols, ammonia, and hydrazine were also added beginning with the June 1988 sampling. These radioactive and hazardous constituents may have been discharged to the facility in the past. An analytical method providing a lower detection limit for total organic halogens (TOX) was also used beginning in June 1988 and continued in the September 1988 sampling.

The gross beta radiation in wells 199-N-27, 199-N-32, 199-N-33, 199-N-36, 199-N-42, and 199-N-70, exceeded the screening level used for the 4 mrem/yr standard (40 CFR 265; 40 CFR 141). The beta-emitting constituents

that are in part responsible for the gross beta readings are cobalt-60, tritium, and strontium-90. In wells 199-N-29, 199-N-32, and 199-N-33, the strontium-90 40 CFR 141 standard (8-pCi/L) was exceeded. The tritium activity in all the wells that were sampled except 699-81-51 was above the 40 CFR 141 standard of 20,000 pCi/L. Nitrate concentrations were above the drinking water standard in wells 199-N-32 and 199-N-41. The concentrations of coliform in wells 199-N-32, 199-N-52, and 199-N-70 were above the 40 CFR 265 standards. High TOX values were reported in well 199-N-33 from the March 1988 sampling, and the data needed to verify the results could not be collected because of the low water levels in the well during the June sampling. The September analysis from well 199-N-33 samples show levels below the contractual detection limit for both TOX and methylene chloride.

Elevated levels of TOX and methylene chloride occurred in September in well 199-N-42. Occurrences of methylene chloride are being carefully observed (see Section 1.0, Introduction) because they may not reflect actual ground-water conditions.

TABLE 8.2. Constituent List and Summary of Sampling Results for the 1325-N Liquid Waste Disposal Facility, September 1988

----- Constituent List=Contamination Indicator Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards			Full name
						Standard	Agency Exceeded		
191	CONDFLD	umho	1	40	0	700	WDE		Specific conductance, field
199	PHFIELD		0.1	44	0	6.5-8.6	EPAS		pH, field
C69	TOC	ppb	1000	44	0	.			Total organic carbon
H42	TOXLDL	ppb	20	44	0	.			Total organic halogens, low DL
----- Constituent List=Drinking Water Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards			Full name
						Standard	Agency Exceeded		
109	COLIFRM	MPN	2.2	11	0	1	EPA	xxx	Coliform bacteria
111	BETA	pCi/L	8	8	0	50	EPA	xxx	Gross beta
181	RADIUM	pCi/L	1	11	0	5	EPA		Total radium
212	ALPHA	pCi/L	4	11	0	15	EPA		Gross alpha
A06	BARIUM	ppb	8	11	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	11	11 ***	10	EPA		Cadmium
A08	CHROMIUM	ppb	10	11	9	50	EPA		Chromium
A10	SILVER	ppb	10	11	11 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	11	8	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	11	11 ***	2	EPA		Mercury
A22	SELENIUM	ppb	5	11	11 ***	10	EPA		Selenium
A33	ENDRIN	ppb	0.1	11	11 ***	0.2	EPA		Endrin
A34	METHLOR	ppb	3	11	11 ***	100	EPA		Methoxychlor
A35	TOXAENE	ppb	1	11	11 ***	5	EPA		Toxaphene
A36	a-BHC	ppb	0.1	11	11 ***	4	EPA		Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	11	11 ***	4	EPA		Lindane, beta-BHC
A38	g-BHC	ppb	0.1	11	11 ***	4	EPA		Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	11	11 ***	4	EPA		Lindane, delta-BHC
A51	LEADGF	ppb	5	11	11 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	ppb	500	11	0	45000	EPA	xxx	Nitrate
C74	FLUORID	ppb	500	11	11 ***	4000	EPA		Fluoride
H13	2,4-D	ppb	2	11	11 ***	100	EPA		2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	11	11 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	ppb	8	11	0	1000	EPA		Barium, filtered
H21	FCADMIUM	ppb	2	11	10	10	EPA		Cadmium, filtered
H22	FCHROMIUM	ppb	10	11	10	50	EPA		Chromium, filtered
H23	FSILVER	ppb	10	11	11 ***	50	EPA		Silver, filtered
H37	FARSENIC	ppb	5	11	8	50	EPA		Arsenic, filtered
H38	FMECUR	ppb	0.1	11	11 ***	2	EPA		Mercury, filtered
H39	FSELENIUM	ppb	5	11	11 ***	10	EPA		Selenium, filtered
H41	FLEAD	ppb	5	11	11 ***	50	EPA		Lead, filtered

TABLE 8.2. (contd)

----- Constituent List=Water Quality Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards Agency Exceeded	Full name	
A11	SODIUM	ppb	200	11	0	.		Sodium	
A17	MANGESE	ppb	5	11	0	50	EPAS	Manganese	
A19	IRON	ppb	30	11	0	300	EPAS	Iron	xxx
C67	PHENOL	ppb	10	1	1 ***	.		Phenol	
C73	SULFATE	ppb	500	11	0	250000	EPAS	Sulfate	
C75	CHLORID	ppb	500	11	0	250000	EPAS	Chloride	
H24	FSODIUM	ppb	200	11	0	.		Sodium, filtered	
H29	FMANGAN	ppb	5	11	10	50	EPAS	Manganese, filtered	
H31	FIRON	ppb	30	11	10	300	EPAS	Iron, filtered	
H57	LPHENOL	ppb	10	10	10 ***	.		Phenol, low DL	
----- Constituent List=Site Specific and Other Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards Agency Exceeded	Full name	
010	CO-60	pCi/L	22.5	8	0	100	EPAR	Cobalt-60	
024	CS-137	pCi/L	20	8	0	200	EPAR	Cesium-137	
034	RU-106	pCi/L	172.5	8	0	30	EPAR	Ruthenium-106	
037	SB-125	pCi/L	48	1	0	300	EPAR	Antimony-125	
108	TRITIUM	pCi/L	500	8	0	20000	EPA	Tritium (H-3)	xxx
121	SR-90	pCi/L	5	8	0	8	EPA	Strontium-90	xxx
124	U-CHEM	ug/L	0.725	8	0	.		Uranium, chemical	
A01	BERYLUM	ppb	5	1	1 ***	.		Beryllium	
A03	STRONTIUM	ppb	20	1	0	.		Strontium	
A04	ZINC	ppb	5	11	2	5000	EPAS	Zinc	
A06	CALCIUM	ppb	50	11	0	.		Calcium	
A12	NICKEL	ppb	10	11	11 ***	.		Nickel	
A13	COPPER	ppb	10	11	11 ***	1300	EPAP	Copper	
A14	VANADIUM	ppb	5	11	0	.		Vanadium	
A15	ANTIMONY	ppb	100	1	1 ***	.		Antimony	
A16	ALUMINUM	ppb	150	11	11 ***	.		Aluminum	
A18	POTASSIUM	ppb	100	11	0	.		Potassium	
A50	MAGNESIUM	ppb	50	11	0	.		Magnesium	
A54	AR1010	ppb	1	2	2 ***	0	EPAP	Arochlor 1010	
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	
A81	TETRANE	ppb	5	11	11 ***	5	EPA	Tetrachloromethane [Carbon Tetrachloride]	
A84	METHONE	ppb	10	11	11 ***	.		Methyl ethyl ketone	
A87	1,1,1-T	ppb	5	11	11 ***	200	EPA	1,1,1-Trichloroethane	
A88	1,1,2-T	ppb	5	11	11 ***	.		1,1,2-Trichloroethane	
A89	TRICENE	ppb	5	11	11 ***	5	EPA	Trichloroethylene [1,1,2-Trichloroethene]	
A70	PERCENE	ppb	5	11	11 ***	.		Perchloroethylene [Tetrachloroethene]	
A71	OPXYLE	ppb	5	11	11 ***	440	EPAP	Xylene-o,p	
A80	CHLFORM	ppb	5	11	3	100	EPA	Chloroform [Trichloromethane]	
A93	METHYCH	ppb	10	11	9	.		Methylene chloride	
B14	M-XYLE	ppb	5	11	11 ***	440	EPAP	Xylene-m	

TABLE 8.2. (contd)

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

Constituent Code Name Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C76 PHOSPHA ppb	1000	11	11 ***	.	Phosphate
C80 AMMONIU ppb	50	11	10	.	Ammonium ion
H16 TC ppb	1000	1	0	.	Total carbon
H17 TDS ppb	5000	1	0	500000 EPAS	Total dissolved solids
H18 FZINC ppb	5	11	9	5000 EPAS	Zinc, filtered
H19 FCALCIU ppb	50	11	0	.	Calcium, filtered
H25 FNICKEL ppb	10	11	11 ***	.	Nickel, filtered
H26 FCOPPER ppb	10	11	11 ***	1300 EPAP	Copper, filtered
H27 FVANADI ppb	5	11	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	1	1 ***	.	Beryllium, filtered
H35 FSTRONT ppb	20	1	0	.	Strontium, filtered
H36 FANTIMO ppb	100	1	1 ***	.	Antimony, filtered
H58 ALKALIN ppb	20000	1	0	.	Total alkalinity, as CaCO ₃
H62 LHYDRAZ ppb	80	10	10 ***	.	Hydrazine, low DL
H68 HEXONE ppb	10	11	11 ***	.	Hexone

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

Constituent Code Name Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard 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 ***	.	Diethylstilbestrol
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	0.1	1	1 ***	.	DDD
A41 DDE ppb	0.1	1	1 ***	.	DDE
A42 DDT ppb	0.1	1	1 ***	.	DDT
A43 HEPTLOR ppb	0.1	1	1 ***	0 EPAP	Heptachlor
A44 HEPTIDE ppb	0.1	1	1 ***	0 EPAP	Heptachlor epoxide
A46 DIELRIN ppb	0.1	1	1 ***	.	Dieldrin
A47 ALDRIN ppb	0.1	1	1 ***	.	Aldrin
A48 CHLOANE ppb	1	1	1 ***	0 EPAP	Chlordane
A49 END01 ppb	0.1	1	1 ***	.	Endosulfan I (alpha)
A52 END02 ppb	0.1	1	1 ***	.	Endosulfan II (beta)
A62 BENZENE ppb	5	1	1 ***	5 EPA	Benzene
A63 DIOXANE ppb	500	1	1 ***	.	Dioxane
A65 PYRIDIN ppb	500	1	1 ***	.	Pyridine
A66 TOLUENE ppb	5	1	1 ***	2000 EPAP	Toluene
A72 ACROLIN ppb	10	1	1 ***	.	Acrolein
A73 ACRYILE ppb	10	1	1 ***	.	Acrylonitrile

TABLE 8.2. (contd)

Constituent List=WAC 173-303-9905

Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name
A74	BISTHER	ppb	10	1	1 ***	.		Bis(chloromethyl) ether
A75	BROMONE	ppb	10	1	1 ***	.		Bromoacetone
A76	METHBRO	ppb	10	1	1 ***	.		Methyl bromide
A77	CARBIDE	ppb	10	1	1 ***	.		Carbon disulfide
A78	CHLBENZ	ppb	10	1	1 ***	60	EPAP	Chlorobenzene
A79	CHLTHER	ppb	10	1	1 ***	.		2-Chloroethyl vinyl ether
A81	METHCHL	ppb	10	1	1 ***	.		Methyl chloride [Chloromethane]
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	10	1	1 ***	.		1,1-Dichloroethane
A90	1,2-DIC	ppb	10	1	1 ***	6	EPA	1,2-Dichloroethane
A91	TRANDE	ppb	10	1	1 ***	70	EPAP	trans-1,2-Dichloroethane
A92	DICETHY	ppb	10	1	1 ***	7	EPA	1,1-Dichloroethylene
A94	DICPANE	ppb	10	1	1 ***	8	EPAP	1,2-Dichloropropane
A95	DICPENE	ppb	10	1	1 ***	.		1,3-Dichloropropane
A96	NNDIEHY	ppb	10	1	1 ***	.		N,N-diethylhydrazine
A99	HYDRSUL	ppb	10	1	1 ***	.		Hydrogen sulfide
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	10	1	1 ***	.		1,1,2,2-Tetrachlorethane
B08	BROMORM	ppb	10	1	1 ***	100	EPA	Bromoform [Tribromomethane]
B09	TRCMEOL	ppb	10	1	1 ***	.		Trichloromethanethiol
B10	TRCMFLM	ppb	10	1	1 ***	.		Trichloromonofluoromethane
B11	TRCPANE	ppb	10	1	1 ***	.		Trichloropropane
B12	123-trp	ppb	10	1	1 ***	.		1,2,3-Trichloropropane
B13	VINYIDE	ppb	10	1	1 ***	2	EPA	Vinyl chloride
B16	DIETHY	ppb	10	1	1 ***	.		Diethylarsine
B19	ACETILE	ppb	3000	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-Aminobiphenyl
B24	AMIISOX	ppb	10	1	1 ***	.		5-(Aminomethyl)-3-isoxazolol
B25	AMITROL	ppb	10	1	1 ***	.		Amitrole
B26	ANILINE	ppb	10	1	1 ***	.		Aniline
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 ***	.		Benzenethiol
B33	BENDINE	ppb	10	1	1 ***	.		Benzidine

TABLE 8.2. (contd)

----- Constituent List=WAC 173-303-9905 -----						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
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	BRPHEN	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 (DNBP)
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 ***	. 1-Chloro-2,3-epoxypropene
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	OIBAHAC	ppb	10	1	1 ***	. Dibenz[a,h]acridine
B54	OIBAJAC	ppb	10	1	1 ***	. Dibenz[a,h]acridine
B55	OIBAHAM	ppb	10	1	1 ***	. Dibenz[a,h]anthracene
B56	OIBCGCA	ppb	10	1	1 ***	. 7H-Dibenzo[c,g]carbazole
B57	OIBAEPY	ppb	10	1	1 ***	. Dibenzo[a,e]pyrene
B58	OIBAHYP	ppb	10	1	1 ***	. Dibenzo[a,h]pyrene
B59	OIBAIPY	ppb	10	1	1 ***	. Dibenzo[a,i]pyrene
B60	OIBPHTH	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 ***	. 1,4-Dichlorobenzene
B64	DICHBEN	ppb	20	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	OIEPHTH	ppb	10	1	1 ***	. Diethyl phthalate
B68	OIHYSAF	ppb	10	1	1 ***	. Dihydroxofrole
B69	OIMETHB	ppb	10	1	1 ***	. 3,3'-Dimethoxybenzidine
B70	DIMEAMB	ppb	10	1	1 ***	. p-Dimethylaminoazobenzene
B71	DIMBENZ	ppb	10	1	1 ***	. 7,12-Dimethylbenz[a]anthracene
B72	OIMEYLB	ppb	10	1	1 ***	. 3,3'-Dimethylbenzidine
B73	THIONOX	ppb	10	1	1 ***	. Thiofanox
B74	DIMPHAM	ppb	10	1	1 ***	. alpha,alpha-Dimethylphenethylamine
B75	OIMPHEN	ppb	10	1	1 ***	. 2,4-Dimethylphenol
B76	OIMPTH	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	50	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	DIOPTH	ppb	10	1	1 ***	. Di-n-octyl phthalate
B83	DIPHAMI	ppb	10	1	1 ***	. Diphenylamine

TABLE 8.2. (contd)

----- Constituent List=WAC 173-303-9905 -----							
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
B84	DIPHHYD	ppb	10	1	1 ***	.	1,2-Diphenylhydrazine
B85	DIPRNT	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 ***	.	Metholonyl
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-Methyl lactonitrile
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	50	1	1 ***	.	p-Nitroaniline
C12	NITBENZ	ppb	10	1	1 ***	.	Nitrobenzene
C13	NITPHEN	ppb	50	1	1 ***	.	4-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
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-nitrosornicotine
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 ***	.	Phenylenediamine
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

TABLE 8.2. (contd)

----- Constituent List=WAC 173-303-9905 -----						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
C35	RESORCI	ppb	10	1	1 ***	Resorcinol
C36	SAFROL	ppb	10	1	1 ***	Safrol
C37	TETRCHB	ppb	10	1	1 ***	1,2,4,6-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	50	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
C61	BIS2ETH	ppb	10	1	1 ***	Bis(2-chloroisopropyl) ether
C62	HEXAENE	ppb	10	1	1 ***	Hexachloropropene
C63	HYDRAZI	ppb	3000	1	1 ***	Hydrazine
C64	HEXACHL	ppb	10	1	1 ***	Hexachlorophene
C66	NAPHTHA	ppb	10	1	1 ***	Naphthalene
C68	123TRI	ppb	10	1	1 ***	1,2,3-Trichlorobenzene
C69	135TRI	ppb	10	1	1 ***	1,3,5-Trichlorobenzene
C69	1234TE	ppb	10	1	1 ***	1,2,3,4-Tetrachlorobenzene
C80	1236TE	ppb	10	1	1 ***	1,2,3,6-Tetrachlorobenzene
C81	TETEPYR	ppb	2	1	1 ***	Tetraethylpyrophosphate
C82	CHLLATE	ppb	30	1	1 ***	Chlorobenzilate
C83	CARBPHT	ppb	2	1	1 ***	Carbophenothion
C84	OISULFO	ppb	2	1	1 ***	Disulfoton
C86	DIMETHO	ppb	2	1	1 ***	Dimethoate
C86	METHPAR	ppb	2	1	1 ***	Methyl parathion
C87	PARATHI	ppb	2	1	1 ***	Parathion
C70	CYANIDE	ppb	10	1	1 ***	Cyanide
C71	FORMALN	ppb	500	1	1 ***	Formalin
C77	PERCHLO	ppb	1000	1	1 ***	Perchlorate
C78	SULFIDE	ppb	1000	1	1 ***	Sulfide
C79	KEROSEN	ppb	10000	1	1 ***	Kerosene
C81	ETHYGLY	ppb	10000	1	1 ***	Ethylene glycol
C86	DIOXIN	ppb	0.1	1	1 ***	Dioxin
C87	CITRUSR	ppb	1000	1	1 ***	Citrus red
C90	PARALDE	ppb	2000	1	1 ***	Paraldehyde
C91	STRYCHN	ppb	50	1	1 ***	Strychnine
C92	MALHYDR	ppb	500	1	1 ***	Maleic hydrazide
C93	NICOTIN	ppb	100	1	1 ***	Nicotinic acid
C94	ACRYIDE	ppb	10000	1	1 ***	Acrylamide
C96	ALLYLAL	ppb	2500	1	1 ***	Allyl alcohol
C97	CHLACET	ppb	18000	1	1 ***	Chloroacetaldehyde
C98	CHLPROP	ppb	4000	1	1 ***	3-Chloropropionitrile
H03	ETHCARB	ppb	5000	1	1 ***	Ethyl carbamate
H04	ETHCYAN	ppb	2000	1	1 ***	Ethyl cyanide
H06	ETHOXID	ppb	3000	1	1 ***	Ethylene oxide

TABLE 8.2. (contd)

----- Constituent List=WAC 173-303-9905 -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H08 ETHMETH	ppb	10	1	1 ***	.	Ethyl methacrylate
H09 ISOBUTY	ppb	1000	1	1 ***	.	Isobutyl alcohol
H11 PROPYLA	ppb	10000	1	1 ***	.	n-Propylamine
H12 PROPYNO	ppb	8000	1	1 ***	.	2-Propyn-1-ol
H16 2,4,6-T	ppb	2	1	1 ***	.	2,4,6-T
H40 FTHALLI	ppb	5	1	1 ***	.	Thallium, filtered
I21 TRIBUPH	ppb	10	1	1 ***	.	Tributylphosphoric acid

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

xxx - Indicates that Drinking Water Standards were exceeded

EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)

National Primary Drinking Water Regulations as amended by 52 FR 25690

EPAR - based on National Interim Primary Drinking Water Regulations,

Appendix IV, EPA-570/9-78-003

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

EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143

National Secondary Drinking Water Regulations

WDOE - based on additional Secondary Maximum Contaminant Levels given in

WAC 246-64, Public Water Supplies

TABLE 8.3. Constituents with at Least One Detected Value for the 1325-N Liquid Waste Disposal Facility, September 1988

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	PHFIELD 0.1/8.5w	TOC ppb 1000/.	TOXLDL ppb 20/.
1-N-27	19SEP88		158	8.4	#500	#14
		1	158	8.4	#500	#5
		2	158	8.3	#500	#7
		3	158	8.3	#500	#8
1-N-29	15SEP88		.	7.9	#400	#6
		1	.	7.9	#700	#12
		2	.	7.9	#400	#14
		3	.	7.9	#500	#10
1-N-31	15SEP88		133	7.9	#400	#12
		1	133	7.9	#400	#14
		2	133	7.9	#400	#8
		3	133	7.9	#400	#12
1-N-32	16SEP88		235	8.1	#500	#2
		1	232	8.1	#400	#1
		2	232	8.1	#700	27
		3	232	8.1	#500	#8
1-N-33	16SEP88		168	8.2	#400	#7
		1	168	8.2	#400	#8
		2	168	8.2	#400	#10
		3	168	8.2	#400	#12
1-N-36	16SEP88		144	7.8	#500	#12
		1	144	7.7	#500	#11
		2	144	7.8	#600	#5
		3	144	7.8	#700	#4
1-N-41	19SEP88		234	5.6	#400	#1.9
		1	235	5.6	#800	#5
		2	235	5.7	#500	#3
		3	235	5.7	#700	#8
1-N-42	19SEP88		198	7.4	#500	234
		1	198	7.4	#800	#3
		2	198	7.4	#500	#2
		3	198	7.4	#800	#3
1-N-52	19SEP88		215	8.3	#300	#-2
		1	215	8.2	#300	#2
		2	216	8.3	#400	#13
		3	216	8.2	#500	#1
1-N-70	19SEP88		200	8.2	#500	#2
		1	200	8.2	#800	#11
		2	200	8.2	#800	#4
		3	200	8.2	#800	#5
6-81-58	19SEP88		179	7.9	#400	#-1
		1	180	7.8	#400	#14
		2	179	7.9	#400	#0
		3	180	7.8	#300	#0

TABLE 8.3. (contd)

Well name	Collection Date	Duplicate sample number	ALKALIN ppb 20000/.	ALPHA pCi/L 4/15	AMMONIU ppb 50/.	ARSENIC ppb 5/50	FARSEN1 ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BETA pCi/L 5/50	FCADMIU ppb 2/10
1-N-27	19SEP88		.	0.8450	537	<5	<5	15	15	488.0	<2
1-N-29	15SEP88		.	*-0.0351	<50	<5	<5	10	10	.	<2
1-N-31	15SEP88		.	*0.5970	<50	<5	<5	18	17	.	<2
1-N-32	16SEP88		.	0.9430	<50	<5	<5	28	28	111.0	<2
1-N-33	16SEP88		.	*-0.0281	<50	5	<5	18	15	948.0	<2
1-N-36	16SEP88		.	0.9480	<50	<5	<5	18	16	.	<2
1-N-41	19SEP88		.	*0.4380	<50	8	8	23	25	83.4	<2
1-N-42	19SEP88		.	*0.0398	<50	7	8	15	18	72.1	3
1-N-52	19SEP88		.	*0.5710	<50	8	7	28	28	44.0	<2
1-N-70	19SEP88		.	*0.3630	<50	8	<5	30	30	65.1	<2
6-81-58	19SEP88		92,900	1.4300	<50	<5	<5	16	17	3.7	<2

Well name	Collection Date	Duplicate sample number	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLFORM ppb 5/100	CHLORIO ppb 500/250000s	FCHROMI ppb 10/50	CHROMUM ppb 10/50	CO-60 pCi/L 22.5/100r	COLIFRM MPN 2.2/1	CS-137 pCi/L 20/200r
1-N-27	19SEP88		22,800	21,900	8	828	<10	<10	86.800	<2.2	*-7.840
1-N-29	15SEP88		20,800	18,400	9	617	<10	<10	.	<2.2	.
1-N-31	15SEP88		29,000	26,500	8	697	<10	<10	.	<2.2	.
1-N-32	16SEP88		40,400	36,800	5	743	<10	<10	84.300	2.2	*-0.285
1-N-33	16SEP88		26,000	27,800	6	853	<10	<10	43.700	<2.2	*-1.860
1-N-36	16SEP88		26,000	26,900	7	785	<10	<10	.	<2.2	.
1-N-41	19SEP88		32,900	29,600	<5	1,300	<10	<10	68.300	<2.2	*-1.860
1-N-42	19SEP88		25,500	23,000	<5	1,060	<10	<10	54.100	<2.2	*1.830
1-N-52	19SEP88		26,600	25,400	<3	1,350	<10	<10	21.800	16.0	*-1.770
1-N-70	19SEP88		27,900	26,400	<3	853	<10	18	86.800	2.2	*-0.626
6-81-58	19SEP88		28,400	28,400	<5	1,160	11	15	*0.534	<2.2	*-3.310

Well name	Collection Date	Duplicate sample number	IRON ppb 30/300s	FIRON ppb 30/300s	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	METHYCH ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.
1-N-27	19SEP88		<30	<30	4,290	4,160	<5	<5	<10	13,900	2,980
1-N-29	15SEP88		<30	<30	2,920	3,170	<5	<5	<10	13,800	2,130
1-N-31	15SEP88		<30	<30	4,430	4,620	<5	<5	<10	28,500	2,680
1-N-32	16SEP88		<30	<30	7,740	8,050	<5	<5	<10	52,300	3,390
1-N-33	16SEP88		<30	<30	4,720	4,170	<5	<5	<10	26,900	2,310
1-N-36	16SEP88		<30	<30	5,000	4,360	<5	<5	<10	18,200	2,200
1-N-41	19SEP88		106	<30	6,620	7,050	<5	<5	15	50,800	3,690
1-N-42	19SEP88		667	<30	5,680	5,850	<5	<5	790	25,600	3,430
1-N-52	19SEP88		38	<30	7,540	7,110	<5	<5	<10	26,300	3,510
1-N-70	19SEP88		139	44	7,610	7,480	13	16	<10	32,300	3,530
6-81-58	19SEP88		497	<30	7,400	7,900	<5	7	<10	2,480	2,950

TABLE 8.3. (contd)

Well name	Collection Date	Duplicate sample number	POTASUM ppb 100/.	RADIUM pCi/L 1/5	RU-108 pCi/L 172.6/30r	SB-125 pCi/L 48/300r	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONTIUM ppb 20/.
1-N-27	19SEP88		3,290	*-0.0014	99.100	.	2,970	2,730	143.000	.	.
1-N-29	16SEP88		1,980	*0.0548	.	.	1,340	1,600	.	.	.
1-N-31	16SEP88		2,630	*-0.0813	.	.	2,140	2,040	.	.	.
1-N-32	16SEP88		3,480	*-0.0220	89.200	.	3,240	3,110	17.200	.	.
1-N-33	16SEP88		2,720	*0.0539	*77.700	59.4	2,700	2,230	380.000	.	.
1-N-36	16SEP88		2,540	*0.0183	.	.	2,610	2,480	.	.	.
1-N-41	19SEP88		3,560	*0.0384	*15.700	.	5,910	5,670	*-0.144	.	.
1-N-42	19SEP88		3,690	*0.1060	*8.710	.	7,090	6,420	*-0.192	.	.
1-N-52	19SEP88		3,970	*0.0397	*-0.997	.	7,660	6,900	*-0.051	.	.
1-N-70	19SEP88		3,840	*0.1140	82.200	.	6,170	6,870	*0.509	.	.
6-81-58	19SEP88		2,510	*0.0835	*-19.600	.	4,240	5,110	*-0.085	173	185

Well name	Collection Date	Duplicate sample number	SULFATE ppb 500/250000s	TC ppb 1000/.	TDS ppb 5000/500000s	TRITIUM pCi/L 500/20000	U-CHEM ug/L 0.725/.	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
1-N-27	19SEP88		7,980	.	.	162,000	0.944	12	18	7	<5
1-N-29	16SEP88		6,360	.	.	.	.	11	11	<5	<5
1-N-31	16SEP88		7,990	.	.	.	.	9	11	5	<5
1-N-32	16SEP88		8,940	.	.	119,000	1.350	13	15	6	<5
1-N-33	16SEP88		8,710	.	.	113,000	0.783	10	11	7	<5
1-N-36	16SEP88		8,160	.	.	.	.	12	11	<3	<5
1-N-41	19SEP88		12,800	.	.	85,900	0.721	25	21	42	11
1-N-42	19SEP88		9,880	.	.	99,900	0.738	32	33	7	<5
1-N-52	19SEP88		13,700	.	.	70,900	2.380	34	37	10	<5
1-N-70	19SEP88		10,800	.	.	91,800	0.757	25	27	48	12
6-81-58	19SEP88		14,900	20,200	128,000	535	2.930	10	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 given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25690
- r - based on National Interim Primary Drinking Water Regulations,
Appendix IV, EPA-570/9-78-003
- 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
(July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-64, 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

9.0 216-A-10 CRIB

S. P. Luttrell

The 216-A-10 crib has been proposed for closure as an interim-status facility under RCRA. Six wells drilled in 1988 combined with two existing wells comprise the interim-status ground-water monitoring network at the 216-A-10 crib.

The 216-A-10 crib is a cross-sectionally v-shaped crib approximately 45 ft deep and 275 ft long, and located in the 200-East Area (Figure 4.1). It received startup wastes from the Plutonium Uranium Extraction (PUREX) Plant 400 ft to the north during a 4-month period in 1956, but did not begin continuous service until 1961 when it replaced the retired 216-A-5 crib. The crib operated nearly continuously from 1961 to 1973, from 1982 to January 1987, and sporadically in 1977, 1978, and 1981.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

This section discusses the status of activities relating to drilling and constructing ground-water monitoring wells, and hydrogeologic characterization at the 216-A-10 crib.

Drilling

Six new wells (299-E17-19, 299-E17-20, 299-E24-16, 299-E24-17, 299-E24-18, and 299-E25-36) were drilled and constructed at the 216-A-10 crib in 1988 (Figure 9.1). Final well development and sample pump installation were completed in October 1988. The wells were developed until turbidity was less than 5 nephelometric turbidity units (NTU). A HydroStar sampling pump was installed in each of the new wells. The existing wells (299-E17-2 and 299-E24-1) have submersible pumps. The wells were surveyed for location and elevation. Well inspection/completion forms, as-built diagrams, geologic logs, and geophysical logs are presented in Volume 2, Appendix A.

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

Hydrogeologic Characterization

Results of moisture content analyses, radionuclide (total alpha, beta, and gamma) and chemical (nitrate and total organic carbon) analyses, hydrologic testing and data analyses, and water-level data are presented in this section. Moisture content analyses were conducted by Pacific Northwest Laboratory on samples collected by the drive-barrel drilling method from intervals in which no water had been added. The radionuclide and chemical analyses were conducted by United States Testing Company, Incorporated. In addition, sediment pH was measured in the field. These results are presented

in Tables 9.1 through 9.5. In Table 9.1, data for well 299-E17-19, the high moisture content at 288.5, 290, and 293.5 ft corresponds to silt layers at these depths.

Data from hydrologic tests in wells 299-E17-20 and 299-E24-18 were analyzed. The transmissivity of the aquifer materials in the uppermost part of the unconfined aquifer beneath the 216-A-10 crib is likely greater than 100,000 ft²/d. A quantitative value for transmissivity could not be determined because the aquifer was not stressed enough to yield adequate drawdown and recovery data for a quantitative analysis.

Casing elevation, depth-to-water, and water-level elevation data are presented in Table 9.6.

GROUND-WATER SAMPLING AND ANALYSIS

Ground-water sampling and analysis from wells at the 216-A-10 crib began in November 1988. Wells 299-E24-18 and 299-E25-36 provide data on background concentrations, and wells 299-E17-1, 299-E17-19, 299-E17-20, 299-E24-2, 299-E24-16, and 299-E24-17 are the downgradient monitoring wells (see Figure 9.1).

Collection and Analysis

The first set of ground-water samples were collected between November 1 and November 7, 1988. The "long list" of analyses (WAC 173-303-9905 and 40 CFR 261, Appendix IX) was conducted on the samples, and the results have all been received from the laboratory.

Water-level measurements were not obtained from all the wells at the time of sampling (see Table 9.6). Therefore, water levels were measured again on November 23, 1988, in all the wells except wells 299-E17-19 and 299-E24-18 (which had been measured at the time of sampling).

TABLE 9.1. Sediment Moisture Content, pH, Nitrate, Total Organic Carbon, Total Beta, Total Alpha, and Gamma (cesium-137) for Samples from Well 299-E17-19 at the 216-A-10 Crib

Depth, ft	% Moisture	pH	Nitrate, ppm	TOC, (a) ppm	Beta, pCi/g	Alpha, pCi/g	Cs-137, (b) pCi/g
5	3.01	8.3					
10	3.72	8.9					
15	3.74	8.6					
20	3.88	8.1	12.60	<10	26.1	<2	<0.02
25	3.12	8.3					
30	3.48	8.2	8.27	<10	25.3	6.5	<0.02
35	2.00	8.4					
40	3.44	8.0	5.22	<10	23.5	2.1	<0.02
45	2.96	8.0					
50	2.89	8.1	9.69	<10	24.6	4.3	<0.02
55	3.35	8.0					
60	5.53	4.0					572.00
65	4.78	6.8					
70	1.67	7.9	1.24	<10	50.0	3.0	<0.02
75	4.08	8.4					
80	4.30	8.3	<1	<10	76.3	<2	<0.10
85	4.76	7.9					
90	4.65	7.8	<1	12.80	62.8	<2	<0.02
95	3.83	7.6					
100	4.86	7.5	<1	<10	89.6	4.8	<0.02
105	4.38	7.9					
110	5.05	7.8	2.69	<10	96.7	5.4	<0.02
115	4.48	7.8					
120	4.33	7.8	1.35	<10	144.0	2.1	<0.02
125	3.83	8.1					
130	4.11	8.0	3.61	<10	126.0	4.2	<0.02
135	4.88	8.1					
140	5.62	8.3	4.72	<10	119.0	3.6	<0.02
145	3.48	8.6					
150	6.35	8.5	4.35	<10	146.0	5.2	<0.02
155	4.95	7.9					
160	4.64	7.9	3.49	<10	112.0	<2	<0.02
165	3.29						
170	4.18	7.9	5.14	<10	132.0	3.2	<0.02
175	3.78	8.5					
180	3.77						
185	3.56						
190			2.86	<10	45.6	<2	<0.02
195	3.95						
205	3.23						
210	3.70		2.13	16.20	55.4	3.8	<0.02
215	7.00						
220	3.59						
225	5.37						
230	3.75		1.10	13.00	45.6	<2	
235	3.77						
240	4.56						
245	4.12						
250	6.87		37.90	<10	27.9	4.4	
255	6.03						
260	3.02						
265	3.34						
270	2.77		56.80	<10	19.1	3.4	
275	3.36						
280	5.45						
285	3.41						
288.5	16.82						
290	19.26		181.00	<12	32.1	11.9	
293.5	13.43						

(a) TOC = total organic carbon.

(b) Cs-137 = cesium-137.

TABLE 9.2. Sediment Moisture Content, pH, Nitrate, Total Organic Carbon, Total Beta, Total Alpha, and Gamma (cesium-137) for Samples from Well 299-E17-20 at the 216-A-10 Crib

Depth, ft	% Moisture	pH	Nitrate, ppm	TOC, (a) ppm	Beta, pCi/g	Alpha, pCi/g	Cs-137, (b) pCi/g
5	2.83	ALL >7.0					
10	2.70						
15	2.72						
20	1.98		<1	<10	23.9	<1	<0.02
25	2.00						
30	2.89				23.8	3.4	<0.02
35	1.07						
40	1.24		1.19	<10	26.5	5.2	<0.02
45	1.27						
50	1.49		1.59	<10	24.4	<2	<0.02
55	1.55						
57					673	80.4	1280
60	0.76		19.50	<10	81.7	9.2	<0.02
65	2.58						
70	2.05		17.00	<10	42.7	<2	<0.02
75	1.90						
80	1.96		10.90	<10	45.3	3.9	<0.02
85	2.00						
90	3.40		1.62	<10	124.0	3.2	<0.02
95	3.87						
100	5.82			<10	76.1	3.5	<0.02
104	7.52		10.8	<12	136	2.57	<0.02
105	5.30						
110	3.18		2.94	<10	115.0	2.6	<0.02
115	3.93						
120	6.75		5.07	<10	139.0	4.6	
125	3.86						
130	3.75		13.10	<10	31.2	2.1	
135	2.71						
140	7.84		23.80	<10	26.7	4.3	<0.02
145	4.40						
150	5.10		11.80	<10	24.7	5.0	<0.02
155	4.83						
160	11.59		10.30	<10	25.4	4.1	<0.02
165	4.17						
170	3.62		39.40	13	26.0	2.3	<0.02
175	5.62						
180	3.81						
185	3.44						
190	4.55		20.90	<10	26.3	3.0	<0.02
195	4.94						
200	4.04						
205	3.11						
210	6.85		66.40	10.60	19.9	2.4	
215	3.61						
220	3.44						
225	3.70						
230	3.71		103.00	10.40	18.8	2.3	
240	4.96						
245	3.77						
250	5.32		95.10	<10	20.1	42.3	
255	4.02						
260	3.00						
265	3.59						

(a) TOC = total organic carbon.

(b) Cs-137 = cesium-137.

TABLE 9.3. Sediment Moisture Content, pH, Nitrate, Total Organic Carbon, Total Beta, Total Alpha, and Gamma (cesium-137) for Samples from Well 299-E24-16 at the 216-A-10 Crib

Depth, ft	% Moisture	pH	Nitrate, ppm	TOC, (a) ppm	Beta, pCi/g	Alpha, pCi/g	Cs-137, (b) pCi/g
5	3.34						
10	3.18						
15	2.48						
20	1.82		<1	<10	29.9	3.3	<0.02
25	3.20	9.1					
30	5.74		5.98	<10	22.7	2.9	
35	3.52	8.7					
40	2.74		4.96	<12	23.9	4.8	
45	5.67	9.5					
50	2.34	8.5	12.20	<10	21.6	<2	<0.02
55	3.95	8.4					
60	4.92	6.8	<1	<10		14.8	0.14
65	6.14	6.9					
70	5.85	4.5	<1	29.10	587.0	55.3	929.00
75	4.41	5.3					
80	4.86		50.50	11.60	354.0	82.2	0.44
85	5.57						
90	2.91	7.8	25.70	<10	327.0	2.2	<0.02
95	3.27	8.0					
100	4.19	7.8	25.10	<10	300.0	3.7	<0.02
105	6.72						
110	3.50		19.50	<10	305.0	7.3	0.16
115	3.31						
120	7.37	8.2	37.30	<10	224.0	6.8	<0.02
125	4.84						
130	3.43	8.3	28.10	<10	333.0	5.2	<0.02
135	3.82	8.3					
140	6.40	8.4	78.60	<10	136.0	6.3	<0.02
145	2.93	8.4					
150	6.48	8.4	48.90	<10	67.2	3.9	<0.02
155	3.85	8.6					
160	3.89	8.5	40.20	<10	125.0	3.0	<0.02
165	3.49	8.3					
170	1.68		134.00	<10			
175	11.05						
180	3.60						
185	4.47						
190	4.40	7.6	78.90	<10	22.7	<2	<0.02
195	3.47	8.5					
200	4.45	7.9					
205	3.53	8.1					
210	3.73	8.4	111.00	14.40	18.4	<2	
215	3.75	8.8					
220	3.26	8.9					
225	4.43	8.9					
230	3.83	8.3	166.00	<10	17.3	4.2	
235	3.21	8.0					
240	3.58	8.0					
245	4.18	8.4					
250	5.52	8.5	30.00	<10	22.0	4.0	
255	3.74	8.3					
260	3.31	8.4					
265	4.01	8.9					

(a) TOC = total organic carbon.

(b) Cs-137 = cesium-137.

TABLE 9.4. Sediment Moisture Content, pH, Nitrate, Total Organic Carbon, Total Beta, Total Alpha, and Gamma (cesium-137) for Samples from Well 299-E24-17 at the 216-A-10 Crib

Depth, ft	% Moisture	pH	Nitrate, ppm	TOC, ^(a) ppm	Beta, pCi/g	Alpha, pCi/g	Cs-137, ^(b) pCi/g
5	4.10	8.1					
10	2.70	8.1					
15	3.72	7.8					
20	2.20	8.5	2.28	<10	26.3	2.5	<0.02
25	3.95	8.0					
30	2.14	8.9	1.52	<10	25.1	3.0	<0.02
35	2.02	8.5					
40	2.38	8.5	<1	<10	24.8	<1	<0.02
45		8.0					
50	2.37	8.2	2.30	<10	25.8	<2	<0.02
55	2.99	7.9					
56		4.8					
60	4.07		17.70	21.90	112.0	11.1	2.86
65	3.78						
70	4.37	8.1	15.10	<10	97.4	14.3	0.03
75	2.67	8.0					
80	2.89	8.1	11.70	<10	106.0	4.5	<0.02
85	6.38	7.3					
90	5.96	7.3	8.97	<10	307.0	<2	<0.02
95	3.45	8.1					
100	4.30	8.3	27.10	<10	191.0	8.0	<0.02
105	4.57	8.3					
110	5.56	8.2	19.40	<10	182.0	6.8	<0.02
115	5.89	8.7					
120	4.33	8.5	13.10	<10	190.0	<1	<0.02
125	3.70						
130	3.58	8.6	15.10	<10	221.0	3.3	<0.02
135	4.82	8.2					
140	3.96	8.1	15.80	<10	55.7	<2	<0.02
145	4.79	8.1					
150	3.51	8.0	18.60	<10	105.0	4.7	0.25
155	4.60						
160	4.51	8.2	25.70	<10	23.3	2.6	<0.02
165	5.03	8.2					
170	4.66	8.3			24.7	3.2	<0.02
175	3.47	8.3					
180	3.74	8.3					
185	1.95						
190	2.99		21.80	<10	19.9	3.6	<0.02
195	2.62						
200	3.15						
205	3.68						
210	3.35		24.50	<10	22.2	<2	<0.02
215	4.00						
220	4.15						
225	4.37						
230	2.58		31.40	<10	19.2	2.2	<0.02
235	3.59						
240	3.54						
245	3.48						
250	2.77		21.10	<10	19.0	<2	<0.02
255	3.86						
260	3.01						
265	3.19						

(a) TOC = total organic carbon.

(b) Cs-137 = cesium-137.

TABLE 9.5. Sediment Moisture Content Data for Samples from Wells 299-E24-18 and 299-E25-36 at the 216-A-10 Crib

Well 299-E24-18		Well 299-E25-36	
Depth, ft	% Moisture	Depth, ft	% Moisture
5	2.89	5	4.93
10	2.14	10	2.25
15	1.90	15	3.69
20	1.60	20	3.84
25	1.47	25	2.82
30	1.68	30	2.84
35	1.52	35	3.90
40	1.53	40	3.34
45	1.41	45	3.87
50	1.59	50	3.93
55	1.65		
60	1.91		
65	1.85		
70	1.94		
75	1.65	75	3.07
80	1.64	80	4.84
85	1.65	85	3.97
90	1.77	90	2.85
95	3.14	95	3.34
100	1.95	100	2.64
105	1.88	105	3.11
110	1.75	110	2.95
115	1.80	115	4.06
120	3.54	120	2.84
125	1.61	125	3.33
130	1.73	130	4.00
135	1.75	135	2.86
140	1.84	140	5.02
145	1.87	145	2.92
150	1.66	150	2.98
155	1.78	155	2.82
160	1.93		
165	1.93		
170	1.83	170	3.78
175	2.45	175	1.63
180	1.96	180	3.28
185	1.77	185	3.82
190	2.03	190	4.35
195	2.34	195	3.58
200	1.78	200	3.17
205	2.70	205	3.84
210	2.07	210	5.72
215	2.01	215	2.97
220	2.17	220	3.17
225	2.14	225	4.46
230	2.27	230	3.27
235	2.12	235	3.33
240	2.12		
245	1.96	245	2.98
250	2.00	250	3.52
255	2.03		
260	2.13		

TABLE 9.6. Casing Elevations, Water-Level Measurements, and Water-Level Elevations for Wells at the 216-A-10 Crib

<u>Well Number</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Date of Measurement</u>	<u>Depth to Water, ft</u>	<u>Water-Level Elevation, ft above MSL</u>
299-E17-1	719.17	11-07-88(b)	313.80	405.37
		11-23-88(c)	314.00	405.17
299-E17-8	718.38	11-23-88	313.05	405.33
299-E17-19	719.33	11-02-88	(d)	(d)
		11-23-88	(d)	(d)
299-E17-20	719.23	11-02-88	(d)	(d)
		11-23-88	313.49	405.74
299-E24-2	717.47	11-02-88	(d)	(d)
		11-23-88	312.09	405.38
299-E24-16	718.27	11-03-88	313.44	404.83
		11-23-88	313.03	405.24
299-E24-17	718.69	11-03-88	312.65	406.04
		11-03-88	315.20	403.49
		11-23-88	313.89	404.80
299-E24-18	719.28	11-03-88	312.50	406.78
		11-23-88	(d)	(d)
299-E25-36	707.39	11-04-88	300.76	406.63
		11-23-88	301.62	405.77

(a) MSL = mean sea level.

(b) Data collected before sample collection.

(c) Data collected at other times.

(d) No measurements were made.

Discussion of Results

A summary of the analytical results is provided in Table 9.7. The results for constituents with at least one detected value are provided in Table 9.8. (The sampling schedule for the 216-A-10 Crib is shown in Table 9.9.) Major observations of the analyses are discussed below.

TABLE 9.7. Constituent List and Summary of Sampling Results for the 216-A-10 Crib, November 1988

----- Constituent List=Contamination Indicator Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
088	CONDLAB	umho	.	32	0	700 WDOE	Specific conductance, laboratory
191	CONDFLD	umho	1	34	0	700 WDOE	Specific conductance, field
199	PHFIELD		0.1	34	0	6.5-8.5 EPAS	pH, field
207	PH-LAB		0.01	32	0	6.5-8.5 EPAS	pH, laboratory
C69	TOC	ppb	1000	32	0	.	Total organic carbon
H42	TOXLDL	ppb	20	32	0	.	Total organic halogens, low DL

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

TABLE 9.7. (contd)

Constituent List=Water Quality Parameters									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full name	
A11	SODIUM	ppb	200	9	0	.		Sodium	
A17	MANGENE	ppb	5	9	1	50	EPAS	Manganese	
A19	IRON	ppb	30	9	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	9	0	.		Sodium, filtered	
H29	FMANGAN	ppb	5	9	9 ***	50	EPAS	Manganese, filtered	
H31	FIRON	ppb	30	9	8	300	EPAS	Iron, filtered	
----- Constituent List=Site Specific and Other Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard	Agency Exceeded	Full name	
A01	BERYLUM	ppb	5	9	9 ***	.		Beryllium	
A03	STRONTUM	ppb	20	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	3	1300	EPAP	Copper	
A14	VANADIUM	ppb	5	9	0	.		Vanadium	
A16	ANTIMONY	ppb	100	9	9 ***	.		Antimony	
A18	ALUMINUM	ppb	150	9	9 ***	.		Aluminum	
A18	POTASSUM	ppb	100	9	0	.		Potassium	
A50	MAGNES	ppb	50	9	0	.		Magnesium	
C78	PHOSPHA	ppb	1000	8	8 ***	.		Phosphate	
H18	TC	ppb	1000	8	0	.		Total carbon	
H18	FZINC	ppb	5	9	0	5000	EPAS	Zinc, filtered	
H19	FCALCIU	ppb	50	9	0	.		Calcium, filtered	
H25	FNICKEL	ppb	10	9	2	.		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	20	9	0	.		Strontium, filtered	
H36	FANTIMO	ppb	100	9	9 ***	.		Antimony, filtered	
H58	ALKALIN	ppb	20000	1	0	.		Total alkalinity, as CaCO3	
H66	BROMIDE	ppb	1000	8	8 ***	.		Bromide	
H67	NITRITE	ppb	1000	8	8 ***	.		Nitrite	
I01	ACETONE	ppb	10	9	4	.		Acetone	
I09	BUTANOL	ppb	5000	8	8 ***	.		1-Butanol	
I10	PROPANL	ppb	5000	8	8 ***	.		2-Propanol	
I21	TRIBUPH	ppb	10	8	8 ***	.		Tributylphosphoric acid	
I26	TAF	ppb	10	8	8 ***	.		Tetrahydrofuran	
I67	ETHANOL	ppb	5000	8	8 ***	.		Ethanol	
L20	MBP	ppb	5000	8	8 ***	.		Monobutylphosphate	
L21	OBP	ppb	5000	8	8 ***	.		Dibutylphosphate	

TABLE 9.7. (contd)

Constituent List=WAC 173-303-9905						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A23 THALIUM	ppb	5	9	9 ***	.	Thallium
A24 THIOUREA	ppb	200	8	8 ***	.	Thiourea
A25 ACETREA	ppb	200	8	8 ***	.	1-Acetyl-2-thiourea
A26 CHLOREA	ppb	200	8	8 ***	.	1-(o-Chlorophenyl) thiourea
A27 DIETROL	ppb	200	8	8 ***	.	Diethylstilbestrol
A28 ETHYREA	ppb	200	8	8 ***	.	Ethylenethiourea
A29 NAPHREA	ppb	200	8	8 ***	.	1-Naphthyl-2-thiourea
A32 PHENREA	ppb	500	8	8 ***	.	N-phenylthiourea
A40 DDD	ppb	0.1	9	9 ***	.	DDD
A41 DDE	ppb	0.1	9	9 ***	.	DDE
A42 DDT	ppb	0.1	9	9 ***	.	DDT
A43 HEPTLOR	ppb	0.1	9	9 ***	0 EPAP	Heptachlor
A44 HEPTIDE	ppb	0.1	9	9 ***	0 EPAP	Heptachlor epoxide
A46 DIELRIN	ppb	0.1	9	9 ***	.	Dieldrin
A47 ALDRIN	ppb	0.1	9	9 ***	.	Aldrin
A48 CHLOANE	ppb	1	9	9 ***	0 EPAP	Chlordane
A49 ENDO1	ppb	0.1	9	9 ***	.	Endosulfan I (alpha)
A52 ENDO2	ppb	0.1	9	9 ***	.	Endosulfan II (beta)
A54 AR1016	ppb	1	8	8 ***	0 EPAP	Arochlor 1016
A55 AR1221	ppb	1	8	8 ***	0 EPAP	Arochlor 1221
A56 AR1232	ppb	1	8	8 ***	0 EPAP	Arochlor 1232
A57 AR1242	ppb	1	8	8 ***	0 EPAP	Arochlor 1242
A58 AR1248	ppb	1	8	8 ***	0 EPAP	Arochlor 1248
A59 AR1254	ppb	1	8	8 ***	0 EPAP	Arochlor 1254
A60 AR1260	ppb	1	8	8 ***	0 EPAP	Arochlor 1260
A61 TETRANE	ppb	5	9	9 ***	5 EPA	Tetrachloromethane [Carbon Tetrachloride]
A62 BENZENE	ppb	5	9	9 ***	5 EPA	Benzene
A63 DIOXANE	ppb	500	9	9 ***	.	Dioxane
A64 METHONE	ppb	10	9	9 ***	.	Methyl ethyl ketone
A65 PYRIDIN	ppb	500	9	9 ***	.	Pyridine
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 [1,1,2-Trichloroethane]
A70 PERCENE	ppb	5	9	9 ***	.	Perchloroethylene [Tetrachloroethane]
A71 OPXYLE	ppb	5	9	9 ***	440 EPAP	Xylene-o,p
A72 ACROLIN	ppb	10	9	9 ***	.	Acrolein
A73 ACRYLE	ppb	10	9	9 ***	.	Acrylonitrile
A74 BISTHER	ppb	10	9	9 ***	.	Bis(chloromethyl) ether
A75 BROMONE	ppb	10	9	9 ***	.	Bromoacetone
A76 METHBRO	ppb	10	9	9 ***	.	Methyl bromide
A77 CARBIDE	ppb	10	9	9 ***	.	Carbon disulfide
A78 CHLBENZ	ppb	10	9	9 ***	60 EPAP	Chlorobenzene
A79 CHLTHER	ppb	10	9	9 ***	.	2-Chloroethyl vinyl ether
A80 CHLFORM	ppb	5	9	9 ***	100 EPA	Chloroform [Trichloromethane]
A81 METHCHL	ppb	10	9	9 ***	.	Methyl chloride [Chloromethane]
A82 CHMTHER	ppb	10	9	9 ***	.	Chloromethyl methyl ether
A83 CROTONA	ppb	10	9	9 ***	.	Crotonaldehyde
A84 DIBRCHL	ppb	10	9	9 ***	0 EPAP	1,2-Dibromo-3-chloropropane
A85 DIBRETH	ppb	10	9	9 ***	.	1,2-Dibromoethane

TABLE 9.7. (contd)

----- Constituent List=WAC 173-303-9905 -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name	
A86	DIBRMET	ppb	10	9	9 ***	.		Dibromomethane	
A87	DIBUTEN	ppb	10	9	9 ***	.		1,4-Dichloro-2-butene	
A88	DICDIFM	ppb	10	9	9 ***	.		Dichlorodifluoromethane	
A89	1,1-DIC	ppb	10	9	9 ***	.		1,1-Dichloroethane	
A90	1,2-DIC	ppb	10	9	9 ***	6	EPA	1,2-Dichloroethane	
A91	TRANDE	ppb	10	9	9 ***	70	EPAP	trans-1,2-Dichloroethene	
A92	DICETHY	ppb	10	9	9 ***	7	EPA	1,1-Dichloroethylene	
A93	METHYCH	ppb	10	9	7	.		Methylene chloride [Dichloromethane]	
A94	DICPANE	ppb	10	9	9 ***	8	EPAP	1,2-Dichloropropane	
A95	DICPENE	ppb	10	9	9 ***	.		1,3-Dichloropropene	
A96	MNDIEHY	ppb	10	9	9 ***	.		N,N-diethylhydrazine	
A99	HYDRSUL	ppb	10	9	9 ***	.		Hydrogen sulfide	
B01	IODOMET	ppb	10	9	9 ***	.		Iodomethane	
B02	METHACR	ppb	10	9	9 ***	.		Methacrylonitrile	
B03	METHTHI	ppb	10	9	9 ***	.		Methanethiol	
B04	PENTACH	ppb	10	9	9 ***	.		Pentachloroethane	
B05	1112-tc	ppb	10	9	9 ***	.		1,1,1,2-Tetrachloroethane	
B06	1122-tc	ppb	10	9	9 ***	.		1,1,2,2-Tetrachloroethane	
B08	BROMORM	ppb	10	9	9 ***	100	EPA	Bromoform [Tribromomethane]	
B09	TRCMEOL	ppb	10	9	9 ***	.		Trichloromethanethiol	
B10	TRCMFLM	ppb	10	9	9 ***	.		Trichloromonofluoromethane	
B11	TRCPANE	ppb	10	9	9 ***	.		Trichloropropane	
B12	123-trp	ppb	10	9	9 ***	.		1,2,3-Trichloropropane	
B13	VINYIDE	ppb	10	9	9 ***	2	EPA	Vinyl chloride	
B14	M-XYLE	ppb	6	9	9 ***	440	EPAP	Xylene-m	
B15	DIETHY	ppb	10	9	9 ***	.		Diethylarsine	
B19	ACETILE	ppb	3000	9	9 ***	.		Acetonitrile	
B20	ACETOPH	ppb	10	8	8 ***	.		Acetophenone	
B21	WARFRIN	ppb	10	8	8 ***	.		Warfarin	
B22	ACEFENE	ppb	10	8	8 ***	.		2-Acetylaminofluorene	
B23	AMINOYL	ppb	10	8	8 ***	.		4-Aminobiphenyl	
B24	AMIISOX	ppb	10	8	8 ***	.		6-(Aminomethyl)-3-isoxazole	
B25	AMITROL	ppb	10	8	8 ***	.		Amitrole	
B26	ANILINE	ppb	10	8	8 ***	.		Aniline	
B27	ARAMITE	ppb	10	8	8 ***	.		Aramite	
B28	AURAMIN	ppb	10	8	8 ***	.		Auramine	
B29	BENZCAC	ppb	10	8	8 ***	.		Benz[c]acridine	
B30	BENZAAN	ppb	10	8	8 ***	.		Benz[a]anthracene	
B31	BENDICM	ppb	10	8	8 ***	.		Benzene, dichloromethyl	
B32	BENTHOL	ppb	10	8	8 ***	.		Benzenethiol	
B33	BENDINE	ppb	10	8	8 ***	.		Benzidine	
B34	BENZBFL	ppb	10	8	8 ***	.		Benzo[b]fluoranthene	
B35	BENZJFL	ppb	10	8	8 ***	.		Benzo[j]fluoranthene	
B36	PBENZQU	ppb	10	8	8 ***	.		p-Benzoquinone	
B37	BENZCHL	ppb	10	8	8 ***	.		Benzyl chloride	
B38	BIS2CHM	ppb	10	8	8 ***	.		Bis(2-chloroethoxy) methane	
B39	BIS2CHE	ppb	10	8	8 ***	.		Bis(2-chloroethyl) ether	
B40	BIS2EPH	ppb	10	8	6	.		Bis(2-ethylhexyl) phthalate	
B41	BROPHEN	ppb	10	8	8 ***	.		4-Bromophenyl phenyl ether	
B42	BUTBENP	ppb	10	8	8 ***	.		Butyl benzyl phthalate	

TABLE 9.7. (contd)

Constituent List=WAC 173-303-9906								
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
B43	BUTDIMP	ppb	10	8	8 ***	.	2-sec-Butyl-4,6-dinitrophenol (DNBP)	
B44	CHALETH	ppb	10	8	8 ***	.	Chloroalkyl ethers	
B45	CHLANIL	ppb	10	8	8 ***	.	p-Chloroaniline	
B46	CHLCRES	ppb	10	8	8 ***	.	p-Chloro-m-cresol	
B47	CHLEPOX	ppb	10	8	8 ***	0 EPAP	1-Chloro-2,3-epoxypropane	
B48	CHLNAPH	ppb	10	8	8 ***	.	2-Chloronaphthalene	
B49	CHLPHEN	ppb	10	8	8 ***	.	2-Chlorophenol	
B50	CHRYSEN	ppb	10	8	8 ***	.	Chrysene	
B51	CRESOLS	ppb	10	8	8 ***	.	Cresols	
B52	CYCHDIN	ppb	10	8	8 ***	.	2-Cyclohexyl-4,6-dinitrophenol	
B53	DIBAHAC	ppb	10	8	8 ***	.	Dibenz[a,h]acridine	
B54	DIBAJAC	ppb	10	8	8 ***	.	Dibenz[a,j]acridine	
B55	DIBAHAN	ppb	10	8	8 ***	.	Dibenz[a,h]anthracene	
B56	DIBCGCA	ppb	10	8	8 ***	.	7H-Dibenzo[c,g]carbazole	
B57	DIBAEPY	ppb	10	8	8 ***	.	Dibenzo[a,e]pyrene	
B58	DIBAHFY	ppb	10	8	8 ***	.	Dibenzo[a,h]pyrene	
B59	DIBAIPY	ppb	10	8	8 ***	.	Dibenzo[a,i]pyrene	
B60	DIBPHTH	ppb	10	8	8 ***	.	Di-n-butyl phthalate	
B61	12-dben	ppb	10	8	8 ***	.	1,2-Dichlorobenzene	
B62	13-dben	ppb	10	8	8 ***	.	1,3-Dichlorobenzene	
B63	14-dben	ppb	10	8	8 ***	.	1,4-Dichlorobenzene	
B64	DICHBEN	ppb	20	8	8 ***	.	3,3'-Dichlorobenzidine	
B65	24-dchp	ppb	10	8	8 ***	.	2,4-Dichlorophenol	
B66	26-dchp	ppb	10	8	8 ***	.	2,6-Dichlorophenol	
B67	DIEPHTH	ppb	10	8	8 ***	.	Diethyl phthalate	
B68	OIHYSAF	ppb	10	8	8 ***	.	Olhydroxazole	
B69	DIMETHB	ppb	10	8	8 ***	.	3,3'-Dimethoxybenzidine	
B70	DIMEAMB	ppb	10	8	8 ***	.	p-Dimethylaminoazobenzene	
B71	DIMBENZ	ppb	10	8	8 ***	.	7,12-Dimethylbenz[a]anthracene	
B72	DIMEYLB	ppb	10	8	8 ***	.	3,3'-Dimethylbenzidine	
B73	THIONOX	ppb	10	8	8 ***	.	Thiofanox	
B74	DIMPHAM	ppb	10	8	8 ***	.	alpha,alpha-Dimethylphenethylamine	
B75	DIMPHEN	ppb	10	8	8 ***	.	2,4-Dimethylphenol	
B76	DIMPHTH	ppb	10	8	8 ***	.	Dimethyl phthalate	
B77	DINBENZ	ppb	10	8	8 ***	.	Dinitrobenzene	
B78	DINCRES	ppb	10	8	8 ***	.	4,6-Dinitro-o-cresol and salts	
B79	DINPHEN	ppb	50	8	8 ***	.	2,4-Dinitrophenol	
B80	24-dint	ppb	10	8	8 ***	.	2,4-Dinitrotoluene	
B81	26-dint	ppb	10	8	8 ***	.	2,6-Dinitrotoluene	
B82	DIOPTH	ppb	10	8	8 ***	.	Di-n-octyl phthalate	
B83	DIPHAMI	ppb	10	8	8 ***	.	Diphenylamine	
B84	DIPHHYD	ppb	10	8	8 ***	.	1,2-Diphenylhydrazine	
B85	DIPRNIT	ppb	10	8	8 ***	.	Di-n-propylnitrosamine	
B86	ETHMINE	ppb	10	8	8 ***	.	Ethyleneimine	
B87	ETHMETS	ppb	10	8	8 ***	.	Ethyl methanesulfonate	
B88	FLUORAN	ppb	10	8	8 ***	.	Fluoranthene	
B89	HEXC BEN	ppb	10	8	8 ***	.	Hexachlorobenzene	
B90	HEXC BUT	ppb	10	8	8 ***	.	Hexachlorobutadiene	
B91	HEXC CYC	ppb	10	8	8 ***	.	Hexachlorocyclopentadiene	
B92	HEXC ETH	ppb	10	8	8 ***	.	Hexachloroethane	

TABLE 9.7. (contd)

----- Constituent List=WAC 173-303-9905 -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards	Agency Exceeded	Full name	
B93	INDENOP	ppb	10	8	8 ***	.	.	Indeno(1,2,3-cd)pyrene	
B94	ISOSOLE	ppb	10	8	8 ***	.	.	Isosafrole	
B95	MALOILE	ppb	10	8	8 ***	.	.	Malononitrile	
B96	MELPHAL	ppb	10	8	8 ***	.	.	Melphalan	
B97	METHAPY	ppb	10	8	8 ***	.	.	Methapyrilene	
B98	METHNYL	ppb	10	8	8 ***	.	.	Metholonyl	
B99	METAZIR	ppb	10	8	8 ***	.	.	2-Methylaziridine	
C01	METCHAN	ppb	10	8	8 ***	.	.	3-Methylcholanthrene	
C02	METBISC	ppb	10	8	8 ***	.	.	4,4'-Methylenebis(2-chloroaniline)	
C03	METACTO	ppb	10	8	8 ***	.	.	2-Methylactonitrile	
C04	METACRY	ppb	10	9	9 ***	.	.	Methyl methacrylate	
C05	METMSUL	ppb	10	8	8 ***	.	.	Methyl methanesulfonate	
C06	METPROP	ppb	10	8	8 ***	.	.	2-Methyl-2-(methylthio) propionaldehyde-	
C07	METHIOU	ppb	10	8	8 ***	.	.	Methylthiouracil	
C08	NAPHQUI	ppb	10	8	8 ***	.	.	1,4-Naphthoquinone	
C09	1-napha	ppb	10	8	8 ***	.	.	1-Naphthylamine	
C10	2-napha	ppb	10	8	8 ***	.	.	2-Naphthylamine	
C11	NITRAMI	ppb	50	8	8 ***	.	.	p-Nitroaniline	
C12	NITBENZ	ppb	10	8	8 ***	.	.	Nitrobenzene	
C13	NITPHEN	ppb	50	8	8 ***	.	.	4-Nitrophenol	
C14	NNIBUTY	ppb	10	8	8 ***	.	.	N-nitrosodi-n-butylamine	
C15	NNIDIEA	ppb	10	8	8 ***	.	.	N-nitrosodietanolamine	
C16	NNIDIEY	ppb	10	8	8 ***	.	.	N-nitrosodiethylamine	
C17	NNIDIME	ppb	10	8	8 ***	.	.	N-nitrosodimethylamine	
C18	NNIMETH	ppb	10	8	8 ***	.	.	N-nitrosomethylethylamine	
C19	NNIURET	ppb	10	8	8 ***	.	.	N-nitroso-n-methylurethane	
C20	NNIVINY	ppb	10	8	8 ***	.	.	N-nitrosomethylvinylamine	
C21	NNIMORP	ppb	10	8	8 ***	.	.	N-nitrosomorpholine	
C22	NNINICO	ppb	10	8	8 ***	.	.	N-nitrosomornicotine	
C23	NNIPIPE	ppb	10	8	8 ***	.	.	N-nitrosopiperidine	
C24	NITRPYR	ppb	10	8	8 ***	.	.	Nitrosopyrrolidine	
C25	NITRTOL	ppb	10	8	8 ***	.	.	5-Nitro-o-toluidine	
C26	PENTCHB	ppb	10	8	8 ***	.	.	Pentachlorobenzene	
C27	PENTCHN	ppb	10	8	8 ***	.	.	Pentachloronitrobenzene	
C28	PENTCHP	ppb	50	8	8 ***	220	EPAP	Pentachlorophenol	
C29	PHENTIN	ppb	10	8	8 ***	.	.	Phenacetin	
C30	PHENINE	ppb	10	8	8 ***	.	.	Phenylenediamine	
C31	PHTHEST	ppb	10	8	8 ***	.	.	Phthalic acid esters	
C32	PICOLIN	ppb	10	8	8 ***	.	.	2-Picoline	
C33	PRONIDE	ppb	10	8	8 ***	.	.	Pronamide	
C34	RESERPI	ppb	10	8	8 ***	.	.	Reserpine	
C35	RESORCI	ppb	10	8	8 ***	.	.	Resorcinol	
C36	SAFROL	ppb	10	8	8 ***	.	.	Safrol	
C37	TETRCHB	ppb	10	8	8 ***	.	.	1,2,4,6-Tetrachlorobenzene	
C39	TETRCHP	ppb	10	8	8 ***	.	.	2,3,4,6-Tetrachlorophenol	
C40	THIURAM	ppb	10	8	8 ***	.	.	Thiuram	
C41	TOLUDIA	ppb	10	8	8 ***	.	.	Toluenediamine	
C42	OTOLHYD	ppb	10	8	8 ***	.	.	o-Toluidine hydrochloride	
C43	TRICHLB	ppb	10	8	8 ***	.	.	1,2,4-Trichlorobenzene	
C44	245-trp	ppb	50	8	8 ***	.	.	2,4,6-Trichlorophenol	
C45	248-trp	ppb	10	8	8 ***	.	.	2,4,8-Trichlorophenol	

TABLE 9.7. (contd)

----- Constituent List=WAC 173-303-9905 -----						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
C46	TRIPHOS	ppb	10	8	8 ***	. 0,0,0-triethyl phosphorothioate
C47	SYMTRIN	ppb	10	8	8 ***	. Sym-trinitrobenzene
C48	TRISPHO	ppb	10	8	8 ***	. Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	ppb	10	8	8 ***	. Benzo[a]pyrene
C50	CHLNAPZ	ppb	10	8	8 ***	. Chloronaphazene
C61	BISZETH	ppb	10	8	8 ***	. Bis(2-chloroisopropyl) ether
C62	HEXAENE	ppb	10	8	8 ***	. Hexachloropropene
C63	HYDRAZI	ppb	3000	8	8 ***	. Hydrazine
C64	HEXACHL	ppb	10	8	8 ***	. Hexachlorophene
C65	NAPHTHA	ppb	10	8	8 ***	. Naphthalene
C66	123TRI	ppb	10	8	8 ***	. 1,2,3-Trichlorobenzene
C68	135TRI	ppb	10	8	8 ***	. 1,3,5-Trichlorobenzene
C69	1234TE	ppb	10	8	8 ***	. 1,2,3,4-Tetrachlorobenzene
C60	1235TE	ppb	10	8	8 ***	. 1,2,3,5-Tetrachlorobenzene
C61	TETEPYR	ppb	2	8	8 ***	. Tetraethylpyrophosphate
C62	CHLLATE	ppb	30	8	8 ***	. Chlorobenzilate
C63	CARBPHT	ppb	2	8	8 ***	. Carbophenothion
C64	DISULFO	ppb	2	8	8 ***	. Disulfoton
C65	DIMETHO	ppb	2	8	8 ***	. Dimethoate
C66	METHPAR	ppb	2	8	8 ***	. Methyl parathion
C67	PARATHI	ppb	2	8	8 ***	. Parathion
C70	CYANIDE	ppb	10	8	8 ***	. Cyanide
C71	FORMALN	ppb	500	8	8 ***	. Formalin
C77	PERCHLO	ppb	1000	8	8 ***	. Perchlorate
C78	SULFIDE	ppb	1000	8	8 ***	. Sulfide
C79	KEROSENE	ppb	10000	8	8 ***	. Kerosene
C80	AMMONIU	ppb	50	8	8 ***	. Ammonium ion
C88	DIOXIN	ppb	0.1	8	8 ***	. Dioxin
C87	CITRUSR	ppb	1000	8	8 ***	. Citrus red
C90	PARALDE	ppb	2000	8	8 ***	. Paraldehyde
C91	STRYCHN	ppb	50	8	8 ***	. Strychnine
C92	MALHYDR	ppb	500	8	8 ***	. Maleic hydrazide
C93	NICOTIN	ppb	100	8	8 ***	. Nicotinic acid
C94	ACRYIDE	ppb	10000	8	8 ***	. Acrylamide
C95	ALLYLAL	ppb	2500	8	8 ***	. Allyl alcohol
C97	CHLACET	ppb	18000	8	8 ***	. Chloroacetaldehyde
C98	CHLPROP	ppb	4000	8	8 ***	. 3-Chloropropionitrile
H03	ETHCARB	ppb	5000	8	8 ***	. Ethyl carbamate
H04	ETHCYAN	ppb	2000	8	8 ***	. Ethyl cyanide
H05	ETHOXID	ppb	3000	8	8 ***	. Ethylene oxide
H06	ETHMETH	ppb	10	8	8 ***	. Ethyl methacrylate
H09	ISOBUTY	ppb	1000	8	8 ***	. Isobutyl alcohol
H11	PROPYLA	ppb	10000	8	8 ***	. n-Propylamine
H12	PROPYNO	ppb	8000	8	8 ***	. 2-Propyn-1-ol
H15	2,4,5-T	ppb	2	8	8 ***	. 2,4,5-T
H40	FTHALLI	ppb	5	8	8 ***	. Thallium, filtered
H68	HEXONE	ppb	10	8	8 ***	. Hexone

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

xxx - Indicates that Drinking Water Standards were exceeded

EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)

National Primary Drinking Water Regulations as amended by 52 FR 25690

EPAR - based on National Interim Primary Drinking Water Regulations,

TABLE 9.7. (contd)

Appendix IV, EPA-570/9-76-003
EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 48938
EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 148
National Secondary Drinking Water Regulations
WDOE - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-64, Public Water Supplies

TABLE 9.8. Constituents with at Least One Detected Value for the 216-A-10 Crib,
November 1988

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5e	PHFIELD 0.1/8.5e	TOC ppb 1000/.	TOXLDL ppb 20/.
2-E17-1	07NOV88		548	593	7.6	7.8	#500	#1
		1	546	601	7.7	7.7	#600	#6
		2	546	608	7.8	7.7	#600	#4
		3	546	603	7.7	7.8	#500	#2
2-E17-19	02NOV88		468	441	7.6	7.6	#500	#2
		1	471	443	7.6	7.7	#500	#2
		2	473	440	7.6	7.6	#400	#2
		3	473	439	7.6	7.7	#500	#5
2-E17-20	02NOV88		694	641	7.6	7.6	#400	#2
		1	694	651	7.6	7.8	#400	#3
		2	694	642	7.8	7.7	#500	#2
		3	693	640	7.6	7.8	#500	#1
2-E24-2	01NOV88		384	360	7.6	8.2	#400	#2
		1	383	359	7.8	8.0	#500	#2
		2	384	364	7.6	8.0	#400	#1
		3	384	365	7.6	8.0	#500	#2
2-E24-2	03NOV88		340	.	.	7.9	.	.
2-E24-16	03NOV88		399	415	7.5	7.9	#400	#16
		1	396	421	7.5	7.8	#500	#9
		2	399	428	7.5	8.0	#500	#11
		3	400	423	7.6	7.9	#400	#7
2-E24-17	03NOV88		425	450	7.6	7.6	#500	#4
		1	423	453	7.6	7.9	#500	#8
		2	425	446	7.7	7.6	#500	#9
		3	424	449	7.7	7.7	#500	#3
2-E24-18	02NOV88		407	365	7.8	8.0	#400	#3
		1	408	367	7.8	8.2	#500	#3
		2	408	368	7.8	8.1	#500	#7
		3	408	369	7.8	8.2	#500	#8
2-E24-18	03NOV88		353	.	.	8.0	.	.
2-E25-36	04NOV88		179	203	7.7	7.7	#600	#10
		1	179	204	7.7	8.0	#700	#4
		2	180	202	7.8	7.9	#600	#7
		3	180	204	7.8	8.0	#600	#5

TABLE 9.8. (contd)

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALKALIN ppb 20000/.	ALPHA pCi/L 4/15	ARSENIC ppb 5/50	FARSEN ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BETA pCi/L 8/50
2-E17-1	07NOV88		<10	101,000	*1.080	5	5	55	54	31.30
2-E17-19	02NOV88		89	.	5.560	8	5	83	51	39.80
2-E17-20	02NOV88		17	.	2.880	5	5	73	68	81.10
2-E24-2	01NOV88		<10	.	3.450	12	12	45	41	45.80
2-E24-16	03NOV88		17	.	3.400	10	9	53	48	71.30
2-E24-17	03NOV88		16	.	1.770	10	10	81	58	64.80
	03NOV88	1	18	.	2.420	10	9	81	55	88.10
2-E24-18	02NOV88		<10	.	4.250	8	8	82	62	35.80
2-E25-36	04NOV88		<10	.	0.944	10	9	25	15	7.48

Well name	Collection Date	Duplicate sample number	BIS2EPH ppb 10/.	CADMIUM ppb 2/10	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s	CHROMIUM ppb 10/50	COLIFRM MPN 2.2/1	COPPER ppb 10/1300p
2-E17-1	07NOV88		<10	<2	59,000	61,100	4,600	<10	18.0	<10
2-E17-19	02NOV88		12	<2	42,800	48,800	3,900	74	<2.2	15
2-E17-20	02NOV88		<10	<2	73,300	77,800	3,800	38	<2.2	12
2-E24-2	01NOV88		<10	2	37,100	39,100	3,800	<10	<2.2	<10
2-E24-16	03NOV88		<10	<2	40,800	42,100	3,800	38	<2.2	10
2-E24-17	03NOV88		14	<2	44,200	45,800	3,800	32	<2.2	<10
	03NOV88	1	.	<2	44,300	48,200	.	31	.	11
2-E24-18	02NOV88		11	<2	35,700	38,800	3,800	68	<2.2	13
2-E25-36	04NOV88		<10	<2	19,200	22,900	3,400	15	<2.2	11

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 10/.	NICKEL ppb 10/.
2-E17-1	07NOV88		47	<30	8	18,100	17,900	8	<10	<10
2-E17-19	02NOV88		1,280	<30	<5	15,000	13,400	24	<10	38
2-E17-20	02NOV88		540	<30	<5	23,100	22,000	13	<10	20
2-E24-2	01NOV88		75	<30	<5	11,700	11,400	<5	<10	<10
2-E24-16	03NOV88		301	<30	<5	13,100	12,700	11	<10	19
2-E24-17	03NOV88		385	<30	<5	13,800	13,300	13	83	20
	03NOV88	1	345	<30	<5	13,800	13,300	12	83	21
2-E24-18	02NOV88		455	<30	<5	11,800	10,900	12	<10	38
2-E25-36	04NOV88		275	45	<5	8,290	5,320	10	<10	<10

TABLE 9.8. (contd)

Well name	Collection Date	Duplicate sample number	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	SODIUM ppb 200/.	FSODIUM ppb 200/.	FSTRONT ppb 20/.
2-E17-1	07NOV88		<10	202,000	8,410	8,430	*0.119	28,100	28,700	332
2-E17-19	02NOV88		14	116,000	8,440	7,190	0.560	22,200	19,800	253
2-E17-20	02NOV88		14	246,000	8,270	8,830	0.297	25,300	24,200	383
2-E24-2	01NOV88		<10	73,600	5,520	5,560	*0.104	17,000	18,800	198
2-E24-16	03NOV88		14	98,900	5,860	5,890	0.551	18,800	17,300	229
2-E24-17	03NOV88		17	122,000	5,820	5,890	0.574	18,000	17,900	245
	03NOV88	1	13	.	5,860	5,990	0.285	18,400	17,900	243
2-E24-18	02NOV88		13	82,600	6,100	6,280	0.232	19,800	19,100	182
2-E25-36	04NOV88		12	2,400	4,200	4,780	0.252	14,900	12,800	92

Well name	Collection Date	Duplicate sample number	STRONTIUM ppb 20/.	SULFATE ppb 500/250000s	TC ppb 1000/.	TOLUENE ppb 5/2000p	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-E17-1	07NOV88		338	35,100	20,400	<5	20	12	35	10
2-E17-19	02NOV88		284	32,600	22,300	<5	14	16	110	48
2-E17-20	02NOV88		405	31,200	21,000	<5	13	14	60	50
2-E24-2	01NOV88		202	28,600	19,900	#3	30	33	11	23
2-E24-16	03NOV88		240	28,800	21,200	<5	22	28	33	14
2-E24-17	03NOV88		247	29,400	20,700	<5	22	24	65	46
	03NOV88	1	251	.	.	<5	22	25	68	43
2-E24-18	02NOV88		196	25,900	20,500	<5	14	20	11	15
2-E25-36	04NOV88		108	19,900	18,400	<5	31	43	<5	10

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25690
- r - based on National Interim Primary Drinking Water Regulations,
Appendix IV, EPA-570/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 46938
- s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143
(July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-54, Public Water Supplies

Data flags

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

TABLE 9.9. Sampling Schedule for the 216-A-10 Crib

Well	1988			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E17- 1		L			X			X			X	
299-E17-19		L			X			X			XR	V
299-E17-20		L			X			XR	V		X	
299-E24- 2		L			X			X			X	
299-E24-16		L			X			X			X	
299-E24-17		LR	V		X			X			X	
299-E24-18		L			X			X			X	
299-E25-36		L			XR	V		X			X	

L Long list (WAC 173-303-9905)
 R Quality control replicates
 V Volatile organic analyses blanks
 X Regular sample list

- Specific conductance averaged 200 $\mu\text{mhos/cm}$ and 370 $\mu\text{mhos/cm}$, respectively, in the upgradient wells 299-E25-36 and 299-E24-18. The specific conductance ranged from an average of 360 $\mu\text{mhos/cm}$ in well 299-E24-2 to an average of 640 $\mu\text{mhos/cm}$ in well 299-E17-20.
- Concentrations of total beta exceeded the 50 pCi/L screening level (40 CFR 265, Appendix III) in wells 299-E17-20 (81.1 pCi/L), 299-E24-16 (71.3 pCi/L) and 299-E24-17 (64.6 pCi/L).
- Chromium (unfiltered) concentrations were above the 40 CFR 265, Appendix III, standard of 50 ppb in two new wells, 299-E24-18 (68 ppb) and 299-E17-19 (74 ppb). Chromium concentrations in the two existing wells (both filtered and unfiltered samples) and in all filtered samples from the new wells were below the detection level. These results are similar to those observed for other recently constructed wells, in which well completion may still be affecting ground-water chemistry in the well (see Section 1.0 Introduction).
- Methylene chloride was reported at a concentration of 83 ppb in well 299-E24-17. This constituent has appeared randomly in samples throughout the Hanford Site (see Section 1.0 Introduction). Acetone concentrations ranging from 6 to 9 ppm were reported in the four new wells near the 216-A-10 crib. Acetone was also detected in a number of samples collected at other sites during the time period that the 216-A-10 crib samples were collected. Toluene was reported at a concentration of 3 ppb in well 299-E24-2. Bis(2-ethylhexyl) phthalate was reported at concentrations of 11, 14, and 12 ppb in wells 299-E24-18, 299-E24-17, and 299-E17-19,

respectively. The presence of these constituents may reflect handling or laboratory contamination, and not be representative of true ground-water conditions. This possibility is being investigated.

- Nitrate concentrations in the wells near the crib ranged from 73.6 ppm in well 299-E24-2 to 245 ppm in well 299-E17-20. Nitrate concentrations were 2.4 ppm and 82.6 ppm, respectively, in upgradient wells 299-E25-36 and 299-E24-18.

10.0 216-A-29 DITCH

S. P. Luttrell

Two new wells were installed at the 216-A-29 ditch in 1988. These, with the two wells planned for construction in 1989 and three existing wells, will provide the ditch with a RCRA interim-status ground-water monitoring system.

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

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

This section discusses the status of activities relating to drilling and constructing ground-water monitoring wells, and hydrogeologic characterization at the 216-A-29 ditch.

Drilling

Two new wells (299-E25-34 and 299-E25-35) were drilled and constructed at the 216-A-29 ditch in 1988 (Figure 10.1). Final well development and sampling pump installation were completed in October. HydroStar sampling pumps were installed in the new wells. The wells were developed until turbidity was less than 5 NTU. Two existing wells in the monitoring system (299-E25-26 and 299-E25-28) have submersible pumps, and one existing well in the monitoring system (299-E25-32) has a HydroStar sampling pump. The wells were surveyed for location and elevation. Well inspection/completion forms, as-built diagrams, geologic logs, and geophysical logs for the two new wells at the 216-A-29 ditch are presented in Volume 2, Appendix B.

Hydrogeologic Characterization

Results of moisture content analyses, hydrologic testing data analyses, and water-level data are presented in this section. Moisture content analyses were conducted on samples collected by the drive-barrel method from intervals in which no water had been added. These results are presented in

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

Table 10.1. Elevated moisture contents shown in the table generally correspond to silty sand or silty sand layers.

Data from hydrologic tests in wells 299-E25-34 and 299-E25-35 were analyzed. The transmissivity of the uppermost unconfined aquifer beneath the 216-A-29 ditch is estimated to be at least 250,000 ft²/d at well 299-E25-34 and 80,000 ft²/d at well 299-E25-35. The hydraulic conductivity of the aquifer is estimated to be at least 3000 ft/d at well 299-E25-34 and 700 ft/d at well 299-E25-35. These estimates provide an indication of the range of transmissivity and hydraulic conductivity at the 216-A-29 ditch; however, the results are not quantitative. Casing elevation, depth-to-water, and water-level elevation data are presented in Table 10.2.

GROUND-WATER SAMPLING AND ANALYSIS

Ground-water sampling and analysis of wells at the 216-A-29 ditch began in November 1988. Well 299-E25-32 and a well planned for construction in 1989 will comprise the background wells. Wells 299-E25-26, 299-E25-28, 299-E25-34, and 299-E25-35 are the current downgradient monitoring wells (see Figure 10.1).

Collection and Analysis

The first set of quarterly samples was collected on November 18 and 21, 1988, except in well 299-E25-26, which was sampled on December 15. Water-level measurements were made in all the wells at the time of sampling. Most of the analytical results for the samples from all the wells except 299-E25-26, for which no results are available, have been reported. Available results are included here. Total organic halogen results are not available for most of the wells. Well 299-E25-34 was resampled on December 12, 1988, for analysis of volatile organic constituents for reasons indicated below. Results are not yet available for this analysis.

TABLE 10.1. Sediment Moisture Content Data for Samples from Wells 299-E25-34 and 299-E25-35 at the 216-A-29 Ditch

Well 299-E25-34		Well 299-E25-35	
Depth, ft	% Moisture	Depth, ft	% Moisture
5	3.53	10	7.18
		15	3.94
		20	3.65
25	5.80	25	3.24
30	5.63	30	6.43
35	21.99	35	5.62
40	7.25	40	6.76
45	5.57	45	7.59
50	6.83	50	5.95
55	14.36	55	5.49
60	7.75	60	4.93
65	7.52	65	4.71
70	4.34	70	4.64
75	4.19	75	4.62
80	3.16	80	4.89
85	3.79	85	5.60
87	26.37		
90	4.10	90	5.65
95	3.41	95	6.81
100	2.99	100	5.01
105	3.07	105	4.98
110	2.40	110	6.18
115	2.37	115	18.60
120	2.76	120	12.85
		121	27.71
125	2.56	125	4.01
130	2.84	130	4.18
135	3.11	135	3.52
		140	3.73
		145	3.72
150	3.24	150	4.25
155	2.71	155	4.41
		160	9.86
		165	5.73
		170	4.33
		175	3.21
		180	4.35
		185	4.39
		190	3.69
		195	4.23
		200	3.38
		205	3.66
		210	3.92
		215	2.82
		220	3.86

TABLE 10.2. Casing Elevations, Water-Level Measurements, and Water-Level Elevations for Wells at the 216-A-29 Ditch

<u>Well Number</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Date of Measurement</u>	<u>Depth to Water, ft</u>	<u>Water-Level Elevation, ft above MSL</u>
299-E25-26	668.55	11-19-88	(b)	(b)
		12-06-88	260.30	408.25
		12-15-88	261.44	407.11
299-E25-28	662.44	11-18-88(c)	255.75	406.69
		12-06-88(d)	255.16	407.28
299-E25-32A	669.19	11-21-88	260.85	408.34
		12-06-88	261.67	407.52
299-E25-34	662.87	11-18-88	255.81	407.06
		12-06-88	255.70	407.17
299-E25-35	674.39	11-21-88	266.34	408.05
		12-06-88	268.00	406.39

(a) MSL = mean sea level.

(b) No water-level measurement or sample was taken.

(c) Data collected before sample collection.

(d) Data collected at other times.

Discussion of Results

A summary of the analytical results is provided in Table 10.3. The results for constituents with at least one detected value are provided in Table 10.4. (The sampling schedule for wells near the 216-A-29 Ditch is shown in Table 10.5.) Major observations of the analyses received to date are discussed below.

- Specific conductance ranged from an average of 182 $\mu\text{mhos/cm}$ to 198 $\mu\text{mhos/cm}$ in wells 299-E25-28, 299-E25-32, and 299-E25-34. Specific conductance averaged 769 $\mu\text{mhos/cm}$ in well 299-E25-35.
- Major cations and anions were elevated in well 299-E25-35 as compared to the other three wells.
- Chromium (unfiltered) concentrations were elevated in the two new wells and well 299-E25-32, ranging from 17 ppb in well 299-E25-34 to 30 ppb in well 299-E25-35. Chromium concentrations in filtered samples from these wells were not. These results are similar to

TABLE 10.3. Constituent List and Summary of Sampling Results for the
216-A-29 Ditch, November 1988

----- Constituent List=Contamination Indicator Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
191	CONDFLD	umho	1	18	0	700 WDOE xxx	Specific conductance, field
199	PHFIELD		0.1	18	0	6.5-8.5 EPAS	pH, field
C89	TOC	ppb	1000	18	0	.	Total organic carbon
H42	TOXLDL	ppb	20	18	0	.	Total organic halogens, low DL
----- Constituent List=Drinking Water Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109	COLIFRM	MPN	2.2	4	4 ***	1 EPA	Coliform bacteria
111	BETA	pCi/L	8	4	0	50 EPA	Gross beta
181	RADUUM	pCi/L	1	4	0	5 EPA	Total radium
212	ALPHA	pCi/L	4	4	0	15 EPA	Gross alpha
A06	BARIUM	ppb	8	4	0	1000 EPA	Barium
A07	CADMIUM	ppb	2	4	4 ***	10 EPA	Cadmium
A08	CHROMIUM	ppb	10	4	1	50 EPA	Chromium
A10	SILVER	ppb	10	4	4 ***	50 EPA	Silver
A20	ARSENIC	ppb	5	4	1	50 EPA	Arsenic
A21	MERCURY	ppb	0.1	4	4 ***	2 EPA	Mercury
A22	SELENIUM	ppb	5	4	4 ***	10 EPA	Selenium
A33	ENDRIN	ppb	0.1	4	4 ***	0.2 EPA	Endrin
A34	METHLOR	ppb	3	4	4 ***	100 EPA	Methoxychlor
A35	TOXAENE	ppb	1	4	4 ***	5 EPA	Toxaphene
A36	a-BHC	ppb	0.1	4	4 ***	4 EPA	Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	4	4 ***	4 EPA	Lindane, beta-BHC
A38	g-BHC	ppb	0.1	4	4 ***	4 EPA	Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	4	4 ***	4 EPA	Lindane, delta-BHC
A51	LEADGF	ppb	5	4	4 ***	50 EPA	Lead (graphite furnace)
C72	NITRATE	ppb	500	4	0	45000 EPA	Nitrate
C74	FLUORID	ppb	500	4	3	4000 EPA	Fluoride
H13	2,4-D	ppb	2	4	4 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	4	4 ***	10 EPA	2,4,5-TP silvex
H20	FBARIUM	ppb	8	4	0	1000 EPA	Barium, filtered
H21	FCADMIU	ppb	2	4	4 ***	10 EPA	Cadmium, filtered
H22	FCHROMI	ppb	10	4	2	50 EPA	Chromium, filtered
H23	FSILVER	ppb	10	4	4 ***	50 EPA	Silver, filtered
H37	FARSENI	ppb	5	4	1	50 EPA	Arsenic, filtered
H38	FMERCUR	ppb	0.1	4	4 ***	2 EPA	Mercury, filtered
H39	FSELENI	ppb	5	4	4 ***	10 EPA	Selenium, filtered
H41	FLEAD	ppb	5	4	4 ***	50 EPA	Lead, filtered

TABLE 10.3. (contd)

Constituent List=Water Quality Parameters								
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards Agency Exceeded	Full name
A11	SODIUM	ppb	200	4	0	.		Sodium
A17	MANGESE	ppb	5	4	2	50	EPAS	Manganese
A19	IRON	ppb	30	4	1	300	EPAS	Iron
C73	SULFATE	ppb	500	4	0	250000	EPAS	Sulfate
C75	CHLORID	ppb	500	4	0	250000	EPAS	Chloride
H24	FSODIUM	ppb	200	4	0	.		Sodium, filtered
H29	FMANGAN	ppb	5	4	2	50	EPAS	Manganese, filtered
H31	FIRON	ppb	30	4	2	300	EPAS	Iron, filtered
H57	LPHENOL	ppb	10	4	4	.		Phenol, low DL
Constituent List=Site Specific and Other Parameters								
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards Agency Exceeded	Full name
A01	BERYLUM	ppb	5	4	4	.		Beryllium
A03	STRONUM	ppb	20	4	0	.		Strontium
A04	ZINC	ppb	5	4	1	5000	EPAS	Zinc
A06	CALCIUM	ppb	50	4	0	.		Calcium
A12	NICKEL	ppb	10	4	1	.		Nickel
A13	COPPER	ppb	10	4	4	1300	EPAP	Copper
A14	VANADUM	ppb	5	4	0	.		Vanadium
A16	ANTIONY	ppb	100	4	4	.		Antimony
A18	ALUMNUM	ppb	150	4	4	.		Aluminum
A18	POTASUM	ppb	100	4	0	.		Potassium
A50	MAGNES	ppb	50	4	0	.		Magnesium
A81	TETRANE	ppb	5	4	4	5	EPA	Tetrachloromethane [Carbon Tetrachloride]
A84	METHONE	ppb	10	4	4	.		Methyl ethyl ketone
A87	1,1,1-T	ppb	5	4	4	200	EPA	1,1,1-Trichloroethane
A88	1,1,2-T	ppb	5	4	4	.		1,1,2-Trichloroethane
A89	TRICENE	ppb	5	4	4	5	EPA	Trichloroethylene [1,1,2-Trichloroethene]
A70	PERCENE	ppb	5	4	4	.		Perchloroethylene [Tetrachloroethene]
A71	OPXYLE	ppb	5	4	4	440	EPAP	Xylene-o,p
A80	CHLFORM	ppb	5	4	4	100	EPA	Chloroform [Trichloromethane]
A93	METHYCH	ppb	10	4	3	.		Methylene chloride
B14	M-XYLE	ppb	5	4	4	440	EPAP	Xylene-m
C78	PHOSPHA	ppb	1000	4	4	.		Phosphate
H18	FZINC	ppb	5	4	2	5000	EPAS	Zinc, filtered
H19	FCALCIU	ppb	50	4	0	.		Calcium, filtered
H25	FNICKEL	ppb	10	4	4	.		Nickel, filtered
H26	FCOPPER	ppb	10	4	3	1300	EPAP	Copper, filtered
H27	FVANADI	ppb	5	4	0	.		Vanadium, filtered
H28	FALUMIN	ppb	150	4	4	.		Aluminum, filtered
H30	FPOTASS	ppb	100	4	0	.		Potassium, filtered
H32	FMAGNES	ppb	50	4	0	.		Magnesium, filtered
H33	FBERYLL	ppb	5	4	4	.		Beryllium, filtered
H35	FSTRONT	ppb	20	4	0	.		Strontium, filtered
H38	FANTIMO	ppb	100	4	4	.		Antimony, filtered
H60	TURBID	ntu	0.1	4	1	.		Turbidity
H66	BROMIDE	ppb	1000	4	4	.		Bromide
H67	NITRITE	ppb	1000	4	4	.		Nitrite
H68	HEXONE	ppb	10	4	4	.		Hexone

TABLE 10.3. (contd)

*** - Indicates all samples were reported as below contractual detection limits
 xxx - Indicates that Drinking Water Standards were exceeded
 EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
 National Primary Drinking Water Regulations as amended by 52 FR 25690
 EPAR - based on National Interim Primary Drinking Water Regulations,
 Appendix IV, EPA-570/9-78-003
 EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
 EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143
 National Secondary Drinking Water Regulations
 WDOE - based on additional Secondary Maximum Contaminant Levels given in
 WAC 248-54, Public Water Supplies

TABLE 10.4. Constituents with at Least One Detected Value for the
216-A-29 Ditch, November 1988

Well name	Collection Date	Duplicate sample number	ALPHA pCi/L 4/16	ARSENIC ppb 5/50	FARSENIC ppb 5/50	BARIUM ppb 6/1000	FBARIUM ppb 6/1000	BETA pCi/L 8/50	FCALCIUM ppb 50/.	CALCIUM ppb 50/.	CHLORIDE ppb 500/250000s
2-E25-28	18NOV88		*0.202	9	9	13	14	*3.40	20,300	20,800	3,000
2-E25-32	21NOV88		*0.403	<5	<5	13	15	4.47	21,800	19,000	2,700
2-E25-34	18NOV88		*0.264	8	7	20	20	*2.47	21,900	20,900	3,000
2-E25-35	21NOV88		3.190	9	9	34	32	12.80	79,800	78,300	7,600

Well name	Collection Date	Duplicate sample number	FCHROMI ppb 10/50	CHROMIUM ppb 10/50	FCOPPER ppb 10/1300p	FLUORID ppb 500/4000	IRON ppb 30/300s	FIRON ppb 30/300s	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s
2-E25-28	18NOV88		<10	<10	10	<500	<30	<30	6,220	5,930	<5
2-E25-32	21NOV88		11	20	<10	<500	93	<30	5,310	5,910	<5
2-E25-34	18NOV88		10	17	<10	<500	497	37	5,930	6,030	10
2-E25-35	21NOV88		<10	30	<10	600	238	33	28,300	29,000	8

Well name	Collection Date	Duplicate sample number	MANGESE ppb 5/50s	METHYCH ppb 10/.	NICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	SODIUM ppb 200/.	FSODIUM ppb 200/.
2-E25-28	18NOV88		<5	<10	<10	1,000	4,010	4,110	*0.0333	11,600	11,600
2-E25-32	21NOV88		<5	<10	11	800	5,280	4,880	*0.0656	7,460	8,540
2-E25-34	18NOV88		11	180	10	1,100	4,310	4,170	*0.1430	10,500	10,900
2-E25-35	21NOV88		24	<10	16	9,000	6,670	6,240	0.1910	46,400	48,600

Well name	Collection Date	Duplicate sample number	FSTRONT ppb 20/.	STRONUM ppb 20/.	SULFATE ppb 500/250000s	TURBID ntu 0.1/.	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-E25-28	18NOV88		108	108	12,500	<0.1	38	44	20	12
2-E25-32	21NOV88		121	107	12,700	0.7	25	18	<5	<5
2-E25-34	18NOV88		113	108	13,800	7.2	35	37	33	<5
2-E25-35	21NOV88		403	385	238,000	3.5	17	15	38	29

TABLE 10.4. (contd)

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	PHFIELD 0.1/8.5s	TOC ppb 1000/.	TOXLDL ppb 20/.
2-E25-28	18NOV88		197	8.5	#700	#3
		1	198	8.5	#700	#11
		2	197	8.4	#600	#3
		3	197	8.4	#700	#6
2-E25-32	21NOV88		183	8.4	#600	#6
		1	183	8.4	#700	#5
		2	182	8.4	#600	#2
		3	182	8.4	#600	#5
2-E25-34	18NOV88		194	8.2	#600	127
		1	194	8.3	#600	122
		2	194	8.3	#600	136
		3	194	8.3	#600	98
2-E25-35	21NOV88		767	7.8	#700	#0
		1	767	7.5	#600	#-1
		2	771	7.8	#600	#-1
		3	771	7.8	#400	#-2

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25690
r - based on National Interim Primary Drinking Water Regulations,
Appendix IV, EPA-570/9-78-003
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
(July, 1987) National Secondary Drinking Water Regulations
w - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-54, Public Water Supplies

Data flags

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

TABLE 10.5. Sampling Schedule for the 216-A-29 Ditch

Well	1988			1989								
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
299-E25-26					S			S			OL	
299-E25-28		X			S			S			OLR	
299-E25-32		XR			S			SRV			OL	
299-E25-34		X			XRV			X			L	
299-E25-35		X			X			X			L	
299-E25-37											L	
299-E25-38											L	

- L Long list (WAC 173-303-9905)
- OL Long list (overlap with another project)
- R Quality control replicates
- S Short list (overlap with another project)
- V Volatile organic analyses blanks
- X Regular sample list

those observed for other recently constructed wells, in which well completion may still be affecting ground-water chemistry in the well (see Section 1.0 Introduction).

- Methylene chloride was reported at a concentration of 160 ppb in well 299-E25-34. This constituent has appeared randomly in several samples throughout the Hanford Site (see Section 1.0 Introduction). The well was resampled to confirm or refute the methylene chloride results. The results of this resampling are not yet available.

TABLE 10.2. Sampling Schedule for the 216-A-20 Well

Well	1978					1979				
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul/Aug/Sept
216-A-20-25										
216-A-20-26										
216-A-20-27										
216-A-20-28										
216-A-20-29										
216-A-20-30										
216-A-20-31										
216-A-20-32										
216-A-20-33										
216-A-20-34										
216-A-20-35										
216-A-20-36										
216-A-20-37										
216-A-20-38										
216-A-20-39										
216-A-20-40										
216-A-20-41										
216-A-20-42										
216-A-20-43										
216-A-20-44										
216-A-20-45										
216-A-20-46										
216-A-20-47										
216-A-20-48										
216-A-20-49										
216-A-20-50										
216-A-20-51										
216-A-20-52										
216-A-20-53										
216-A-20-54										
216-A-20-55										
216-A-20-56										
216-A-20-57										
216-A-20-58										
216-A-20-59										
216-A-20-60										
216-A-20-61										
216-A-20-62										
216-A-20-63										
216-A-20-64										
216-A-20-65										
216-A-20-66										
216-A-20-67										
216-A-20-68										
216-A-20-69										
216-A-20-70										
216-A-20-71										
216-A-20-72										
216-A-20-73										
216-A-20-74										
216-A-20-75										
216-A-20-76										
216-A-20-77										
216-A-20-78										
216-A-20-79										
216-A-20-80										
216-A-20-81										
216-A-20-82										
216-A-20-83										
216-A-20-84										
216-A-20-85										
216-A-20-86										
216-A-20-87										
216-A-20-88										
216-A-20-89										
216-A-20-90										
216-A-20-91										
216-A-20-92										
216-A-20-93										
216-A-20-94										
216-A-20-95										
216-A-20-96										
216-A-20-97										
216-A-20-98										
216-A-20-99										
216-A-20-100										

1. Long-term (over 100 years)
 2. Long-term (over 10 years with another project)
 3. Long-term (over 10 years)
 4. Long-term (over 10 years with another project)
 5. Long-term (over 10 years)
 6. Long-term (over 10 years)
 7. Long-term (over 10 years)
 8. Long-term (over 10 years)
 9. Long-term (over 10 years)
 10. Long-term (over 10 years)

These observed for other recently constructed wells in which well completion may still be affecting ground-water chemistry in the well (see Section 1.0 Introduction).

The observed for other recently constructed wells in which well completion may still be affecting ground-water chemistry in the well (see Section 1.0 Introduction).

11.0 216-A-36B CRIB

S. P. Luttrell

The 216-A-36B crib requires an interim-status ground-water monitoring system. Five new monitoring wells installed in 1988, combined with two existing wells near the crib, comprise the ground-water monitoring system.

The 216-A-36B crib is the southern 500-ft section of a 600-ft-long crib (Figure 11.1). It is 12 ft wide and 12 ft deep, and was separated from the 216-A-36A crib in 1966 by a grout curtain. The 216-A-36B crib received ammonia scrubber distillate from the PUREX Plant from September 1965 to 1972, then was reactivated from November 1982 until October 1987, when waste discharge to the crib ceased.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No drilling or hydrogeologic characterization was performed during the period covered by this report. Casing elevation, depth to water, and water-level elevation data are provided in Table 11.1.

GROUND-WATER SAMPLING AND ANALYSIS

Ground-water sampling and analysis continued with collection of the third quarterly sample set during this reporting period. Well 299-E17-17 is the background well, and wells 299-E17-5, 299-E17-9, 299-E17-14, 299-E17-15, 299-E17-16, and 299-E17-18 are the downgradient monitoring wells (see Figure 11.1). Samples from well 299-E17-6 are used for hydrochemical characterization information only. Well 299-E17-9 was sampled for the first time this quarter. Well 299-E17-10 is being remediated and may be included in the network in the future.

Collection and Analysis

The third quarterly sample set was collected on December 20 and December 21, 1988. Analytical results have not been received from the laboratory for these samples.

Analytical results from samples that were collected in September 1988 have been received and are discussed in the next section.

FIGURE 11.1. Monitoring Well Locations for the 216-A-36B Crib
(New wells are indicated by solid bullets.)

TABLE 11.1. Surveyed Elevations of Well Casings, and Water-Level Measurements and Elevations Around the 216-A-36B Crib

<u>Well Number</u>	<u>Casing Elevation, ft above MSL (a)</u>	<u>Date of Measurement</u>	<u>Depth to Water, ft</u>	<u>Water-Level Elevation, ft above MSL</u>
299-E17-5	718.69	12-20-88	314.12	404.57
299-E17-6	720.10	12-20-88	314.15	405.95
299-E17-9	717.64	12-20-88	312.22	405.42
299-E17-14	722.18	11-22-88	316.19	405.99
		12-21-88	315.35	406.83
299-E17-15	721.78	11-22-88	316.60	405.18
		12-21-88	324.61	397.17(b)
299-E17-16	720.58	11-22-88	314.71	405.87
		12-21-88	(c)	(c)
299-E17-17	719.92	11-22-88	313.93	405.99
		12-21-88	315.34	404.58
299-E17-18	720.65	11-22-88	314.87	405.78
		12-21-88	315.98	404.67

(a) MSL = mean sea level.

(b) Anomalous value. May indicate a measurement or recording error.

(c) Not measured.

Discussion of Results

A summary of the analytical results of samples collected the previous quarter is provided in Table 11.2. The results for constituents with at least one detected value are provided in Table 11.3. (The sampling schedule for wells near the 216-A-36B Crib is shown in Table 11.4.) Major observations of the analyses are discussed below.

- Total beta concentrations were measured at 2950 pCi/L in well 299-E17-15, 814 pCi/L in well 299-E17-5, and 688 pCi/L in well 299-E17-14, which is consistent with the high values for these wells for the May/June sampling.

TABLE 11.2. Constituent List and Summary of Sampling Results for the
216-A-36B Crib, September 1988

----- Constituent List=Contamination Indicator Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
191	CONDFLD	umho	1	28	0	700 WDOE	Specific conductance, field
199	PHFIELD		0.1	28	0	6.5-8.5 EPAS	pH, field
C69	TOC	ppb	1000	25	0	.	Total organic carbon
H42	TOXLDL	ppb	20	25	0	.	Total organic halogens, low DL
----- Constituent List=Drinking Water Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
109	COLIFRM	MPN	2.2	8	5	1 EPA	Coliform bacteria
111	BETA	pCi/L	8	7	0	60 EPA	Gross beta
181	RADIUM	pCi/L	1	8	0	5 EPA	Total radium
212	ALPHA	pCi/L	4	7	0	15 EPA	Gross alpha
A06	BARIUM	ppb	8	7	0	1000 EPA	Barium
A07	CADMIUM	ppb	2	7	7 ***	10 EPA	Cadmium
A08	CHROMIUM	ppb	10	7	2	60 EPA	Chromium
A10	SILVER	ppb	10	7	7 ***	60 EPA	Silver
A20	ARSENIC	ppb	5	7	1	60 EPA	Arsenic
A21	MERCURY	ppb	0.1	7	7 ***	2 EPA	Mercury
A22	SELENIUM	ppb	5	7	7 ***	10 EPA	Selenium
A33	ENDRIN	ppb	0.1	8	8 ***	0.2 EPA	Endrin
A34	METHLOR	ppb	3	8	8 ***	100 EPA	Methoxychlor
A36	TOXAENE	ppb	1	8	8 ***	5 EPA	Toxaphene
A38	a-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, beta-BHC
A38	g-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	8	8 ***	4 EPA	Lindane, delta-BHC
A61	LEADGF	ppb	5	7	7 ***	60 EPA	Lead (graphite furnace)
C72	NITRATE	ppb	600	7	0	46000 EPA	Nitrate
C74	FLUORID	ppb	600	7	8	4000 EPA	Fluoride
H13	2,4-D	ppb	2	8	8 ***	100 EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	8	8 ***	10 EPA	2,4,5-TP silvex
H20	FBARIUM	ppb	8	7	0	1000 EPA	Barium, filtered
H21	FCADMIUM	ppb	2	7	7 ***	10 EPA	Cadmium, filtered
H22	FCHROMIUM	ppb	10	7	7 ***	60 EPA	Chromium, filtered
H23	FSILVER	ppb	10	7	7 ***	60 EPA	Silver, filtered
H37	FARSENIC	ppb	5	7	1	60 EPA	Arsenic, filtered
H38	FMERCURY	ppb	0.1	7	7 ***	2 EPA	Mercury, filtered
H39	FSELENIUM	ppb	5	7	7 ***	10 EPA	Selenium, filtered
H41	FLEAD	ppb	5	7	7 ***	60 EPA	Lead, filtered

TABLE 11.2. (contd)

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

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A11 SODIUM	ppb	200	7	0	.	Sodium
A17 MANGESE	ppb	5	7	3	50 EPAS	Manganese
A19 IRON	ppb	30	7	1	300 EPAS	Iron
C57 PHENOL	ppb	10	8	8 ***	.	Phenol
C73 SULFATE	ppb	500	7	0	250000 EPAS	Sulfate
C75 CHLORID	ppb	500	7	0	250000 EPAS	Chloride
H24 FSODIUM	ppb	200	7	0	.	Sodium, filtered
H29 FMANGAN	ppb	5	7	4	50 EPAS	Manganese, filtered
H31 FIRON	ppb	30	7	5	300 EPAS	Iron, filtered
H57 LPHENOL	ppb	10	1	1 ***	.	Phenol, low DL

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

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A01 BERYLIUM	ppb	5	7	7 ***	.	Beryllium
A03 STRONTIUM	ppb	20	7	0	.	Strontium
A04 ZINC	ppb	5	7	2	5000 EPAS	Zinc
A05 CALCIUM	ppb	50	7	0	.	Calcium
A12 NICKEL	ppb	10	7	2	.	Nickel
A13 COPPER	ppb	10	7	5	1300 EPAP	Copper
A14 VANADIUM	ppb	5	7	1	.	Vanadium
A15 ANTIMONY	ppb	100	7	7 ***	.	Antimony
A16 ALUMINUM	ppb	150	7	7 ***	.	Aluminum
A18 POTASSIUM	ppb	100	7	0	.	Potassium
A50 MAGNESIUM	ppb	50	7	0	.	Magnesium
A81 TETRACHLOROMETHANE	ppb	5	8	8 ***	5 EPA	Tetrachloromethane [Carbon Tetrachloride]
A82 BENZENE	ppb	5	8	8 ***	5 EPA	Benzene
A83 DIOXANE	ppb	500	8	8 ***	.	Dioxane
A84 METHYL ETHYL KETONE	ppb	10	8	8 ***	.	Methyl ethyl ketone
A85 PYRIDINE	ppb	500	8	8 ***	.	Pyridine
A86 TOLUENE	ppb	5	8	8 ***	2000 EPAP	Toluene
A87 1,1,1-TRICHLOROETHANE	ppb	5	8	8 ***	200 EPA	1,1,1-Trichloroethane
A88 1,1,2-TRICHLOROETHANE	ppb	5	8	8 ***	.	1,1,2-Trichloroethane
A89 TRICHLOROETHYLENE	ppb	5	8	8 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethene]
A70 PERCHLOROETHYLENE	ppb	5	8	8 ***	.	Perchloroethylene [Tetrachloroethene]
A71 OXYL	ppb	5	8	8 ***	440 EPAP	Xylene-o,p
A72 ACROLEIN	ppb	10	8	8 ***	.	Acrolein
A73 ACRYLONITRILE	ppb	10	8	8 ***	.	Acrylonitrile
A74 BIS(2-CHLOROMETHYL) ETHER	ppb	10	8	8 ***	.	Bis(chloromethyl) ether
A75 BROMOACETONE	ppb	10	8	8 ***	.	Bromoacetone
A76 METHYL BROMIDE	ppb	10	8	8 ***	.	Methyl bromide
A77 CARBON DISULFIDE	ppb	10	8	8 ***	.	Carbon disulfide
A78 CHLOROBENZENE	ppb	10	8	8 ***	50 EPAP	Chlorobenzene
A79 2-CHLOROETHYL VINYL ETHER	ppb	10	8	8 ***	.	2-Chloroethyl vinyl ether
A80 CHLOROFORM	ppb	5	8	8 ***	100 EPA	Chloroform [Trichloromethane]
A81 METHYL CHLORIDE	ppb	10	8	8 ***	.	Methyl chloride [Chloromethane]
A82 CHLOROMETHYL METHYL ETHER	ppb	10	8	8 ***	.	Chloromethyl methyl ether

TABLE 11.2. (contd)

----- Constituent List=Site Specific and Other Parameters -----								
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name
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	10	6	6 ***	.		1,1-Dichloroethane
A90	1,2-DIC	ppb	10	6	6 ***	6	EPA	1,2-Dichloroethane
A91	TRANOCE	ppb	10	6	6 ***	70	EPAP	trans-1,2-Dichloroethene
A92	DICETHY	ppb	10	6	6 ***	7	EPA	1,1-Dichloroethylene
A93	METHYCH	ppb	10	6	3	.		Methylene chloride
A94	DICPANE	ppb	10	6	6 ***	6	EPAP	1,2-Dichloropropane
A95	DICPENE	ppb	10	6	6 ***	.		1,3-Dichloropropane
A96	NNDIEHY	ppb	10	6	6 ***	.		N,N-diethylhydrazine
A99	HYDRSUL	ppb	10	6	6 ***	.		Hydrogen sulfide
B01	IODOMET	ppb	10	6	6 ***	.		Iodomethane
B02	METHACR	ppb	10	6	6 ***	.		Methacrylonitrile
B03	METHNTHI	ppb	10	6	6 ***	.		Methanethiol
B04	PENTACH	ppb	10	6	6 ***	.		Pentachloroethane
B05	1112-tc	ppb	10	6	6 ***	.		1,1,1,2-Tetrachloroethane
B06	1122-tc	ppb	10	6	6 ***	.		1,1,2,2-Tetrachloroethane
B08	BROMORM	ppb	10	6	6 ***	100	EPA	Bromoform [Tribromomethane]
B09	TRCMEOL	ppb	10	6	6 ***	.		Trichloromethanethiol
B10	TRCMFLM	ppb	10	6	6 ***	.		Trichloromonofluoromethane
B11	TRCPANE	ppb	10	6	6 ***	.		Trichloropropane
B12	123-trp	ppb	10	6	6 ***	.		1,2,3-Trichloropropane
B13	VINYIDE	ppb	10	6	6 ***	2	EPA	Vinyl chloride
B14	M-XYLE	ppb	5	6	6 ***	440	EPAP	Xylene-m
B15	DIETHY	ppb	10	6	6 ***	.		Diethylarsine
B19	ACETILE	ppb	3000	6	6 ***	.		Acetonitrile
B81	12-dben	ppb	10	6	6 ***	.		1,2-Dichlorobenzene
B82	13-dben	ppb	10	6	6 ***	.		1,3-Dichlorobenzene
B83	14-dben	ppb	10	6	6 ***	.		1,4-Dichlorobenzene
B89	HEXCBEN	ppb	10	6	6 ***	.		Hexachlorobenzene
C04	METACRY	ppb	10	6	6 ***	.		Methyl methacrylate
C26	PENTCHB	ppb	10	6	6 ***	.		Pentachlorobenzene
C37	TETRCHB	ppb	10	6	6 ***	.		1,2,4,5-Tetrachlorobenzene
C43	TRICHLB	ppb	10	6	6 ***	.		1,2,4-Trichlorobenzene
C64	HEXACHL	ppb	10	6	6 ***	.		Hexachlorophene
C65	NAPHTHA	ppb	10	6	6 ***	.		Naphthalene
C68	123TRI	ppb	10	6	6 ***	.		1,2,3-Trichlorobenzene
C68	135TRI	ppb	10	6	6 ***	.		1,3,5-Trichlorobenzene
C69	1234TE	ppb	10	6	6 ***	.		1,2,3,4-Tetrachlorobenzene
C80	1235TE	ppb	10	6	6 ***	.		1,2,3,5-Tetrachlorobenzene
C71	FORMALN	ppb	600	6	6 ***	.		Formalin
C76	PHOSPHA	ppb	1000	7	7 ***	.		Phosphate
C79	KEROSEN	ppb	10000	6	6 ***	.		Kerosene
C80	AMMONIU	ppb	60	7	7 ***	.		Ammonium ion
H05	ETHOXID	ppb	3000	6	6 ***	.		Ethylene oxide
H08	ETHMETH	ppb	10	6	6 ***	.		Ethyl methacrylate

TABLE 11.2. (contd)

----- Constituent List=Site Specific and Other Parameters -----								
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded		Full name	
H18 TC	ppb	1000	7	0	.		Total carbon	
H18 FZINC	ppb	5	7	2	5000	EPAS	Zinc, filtered	
H19 FCALCIU	ppb	50	7	0	.		Calcium, filtered	
H26 FNICKEL	ppb	10	7	8	.		Nickel, filtered	
H28 FCOPPER	ppb	10	7	7	1800	EPAP	Copper, filtered	
H27 FVANADI	ppb	5	7	1	.		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	
H36 FSTRONT	ppb	20	7	0	.		Strontium, filtered	
H36 FANTIMO	ppb	100	7	7	.		Antimony, filtered	
H88 BROMIDE	ppb	1000	7	7	.		Bromide	
H87 NITRITE	ppb	1000	7	7	.		Nitrite	
H88 HEXONE	ppb	10	8	8	.		Hexone	
I21 TRIBUPH	ppb	10	8	8	.		Tributylphosphoric acid	

11.7

- *** - Indicates all samples were reported as below contractual detection limits
 xxx - Indicates that Drinking Water Standards were exceeded
 EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
 National Primary Drinking Water Regulations as amended by 52 FR 26890
 EPAR - based on National Interim Primary Drinking Water Regulations,
 Appendix IV, EPA-570/9-76-003
 EPAP - based on proposed Maximum Contaminant Level Goals in 50 FR 46936
 EPAS - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143
 National Secondary Drinking Water Regulations
 WDOE - based on additional Secondary Maximum Contaminant Levels given in
 WAC 248-54, Public Water Supplies

TABLE 11.3. Constituents with at Least One Detected Value for the 216-A-36B Crib, September 1988

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	PHFIELD 0.1/8.5m	TOC ppb 1000/.	TOXLDL ppb 20/.
2-E17-5	09SEP88	1	781	7.5	#809	5590
		2	782	7.4	#782	3180
		3	782	7.5	#783	3480
		3	783	7.4	#928	3950
2-E17-8	09SEP88	1	293	7.3	#403	#0.8
		2	292	7.3	.	.
		3	291	7.3	.	.
		3	290	7.3	.	.
2-E17-14	13SEP88	1	605	7.6	#861	19,300
		2	604	7.5	1,050	12,800
		3	603	7.5	#673	14,300
		3	605	7.6	#923	13,900
2-E17-16	14SEP88	1	750	7.5	#900	3,130
		2	744	7.6	1,000	3,310
		3	744	7.5	1,200	2,970
		3	748	7.6	#800	1,630
2-E17-16	14SEP88	1	193	7.9	#800	1,340
		2	185	7.7	#800	1,510
		3	185	7.9	1,100	2,880
		3	187	7.9	#900	2,420
2-E17-17	13SEP88	1	295	7.6	#844	#10.5
		2	294	7.5	#775	#5.3
		3	294	7.7	#572	#8.9
		3	296	7.6	#747	#4.6
2-E17-18	13SEP88	1	193	7.9	#739	42.4
		2	192	7.9	#745	40.8
		3	192	7.9	#678	57.3
		3	192	7.8	#831	60.1

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25890
- r - based on National Interim Primary Drinking Water Regulations,
Appendix IV, EPA-570/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 48936
- s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143
(July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-54, Public Water Supplies

Data flags

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

TABLE 11.3. (contd)

Well name	Collection Date	Duplicate sample number	ALPHA pCi/L 4/15	ARSENIC ppb 5/50	FARSENIC ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BETA pCi/L 8/50	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s
2-E17-5	09SEP88		2.45	7	5	61	61	814.0	74,900	69,800	4,270
2-E17-6	09SEP88		0.77	<5	<5	69	79	15.1	38,500	30,600	3,150
2-E17-14	13SEP88		7.55	8	7	55	56	688.0	73,600	74,400	4,350
2-E17-15	14SEP88		4.17	7	7	51	56	2,950.0	78,700	74,900	3,110
2-E17-16	14SEP88		2.17	13	13	20	23	18.2	27,800	23,200	4,830
2-E17-17	13SEP88		2.58	8	8	48	49	136.0	39,300	42,000	4,870
2-E17-18	13SEP88		3.41	12	11	34	37	15.0	27,500	25,600	3,420

Well name	Collection Date	Duplicate sample number	CHROMIUM ppb 10/50	COLIFRM MPN 2.2/1	COPPER ppb 10/1300p	FLUORID ppb 500/4000	IRON ppb 30/300s	FIRON ppb 30/300s	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s
2-E17-5	09SEP88		<10	M	<10	<500	<30	<30	21,300	19,900	<5
2-E17-6	09SEP88		<10	<2.2	<10	<500	369	350	11,700	13,200	101
2-E17-14	13SEP88		20	2.2	10	<500	79	<30	19,200	21,100	7
2-E17-15	14SEP88		28	<2.2	<10	<500	133	<30	18,400	20,700	6
2-E17-16	14SEP88		23	<2.2	<10	<500	114	<30	8,310	8,050	<5
2-E17-17	13SEP88		20	<2.2	11	<500	119	33	11,900	12,100	<5
2-E17-18	13SEP88		17	<2.2	<10	543	67	<30	7,240	8,250	<5

Well name	Collection Date	Duplicate sample number	MANGESE ppb 5/50s	METHYCH ppb 10/.	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	SODIUM ppb 200/.
2-E17-5	09SEP88		<5	<10	<10	<10	234,000	8,120	8,590	0.0497	29,200
2-E17-6	09SEP88		84	.	<10	<10	3,510	7,270	6,350	.	17,400
2-E17-14	13SEP88		7	<10	14	10	238,000	7,190	6,670	0.2720	24,500
2-E17-15	14SEP88		8	22	18	<10	253,000	7,980	6,930	0.1430	31,600
2-E17-16	14SEP88		<5	6400	12	<10	7,290	4,970	3,880	0.0123	14,700
2-E17-17	13SEP88		<5	8	14	<10	105,000	6,840	6,610	0.0401	24,100
2-E17-18	13SEP88		6	<10	10	<10	8,540	5,600	4,710	0.1000	16,900

Well name	Collection Date	Duplicate sample number	FSODIUM ppb 200/.	FSTRONT ppb 20/.	STRONUM ppb 20/.	SULFATE ppb 500/250000s	TC ppb 1000/.	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-E17-5	09SEP88		28,700	370	374	38,100	23,800	14	18	<5	<5
2-E17-6	09SEP88		19,100	233	203	21,900	31,100	<5	<5	<5	<5
2-E17-14	13SEP88		27,500	383	378	33,900	27,300	18	16	12	10
2-E17-15	14SEP88		37,100	372	348	30,800	22,000	17	17	19	11
2-E17-16	14SEP88		19,200	185	112	29,600	18,300	37	35	25	19
2-E17-17	13SEP88		25,700	212	220	32,500	20,300	17	28	20	14
2-E17-18	13SEP88		20,700	143	130	25,500	20,800	32	33	10	8

TABLE 11.4. Sampling Schedule for the 216-A-36B Crib

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

L Long list (WAC 173-303-9905)

R Quality control replicates

S Short list (overlap with another project)

V Volatile organic analyses blanks

X Regular sample list

(a) Well will be sampled pending remediation.

- Specific conductance results ($\mu\text{mhos/cm}$) were as follows. The values are rounded to two significant figures. Well 299-E17-5 has increased from the May/June result of 440 to 780. Well 299-E17-14 has decreased from 920 to 600. Well 299-E17-16 has decreased from 500 to 190. The specific conductance in well 299-E17-17 is 290.
- Average total organic halogen (TOX) concentrations were 4045 ppb in well 299-E17-5, 15,075 ppb in well 299-E17-14, 2760 ppb in well 299-E17-15, and 2032 ppb in well 299-E17-16. This is an increase in TOX compared with results from the May/June sampling, which were less than the detection limit (20 ppb) with the exception of well 299-E17-15, which was less than 90 ppb for the May/June sampling. Several TOX samples were split and re-analyzed, and the results are discussed later in this section.
- Elevated chromium (unfiltered) concentrations, reported for four wells from the May/June 1988 sampling, were not observed in this sampling round. Additional well development occurred between these two sampling periods.
- Cadmium (filtered and unfiltered) concentrations, which exceeded the standard in well 299-E17-14 for the May/June sampling, are below the standard for that well.
- Concentrations of a number of trace metals were much lower in several of the wells than they were for the May/June sampling, indicating the success of well redevelopment (see Section 1.0 Introduction).

- Ammonia was below the detection level in all wells.
- Elevated nitrate concentrations were measured in wells 299-E17-5, 299-E17-14, 299-E17-15, and 299-E17-17, with concentrations of 234 ppm, 238 ppm, 253 ppm, and 105 ppm, respectively.
- Methylene chloride was reported at a concentration of 6.4 ppm in well 299-E17-16 (see Section 1.0 Introduction).

Elevated TOX concentrations were found in wells 299-E17-5, 299-E17-14, 299-E17-15, and 299-E17-16. The TOX samples for these wells were split and analyzed for volatile organic constituents (VOC) by Pacific Northwest Laboratory in attempt to determine specific constituents contributing to the high TOX concentrations. The results indicated methylene chloride concentrations of 8450 ppb, 6180 ppb, 4435 ppb, and 824 ppb, for wells 299-E17-5, 299-E17-14, 299-E17-15, and 299-E17-16, respectively (Table 11.5). The results for well 299-E17-14 also indicated the presence of an unknown aromatic. United States Testing Company, Incorporated, analytical results of the VOC samples indicated methylene chloride in wells 299-E17-15 (22 ppb) and 299-E17-16 (6400 ppb) (Table 11.5).

The analytical results for VOC analyses conducted on samples from the TOX sample container and the VOC sample container are not consistent. These results indicate methylene chloride contamination of the TOX samples. The source of the methylene chloride contamination is unknown and is being investigated (see Section 1.0 Introduction).

TABLE 11.5. Results of United States Testing Company, Incorporated (UST), Total Organic Halogen Analyses, Pacific Northwest Laboratory Analyses for Volatile Organic Constituents from Total Organic Halogen Sample Splits, and UST Analyses for Volatile Organic Constituents. UST total organic halogen values are the average of four duplicate samples.

Well Number	UST Average TOX (Original)	Methylene Chloride Results	
		PNL TOX Sample (Split)	UST VOC Samples
299-E17-5	4,045	8,450	<10
299-E17-14	15,075	6,180	<10
299-E17-15	2,760	4,435	22
299-E17-16	2,032	824	6,400

12.0 216-B-3 POND

S. P. Luttrell

Four new wells installed at the 216-B-3 Pond (B Pond) in 1988 in conjunction with three existing wells and six additional wells to be installed in 1989 will provide the pond with a RCRA interim-status ground-water monitoring system. B Pond consists of a series of interconnected surface ponds to the east of the 200-East Area (Figure 4.1). The pond receives large volumes of waste water from facilities in the 200-East Area.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

This section discusses the status of activities to date relating to drilling and constructing ground-water monitoring wells, and hydrogeologic characterization at B Pond.

Drilling

Four new wells were drilled and constructed at B Pond in 1988 (Figure 12.1).. Final well development was conducted and sampling pumps were installed in October. The wells were developed until turbidity was less than 5 NTU, and HydroStar sampling pumps were installed. The new wells were surveyed for location and elevation. These wells had temporary well numbers assigned to them, which have been replaced with permanent numbers. The temporary (BP-) and permanent (699) numbers are given below:

- BP-3 became 699-44-42.
- BP-7 became 699-43-42J.
- BP-8 became 699-43-43.
- BP-10 became 699-42-42B.

Two existing wells that will be used in the monitoring system (299-E18-1 and 299-E32-4) have HydroStar sampling pumps, and one existing well in the monitoring system (699-42-40A) has a submersible pump. Well

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

inspection/completion forms, as-built diagrams, geologic logs, and geophysical logs for the four new wells at B Pond are presented in Volume 2, Appendix C.

Hydrogeologic Characterization

Results of moisture content analyses, hydrologic testing data analyses, and water-level data are presented in this section. Moisture content analyses were conducted on samples collected by the drive-barrel method from intervals in which no water had been added. These results are presented in Tables 12.1 and 12.2. The elevated moisture contents shown in the tables generally correspond to intervals of finer-grained sediments, primarily fine sand.

A hydrologic test was conducted in well 699-42-42B during development of that well. Data from this test and tests in wells 699-43-43 and 699-44-42 were analyzed. Estimates of transmissivity and hydraulic conductivity of the uppermost aquifer materials underlying B Pond from aquifer pumping tests are given in Table 12.3.

The casing elevations, depth-to-water, and water-level elevations for the four new wells are given in Table 12.4.

GROUND-WATER SAMPLING AND ANALYSIS

Ground-water sampling and analysis began this quarter. The background wells are 299-E18-1 and 299-E32-4, and the downgradient wells are 699-42-40A, 699-42-42B, 699-43-42J, 699-43-43, and 699-44-42 (shown in Figure 12.1).

Collection and Analysis

Samples were collected from well 299-E32-4 on September 27 and December 28, 1988; from well 299-E18-1 on November 10 and 23, 1988 as part of the sampling for other Hanford Site RCRA programs; and from wells 699-42-40A, 699-42-42B, 699-43-42J (indicated as 699-43-42F in the table of analytical results), 699-43-43, and 699-44-42 on November 21 and 22, 1988. There is a large time interval between sampling periods for the two background wells because these wells were installed and are sampled for other sites. The TOX results have not yet been received from UST for wells

TABLE 12.1. Sediment Moisture Content Data for Samples from Wells 699-44-42 and 699-43-42J at the 216-B-3 Pond

<u>Well 699-44-42</u>		<u>Well 699-43-42J</u>	
<u>Depth,</u> <u>ft</u>	<u>% Moisture,</u> <u>by weight</u>	<u>Depth,</u> <u>ft</u>	<u>% Moisture,</u> <u>by weight</u>
5	3.45	5	3.08
10	2.55	95	3.66
15	3.07	100	4.78
20	3.09	105	8.65
25	3.27	110	5.51
30	3.28		
35	3.57		
40	2.54		
45	2.72		
50	3.23		
55	6.82		
60	7.48		
65	9.44		
70	7.53		
75	7.44		
80	16.83		
85	16.17		
90	16.31		
95	5.64		
100	5.13		
105	7.54		
110	5.76		

699-42-4A, 699-42-40B, 699-42-42B, 699-43-43, 699-43-42J, and 699-44-42. Analytical results for the sample collected December 28 in well 299-E32-4 have not been received.

Water-level measurements were not made before sampling wells 699-44-42, 699-43-42J, 699-43-43, and 699-42-42B. The measuring tape got stuck in the first of these four wells on the day they were sampled. Water levels were measured on December 13, 1988, in these wells.

Discussion of Results

A summary of the analytical results is provided in Table 12.5. The results for constituents with at least one detected value are provided in Table 12.6. (A sampling schedule for wells near B Pond is shown in Table 12.7.) Major observations of the analyses received to date are discussed below.

TABLE 12.2. Sediment Moisture Content Data for Samples from Wells 699-43-43 and 699-42-42B at the 216-B-3 Pond

<u>Well 699-43-43</u>		<u>Well 699-42-42B</u>	
<u>Depth,</u> <u>ft</u>	<u>% Moisture,</u> <u>by weight</u>	<u>Depth,</u> <u>ft</u>	<u>% Moisture,</u> <u>by weight</u>
5	2.72	5	3.11
10	2.44	10	3.01
15	4.70	15	4.81
20	5.01	20	4.94
25	8.29	25	7.28
30	7.00	30	6.17
35	14.78	35	11.13
40	12.64	40	6.29
45	3.01	45	6.53
50	3.34	50	20.12
55	3.96	55	11.26
60	2.93	60	12.10
65	3.50	65	8.78
70	3.28	70	10.49
75	3.44	75	11.33
80	2.84	80	9.94
85	11.44	85	7.19
90	3.08	90	12.97
95	3.24	95	3.63
100	3.48	100	3.55
105	5.93	105	5.12

TABLE 12.3. Estimates of Transmissivity and Hydraulic Conductivity of the Uppermost Aquifer Materials Underlying the 216-B-3 Pond

<u>Well Number</u>	<u>Transmissivity, ft²/d</u>	<u>Hydraulic Conductivity, ft/d</u>
699-44-42	76,000	2,800
699-43-43	37,000	N/A
699-42-42B	330	15

- Elevated chromium concentrations were found in unfiltered samples from each of the new wells (from 16 ppb in well 699-42-42B to 57 ppb in well 699-43-43). Concentrations were below the detection limit for all filtered chromium samples. These results are similar to those observed for other recently constructed wells, in which effects of the well completion may still be affecting ground-water chemistry in the well (see Section 1.0 Introduction).

TABLE 12.4. Casing Elevations, Water-Level Measurements, and Water-Level Elevations for Wells at the 216-B-3 Pond

<u>Well Number</u>	<u>Casing Elevation, ft above MSL^(a)</u>	<u>Date of Measurement</u>	<u>Depth to Water, ft</u>	<u>Water-Level Elevation, ft above MSL</u>
299-E18-1	720.24	11-10-88	314.61	405.65
299-E32-4	685.68	10-26-88	280.64	405.24
699-42-40A	545.53	11-22-88	120.97	424.56
699-44-42	579.22	12-13-88	157.15	422.07
699-43-42J	581.68	12-13-88	161.09	420.59
699-43-43	579.37	12-13-88	163.17	416.20
699-42-42B	583.23	12-13-88	164.91	418.32

(a) MSL = mean sea level.

- A tritium concentration of 77,800 pCi/L was reported for well 699-42-42. Tritium concentrations were 1850 pCi/L in well 299-E32-4 and 1200 pCi/L in well 699-43-42J. Tritium did not exceed 1000 pCi/L in any other well.
- Specific conductance ranged from approximately 122 μ mhos/cm to 252 μ mhos/cm in the downgradient wells. Specific conductance ranged from approximately 410 μ mhos/cm to 595 μ mhos/cm in the background wells.
- Nitrate concentrations were 8.4 and 25 ppm, respectively, in background wells 299-E18-1 and 299-E32-4. Nitrate concentrations in the wells near B Pond ranged from less than detection (0.5 ppm) in well 699-42-40B to 6.2 ppm in well 699-42-42B.
- Sulfate concentrations were much higher (approximately 170 ppm) in well 299-E18-1 than in any other well.

TABLE 12.5. Constituent List and Summary of Sampling Results for the
216-8-3 Pond, November 1988

----- Constituent List=Contamination Indicator Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards	Standard Agency Exceeded	Full name	
088	CONDLAB	umho	.	8	0	700	WDOE	Specific conductance, laboratory	
191	CONDFO	umho	1	30	0	700	WDOE	Specific conductance, field	
199	PHFIELD		0.1	30	0	8.6	EPAS	xxx	pH, field
207	PH-LAB		0.01	8	0	8.6	EPAS		pH, laboratory
C89	TOC	ppb	1000	32	0	.			Total organic carbon
H42	TOXLDL	ppb	20	32	0	.			Total organic halogens, low DL
----- Constituent List=Drinking Water Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards	Standard Agency Exceeded	Full name	
109	COLIFRM	MPN	2.2	4	4 ***	1	EPA	Coliform bacteria	
111	BETA	pCi/L	8	9	0	50	EPA	Gross beta	
181	RADIUM	pCi/L	1	9	0	5	EPA	Total radium	
212	ALPHA	pCi/L	4	9	0	15	EPA	Gross alpha	
A08	BARIUM	ppb	8	9	0	1000	EPA	Barium	
A07	CADMIUM	ppb	2	9	8	10	EPA	Cadmium	
A08	CHROMIUM	ppb	10	9	2	50	EPA	xxx	Chromium
A10	SILVER	ppb	10	9	9 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	9	5	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	8	8 ***	2	EPA		Mercury
A22	SELENIUM	ppb	5	9	8	10	EPA		Selenium
A38	ENDRIN	ppb	0.1	8	8 ***	0.2	EPA		Endrin
A34	METHLOR	ppb	3	8	8 ***	100	EPA		Methoxychlor
A35	TOXAENE	ppb	1	8	8 ***	5	EPA		Toxaphene
A36	a-BHC	ppb	0.1	8	8 ***	4	EPA		Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	8	8 ***	4	EPA		Lindane, beta-BHC
A38	g-BHC	ppb	0.1	8	8 ***	4	EPA		Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	8	8 ***	4	EPA		Lindane, delta-BHC
A61	LEADGF	ppb	5	9	9 ***	50	EPA		Lead (graphite furnace)
C72	NITRATE	ppb	500	9	1	45000	EPA		Nitrate
C74	FLUORID	ppb	500	9	9 ***	4000	EPA		Fluoride
H13	2,4-D	ppb	2	8	8 ***	100	EPA		2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	8	8 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	ppb	8	8	1	1000	EPA		Barium, filtered
H21	FCAOMIU	ppb	2	8	8 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	ppb	10	8	8 ***	50	EPA		Chromium, filtered
H23	FSILVER	ppb	10	8	8 ***	50	EPA		Silver, filtered
H37	FARSENI	ppb	5	8	4	50	EPA		Arsenic, filtered
H38	FMERCUR	ppb	0.1	7	7 ***	2	EPA		Mercury, filtered
H39	FSELENI	ppb	5	8	5	10	EPA		Selenium, filtered
H41	FLEAD	ppb	5	8	8 ***	50	EPA		Lead, filtered

TABLE 12.5. (contd)

----- Constituent List=Water Quality Parameters -----									
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards			Full name	
					Standard	Agency	Exceeded		
A11 SODIUM	ppb	200	9	0	.			Sodium	
A17 MANGESE	ppb	5	9	4	50	EPAS	xxx	Manganese	
A19 IRON	ppb	30	9	0	300	EPAS	xxx	Iron	
C57 PHENOL	ppb	10	2	2 ***	.			Phenol	
C73 SULFATE	ppb	500	9	0	250000	EPAS		Sulfate	
C75 CHLORID	ppb	500	9	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	8	300	EPAS		Iron, filtered	
H57 LPHENOL	ppb	10	8	8 ***	.			Phenol, low DL	
----- Constituent List=Site Specific and Other Parameters -----									
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards			Full name	
					Standard	Agency	Exceeded		
010 CO-60	pCi/L	22.5	1	0	100	EPAR		Cobalt-60	
024 CS-137	pCi/L	20	1	0	200	EPAR		Cesium-137	
034 RU-106	pCi/L	172.5	1	0	80	EPAR		Ruthenium-106	
108 TRITIUM	pCi/L	500	8	0	20000	EPA	xxx	Tritium (H-3)	
121 SR-90	pCi/L	5	1	0	8	EPA		Strontium-90	
124 U-CHEM	ug/L	0.725	1	0	.			Uranium, chemical	
197 TC-99	pCi/L	15	1	0	900	EPAR		Technetium-99	
A01 BERYLIUM	ppb	5	9	9 ***	.			Beryllium	
A03 STRONIUM	ppb	20	9	0	.			Strontium	
A04 ZINC	ppb	5	9	2	5000	EPAS		Zinc	
A05 CALCIUM	ppb	50	9	0	.			Calcium	
A12 NICKEL	ppb	10	9	5	.			Nickel	
A13 COPPER	ppb	10	9	8	1300	EPAP		Copper	
A14 VANADIUM	ppb	5	9	2	.			Vanadium	
A16 ANTIMONY	ppb	100	9	9 ***	.			Antimony	
A18 ALUMINUM	ppb	150	9	8	.			Aluminum	
A19 POTASSIUM	ppb	100	9	0	.			Potassium	
A50 MAGNES	ppb	50	9	0	.			Magnesium	
C78 PHOSPHA	ppb	1000	9	9 ***	.			Phosphate	
H16 TC	ppb	1000	2	0	.			Total carbon	
H18 FZINC	ppb	5	8	4	5000	EPAS		Zinc, filtered	
H19 FCALCIU	ppb	50	8	0	.			Calcium, filtered	
H25 FNICKEL	ppb	10	8	6	.			Nickel, filtered	
H26 FCOPPER	ppb	10	8	8 ***	1300	EPAP		Copper, filtered	
H27 FVANADI	ppb	5	8	3	.			Vanadium, filtered	
H28 FALUMIN	ppb	150	8	8 ***	.			Aluminum, filtered	
H30 FPOTASS	ppb	100	8	0	.			Potassium, filtered	
H32 FMAGNES	ppb	50	8	0	.			Magnesium, filtered	
H33 FBERYLL	ppb	5	8	8 ***	.			Beryllium, filtered	
H35 FSTRONT	ppb	20	8	0	.			Strontium, filtered	
H36 FANTIMO	ppb	100	8	8 ***	.			Antimony, filtered	
H60 TURBID	ntu	0.1	8	0	.			Turbidity	
H66 BROMIDE	ppb	1000	8	8 ***	.			Bromide	
H67 NITRITE	ppb	1000	8	8 ***	.			Nitrite	

TABLE 12.5. (contd)

----- Constituent List=Site Specific and Other Parameters -----						
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
I01 ACETONE	ppb	10	6	1	.	Acetone
I09 BUTANOL	ppb	5000	1	1 ***	.	1-Butanol
I10 PROPANL	ppb	5000	1	1 ***	.	2-Propanol
I21 TRIBUPH	ppb	10	2	2 ***	.	Tributylphosphoric acid
I28 TAF	ppb	10	5	5 ***	.	Tetrahydrofuran
I87 ETHANDL	ppb	5000	1	1 ***	.	Ethanol
L20 MBP	ppb	5000	1	1 ***	.	Monobutylphosphate
L21 DBP	ppb	5000	1	1 ***	.	Dibutylphosphate
----- Constituent List=WAC 173-308-9905 -----						
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	2	2 ***	.	Thiourea
A26 ACETREA	ppb	200	2	2 ***	.	1-Acetyl-2-thiourea
A28 CHLOREA	ppb	200	2	2 ***	.	1-(o-Chlorophenyl) thiourea
A27 DIETROL	ppb	200	2	2 ***	.	Diethylstilbestrol
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	0.1	2	2 ***	.	DDD
A41 DDE	ppb	0.1	2	2 ***	.	DDE
A42 DDT	ppb	0.1	2	2 ***	.	DDT
A43 HEPTLOR	ppb	0.1	2	2 ***	0 EPAP	Heptachlor
A44 HEPTIDE	ppb	0.1	2	2 ***	0 EPAP	Heptachlor epoxide
A46 DIELRIN	ppb	0.1	2	2 ***	.	Dieldrin
A47 ALDRIN	ppb	0.1	2	2 ***	.	Aldrin
A48 CHLOANE	ppb	1	2	2 ***	0 EPAP	Chlordane
A49 ENDD1	ppb	0.1	2	2 ***	.	Endosulfan I (alpha)
A52 ENDD2	ppb	0.1	2	2 ***	.	Endosulfan II (beta)
A54 AR1016	ppb	1	2	2 ***	0 EPAP	Arochlor 1016
A56 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 AR1264	ppb	1	2	2 ***	0 EPAP	Arochlor 1264
A60 AR1280	ppb	1	2	2 ***	0 EPAP	Arochlor 1280
A61 TETRANE	ppb	5	12	12 ***	5 EPA	Tetrachloromethane [Carbon Tetrachloride]
A62 BENZENE	ppb	5	6	6 ***	5 EPA	Benzene
A63 DIOXANE	ppb	500	6	6 ***	.	Dioxane
A64 METHONE	ppb	10	12	12 ***	.	Methyl ethyl ketone
A65 PYRIDIN	ppb	500	6	6 ***	.	Pyridine
A66 TOLUENE	ppb	5	6	6 ***	2000 EPAP	Toluene
A67 1,1,1-T	ppb	5	12	12 ***	200 EPA	1,1,1-Trichloroethane
A68 1,1,2-T	ppb	5	12	12 ***	.	1,1,2-Trichloroethane
A69 TRICENE	ppb	5	12	12 ***	5 EPA	Trichloroethylene [1,1,2-Trichloroethene]
A70 PERCENE	ppb	5	12	12 ***	.	Perchloroethylene [Tetrachloroethene]
A71 OPXYLE	ppb	5	12	12 ***	440 EPAP	Xylene-o,p

TABLE 12.5. (contd)

Constituent List=WAC 173-303-9906						
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded
A72	ACROLIN	ppb	10	6	6 ***	.
A73	ACRYILE	ppb	10	6	6 ***	.
A74	BISTHER	ppb	10	6	6 ***	.
A75	BROMONE	ppb	10	6	6 ***	.
A76	METHBRO	ppb	10	6	6 ***	.
A77	CARBIDE	ppb	10	6	6 ***	.
A78	CHLBENZ	ppb	10	6	6 ***	80 EPAP
A79	CHLTHER	ppb	10	6	6 ***	.
A80	CHLFORM	ppb	5	12	12 ***	100 EPA
A81	METHCHL	ppb	10	6	6 ***	.
A82	CHMTHER	ppb	10	6	6 ***	.
A83	CROTONA	ppb	10	6	6 ***	.
A84	DIBRCHL	ppb	10	6	6 ***	0 EPAP
A85	DIBRETH	ppb	10	6	6 ***	.
A86	DIBRMET	ppb	10	6	6 ***	.
A87	DIBUTEN	ppb	10	6	6 ***	.
A88	DICDIFM	ppb	10	6	6 ***	.
A89	1,1-DIC	ppb	10	6	6 ***	.
A90	1,2-DIC	ppb	10	6	6 ***	6 EPA
A91	TRANDE	ppb	10	6	6 ***	70 EPAP
A92	DICETHY	ppb	10	6	6 ***	7 EPA
A93	METHYCH	ppb	10	12	12 ***	.
A94	DICPANE	ppb	10	6	6 ***	6 EPAP
A95	DICPENE	ppb	10	6	6 ***	.
A96	NNDIEHY	ppb	10	6	6 ***	.
A99	HYDRSUL	ppb	10	6	6 ***	.
B01	IODOMET	ppb	10	6	6 ***	.
B02	METHACR	ppb	10	6	6 ***	.
B03	METHTHI	ppb	10	6	6 ***	.
B04	PENTACH	ppb	10	6	6 ***	.
B05	1112-tc	ppb	10	6	6 ***	.
B06	1122-tc	ppb	10	6	6 ***	.
B08	BROMORM	ppb	10	6	6 ***	100 EPA
B09	TRCMEOL	ppb	10	6	6 ***	.
B10	TRCMFLM	ppb	10	6	6 ***	.
B11	TRCPANE	ppb	10	6	6 ***	.
B12	123-trp	ppb	10	6	6 ***	.
B13	VINYIDE	ppb	10	6	6 ***	2 EPA
B14	M-XYLE	ppb	5	12	12 ***	440 EPAP
B15	DIETHY	ppb	10	6	6 ***	.
B19	ACETILE	ppb	3000	6	6 ***	.
B20	ACETOPH	ppb	10	2	2 ***	.
B21	WARFRIN	ppb	10	2	2 ***	.
B22	ACEFENE	ppb	10	2	2 ***	.
B23	AMINOYL	ppb	10	2	2 ***	.
B24	AMIISOX	ppb	10	2	2 ***	.
B25	AMITROL	ppb	10	2	2 ***	.
B26	ANILINE	ppb	10	2	2 ***	.
B27	ARAMITE	ppb	10	2	2 ***	.
B28	AURAMIN	ppb	10	2	2 ***	.
						Full name
						Acrolein
						Acrylonitrile
						Bis(chloromethyl) ether
						Bromoacetone
						Methyl bromide
						Carbon disulfide
						Chlorobenzene
						2-Chloroethyl vinyl ether
						Chloroform [Trichloromethane]
						Methyl chloride [Chloromethane]
						Chloromethyl methyl ether
						Crotonaldehyde
						1,2-Dibromo-3-chloropropane
						1,2-Dibromoethane
						Dibromomethane
						1,4-Dichloro-2-butene
						Dichlorodifluoromethane
						1,1-Dichloroethane
						1,2-Dichloroethane
						trans-1,2-Dichloroethene
						1,1-Dichloroethylene
						Methylene chloride [Dichloromethane]
						1,2-Dichloropropane
						1,3-Dichloropropane
						N,N-diethylhydrazine
						Hydrogen sulfide
						Iodomethane
						Methacrylonitrile
						Methanethiol
						Pentachloroethane
						1,1,1,2-Tetrachloroethane
						1,1,2,2-Tetrachloroethane
						Bromoform [Tribromomethane]
						Trichloromethanethiol
						Trichloromonofluoromethane
						Trichloropropane
						1,2,3-Trichloropropane
						Vinyl chloride
						Xylene-m
						Diethylarsine
						Acetonitrile
						Acetophenone
						Warfarin
						2-Acetylaminofluorene
						4-Aminobiphenyl
						5-(Aminomethyl)-3-isoxazolol
						Amitrole
						Aniline
						Aramite
						Auramine

TABLE 12.5. (contd)

Constituent List=WAC 178-303-0905						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
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 ***	Benzenethiol
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
B36	PBENZQU	ppb	10	2	2 ***	p-Benzoquinone
B37	BENZCHL	ppb	10	2	2 ***	Benzyl chloride
B38	BIS2CHW	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 (DNBP)
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 ***	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	DIBAIKY	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 ***	1,4-Dichlorobenzene
B64	DICHBEN	ppb	20	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	DIWEAMB	ppb	10	2	2 ***	p-Dimethylaminoazobenzene
B71	DIWBENZ	ppb	10	2	2 ***	7,12-Dimethylbenz[a]anthracene
B72	DIWEYLB	ppb	10	2	2 ***	3,3'-Dimethylbenzidine
B73	THIONOX	ppb	10	2	2 ***	Thiofenox
B74	DIMPHAW	ppb	10	2	2 ***	alpha,alpha-Dimethylphenethylamine
B75	DIMPHEM	ppb	10	2	2 ***	2,4-Dimethylphenol
B76	DIMPHTH	ppb	10	2	2 ***	Dimethyl phthalate
B77	DINBENZ	ppb	10	2	2 ***	Dinitrobenzene
B78	DINCREC	ppb	10	2	2 ***	4,6-Dinitro-o-cresol and salts

TABLE 12.5. (contd)

Constituent List=WAC 173-303-9905							Drinking Water Standards		Full name
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection		Standard	Agency Exceeded	
B79	DINPHEN	ppb	50	2	2 ***	.	.	.	2,4-Dinitrophenol
B80	24-dint	ppb	10	2	2 ***	.	.	.	2,4-Dinitrotoluene
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	ETHMINE	ppb	10	2	2 ***	.	.	.	Ethylamine
B87	ETHMETS	ppb	10	2	2 ***	.	.	.	Ethyl methanesulfonate
B88	FLUORAN	ppb	10	2	2 ***	.	.	.	Fluoranthene
B89	HEXC BEN	ppb	10	2	2 ***	.	.	.	Hexachlorobenzene
B90	HEXC BUT	ppb	10	2	2 ***	.	.	.	Hexachlorobutadiene
B91	HEXC CYC	ppb	10	2	2 ***	.	.	.	Hexachlorocyclopentadiene
B92	HEXC ETH	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 ***	.	.	.	Melphalen
B97	METHAPY	ppb	10	2	2 ***	.	.	.	Methapyrilene
B98	METHNYL	ppb	10	2	2 ***	.	.	.	Metholonyl
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-Methylactonitrile
C04	METACRY	ppb	10	6	6 ***	.	.	.	Methyl methacrylate
C05	METWSUL	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	50	2	2 ***	.	.	.	p-Nitroaniline
C12	NITBENZ	ppb	10	2	2 ***	.	.	.	Nitrobenzene
C13	NITPHEN	ppb	50	2	2 ***	.	.	.	4-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-nitrosomethyl ethylamine
C19	NNIURET	ppb	10	2	2 ***	.	.	.	N-nitroso-n-methylurethane
C20	NNIVINY	ppb	10	2	2 ***	.	.	.	N-nitrosomethylvinylamine
C21	NNIWORP	ppb	10	2	2 ***	.	.	.	N-nitrosomorpholine
C22	NNINICO	ppb	10	2	2 ***	.	.	.	N-nitrosornicotine
C23	NNIPPE	ppb	10	2	2 ***	.	.	.	N-nitrosopiperidine
C24	NITRPYR	ppb	10	2	2 ***	.	.	.	Nitrosopyrrolidine
C25	NITRYOL	ppb	10	2	2 ***	.	.	.	5-Nitro-o-toluidine
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

TABLE 12.5. (contd)

Constituent List=WAC 173-303-9905							Drinking Water Standards		Full name
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection		Standard	Agency Exceeded	
C31	PHTHEST	ppb	10	2	2	***	.	.	Phthalic acid esters
C32	PICOLIN	ppb	10	2	2	***	.	.	2-Picoline
C33	PROMIDE	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	***	.	.	1,2,4,6-Tetrachlorobenzene
C39	TETRCHP	ppb	10	2	2	***	.	.	2,3,4,6-Tetrachlorophenol
C40	THIURAM	ppb	10	2	2	***	.	.	Thiuram
C41	TDLUDIA	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	60	2	2	***	.	.	2,4,6-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	***	.	.	Chloronaphazline
C61	BIS2ETH	ppb	10	2	2	***	.	.	Bis(2-chloroisopropyl) ether
C62	HEXAENE	ppb	10	2	2	***	.	.	Hexachloropropene
C63	HYDRAZI	ppb	8000	2	2	***	.	.	Hydrazine
C64	HEXACHL	ppb	10	2	2	***	.	.	Hexachlorophene
C65	NAPHTNA	ppb	10	2	2	***	.	.	Naphthalene
C66	123TRI	ppb	10	2	2	***	.	.	1,2,3-Trichlorobenzene
C68	135TRI	ppb	10	2	2	***	.	.	1,3,5-Trichlorobenzene
C69	1234TE	ppb	10	2	2	***	.	.	1,2,3,4-Tetrachlorobenzene
C60	1235TE	ppb	10	2	2	***	.	.	1,2,3,5-Tetrachlorobenzene
C61	TEPEPYR	ppb	2	2	2	***	.	.	Tetraethylpyrophosphate
C62	CHLLATE	ppb	30	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	3	3	***	.	.	Cyanide
C71	FORMALN	ppb	600	6	6	***	.	.	Formalin
C77	PERCHLO	ppb	1000	2	2	***	.	.	Perchlorate
C78	SULFIDE	ppb	1000	2	2	***	.	.	Sulfide
C79	KEROSEN	ppb	10000	2	2	***	.	.	Kerosene
C80	AMMONIU	ppb	50	3	3	***	.	.	Ammonium ion
C81	ETHYGLY	ppb	10000	1	1	***	.	.	Ethylene glycol
C86	DIOXIN	ppb	0.1	2	2	***	.	.	Dioxin
C87	CITRUSR	ppb	1000	2	2	***	.	.	Citrus red
C90	PARALDE	ppb	2000	2	2	***	.	.	Paraldehyde
C91	STRYCHN	ppb	60	2	2	***	.	.	Strychnine
C92	MALHYDR	ppb	600	2	2	***	.	.	Maleic hydrazide
C93	NICOTIN	ppb	100	2	2	***	.	.	Nicotinic acid
C94	ACRYIDE	ppb	10000	2	2	***	0	EPAP	Acrylamide
C95	ALLYLAL	ppb	2500	2	2	***	.	.	Allyl alcohol
C97	CHLACET	ppb	18000	2	2	***	.	.	Chloroacetaldehyde
C98	CHLPROP	ppb	4000	2	2	***	.	.	3-Chloropropionitrile

TABLE 12.5. (contd)

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

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H03	ETHCARB	ppb	5000	2	2 ***	.	Ethyl carbamate
H04	ETHCYAN	ppb	2000	2	2 ***	.	Ethyl cyanide
H05	ETHOXID	ppb	3000	6	6 ***	.	Ethylene oxide
H06	ETHMETH	ppb	10	6	6 ***	.	Ethyl methacrylate
H09	ISOBUTY	ppb	1000	2	2 ***	.	Isobutyl alcohol
H11	PROPYLA	ppb	10000	2	2 ***	.	n-Propylamine
H12	PROPYNO	ppb	8000	2	2 ***	.	2-Propyn-1-ol
H15	2,4,5-T	ppb	2	2	2 ***	.	2,4,5-T
H40	PTHALLI	ppb	5	3	3 ***	.	Thallium, filtered
H68	HEXONE	ppb	10	12	12 ***	.	Hexone

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

xxx - Indicates that Drinking Water Standards were exceeded

EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 26890

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

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

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

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

TABLE 12.6. Constituents with at Least One Detected Value for the
216-B-3 Pond, November 1988

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho ./700w	PH-LAB 0.01/8.5s	PHFIELD 0.1/8.5s	TOC ppb 1000/.	TOXLDL ppb 20/.
2-E18-1	10NOV88		595	571	7.9	8.6	#400	#4
		1	594	588	7.9	8.6	#300	#0
		2	593	588	8.0	8.5	#300	#3
		3	594	583	7.9	8.5	#300	#3
2-E18-1	23NOV88		633	.	.	8.5	.	.
2-E32-4	27SEP88		410	410	7.8	7.9	#300	35
		1	410	415	7.7	8.0	#200	#2
		2	410	411	7.8	8.1	#400	32
		3	410	412	7.7	8.1	#200	74
6-42-40A	22NOV88		170	.	.	8.3	#800	#9
		1	169	.	.	8.3	#800	#6
		2	169	.	.	8.3	#800	#1
		3	169	.	.	8.3	#800	#-2
6-42-40B	22NOV88		122	.	.	8.4	1,300	#5
		1	.	.	.	.	1,200	47
		2	.	.	.	.	1,300	#7
		3	.	.	.	.	1,200	#10
6-42-42B	22NOV88		251	.	.	8.4	#400	#4
		1	252	.	.	8.3	#400	#1
		2	251	.	.	8.4	#400	#-2
		3	250	.	.	8.4	#400	#2
6-43-42J	22NOV88		187	.	.	8.0	#800	#2
		1	187	.	.	8.2	#800	#6
		2	187	.	.	8.0	#800	#4
		3	187	.	.	8.3	#700	#5
6-43-43	21NOV88		172	.	.	8.0	#800	#1
		1	172	.	.	8.0	#800	#2
		2	172	.	.	8.0	#800	#6
		3	172	.	.	8.0	#800	#6
6-44-42	21NOV88		182	.	.	8.0	#800	#3
		1	182	.	.	8.2	#800	#2
		2	182	.	.	8.2	#600	#2
		3	181	.	.	8.2	#700	#4

TABLE 12.6. (contd)

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALPHA pCi/L 4/15	ALUMNUM ppb 150/.	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BETA pCi/L 8/50	CADMIUM ppb 2/10
2-E18-1	10NOV88		#2	3.8300	<150	<5	<5	42	43	8.45	<2
	10NOV88	1	#2	3.9000	<150	<5	<5	38	38	10.70	<2
	10NOV88	2	#3	.	.	.	.	.	.	.	.
	10NOV88	3	#1	.	.	.	.	.	.	.	.
	23NOV88		<10	.	.	.	.	.	.	.	.
	23NOV88	M	<5	.	.	.	.	.	.	.	.
2-E32-4	27SEP88		.	4.5900	<150	<5	<5	82	73	9.22	<2
8-42-40A	22NOV88		.	*0.1800	<150	<5	<5	8	<8	4.08	<2
8-42-40B	22NOV88		.	*-0.4480	228	<5	.	12	.	4.31	3
8-42-42B	22NOV88		.	1.3700	<150	7	8	30	32	5.48	<2
8-43-42J	22NOV88		.	*0.7080	<150	9	9	12	13	8.01	<2
8-43-43	21NOV88		.	0.9820	<150	7	7	13	12	7.05	<2
8-44-42	21NOV88		.	*0.0783	<150	11	12	12	12	7.57	<2

Well name	Collection Date	Duplicate sample number	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORID ppb 500/250000s	CHROMIUM ppb 10/50	CO-60 pCi/L 22.5/100r	COPPER ppb 10/1300p	CS-137 pCi/L 20/200r	IRON ppb 30/300s	FIIRON ppb 30/300s
2-E18-1	10NOV88		83,200	87,400	8,800	30	.	<10	.	355	<30
	10NOV88	1	58,400	57,700	8,200	20	.	12	.	285	<30
	10NOV88	2	.	.	.	.	.	.	.	.	.
	10NOV88	3	.	.	.	.	.	.	.	.	.
	23NOV88		.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.	.
2-E32-4	27SEP88		40,000	44,900	8,470	25	*-7.93	<10	6.59	123	34
8-42-40A	22NOV88		17,000	18,100	2,500	<10	.	<10	.	309	57
8-42-40B	22NOV88		.	13,200	2,900	<10	.	<10	.	13,200	.
8-42-42B	22NOV88		22,000	22,200	3,700	16	.	<10	.	137	<30
8-43-42J	22NOV88		23,400	22,400	2,800	83	.	<10	.	163	<30
8-43-43	21NOV88		23,500	25,200	2,900	57	.	<10	.	231	<30
8-44-42	21NOV88		24,100	24,100	3,100	18	.	<10	.	104	<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	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5
2-E18-1	10NOV88		15,200	15,300	12	25	15	8,400	8,540	8,330	0.27200
	10NOV88	1	14,700	14,700	12	19	15	8,400	8,380	8,410	0.20700
	10NOV88	2	.	.	.	.	.	.	.	.	.
	10NOV88	3	.	.	.	.	.	.	.	.	.
	23NOV88		.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.	.
2-E32-4	27SEP88		14,300	12,900	<5	<10	<10	25,000	8,080	8,790	*0.01610
8-42-40A	22NOV88		4,700	4,430	12	<10	<10	700	2,770	2,910	*0.09980
8-42-40B	22NOV88		4,340	.	174	<10	<10	<500	.	3,200	*0.08000
8-42-42B	22NOV88		7,790	7,740	5	<10	<10	8,200	4,050	4,080	*0.19400
8-43-42J	22NOV88		5,840	5,850	<5	19	<10	1,000	4,750	4,810	*0.12700
8-43-43	21NOV88		5,770	5,270	<5	25	<10	800	5,480	5,900	*-0.00818
8-44-42	21NOV88		8,510	8,450	<5	<10	<10	1,100	5,310	5,190	0.18900

TABLE 12.6. (contd)

Well name	Collection Date	Duplicate sample number	RU-108 pCi/L 172.5/30r	FSELENI ppb 5/10	SELENIUM ppb 6/10	SODIUM ppb 200/.	FSODIUM ppb 200/.	SR-90 pCi/L 5/8	FSTRONT ppb 20/.	STRONTIUM ppb 20/.	SULFATE ppb 500/250000s
2-E18-1	10NOV88		.	7	7	25,900	28,100	.	255	249	172,000
	10NOV88	1	.	8	7	27,000	28,700	.	241	241	189,000
	10NOV88	2	.	.	.	.	.	.	.	.	.
	10NOV88	3	.	.	.	.	.	.	.	.	.
	23NOV88		.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.	.
2-E32-4	27SEP88		0	7	7	30,600	27,300	*0.37	214	234	59,700
8-42-40A	22NOV88		.	<5	<5	3,920	3,770	.	84	89	12,200
8-42-40B	22NOV88		.	.	<5	4,480	.	.	.	92	7,200
8-42-42B	22NOV88		.	<5	<5	21,800	22,600	.	153	158	19,800
8-43-42J	22NOV88		.	<5	<5	9,830	10,200	.	107	102	11,300
8-43-43	21NOV88		.	<5	<5	7,450	7,020	.	105	112	9,300
8-44-42	21NOV88		.	<5	<5	14,400	14,900	.	129	128	12,000

Well name	Collection Date	Duplicate sample number	TC ppb 1000/.	TC-99 pCi/L 15/900r	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/.	U-CHEM ug/L 0.725/.	FVANADI ppb 5/.	VANADIUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-E18-1	10NOV88		21,500	.	*-287.0	.	.	<5	8	79	28
	10NOV88	1	.	.	.	.	.	<5	<5	53	41
	10NOV88	2	.	.	.	.	.	.	.	.	.
	10NOV88	3	.	.	.	.	.	.	.	.	.
	23NOV88		.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.	.
2-E32-4	27SEP88		28,600	*-0.437	1,850.0	.	7.73	16	19	6	<5
8-42-40A	22NOV88		.	.	*-371.0	.	.	<5	<5	5	<5
8-42-40B	22NOV88		.	.	*93.1	200.0	.	.	10	19	.
8-42-42B	22NOV88		.	.	77,800.0	2.0	.	27	25	109	43
8-43-42J	22NOV88		.	.	1,200.0	1.1	.	51	48	8	8
8-48-43	21NOV88		.	.	539.0	0.8	.	33	34	<5	<5
8-44-42	21NOV88		.	.	983.0	0.9	.	44	40	<5	<5

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 26890
- r - based on National Interim Primary Drinking Water Regulations,
Appendix IV, EPA-570/9-78-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 48938
- s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143
(July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-54, Public Water Supplies

Data flags

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

TABLE 12.7. Sampling Schedule for the 216-B-3 Pond

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

L Long list (WAC 173-303-9905)
 OL Long list (overlap with another project)
 R Quality control replicates
 S Short list (overlap with another project)
 V Volatile organic analyses blanks
 X Regular sample list

13.0 2101-M POND

M. A. Chamness

This section discusses the status of activities and observations concerning hydrogeologic characterization and sampling and analyzing the ground water at the 2101-M Pond. The 2101-M Pond program is following an interim-status ground-water contamination detection program, with the first year of background data currently being collected as required by 40 CFR 265. Locations of the four monitoring wells at the 2101-M Pond site are shown in Figure 13.1. Westinghouse Hanford Company is preparing a closure plan for this site.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

No wells were drilled during this quarter. Results of the first-quarter ground-water samples indicated the presence of unfiltered iron, arsenic, chromium, and filtered and unfiltered manganese and selenium above primary or secondary drinking water standards (Fruland, Bates, and Lundgren 1989).

Hydrogeologic Characterization

Water-level measurements have been collected at least once a month since October 1988. Table 13.1 provides this quarter's water-level data.

SEDIMENT SAMPLING AND ANALYSIS

Seven sediment samples were taken from two of the wells during drilling for analysis of metals and volatile organic compounds. Samples from well 299-E18-3 were taken at depths of 45, 62, 84, 97, and 194 ft, with the latter being split into two samples. One sample was taken from the background well, 299-E18-1, at a depth of 195 ft. All of these samples were collected using clean stainless steel utensils and buckets. Sample bottles were filled quickly to minimize loss of volatile organic constituents. All samples were placed in a cooler and kept at 4°C until analyzed by the analytical laboratory. Chain-of-custody procedures were followed throughout. Metals were analyzed using the x-ray fluorescence (XRF) method, and the

FIGURE 13.1. 2101-M Pond Monitoring Well Location Map

TABLE 13.1. Water-Level Measurements and Elevation Data^(a)

Well Number	Top of Casing Elevation (ft)	Correction Factor ^(b)	Measurement Date	Depth to Water (ft)	Water-Level Elevation (ft)
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
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 ^(c)	315.69	405.74
			12/08/88	315.47	405.96
299-E18-3	722.04	+0.03	10/06/88 ^(d)		
			10/14/88	316.13	405.94
			10/26/88	316.10	405.97
			11/14/88	316.21	405.86
			12/08/88 ^(c)	316.02	406.05
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

(a) Samples collected at times other than during sampling. All measurements were taken with the same steel tape and within a short time period.

(b) The correction factors are based on inclinometer measurement which 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.

(c) Measured only once.

(d) Unable to make measurements.

volatile organic compounds were analyzed using the methods given in SW-846 (EPA 1982). None of the results indicated levels of metals above background levels (Table 13.2). No volatile organic compounds were found in any of the samples with the exception of methylene chloride, which was found in two of the samples (Table 13.3). Because methylene chloride was found in only one of the split samples from the 194-ft depth in 299-E18-3, it is thought to have been introduced into both samples in the laboratory (Section 1.0 Introduction).

TABLE 13.2. Results of Borehole Sediment Analysis Using X-Ray Fluorescence Method

Constituent	Metals Results		
	299-E18-1 (195 ft)	299-E18-3 (45 ft)	299-E18-3 (45 ft)(a)
Aluminum (%)	6.79 ± 0.39	6.63 ± 0.38	6.56 ± 0.38
Silica (%)	30.0 ± 1.5	30.4 ± 1.5	31.7 ± 1.6
Phosphorus (%)	<0.069	<0.064	<0.068
Sulfur (%)	<0.019	<0.018	<0.019
Chlorine (%)	<0.010	<0.010	<0.010
Potassium (%)	1.833 ± 0.093	2.07 ± 0.10	2.12 ± 0.11
Calcium (%)	2.64 ± 0.13	2.26 ± 0.12	2.27 ± 0.12
Titanium (%)	0.385 ± 0.020	0.292 ± 0.015	0.291 ± 0.015
Vanadium (ppm)	98 ± 23	65 ± 20	58 ± 20
Chromium (ppm)	34 ± 12	32 ± 11	24 ± 11
Manganese (ppm)	625 ± 34	484 ± 27	459 ± 26
Iron (ppm)	3.33 ± 0.17	2.57 ± 0.13	2.52 ± 0.13
Cobalt (ppm)	<35	43 ± 16	<31
Nickel (ppm)	19.3 ± 4.1	21.4 ± 3.7	15.4 ± 3.6
Copper (ppm)	19.6 ± 1.8	14.7 ± 1.5	15.8 ± 1.6
Zinc (ppm)	57.0 ± 3.3	45.0 ± 2.7	45.1 ± 2.6
Gallium (ppm)	14.5 ± 1.1	13.2 ± 1.0	13.4 ± 1.0
Mercury (ppm)	<2.5	<2.4	<2.4
Selenium (ppm)	<0.89	<0.87	<0.86
Lead (ppm)	13.1 ± 1.4	11.1 ± 1.4	10.6 ± 1.3
Arsenic (ppm)	4.63 ± 0.74	4.46 ± 0.72	5.11 ± 0.74
Bromine (ppm)	<0.84	<0.80	0.83 ± 0.40
Rubidium (ppm)	70.5 ± 3.6	87.5 ± 4.5	87.0 ± 4.4
Strontium (ppm)	412 ± 21	358 ± 18	352 ± 18
	299-E18-1 (62 ft)	299-E18-3 (84 ft)	299-E18-3 (97 ft)
Aluminum (%)	6.74 ± 0.39	6.73 ± 0.39	6.92 ± 0.40
Silica (%)	30.0 ± 1.5	29.9 ± 1.5	30.8 ± 1.6
Phosphorus (%)	<0.066	<0.066	<0.066
Sulfur (%)	<0.018	<0.018	<0.018
Chlorine (%)	<0.010	<0.009	<0.010
Potassium (%)	2.02 ± 0.10	2.00 ± 0.10	1.971 ± 0.099
Calcium (%)	2.23 ± 0.11	2.32 ± 0.12	2.26 ± 0.12
Titanium (%)	0.386 ± 0.020	0.355 ± 0.019	0.347 ± 0.018
Vanadium (ppm)	121 ± 23	92 ± 22	91 ± 21
Chromium (ppm)	32 ± 11	38 ± 11	40 ± 11
Manganese (ppm)	593 ± 32	546 ± 30	542 ± 30
Iron (ppm)	3.14 ± 0.16	2.93 ± 0.15	2.73 ± 0.14
Cobalt (ppm)	<34	<33	<32
Nickel (ppm)	23.0 ± 4.0	20.4 ± 3.9	23.5 ± 3.8
Copper (ppm)	18.7 ± 1.7	17.9 ± 1.7	18.0 ± 1.7
Zinc (ppm)	58.1 ± 3.3	58.8 ± 3.4	59.3 ± 3.4
Gallium (ppm)	13.5 ± 1.0	14.9 ± 1.1	14.5 ± 1.1
Mercury (ppm)	<2.5	<2.5	<2.4

TABLE 13.2. (contd)

Constituent	Metal Results		
	299-E18-1 (195 ft)	299-E18-3 (45 ft)	299-E18-3 (45 ft)
Selenium (ppm)	<0.88	<0.87	<0.86
Lead (ppm)	13.4 ± 1.4	15.5 ± 1.5	13.3 ± 1.5
Arsenic (ppm)	6.58 ± 0.82	6.34 ± 0.81	9.60 ± 0.90
Bromine (ppm)	<0.86	<0.87	<0.86
Rubidium (ppm)	79.5 ± 4.1	86.4 ± 4.4	80.7 ± 4.1
Strontium (ppm)	363 ± 19	352 ± 18	360 ± 19
	299-E18-1 (194 ft)	299-E18-3 (194 ft) (a)	
Aluminum (%)	6.68 ± 0.39	6.53 ± 0.38	
Silica (%)	29.3 ± 1.5	30.0 ± 1.5	
Phosphorus (%)	<0.067	<0.067	
Sulfur (%)	<0.018	<0.018	
Chlorine (%)	<0.010	<0.010	
Potassium (%)	2.01 ± 0.10	1.98 ± 0.10	
Calcium (%)	2.50 ± 0.13	2.51 ± 0.13	
Titanium (%)	0.347 ± 0.018	0.344 ± 0.018	
Vanadium (ppm)	<41	93 ± 22	
Chromium (ppm)	46 ± 12	48 ± 12	
Manganese (ppm)	473 ± 27	481 ± 27	
Iron (ppm)	2.85 ± 0.14	2.84 ± 0.14	
Cobalt (ppm)	47 ± 17	<33	
Nickel (ppm)	30.4 ± 4.0	25.1 ± 2.4	
Copper (ppm)	19.5 ± 1.8	19.6 ± 1.7	
Zinc (ppm)	58.5 ± 3.3	60.3 ± 3.4	
Gallium (ppm)	14.6 ± 1.1	13.8 ± 1.1	
Mercury (ppm)	<2.4	<2.5	
Selenium (ppm)	1.14 ± 0.43	<0.87	
Lead (ppm)	13.8 ± 1.4	15.1 ± 1.5	
Arsenic (ppm)	10.08 ± 0.92	10.00 ± 0.92	
Bromine (ppm)	<0.85	<0.86	
Rubidium (ppm)	81.1 ± 4.2	79.8 ± 4.1	
Strontium (ppm)	383 ± 20	374 ± 19	

(a) Duplicate analysis.

**TABLE 13.3. Borehole Sediment Analyses Volatile Organic
Constituent Results**

<u>Well Number</u>	<u>Depth, ft</u>	<u>Constituent</u>	<u>Results, ppm</u>
299-E18-3	45	tetrachloromethane	<5.00E-03
		methyl ethyl ketone	<1.00E-02
		1,1,1-trichloroethane	<5.00E-03
		1,1,2-trichloroethane	<5.00E-03
		trichloroethylene	<5.00E-03
		perchloroethylene	<5.00E-03
		xylene-O,P	<5.00E-03
		chloroform	<5.00E-03
		methylene chloride	<1.00E-02
		xylene-M	<5.00E-03
		hexone	<1.00E-02
299-E18-3	62	tetrachloromethane	<5.00E-03
		methyl ethyl ketone	<1.00E-02
		1,1,1-trichloroethane	<5.00E-03
		1,1,2-trichloroethane	<5.00E-03
		trichloroethylene	<5.00E-03
		perchloroethylene	<5.00E-03
		xylene-O,P	<5.00E-03
		chloroform	<5.00E-03
		methylene chloride	<1.00E-02
		xylene-M	<5.00E-03
		hexone	<1.00E-02
299-E18-3	84	tetrachloromethane	<5.00E-03
		methyl ethyl ketone	<1.00E-02
		1,1,1-trichloroethane	<5.00E-03
		1,1,2-trichloroethane	<5.00E-03
		trichloroethylene	<5.00E-03
		perchloroethylene	<5.00E-03
		xylene-O,P	<5.00E-03
		chloroform	<5.00E-03
		methylene chloride	<1.00E-02
		xylene-M	<5.00E-03
		hexone	<1.00E-02
299-E18-3	97	tetrachloromethane	<5.00E-03
		methyl ethyl ketone	<1.00E-02
		1,1,1-trichloroethane	<5.00E-03
		1,1,2-trichloroethane	<5.00E-03
		trichloroethylene	<5.00E-03
		perchloroethylene	<5.00E-03
		xylene-O,P	<5.00E-03
		chloroform	<5.00E-03
		methylene chloride	2.10E-02
		xylene-M	<5.00E-03
		hexone	<1.00E-02

TABLE 13.3. (contd)

<u>Well Number</u>	<u>Depth, ft</u>	<u>Constituent</u>	<u>Results, ppm</u>
299-E18-3	194	tetrachloromethane	<5.00E-03
		methyl ethyl ketone	<1.00E-02
		1,1,1-trichloroethane	<5.00E-03
		1,1,2-trichloroethane	<5.00E-03
		trichloroethylene	<5.00E-03
		perchloroethylene	<5.00E-03
		xylene-O,P	<5.00E-03
		chloroform	<5.00E-03
		methylene chloride	2.90E-02
		xylene-M	<5.00E-03
		hexone	<1.00E-02
299-E18-3	195	tetrachloromethane	<5.00E-03
		methyl ethyl ketone	<1.00E-02
		1,1,1-trichloroethane	<5.00E-03
		1,1,2-trichloroethane	<5.00E-03
		trichloroethylene	<5.00E-03
		perchloroethylene	<5.00E-03
		xylene-O,P	<5.00E-03
		chloroform	<5.00E-03
		methylene chloride	<1.00E-02
		xylene-M	<5.00E-03
		hexone	<1.00E-02
299-E18-1	195	tetrachloromethane	<5.00E-03
		methyl ethyl ketone	<1.00E-02
		1,1,1-trichloroethane	<5.00E-03
		1,1,2-trichloroethane	<5.00E-03
		trichloroethylene	<5.00E-03
		perchloroethylene	<5.00E-03
		xylene-O,P	<5.00E-03
		chloroform	<5.00E-03
		methylene chloride	<1.00E-02
		xylene-M	<5.00E-03
		hexone	<1.00E-02

GROUND-WATER SAMPLING AND ANALYSIS

The second set of quarterly samples has been taken, as required in 40 CFR 265.92. The sampling and results are discussed below.

Collection and Analysis

Samples from each of the newly installed monitoring wells were taken on November 9 and 10, 1988, after approximately three borehole volumes of water had been purged from the well.

A summary of the analytical data from the wells is provided in Table 13.4. The data for constituents that had at least one value reported above the detection limit are presented in Table 13.5. The sampling schedule for wells near the 2101-M pond is shown in Table 13.6. Each of the wells is discussed below.

Well 299-E18-1

The sample was taken after well purging. There were apparently no problems with turbidity or the functioning of the pump. The sample is thought to be representative of the ground water. Water-level measurements were made.

Well 299-E18-2

The sample was taken after well purging. There were no recorded problems with turbidity or functioning of the pump. The sample is thought to be representative of the ground water. Water-level measurements were made. This well is being used as part of another ground-water monitoring network and was sampled for indicator evaluation parameters for that network on November 22, 1988. The results for this sampling are reported in Tables 13.4 and 13.5 with the other second-quarter results.

Well 299-E18-3

The sample was taken after well purging. There were no recorded problems with turbidity or functioning of the pump. The sample is thought to be representative of the ground water. Water-level measurements were made.

TABLE 13.4. Constituent List and Summary of Sampling Results for the 2101-M Pond, November 1988

----- Constituent List=Contamination Indicator Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Agency Exceeded	Standards	Full name
088	CONDLAB	umho	.	16	0	700	WDOE		Specific conductance, laboratory
191	CONDFLD	umho	1	24	0	700	WDOE		Specific conductance, field
199	PHFIELD		0.1	24	0	6.5-8.5	EPAS	xxx	pH, field
207	PH-LAB		0.01	16	0	6.5-8.5	EPAS		pH, laboratory
C89	TOC	ppb	1000	20	0	.			Total organic carbon
H42	TOXLDL	ppb	20	20	0	.			Total organic halogens, low DL
----- Constituent List=Interim Primary Drinking Water Parameters -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Agency Exceeded	Standards	Full name
109	COLIFRM	MPN	2.2	4	4 ***	1	EPA		Coliform bacteria
111	BETA	pCi/L	8	8	0	50	EPA		Gross beta
181	RADIUM	pCi/L	1	8	0	5	EPA		Total radium
212	ALPHA	pCi/L	4	8	0	15	EPA		Gross alpha
A06	BARIUM	ppb	8	8	0	1000	EPA		Barium
A07	CADMIUM	ppb	2	8	8 ***	10	EPA		Cadmium
A08	CHROMIUM	ppb	10	8	0	50	EPA		Chromium
A10	SILVER	ppb	10	8	8 ***	50	EPA		Silver
A20	ARSENIC	ppb	5	8	2	50	EPA		Arsenic
A21	MERCURY	ppb	0.1	5	5 ***	2	EPA		Mercury
A22	SELENIUM	ppb	5	8	4	10	EPA		Selenium
A33	ENDRIN	ppb	0.1	5	5 ***	0.2	EPA		Endrin
A34	METHLOR	ppb	3	5	5 ***	100	EPA		Methoxychlor
A35	TOXAENE	ppb	1	5	5 ***	5	EPA		Toxaphene
A36	a-BHC	ppb	0.1	5	5 ***	4	EPA		Lindane, alpha-BHC
A37	b-BHC	ppb	0.1	5	5 ***	4	EPA		Lindane, beta-BHC
A38	g-BHC	ppb	0.1	5	5 ***	4	EPA		Lindane, gamma-BHC
A39	d-BHC	ppb	0.1	5	5 ***	4	EPA		Lindane, delta-BHC
A61	LEADGF	ppb	5	8	5	50	EPA		Lead (graphite furnace)
C72	NITRATE	ppb	500	8	4	45000	EPA		Nitrate
C74	FLUORID	ppb	500	8	4	4000	EPA		Fluoride
H13	2,4-D	ppb	2	5	5 ***	100	EPA		2,4-D [2,4-Dichlorophenoxyacetic acid]
H14	2,4,5TP	ppb	2	5	5 ***	10	EPA		2,4,5-TP silvex
H20	FBARIUM	ppb	8	8	0	1000	EPA		Barium, filtered
H21	FCADMIU	ppb	2	8	8 ***	10	EPA		Cadmium, filtered
H22	FCHROMI	ppb	10	8	5	50	EPA		Chromium, filtered
H23	FSILVER	ppb	10	8	8 ***	50	EPA		Silver, filtered
H37	FARSENI	ppb	5	8	2	50	EPA		Arsenic, filtered
H38	FMERCUR	ppb	0.1	5	5 ***	2	EPA		Mercury, filtered
H39	FSELENI	ppb	5	8	4	10	EPA		Selenium, filtered
H41	FLEAD	ppb	5	8	8 ***	50	EPA		Lead, filtered

TABLE 13.4. (contd)

----- Constituent List=Water Quality Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards Agency Exceeded	Full name
A11 SODIUM	ppb	200	8	0	.		Sodium
A17 MANGESE	ppb	5	8	2	50	EPAS	Manganese
A19 IRON	ppb	30	8	0	300	EPAS	Iron
C67 PHENOL	ppb	10	4	4 ***	.	xxx	Phenol
C73 SULFATE	ppb	500	8	0	260000	EPAS	Sulfate
C76 CHLORID	ppb	500	8	0	260000	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	5	300	EPAS	Iron, filtered
H57 LPHENOL	ppb	10	1	1 ***	.		Phenol, low DL
----- Constituent List=Site Specific and Other Parameters -----							
Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Standards Agency Exceeded	Full name
108 TRITIUM	pCi/L	500	5	0	20000	EPA	Tritium (H-3)
A01 BERYLIUM	ppb	5	8	8 ***	.		Beryllium
A03 STRONTIUM	ppb	20	8	0	.		Strontium
A04 ZINC	ppb	5	8	0	5000	EPAS	Zinc
A08 CALCIUM	ppb	50	8	0	.		Calcium
A12 NICKEL	ppb	10	8	0	.		Nickel
A13 COPPER	ppb	10	8	5	1300	EPAP	Copper
A14 VANADIUM	ppb	5	8	1	.		Vanadium
A16 ANTIMONY	ppb	100	8	8 ***	.		Antimony
A18 ALUMINUM	ppb	150	8	8 ***	.		Aluminum
A19 POTASSIUM	ppb	100	8	0	.		Potassium
A50 MAGNESIUM	ppb	50	8	0	.		Magnesium
A61 TETRACHLOROMETHANE	ppb	5	15	15 ***	5	EPA	Tetrachloromethane [Carbon Tetrachloride]
A62 BENZENE	ppb	5	14	14 ***	5	EPA	Benzene
A63 DIOXANE	ppb	500	14	14 ***	.		Dioxane
A64 METHYL ETHYL KETONE	ppb	10	15	15 ***	.		Methyl ethyl ketone
A65 PYRIDINE	ppb	500	14	14 ***	.		Pyridine
A66 TOLUENE	ppb	5	14	14 ***	2000	EPAP	Toluene
A67 1,1,1-TRICHLOROETHANE	ppb	5	15	15 ***	200	EPA	1,1,1-Trichloroethane
A68 1,1,2-TRICHLOROETHANE	ppb	5	15	15 ***	.		1,1,2-Trichloroethane
A69 TRICHLOROETHYLENE	ppb	5	15	15 ***	5	EPA	Trichloroethylene [1,1,2-Trichloroethane]
A70 PERCHLOROETHYLENE	ppb	5	15	15 ***	.		Perchloroethylene [Tetrachloroethane]
A71 OXYLX	ppb	5	15	15 ***	440	EPAP	Xylene-o,p
A72 ACROLEIN	ppb	10	14	14 ***	.		Acrolein
A73 ACRYLONITRILE	ppb	10	14	14 ***	.		Acrylonitrile
A74 BIS(2-CHLOROMETHYL) ETHER	ppb	10	14	14 ***	.		Bis(2-chloromethyl) ether
A75 BROMOACETONE	ppb	10	14	14 ***	.		Bromoacetone
A76 METHYLBROMIDE	ppb	10	14	14 ***	.		Methyl bromide
A77 CARBON DISULFIDE	ppb	10	14	14 ***	.		Carbon disulfide
A78 CHLOROBENZENE	ppb	10	14	14 ***	60	EPAP	Chlorobenzene
A79 2-CHLOROETHYL VINYL ETHER	ppb	10	14	14 ***	.		2-Chloroethyl vinyl ether
A80 CHLOROFORM	ppb	5	15	15 ***	100	EPA	Chloroform [Trichloromethane]

TABLE 13.4. (contd)

Constituent List=Site Specific and Other Parameters						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
A81	METHCHL	ppb	10	14	14 ***	. Methyl chloride [Chloromethane]
A82	CHMTHER	ppb	10	14	14 ***	. Chloromethyl methyl ether
A83	CROTONA	ppb	10	14	14 ***	. Crotonaldehyde
A84	DIBRCHL	ppb	10	14	14 ***	0 EPAP 1,2-Dibromo-3-chloropropane
A85	DIBRETH	ppb	10	14	14 ***	. 1,2-Dibromoethane
A86	DIBRMET	ppb	10	14	14 ***	. Dibromomethane
A87	DIBUTEN	ppb	10	14	14 ***	. 1,4-Dichloro-2-butene
A88	DICDIFM	ppb	10	14	14 ***	. Dichlorodifluoromethane
A89	1,1-DIC	ppb	10	14	14 ***	. 1,1-Dichloroethane
A90	1,2-DIC	ppb	10	14	14 ***	5 EPA 1,2-Dichloroethane
A91	TRANDE	ppb	10	14	14 ***	70 EPAP trans-1,2-Dichloroethene
A92	DICETHY	ppb	10	14	14 ***	7 EPA 1,1-Dichloroethylene
A93	METHYCH	ppb	10	15	15 ***	. Methylene chloride
A94	DICPANE	ppb	10	14	14 ***	8 EPAP 1,2-Dichloropropane
A95	DICPENE	ppb	10	14	14 ***	. 1,3-Dichloropropane
A96	NNDIEHY	ppb	10	14	14 ***	. N,N-diethylhydrazine
A99	HYDRSUL	ppb	10	14	14 ***	. Hydrogen sulfide
B01	IODOMET	ppb	10	14	14 ***	. Iodomethane
B02	METHACR	ppb	10	14	14 ***	. Methacrylonitrile
B03	METHTHI	ppb	10	14	14 ***	. Methanethiol
B04	PENTACH	ppb	10	14	14 ***	. Pentachloroethane
B05	1112-tc	ppb	10	14	14 ***	. 1,1,1,2-Tetrachloroethane
B06	1122-tc	ppb	10	14	14 ***	. 1,1,2,2-Tetrachloroethane
B08	BROMORM	ppb	10	14	14 ***	100 EPA Bromoform [Tribromomethane]
B09	TRCMEOL	ppb	10	14	14 ***	. Trichloromethanethiol
B10	TRCMFLM	ppb	10	14	14 ***	. Trichloromonofluoromethane
B11	TRCPANE	ppb	10	14	14 ***	. Trichloropropane
B12	123-trp	ppb	10	14	14 ***	. 1,2,3-Trichloropropane
B13	VINYIOE	ppb	10	14	14 ***	2 EPA Vinyl chloride
B14	M-XYLE	ppb	5	15	15 ***	440 EPAP Xylene-m
B15	DIETHY	ppb	10	14	14 ***	. Diethylarsine
B19	ACETILE	ppb	3000	14	14 ***	. Acetonitrile
C04	METACRY	ppb	10	14	14 ***	. Methyl methacrylate
C71	FORMALN	ppb	500	14	14 ***	. Formalin
C76	PHOSPHA	ppb	1000	8	8 ***	. Phosphate
H05	ETHOXIO	ppb	3000	14	14 ***	. Ethylene oxide
H06	ETHWETH	ppb	10	14	14 ***	. Ethyl methacrylate
H16	TC	ppb	1000	4	0	. Total carbon
H18	FZINC	ppb	5	8	0	5000 EPAS Zinc, filtered
H19	FCALCIU	ppb	50	8	0	. Calcium, filtered
H25	FNICKEL	ppb	10	8	0	. Nickel, filtered
H26	FCOPPER	ppb	10	8	5	1300 EPAP Copper, filtered
H27	FVANADI	ppb	5	8	2	. Vanadium, filtered
H28	FALUMIN	ppb	150	8	8 ***	. Aluminum, filtered
H30	FPOTASS	ppb	100	8	0	. Potassium, filtered
H32	FMAGNES	ppb	50	8	0	. Magnesium, filtered
H33	FBERYLL	ppb	5	8	8 ***	. Beryllium, filtered
H35	FSTRDNT	ppb	20	8	0	. Strontium, filtered
H36	FANTIMO	ppb	100	8	8 ***	. Antimony, filtered

TABLE 13.4. (contd)

----- Constituent List=Site Specific and Other Parameters -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
H60	TURBID	ntu	0.1	1	0	.	Turbidity
H66	BROWIDE	ppb	1000	6	8 ***	.	Bromide
H67	NITRITE	ppb	1000	6	8 ***	.	Nitrite
H68	HEXONE	ppb	10	16	16 ***	.	Hexone
I01	ACETONE	ppb	10	14	4	.	Acetone
I09	BUTANOL	ppb	5000	4	4 ***	.	1-Butanol
I10	PROPANL	ppb	5000	4	4 ***	.	2-Propanol
I21	TRIBUPH	ppb	10	4	4 ***	.	Tributylphosphoric acid
I28	TAF	ppb	10	14	14 ***	.	Tetrahydrofuran
I67	ETHANOL	ppb	5000	4	4 ***	.	Ethanol
L20	MBP	ppb	5000	4	4 ***	.	Monobutylphosphate
L21	DBP	ppb	5000	4	4 ***	.	Dibutylphosphate
----- Constituent List=WAC 173-303-9905 -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
A28	THALIUM	ppb	5	5	5 ***	.	Thallium
A24	THIDURA	ppb	200	4	4 ***	.	Thiourea
A25	ACETREA	ppb	200	4	4 ***	.	1-Acetyl-2-thiourea
A26	CNLOREA	ppb	200	4	4 ***	.	1-(α -Chlorophenyl) thiourea
A27	DIETROL	ppb	200	4	4 ***	.	Diethylstilbesterol
A28	ETHYREA	ppb	200	4	4 ***	.	Ethylenethiourea
A29	NAPHREA	ppb	200	4	4 ***	.	1-Naphthyl-2-thiourea
A32	PHENREA	ppb	500	4	4 ***	.	N-phenylthiourea
A40	DDD	ppb	0.1	4	4 ***	.	DDD
A41	DDE	ppb	0.1	4	4 ***	.	DDE
A42	DDT	ppb	0.1	4	4 ***	.	DDT
A43	HEPTLOR	ppb	0.1	4	4 ***	0 EPAP	Heptachlor
A44	HEPTIDE	ppb	0.1	4	4 ***	0 EPAP	Heptachlor epoxide
A46	DIELRIN	ppb	0.1	4	4 ***	.	Dieldrin
A47	ALDRIN	ppb	0.1	4	4 ***	.	Aldrin
A48	CHLOANE	ppb	1	4	4 ***	0 EPAP	Chlordane
A49	END01	ppb	0.1	4	4 ***	.	Endosulfan I (alpha)
A52	END02	ppb	0.1	4	4 ***	.	Endosulfan II (beta)
A54	AR1016	ppb	1	4	4 ***	0 EPAP	Arochlor 1016
A55	AR1221	ppb	1	4	4 ***	0 EPAP	Arochlor 1221
A56	AR1232	ppb	1	4	4 ***	0 EPAP	Arochlor 1232
A67	AR1242	ppb	1	4	4 ***	0 EPAP	Arochlor 1242
A58	AR1248	ppb	1	4	4 ***	0 EPAP	Arochlor 1248
A59	AR1254	ppb	1	4	4 ***	0 EPAP	Arochlor 1254
A60	AR1260	ppb	1	4	4 ***	0 EPAP	Arochlor 1260
B20	ACETOPH	ppb	10	4	4 ***	.	Acetophenone
B21	WARFRIN	ppb	10	4	4 ***	.	Warfarin
B22	ACEFENE	ppb	10	4	4 ***	.	2-Acetylaminofluorene
B23	AMINOYL	ppb	10	4	4 ***	.	4-Aminobiphenyl
B24	AMIISOX	ppb	10	4	4 ***	.	5-(Aminomethyl)-3-isoxazolol

TABLE 13.4. (contd)

Constituent List=WAC 173-303-9905								
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name	
B25	AMITROL	ppb	10	4	4 ***	.	Amitrole	
B26	ANILINE	ppb	10	4	4 ***	.	Aniline	
B27	ARAMITE	ppb	10	4	4 ***	.	Aramite	
B28	AURAMIN	ppb	10	4	4 ***	.	Auramine	
B29	BENZCAC	ppb	10	4	4 ***	.	Benz[c]acridine	
B30	BENZAAN	ppb	10	4	4 ***	.	Benz[a]anthracene	
B31	BENDICM	ppb	10	4	4 ***	.	Benzene, dichloromethyl	
B32	BENTHOL	ppb	10	4	4 ***	.	Benzenethiol	
B33	BENDINE	ppb	10	4	4 ***	.	Benzidine	
B34	BENZBFL	ppb	10	4	4 ***	.	Benzo[b]fluoranthene	
B35	BENZJFL	ppb	10	4	4 ***	.	Benzo[j]fluoranthene	
B36	PBENZQU	ppb	10	4	4 ***	.	p-Benzoquinone	
B37	BENZCHL	ppb	10	4	4 ***	.	Benzyl chloride	
B38	BIS2CHM	ppb	10	4	4 ***	.	Bis(2-chloroethoxy) methane	
B39	BIS2CHE	ppb	10	4	4 ***	.	Bis(2-chloroethyl) ether	
B40	BIS2EPH	ppb	10	4	4 ***	.	Bis(2-ethylhexyl) phthalate	
B41	BROPHEN	ppb	10	4	4 ***	.	4-Bromophenyl phenyl ether	
B42	BUTBENP	ppb	10	4	4 ***	.	Butyl benzyl phthalate	
B43	BUTDINP	ppb	10	4	4 ***	.	2-sec-Butyl-4,6-dinitrophenol (DNBP)	
B44	CHALETH	ppb	10	4	4 ***	.	Chloroalkyl ethers	
B45	CHLANIL	ppb	10	4	4 ***	.	p-Chloroaniline	
B46	CHLCRES	ppb	10	4	4 ***	.	p-Chloro-m-cresol	
B47	CHLEPOX	ppb	10	4	4 ***	0 EPAP	1-Chloro-2,3-epoxypropane	
B48	CHLNAPH	ppb	10	4	4 ***	.	2-Chloronaphthalene	
B49	CHLPHEN	ppb	10	4	4 ***	.	2-Chlorophenol	
B51	CRESOLS	ppb	10	4	4 ***	.	Cresols	
B52	CYCHDIN	ppb	10	4	4 ***	.	2-Cyclohexyl-4,6-dinitrophenol	
B53	DIBAHAC	ppb	10	4	4 ***	.	Dibenz[a,h]acridine	
B54	DIBAJAC	ppb	10	4	4 ***	.	Dibenz[a,j]acridine	
B55	DIBAHAN	ppb	10	4	4 ***	.	Dibenz[a,h]anthracene	
B56	DIBCGCA	ppb	10	4	4 ***	.	7H-Dibenzo[c,g]carbazole	
B57	DIBAEPY	ppb	10	4	4 ***	.	Dibenzo[a,e]pyrene	
B58	DIBAHFY	ppb	10	4	4 ***	.	Dibenzo[a,h]pyrene	
B59	DIBAIKY	ppb	10	4	4 ***	.	Dibenzo[a,i]pyrene	
B60	OIBPHTH	ppb	10	4	4 ***	.	Di-n-butyl phthalate	
B61	12-dben	ppb	10	4	4 ***	.	1,2-Dichlorobenzene	
B62	13-dben	ppb	10	4	4 ***	.	1,3-Dichlorobenzene	
B63	14-dben	ppb	10	4	4 ***	.	1,4-Dichlorobenzene	
B64	DICHBEN	ppb	20	4	4 ***	.	3,3'-Dichlorobenzidine	
B65	24-dchp	ppb	10	4	4 ***	.	2,4-Dichlorophenol	
B66	26-dchp	ppb	10	4	4 ***	.	2,6-Dichlorophenol	
B67	DIEPHTH	ppb	10	4	4 ***	.	Diethyl phthalate	
B68	DINHSAF	ppb	10	4	4 ***	.	Dihydrosafrole	
B69	DIMETHS	ppb	10	4	4 ***	.	3,3'-Dimethoxybenzidine	
B70	DIEMAMB	ppb	10	4	4 ***	.	p-Dimethylaminoazobenzene	
B71	DIWBENZ	ppb	10	4	4 ***	.	7,12-Dimethylbenz[a]anthracene	
B72	DIWEYLB	ppb	10	4	4 ***	.	3,3'-Dimethylbenzidine	
B73	THIONOX	ppb	10	4	4 ***	.	Thiofanox	
B74	DIMPHAM	ppb	10	4	4 ***	.	alpha,alpha-Dimethylphenethylamine	

TABLE 13.4. (contd)

Constituent List=WAC 173-303-9905						
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded Full name
B75	OIMPHEN	ppb	10	4	4 ***	2,4-Dimethylphenol
B76	OIMPTH	ppb	10	4	4 ***	Dimethyl phthalate
B77	DINBENZ	ppb	10	4	4 ***	Dinitrobenzene
B78	DINCRES	ppb	10	4	4 ***	4,6-Dinitro-o-cresol and salts
B79	DINPHEN	ppb	50	4	4 ***	2,4-Dinitrophenol
B80	24-dint	ppb	10	4	4 ***	2,4-Dinitrotoluene
B81	26-dint	ppb	10	4	4 ***	2,6-Dinitrotoluene
B82	DIOPHTH	ppb	10	4	4 ***	Di-n-octyl phthalate
B83	DIPHAMI	ppb	10	4	4 ***	Diphenylamine
B84	DIPHHYD	ppb	10	4	4 ***	1,2-Diphenylhydrazine
B85	DIPRNIT	ppb	10	4	4 ***	Di-n-propylnitrosamine
B86	ETHWINE	ppb	10	4	4 ***	Ethyleneimine
B87	ETHWETS	ppb	10	4	4 ***	Ethyl methanesulfonate
B88	FLUORAN	ppb	10	4	4 ***	Fluoranthene
B89	HEXC BEN	ppb	10	4	4 ***	Hexachlorobenzene
B90	HEXC BUT	ppb	10	4	4 ***	Hexachlorobutadiene
B91	HEXC CYC	ppb	10	4	4 ***	Hexachlorocyclopentadiene
B92	HEXC ETH	ppb	10	4	4 ***	Hexachloroethane
B93	INDENOP	ppb	10	4	4 ***	Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	ppb	10	4	4 ***	Isosafrole
B95	MALOILE	ppb	10	4	4 ***	Malononitrile
B96	MELPHAL	ppb	10	4	4 ***	Melphalan
B97	METHAPY	ppb	10	4	4 ***	Methapyrilene
B98	METHNYL	ppb	10	4	4 ***	Metholonyl
B99	METAZIR	ppb	10	4	4 ***	2-Methylaziridine
C01	METCHAN	ppb	10	4	4 ***	3-Methylcholanthrene
C02	METBISC	ppb	10	4	4 ***	4,4'-Methylenebis(2-chloroaniline)
C03	METACTO	ppb	10	4	4 ***	2-Methylactonitrile
C06	METMSUL	ppb	10	4	4 ***	Methyl methanesulfonate
C08	METPROP	ppb	10	4	4 ***	2-Methyl-2-(methylthio) propionaldehyde
C07	METHIOU	ppb	10	4	4 ***	Methylthiouracil
C08	NAPHQUI	ppb	10	4	4 ***	1,4-Naphthoquinone
C09	1-napha	ppb	10	4	4 ***	1-Naphthylamine
C10	2-napha	ppb	10	4	4 ***	2-Naphthylamine
C11	NITRANI	ppb	50	4	4 ***	p-Nitroaniline
C12	NITBENZ	ppb	10	4	4 ***	Nitrobenzene
C13	NITPHEN	ppb	50	4	4 ***	4-Nitrophenol
C14	NNIBUTY	ppb	10	4	4 ***	N-nitrosodi-n-butylamine
C15	NNIDIEA	ppb	10	4	4 ***	N-nitrosodiethanolamine
C16	NNIDIEY	ppb	10	4	4 ***	N-nitrosodiethylamine
C17	NNIDIWE	ppb	10	4	4 ***	N-nitrosodimethylamine
C18	NNIMETH	ppb	10	4	4 ***	N-nitrosomethylethylamine
C19	NNIURET	ppb	10	4	4 ***	N-nitroso-n-methylurethane
C20	NNIVINY	ppb	10	4	4 ***	N-nitrosomethylvinylamine
C21	NNIMORP	ppb	10	4	4 ***	N-nitrosomorpholine
C22	NNINICO	ppb	10	4	4 ***	N-nitrosomorpholine
C23	NNIPIPE	ppb	10	4	4 ***	N-nitrosopiperidine
C24	NITRPYR	ppb	10	4	4 ***	Nitrosopyrrolidine
C25	NITRTOL	ppb	10	4	4 ***	6-Nitro-o-toluidine

TABLE 13.4. (contd)

----- Constituent List=WAC 173-303-9905 -----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C26	PENTCHB	ppb	10	4	4 ***	.	Pentachlorobenzene
C27	PENTCHN	ppb	10	4	4 ***	.	Pentachloronitrobenzene
C28	PENTCHP	ppb	50	4	4 ***	220 EPAP	Pentachlorophenol
C29	PHENTIN	ppb	10	4	4 ***	.	Phenacetin
C30	PHENINE	ppb	10	4	4 ***	.	Phenylenediamine
C31	PHTHEST	ppb	10	4	4 ***	.	Phthalic acid esters
C32	PICOLIN	ppb	10	4	4 ***	.	2-Picoline
C33	PRONIDE	ppb	10	4	4 ***	.	Pronamide
C34	RESERPI	ppb	10	4	4 ***	.	Reserpine
C35	RESORCI	ppb	10	4	4 ***	.	Resorcinol
C36	SAFROL	ppb	10	4	4 ***	.	Safrol
C37	TETRCHB	ppb	10	4	4 ***	.	1,2,4,5-Tetrachlorobenzene
C38	TETRCHP	ppb	10	4	4 ***	.	2,3,4,6-Tetrachlorophenol
C40	THIURAM	ppb	10	4	4 ***	.	Thiuram
C41	TOLUDIA	ppb	10	4	4 ***	.	Toluenediamine
C42	OTDLHYD	ppb	10	4	4 ***	.	o-Toluidine hydrochloride
C43	TRICHLB	ppb	10	4	4 ***	.	1,2,4-Trichlorobenzene
C44	246-trp	ppb	50	4	4 ***	.	2,4,6-Trichlorophenol
C45	248-trp	ppb	10	4	4 ***	.	2,4,8-Trichlorophenol
C46	TRIPHOS	ppb	10	4	4 ***	.	O,o,o-triethyl phosphorothioate
C47	SYMTRIN	ppb	10	4	4 ***	.	Sym-trinitrobenzene
C48	TRISPHO	ppb	10	4	4 ***	.	Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	ppb	10	4	4 ***	.	Benzo[a]pyrene
C50	CHLNAPZ	ppb	10	4	4 ***	.	Chloronaphazene
C51	BIS2ETH	ppb	10	4	4 ***	.	Bis(2-chloroisopropyl) ether
C52	HEXAENE	ppb	10	4	4 ***	.	Hexachloropropene
C53	HYDRAZI	ppb	3000	4	4 ***	.	Hydrazine
C54	HEXACHL	ppb	10	4	4 ***	.	Hexachlorophene
C55	NAPHTHA	ppb	10	4	4 ***	.	Naphthalene
C56	128TRI	ppb	10	4	4 ***	.	1,2,3-Trichlorobenzene
C58	135TRI	ppb	10	4	4 ***	.	1,3,5-Trichlorobenzene
C59	1234TE	ppb	10	4	4 ***	.	1,2,3,4-Tetrachlorobenzene
C60	1235TE	ppb	10	4	4 ***	.	1,2,3,5-Tetrachlorobenzene
C61	TETEPYR	ppb	2	4	4 ***	.	Tetraethylpyrophosphate
C62	CHLLATE	ppb	80	4	4 ***	.	Chlorobenzilate
C63	CARBPHT	ppb	2	4	4 ***	.	Carbophenothion
C64	DISULFO	ppb	2	4	4 ***	.	Disulfoton
C65	DIMETHO	ppb	2	4	4 ***	.	Dimethoate
C66	METHPAR	ppb	2	4	4 ***	.	Methyl parathion
C67	PARATHI	ppb	2	4	4 ***	.	Parathion
C70	CYANIDE	ppb	10	5	5 ***	.	Cyanide
C77	PERCHLO	ppb	1000	4	4 ***	.	Perchlorate
C78	SULFIDE	ppb	1000	4	4 ***	.	Sulfide
C79	KEROSEN	ppb	10000	4	4 ***	.	Kerosene
C80	AMMONIU	ppb	50	5	5 ***	.	Ammonium ion
C88	DIOXIN	ppb	0.1	4	4 ***	.	Dioxin
C87	CITRUSR	ppb	1000	4	4 ***	.	Citrus red
C90	PARALDE	ppb	2000	4	4 ***	.	Paraldehyde
C91	STRYCHN	ppb	50	4	4 ***	.	Strychnine

TABLE 13.4. (contd)

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

Constituent Code Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standards Standard Agency Exceeded	Full name
C92 MALHYDR	ppb	500	4	4 ***	.	Maleic hydrazide
C93 NICOTIN	ppb	100	4	4 ***	.	Nicotinic acid
C94 ACRYIDE	ppb	10000	4	4 ***	0 EPAP	Acrylamide
C96 ALLYLAL	ppb	2500	4	4 ***	.	Allyl alcohol
C97 CHLACET	ppb	16000	4	4 ***	.	Chloroacetaldehyde
C98 CHLPROP	ppb	4000	4	4 ***	.	3-Chloropropionitrile
H03 ETHCARB	ppb	6000	4	4 ***	.	Ethyl carbamate
H04 ETHCYAN	ppb	2000	4	4 ***	.	Ethyl cyanide
H09 ISOBUTY	ppb	1000	4	4 ***	.	Isobutyl alcohol
H11 PROPYLA	ppb	10000	4	4 ***	.	n-Propylamine
H12 PROPYNO	ppb	8000	4	4 ***	.	2-Propyn-1-ol
H16 2,4,6-T	ppb	2	4	4 ***	.	2,4,6-T
H40 FTHALLI	ppb	5	5	5 ***	.	Thallium, filtered

*** - Indicates all samples were reported as below contractual detection limits
 xxx - Indicates that Drinking Water Standards were exceeded

EPA - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
 National Primary Drinking Water Regulations as amended by 52 FR 26890

EPAR - based on National Interim Primary Drinking Water Regulations,
 Appendix IV, EPA-670/9-78-003

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

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

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

TABLE 13.5. Constituents with at Least One Detected Value for the 2101-M Pond, November 1988

Well name	Collection Date	Duplicate sample number	CONDFLD umho 1/700w	CONDLAB umho . /700w	PH-LAB 0.01/8.5a	PHFIELD 0.1/8.5a	TOC ppb 1000/.	TOXLDL ppb 20/.
2-E18-1	10NOV88	1	595	571	7.9	8.6	#400	#4
		2	594	588	7.9	8.6	#300	#0
		3	593	588	8.0	8.5	#300	#3
		3	594	583	7.9	8.5	#300	#3
2-E18-1	23NOV88		633	.	.	8.5	.	.
2-E18-2	10NOV88	1	283	269	7.8	8.4	#200	#7
		2	282	271	7.8	8.4	#300	#1
		3	282	270	7.9	8.4	#300	#2
		3	282	271	7.9	8.4	#500	#7
2-E18-2	22NOV88	1	257	.	.	8.0	#200	#7
		2	260	.	.	8.1	#300	#7
		3	260	.	.	8.1	#300	#2
		3	260	.	.	8.1	#200	#6
2-E18-2	23NOV88		279	.	.	8.5	.	.
2-E18-3	10NOV88	1	232	229	7.8	8.1	#400	#6
		2	232	233	7.8	8.1	#500	#7
		3	232	233	7.9	8.1	#500	#2
		3	232	234	7.9	8.1	#500	#6
2-E18-3	28NOV88		247	.	.	8.4	.	.
2-E18-4	09NOV88	1	270	242	7.9	8.2	#500	#4
		2	271	250	7.9	8.2	#600	#2
		3	271	251	8.0	8.2	#500	#3
		3	270	250	8.0	8.2	#500	#2
2-E18-4	23NOV88		252	.	.	8.4	.	.

TABLE 13.5. (contd)

Well name	Collection Date	Duplicate sample number	ACETONE ppb 10/.	ALPHA pCi/L 4/15	ARSENIC ppb 5/50	FARSENI ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BETA pCi/L 5/50	FCALCIU ppb 50/.	CALCIUM ppb 50/.
2-E18-1	10NOV88		#2	3.830	<5	<5	42	43	8.45	83,200	87,400
	10NOV88	1	#2	3.900	<5	<5	38	38	10.70	68,400	67,700
	10NOV88	2	#3	.	.	.	.	.	.	.	.
	10NOV88	3	#1	.	.	.	.	.	.	.	.
	23NOV88		<10	.	.	.	.	.	.	.	.
	23NOV88	M	<5	.	.	.	.	.	.	.	.
2-E18-2	10NOV88		#2	1.590	8	5	51	51	6.22	25,500	24,300
	10NOV88	1	#2	.	.	.	.	.	.	.	.
	22NOV88		.	1.810	8	5	52	53	4.97	24,800	24,300
	23NOV88		11	.	.	.	.	.	.	.	.
	23NOV88	M	<5	.	.	.	.	.	.	.	.
2-E18-3	10NOV88		#4	*0.292	11	14	52	58	5.68	28,000	27,000
	10NOV88	1	<10	.	.	.	.	.	.	.	.
	28NOV88		<10	.	.	.	.	.	.	.	.
	28NOV88	M	<5	.	.	.	.	.	.	.	.
2-E18-4	09NOV88		#5	1.900	11	9	51	52	7.80	28,700	29,000
	09NOV88	1	#3	.	.	.	.	.	.	.	.
	23NOV88		<10	.	.	.	.	.	.	.	.
	23NOV88	M	<5	.	.	.	.	.	.	.	.

Well name	Collection Date	Duplicate sample number	CHLORID ppb 500/250000s	FCROMI ppb 10/50	CHROMIUM ppb 10/50	COPPER ppb 10/1300p	FCOPPER ppb 10/1300p	FLUORID ppb 500/4000	IRON ppb 30/300s	FIRON ppb 30/300s
2-E18-1	10NOV88		8,800	<10	30	<10	<10	<500	355	<30
	10NOV88	1	8,200	<10	20	12	<10	<500	266	<30
	10NOV88	2	.	.	.	.	.	.	.	.
	10NOV88	3	.	.	.	.	.	.	.	.
	23NOV88		.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.
2-E18-2	10NOV88		2,800	<10	20	<10	12	600	142	<30
	10NOV88	1	.	.	.	.	.	.	.	.
	22NOV88		2,700	11	41	<10	<10	600	218	<30
	23NOV88		.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.
2-E18-3	10NOV88		4,400	<10	21	<10	<10	<500	325	53
	10NOV88	1	.	.	.	.	.	.	.	.
	28NOV88		.	.	.	.	.	.	.	.
	28NOV88	M	.	.	.	.	.	.	.	.
2-E18-4	09NOV88		6,400	<10	21	<10	<10	<500	281	<30
	09NOV88	1	.	.	.	.	.	.	.	.
	23NOV88		.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.

TABLE 13.5. (contd)

Well name	Collection Date	Duplicate sample number	LEADGF ppb 5/50	MAGNES ppb 50/.	FMAGNES ppb 50/.	MANGESE ppb 5/50	NICKEL ppb 10/.	FNICKEL ppb 10/.	NITRATE ppb 500/45000	FPOTASS ppb 100/.
2-E18-1	10NOV88		<5	15,200	16,300	12	25	16	8,400	6,540
	10NOV88	1	<5	14,700	14,700	12	19	15	8,400	6,380
	10NOV88	2	.	.	.	.	.	.	.	.
	10NOV88	3	.	.	.	.	.	.	.	.
	23NOV88	.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.
2-E18-2	10NOV88		<5	8,460	7,170	<5	20	17	<500	5,220
	10NOV88	1	.	.	.	.	.	.	.	.
	22NOV88	.	<5	8,890	8,910	5	20	10	<500	4,850
	23NOV88	.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.
	23NOV88	.	.	.	.	.	.	.	.	.
2-E18-3	10NOV88		<5	7,180	7,850	<5	20	12	<500	5,290
	10NOV88	1	.	.	.	.	.	.	.	.
	28NOV88	.	.	.	.	.	.	.	.	.
	28NOV88	M	.	.	.	.	.	.	.	.
2-E18-4	09NOV88		6	7,850	7,940	5	18	11	<500	5,450
	09NOV88	1	.	.	.	.	.	.	.	.
	23NOV88	.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.
Well name	Collection Date	Duplicate sample number	POTASUM ppb 100/.	RADIUM pCi/L 1/5	FSELENI ppb 5/10	SELENIUM ppb 5/10	SODIUM ppb 200/.	FSODIUM ppb 200/.	FSTRONT ppb 20/.	STRONIUM ppb 20/.
2-E18-1	10NOV88		8,330	0.2720	7	7	25,900	28,100	255	249
	10NOV88	1	8,410	0.2070	8	7	27,000	28,700	241	241
	10NOV88	2	.	.	.	.	.	.	.	.
	10NOV88	3	.	.	.	.	.	.	.	.
	23NOV88	.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.
2-E18-2	10NOV88		4,580	0.1740	<5	<5	18,600	19,000	144	129
	10NOV88	1	.	.	.	.	.	.	.	.
	22NOV88	.	4,860	0.1400	<5	<5	17,800	17,600	136	135
	23NOV88	.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.
	23NOV88	.	.	.	.	.	.	.	.	.
2-E18-3	10NOV88		4,820	0.2890	<5	<5	5,280	6,020	145	130
	10NOV88	1	.	.	.	.	.	.	.	.
	28NOV88	.	.	.	.	.	.	.	.	.
	28NOV88	M	.	.	.	.	.	.	.	.
2-E18-4	09NOV88		5,400	*0.0309	<5	<5	6,740	6,620	151	148
	09NOV88	1	.	.	.	.	.	.	.	.
	23NOV88	.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.

TABLE 13.5. (contd)

Well name	Collection Date	Duplicate sample number	SULFATE ppb 500/250000s	TC ppb 1000/.	TRITIUM pCi/L 500/20000	TURBID ntu 0.1/.	FVANADI ppb 5/.	VANADUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-E18-1	10NOV88		172,000	21,500	*-287	.	<5	8	79	28
	10NOV88	1	169,000	.	.	.	<5	<5	53	41
	10NOV88	2	.	.	.	.	.	.	.	.
	10NOV88	3	.	.	.	.	.	.	.	.
	23NOV88	.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.
2-E18-2	10NOV88		26,600	22,900	*-216	.	16	12	332	235
	10NOV88	1	.	.	.	.	.	.	.	.
	22NOV88	.	28,100	.	*391	1.6	17	20	96	67
	23NOV88	.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.
2-E18-3	10NOV88		14,700	21,200	*-341	.	24	22	33	5
	10NOV88	1	.	.	.	.	.	.	.	.
	28NOV88	.	.	.	.	.	.	.	.	.
	28NOV88	M	.	.	.	.	.	.	.	.
2-E18-4	09NOV88		17,000	22,200	847	.	25	25	32	15
	09NOV88	1	.	.	.	.	.	.	.	.
	23NOV88	.	.	.	.	.	.	.	.	.
	23NOV88	M	.	.	.	.	.	.	.	.

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25690
- r - based on National Interim Primary Drinking Water Regulations,
Appendix IV, EPA-670/9-76-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 48938
- s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143
(July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-54, Public Water Supplies

Data flags

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

TABLE 13.6. Sampling Schedule for the 2101-M Pond

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

(a) Sampled twice that month; once for L, once for volatile organic constituents.

L Long list (WAC 173-303-9905)

R Quality control replicates

V Volatile organic analyses blanks

X Regular sample list

Well 299-E18-4

The sample was taken after well purging. There were no recorded problems with turbidity, although the pump had a relatively slow discharge rate. This sample is thought to be representative of the ground water. Water-level measurements were made.

Discussion of Results

Chromium, arsenic, manganese, and selenium, which were all elevated in one or more of the wells in the first-quarter samples, have dropped below their respective primary or secondary drinking water standards.

A comprehensive suite of constituents based on the 9905 list of dangerous chemicals in WAC 173-303 was analyzed for this quarter. No volatile organic compounds or other constituents were detected with the following exception: acetone was initially detected in all four of the wells and in the blanks at low levels. Backup duplicate samples were run to determine whether the acetone was caused by laboratory contamination. This time acetone was found in three of the four wells as well as the blank. The wells were each sampled again after the appropriate purging of the wells, duplicate samples were collected, and one sent to United States Testing Company, Incorporated (UST), and the other to Pacific Northwest Laboratory (PNL) for an independent check. Analyses from UST indicated acetone only in well 299-E18-2. Analyses by PNL (see Table 13.4, acetone results) indicated

no acetone in any of the samples. Therefore it is concluded that the acetone was an artifact of laboratory contamination, and there is no acetone in the ground water at any of the four monitoring wells.

Only unfiltered iron remains above the secondary drinking water standard of 300 ppb in well 299-E18-1 and 299-E18-3 (Table 13.4).

14.0 GROUT TREATMENT FACILITY

S. S. Teel

The interim-status RCRA background ground-water monitoring program for the Grout Treatment Facility (GTF) began in 1988. It is based on characterization work presented in Swanson et al. (1988) and the Part B Permit Application (WHC 1988b). The Part B Permit Application was submitted to the Washington State Department of Ecology in November 1988.

The ground-water monitoring network consists of two upgradient wells (299-E25-25 and 299-E25-32), and three downgradient wells (299-E25-29, 299-E25-31, and 299-E25-33). Ground-water samples are also collected and analyzed from six site characterization wells. The purpose of these additional wells is to monitor the effects of nearby waste-disposal facilities. The location of all of the wells in the monitoring network is shown in Figure 14.1.

DRILLING AND HYDROLOGIC CHARACTERIZATION

No drilling activity occurred during the report period. Hydrologic characterization work consisted of water-level measurements made before the ground-water samples are collected.

Hydrologic Characterization

Table 14.1 lists the water-level data collected by PNL. Figure 14.2 presents a water-table map constructed from data collected during the October 1988 sampling. Data for wells 299-E25-28 (406.82), 299-E25-30 (412.22), and 299-E25-33 (389.57) were not used in constructing this map. Data from well 299-E25-28 were not used because it monitors a different portion of the aquifer than the other wells. Data from wells 299-E25-30 and 299-E25-33 were not used because the calculated water-table elevation appears to be erroneous. These erroneous values appear to be caused by measurement error. Westinghouse Hanford Company personnel have also had difficulty in measuring well 299-E25-30 because the steel tape would not go past 263 ft. However, another possible source of error could be casing elevation. The casing elevation of

FIGURE 14.1. Monitoring Well Locations for the Grout Treatment Facility

TABLE 14.1. Water-Level Data Collected by Pacific Northwest Laboratory During the Fourth Quarter of 1988 for the Grout Treatment Facility

<u>Well Name</u>	<u>Date</u>	<u>Depth to Water, ft</u>	<u>Water Table Elevation, ft above MSL (a)</u>	<u>Casing Elevation, ft above MSL</u>
299-E25-18	10/17/88	273.01	406.04	679.05
299-E25-22	10/17/88	267.98	406.04	674.02
299-E25-25	10/18/88	261.12	408.30	669.42
299-E25-26	10/19/88	NM(b)	NM	668.55
299-E25-26	12/15/88	261.44	407.11	668.55
299-E25-27	10/18/88	268.99	407.11	676.10
299-E25-28	10/19/88	255.62	406.82	662.44
299-E25-28	11/18/88	255.75	406.69	662.44
299-E25-29	10/17/88	266.02	406.82	672.84
299-E25-30	10/18/88	265.93	412.22	678.15
299-E25-31	10/18/88	265.31	407.22	672.53
299-E25-32	10/19/88	261.06	408.13	669.19
299-E25-32	11/21/88	260.85	408.34	669.19
299-E25-33	10/17/88	285.40	389.57	674.97

(a) MSL = mean sea level.

(b) NM = no measurement taken.

wells 299-E25-26, 299-E25-27, 299-E25-29, 299-E25-30, 299-E25-32, and 299-E25-33 were resurveyed in early February but the data were not received in time to be included in this report.

The water table map shown in Figure 14.2 suggests that the direction of ground-water flow beneath the GTF is to the southwest. This is consistent with data reported by Swanson et al. (1988) and the Part B Permit Application (WHC 1988b). Westinghouse Hanford Company personnel are currently performing monthly water-level measurements in wells near the GTF.

GROUND-WATER SAMPLING AND ANALYSIS

Ground-water samples were collected in October from the 11 well network. The next sampling is scheduled for January 1989. Quarterly sampling is being conducted to establish background levels for ground-water constituents.

FIGURE 14.2. Water Table Elevations Near the Grout Treatment Facility, October 1988. [Data for wells 299-E25-28 (406.82), 299-E25-30 (412.22), and 299-E25-33 (389.57) were not used in constructing this map.]

Collection and Analysis

All 11 wells were sampled from October 17 through 19, 1988. These wells are 299-E25-18, 299-E25-22, 299-E25-25, 299-E25-26, 299-E25-27, 299-E25-28, 299-E25-29, 299-E25-30, 299-E25-31, 299-E25-32, and 299-E25-33.

All of the samples were taken after approximately three borehole volumes of water had been purged. Water-level measurements were taken at all of the wells before samples were collected except at well 299-E25-26. A water-level measurement was not taken at the well at this time because a well access problem. The well design has been modified to allow easier access. Subsequent water-level measurements have been made at this well (see Table 14.1).

One of the four replicate samples for total organic carbon for well 299-E25-32 was inadvertently broken. All other replicate samples arrived safely at the laboratory.

A summary of the analytical data from the wells is provided in Table 14.2. The data for constituents that had at least one detected value are presented in Table 14.3. The sampling schedule for wells near the GTF is shown in Table 14.4.

Discussion of Results

The analytical results in Tables 14.2 and 14.3 show elevated levels for some constituents. Chromium (unfiltered) in wells 299-E25-29 (71.4 ppb) and 299-E25-30 (207.0 ppb) exceeds the standard of 50 ppb in 40 CFR 265, Appendix III. However, filtered chromium values for these wells are 11 ppb and <10 ppb, respectively, and are below this standard. Tritium in wells 299-E25-29 (70,000 pCi/L), 299-E25-31 (28,100 pCi/L), and 299-E25-33 (24,300 pCi/L) occurs above the standard of 20,000 pCi/L in 40 CFR 141. These tritium values are not caused by operations at the GTF, but result from the disposal of liquids used in chemical processing activities in the 200-East Area.

The above-mentioned chromium concentrations may not be representative of the ground water at the site (also see Section 1.0 Introduction). Both wells show a trend of decreasing concentration with time for this constituent. This and the fact that the wells have only been sampled twice since they were

TABLE 14.2. Constituent List and Summary of Sampling Results for the Grout Treatment Facility, October 1988

----- Constituent List=Indicator Parameters -----								
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name
191	CONDFO	umho	1	43	0	700	WDOE	Specific conductance, field
199	PHFIELD		0.1	44	0	6.5-8.6	EPAS	pH, field
C89	TOC	ppb	1000	23	0	.	xxx	Total organic carbon
H42	TOXLDL	ppb	20	24	0	.		Total organic halogens, low DL

----- Constituent List=Drinking Water Parameter -----									
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Agency Exceeded	Full name	
109	COLIFRM	MPN	2.2	5	5 ***	1	EPA	Coliform bacteria	
111	BETA	pCi/L	8	5	0	50	EPA	Gross beta	
181	RADIUM	pCi/L	1	5	0	5	EPA	Total radium	
212	ALPHA	pCi/L	4	5	0	15	EPA	Gross alpha	
A06	BARIUM	ppb	8	11	0	1000	EPA	Barium	
A07	CADMIUM	ppb	2	11	11 ***	10	EPA	Cadmium	
A08	CHROMIUM	ppb	10	11	5	50	EPA	Chromium	
A10	SILVER	ppb	10	11	11 ***	50	EPA	Silver	
A20	ARSENIC	ppb	5	11	1	50	EPA	Arsenic	
A21	MERCURY	ppb	0.1	5	5 ***	2	EPA	Mercury	
A22	SELENIUM	ppb	5	11	9	10	EPA	Selenium	
A33	ENDRIN	ppb	0.1	5	5 ***	0.2	EPA	Endrin	
A34	METHLOR	ppb	3	5	5 ***	100	EPA	Methoxychlor	
A35	TOXAENE	ppb	1	5	5 ***	5	EPA	Toxaphene	
A36	a-BHC	ppb	0.1	5	5 ***	4	EPA	Lindane, alpha-BHC	
A37	b-BHC	ppb	0.1	5	5 ***	4	EPA	Lindane, beta-BHC	
A38	g-BHC	ppb	0.1	5	5 ***	4	EPA	Lindane, gamma-BHC	
A39	d-BHC	ppb	0.1	5	5 ***	4	EPA	Lindane, delta-BHC	
A51	LEADGF	ppb	5	5	5 ***	50	EPA	Lead (graphite furnace)	
C72	NITRATE	ppb	500	10	0	45000	EPA	Nitrate	
C74	FLUORID	ppb	500	10	9	4000	EPA	Fluoride	
H13	2,4-D	ppb	2	5	5 ***	100	EPA	2,4-D [2,4-Dichlorophenoxyacetic acid]	
H14	2,4,5TP	ppb	2	5	5 ***	10	EPA	2,4,5-TP silvex	
H20	FBARIUM	ppb	8	11	0	1000	EPA	Barium, filtered	
H21	FCADMIUM	ppb	2	11	10	10	EPA	Cadmium, filtered	
H22	FCHROMIUM	ppb	10	11	9	50	EPA	Chromium, filtered	
H23	FSILVER	ppb	10	11	11 ***	50	EPA	Silver, filtered	
H37	FARSENIC	ppb	5	11	1	50	EPA	Arsenic, filtered	
H38	FMERCURY	ppb	0.1	5	5 ***	2	EPA	Mercury, filtered	
H39	FSELENIUM	ppb	5	11	11 ***	10	EPA	Selenium, filtered	
H41	FLEAD	ppb	5	5	5 ***	50	EPA	Lead, filtered	

TABLE 14.2. (contd)

Constituent List=Water Quality Parameters									
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Agency	Standards Exceeded	Full name
A11	SODIUM	ppb	200	11	0	.			Sodium
A17	MANGANESE	ppb	5	11	4	50	EPAS		Manganese
A19	IRON	ppb	30	11	1	300	EPAS	xxx	Iron
C73	SULFATE	ppb	500	10	0	250000	EPAS		Sulfate
C75	CHLORIDE	ppb	500	10	0	250000	EPAS		Chloride
H24	FSODIUM	ppb	200	11	0	.			Sodium, filtered
H29	FMANGAN	ppb	5	11	10	50	EPAS		Manganese, filtered
H31	FIROH	ppb	30	11	11 ***	300	EPAS		Iron, filtered
H57	LPHENOL	ppb	10	5	5 ***	.			Phenol, low DL
Constituent List=Site Specific									
Constituent Code	Name	Units	Detection Limit	Samples	Below Detection	Drinking Water Standard	Water Agency	Standards Exceeded	Full name
010	CO-60	pCi/L	22.5	10	0	100	EPAR		Cobalt-60
024	CS-137	pCi/L	20	10	0	200	EPAR		Cesium-137
034	RU-106	pCi/L	172.5	10	0	30	EPAR		Ruthenium-106
108	TRITIUM	pCi/L	500	10	0	20000	EPA	xxx	Tritium (H-3)
197	TC-99	pCi/L	0.1	11	0	900	EPAR		Technetium-99
A01	BERYLLIUM	ppb	5	11	11 ***	.			Beryllium
A03	STRONTIUM	ppb	20	11	0	.			Strontium
A04	ZINC	ppb	5	11	2	5000	EPAS		Zinc
A05	CALCIUM	ppb	50	11	0	.			Calcium
A12	NICKEL	ppb	10	11	5	.			Nickel
A13	COPPER	ppb	10	11	11 ***	1300	EPAP		Copper
A14	VANADIUM	ppb	5	11	0	.			Vanadium
A15	ANTIMONY	ppb	100	11	11 ***	.			Antimony
A16	ALUMINUM	ppb	150	11	10	.			Aluminum
A18	POTASSIUM	ppb	100	11	0	.			Potassium
A50	MAGNESIUM	ppb	50	11	0	.			Magnesium
C76	PHOSPHATE	ppb	1000	10	9	.			Phosphate
C80	AMMONIUM ION	ppb	50	10	8	.			Ammonium ion
H16	TC	ppb	1000	10	0	.			Total carbon
H18	FZINC	ppb	5	11	3	5000	EPAS		Zinc, filtered
H19	FCALCIUM	ppb	50	11	0	.			Calcium, filtered
H25	FNICKEL	ppb	10	11	11 ***	.			Nickel, filtered
H26	FCOPPER	ppb	10	11	11 ***	1300	EPAP		Copper, filtered
H27	FVANADIUM	ppb	5	11	0	.			Vanadium, filtered
H28	FALUMINUM	ppb	150	11	11 ***	.			Aluminum, filtered
H30	FPOTASSIUM	ppb	100	11	0	.			Potassium, filtered
H32	FMAGNESIUM	ppb	50	11	0	.			Magnesium, filtered
H33	FBERYLLIUM	ppb	5	11	11 ***	.			Beryllium, filtered
H35	FSTRONTIUM	ppb	20	11	0	.			Strontium, filtered
H36	FANTIMONY	ppb	100	11	11 ***	.			Antimony, filtered
H66	BROMIDE	ppb	1000	10	10 ***	.			Bromide
H67	NITRITE	ppb	1000	10	10 ***	.			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 given in 40 CFR Part 141 (July, 1987)
National Primary Drinking Water Regulations as amended by 52 FR 25690

EPAR - based on National Interim Primary Drinking Water Regulations,

Appendix IV, EPA-570/9-78-003

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

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

WDOE - based on additional Secondary Maximum Contaminant Levels given in
WAC 248-64, Public Water Supplies

TABLE 14.3. Constituents with at Least One Detected Value for the Grout Treatment Facility, October 1988

Quadruplicate Contamination Indicator Parameters

Well name	Collection Date	Duplicate sample number	COND FLD umho 1/700w	PH FIELD 0.1/8.5a	TOC ppb 1000/.	TOX LDL ppb 20/.
2-E25-18	17OCT88		196	8.0	.	.
		1	196	8.0	.	.
		2	196	8.0	.	.
		3	196	8.0	.	.
2-E25-22	17OCT88		195	8.1	.	.
		1	195	8.1	.	.
		2	195	8.1	.	.
		3	195	8.1	.	.
2-E25-25	18OCT88		188	8.1	#700	188
		1	188	8.2	#800	190
		2	188	8.2	#700	201
		3	188	8.2	#600	282
2-E25-26	19OCT88		185	8.1	1,100	#4
		1	185	8.2	.	.
		2	185	8.2	.	.
		3	185	8.2	.	.
2-E25-27	18OCT88		222	8.5	#600	271
		1	222	8.5	.	.
		2	222	8.6	.	.
		3	222	8.6	.	.
2-E25-28	19OCT88		194	8.2	#600	#3
		1	194	8.3	.	.
		2	194	8.3	.	.
		3	194	8.3	.	.
2-E25-29	17OCT88		237	8.4	#500	125
		1	239	8.3	#500	660
		2	238	8.3	#500	607
		3	238	8.4	#600	384
2-E25-30	18OCT88		523	8.7	#700	380
		1	.	8.7	.	.
		2	520	8.7	.	.
		3	519	8.7	.	.
2-E25-31	18OCT88		243	8.1	#900	479
		1	248	8.2	#900	492
		2	248	8.2	1,000	607
		3	248	8.1	1,000	621
2-E25-32	19OCT88		170	8.2	.	#1
		1	170	8.2	#800	#6
		2	170	8.3	#800	#9
		3	170	8.3	#800	#6
2-E25-33	17OCT88		307	8.0	#400	64
		1	307	8.0	#500	66
		2	307	8.0	#400	60
		3	307	8.0	#400	30

TABLE 14.3. (contd)

Well name	Collection Date	Duplicate sample number	ALPHA pCi/L 4/15	ALUMNUM ppb 150/.	AMMONIU ppb 50/.	ARSENIC ppb 5/50	FARSEN1 ppb 5/50	BARIUM ppb 5/1000	FBARIUM ppb 5/1000	BETA pCi/L 5/50	FCADMIU ppb 2/10
2-E25-18	17OCT88	.	.	<150	.	12	11	12.0	15	.	<2
2-E25-22	17OCT88	.	.	<150	<50	10	10	12.7	21	.	<2
2-E25-25	18OCT88	.	*0.657	219	<50	<5	<5	18.8	18	7.42	<2
2-E25-26	19OCT88	.	.	<150	<50	7	7	12.4	11	.	<2
2-E25-27	18OCT88	.	.	<150	<50	5	5	12.4	13	.	<2
2-E25-28	19OCT88	.	.	<150	<50	11	12	13.4	12	.	<2
2-E25-29	17OCT88	.	*0.920	<150	<50	14	14	20.5	29	11.80	<2
2-E25-30	18OCT88	.	.	<150	80	38	34	13.5	11	.	<2
2-E25-31	18OCT88	.	1.030	<150	78	11	10	28.3	31	3.72	3
2-E25-32	19OCT88	.	*0.406	<150	<50	6	5	12.8	15	8.05	<2
2-E25-33	17OCT88	.	3.020	<150	<50	9	9	31.7	37	10.50	<2

Well name	Collection Date	Duplicate sample number	FCALCIU ppb 50/.	CALCIUM ppb 50/.	CHLORIO ppb 500/250000s	FCHROMI ppb 10/50	CHROMUM ppb 10/50	CO-60 pCi/L 22.6/100r	CS-137 pCi/L 20/200r	FLUORID ppb 500/4000
2-E25-18	17OCT88	.	24,300	22,200	.	<10	<10.0	.	.	.
2-E25-22	17OCT88	.	19,300	21,200	3,400	<10	<10.0	7.930	*-1.410	<500
2-E25-25	18OCT88	.	20,600	18,300	3,700	<10	32.5	*-1.630	*2.640	<500
2-E25-26	19OCT88	.	21,400	20,100	3,200	<10	<10.0	*2.230	*-0.125	<500
2-E25-27	18OCT88	.	21,700	19,500	3,700	<10	<10.0	6.120	*3.270	<500
2-E25-28	19OCT88	.	20,100	17,500	3,000	<10	<10.0	*-0.414	*-0.373	<500
2-E25-29	17OCT88	.	28,400	23,000	3,000	11	71.4	*-1.370	*-0.361	<500
2-E25-30	18OCT88	.	10,900	11,700	2,200	<10	207.0	*-1.850	*-1.990	<500
2-E25-31	18OCT88	.	24,000	20,700	3,000	<10	23.5	*1.240	*-0.496	<500
2-E25-32	19OCT88	.	19,400	17,500	2,900	<10	32.2	*0.757	*1.060	<500
2-E25-33	17OCT88	.	37,600	35,500	4,800	10	23.4	*-0.828	*5.480	510

Well name	Collection Date	Duplicate sample number	IRON ppb 30/300s	MAGNES ppb 50/.	FMAGNES ppb 50/.	FMANGAN ppb 5/50s	MANGESE ppb 5/50s	NICKEL ppb 10/.	NITRATE ppb 500/46000	PHOSPHA ppb 1000/.
2-E25-18	17OCT88	.	175.0	6,250	6,890	7	9.28	<10.0	.	.
2-E25-22	17OCT88	.	<30.0	5,880	5,500	<5	<5.00	<10.0	3,700	<1000
2-E25-25	18OCT88	.	1,490.0	6,370	5,500	<5	47.60	18.9	600	<1000
2-E25-26	19OCT88	.	77.1	5,590	6,230	<5	<5.00	<10.0	1,500	<1000
2-E25-27	18OCT88	.	140.0	5,950	6,130	<5	<5.00	<10.0	4,000	<1000
2-E25-28	19OCT88	.	49.0	5,190	5,310	<5	<5.00	<10.0	1,300	<1000
2-E25-29	17OCT88	.	508.0	5,900	7,480	<5	14.80	44.2	9,300	<1000
2-E25-30	18OCT88	.	1,010.0	5,400	4,810	<5	30.20	118.0	4,500	18,800
2-E25-31	18OCT88	.	632.0	5,890	6,050	<5	10.00	17.2	7,000	<1000
2-E25-32	19OCT88	.	198.0	4,800	5,240	<5	6.64	20.1	700	<1000
2-E25-33	17OCT88	.	173.0	6,970	9,800	<5	5.82	13.7	12,900	<1000

TABLE 14.3. (contd)

Well name	Collection Date	Duplicate sample number	FPOTASS ppb 100/.	POTASUM ppb 100/.	RADIUM pCi/L 1/5	RU-108 pCi/L 172.5/30r	SELENIUM ppb 5/10	SODIUM ppb 200/.	FSODIUM ppb 200/.	FSTRONT ppb 20/.
2-E25-18	17OCT88		5,170	4,870	.	.	<5	15,800	16,800	118
2-E25-22	17OCT88		4,810	5,320	.	*-26.80	<5	18,800	15,500	101
2-E25-26	18OCT88		4,440	4,320	0.1780	*-3.14	<5	8,500	8,520	114
2-E25-28	19OCT88		3,760	4,200	.	*47.20	<5	10,200	8,900	98
2-E25-27	18OCT88		4,270	4,100	.	*12.80	<5	11,400	11,300	111
2-E25-28	19OCT88		3,510	3,520	.	*9.41	<5	10,300	9,850	95
2-E25-29	17OCT88		5,230	4,620	0.2830	*-12.00	<5	21,800	31,600	135
2-E25-30	18OCT88		6,480	6,590	.	*-16.80	5	95,500	91,600	125
2-E25-31	18OCT88		4,630	4,880	*0.1430	*-47.60	<5	19,100	18,400	107
2-E25-32	19OCT88		4,440	4,100	*0.0918	*-50.80	<5	8,920	7,360	107
2-E25-33	17OCT88		5,720	5,490	0.1550	*5.18	5	29,800	31,700	174

Well name	Collection Date	Duplicate sample number	STRONTIUM ppb 20/.	SULFATE ppb 500/250000s	TC ppb 1000/.	TC-99 pCi/L 0.1/900r	TRITIUM pCi/L 500/20000	EVANADI ppb 5/.	VANADIUM ppb 5/.	ZINC ppb 5/5000s	FZINC ppb 5/5000s
2-E25-18	17OCT88		111.0	.	18,500	1.29	.	38	80.5	14.20	12
2-E25-22	17OCT88		111.0	22,800	15,300	29.97	5,240	39	46.7	9.22	9
2-E25-26	18OCT88		113.0	12,400	17,000	1.43	*-163	24	14.3	15.80	6
2-E25-28	19OCT88		107.0	14,400	17,000	3.14	2,380	31	25.1	12.40	9
2-E25-27	18OCT88		111.0	22,700	18,900	4.41	3,770	25	21.2	6.15	8
2-E25-28	19OCT88		95.3	12,900	18,200	2.81	1,490	43	33.0	33.70	17
2-E25-29	17OCT88		112.0	34,600	20,600	7.18	70,000	35	34.8	5.92	8
2-E25-30	18OCT88		138.0	64,800	32,700	5.43	1,380	89	80.5	<5.00	<5
2-E25-31	18OCT88		108.0	26,900	20,800	1.23	28,100	37	32.9	10.80	8
2-E25-32	19OCT88		99.8	12,800	15,500	2.75	1,150	23	13.8	7.00	<5
2-E25-33	17OCT88		185.0	70,900	24,300	8.22	24,200	22	21.8	<5.00	<5

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

Suffix

- none - based on Maximum Contaminant Levels given in 40 CFR Part 141 (July, 1987)
- National Primary Drinking Water Regulations as amended by 52 FR 25690
- r - based on National Interim Primary Drinking Water Regulations, Appendix IV, EPA-670/9-76-003
- p - based on proposed Maximum Contaminant Level Goals in 50 FR 48936
- s - based on Secondary Maximum Contaminant Levels given in 40 CFR Part 143 (July, 1987) National Secondary Drinking Water Regulations
- w - based on additional Secondary Maximum Contaminant Levels given in WAC 248-54, Public Water Supplies

Data flags

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

TABLE 14.4. Sampling Schedule for the Grout Treatment Facility

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

R Quality control replicates

X Regular sample list

L1 List 1, first quarter

L2 List 2, first quarter

L3 List 3, first quarter

L4 List 4, first quarter

installed suggests that the high chromium concentrations may be a result of incomplete well development. Also, these wells are constructed with 2-in.-dia casing. Wells constructed with small diameter casings can be more difficult to develop than wells with larger diameters.

Wells 299-E25-25 (1490 ppb), 299-E25-29 (506 ppb), 299-E25-30 (1010 ppb), and 299-E25-31 (532 ppb) exhibit iron concentrations that are relatively higher than the other wells. All of these wells show trends of decreasing concentrations with time except for well 299-E25-25. The carbon steel casing that was used to construct this well may be introducing some iron into the water. Filtered iron concentrations for all four of these wells are below detection limits.

Well 299-E25-30 also shows relatively higher values for several other constituents including ammonium, arsenic, filtered arsenic, nickel (however, filtered nickel was below the detection limit), vanadium, filtered vanadium, and total carbon. Also, this well shows very high values for phosphate,

sodium, and filtered sodium. Ammonium, total carbon, and the unfiltered metals appear to be decreasing with time. Data for the unfiltered metals are not available prior to the October sampling.

Well 299-E25-31 also has a higher ammonium concentration compared to the other wells. Well 299-E25-25 is the only well where aluminum occurs above the detection limit.

Six wells show TOX concentrations above the detection limit: 299-E25-25, 299-E25-27, 299-E25-29, 299-E25-30, 299-E25-31, and 299-E25-33. Well 299-E25-33 is only slightly above the detection limit. Wells 299-E25-29 and 299-E25-31 are the only wells that have previously shown TOX results above the detection limit; these concentrations appear to be decreasing with time. The trip blank analysis (October sampling) did not indicate methylene chloride contamination (see Section 1.0). The cause of the elevated TOX values is under continuing investigation.

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