**Ground-Water Monitoring
Compliance Projects for
Hanford Site Facilities**

**Progress Report for the Period
October 1 to December 31, 1986**

**Volume 1: The Report
and Appendix A**

February 1987

**Prepared by the
Pacific Northwest Laboratory
and Rockwell Hanford Operations
for the
U.S. Department of Energy
Richland Operations Office**

GROUND-WATER MONITORING COMPLIANCE PROJECTS
FOR HANFORD SITE FACILITIES

PROGRESS REPORT

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VOLUME 1: THE REPORT AND APPENDIX A

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SUMMARY

This report documents recent progress on ground-water monitoring projects for four Hanford Site facilities: the 300 Area Process Trenches, the 183-H Solar Evaporation Basins, the 200 Area Low-Level Burial Grounds, and the Non-radioactive Dangerous Waste (NRDW) Landfill. This report is the second in a series of periodic progress reports, and it covers the time period from October 1 through December 31, 1986.

The four ground-water monitoring projects discussed in this report are designed according to the applicable ground-water monitoring requirements contained in the Resource Conservation and Recovery Act (RCRA), 40 CFR 265.90 [U.S. Environmental Protection Agency (USEPA) 1984], and in WAC 173-303-400 of Washington State's regulations (Washington State Department of Ecology 1986).

The existing ground-water monitoring projects for the first two facilities named in the paragraph above are currently being expanded by adding new wells to the networks. During the reporting period, sampling of the existing wells continued on a monthly basis, and the analytical results for samples collected from September through November 1986 are included and discussed in this document. (The results for samples collected in December 1986, near the end of the reporting period, will be included in the next report.) Also, a number of new wells were installed in both of these areas during the reporting period, and the progress made on these well installation efforts is described in this document. In the 100-H Area, 12 new wells were installed, completing (as per the milestone in the October 1, 1986, Consent Agreement and Compliance Order) the drilling effort initiated last quarter. Eleven new wells were installed in the vicinity of the 300 Area, and the remaining six were in progress at the end of the reporting period. Sampling pumps were installed upon receipt in some of the new wells in both areas during December, allowing six of the new wells at the 100-H Area to be sampled that month. The remaining new wells will be added to the sampling network as soon as their pumps are installed and functioning properly.

A new ground-water monitoring project is being established for the 200 Area Low-Level Burial Grounds. Progress made during the reporting period

included completion of the compliance plan outline and initial drafting of the full plan. The final drilling specifications were also prepared during the quarter, and the bid packages are expected to be issued soon.

A new ground-water monitoring project is also being initiated at the NRDW Landfill. The drilling effort was finished this quarter (as per the milestone in the October 1, 1986, Consent Agreement and Compliance Order), and the well network for the facility is now complete. In addition, analytical results were received this quarter for the first set of samples collected from the five shallow monitoring wells.

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INTRODUCTION

This report covers recent progress on ground-water monitoring projects for four Hanford Site facilities: the 300 Area Process Trenches, the 183-H Solar Evaporation Basins, the 200 Area Low-Level Burial Grounds, and the Nonradioactive Dangerous Waste (NRDW) Landfill. These four ground-water monitoring projects are designed according to the applicable ground-water monitoring requirements contained in the Resource Conservation and Recovery Act (RCRA), 40 CFR 265.90 [U.S. Environmental Protection Agency (USEPA) 1984], and in WAC 173-303 of Washington State's regulations (Washington State Department of Ecology 1986). Two of these monitoring projects (for the 300 Area Process Trenches and the 183-H Solar Evaporation Basins) were implemented in June 1985 and are now in the process of being expanded by adding new wells to the networks; the other two projects are new. Installation of the monitoring well network for the NRDW Landfill was completed recently, and sampling has been initiated. Drilling is expected to begin soon at the 200 Area Low-Level Burial Grounds.

Detailed plans for these four monitoring projects have been or will be provided in separate documents (USD OE 1986a, 1986c, 1986d, and 1986e) and are not included here. For preparation of this report, it was assumed that the reader would have a basic knowledge of the projects.

This report is the second in a series of periodic progress reports, and it covers the time period from October 1 to December 31, 1986. The previous report (USD OE 1986b) was produced in November 1986 and covered the time period from May 1 to September 30, 1986. Subsequent reports will be produced on a quarterly basis, with the next report (to be issued in May 1987) covering the time period from January 1 to March 31, 1986.

This report contains a chapter for each of the four projects. In general, each chapter includes two main sections: one concerning drilling and hydrogeologic characterization, and a second concerning routine sampling and analysis of the ground water. Some limited interpretive remarks are included along with the raw data obtained, but these remarks are preliminary pending collection of more data. Detailed interpretations, with illustrative figures such as geo-

logic cross sections and water table maps, will be contained in the characterization reports.

Supporting information for this report, including raw analytical data and drilling logs, is included in appendices. Appendix A is contained in this volume, Appendix B is in Volume 2, and Appendices C through G are in Volume 3.

300 AREA PROCESS TRENCHES

Two recently issued reports (USD0E 1986b and USD0E 1986e) contain information on the progress made and the data obtained by the RCRA Compliance Ground-Water Monitoring Project for the 300 Area Process Trenches during the time period from June 1985 through September 30, 1986. This report includes information on subsequent activities and data.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

As shown in Table 1, 11 new monitoring wells were completed and the remaining 6 were in progress as of December 31, 1986. Drilling activities on the single and cluster wells are discussed in the next two paragraphs, respectively.

Seven of the 8 single wells (S1, S3, S4, S5, S6, S7, and S8) were completed at the top of the unconfined aquifer. (Locations of these wells and the others to be installed in this area are shown on Figure 1.) The remaining single well, S2, has been drilled to a total depth of 181 ft and will be completed just above the top of the uppermost basalt.

Four of the 9 cluster wells were completed during the reporting period. Three of these wells (C1A, C2A, and C3A) were completed as shallow wells at the top of the unconfined aquifer; the fourth (C2B) was completed as an intermediate-depth well at the bottom of the unconfined aquifer. The 5 cluster wells in progress at the end of the reporting period were wells C1B, C3B, C1C, C2C, and C3C. Well C1B, originally intended to be an intermediate-depth well, was modified to be a deep well; it was drilled to a depth of 180 ft and will be completed just above the top of the uppermost basalt layer. Well C3B, drilled to 125 ft, will be completed as an intermediate-depth well at the bottom of the unconfined aquifer. Well C1C, originally intended to be a deep well, has a broken casing at 114 ft and will be plugged below the break and completed as an intermediate-depth well. Wells C2C and C3C, drilled to depths of 173 ft and 153 ft, respectively, will both be completed as deep wells, just above the top of the uppermost basalt.

TABLE 1. Status of the 300 Area Well Drilling Effort as of December 31, 1986

<u>Temporary Well Number</u>	<u>Type of Well(a)</u>	<u>Completed</u>	<u>In Progress</u>
S1	Shallow	x	
S2	Deep		x
S3	Shallow	x	
S4	Shallow	x	
S5	Shallow	x	
S6	Shallow	x	
S7	Shallow	x	
S8	Shallow	x	
C1A	Shallow	x	
C1B	Deep		x
C1C	Intermediate		x
C2A	Shallow	x	
C2B	Intermediate	x	
C2C	Deep		x
C3A	Shallow	x	
C3B	Intermediate		x
C3C	Deep		x

(a) Shallow wells are being completed at the top of the unconfined aquifer; intermediate-depth wells are being completed at the bottom of the unconfined aquifer; and deep wells are being completed just above the top of the uppermost basalt.

A Site Safety Plan covering drilling and other related field activities has been developed. Implementation of this plan for future field work will help to ensure that safe practices are used.

Data logging equipment was received and tested in preparation for the aquifer tests to be conducted. Some malfunctions were encountered during the testing of the data loggers, and the units not functioning properly were returned under warranty for repair or replacement of parts. The units are now all functioning properly and will be available for use in the aquifer testing effort to begin soon.

FIGURE 1. Well Location Map for the 300 Area and Vicinity

During this quarter, a location was selected for the surface water monitoring station being established on the Columbia River. The selected location is near the PRTR water intake (see the upper-most quadrant, line N53600, of Figure 1) and will provide a record of the river level near the 300 Area Process Trenches. Work is proceeding on the station and it is expected to be in place in January 1987.

A draft plan for aquifer testing has been developed and is being reviewed. The plan includes a description of the tests, the wells considered, and a preliminary cost evaluation and schedule. Testing is expected to begin and be completed during the next reporting period.

A comprehensive outline for the interim characterization report has been developed and has been through two cycles of internal review and comment. The outline is now being revised to a final form.

ROUTINE SAMPLING AND ANALYSIS OF THE GROUND WATER

Routine sampling and analysis of the ground water has been conducted for this facility on a monthly basis since June 1985. Recent activities under this effort and the results obtained are discussed in the following sections.

Collection and Analysis

Sampling of the 16 wells being used to monitor the 300 Area Process Trenches continued through the quarter. Most of the ground-water samples were analyzed for the standard list of constituents (see Table 2 in USDOE 1986e); however, to satisfy regulatory requirements and to help ensure that no contaminants would be overlooked, additional analyses (listed in Table 3 of USDOE 1986e) were conducted once during the quarter on samples collected from one upgradient well and one downgradient well (699-S19-E13 and 399-1-5, respectively). In the future, to maximize the efficiency of the laboratory, the sampling schedule will be changed slightly so that these additional quarterly analyses will be spread out over the quarter rather than all being conducted during one month.

Piston-type sampling pumps were installed in 8 of the new wells during December. Mechanical difficulties were encountered with the pumps, and

therefore samples could not be obtained from these wells. Efforts are now being made to resolve the problem so that these wells can be added to the monitoring network and sampled as soon as possible.

Work has begun on computerizing some of the paperwork that accompanies the samples, including the Chain-of-Custody forms and Field Record Logbook sheets; these forms are currently filled out manually or by typing, and efficiency will be improved if some of the repetitive information on these forms can be entered by the computer instead.

U.S. Testing (UST) has been having problems for several months with their Total Organic Carbon (TOC) instrument. Continuing attempts to fix the instrument have not been totally successful, and UST has decided to purchase a new instrument from a different manufacturer. The TOC analysis for the November and December samples has been delayed because of this problem, but UST expects to catch up quickly as soon as they have a properly functioning instrument. The samples have been properly preserved and stored, so the analytical results should not be affected by this delay.

A quality assurance audit of UST was performed during December by the Quality Assurance Department of PNL. Results of this audit indicate that the laboratory is generally functioning in conformance with quality assurance standards.

Discussion of Results

Analytical data obtained from samples collected in the 300 Area between September 1986 and November 1986 are included in this report and discussed in the following paragraphs. Results for samples collected in December 1986, near the end of the reporting period, will be included in the next progress report.

The results of sample analyses during the reporting period were basically consistent with those reported previously in USDOE 1986b and USDOE 1986e. In general, the samples continued to show the presence of metals, anions, radionuclides, and a few volatile organics. Some of the data are discussed in more detail below and are also shown on plots presented later in this section. For plotting purposes, the wells have been split into two groups. The first group consists of those wells nearest the process trenches (i.e., wells 399-1-1

through 399-1-8); the second group consists of the remaining, more distant, wells. The well numbers are denoted on these plots using the following abbreviations:

399-1-1 = 11	399-1-5 = 15	399-2-1 = 21	399-4-7 = 47
399-1-2 = 12	399-1-6 = 16	399-3-7 = 37	399-8-2 = 82
399-1-3 = 13	399-1-7 = 17	399-3-10 = 310	699-S19-E13 = S19
399-1-4 = 14	399-1-8 = 18	399-4-1 = 41	699-S30-E15A = S30

Table 2 is a summary of all results obtained for samples collected from September 1986 through November 1986. For those constituents that were undetected during this time period, three asterisks appear in the column marked "Below Detection." Also, any constituents having at least one value above the regulatory standard or a screening limit are marked with three X's in the column labeled "Exceed." The raw analytical data for all constituents with at least one value above the detection limit are presented in Appendix A on pages A.26 through A.68.

The slightly elevated chloroform levels that appeared in samples collected from wells 399-2-1 and 399-3-7 during the previous reporting period have declined to about 10 ppb (Figure 2). A decline was also observed in samples taken from wells nearer the process trenches; by the end of the reporting period, chloroform concentrations in samples from those wells were below 20 ppb.

Gross beta levels dropped in September from a peak in the previous month for samples collected from wells 399-1-3 and 399-1-7 (Figure 3). Results reported for samples collected from well 699-S30-E15A showed an apparent increase in October, but returned to normal in November. Gross beta levels increased during the quarter in samples collected from several wells nearest the trenches: 399-1-2, 399-1-4, and 399-1-5.

Gross alpha levels appear to have stabilized in samples from wells 399-1-1, 399-1-3, and 399-1-7 after continuously declining during the previous reporting period (Figure 4). Results for samples collected from wells 399-1-4 and 399-1-5 during October and November showed a slight increase from previous

TABLE 2. Summary of Analyses Conducted on Samples Collected from 300 Area Wells, September 1986 through November 1986

-----Constituent List=Contamination Indicators-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
191	CONDUCT	UMHO	.	47	0	.	Specific conductance
199	PH		.	48	0	.	pH
C68	TOX	PPB	100	48	48 ***	.	Total organic halogen
C69	TOC	PPB	1000	38	33	.	Total organic carbon
-----Constituent List=Drinking Water Standards-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
109	COLIFRM	MPN	2.2	48	34	1 EPA	Coliform bacteria
111	BETA	PCI/L	8	48	0	50 EPA	Gross beta
181	RADIUM	PCI/L	1	48	44	5 EPA	Radium
212	LOALPHA	PCI/L	4	48	2	15 EPA	Gross alpha
A06	BARIUM	PPB	6	48	0	1000 EPA	Barium
A07	CADMIUM	PPB	2	48	44	10 EPA	Cadmium
A08	CHROMIUM	PPB	10	48	48 ***	50 EPA	Chromium
A10	SILVER	PPB	10	48	48 ***	50 EPA	Silver
A20	ARSENIC	PPB	5	48	46	50 EPA	Arsenic
A21	MERCURY	PPB	.1	48	48 ***	2 EPA	Mercury
A22	SELENIUM	PPB	5	48	48 ***	10 EPA	Selenium
A33	ENDRIN	PPB	1	16	16 ***	.2 EPA	Endrin
A34	METHLOR	PPB	1	16	16 ***	100 EPA	Methoxychlor
A35	TOXAENE	PPB	1	16	16 ***	5 EPA	Toxaphene
A36	a-BHC	PPB	1	16	16 ***	4 EPA	Alpha-BHC
A37	b-BHC	PPB	1	16	16 ***	4 EPA	Beta-BHC
A38	g-BHC	PPB	1	16	16 ***	4 EPA	Gamma-BHC
A39	d-BHC	PPB	1	16	16 ***	4 EPA	Delta-BHC
A51	LEADGF	PPB	5	48	46	50 EPA	Lead (graphite furnace)
C72	NITRATE	PPB	500	47	0	45000 EPA	Nitrate
C74	FLUORID	PPB	500	47	43	1400 EPA	Fluoride
H13	2,4-D	PPB	1	16	16 ***	100 EPA	2,4-D
H14	2,4,6TP	PPB	1	16	16 ***	10 EPA	2,4,6-TP silvex
H20	FBARIUM	PPB	6	46	0	1000 EPA	Barium, filtered
H21	FCADMIU	PPB	2	46	46	10 EPA	Cadmium, filtered
H22	FCHROMI	PPB	10	46	48 ***	50 EPA	Chromium, filtered
H23	FSILVER	PPB	10	46	48 ***	50 EPA	Silver, filtered
H37	FARSENI	PPB	5	46	44	50 EPA	Arsenic, filtered
H38	FMERCUR	PPB	.1	47	47 ***	2 EPA	Mercury, filtered
H39	FSELENI	PPB	5	46	48 ***	10 EPA	Selenium, filtered
H41	FLEAD	PPB	5	46	43	50 EPA	Lead, filtered

TABLE 2. (contd)

-----Constituent List=Quality Characteristics-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
A11	SODIUM	PPB	100	48	0	.	Sodium
A17	MANGESE	PPB	5	48	42	.	Manganese
A19	IRON	PPB	50	48	25	.	Iron
C57	PHENOL	PPB	10	2	2 ***	.	Phenol
C73	SULFATE	PPB	500	47	0	.	Sulfate
C75	CHLORID	PPB	500	47	0	.	Chloride
H24	FSODIUM	PPB	100	48	0	.	Sodium, filtered
H29	FMANGAN	PPB	5	48	40	.	Manganese, filtered
H31	FIRON	PPB	50	48	42	.	Iron, filtered
-----Constituent List=Site Specific-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
010	CO	PCI/L	22.5	2	2 ***	.	Cobalt-60
024	CS-137	PCI/L	20	2	0	.	Cesium-137
034	RU	PCI/L	172.5	2	2 ***	.	Ruthenium-106
121	SR	PCI/L	5	2	1	.	Strontium-90
124	U-CHEM		.	2	0	.	Natural uranium
A04	ZINC	PPB	5	48	24	.	Zinc
A05	CALCIUM	PPB	50	48	0	.	Calcium
A12	NICKEL	PPB	10	48	48 ***	.	Nickel
A13	COPPER	PPB	10	48	35	1300 EPAP	Copper
A16	ALUMNUM	PPB	150	48	48 ***	.	Aluminum
A50	MAGNES	PPB	0	48	0	.	Magnesium
A61	TETRANE	PPB	10	48	48 ***	5 EPAP	Tetrachloromethane
A64	METHONE	PPB	10	48	48 ***	.	Methyl ethyl ketone
A67	1,1,1-T	PPB	10	48	47	200 EPAP	1,1,1-trichloroethane
A68	1,1,2-T	PPB	10	48	48 ***	.	1,1,2-trichloroethane
A69	TRICENE	PPB	10	48	47	5 EPAP	Trichloroethylene
A70	PERCENE	PPB	10	48	48 ***	.	Perchloroethylene
A71	OPXYLE	PPB	10	48	48 ***	440 EPAP	Xylene-o,p
B14	M-XYLE	PPB	10	48	48 ***	440 EPAP	Xylene-m
C70	CYANIDE	PPB	10	48	48 ***	.	Cyanide
C78	SULFIDE	PPB	1000	48	47	.	Sulfide
C80	AMMONIU	PPB	50	48	31	.	Ammonium ion
H18	FZINC	PPB	5	48	29	.	Zinc, filtered
H19	FCALCIU	PPB	50	48	0	.	Calcium, filtered
H25	FNICKEL	PPB	10	48	48 ***	.	Nickel, filtered
H26	FCOPPER	PPB	10	48	37	1300 EPAP	Copper, filtered
H28	FALUMIN	PPB	150	48	48 ***	.	Aluminum, filtered
H32	FMAGNES	PPB	0	48	0	.	Magnesium, filtered

TABLE 2. (contd)

-----Constituent List=Tag-alongs-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
A14	VANADUM	PPB	5	48	20	.	Vanadium
A18	POTASUM	PPB	100	48	0	.	Potassium
A80	CHLFORM	PPB	10	48	23	.	Chloroform
A93	METHYCH	PPB	10	48	48 ***	.	Methylene chloride
C76	PHOSPHA	PPB	1000	47	47 ***	.	Phosphate
H27	FVANADI	PPB	5	48	24	.	Vanadium, filtered
H30	FPOTASS	PPB	100	48	0	.	Potassium, filtered

-----Constituent List=WAC 173-303-9905-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
A01	BERYLAM	PPB	5	2	2 ***	.	Beryllium
A02	OSMIUM	PPB	300	2	2 ***	.	Osmium
A03	STRONIUM	PPB	300	2	2 ***	.	Strontium
A15	ANTIMONY	PPB	100	2	2 ***	.	Antimony
A23	THALIUM	PPB	10	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 ***	.	Diethylstilbestrol
A28	ETHYREA	PPB	200	2	2 ***	.	Ethylenethiourea
A29	NAPHREA	PPB	200	2	2 ***	.	1-naphthyl-2-thiourea
A32	PHENREA	PPB	200	2	2 ***	.	N-phenylthiourea
A40	DDD	PPB	1	2	2 ***	.	DDD
A41	DDE	PPB	1	2	2 ***	.	DDE
A42	DDT	PPB	1	2	2 ***	.	DDT
A43	HEPTLOR	PPB	1	2	2 ***	0 EPAP	Heptachlor
A44	HEPTIDE	PPB	1	2	2 ***	0 EPAP	Heptachlor epoxide
A46	DIELRIN	PPB	1	2	2 ***	.	Dieldrin
A47	ALDRIN	PPB	1	2	2 ***	.	Aldrin
A48	CHLOANE	PPB	1	2	2 ***	0 EPAP	Chlordane
A49	END01	PPB	1	2	2 ***	.	Endosulfan I
A52	END02	PPB	1	2	2 ***	.	Endosulfan II
A82	BENZENE	PPB	10	2	2 ***	5 EPAP	Benzene
A83	DIOXANE	PPB	500	2	2 ***	.	Dioxane
A85	PYRIDINE	PPB	500	2	2 ***	.	Pyridine
A88	TOLUENE	PPB	10	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 ***	.	Chlorobenzene
A79	CHLTHER	PPB	10	2	2 ***	.	2-chloroethyl vinyl ether
A81	METHCHL	PPB	10	2	2 ***	.	Methyl chloride
A82	CHMTHER	PPB	10	2	2 ***	.	Chloromethyl methyl ether
A83	CROTONA	PPB	10	2	2 ***	.	Crotonaldehyde

TABLE 2. (contd)

-----Constituent List=WAC 173-303-9906-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
A84	DIBRCHL	PPB	10	2	2 ***	.	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
A90	1,2-DIC	PPB	10	2	2 ***	6 EPAP	1,2-dichloroethane
A91	TRANDE	PPB	10	2	2 ***	70 EPAP	Trans-1,2-dichloroethane
A92	DICETHY	PPB	10	2	2 ***	7 EPAP	1,1-dichloroethylene
A94	DICPANE	PPB	10	2	2 ***	6 EPAP	1,2-dichloropropane
A95	DICPENE	PPB	10	2	2 ***	.	1,3-dichloropropane
A96	NNDIEHY	PPB	10	2	2 ***	.	N,N-diethylhydrazine
A97	1,1-DIM	PPB	3000	2	2 ***	.	1,1-dimethylhydrazine
A98	1,2-DIM	PPB	3000	2	2 ***	.	1,2-dimethylhydrazine
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
B08	BROMORM	PPB	10	2	2 ***	.	Bromoform
B09	TRCMEOL	PPB	10	2	2 ***	.	Trichloromethanethiol
B10	TRCMFLM	PPB	10	2	2 ***	.	Trichloromonofluoromethane
B11	TRCPANE	PPB	10	2	2 ***	.	Trichloropropane
B12	123-trp	PPB	10	2	2 ***	.	1,2,3-trichloropropane
B13	VINYIDE	PPB	10	2	2 ***	1 EPAP	Vinyl chloride
B16	DIETHY	PPB	10	2	2 ***	.	Diethylarsine
B19	ACETILE	PPB	3000	2	2 ***	.	Acetonitrile
B20	ACETONE	PPB	10	2	2 ***	.	Acetophenone
B21	WARFRIN	PPB	10	2	2 ***	.	Warfarin
B22	ACEFENE	PPB	10	2	2 ***	.	2-acetylaminofluorene
B23	AMINOYL	PPB	10	2	2 ***	.	4-aminobiphenyl
B24	AMISOX	PPB	10	2	2 ***	.	5-(aminomethyl)-3-isoxazolol
B25	AMITROL	PPB	10	2	2 ***	.	Amitrole
B26	ANILINE	PPB	10	2	2 ***	.	Aniline
B27	ARAMITE	PPB	10	2	2 ***	.	Aramite
B28	AURAMIN	PPB	10	2	2 ***	.	Auramine
B29	BENZCAC	PPB	10	2	2 ***	.	Benz[c]acridine
B30	BENZAAN	PPB	10	2	2 ***	.	Benz[a]anthracene
B31	BENDICM	PPB	10	2	2 ***	.	Benzene, dichloromethyl
B32	BENTHOL	PPB	10	2	2 ***	.	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	BIS2CHM	PPB	10	2	2 ***	.	Bis(2-chloroethoxy) methane
B39	BIS2CHE	PPB	10	2	2 ***	.	Bis(2-chloroethyl) ether
B40	BIS2EPH	PPB	10	2	2 ***	.	Bis(2-ethylhexyl) phthalate

TABLE 2. (contd)

-----Constituent List=WAC 173-303-9905-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
B41	BROPHEN	PPB	10	2	2 ***	.	4-bromophenyl phenyl ether
B42	BUTBENP	PPB	10	2	2 ***	.	Butyl benzyl phthalate
B43	BUTDINP	PPB	10	2	2 ***	.	2-sec-butyl-4,6-dinitrophenol
B44	CHALETH	PPB	10	2	2 ***	.	Chloroalkyl ethers
B45	CHLANIL	PPB	10	2	2 ***	.	P-chloroaniline
B46	CHLCRES	PPB	10	2	2 ***	.	P-chloro-m-cresol
B47	CHLEPOX	PPB	10	2	2 ***	.	1-chloro-2,3-epoxypropane
B48	CHLNAPH	PPB	10	2	2 ***	.	2-chloronaphthalene
B49	CHLPHEN	PPB	10	2	2 ***	.	2-chlorophenol
B50	CHRYSEN	PPB	10	2	2 ***	.	Chrysene
B51	CRESOLS	PPB	10	2	2 ***	.	Cresols
B52	CYCHDIN	PPB	10	2	2 ***	.	2-cyclohexyl-4,6-dinitrophenol
B53	DIBAHAC	PPB	10	2	2 ***	.	Dibenz[a,h]acridine
B54	DIBAJAC	PPB	10	2	2 ***	.	Dibenz[a,j]acridine
B55	DIBAHAN	PPB	10	2	2 ***	.	Dibenz[a,h]anthracene
B56	DIBCGCA	PPB	10	2	2 ***	.	7H-dibenzo[c,g]carbazole
B57	DIBAEPY	PPB	10	2	2 ***	.	Dibenzo[a,e]pyrene
B58	DIBAHPY	PPB	10	2	2 ***	.	Dibenzo[a,h]pyrene
B59	DIBAIPY	PPB	10	2	2 ***	.	Dibenzo[a,i]pyrene
B60	DIBPHTH	PPB	10	2	2 ***	.	Di-n-butyl phthalate
B61	12-dben	PPB	10	2	2 ***	.	1,2-dichlorobenzene
B62	13-dben	PPB	10	2	2 ***	.	1,3-dichlorobenzene
B63	14-dben	PPB	10	2	2 ***	.	1,4-dichlorobenzene
B64	DICHBEN	PPB	10	2	2 ***	.	3,3'-dichlorobenzidine
B65	24-dchp	PPB	10	2	2 ***	.	2,4-dichlorophenol
B66	26-dchp	PPB	10	2	2 ***	.	2,6-dichlorophenol
B67	DIEPHTH	PPB	10	2	2 ***	.	Diethyl phthalate
B68	DIHYSAF	PPB	10	2	2 ***	.	Dihydrosafrole
B69	DIMETHB	PPB	10	2	2 ***	.	3,3'-dimethoxybenzidine
B70	DIMEAMB	PPB	10	2	2 ***	.	P-dimethylaminoazobenzene
B71	DIMBENZ	PPB	10	2	2 ***	.	7,12-dimethylbenz[a]anthracene
B72	DIMEYLB	PPB	10	2	2 ***	.	3,3'-dimethylbenzidine
B73	THIONOX	PPB	10	2	2 ***	.	Thiofanox
B74	DIMPHAM	PPB	10	2	2 ***	.	Alpha, alpha-dimethylphenethylamine
B75	DIMPHTH	PPB	10	2	2 ***	.	2,4-dimethylphenol
B76	OIMPHTH	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	OINPHEN	PPB	10	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	OIOPTH	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	ETHMETH	PPB	10	2	2 ***	.	Ethyl methanesulfonate
B88	FLUORAN	PPB	10	2	2 ***	.	Fluoranthene

TABLE 2. (contd)

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

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
B89	HEXCBEN	PPB	10	2	2 ***	.	Hexachlorobenzene
B90	HEXCBUT	PPB	10	2	2 ***	.	Hexachlorobutadiene
B91	HEXCCYC	PPB	10	2	2 ***	.	Hexachlorocyclopentadiene
B92	HEXCETH	PPB	10	2	2 ***	.	Hexachloroethane
B93	INDENOP	PPB	10	2	2 ***	.	Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	PPB	10	2	2 ***	.	Isosafrole
B95	WALOILE	PPB	10	2	2 ***	.	Malononitrile
B96	WELPHAL	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	METACTO	PPB	10	2	2 ***	.	2-methyl lactonitrile
C04	METACRY	PPB	10	2	2 ***	.	Methyl methacrylate
C05	METMSUL	PPB	10	2	2 ***	.	Methyl methanesulfonate
C06	METPROP	PPB	10	2	2 ***	.	2-methyl-2-(methylthio) propionaldehyde-
C07	METHIOU	PPB	10	2	2 ***	.	Methylthiouracil
C08	NAPHQUI	PPB	10	2	2 ***	.	1,4-naphthoquinone
C09	1-napha	PPB	10	2	2 ***	.	1-naphthylamine
C10	2-napha	PPB	10	2	2 ***	.	2-naphthylamine
C11	NITRANI	PPB	10	2	2 ***	.	P-nitroaniline
C12	NITBENZ	PPB	10	2	2 ***	.	Nitrobenzene
C13	NITPHEN	PPB	10	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-nitrosomethylethylamine
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	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	10	2	2 ***	220 EPAP	Pentachlorophenol
C29	PHENTIN	PPB	10	2	2 ***	220 EPAP	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

TABLE 2. (contd)

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

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
C37	TETRCHB	PPB	10	2	2 ***	.	1,2,4,5-tetrachlorobenzene
C39	TETRCHP	PPB	10	2	2 ***	.	2,3,4,6-tetrachlorophenol
C40	THIURAM	PPB	10	2	2 ***	.	Thiuram
C41	TOLUDIA	PPB	10	2	2 ***	.	Toluenediamine
C42	OTOLHYD	PPB	10	2	2 ***	.	O-toluidine hydrochloride
C43	TRICHLB	PPB	10	2	2 ***	.	1,2,4-trichlorobenzene
C44	245-trp	PPB	10	2	2 ***	.	2,4,5-trichlorophenol
C45	246-trp	PPB	10	2	2 ***	.	2,4,6-trichlorophenol
C46	TRIPHOS	PPB	10	2	2 ***	.	O,O,O-triethyl phosphorothioate
C47	SYMTRIN	PPB	10	2	2 ***	.	Sym-trinitrobenzene
C48	TRIPHOS	PPB	10	2	2 ***	.	Tris(2,3-dibromopropyl) phosphate
C49	BENZOPY	PPB	10	2	2 ***	.	Benzo[a]pyrene
C50	CHLNAPH	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	135TRI	PPB	10	2	2 ***	.	1,3,5-trichlorobenzene
C59	1234TE	PPB	10	2	2 ***	.	1,2,3,4-tetrachlorobenzene
C60	1235TE	PPB	10	2	2 ***	.	1,2,3,5-tetrachlorobenzene
C61	TETEPYR	PPB	100	2	2 ***	.	Tetraethylpyrophosphate
C62	CHLLATE	PPB	100	2	2 ***	.	Chlorobenzilate
C63	CARBPHT	PPB	2	2	2 ***	.	Carbophenothion
C64	DISULFO	PPB	2	2	2 ***	.	Disulfoton
C65	DIMETHO	PPB	5	2	2 ***	.	Dimethoate
C66	METHPAR	PPB	2	2	2 ***	.	Methyl parathion
C67	PARATHI	PPB	2	2	2 ***	.	Parathion
C71	FORMALN	PPB	500	2	2 ***	.	Formalin
C79	KEROSEN	PPB	10000	2	2 ***	.	Kerosene
C81	ETHYGLY	PPB	10000	2	2 ***	.	Ethylene glycol
C86	DIOXIN	PPB	.1	2	2 ***	.	Dioxin
C87	CITRUSR	PPB	1000	2	2 ***	.	Citrus red
C88	CYANBRO	PPB	3000	2	2 ***	.	Cyanogen bromide
C89	CYANCHL	PPB	3000	2	2 ***	.	Cyanogen chloride
C90	PARALDE	PPB	3000	2	2 ***	.	Paraldehyde
C91	STRYCHN	PPB	50	2	2 ***	.	Strychnine
C92	MAHYDR	PPB	500	2	2 ***	.	Maleic hydrazide
C93	NICOTIN	PPB	100	2	2 ***	.	Nicotinic acid
C94	ACRYIDE	PPB	3000	2	2 ***	0 EPAP	Acrylamide
C95	ALLYLAL	PPB	3000	2	2 ***	.	Allyl alcohol
C96	CHLORAL	PPB	3000	2	2 ***	.	Chloral
C97	CHLACET	PPB	3000	2	2 ***	.	Chloroacetaldehyde
C98	CHLPROP	PPB	3000	2	2 ***	.	3-chloropropionitrile
C99	CYANOGN	PPB	3000	2	2 ***	.	Cyanogen
H01	DICPROP	PPB	3000	2	2 ***	.	Dichloropropanol
H03	ETHCARB	PPB	3000	2	2 ***	.	Ethyl carbamate
H04	ETHCYAN	PPB	3000	2	2 ***	.	Ethyl cyanide
H05	ETHOXID	PPB	3000	2	2 ***	.	Ethylene oxide
H06	ETHMETH	PPB	3000	2	2 ***	.	Ethyl methacrylate

TABLE 2. (contd)

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

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
H07	FLUOROA	PPB	3000	2	2 ***	.	Fluoroacetic acid
H08	GLYCIDY	PPB	3000	2	2 ***	.	Glycidylaldehyde
H09	ISOBUTY	PPB	3000	2	2 ***	.	Isobutyl alcohol
H10	METZINE	PPB	3000	2	2 ***	.	Methyl hydrazine
H11	PROPYLA	PPB	3000	2	2 ***	.	N-propylamine
H12	PROPYNO	PPB	3000	2	2 ***	.	2-propyn-1-ol
H15	2,4,6-T	PPB	1	2	2 ***	.	2,4,6-T
H33	FBERYLL	PPB	5	2	2 ***	.	Beryllium, filtered
H34	FOSMIUM	PPB	300	2	2 ***	.	Osmium, filtered
H35	FSTRONT	PPB	300	2	2 ***	.	Strontium, filtered
H36	FANTIMO	PPB	100	2	2 ***	.	Antimony, filtered
H40	FTHALLI	PPB	10	2	2 ***	.	Thallium, filtered

*** - Indicates all samples were below detection limits

xxx - Indicates that regulatory limits were exceeded

EPA - based on limits given in 40CFR 265, Appendix III,

EPA Interim Primary Drinking Water Standards

EPAP - based on proposed Maximum Contaminant Levels

Solid Horizontal Line represents Detection Limit

Wells near the Trenches
Constituent=A80 CHLFORM PPB EPA Limit=.

Wells further from the Trenches
Constituent=A80 CHLFORM PPB

FIGURE 2. Chloroform Concentrations in Samples from Monitoring Wells for the 300 Area Process Trenches, June 1985 through November 1986

Solid Horizontal Line represents Detection Limit

Wells near the Trenches
Constituent=111 BETA PCI/L Screening Limit=50

Wells further from the Trenches
Constituent=111 BETA PCI/L Screening Limit=50

FIGURE 3. Gross Beta Concentrations in Samples from Monitoring Wells for the 300 Area Process Trenches, June 1985 through November 1986

Solid Horizontal Line represents Detection Limit

Wells near the Trenches
Constituent=212 LOALPHA PCI/L Screening Limit=15

Wells further from the Trenches
Constituent=212 LOALPHA PCI/L Screening Limit=15

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FIGURE 4. Gross Alpha Concentrations in Samples from Monitoring Wells for the 300 Area Process Trenches, June 1985 through November 1986

months. Gross alpha levels also increased during the quarter in samples from well 399-4-7. Although the gross alpha levels in samples from several 300 Area wells are above the 15 pCi/L limit specified in the Drinking Water regulations, analyses for natural uranium conducted on samples from two wells during the last quarter showed that uranium is present in the ground water in this area and that it may account for most of the gross alpha. It is therefore suspected that subtraction of uranium concentrations from the gross alpha concentrations (as required in the Drinking Water regulations) would bring the gross alpha levels below the regulatory guideline in all cases.

Nitrate concentrations in samples collected from the wells near the trenches fluctuated considerably during the quarter but showed an overall general decline from the previous reporting period (Figure 5). Nitrate concentrations in well 399-1-8, which taps a lower zone in the unconfined aquifer, also continued to decline through the quarter.

Cadmium levels were reported above the detection limit in samples collected from wells 399-1-8, 399-4-1, and 699-S30-E15A during October (Figure 6). November results indicated that the cadmium levels had returned to below detection limits in all three wells.

Ammonium values reported for the October samples increased considerably over the previous month (Figure 7). The instrument and method were examined carefully and no problems were found. Since a similar pattern was observed in the ammonium results for samples collected from the 100-H Area wells (as discussed in a later chapter), it appears that the samples for the month of October may have somehow been contaminated after collection. Whatever the case, the results for the November samples were once again below the detection limit.

Since field filtering of samples began in September 1986, the analytical results for metals in the unfiltered samples from well 399-3-7 have been higher than for the filtered samples; this is the only well so far to consistently show a difference between filtered and unfiltered samples. Although the observed difference between results of filtered and unfiltered samples might be expected to be indicative of a large amount of suspended solids in the water

Solid Horizontal Line represents Detection Limit

Wells near the Trenches
Constituent=C72 NITRATE PPB EPA Limit=45000

Wells further from the Trenches
Constituent=C72 NITRATE PPB

FIGURE 5. Nitrate Concentrations in Samples from Monitoring Wells for the 300 Area Process Trenches, June 1985 through November 1986

Solid Horizontal Line represents Detection Limit

Wells near the Trenches
Constituent=A07 CADMIUM PPB EPA Limit=10

Wells further from the Trenches
Constituent=A07 CADMIUM PPB

FIGURE 6. Cadmium Concentrations in Samples from Monitoring Wells for the 300 Area Process Trenches, June 1985 through November 1986

Solid Horizontal Line represents Detection Limit

Wells near the Trenches
Constituent=C80 AMMONIU PPB EPA Limit=.

Wells further from the Trenches
Constituent=C80 AMMONIU PPB

FIGURE 7. Ammonium Concentrations in Samples from Monitoring Wells for the 300 Area Process Trenches, June 1985 through November 1986

discharged from this well, the sample collection personnel have not noted the water as being heavily laden with sediment.

Tests that have been conducted on the field filters now in use have not shown any filter contamination; however, some filtered samples from well 399-1-8 have shown higher metals results than the unfiltered samples. There is no clear explanation for this yet, but further checking will be done.

183-H SOLAR EVAPORATION BASINS

Two recently issued reports (USDOE 1986b and USDOE 1986d) contain information on the progress made and the data obtained by the RCRA Compliance Ground-Water Monitoring Project for the 183-H Solar Evaporation Basins during the time period from June 1985 through September 30, 1986. This report includes information on subsequent activities and data.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Extensive drilling and hydrogeologic characterization activities were conducted during this reporting period, and installation of 16 new wells was completed as per the milestone in the October 1, 1986, Consent Agreement and Compliance Order. The next two sections of this chapter contain discussions of these activities.

Well Drilling Effort

Expansion of the monitoring project through installation of 16 new wells began during the last reporting period, in August 1986. Locations of the new wells being installed under this drilling effort are shown on Figure 8. Four wells, W1 through W4, were completed last quarter and were discussed in the last progress report (USDOE 1986b); the remaining 12 wells were completed during this reporting period and are discussed below. A summary of completion information for all 16 wells is presented in Table 3.

At the beginning of this reporting period, completion work was being conducted on three wells: C1C, C2C, and C3C. Drilling of well W5 was also in progress at that time.

As described in the last progress report (USDOE 1986b), a multiple-completion strategy had been chosen for the deepest well, C2C. Four, 2-in.-diameter piezometers (each with a 2-ft screen) were placed in this well. Locations of the completion intervals are shown on the geologist's diagram in Figure 9. Special care was taken during installation of these piezometers to ensure that adequate seals were placed between each of the completion zones. The intervals between the piezometers were sealed with

FIGURE 8. Well Location Map for the 100-H Area

TABLE 3. Summary of Completion Information for Wells Installed in the 100-H Area During the Period from August 12 Through December 5, 1986

Temporary Well Number	Completion Date	Drilled Depth ^(a)	Depth to Bottom ^(a)	Initial Depth to Water ^(a)	Depth to Ringold Contact ^(a)	Depth of Screened Interval ^(a)
W1	9-22-86	55'	53'	43'	54'	38'-53'
W2	9-11-86	55'	48'	44'	48'	38'-48'
W3	9-24-86	51'	46'	43'	46.5'	36'-46'
W4	9-22-86	38'	38'	29'	38'	23'-38'
W5	10-10-86	59'	53'	43'	59'	38'-53'
W6	11-20-86	61'	52'	42'	59'	37'-52'
W7	11-20-86	--(b)	--(b)	--(b)	--(b)	--(b)
W7 (R) ^(c)	12-05-86	60'	53'	43'	59'	38'-53'
C1A	10-27-86	--(b)	--(b)	--(b)	--(b)	--(b)
C1A (R) ^(c)	11-04-86	52'	48'	38'	51'	33'-48'
C1B	10-27-86	--(b)	--(b)	--(b)	--(b)	--(b)
C1B (R) ^(c)	11-11-86	51'	50'	37'	50.5'	45'-50'
C1C	10-03-86	220'	82'	36'	50'	72'-82'
C2A	11-11-86	46'	42'	32'	44'	27'-42'
C2B	11-19-86	44'	42'	30'	43'	37'-42'
C2C (P1) ^(d)	10-29-86	330'	327'	flowing/ capped	46'	325'-327'
(P2) ^(d)	10-29-86	330'	297'	0.25'	46'	295'-297'
(P3) ^(d)	10-29-86	330'	196'	27.5'	46'	194'-196'
(P4) ^(d)	10-29-86	330'	80'	30.5	46'	78'-80'
C3A	11-04-86	56'	51'	41'	55'	36'-51'
C3B	11-14-86	58'	55'	40.5'	56'	50'-55'
C3C	10-15-86	155'	110'	41'	55'	100'-110'

(a) All depths are given relative to land surface.

(b) This well was abandoned and backfilled.

(c) R = Replacement.

(d) P = Piezometer.

bentonite slurry and bentonite pellets, with one exception: the interval between piezometers 1 and 2 was sealed with bentonite pellet seals and a neat^(a) cement grout. The cement seal was judged to be needed for meeting the Washington State standard concerning sealing of artesian wells, as specified in Chapter 173-160 of the Washington Administrative Code (Washington State

(a) Neat cement is concrete that does not contain aggregate.

199-H4-15C

LOG OF BOREHOLE AND MONITOR WELL CONSTRUCTION

BOREHOLE OR WELL NO. C2C

PROJECT RCEA GW Monitoring GEOLOGIST TL WIKALA PAGE 1 OF 2

LOCATION DESCRIPTION OR COOR. 100-H DATE: STARTED 8-12-86 COMPLETED 10-29-86

DRILLING COMPANY Onwego DRILLERS' NAMES K. Olson AND —

DRILLING METHOD(S) Cable Tool DRILL RIG —

DRILLING FLUID Water TEMPORARY CASING OR AUGER: TYPE Carbon Steel INSIDE DIA. 12"/10"

DRILL BITS: TYPE Drive Barrel / Hand Tool OUTSIDE DIA. 8"/10" SURVEYED GROUND ELEVATION —

Revised/Approved J.P. Raymond 11/6/86

CIRCULATION		CONSTRUCTION DATA		DEPTH - IN FT	DIAGRAM LITHOL.	GEOLOGIC AND HYDROLOGIC	
RETURN IN GPM	LOSS GPM	DESCRIPTION	DIAGRAM ANNULUS WELL			DESCRIPTION AND COMMENTS	% Core & Box No.
		12" carbon steel casing (removed)	11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100	Sandy Gravel. Basaltic pebbles and cobbles mixed with brownish gray fine to medium sand. Silt lenses @ 4'-5' Slightly moist @ 19'-25' Static water level @ 31' Coarse Sandy Gravel Silty Sandy Gravel. Gravel is clay (brownish gray) Top of Ringold contact @ 46' Reddish Brown Silty Gravel Gravelly silt Gravelly clayey silt Gravelly silt Paler Yellow Silty Sand, Sand is heavy Reddish Brown Silty Sand with clay and caliche Clayey silt with sand and caliche Yellowish Brown Silty Sand with Clay Reddish Brown Silty Sand with Clay Yellowish Brown Silty Sand with Clay and caliche Silty Sand with Clay Reddish Brown Clayey Sandy Silt		
		10" carbon steel casing (removed)	101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200	0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100			
		Completion Symbols + Granular Seal / Granular Bentonite Seal x Bentonite Pallet Seal E Bentonite Slurry Seal o Artificial Sand Pack O Natural Pack (Gravel)				Lithologic Symbols - Clay - Silt - Sand o Gravel o Gravel w/ weathering rinds o Caliche	

FIGURE 9. Geologist's Diagram for Well C2C

BOREHOLE OR WELL NO. C2C

GEOLOGIST: T. L. WIKALA

PAGE 2 OF 2

Received / approved J R Raymond 11/5/88

FIGURE 9. (contd)

Department of Ecology 1973). Setting of the seals and piezometers was a time-consuming process, and completion of this well took about 6 weeks. At the time of completion (October 29, 1986), the approximate depth to water in each of the four piezometers was as follows:

- Piezometer 1: flowing above the land surface, subsequently capped
- Piezometer 2: about 0.3 ft below the land surface
- Piezometer 3: about 27.5 ft below the land surface
- Piezometer 4: about 30.5 ft below land surface.

The geologist's log, drilling log, and inspection record for this well are contained in Volume 2, Appendix B, pages B.434 through B.574.

The other two deep wells, C1C and C3C, were both completed within the Ringold Formation. Well C1C had been drilled to a depth of about 220 ft prior to selection of the completion interval (72 to 82 ft below land surface). Therefore, the first step in completion of the well was backfilling of the hole with a bentonite slurry seal to a depth of about 92 ft. A 5-ft bentonite pellet seal was placed next, and then the artificial sand pack and screen were set. The hydraulic head in this well at the time of completion was measured at a depth of about 38 ft below land surface. Figure 10 is the geologist's diagram for this well showing the types of materials penetrated and some well construction information. The geologist's log, drilling log, and inspection record for this well are contained in Volume 2, Appendix B pages B.363 through B.433.

Well C3C had been drilled to a depth of 155 ft before the completion interval (100 to 110 ft) was chosen. Therefore, the first step in well completion was backfilling of the hole with a bentonite slurry seal to a depth of about 118 ft. A 2-ft bentonite pellet seal was placed next, and then the artificial sand pack and screen were set. The hydraulic head in this well at the time of completion was measured at a depth of about 41 ft below the land surface. Figure 11 is the geologist's diagram showing the types of materials penetrated and some well completion information. The geologist's log, drilling log, and inspection record for this well are contained in Volume 2, Appendix B, pages B.277 through B.362.

199-144-12C
LOG OF BOREHOLE AND MONITOR WELL CONSTRUCTION

BOREHOLE OR WELL NO. C1C

PROJECT RCRA G-W Monitoring GEOLOGIST Jim LUKALA PAGE 1 OF 2

LOCATION DESCRIPTION OR COOR. 100-H DATE: STARTED 8-12-86 COMPLETED 10-3-86

DRILLING COMPANY Onvco DRILLERS' NAMES L. Bultena AND

DRILLING METHOD(S) Cable Tool DRILL RIG

DRILLING FLUID Water TEMPORARY CASING OR AUGER: TYPE Carbon Steel INSIDE DIA. 12"/10"

DRILL BITS: TYPE Drive Barrel / Hard Tool OUTSIDE DIA. 3"/10" SURVEYED GROUND ELEVATION

Reviewed/Approved J.R. Raymond 10/9/86

CIRCULATION		CONSTRUCTION DATA		DEPTH		GEOLOGIC AND HYDROLOGIC	
RETURN IN GPM	LOSS GPM	DESCRIPTION	DIAGRAM	IN FT	DIAGRAM LITHOL.	DESCRIPTION AND COMMENTS	% Core & Box No.
			ANNULUS WELL				
		12" carbon steel casing (removed)		0 10 20 22		Sandy Gravel, Basaltic pebbles and cobbles mixed with brown medium sand. Silt lens b/w 5'-10' Sandy Gravel with grey medium sand Slightly moist (starting @ 34') Static water level @ 26' Below land surface Silty Sandy Gravel, chunks of caliche Top of Ringold contact @ 50'	
		6" SS 304 casing		22 24 26 28		Reddish Brown Silty Gravel Gravelly silt with clay	
		10" carbon steel casing (removed)		28 30 32 34		Gravelly Clayey Silt Gravelly Silt	
		6" (10 dot) SS 304 screen		34 36 38		Silty Sand (heaving)	
				38 40 42		Silty Sand with caliche	
				42 44 46		Silty Sand with caliche and clay	
				46 48 50		Reddish Brown Silty Sand with caliche and clay	
				50 52 54		Yellow silt and clay with caliche	
				54 56 58		Yellowish Brown Clayey Silt	
				58 60 62		Light Brown Clayey Silt	
				62 64 66		Sandy Silt with Clay	
				66 68 70		Clay Silt Sand	
				70 72 74		Gravel Gravel w/ weathering rind	
				74 76 78		caliche	

Completion Symbols

- + Concrete Seal
- / Granular Bentonite Seal
- x Bentonite Pellet Seal
- z Bentonite Slurry Seal
- o Artificial Sand Pack
- o Natural Pack (Gravel)

Lithologic Symbols

- ~ Clay
- Silt
- o Sand
- o Gravel
- o Gravel w/ weathering rind
- o caliche

FIGURE 10. Geologist's Diagram for Well C1C

BOREHOLE OR WELL NO. C1C

PROJECT RCRA G-W Monitoring

GEOLOGIST TL LIEKALA

PAGE 2 OF 2

Received / approved J R Raymond 10/9/86

Completion Symbols

- + Concrete Seal
- / Granular Bentonite Seal
- x Bentonite Ballast Seal
- z Bentonite Slurry Seal
- Artificial Sand Pack
- o Natural Pack (Gravel)

Lithologic Symbols

2	Clay	0	Gravel
-	Silt	0	Gravel w/ weathering rinds
.	Sand	0	Caliche

FIGURE 10. (contd)

199-H3-2C
LOG OF BOREHOLE AND MONITOR WELL CONSTRUCTION

BOREHOLE OR WELL NO. C3C
PROJECT PCA G-W Monitoring GEOLOGIST TL LUKALA PAGE 1 OF 1
LOCATION DESCRIPTION OR COOR. 100-H DATE: STARTED 8-12-86 COMPLETED 10-15-86
DRILLING COMPANY Onwego DRILLERS' NAMES D. Garcia AND —
DRILLING METHOD(S) Cable Tool DRILL RIG —
DRILLING FLUID Water TEMPORARY CASING OR AUGER: TYPE Carbon Steel INSIDE DIA. 12"
DRILL BITS: TYPE Drive Barrel / Hard Tool OUTSIDE DIA. 8" / 10" SURVEYED GROUND ELEVATION —
Reviewed/Approved 10/21/86 J.L. Raymond

CIRCULATION		CONSTRUCTION DATA		DEPTH	GEOLOGIC AND HYDROLOGIC		
RETURN IN GPM	LOSS GPM	DESCRIPTION	DIAGRAM ANNULUS WELL	IN FT	DIAGRAM LITHOL.	DESCRIPTION AND COMMENTS	% Core & Box No.
		12" carbon steel casing (removed)	///	5	0 0	Sandy Gravels. Basaltic pebbles and cobbles mixed with brown fine sand.	
			///	12	0 0	Weathering rinds on some clasts @ 15'	
			///	15	0 0 0		
			///	20	0 0 0		
			///	25	0 0		
			///	30	0 0	Sandy Gravel with brownish gray medium sand.	
			///	35	0 0		
			///	40	0 0 0	Slightly moist @ 29'	
			///	45	0 0 0	Static water level @ 41' below land surface	
			///	50	0 0 0		
			///	55	0 0	Top of Ringold contact @ 55'	
			///	60	0 0 0	Clayey Sandy Gravel	
			///	65	0 0 0	Brown Silty Sand with clay and caliche	
			///	70	0 0 0		
			///	75	0 0 0	Clayey Sandy Silt	
			///	80	0 0 0	Reddish Brown Sandy Silt	
			///	85	0 0 0	Reddish Brown heavy sandy silt	
			///	90	0 0 0		
			///	95	0 0 0	Yellowish Brown Clayey Silty Sand with caliche and basaltic and granitic clast	
			///	100	0 0 0		
			///	105	0 0 0	Reddish Brown Gravelly Silty Sand	
			///	110	0 0 0	Clasts of basalt, caliche, and quartzite	
			///	115	0 0 0	Brown clayey silty sand with granules and small pebbles	
			///	120	0 0 0	Reddish Brown Clayey Silty Sand with caliche	
			///	125	0 0 0		
			///	130	0 0 0		
			///	135	0 0 0		
			///	140	0 0 0		
			///	145	0 0 0		
			///	150	0 0 0	Reddish Brown Clayey Silty Sand with caliche	
			///	155	0 0 0		
			///	160	0 0 0		
			///	165	0 0 0		
			///	170	0 0 0		
			///	175	0 0 0		
			///	180	0 0 0		
			///	185	0 0 0		
			///	190	0 0 0		
			///	195	0 0 0		
			///	200	0 0 0		
			///	205	0 0 0		
			///	210	0 0 0		
			///	215	0 0 0		
			///	220	0 0 0		
			///	225	0 0 0		
			///	230	0 0 0		
			///	235	0 0 0		
			///	240	0 0 0		
			///	245	0 0 0		
			///	250	0 0 0		
			///	255	0 0 0		
			///	260	0 0 0		
			///	265	0 0 0		
			///	270	0 0 0		
			///	275	0 0 0		
			///	280	0 0 0		
			///	285	0 0 0		
			///	290	0 0 0		
			///	295	0 0 0		
			///	300	0 0 0		
			///	305	0 0 0		
			///	310	0 0 0		
			///	315	0 0 0		
			///	320	0 0 0		
			///	325	0 0 0		
			///	330	0 0 0		
			///	335	0 0 0		
			///	340	0 0 0		
			///	345	0 0 0		
			///	350	0 0 0		
			///	355	0 0 0		
			///	360	0 0 0		
			///	365	0 0 0		
			///	370	0 0 0		
			///	375	0 0 0		
			///	380	0 0 0		
			///	385	0 0 0		
			///	390	0 0 0		
			///	395	0 0 0		
			///	400	0 0 0		
			///	405	0 0 0		
			///	410	0 0 0		
			///	415	0 0 0		
			///	420	0 0 0		
			///	425	0 0 0		
			///	430	0 0 0		
			///	435	0 0 0		
			///	440	0 0 0		
			///	445	0 0 0		
			///	450	0 0 0		
			///	455	0 0 0		
			///	460	0 0 0		
			///	465	0 0 0		
			///	470	0 0 0		
			///	475	0 0 0		
			///	480	0 0 0		
			///	485	0 0 0		
			///	490	0 0 0		
			///	495	0 0 0		
			///	500	0 0 0		
			///	505	0 0 0		
			///	510	0 0 0		
			///	515	0 0 0		
			///	520	0 0 0		
			///	525	0 0 0		
			///	530	0 0 0		
			///	535	0 0 0		
			///	540	0 0 0		
			///	545	0 0 0		
			///	550	0 0 0		
			///	555	0 0 0		
			///	560	0 0 0		
			///	565	0 0 0		
			///	570	0 0 0		
			///	575	0 0 0		
			///	580	0 0 0		
			///	585	0 0 0		
			///	590	0 0 0		
			///	595	0 0 0		
			///	600	0 0 0		
			///	605	0 0 0		
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			///	650	0 0 0		
			///	655	0 0 0		
			///	660	0 0 0		
			///	665	0 0 0		
			///	670	0 0 0		
			///	675	0 0 0		
			///	680	0 0 0		
			///	685	0 0 0		
			///	690	0 0 0		
			///	695	0 0 0		
			///	700	0 0 0		
			///	705	0 0 0		
			///	710	0 0 0		
			///	715	0 0 0		
			///	720	0 0 0		
			///	725	0 0 0		
			///	730	0 0 0		
			///	735	0 0 0		
			///	740	0 0 0		
			///	745	0 0 0		
			///	750	0 0 0		
			///	755	0 0 0		
			///	760	0 0 0		
			///	765	0 0 0		
			///	770	0 0 0		
			///	775	0 0 0		
			///	780	0 0 0		
			///	785	0 0 0		
			///	790	0 0 0		
			///	795	0 0 0		
			///	800	0 0 0		
			///	805	0 0 0		
			///	810	0 0 0		
			///	815	0 0 0		
			///	820	0 0 0		
			///	825	0 0 0		
			///	830	0 0 0		
			///	835	0 0 0		
			///	840	0 0 0		
			///	845	0 0 0		
			///	850	0 0 0		
			///	855	0 0 0		
			///	860	0 0 0		
			///	865	0 0 0		
			///	870	0 0 0		
			///	875	0 0 0		
			///	880	0 0 0		
			///	885	0 0 0		
			///	890	0 0 0		
			///	895	0 0 0		
			///	900	0 0 0		
			///	905	0 0 0		
			///	910	0 0 0		
			///	915	0 0 0		
			///	920	0 0 0		
			///	925	0 0 0		
			///	930	0 0 0		
			///	935	0 0 0		
			///	940	0 0 0		
			///	945	0 0 0		
			///	950	0 0 0		
			///	955	0 0 0		
			///	960	0 0 0		
			///	965	0 0 0		
			///	970	0 0 0		
			///	975	0 0 0		
			///	980	0 0 0		
			///	985	0 0 0		
			///	990	0 0 0		
			///	995	0 0 0		
			///	1000	0 0 0		

Completion Symbols
+ Concrete Seal
/ Granular Bentonite Seal
X Bentonite Pallet Seal
B Bentonite Slurry Seal
• Artificial Sand Pack
O Natural Pack (Gravel)

Lithologic Symbols
~ Clay
- Silt
• Sand
o Gravel
o Gravel w/ weathering rinds
o Caliche

FIGURE 11. Geologist's Diagram for Well C3C

Drilling of well W5 was in progress at the beginning of this reporting period. Although this well (along with all of the other shallow wells) was designed to be completed at the top of the aquifer, it was drilled to the top of the Ringold Formation before completion to verify the presence and continuity of the silts and clays beneath the area. The Ringold contact was noted in this well at a depth of about 59 ft below land surface, with a change from gravelly sand to clays and silts. Well W5 was completed according to specifications, with a stainless-steel screen set from 38 to 53 ft. (The water table at that time was at a depth of about 43 ft.) Figure 12 is the geologist's diagram for this well showing the types of materials penetrated and some well construction information. The geologist's log, drilling log, and inspection record for this well are contained in Volume 2, Appendix B, on pages B.245 through B.276.

Following completion of wells C2C, C3C, and W5, the drilling rigs were moved and work was initiated on the three shallow cluster wells: C2A, C3A, and C1A. The fourth rig was moved offsite after completion of well C1C.

Installation of two of the three shallow cluster wells (wells C2A and C3A) was accomplished without difficulties; however, completion problems were encountered during installation of the third shallow cluster well, C1A. In particular, the stainless-steel casing and screen shifted vertically during the removal of the temporary casing. The integrity of the structure was therefore questionable, and the decision was made to abandon and backfill well C1A and to install a replacement well. The replacement well, labeled "C1A (Replacement)," was installed approximately 25 ft northwest of the original location. The geologist's diagrams for wells C1A, C1A (Replacement), C2A, and C3A are presented in Figures 13 through 16. Appendix B in Volume 2 (pages B.133 through B.244) contains the geologist's logs, drilling logs, and inspection records for this group of wells.

The intermediate cluster wells (C1B, C2B, and C3B) were drilled next. Installation of these wells proceeded smoothly, although the location of one well (C1B) had to be changed to avoid potential traffic hazards. The starter casing for this well had been installed prior to this decision, so it was pulled and the hole was abandoned and backfilled before the replacement well

199-44-11

BOREHOLE OR WELL NO. WS

PROJECT RCRA Co-W Monitoring

GEOLOGIST - T. LILKALA

PAGE 1 OF

LOCATION DESCRIPTION OR COOR. 100-H Area

DATE: STARTED 9-23-86 COMPLETED 10-10-86

DRILLING COMPANY Onwego Drilling

DRILLERS' NAMES D. Luc Fle

DRILLING METHOD(S) Cable Tool

DRILL RIG

DRILLING FLUID Water

TEMPORARY CASING OR AUGER: TYPE

INSIDE DIA. 14" / 10"

DRILL BITS: TYPE Drive Barrel / Hard Tool

OUTSIDE DIA. 8" / 10"

SURVEYED GROUND ELEVATION

Reviewed/Approved 10/27/86 J.P. Raymond

CIRCULATION		CONSTRUCTION DATA		GEOLOGIC AND HYDROLOGIC			
RETURN IN GPM	LOSS GPM	DESCRIPTION	DIAGRAM ANNULUS WELL	DEPTH IN FT	DIAGRAM LITHOL.	DESCRIPTION AND COMMENTS	± Core & Box No.
		7 1/2" carbon steel casing (surface pipe) (removed)	///	5	0.0 0.0	Brownish gray sandy Gravel. <u>caution</u>	
		6" ss 3rd casing	///	10	0.0 0.0	Brown Sandy Gravel	
		10" carbon steel casing (removed)	///	15	0.0 0.0		
		6" (20 slot) ss sand screen	///	20	0.0 0.0		
		10" (4 1/2" size) aquifer testing screen	///	25	0.0 0.0	Dark Brown Gravelly Sand. Moist, coarse sand with pebbles	
			///	30	0.0 0.0	Dark Grey Moist Fine Sand. Looks like decayed organic material @ 25'	
			///	35	0.0 0.0	Sticky Water Level @ 42'	
			///	40	0.0 0.0	Sandy Gravel. grayish brown sand and brown pebbles	
			///	45	0.0 0.0	Dark Grey Moist fine sand. looks like decayed material @ 45'	
			///	50	0.0 0.0	Dark Grey Gravelly Sand @ 49'	
			///	55	0.0 0.0	Top of Ringold Contact @ 59'	
			///	60	0.0 0.0		
			///	65	0.0 0.0		
			///	70	0.0 0.0		
			///	75	0.0 0.0		
			///	80	0.0 0.0		
			///	85	0.0 0.0		
			///	90	0.0 0.0		
			///	95	0.0 0.0		
			///	100	0.0 0.0		
			///	105	0.0 0.0		
			///	110	0.0 0.0		
			///	115	0.0 0.0		
			///	120	0.0 0.0		
			///	125	0.0 0.0		
			///	130	0.0 0.0		
			///	135	0.0 0.0		
			///	140	0.0 0.0		
			///	145	0.0 0.0		
			///	150	0.0 0.0		
			///	155	0.0 0.0		
			///	160	0.0 0.0		
			///	165	0.0 0.0		
			///	170	0.0 0.0		
			///	175	0.0 0.0		
			///	180	0.0 0.0		
			///	185	0.0 0.0		
			///	190	0.0 0.0		
			///	195	0.0 0.0		
			///	200	0.0 0.0		
			///	205	0.0 0.0		
			///	210	0.0 0.0		
			///	215	0.0 0.0		
			///	220	0.0 0.0		
			///	225	0.0 0.0		
			///	230	0.0 0.0		
			///	235	0.0 0.0		
			///	240	0.0 0.0		
			///	245	0.0 0.0		
			///	250	0.0 0.0		
			///	255	0.0 0.0		
			///	260	0.0 0.0		
			///	265	0.0 0.0		
			///	270	0.0 0.0		
			///	275	0.0 0.0		
			///	280	0.0 0.0		
			///	285	0.0 0.0		
			///	290	0.0 0.0		
			///	295	0.0 0.0		
			///	300	0.0 0.0		
			///	305	0.0 0.0		
			///	310	0.0 0.0		
			///	315	0.0 0.0		
			///	320	0.0 0.0		
			///	325	0.0 0.0		
			///	330	0.0 0.0		
			///	335	0.0 0.0		
			///	340	0.0 0.0		
			///	345	0.0 0.0		
			///	350	0.0 0.0		
			///	355	0.0 0.0		
			///	360	0.0 0.0		
			///	365	0.0 0.0		
			///	370	0.0 0.0		
			///	375	0.0 0.0		
			///	380	0.0 0.0		
			///	385	0.0 0.0		
			///	390	0.0 0.0		
			///	395	0.0 0.0		
			///	400	0.0 0.0		
			///	405	0.0 0.0		
			///	410	0.0 0.0		
			///	415	0.0 0.0		
			///	420	0.0 0.0		
			///	425	0.0 0.0		
			///	430	0.0 0.0		
			///	435	0.0 0.0		
			///	440	0.0 0.0		
			///	445	0.0 0.0		
			///	450	0.0 0.0		
			///	455	0.0 0.0		
			///	460	0.0 0.0		
			///	465	0.0 0.0		
			///	470	0.0 0.0		
			///	475	0.0 0.0		
			///	480	0.0 0.0		
			///	485	0.0 0.0		
			///	490	0.0 0.0		
			///	495	0.0 0.0		
			///	500	0.0 0.0		
			///	505	0.0 0.0		
			///	510	0.0 0.0		
			///	515	0.0 0.0		
			///	520	0.0 0.0		
			///	525	0.0 0.0		
			///	530	0.0 0.0		
			///	535	0.0 0.0		
			///	540	0.0 0.0		
			///	545	0.0 0.0		
			///	550	0.0 0.0		
			///	555	0.0 0.0		
			///	560	0.0 0.0		
			///	565	0.0 0.0		
			///	570	0.0 0.0		
			///	575	0.0 0.0		
			///	580	0.0 0.0		
			///	585	0.0 0.0		
			///	590	0.0 0.0		
			///	595	0.0 0.0		
			///	600	0.0 0.0		
			///	605	0.0 0.0		
			///	610	0.0 0.0		
			///	615	0.0 0.0		
			///	620	0.0 0.0		
			///	625	0.0 0.0		
			///	630	0.0 0.0		
			///	635	0.0 0.0		
			///	640	0.0 0.0		
			///	645	0.0 0.0		
			///	650	0.0 0.0		
			///	655	0.0 0.0		
			///	660	0.0 0.0		
			///	665	0.0 0.0		
			///	670	0.0 0.0		
			///	675	0.0 0.0		
			///	680	0.0 0.0		
			///	685	0.0 0.0		
			///	690	0.0 0.0		
			///	695	0.0 0.0		
			///	700	0.0 0.0		
			///	705	0.0 0.0		
			///	710	0.0 0.0		
			///	715	0.0 0.0		
			///	720	0.0 0.0		
			///	725	0.0 0.0		
			///	730	0.0 0.0		
			///	735	0.0 0.0		
			///	740	0.0 0.0		
			///	745	0.0 0.0		
			///	750	0.0 0.0		
			///	755	0.0 0.0		
			///	760	0.0 0.0		
			///	765	0.0 0.0		
			///	770	0.0 0.0		
			///	775	0.0 0.0		
			///	780	0.0 0.0		
			///	785	0.0 0.0		
			///	790	0.0 0.0		
			///	795	0.0 0.0		
			///	800	0.0 0.0		
			///	805	0.0 0.0		
			///	810	0.0 0.0		
			///	815	0.0 0.0		
			///	820	0.0 0.0		
			///	825	0.0 0.0		
			///	830	0.0 0.0		
			///	835	0.0 0.0		
			///	840	0.0 0.0		
			///	845	0.0 0.0		
			///	850	0.0 0.0		
			///	855	0.0 0.0		
			///	860	0.0 0.0		
			///	865	0.0 0.0		
			///	870	0.0 0.0		
			///	875	0.0 0.0		
			///	880	0.0 0.0		
			///	885	0.0 0.0		
			///	890	0.0 0.0		
			///	895	0.0 0.0		
			///	900	0.0 0.0		
			///	905	0.0 0.0		
			///	910	0.0 0.0		
			///	915	0.0 0.0		
			///	920	0.0 0.0		
			///	925	0.0 0.0		
			///	930	0.0 0.0		
			///	935	0.0 0.0		
			///	940	0.0 0.0		
			///	945	0.0 0.0		
			///	950	0.0 0.0		
			///	955	0.0 0.0		
			///	960	0.0 0.0		
			///	965	0.0 0.0		
			///	970	0.0 0.0		
			///	975	0.0 0.0		
			///	980	0.0 0.0		
			///	985	0.0 0.0		
			///	990	0.0 0.0		
			///	995	0.0 0.0		
			///	1000	0.0 0.0		
			///	1005	0.0 0.0		
			///	1010	0.0 0.0		
			///	1015	0.0 0.0		
			///	1020	0.0 0.0		
			///	1025	0.0 0.0		
			///	1030	0.0 0.0		
			///	1035	0.0 0.0		
			///	1040	0.0 0.0		
			///	1045	0.0 0.0		
			///	1050	0.0 0.0		
			///	1055	0.0 0.0		
			///	1060	0.0 0.0		
			///	1065	0.0 0.0		
			///	1070	0.0 0.0		
			///	1075	0.0 0.0		
			///	1080	0.0 0.0		
			///	1085	0.0 0.0		
			///	1090	0.0 0.0		
			///	1095	0.0 0.0		
			///	1100	0.0 0.0		
			///	1105	0.0 0.0		
			///	1110	0.0 0.0		
			///	1115	0.0 0.0		
			///	1120	0.0 0.0		
			///	1125	0.0 0.0		
			///	1130	0.0 0.0		
			///	1135	0.0 0.0		
			///	1140	0.0 0.0		
			///	1145	0.0 0.0		
			///	1150	0.0 0.0		
			///	1155	0.0 0.0		
			///	1160	0.0 0.0		
			///	1165	0.0 0.0		
			///	1170	0.0 0.0		
			///	1175	0.0 0.0		
			///	1180	0.0 0.0		
			///	1185	0.0 0.0		
			///	1190	0.0 0.0		
			///	1195	0.0 0.0		
			///	1200	0.0 0.0		
			///	1205	0.0 0.0		

FIGURE 12. Geologist's Diagram for Well W5

LOG OF BOREHOLE AND MONITOR WELL CONSTRUCTION

BOREHOLE OR WELL NO. CIAPROJECT RCRA GW MonitoringGEOLOGIST FL - LIKALAPAGE 1 OF 1LOCATION DESCRIPTION OR COOR. 100-HDATE: STARTED 10-10-86 COMPLETED 10-27-86DRILLING COMPANY Onwego DrillingDRILLERS' NAMES D. Luttke AND —DRILLING METHOD(S) Cable ToolDRILL RIG —DRILLING FLUID Water

TEMPORARY CASING OR AUGER: TYPE

Carbon SteelINSIDE DIA. 1 1/2" / 10"DRILL BITS: TYPE Drive Barrel / Hard ToolOUTSIDE DIA. 3" / 10"SURVEYED GROUND ELEVATION —Reviewed/approved J.R. Raymond 11/6/86 Reviewed by CIA Representative

CIRCULATION		CONSTRUCTION DATA		DEPTH IN FT	GEOLOGIC AND HYDROLOGIC		
RETURN IN GPM	LOSS GPM	DESCRIPTION	DIAGRAM ANNULUS WELL		DIAGRAM LITHOL.	DESCRIPTION AND COMMENTS	% Core & Box No.
		10" carbon steel casing (removed)	11	5	0-0	Brown Silty Sandy Gravel. Backfill.	
		6" 45 304 casing (removed)	11	10	0-0	lt Brownish Grey Sandy Gravel	
			11	15	0-0	Silty Sandy Gravel	
			11	20	0-0	Brownish Grey Sandy Gravel	
		6" (20 slot) SS 304 screen (removed)	11	25	0-0	Static water level @ 35'	
		10" (telescope size) aquifer testing screen	11	30	0-0	Sandy Gravel. C-M sands from lens present	
			11	35	0-0	Top of Argillid Contact @ 51.5'	
			11	40	0-0		
			11	45	0-0		
			11	50	0-0		
			11	55	0-0		
			11	60	0-0		
			11	65	0-0		
			11	70	0-0		
			11	75	0-0		
			11	80	0-0		
			11	85	0-0		
			11	90	0-0		
			11	95	0-0		
			11	100	0-0		
			11	105	0-0		
			11	110	0-0		
			11	115	0-0		
			11	120	0-0		
			11	125	0-0		
			11	130	0-0		
			11	135	0-0		
			11	140	0-0		
			11	145	0-0		
			11	150	0-0		
			11	155	0-0		
			11	160	0-0		
			11	165	0-0		
			11	170	0-0		
			11	175	0-0		
			11	180	0-0		
			11	185	0-0		
			11	190	0-0		
			11	195	0-0		
			11	200	0-0		
			11	205	0-0		
			11	210	0-0		
			11	215	0-0		
			11	220	0-0		
			11	225	0-0		
			11	230	0-0		
			11	235	0-0		
			11	240	0-0		
			11	245	0-0		
			11	250	0-0		
			11	255	0-0		
			11	260	0-0		
			11	265	0-0		
			11	270	0-0		
			11	275	0-0		
			11	280	0-0		
			11	285	0-0		
			11	290	0-0		
			11	295	0-0		
			11	300	0-0		
			11	305	0-0		
			11	310	0-0		
			11	315	0-0		
			11	320	0-0		
			11	325	0-0		
			11	330	0-0		
			11	335	0-0		
			11	340	0-0		
			11	345	0-0		
			11	350	0-0		
			11	355	0-0		
			11	360	0-0		
			11	365	0-0		
			11	370	0-0		
			11	375	0-0		
			11	380	0-0		
			11	385	0-0		
			11	390	0-0		
			11	395	0-0		
			11	400	0-0		
			11	405	0-0		
			11	410	0-0		
			11	415	0-0		
			11	420	0-0		
			11	425	0-0		
			11	430	0-0		
			11	435	0-0		
			11	440	0-0		
			11	445	0-0		
			11	450	0-0		
			11	455	0-0		
			11	460	0-0		
			11	465	0-0		
			11	470	0-0		
			11	475	0-0		
			11	480	0-0		
			11	485	0-0		
			11	490	0-0		
			11	495	0-0		
			11	500	0-0		
			11	505	0-0		
			11	510	0-0		
			11	515	0-0		
			11	520	0-0		
			11	525	0-0		
			11	530	0-0		
			11	535	0-0		
			11	540	0-0		
			11	545	0-0		
			11	550	0-0		
			11	555	0-0		
			11	560	0-0		
			11	565	0-0		
			11	570	0-0		
			11	575	0-0		
			11	580	0-0		
			11	585	0-0		
			11	590	0-0		
			11	595	0-0		
			11	600	0-0		
			11	605	0-0		
			11	610	0-0		
			11	615	0-0		
			11	620	0-0		
			11	625	0-0		
			11	630	0-0		
			11	635	0-0		
			11	640	0-0		
			11	645	0-0		
			11	650	0-0		
			11	655	0-0		
			11	660	0-0		
			11	665	0-0		
			11	670	0-0		
			11	675	0-0		
			11	680	0-0		
			11	685	0-0		
			11	690	0-0		
			11	695	0-0		
			11	700	0-0		
			11	705	0-0		
			11	710	0-0		
			11	715	0-0		
			11	720	0-0		
			11	725	0-0		
			11	730	0-0		
			11	735	0-0		
			11	740	0-0		
			11	745	0-0		
			11	750	0-0		
			11	755	0-0		
			11	760	0-0		
			11	765	0-0		
			11	770	0-0		
			11	775	0-0		
			11	780	0-0		
			11	785	0-0		
			11	790	0-0		
			11	795	0-0		
			11	800	0-0		
			11	805	0-0		
			11	810	0-0		
			11	815	0-0		
			11	820	0-0		
			11	825	0-0		
			11	830	0-0		
			11	835	0-0		
			11	840	0-0		
			11	845	0-0		
			11	850	0-0		
			11	855	0-0		
			11	860	0-0		
			11	865	0-0		
			11	870	0-0		
			11	875	0-0		
			11	880	0-0		
			11	885	0-0		
			11	890	0-0		
			11	895	0-0		
			11	900	0-0		
			11	905	0-0		
			11	910	0-0		
			11	915	0-0		
			11	920	0-0		
			11	925	0-0		
			11	930	0-0		
			11	935	0-0		
			11	940	0-0		
			11	945	0-0		
			11	950	0-0		
			11	955	0-0		
			11	960	0-0		
			11	965	0-0		
			11	970	0-0		
			11	975	0-0		
			11	980	0-0		
			11	985	0-0		
			11	990	0-0		
			11	995	0-0		
			11	1000	0-0		

Completion Symbols

- + Concrete Seal
- / Granular Bentonite Seal
- x Bentonite Pellet Seal
- z Bentonite Slurry Seal
- Artificial Sand Pack
- o Natural Gravel Pack

Lithologic Symbols

- ~ Clay
- Silt
- Sand
- o Gravel
- o Gravel with weathering rinds
- Caliche

FIGURE 13. Geologist's Diagram for Well CIA

FIGURE 14. Geologist's Diagram for Well C1A (Replacement)

FIGURE 15. Geologist's Diagram for Well C2A

FIGURE 16. Geologist's Diagram for Well C3A

was installed. Well C1B (Replacement) was drilled approximately 50 ft to the west of the original location. All three intermediate cluster wells were completed according to specifications, with a 5-ft screen set at the bottom of the glaciofluvial sands and gravels, just above the Ringold Formation. The geologist's diagrams for wells C1B, C1B (Replacement), C2B, and C3B are presented in Figures 17 through 20. Appendix B in Volume 2 (pages B.65 through B.132) contains the geologist's logs, drilling logs, and inspection records for this group of wells.

Two more shallow wells, W6 and W7, were drilled following installation of the intermediate cluster wells. A 42-in. pipeline (no longer in use) was encountered during drilling of well W7, so the hole was plugged and abandoned, and a replacement well was drilled approximately 40 ft east of the original location. The geologist's diagrams for wells W6, W7, and W7 (Replacement) are presented in Figures 21 through 23. Appendix B in Volume 2 (pages B.3 through B.64) contains the geologist's logs, drilling logs, and inspection records for this group of wells.

Location coordinates and casing elevations for all of the new wells installed as part of this effort were recently provided by Kaiser Engineers Hanford. Permanent well names were then assigned on the basis of the location coordinates. These permanent well names, to be used in all future reports, are listed below following the temporary well names.

W1 = 199-H4-7	W5 = 199-H4-11	C1B = 199-H4-12B	C2C = 199-H4-15C
W2 = 199-H4-8	W6 = 199-H4-13	C1C = 199-H4-12C	C3A = 199-H3-2A
W3 = 199-H4-9	W7 = 199-H4-14	C2A = 199-H4-15A	C3B = 199-H3-2B
W4 = 199-H4-10	C1A = 199-H4-12A	C2B = 199-H4-15B	C3C = 199-H3-2C

Hydrogeologic Characterization Effort

Several important characterization efforts were conducted during the reporting period. These efforts, which included collection of sediment samples during drilling, geophysical logging of the boreholes, and aquifer testing, are described below.

BOREHOLE OR WELL NO. C1B

PROJECT RERA G-W Monitoring GEOLOGIST JL LIKALA PAGE 1 OF 1

LOCATION-DESCRIPTION OR COOR. 100 - H - DATE: STARTED 10-21-86 COMPLETED 10-27-

DRILLING COMPANY Onwego Drilling DRILLERS' NAMES D. Ludtke AND —

DRILLING METHOD(S) Cable Tool DRILL BIT —

DRILLING FLUID — TEMPORARY CASING OR AUGER: TYPE Carbon Steel - INSIDE DIA. 14"

DRILL BITS: TYPE _____ OUTSIDE DIA. _____ SURVEYED GROUND ELEVATION _____

Reviewed/Approved J R Raymond 11/10/86

[illegible]

FIGURE 17. Geologist's Diagram for Well C18

144-H4-12B

LOG OF BOREHOLE AND MONITOR WELL CONSTRUCTION

BOREHOLE OR WELL NO. C1B (REPLACEMENT)

PROJECT RCEA G-W Monitoring GEOLOGIST TL. LIKALA PAGE 1 OF 1

LOCATION/DESCRIPTION OR COOR. 100-H DATE: STARTED 10-27-86 COMPLETED 11-11-86

DRILLING COMPANY Onweno Drilling DRILLERS' NAMES D. Ludeke AND —

DRILLING METHOD(S) Cable Tool DRILL BIT —

DRILLING FLUID Water TEMPORARY CASING OR AUGER: TYPE Carbon Steel INSIDE DIA. 14" / 10"

DRILL BITS: TYPE Drive Barrel / Hard Tool OUTSIDE DIA. 8" / 10" SURVEYED GROUND ELEVATION —

Revised / approved J.P. Raymond 11/24/86, J.P. Raymond 12/22/86

CIRCULATION		CONSTRUCTION DATA		DEPTH	GEOLOGIC AND HYDROLOGIC		
RETURN IN GPM	LOSS GPM	DESCRIPTION	DIAGRAM ANNULUS WELL	IN FT	DIAGRAM LITHOL.	DESCRIPTION AND COMMENTS	% Core & Box No.
		14" Carbon steel casing (removed)	///	5	0.0 0.0	Silty Sandy Gravel	
			///	10	0.0 0.0	sandy gravel	
		10" carbon steel casing (removed)	///	15	0.0 0.0		
			///	20	0.0 0.0	Sandy Gravel	
		6" SS 304 casing	///	25	0.0 0.0		
			///	30	0.0 0.0	Brownish grey sandy gravel. CaCO ₃ cementing between clasts	
			///	35	0.0 0.0	4" thick moist mud sand layer @ 36'	
			///	40	0.0 0.0	Cemented sandy gravel. Decayed organic material present	
		6" (20 slot) SS 304 screen	///	45	0.0 0.0	Static Water Level @ 37'	
			///	50	0.0 0.0	Gravelly sand @ 45'	
			///	55	0.0 0.0	Sand @ 50'	
			///	60	0.0 0.0	Top of Ringold @ 50.5'	
			///	65	0.0 0.0		
			///	70	0.0 0.0		
			///	75	0.0 0.0		
			///	80	0.0 0.0		
			///	85	0.0 0.0		
			///	90	0.0 0.0		
			///	95	0.0 0.0		
			///	100	0.0 0.0		
			///	105	0.0 0.0		
			///	110	0.0 0.0		
			///	115	0.0 0.0		
			///	120	0.0 0.0		
			///	125	0.0 0.0		
			///	130	0.0 0.0		
			///	135	0.0 0.0		
			///	140	0.0 0.0		
			///	145	0.0 0.0		
			///	150	0.0 0.0		
			///	155	0.0 0.0		
			///	160	0.0 0.0		
			///	165	0.0 0.0		
			///	170	0.0 0.0		
			///	175	0.0 0.0		
			///	180	0.0 0.0		
			///	185	0.0 0.0		
			///	190	0.0 0.0		
			///	195	0.0 0.0		
			///	200	0.0 0.0		
			///	205	0.0 0.0		
			///	210	0.0 0.0		
			///	215	0.0 0.0		
			///	220	0.0 0.0		
			///	225	0.0 0.0		
			///	230	0.0 0.0		
			///	235	0.0 0.0		
			///	240	0.0 0.0		
			///	245	0.0 0.0		
			///	250	0.0 0.0		
			///	255	0.0 0.0		
			///	260	0.0 0.0		
			///	265	0.0 0.0		
			///	270	0.0 0.0		
			///	275	0.0 0.0		
			///	280	0.0 0.0		
			///	285	0.0 0.0		
			///	290	0.0 0.0		
			///	295	0.0 0.0		
			///	300	0.0 0.0		
			///	305	0.0 0.0		
			///	310	0.0 0.0		
			///	315	0.0 0.0		
			///	320	0.0 0.0		
			///	325	0.0 0.0		
			///	330	0.0 0.0		
			///	335	0.0 0.0		
			///	340	0.0 0.0		
			///	345	0.0 0.0		
			///	350	0.0 0.0		
			///	355	0.0 0.0		
			///	360	0.0 0.0		
			///	365	0.0 0.0		
			///	370	0.0 0.0		
			///	375	0.0 0.0		
			///	380	0.0 0.0		
			///	385	0.0 0.0		
			///	390	0.0 0.0		
			///	395	0.0 0.0		
			///	400	0.0 0.0		
			///	405	0.0 0.0		
			///	410	0.0 0.0		
			///	415	0.0 0.0		
			///	420	0.0 0.0		
			///	425	0.0 0.0		
			///	430	0.0 0.0		
			///	435	0.0 0.0		
			///	440	0.0 0.0		
			///	445	0.0 0.0		
			///	450	0.0 0.0		
			///	455	0.0 0.0		
			///	460	0.0 0.0		
			///	465	0.0 0.0		
			///	470	0.0 0.0		
			///	475	0.0 0.0		
			///	480	0.0 0.0		
			///	485	0.0 0.0		
			///	490	0.0 0.0		
			///	495	0.0 0.0		
			///	500	0.0 0.0		
			///	505	0.0 0.0		
			///	510	0.0 0.0		
			///	515	0.0 0.0		
			///	520	0.0 0.0		
			///	525	0.0 0.0		
			///	530	0.0 0.0		
			///	535	0.0 0.0		
			///	540	0.0 0.0		
			///	545	0.0 0.0		
			///	550	0.0 0.0		
			///	555	0.0 0.0		
			///	560	0.0 0.0		
			///	565	0.0 0.0		
			///	570	0.0 0.0		
			///	575	0.0 0.0		
			///	580	0.0 0.0		
			///	585	0.0 0.0		
			///	590	0.0 0.0		
			///	595	0.0 0.0		
			///	600	0.0 0.0		
			///	605	0.0 0.0		
			///	610	0.0 0.0		
			///	615	0.0 0.0		
			///	620	0.0 0.0		
			///	625	0.0 0.0		
			///	630	0.0 0.0		
			///	635	0.0 0.0		
			///	640	0.0 0.0		
			///	645	0.0 0.0		
			///	650	0.0 0.0		
			///	655	0.0 0.0		
			///	660	0.0 0.0		
			///	665	0.0 0.0		
			///	670	0.0 0.0		
			///	675	0.0 0.0		
			///	680	0.0 0.0		
			///	685	0.0 0.0		
			///	690	0.0 0.0		
			///	695	0.0 0.0		
			///	700	0.0 0.0		
			///	705	0.0 0.0		
			///	710	0.0 0.0		
			///	715	0.0 0.0		
			///	720	0.0 0.0		
			///	725	0.0 0.0		
			///	730	0.0 0.0		
			///	735	0.0 0.0		
			///	740	0.0 0.0		
			///	745	0.0 0.0		
			///	750	0.0 0.0		
			///	755	0.0 0.0		
			///	760	0.0 0.0		
			///	765	0.0 0.0		
			///	770	0.0 0.0		
			///	775	0.0 0.0		
			///	780	0.0 0.0		
			///	785	0.0 0.0		
			///	790	0.0 0.0		
			///	795	0.0 0.0		
			///	800	0.0 0.0		
			///	805	0.0 0.0		
			///	810	0.0 0.0		
			///	815	0.0 0.0		
			///	820	0.0 0.0		
			///	825	0.0 0.0		
			///	830	0.0 0.0		
			///	835	0.0 0.0		
			///	840	0.0 0.0		
			///	845	0.0 0.0		
			///	850	0.0 0.0		
			///	855	0.0 0.0		
			///	860	0.0 0.0		
			///	865	0.0 0.0		
			///	870	0.0 0.0		
			///	875	0.0 0.0		
			///	880	0.0 0.0		
			///	885	0.0 0.0		
			///	890	0.0 0.0		
			///	895	0.0 0.0		
			///	900	0.0 0.0		
			///	905	0.0 0.0		
			///	910	0.0 0.0		
			///	915	0.0 0.0		
			///	920	0.0 0.0		
			///	925	0.0 0.0		
			///	930	0.0 0.0		
			///	935	0.0 0.0		
			///	940	0.0 0.0		
			///	945	0.0 0.0		
			///	950	0.0 0.0		
			///	955	0.0 0.0		
			///	960	0.0 0.0		
			///	965	0.0 0.0		
			///	970	0.0 0.0		
			///	975	0.0 0.0		
			///	980	0.0 0.0		
			///	985	0.0 0.0		
			///	990	0.0 0.0		
			///	995	0.0 0.0		
			///	1000	0.0 0.0		

FIGURE 18. Geologist's Diagram for Well C1B (Replacement)

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FIGURE 20. Geologist's Diagram for Well C3B

BOREHOLE OR WELL NO. W6

Received of J. R. Raymond 11/26/36

Lithologic Symbols

- n Clay
- Silt
- Sand
- Gravel
- Gravel w/ weathering rinds
- Caliche

45

BOREHOLE OR WELL NO. W7

PROJECT RCRA G-W Monitoring

GEOLOGIST . : لکھنؤ

PAGE 1 OF 1

LOCATION	DESCRIPTION OR COOR.	1005H
1	1005H	
2	1005H	
3	1005H	
4	1005H	
5	1005H	
6	1005H	
7	1005H	
8	1005H	
9	1005H	
10	1005H	
11	1005H	
12	1005H	
13	1005H	
14	1005H	
15	1005H	
16	1005H	
17	1005H	
18	1005H	
19	1005H	
20	1005H	
21	1005H	
22	1005H	
23	1005H	
24	1005H	
25	1005H	
26	1005H	
27	1005H	
28	1005H	
29	1005H	
30	1005H	
31	1005H	
32	1005H	
33	1005H	
34	1005H	
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36	1005H	
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40	1005H	
41	1005H	
42	1005H	
43	1005H	
44	1005H	
45	1005H	
46	1005H	
47	1005H	
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68	1005H	
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84	1005H	
85	1005H	
86	1005H	
87	1005H	
88	1005H	
89	1005H	
90	1005H	
91	1005H	
92	1005H	
93	1005H	
94	1005H	
95	1005H	
96	1005H	
97	1005H	
98	1005H	
99	1005H	
100	1005H	

DATE: STARTED 11-12-86 COMPLETED 11-20-86

DRILLING COMPANY Onwzao Drilling

ORTILLERS: NAMES D. Garcia AM

DRILLING METHOD(S) Cable Tool

DRILL RIG

DRILLING FLUID Water

TEMPORARY CASING OR AUGER: TYPE Carbon Steel

INSIDE DIA. 14" / 10"

DRILL BITS: TYPE Drive Barrel / Hard Tool

 $8^v/10^v$

SURVEYED GROUND ELEVATION

Revised/Approved FR Raymond 11/26/86

FIGURE 22. Geologist's Diagram for Well W7

BOREHOLE OR WELL NO. W7 (REPLACEMENT)

PAGE 1 OF 1

DATE: STARTED 11-21-82 COMPLETED 12-5-82

DRILLERS' NAMES D. Garcia AND

DRILL RIG

INSIDE DIA. 14" / 10"

OUTSIDE DIA.

SURVEYED GROUND ELEVATION

Reviewed/Approved J.F. Raymond 12/22/86

FIGURE 23. Geologist's Diagram for Well W7 (Replacement)

Sediment samples were collected at regular 5-ft intervals (or at major changes in lithology) during drilling. A drive barrel or a split-spoon sampler was used for collection of these samples where possible. The grain size distribution, color, and gross mineralogic content of the samples were studied in the field by the geologist and recorded on his logs (Appendix B of Volume 2). The samples were also tested with hydrochloric acid in the field to obtain an indication of the calcium carbonate content. The samples were subsequently delivered to the laboratory for a variety of tests, including: 1) grain size distribution by sieve analysis, 2) moisture content, 3) soil moisture retention, 4) bulk porosity, and 5) hydraulic conductivity. Results of these tests will be presented in a later report.

A suite of geophysical logs, consisting of neutron-epithermal-neutron, gamma-gamma (density), and natural gamma, has been made for each of the wells drilled during the reporting period. These logs were used in the field to help determine completion intervals for the wells. The logs will also be used to develop a conceptual model of the geology in the area. Interpretation of the geophysical logs will be discussed in the characterization report to be issued later; however, copies of the logs for the wells discussed in the previous section of this chapter are included with this report in Volume 3, Appendix C.

Aquifer testing has been conducted on some of the new wells to obtain information on the hydraulic properties of the aquifer. During this quarter, the following 5 wells (completed in the Hanford formation) were pumped at maximum rates and the water level responses were observed: C1A, C2A, C3A, W5, and W7. Results of these five tests and also two tests conducted during the last reporting period are summarized in Table 4.

The testing demonstrated a range in the aquifer's ability to transmit water. As shown in Table 4, the maximum pumping rates ranged from 19 to 550 gpm. It was found during the testing effort that the well yields could not be reliably predicted based on the materials encountered during drilling.

Preliminary analysis of the data indicates that the median hydraulic conductivity of the Hanford formation in the vicinity of the 183-H Solar Evaporation Basins is 81 ft/day. This median value is less than the average range of values (500 to 2000 ft/day) typical for the Hanford Site. As shown in Table 4,

TABLE 4. Preliminary Aquifer Testing Results for Wells in the 100-H Area

<u>Well</u>	<u>Pumping Rate (gpm)</u>	<u>Drawdown (ft)</u>	<u>Transmissivity (ft²/d)</u>	<u>Hydraulic Conductivity (ft/d)</u>
C1A	80	7.5	1,604	123
C2A	44	4.0	1,203	100
C3A	310	4.3	26,740	1,910
W1	20	6.2	200	40
W4	550	7.9	22,730	2,525
W5	45	4.7	1,003	63
W7	19	3.1	661	<350

the values obtained for hydraulic conductivity ranged from 40 to 2525 ft/day. This two and one half order of magnitude variation in hydraulic conductivity is typical of unconsolidated sediments such as those of the Hanford formation. Further interpretation of the testing data will be included in the characterization report to be issued later.

ROUTINE SAMPLING AND ANALYSIS OF THE GROUND WATER

Routine sampling and analysis of the ground water has been conducted for this facility on a monthly basis since June 1985. Recent activities under this effort and the results obtained are discussed in the following two sections.

Collection and Analysis

Monthly sampling of the 5 wells originally in the monitoring network continued throughout the quarter. In addition, 6 of the new wells were sampled during December, after receipt and installation of the dedicated sampling pumps. Most of the ground-water samples were analyzed for the standard list of constituents (see Table 2 in USDOE 1986d); however, to satisfy regulatory requirements and to help ensure that no contaminants would be overlooked, additional analyses (listed in Table 3 of USDOE 1986d) were conducted once during the quarter on samples collected from one upgradient well and one downgradient well (199-H3-1 and 199-H4-3, respectively). In the future, to maximize the efficiency of the laboratory, the sampling schedule will be changed slightly so

that these additional quarterly analyses will be spread out over the quarter rather than all being conducted during one month.

During the quarter, piston-type sampling pumps were ordered for 15 of the new wells. (The one remaining new well, C2C, has four 2-in. piezometers installed and is not being fitted with pumps; instead, it will be dedicated to measurement of hydraulic heads.) Six of the new pumps were received and installed prior to the end of the reporting period, allowing addition of those wells to the monitoring network and collection of samples during December. The remaining pumps are expected to be received and installed soon. Some start-up problems related to installation and operation of these new pumps have been encountered but are now being resolved.

Work has begun on computerizing some of the paperwork that accompanies the samples, including the Chain-of-Custody forms and Field Record Logbook sheets; these forms are currently filled out manually or by typing, and efficiency will be improved if some of the repetitive information on these forms can be entered by the computer instead.

UST has been having problems for several months with their TOC instrument. Continuing attempts to fix the instrument have not been totally successful, and UST has decided to purchase a new instrument from a different manufacturer. The TOC analysis for the November and December samples has been delayed because of this problem, but UST expects to catch up quickly as soon as they have a properly functioning instrument. The samples have been properly preserved and stored, so the analytical results should not be affected by this delay.

A quality assurance audit of UST was performed during December by the Quality Assurance Department of PNL. Results of this audit indicate that the laboratory is generally functioning in conformance with quality assurance standards.

Discussion of Results

Analytical data obtained from samples collected in the 100-H Area between September 1986 and November 1986 are included in this report and discussed in the following paragraphs. Results for samples collected in December 1986, near the end of the reporting period, will be included in the next progress report.

Analytical data obtained from the samples collected during this period were basically comparable to the data included in previous reports (USDOE 1986b and USDOE 1986d). In general, the samples continued to show the presence of metals, anions, radionuclides, and the volatile organic chemical chloroform. Some of the data are discussed in more detail below and are also shown on plots presented later in this section. The well numbers are denoted on these plots by the last digit in the well name (i.e., 199-H4-3 = 3, 199-H4-4 = 4, 199-H4-5 = 5, 199-H4-6 = 6, and 199-H3-1 = 1).

Table 5 is a summary of all results obtained for samples collected from September 1986 through November 1986. For those constituents that were undetected during this time period, three asterisks appear in the column labeled "Below Detection." Also, any constituents having at least one value above the regulatory standard or a screening limit are marked with three X's in the column labeled "Exceed." The raw analytical data for all constituents with at least one value above the detection limit are presented in Appendix A on pages A.3 through A.25.

Concentrations of most of the constituents that peaked in the sample collected from well 199-H4-3 during June 1986 have continued to decline to levels that, in most cases, are close to the values obtained before the increase began last spring. The constituents showing this behavior pattern include a number of metals (i.e., barium, sodium, strontium, calcium, nickel, copper, and potassium) and two anions (i.e., nitrate and sulfate). Plots for these constituents are presented in Figures 24 through 32. The same type of pattern is also exhibited by conductivity (Figure 33) and two radiological measurements: gross alpha and gross beta (Figures 34 and 35). Many of these same constituents were found to increase slightly during this reporting period in samples from well 199-H4-4. These increases were, however, very slight, and the concentrations in samples from this well have recently shown some signs of leveling off.

Some work has recently been conducted to attempt to determine the cause for the observed increases in constituent concentrations in samples from well 199-H4-3. Samples collected from this well show increases in constituent concentrations as the water table rises. Since the water table is far below the bottom of the 183-H Basins, it is not likely that the source of

TABLE 5. Summary of Analyses Conducted on Samples from 100-H Area Wells,
September 1986 through November 1986

-----Constituent List=Contamination Indicators-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
191	CONDUCT	UMHO	.	15	0	.	Specific conductance
199	PH		.	15	0	.	pH
C88	TOX	PPB	100	15	15 ***	.	Total organic halogen
C89	TOC	PPB	1000	10	7	.	Total organic carbon

-----Constituent List=Drinking Water Standards-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
109	COLIFRM	MPN	2.2	15	14	1 EPA	Coliform bacteria
111	BETA	PCI/L	8	15	0	50 EPA	Gross beta
181	RADIUM	PCI/L	1	15	13	5 EPA	Radium
212	LOALPHA	PCI/L	4	15	0	15 EPA	Gross alpha
A06	BARIUM	PPB	8	15	0	1000 EPA	Barium
A07	CADMIUM	PPB	2	15	13	10 EPA	Cadmium
A08	CHROMIUM	PPB	10	15	0	50 EPA	Chromium
A10	SILVER	PPB	10	15	15 ***	50 EPA	Silver
A20	ARSENIC	PPB	5	15	15 ***	50 EPA	Arsenic
A21	MERCURY	PPB	.1	15	15 ***	2 EPA	Mercury
A22	SELENIUM	PPB	5	15	14	10 EPA	Selenium
A33	ENDRIN	PPB	1	5	5 ***	.2 EPA	Endrin
A34	METHLOR	PPB	1	5	5 ***	100 EPA	Methoxychlor
A35	TOXAENE	PPB	1	5	5 ***	5 EPA	Toxaphene
A36	a-BHC	PPB	1	5	5 ***	4 EPA	Alpha-BHC
A37	b-BHC	PPB	1	5	5 ***	4 EPA	Beta-BHC
A38	g-BHC	PPB	1	5	5 ***	4 EPA	Gamma-BHC
A39	d-BHC	PPB	1	5	5 ***	4 EPA	Delta-BHC
A51	LEADGF	PPB	5	15	13	50 EPA	Lead (graphite furnace)
C72	NITRATE	PPB	500	15	0	45000 EPA	Nitrate
C74	FLUORID	PPB	500	15	14	1400 EPA	Fluoride
H13	2,4-D	PPB	1	5	5 ***	100 EPA	2,4-D
H14	2,4,5TP	PPB	1	5	5 ***	10 EPA	2,4,5-TP silvex
H20	FBARIUM	PPB	8	14	0	1000 EPA	Barium, filtered
H21	FCADMIUM	PPB	2	14	14 ***	10 EPA	Cadmium, filtered
H22	FCHROMIUM	PPB	10	14	0	50 EPA	Chromium, filtered
H23	FSILVER	PPB	10	14	14 ***	50 EPA	Silver, filtered
H37	FARSENIC	PPB	5	14	12	50 EPA	Arsenic, filtered
H38	FMERCURY	PPB	.1	14	14 ***	2 EPA	Mercury, filtered
H39	FSELENIUM	PPB	5	14	14 ***	10 EPA	Selenium, filtered
H41	FLEAD	PPB	5	14	13	50 EPA	Lead, filtered

TABLE 5. (contd)

-----Constituent List=Quality Characteristics-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
A11	SODIUM	PPB	100	15	0	.	Sodium
A17	MANGESE	PPB	5	15	8	.	Manganese
A19	IRON	PPB	50	15	3	.	Iron
C57	PHENOL	PPB	10	2	2 ***	.	Phenol
C73	SULFATE	PPB	500	15	0	.	Sulfate
C75	CHLORID	PPB	500	15	0	.	Chloride
H24	FSODIUM	PPB	100	14	0	.	Sodium, filtered
H29	FMANGAN	PPB	5	14	11	.	Manganese, filtered
H31	FIRON	PPB	50	14	14 ***	.	Iron, filtered
-----Constituent List=Site Specific-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
010	CO	PCI/L	22.5	2	1	.	Cobalt-60
024	CS-137	PCI/L	20	2	2 ***	.	Cesium-137
034	RU	PCI/L	172.5	2	2 ***	.	Ruthenium-106
121	SR	PCI/L	5	2	1	.	Strontium-90
124	U-CHEM		.	2	0	.	Natural uranium
A03	STRONUM	PPB	300	15	6	.	Strontium
A04	ZINC	PPB	5	15	5	.	Zinc
A05	CALCIUM	PPB	50	15	0	.	Calcium
A12	NICKEL	PPB	10	15	9	.	Nickel
A13	COPPER	PPB	10	15	10	1300 EPAP	Copper
A14	VANADUM	PPB	5	15	3	.	Vanadium
A16	ALUMNUM	PPB	150	15	11	.	Aluminum
A18	POTASUM	PPB	100	15	0	.	Potassium
A50	MAGNES	PPB	0	15	0	.	Magnesium
A67	1,1,1-T	PPB	10	15	15 ***	200 EPAP	1,1,1-trichloroethane
A70	PERCENE	PPB	10	15	15 ***	.	Perchloroethylene
A80	CHLFORM	PPB	10	15	3	.	Chloroform
A93	METHYCH	PPB	10	15	15 ***	.	Methylene chloride
C80	AMMONIU	PPB	50	15	8	.	Ammonium ion
H18	FZINC	PPB	5	14	5	.	Zinc, filtered
H19	FCALCIU	PPB	50	14	0	.	Calcium, filtered
H25	FNICKEL	PPB	10	14	9	.	Nickel, filtered
H26	FCOPPER	PPB	10	14	11	1300 EPAP	Copper, filtered
H27	FVANADI	PPB	5	14	5	.	Vanadium, filtered
H28	FALUMIN	PPB	150	14	14 ***	.	Aluminum, filtered
H30	FPOTASS	PPB	100	14	0	.	Potassium, filtered
H32	FMAGNES	PPB	0	14	0	.	Magnesium, filtered
H35	FSTRONT	PPB	300	7	2	.	Strontium, filtered

TABLE 5. (contd)

-----Constituent List=Site Specific tag-alongs-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
A01	BERYLAM	PPB	5	10	9	.	Beryllium
A02	OSMIUM	PPB	300	10	10 ***	.	Osmium
A16	ANTIMONY	PPB	100	10	10 ***	.	Antimony
A81	TETRANE	PPB	10	15	15 ***	5 EPAP	Tetrachloromethane
A84	METHONE	PPB	10	15	15 ***	.	Methyl ethyl ketone
A88	1,1,2-T	PPB	10	15	15 ***	.	1,1,2-trichloroethane
A89	TRICENE	PPB	10	15	15 ***	5 EPAP	Trichloroethylene
A71	OPXYLE	PPB	10	15	15 ***	440 EPAP	Xylene-o,p
B14	M-XYLE	PPB	10	15	15 ***	440 EPAP	Xylene-m
C78	PHOSPHA	PPB	1000	15	15 ***	.	Phosphate
-----Constituent List=WAC 173-303-9905-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
A23	THALIUM	PPB	10	2	2 ***	.	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 ***	.	Diethylstilbesterol
A28	ETHYREA	PPB	200	2	2 ***	.	Ethylenethiourea
A29	NAPHREA	PPB	200	2	2 ***	.	1-naphthyl-2-thiourea
A32	PHENREA	PPB	200	2	2 ***	.	N-phenylthiourea
A40	DDD	PPB	1	2	2 ***	.	DDD
A41	DDE	PPB	1	2	2 ***	.	DDE
A42	DDT	PPB	1	2	2 ***	.	DDT
A43	HEPTLOR	PPB	1	2	2 ***	0 EPAP	Heptachlor
A44	HEPTIDE	PPB	1	2	2 ***	0 EPAP	Heptachlor epoxide
A46	DIELRIN	PPB	1	2	2 ***	.	Dieldrin
A47	ALDRIN	PPB	1	2	2 ***	.	Aldrin
A48	CHLOANE	PPB	1	2	2 ***	0 EPAP	Chlordane
A49	END01	PPB	1	2	2 ***	.	Endosulfan I
A52	END02	PPB	1	2	2 ***	.	Endosulfan II
A82	BENZENE	PPB	10	2	2 ***	5 EPAP	Benzene
A83	DIOXANE	PPB	500	2	2 ***	.	Dioxane
A85	PYRIDIN	PPB	500	2	2 ***	.	Pyridine
A88	TOLUENE	PPB	10	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 ***	.	Chlorobenzene
A79	CHLTHER	PPB	10	2	2 ***	.	2-chloroethyl vinyl ether
A81	METHCHL	PPB	10	2	2 ***	.	Methyl chloride
A82	CHMTHER	PPB	10	2	2 ***	.	Chloromethyl methyl ether
A83	CROTONA	PPB	10	2	2 ***	.	Crotonaldehyde

TABLE 5. (contd)

-----Constituent List=WAC 173-303-9905-----								
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name	
A84	DIBRCHL	PPB	10	2	2 ***	.	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	
A90	1,2-DIC	PPB	10	2	2 ***	5 EPAP	1,2-dichloroethane	
A91	TRANDC	PPB	10	2	2 ***	70 EPAP	Trans-1,2-dichloroethene	
A92	DICETHY	PPB	10	2	2 ***	7 EPAP	1,1-dichloroethylene	
A94	DICPANE	PPB	10	2	2 ***	8 EPAP	1,2-dichloropropane	
A95	DICPENE	PPB	10	2	2 ***	.	1,3-dichloropropane	
A96	NNDIEHY	PPB	10	2	2 ***	.	N,N-diethylhydrazine	
A97	1,1-DIM	PPB	3000	2	2 ***	.	1,1-dimethylhydrazine	
A98	1,2-DIM	PPB	3000	2	2 ***	.	1,2-dimethylhydrazine	
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	
B06	1112-tc	PPB	10	2	2 ***	.	1,1,1,2-tetrachloroethane	
B08	1122-tc	PPB	10	2	2 ***	.	1,1,2,2-tetrachloroethane	
B08	BROMORM	PPB	10	2	2 ***	.	Bromoform	
B09	TRCMEOL	PPB	10	2	2 ***	.	Trichloromethanethiol	
B10	TRCMFLM	PPB	10	2	2 ***	.	Trichloromonofluoromethane	
B11	TRCPANE	PPB	10	2	2 ***	.	Trichloropropane	
B12	123-trp	PPB	10	2	2 ***	.	1,2,3-trichloropropane	
B13	VINYIDE	PPB	10	2	2 ***	1 EPAP	Vinyl chloride	
B15	DIETHY	PPB	10	2	2 ***	.	Diethylarsine	
B19	ACETILE	PPB	3000	2	2 ***	.	Acetonitrile	
B20	ACETONE	PPB	10	2	2 ***	.	Acetophenone	
B21	WARFRIN	PPB	10	2	2 ***	.	Warfarin	
B22	ACEFENE	PPB	10	2	2 ***	.	2-acetylaminofluorene	
B23	AMINOYL	PPB	10	2	2 ***	.	4-aminobiphenyl	
B24	AMIISOX	PPB	10	2	2 ***	.	5-(aminomethyl)-3-isoxazolol	
B26	AMITROL	PPB	10	2	2 ***	.	Amitrole	
B28	ANILINE	PPB	10	2	2 ***	.	Aniline	
B27	ARAMITE	PPB	10	2	2 ***	.	Aramite	
B28	AURAMIN	PPB	10	2	2 ***	.	Auramine	
B29	BENZCAC	PPB	10	2	2 ***	.	Benz[c]acridine	
B30	BENZAAN	PPB	10	2	2 ***	.	Benz[a]anthracene	
B31	BENDICM	PPB	10	2	2 ***	.	Benzene, dichloromethyl	
B32	BENTHOL	PPB	10	2	2 ***	.	Benzenethiol	
B33	BENDINE	PPB	10	2	2 ***	.	Benzidine	
B34	BENZBFL	PPB	10	2	2 ***	.	Benzo[b]fluoranthene	
B36	BENZJFL	PPB	10	2	2 ***	.	Benzo[j]fluoranthene	
B38	PBENZQU	PPB	10	2	2 ***	.	P benzoquinone	
B37	BENZCHL	PPB	10	2	2 ***	.	Benzyl chloride	

TABLE 5. (contd)

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

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
B38	BIS2CHM	PPB	10	2	2 ***	.	Bis(2-chloroethoxy) methane
B39	BIS2CHE	PPB	10	2	2 ***	.	Bis(2-chloroethyl) ether
B40	BIS2EPH	PPB	10	2	2 ***	.	Bis(2-ethylhexyl) phthalate
B41	BROPHEN	PPB	10	2	2 ***	.	4-bromophenyl phenyl ether
B42	BUTBENP	PPB	10	2	2 ***	.	Butyl benzyl phthalate
B43	BUTDINP	PPB	10	2	2 ***	.	2-sec-butyl-4,6-dinitrophenol
B44	CHALETH	PPB	10	2	2 ***	.	Chloroalkyl ethers
B45	CHLANIL	PPB	10	2	2 ***	.	p-chloroaniline
B46	CHLCRES	PPB	10	2	2 ***	.	p-chloro-m-cresol
B47	CHLEPOX	PPB	10	2	2 ***	.	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,i]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	DIBAHFY	PPB	10	2	2 ***	.	Dibenzo[a,h]pyrene
B59	DIBAIPY	PPB	10	2	2 ***	.	Dibenzo[a,i]pyrene
B60	DIBPHTH	PPB	10	2	2 ***	.	Di-n-butyl phthalate
B61	12-dben	PPB	10	2	2 ***	.	1,2-dichlorobenzene
B62	13-dben	PPB	10	2	2 ***	.	1,3-dichlorobenzene
B63	14-dben	PPB	10	2	2 ***	.	1,4-dichlorobenzene
B64	DICHBEN	PPB	10	2	2 ***	.	3,3'-dichlorobenzidine
B65	24-dchp	PPB	10	2	2 ***	.	2,4-dichlorophenol
B66	26-dchp	PPB	10	2	2 ***	.	2,6-dichlorophenol
B67	DIEPHTH	PPB	10	2	2 ***	.	Diethyl phthalate
B68	DIHYSAF	PPB	10	2	2 ***	.	Dihydrosafrole
B69	DIMETHB	PPB	10	2	2 ***	.	3,3'-dimethoxybenzidine
B70	DIMEAMB	PPB	10	2	2 ***	.	p-dimethylaminoazobenzene
B71	DIMBENZ	PPB	10	2	2 ***	.	7,12-dimethylbenz[a]anthracene
B72	DIMEYLB	PPB	10	2	2 ***	.	3,3'-dimethylbenzidine
B73	THIONOX	PPB	10	2	2 ***	.	Thiofanox
B74	DIMPHAM	PPB	10	2	2 ***	.	Alpha, alpha-dimethylphenethylamine
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	DINCREB	PPB	10	2	2 ***	.	4,6-dinitro-o-cresol and salts
B79	DINPHEN	PPB	10	2	2 ***	.	2,4-dinitrophenol
B80	24-dint	PPB	10	2	2 ***	.	2,4-dinitrotoluene
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	DIPRNT	PPB	10	2	2 ***	.	Di-n-propylnitrosamine
B86	ETHMINE	PPB	10	2	2 ***	.	Ethyleneimine
B87	ETHMETH	PPB	10	2	2 ***	.	Ethyl methanesulfonate
B88	FLUORAN	PPB	10	2	2 ***	.	Fluoranthene

TABLE 5. (contd)

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

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
B89	HEXCBEN	PPB	10	2	2 ***	.	Hexachlorobenzene
B90	HEXCBUT	PPB	10	2	2 ***	.	Hexachlorobutadiene
B91	HEXCCYC	PPB	10	2	2 ***	.	Hexachlorocyclopentadiene
B92	HEXCETH	PPB	10	2	2 ***	.	Hexachloroethane
B93	INDENOP	PPB	10	2	2 ***	.	Indeno(1,2,3-cd)pyrene
B94	ISOSOLE	PPB	10	2	2 ***	.	Isosafrole
B95	MALOILE	PPB	10	2	2 ***	.	Malononitrile
B96	MELPHAL	PPB	10	2	2 ***	.	Melphalan
B97	METHAPY	PPB	10	2	2 ***	.	Methapyrilene
B98	METHNYL	PPB	10	2	2 ***	.	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-methyl lactonitrile
C04	METACRY	PPB	10	2	2 ***	.	Methyl methacrylate
C05	METMSUL	PPB	10	2	2 ***	.	Methyl methanesulfonate
C06	METPROP	PPB	10	2	2 ***	.	2-methyl-2-(methylthio) propionaldehyde
C07	METHIOU	PPB	10	2	2 ***	.	Methylthiouracil
C08	NAPHQUI	PPB	10	2	2 ***	.	1,4-naphthoquinone
C09	1-napha	PPB	10	2	2 ***	.	1-naphthylamine
C10	2-napha	PPB	10	2	2 ***	.	2-naphthylamine
C11	NITRANI	PPB	10	2	2 ***	.	P-nitroaniline
C12	NITBENZ	PPB	10	2	2 ***	.	Nitrobenzene
C13	NITPHEN	PPB	10	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-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-nitrosornicotine
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	10	2	2 ***	220 EPAP	Pentachlorophenol
C29	PHENTIN	PPB	10	2	2 ***	220 EPAP	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

TABLE 5. (contd)

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

Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
C43	TRICHLB	PPB	10	2	2 ***	.	1,2,4-trichlorobenzene
C44	245-trp	PPB	10	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	TRIPHOS	PPB	10	2	2 ***	.	Tri(2,3-dibromopropyl) phosphate
C49	BENZOPY	PPB	10	2	2 ***	.	Benzo[a]pyrene
C50	CHLNAPH	PPB	10	2	2 ***	.	Chlornaphazine
C51	BIS2ETH	PPB	10	2	2 ***	.	Bis(2-chloroisopropyl) ether
C52	HEXAENE	PPB	10	2	2 ***	.	Hexachloropropene
C53	HYORAZI	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
C57	136TRI	PPB	10	2	2 ***	.	1,3,6-trichlorobenzene
C58	1234TE	PPB	10	2	2 ***	.	1,2,3,4-tetrachlorobenzene
C59	1236TE	PPB	10	2	2 ***	.	1,2,3,5-tetrachlorobenzene
C60	TETEPYR	PPB	100	2	2 ***	.	Tetraethylpyrophosphate
C61	CHLLATE	PPB	100	2	2 ***	.	Chlorobenzilate
C62	CARBPHT	PPB	2	2	2 ***	.	Carbophenothion
C63	DISULFO	PPB	2	2	2 ***	.	Disulfoton
C64	DIMETHO	PPB	5	2	2 ***	.	Dimethoate
C65	METHPAR	PPB	2	2	2 ***	.	Methyl parathion
C66	PARATHI	PPB	2	2	2 ***	.	Parathion
C67	CYANIDE	PPB	10	2	2 ***	.	Cyanide
C68	FORMALN	PPB	500	2	2 ***	.	Formalin
C69	PERCHLO	PPB	1000	2	2 ***	.	Perchlorate
C70	KEROSEN	PPB	10000	2	2 ***	.	Kerosene
C71	CITRUSR	PPB	1000	2	2 ***	.	Citrus red
C72	CYANBRO	PPB	3000	2	2 ***	.	Cyanogen bromide
C73	CYANCHL	PPB	3000	2	2 ***	.	Cyanogen chloride
C74	PARALDE	PPB	3000	2	2 ***	.	Paraldehyde
C75	STRYCHN	PPB	60	2	2 ***	.	Strychnine
C76	MALHYDR	PPB	500	2	2 ***	.	Maleic hydrazide
C77	NICOTIN	PPB	100	2	2 ***	.	Nicotinic acid
C78	ACRYIDE	PPB	3000	2	2 ***	0 EPAP	Acrylamide
C79	ALLYLAL	PPB	3000	2	2 ***	.	Allyl alcohol
C80	CHLORAL	PPB	3000	2	2 ***	.	Chloral
C81	CHLACET	PPB	3000	2	2 ***	.	Chloroacetaldehyde
C82	CHLPROP	PPB	3000	2	2 ***	.	3-chloropropionitrile
C83	CYANOGN	PPB	3000	2	2 ***	.	Cyanogen
H01	DICPROP	PPB	3000	2	2 ***	.	Dichloropropanol
H02	ETHCARB	PPB	3000	2	2 ***	.	Ethyl carbamate
H03	ETHCYAN	PPB	3000	2	2 ***	.	Ethyl cyanide
H04	ETHOXID	PPB	3000	2	2 ***	.	Ethylene oxide
H05	ETHMETH	PPB	3000	2	2 ***	.	Ethyl methacrylate
H06	FLUOROAC	PPB	3000	2	2 ***	.	Fluoroacetic acid
H07	GLYCIDY	PPB	3000	2	2 ***	.	Glycidylaldehyde
H08	ISOBUTY	PPB	3000	2	2 ***	.	Isobutyl alcohol
H09	METZINE	PPB	3000	2	2 ***	.	Methyl hydrazine
H10	PROPYLA	PPB	3000	2	2 ***	.	N-propylamine
H11	PROPYNO	PPB	3000	2	2 ***	.	2-propyn-1-ol

TABLE 5. (contd)

-----Constituent List=WAC 173-303-9906-----							
Code	Constituent Name	Units	Detection Limit	Samples	Below Detection	Regulatory Limits Limit Agency Exceed	Full name
H15	2,4,5-T	PPB	1	2	2 ***	.	2,4,5-T
H33	FBERYLL	PPB	5	2	2 ***	.	Beryllium, filtered
H34	FOSMIUM	PPB	300	2	2 ***	.	Osmium, filtered
H38	FANTIMO	PPB	100	2	2 ***	.	Antimony, filtered
H40	FTHALLI	PPB	10	2	2 ***	.	Thallium, filtered

*** - Indicates all samples were below detection limits

xxx - Indicates that regulatory limits were exceeded

EPA - based on limits given in 40CFR 265, Appendix III,
EPA Interim Primary Drinking Water Standards

EPAP - based on proposed Maximum Contaminant Levels

Horizontal solid line is detection limit
 List=Drinking Water Standards Constituent=A06 BARIUM PPB EPA Limit=1000

FIGURE 24. Barium Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
 List=Quality Characteristics Constituent=A11 SODIUM PPB EPA Limit=.

FIGURE 25. Sodium Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
 List=Site Specific Constituent=A03 STRONUM PPB EPA Limit=.

FIGURE 26. Strontium Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
 List=Site Specific Constituent=A05 CALCIUM PPB EPA Limit=.

FIGURE 27. Calcium Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
 List=Site Specific Constituent=A12 NICKEL PPB EPA Limit=

FIGURE 28. Nickel Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
 List=Site Specific Constituent=A13 COPPER PPB EPA Limit=13100

FIGURE 29. Copper Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
 List=Site Specific Constituent=A18 POTASUM PPB EPA Limit=.

FIGURE 30. Potassium Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
 List=Drinking Water Standards Constituent=C72 NITRATE PPB EPA Limit=45000

FIGURE 31. Nitrate Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
 List=Quality Characteristics Constituent=C73 SULFATE PPB EPA Limit=.

FIGURE 32. Sulfate Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
 List=Contamination Indicators Constituent=191 CONDUCT UMHO EPA Limit=.

FIGURE 33. Conductivity Values in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
List=Drinking Water Standards Constituent=212 LOALPHA PCI/L Screening Limit=15

FIGURE 34. Gross Alpha Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
List=Drinking Water Standards Constituent=111 BETA PCI/L Screening Limit=50

FIGURE 35. Gross Beta Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

contamination originates from direct interaction of the ground water and waste material. A possible explanation could be that fine colloidal particles from the waste materials have been transported some distance below the facility under dispersive conditions. As the water table rises, the dilute solution dissolves soluble constituents or desorbs elements associated with the fine particulates, resulting in higher concentrations in samples from nearby wells. Solutions high in sodium (as is the case with the solution in the basins) can cause such a dispersive medium for fine particle or colloidal transport. This potential explanation, as well as others, will continue to be studied.

The concentrations of three constituents are showing long-term increases or decreases, as outlined below. The reasons for these gradual trends are unknown at this time.

- The concentrations of chloride in samples from wells 199-H4-6 and 199-H4-3 are showing an apparent long-term increase (Figure 36).
- The concentrations of chromium in samples from well 199-H4-3 are showing an apparent long-term decline (Figure 37).

FIGURE 36. Chloride Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
 List=Drinking Water Standards Constituent=A08 CHROMIUM PPB EPA Limit=50

FIGURE 37. Chromium Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

- The concentrations of manganese in samples from well 199-H4-6 are showing an apparent long-term increase (Figure 38).

Ammonium values reported for the October samples increased considerably over the previous month (Figure 39). The instrument and method were examined carefully and no problems were found. Since a similar pattern was observed in the ammonium results from samples collected from the 300 Area wells (as discussed in a previous chapter), it appears that the samples for the month of October may have somehow been contaminated after collection. Whatever the case, the results for the November samples were once again near or below the detection limit.

Horizontal solid line is detection limit
 List=Quality Characteristics Constituent=A17 MANGESE PPB EPA Limit=.

FIGURE 38. Manganese Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

Horizontal solid line is detection limit
 List=Site Specific Constituent=C80 AMMONIU PPB EPA Limit=.

FIGURE 39. Ammonium Concentrations in Samples from Monitoring Wells for the 183-H Solar Evaporation Basins, June 1985 to November 1986

200 AREA LOW-LEVEL BURIAL GROUNDS

During this reporting period, various activities related to planning and implementation of the monitoring program were conducted. These activities are discussed in the following paragraphs.

The compliance plan outline (USD OE 1986c) was finalized during this quarter and was delivered to the Washington State Department of Ecology and the U.S. Environmental Protection Agency on December 9, 1986. Efforts were then concentrated on preparation of the complete plan.

The numerical modeling effort (which will help ensure that the wells to be drilled are designed to provide a long-term sampling capability) was continued during this quarter. Emphasis has been placed on determining the long- and short-term effects of liquid waste disposal on the placement and operation of the monitoring system discussed in the plans. This modeling effort is utilizing data obtained from Rockwell Hanford Operations (Rockwell) on the most probable distribution and quantity of water to be disposed to the ground over the next 20 to 25 years.

An Engineering Study has been carried out to assess the manner in which wells will be drilled and completed for this effort. This study provides the basis for preparation of drilling specifications and bid packages. A Functional Design Criteria (FDC) document has also been prepared and approved. This FDC is the document that is necessary to obtain approval of funds for capital construction. Cost estimates have been prepared, allowing the required budgetary process to proceed.

Drilling specifications have been prepared and reviewed. These specifications have been forwarded to J. A. Jones (JAJ) for preparation of bid packages for materials and drilling. Bid packages are scheduled to be sent to prospective contractors in January 1987. On the current schedule, the drilling should begin in early March.

LOW-LEVEL WASTE MONITORING

During the reporting period, various activities related to planning and implementation of the monitoring program were conducted. These activities are discussed in the following paragraphs.

The compliance plan outline (1200-1000) was finalized during this period and was delivered to the Washington State Department of Ecology and the U.S. Environmental Protection Agency on December 1, 1985. Efforts were then concentrated on preparation of the compliance plan.

The numerical modeling effort which will help define the wells to be drilled are required to provide a long-term monitoring capability) was continued during this quarter. Emphasis has been placed on determining the long-term short-term effects of future waste disposal on the groundwater and operation of the monitoring system discussed in the plan. This work is a part of a project initiated by the Rocky Mountain Laboratory (Rockwell) on the long-term effects of radioactive and chemical waste disposal in the ground over the next 20 to 50 years.

An initial study has been carried out to assess the impact in which wells will be drilled and completed for this effort. This study includes the assistance for preparation of drilling specifications and bid packages. A final National Design Criteria (NDC) document has also been prepared and approved. This NDC is the document that is necessary to obtain approval of funds for capital construction. First cost estimates have been prepared, allowing the monitoring program to proceed.

Drilling specifications have been prepared and reviewed. These specifications have been furnished to J. A. Jones (EAL) for preparation of bid packages for materials and drilling. Bid packages are scheduled to be sent to potential contractors in January 1986. The current schedule for drilling should begin in early March.

NONRADIOACTIVE DANGEROUS WASTE LANDFILL

Activities conducted at the Nonradioactive Dangerous Waste Landfill (NRDW) during the reporting period included drilling and hydrogeologic characterization, as well as initial sampling of the ground water. These activities are discussed in the following sections.

DRILLING AND HYDROGEOLOGIC CHARACTERIZATION

Drilling at the NRDW Landfill began in May 1986 and was completed during this quarter, as per the milestone in the October 1, 1986, Consent Agreement and Compliance Order. Five shallow monitoring wells were completed by the end of the last reporting period (as described in USDOE 1986b). Installation and testing of additional wells during this reporting period is described below.

Well Drilling Effort

Drilling and installation of wells (Figure 40) at the NRDW Landfill continued and was completed between October 1 and December 31, 1986. A cable-tool contractor, Onwego Drilling, Inc., of Kennewick, Washington, was contracted by JAJ to drill well DO-1A in order to evaluate the possibility of completing deep observation and monitoring wells using the specifications as written. (Another contractor, Myricks Well Drilling, had previously encountered difficulties in completion of wells using these specifications, which require the backpulling of temporary casings after installation of piezometers.) The Onwego driller had no problem with completion of well DO-1A according to the specifications.

It had previously been determined that a top-drive, rotary drill rig with a casing hammer might be the most suitable option for timely completion of the three wells partially installed by Myricks Well Drilling (DO-1, DO-2, and DM-1) and the remaining deep well that had not yet been started (DM-2). However, the rotary drilling bids were 200% above the reasonable cost to complete the wells with cable-tool rigs given the costs of Onwego Drilling on well DO-1A. Therefore, JAJ negotiated a contract with Onwego Drilling to complete the remaining wells with cable tool rigs. The target date to complete the wells and characterization project remained December 31, 1986.

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FIGURE 40. Well Location Map for the NRDW Landfill

The Statement of Work attached in Volume 3, Appendix D, details the work required to complete the deep monitoring and observation wells. Briefly, this work included completion of wells DM-1 and DO-2 begun by a previous contractor, drilling and completion of well DM-2, and abandoning well DO-1 which was replaced by well DO-1A. Appendix E in Volume 3 contains drilling logs, geologists' logs, and hand drafts of construction details of the wells. Final as-built drawings, lithologic logs, geophysical logs, and sediment analytical data are not yet available but will be included in a report to be issued later.

Work on well DO-1A was begun on October 3, 1986. Work on the remaining deep monitoring and observation wells (Table 6) was begun on November 25, 1986. Construction of these wells was completed in conjunction with several aquifer tests and sediment sampling sequences that were part of the hydrogeologic characterization effort discussed in the following section. The final monitoring screens and casings were installed by December 31, 1986. Back-pulling of the temporary casing above the ground water on well DM-1, and surface grout work on wells DO-2, DM-1, and DM-2 were completed as reported in Table 6. Purging and sampling pumps for the monitoring wells have been ordered and shipped and will be set as soon as they are received.

Hydrogeologic Characterization Effort

The sediment samples taken from wells drilled or deepened during the quarter are scheduled for grain size analysis and calcium carbonate determination. Raw sediment moisture data have been collected for core barrel samples but have yet to be compiled and tabulated. The results of these analyses will be available in the final characterization report.

The hydrologic characterization effort consisted of defining and testing the potentially differentiable hydrostratigraphic units of the sediments underlying the NRDW Landfill. A fine-grained layer that was found to be present beneath the facility was hypothesized as a hydrologic lower boundary for any potential dense contaminants (sinkers) coming from the NRDW Landfill. A testing sequence had been proposed in a meeting held at Rockwell offices on July 17, 1986, with representatives from the Washington State Department of Ecology, the U.S. Department of Energy, and PNL. Appendix F in Volume 3 contains the presentation text and meeting minutes. The proposed testing

TABLE 6. Wells at the NRDW Landfill That Were Completed or Abandoned During the Reporting Period

Well Type	Designation	Final Screen Installed	Completed ^(a)	Comments
Multiple Piezometer	D0-1	-- ^(b)	12/22/86	Abandoned
Multiple Piezometer	D0-1A	10/31/86	11/11/86	Replaced Well D0-1
Multiple Piezometer	D0-2	12/11/86	1/3/87	
Deep Monitoring	DM-1	12/26/86	1/5/87	
Deep Monitoring	DM-2	12/27/86	1/3/87	

(a) Well completed with surface grout work, protective casing, and locking cap.

(b) No final screen was installed because the well was abandoned.

sequence consisted of aquifer tests and sediment sampling (Denison or Pitcher) and laboratory analyses as outlined in Table 7. The aquifer tests and sampling were completed just prior to the Christmas and New Year holidays.

A table-drive, air-rotary drilling rig was utilized to turn a Pitcher sampler into the fine-grained unit in wells DM-1 and DM-2. The sampler was not effective in obtaining a sample in several attempts on well DM-1 because of the gravelly nature of the sediments. In order to obtain a sample, an 8-in. diameter split-spoon sampler with an 18-in. liner was driven and a sample obtained for permeability analysis. Shelby tube samplers were considered but were not used because it was determined that the tubes would probably collapse due to the presence of gravels and the compact nature of the fine-grained layer. A centering tool along with the use of air circulation was only moderately effective in obtaining a minimally disturbed sample at well DM-2. Split-spoon samples of the fine-grained unit were also obtained at well DM-2. These samples were sent to Shannon and Wilson, Inc., for analyses including: 1) density on the whole tube, 2) a constant head permeability test on an undisturbed sample, 3) one point Atterburg limit, 4) extrusion of the sample from the tube and sample description, 5) a combined washed sieve analysis, and 6) a hydrometer analysis. The results of these analyses have not yet been received but will be included in a report to be issued later.

TABLE 7. Proposed Hydrologic Testing and Sampling of Wells at the NRDW Landfill

<u>Geologic Unit</u>	<u>Date Completed</u>	<u>Test Method</u>
Hanford formation (upper 40 to 50 ft of aquifer)	10/17/86	Multiple-well constant discharge aquifer test at upgradient well DM-1
Ringold Formation above fine-grained layer	12/21/86	Multiple-well constant discharge aquifer test at upgradient well DM-1
Ringold Formation below fine-grained layer	12/23/86	Multiple-well constant discharge aquifer test at downgradient well DM-2
Fine-grained layer		Laboratory permeability analysis on Pitcher samples from wells DM-1 and DM-2

The horizontal hydraulic gradient beneath the NRDW Landfill was evaluated after wells SM-1, SM-2, and SM-3 were completed and developed. The results of this evaluation were used to site wells SM-4 and SM-5. A very shallow gradient (0.1 ft in 1300 ft) occurs, and the ground water flows from west/northwest to east/southeast beneath the NRDW Landfill. Multiple water level measurements were made in wells SM-1, SM-2, and SM-3 daily for a week. Continuous recorders with floats were also placed at each well. The data indicated slight diurnal effects on water levels, and barometric corrections were applied. The corrected water levels were subtracted from surveyed casing elevations to obtain water table elevations. The final characterization report will include all data and analyses.

Aquifer drawdown and recovery data were recorded with pressure transducers and data loggers. Preliminary evaluation of data from the first aquifer test (pumping well DM-1) indicates that the Hanford formation is highly transmissive. Testing of the Ringold Formation above the clay layers (pumping well DM-1) indicated a less transmissive zone and showed significant drawdown in the

upper piezometer in observation well DO-1A above the clay, while negligible drawdown was observed in the lower piezometer below the clay.

Preliminary evaluation of the aquifer test below the fine-grained layer (pumping well DM-2) indicates significant drawdown in both DO-2 and DO-1A below the fine-grained layer and negligible drawdown above it. These estimates indicate that this layer is a confining bed and that it is continuous beneath the NRDW Landfill. Analysis of the aquifer tests is ongoing and the data and results will be contained in the final characterization report.

ROUTINE SAMPLING AND ANALYSIS OF THE GROUND WATER

Ground-water samples were collected from shallow monitoring wells SM-1 through SM-5 on October 1, 1986, by PNL sampling technicians and were submitted to UST for analysis. The analyses conducted on these samples and the procedures used for sampling and Chain-of-Custody are described in the compliance plan for this facility (USD OE 1986a).

The analytical results for this first sample set are reported in Volume 3, Appendix G. Preliminary comparison of the data from upgradient and downgradient wells indicates no apparent impacts of the NRDW Landfill on the ground water.

The general ground-water chemistry was found to be calcium bicarbonate in nature, as indicated by the Stiff diagrams in Figure 41. The Stiff diagrams graphically present the major cations and anions in the ground-water system. The diagrams for the five shallow monitoring wells are nearly identical, indicating that the ground water beneath the NRDW Landfill is a homogeneous solution at the sampling depths of wells SM-1 through SM-5. Bicarbonate ion concentration was determined as the difference between total carbon and total organic carbon, assuming that all inorganic carbon was present as bicarbonate.

The analytical results for this first sample set were compared with the Interim Primary Drinking Water Standards, and no constituent was found to exceed these standards. Barium, phenol, and gross beta were detected in the samples from all five wells. Iron was detected in samples from wells SM-1, SM-2, and SM-3, and gross alpha was reported as being slightly above the detection

FIGURE 41. Stiff Diagrams for First Quarter Samples from Shallow Wells at the NRDW Landfill

limit in the sample from well SM-2. Analytical results for these constituents will be tracked over the following quarters to determine if any trends are evident.

Subsequent sampling to be conducted at the NRDW Landfill will include the complete ground-water monitoring system, comprised of five shallow and two deep monitoring wells.

REFERENCES

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- Washington State Department of Ecology. 1973. Minimum Standards for Construction and Maintenance of Water Wells. Washington Administrative Code, Chapter 173-160, Olympia, Washington.
- Washington State Department of Ecology. July 1986 (Amended). Dangerous Waste Regulations. Washington Administrative Code, Chapter 173-303, Olympia, Washington.

APPENDIX A

RAW ANALYTICAL DATA FOR GROUND-WATER SAMPLES COLLECTED FROM WELLS
IN THE 100-H AND 300 AREAS

APPENDIX A

RAW ANALYTICAL DATA FOR GROUND-WATER SAMPLES COLLECTED FROM WELLS IN THE 100-H AND 300 AREAS

Tables A.1 and A.2 contain the raw analytical data collected from the ground-water monitoring networks for the 183-H Solar Evaporation Basins and the 300 Area Process Trenches, respectively, for September through November 1986. Only those constituents with at least one value above the detection limit are included in these tables.

Reported values are marked as being below the detection limit (<) where appropriate. In most cases the value reported will be the detection limit itself, but if an actual value below the detection limit is reported by the laboratory, that value is given here. For radiological measurements, a detection limit is given, but the actual analytical value is reported and stated as below detection only if it is less than its associated counting error. An "M" in the column labeled "Concentration" indicates a missing data point.

TABLE A.1 Raw Analytical Data for Ground-Water Samples Collected from Wells
in the 100-H Area for September, October, and November 1986

Constituent List = Contamination Indicators

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
191	CONDUCT	UMHO	.	199-H3-1	16SEP86		725
					24OCT86		610
					19NOV86		644
				199-H4-3	15SEP86		1,980
					24OCT86		1,412
					17NOV86		1,160
				199-H4-4	15SEP86		1,150
					24OCT86		1,357
					19NOV86		892
				199-H4-5	16SEP86		457
					27OCT86		430
					19NOV86		405
				199-H4-6	15SEP86		417
					29OCT86		529
					17NOV86		492

Constituent List = Contamination Indicators

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
199	PH		.	199-H3-1	16SEP86		7.60
					24OCT86		7.60
					19NOV86		7.90
				199-H4-3	15SEP86		8.10
					24OCT86		8.00
					17NOV86		8.30
				199-H4-4	15SEP86		8.00
					24OCT86		7.60
					19NOV86		7.50
				199-H4-5	16SEP86		7.40
					27OCT86		7.50
					19NOV86		7.60
				199-H4-6	15SEP86		7.90
					29OCT86		7.70
					17NOV86		8.10

TABLE A.1 (contd)

 Constituent List = Contamination Indicators

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
C69	TOC	PPB	1000	199-H3-1	16SEP86		1,220
					24OCT86	<	887
					19NOV86		M
				199-H4-3	15SEP86		1,100
					24OCT86	<	730
					17NOV86		M
				199-H4-4	15SEP86	<	875
					24OCT86	<	625
					19NOV86		M
				199-H4-5	16SEP86	<	693
					27OCT86	<	598
					19NOV86		M
				199-H4-6	15SEP86		1,010
					29OCT86	<	856
					17NOV86		M

 Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 1

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
109	COLIFRM	MPN	2.2	199-H3-1	16SEP86	<	2.20
					24OCT86	<	2.20
					19NOV86	<	2.20
				199-H4-3	15SEP86	<	2.20
					24OCT86	<	2.20
					17NOV86	<	2.20
				199-H4-4	15SEP86	<	2.20
					24OCT86	<	2.20
					19NOV86		2.20
				199-H4-5	16SEP86	<	2.20
					27OCT86	<	2.20
					19NOV86	<	2.20
				199-H4-6	15SEP86	<	2.20
					29OCT86	<	2.20
					17NOV86	<	2.20

TABLE A.1 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 50

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
111	BETA	PCI/L	8	199-H3-1	16SEP86		12.9
					24OCT86		26.4
					19NOV86		15.0
				199-H4-3	15SEP86		547
					24OCT86		318
					17NOV86		238
				199-H4-4	15SEP86		458
					24OCT86		417
					19NOV86		357
				199-H4-5	16SEP86		13.0
					27OCT86		11.2
					19NOV86		6.87
				199-H4-6	15SEP86		11.9
					29OCT86		12.8
					17NOV86		8.83

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 5

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
181	RADIUM	PCI/L	1	199-H3-1	16SEP86	<	0.032
					24OCT86	<	-0.003
					19NOV86	<	0.061
				199-H4-3	15SEP86		0.358
					24OCT86	<	0.054
					17NOV86	<	0.140
				199-H4-4	15SEP86		0.158
					24OCT86	<	0.105
					19NOV86	<	0.078
				199-H4-5	16SEP86	<	-0.027
					27OCT86	<	0.029
					19NOV86	<	0.076
				199-H4-6	15SEP86	<	0.118
					29OCT86	<	0.097
					17NOV86	<	-0.028

TABLE A.1 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 15

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
212 LOALPHA PCI/L	4	199-H3-1	16SEP86		6.41
			24OCT86		11.5
			19NOV86		4.67
		199-H4-3	15SEP86		179
			24OCT86		249
			17NOV86		167
		199-H4-4	15SEP86		100
			24OCT86		94.8
			19NOV86		61.9
		199-H4-5	16SEP86		1.54
			27OCT86		1.98
			19NOV86		2.78
		199-H4-6	15SEP86		3.27
			29OCT86		2.58
			17NOV86		4.99

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 1000

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
A06 BARIUM PPB	6	199-H3-1	16SEP86		57.0
			24OCT86		54.0
			19NOV86		52.0
		199-H4-3	15SEP86		80.0
			24OCT86		33.0
			17NOV86		32.0
		199-H4-4	15SEP86		104
			24OCT86		110
			19NOV86		60.0
		199-H4-5	16SEP86		52.0
			27OCT86		52.0
			19NOV86		54.0
		199-H4-6	15SEP86		47.0
			29OCT86		46.0
			17NOV86		49.0

TABLE A.1 (contd)

Constituent List = Drinking Water Standards
Primary Drinking Water Standard = 10

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
A07 CADMIUM PPB	2	199-H3-1	16SEP86	<	2.00
			24OCT86	<	2.00
			19NOV86	<	2.00
		199-H4-3	15SEP86		2.00
			24OCT86	<	2.00
			17NOV86	<	2.00
		199-H4-4	15SEP86	<	2.00
			24OCT86		3.00
			19NOV86	<	2.00
		199-H4-5	16SEP86	<	2.00
			27OCT86	<	2.00
			19NOV86	<	2.00
		199-H4-6	15SEP86	<	2.00
			29OCT86	<	2.00
			17NOV86	<	2.00

Constituent List = Drinking Water Standards
Primary Drinking Water Standard = 50

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
A08 CHROMIUM PPB	10	199-H3-1	16SEP86		60.0
			24OCT86		62.0
			19NOV86		50.0
		199-H4-3	15SEP86		571
			24OCT86		426
			17NOV86		405
		199-H4-4	15SEP86		568
			24OCT86		689
			19NOV86		429
		199-H4-5	16SEP86		306
			27OCT86		244
			19NOV86		262
		199-H4-6	15SEP86		51.0
			29OCT86		46.0
			17NOV86		52.0

TABLE A.1 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 10

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
A22 SELENUM PPB	5	199-H3-1	16SEP86		< 5.00
			24OCT86		< 5.00
			19NOV86		< 5.00
		199-H4-3	15SEP86		< 5.00
			24OCT86		< 5.00
			17NOV86		< 5.00
		199-H4-4	15SEP86		< 5.00
			24OCT86		< 5.00
			19NOV86		< 5.00
		199-H4-5	16SEP86		< 5.00
			27OCT86		< 5.00
			19NOV86		5.50
		199-H4-6	15SEP86		< 5.00
			29OCT86		< 5.00
			17NOV86		< 5.00

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 50

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
A51 LEADGF PPB	5	199-H3-1	16SEP86		6.00
			24OCT86		< 5.00
			19NOV86		< 5.00
		199-H4-3	15SEP86		< 5.00
			24OCT86		< 5.00
			17NOV86		< 5.00
		199-H4-4	15SEP86		11.2
			24OCT86		< 5.00
			19NOV86		< 5.00
		199-H4-5	16SEP86		< 5.00
			27OCT86		< 5.00
			19NOV86		< 5.00
		199-H4-6	15SEP86		< 5.00
			29OCT86		< 5.00
			17NOV86		< 5.00

TABLE A.1 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 45000

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
C72	NITRATE	PPB	500	199-H3-1	16SEP86 24OCT86 19NOV86		71,700 57,200 70,900
				199-H4-3	15SEP86 24OCT86 17NOV86		1,120,000 476,000 427,000
				199-H4-4	15SEP86 24OCT86 19NOV86		575,000 528,000 326,000
				199-H4-5	16SEP86 27OCT86 19NOV86		32,200 29,800 33,100
				199-H4-6	15SEP86 29OCT86 17NOV86		36,300 30,000 35,000

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 1400

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
C74	FLUORID	PPB	500	199-H3-1	16SEP86 24OCT86 19NOV86		< 500 < 500 < 500
				199-H4-3	15SEP86 24OCT86 17NOV86		500 < 500 < 500
				199-H4-4	15SEP86 24OCT86 19NOV86		< 500 < 500 < 500
				199-H4-5	16SEP86 27OCT86 19NOV86		< 500 < 500 < 500
				199-H4-6	15SEP86 29OCT86 17NOV86		< 500 < 500 < 500

TABLE A.1 (contd)

Constituent List = Drinking Water Standards
Primary Drinking Water Standard = 1000

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
H20 FBARIUM PPB	6	199-H3-1	16SEP86		49.0
			24OCT86		50.0
			19NOV86		52.0
		199-H4-3	15SEP86		78.0
			24OCT86		28.0
			17NOV86		23.0
		199-H4-4	24OCT86		94.0
			19NOV86		58.0
		199-H4-5	16SEP86		53.0
			27OCT86		47.0
			19NOV86		51.0
		199-H4-6	15SEP86		45.0
			29OCT86		43.0
			17NOV86		48.0

Constituent List = Drinking Water Standards
Primary Drinking Water Standard = 50

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
H22 FCHROMI PPB	10	199-H3-1	16SEP86		44.0
			24OCT86		49.0
			19NOV86		50.0
		199-H4-3	15SEP86		561
			24OCT86		412
			17NOV86		396
		199-H4-4	24OCT86		522
			19NOV86		407
		199-H4-5	16SEP86		303
			27OCT86		238
			19NOV86		251
		199-H4-6	15SEP86		41.0
			29OCT86		46.0
			17NOV86		44.0

TABLE A.1 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 50

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
H37	FARSEN	PPB	5	199-H3-1	16SEP86		< 5.00
					24OCT86		< 5.00
					19NOV86		< 5.00
				199-H4-3	15SEP86		< 5.00
					24OCT86		5.40
					17NOV86		6.30
				199-H4-4	24OCT86		< 5.00
					19NOV86		< 5.00
				199-H4-5	16SEP86		< 5.00
					27OCT86		< 5.00
					19NOV86		< 5.00
				199-H4-6	15SEP86		< 5.00
					29OCT86		< 5.00
					17NOV86		< 5.00

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 50

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
H41	FLEAD	PPB	5	199-H3-1	16SEP86		< 5.00
					24OCT86		< 5.00
					19NOV86		< 5.00
				199-H4-3	15SEP86		< 5.00
					24OCT86		< 5.00
					17NOV86		< 5.00
				199-H4-4	24OCT86		< 5.00
					19NOV86		< 5.00
				199-H4-5	16SEP86		< 5.00
					27OCT86		< 5.00
					19NOV86		< 5.00
				199-H4-6	15SEP86		< 5.00
					29OCT86		< 5.00
					17NOV86		7.30

TABLE A.1 (contd)

Constituent List = Quality Characteristics

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
A11 SODIUM PPB	100	199-H3-1	16SEP86		23,700
			24OCT86		21,800
			19NOV86		22,800
		199-H4-3	15SEP86		458,000
			24OCT86		276,000
			17NOV86		247,000
		199-H4-4	15SEP86		208,000
			24OCT86		213,000
			19NOV86		155,000
		199-H4-5	16SEP86		10,400
			27OCT86		9,900
			19NOV86		10,600
		199-H4-6	15SEP86		23,200
			29OCT86		22,700
			17NOV86		23,800

Constituent List = Quality Characteristics

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
A17 MANGESE PPB	5	199-H3-1	16SEP86		< 5.00
			24OCT86		< 5.00
			19NOV86		< 5.00
		199-H4-3	15SEP86		10.0
			24OCT86		9.00
			17NOV86		8.00
		199-H4-4	15SEP86		< 5.00
			24OCT86		15.0
			19NOV86		< 5.00
		199-H4-5	16SEP86		< 5.00
			27OCT86		< 5.00
			19NOV86		< 5.00
		199-H4-6	15SEP86		69.0
			29OCT86		92.0
			17NOV86		92.0

TABLE A.1 (contd)

 Constituent List = Quality Characteristics

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
A19	IRON	PPB	50	199-H3-1	16SEP86		237
					24OCT86		< 50.0
					19NOV86		< 50.0
				199-H4-3	15SEP86		587
					24OCT86		609
					17NOV86		692
				199-H4-4	15SEP86		74.0
					24OCT86		2,300
					19NOV86		108
				199-H4-5	16SEP86		< 50.0
					27OCT86		66.0
					19NOV86		76.0
				199-H4-6	15SEP86		185
					29OCT86		478
					17NOV86		201

Constituent List = Quality Characteristics

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
C73	SULFATE	PPB	500	199-H3-1	16SEP86		82,700
					24OCT86		67,300
					19NOV86		81,600
				199-H4-3	15SEP86		123,000
					24OCT86		80,200
					17NOV86		78,400
				199-H4-4	15SEP86		92,000
					24OCT86		75,800
					19NOV86		63,000
				199-H4-5	16SEP86		48,700
					27OCT86		50,300
					19NOV86		51,500
				199-H4-6	15SEP86		90,600
					29OCT86		89,200
					17NOV86		88,900

TABLE A.1 (contd)

Constituent List = Quality Characteristics

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
C75	CHLORID	PPB	500	199-H3-1	16SEP86		9,790
					24OCT86		9,350
					19NOV86		9,440
				199-H4-3	15SEP86		9,740
					24OCT86		7,910
					17NOV86		8,120
				199-H4-4	15SEP86		6,010
					24OCT86		9,560
					19NOV86		6,040
				199-H4-5	16SEP86		5,240
					27OCT86		5,430
					19NOV86		5,580
				199-H4-6	15SEP86		12,900
					29OCT86		12,700
					17NOV86		12,700

Constituent List = Quality Characteristics

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
H24	FSODIUM	PPB	100	199-H3-1	16SEP86		23,100
					24OCT86		20,800
					19NOV86		22,800
				199-H4-3	15SEP86		498,000
					24OCT86		272,000
					17NOV86		242,000
				199-H4-4	24OCT86		197,000
					19NOV86		151,000
				199-H4-5	16SEP86		11,000
					27OCT86		9,860
					19NOV86		9,590
				199-H4-6	15SEP86		23,000
					29OCT86		21,800
					17NOV86		23,700

TABLE A.1 (contd)

Constituent List = Quality Characteristics

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
H29	FMANGAN	PPB	5	199-H3-1	16SEP86	<	5.00
					24OCT86	<	5.00
					19NOV86	<	5.00
				199-H4-3	15SEP86	<	5.00
					24OCT86	<	5.00
					17NOV86	<	5.00
				199-H4-4	24OCT86	<	5.00
					19NOV86	<	5.00
				199-H4-5	16SEP86	<	5.00
					27OCT86	<	5.00
					19NOV86	<	5.00
				199-H4-6	15SEP86		47.0
					29OCT86		58.0
					17NOV86		61.0

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
010	CO 60	PCI/L	22.5	199-H3-1	24OCT86	<	4.26
				199-H4-3	24OCT86		5.63

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
121	SR 90	PCI/L	5	199-H3-1	24OCT86	<	0.340
				199-H4-3	24OCT86		0.670

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
124	U-CHEM		.	199-H3-1	24OCT86		7.86
				199-H4-3	24OCT86		275

TABLE A.1 (contd)

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
A03	STRONUM	PPB	300	199-H3-1	16SEP86		492
					24OCT86		488
					19NOV86		497
				199-H4-3	15SEP86		320
					24OCT86	<	300
					17NOV86	<	300
				199-H4-4	15SEP86		368
					24OCT86		363
					19NOV86	<	300
				199-H4-5	16SEP86	<	300
					27OCT86	<	300
					19NOV86	<	300
				199-H4-6	15SEP86		339
					29OCT86		329
					17NOV86		344

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
A04	ZINC	PPB	5	199-H3-1	16SEP86	<	5.00
					24OCT86	<	5.00
					19NOV86	<	5.00
				199-H4-3	15SEP86		7.00
					24OCT86	<	5.00
					17NOV86	<	5.00
				199-H4-4	15SEP86		83.0
					24OCT86		354
					19NOV86		64.0
				199-H4-5	16SEP86		54.0
					27OCT86		48.0
					19NOV86		47.0
				199-H4-6	15SEP86		121
					29OCT86		309
					17NOV86		140

TABLE A.1 (contd)

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
A05	CALCIUM	PPB	50	199-H3-1	16SEP86		81,000
					24OCT86		82,100
					19NOV86		79,000
				199-H4-3	15SEP86		54,600
					24OCT86		20,900
					17NOV86		18,600
				199-H4-4	15SEP86		70,900
					24OCT86		79,300
					19NOV86		40,200
				199-H4-5	16SEP86		57,700
					27OCT86		56,300
					19NOV86		57,000
				199-H4-6	15SEP86		63,200
					29OCT86		61,700
					17NOV86		66,800

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
A12	NICKEL	PPB	10	199-H3-1	16SEP86	<	10.0
					24OCT86	<	10.0
					19NOV86	<	10.0
				199-H4-3	15SEP86		59.0
					24OCT86		32.0
					17NOV86		20.0
				199-H4-4	15SEP86		24.0
					24OCT86		26.0
					19NOV86		15.0
				199-H4-5	16SEP86	<	10.0
					27OCT86	<	10.0
					19NOV86	<	10.0
				199-H4-6	15SEP86	<	10.0
					29OCT86	<	10.0
					17NOV86	<	10.0

TABLE A.1 (contd)

Constituent List = Site Specific
Proposed EPA Limit = 1300

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
A13	COPPER	PPB	10	199-H3-1	16SEP86		< 10.0
					24OCT86		< 10.0
					19NOV86		< 10.0
				199-H4-3	15SEP86		70.0
					24OCT86		26.0
					17NOV86		23.0
				199-H4-4	15SEP86		11.0
					24OCT86		29.0
					19NOV86	<	10.0
				199-H4-5	16SEP86	<	10.0
					27OCT86	<	10.0
					19NOV86	<	10.0
				199-H4-6	15SEP86	<	10.0
					29OCT86	<	10.0
					17NOV86	<	10.0

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
A14	VANADIUM	PPB	5	199-H3-1	16SEP86		10.0
					24OCT86		10.0
					19NOV86		8.00
				199-H4-3	15SEP86	<	5.00
					24OCT86		11.0
					17NOV86		11.0
				199-H4-4	15SEP86		6.00
					24OCT86	<	5.00
					19NOV86		5.00
				199-H4-5	16SEP86	<	5.00
					27OCT86		5.00
					19NOV86		5.00
				199-H4-6	15SEP86		8.00
					29OCT86		5.00
					17NOV86		7.00

TABLE A.1 (contd)

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
A16	ALUMNUM	PPB	150	199-H3-1	16SEP86		< 150
					24OCT86		< 150
					19NOV86		< 150
				199-H4-3	15SEP86		414
					24OCT86		430
					17NOV86		563
				199-H4-4	15SEP86		< 150
					24OCT86		243
					19NOV86		< 150
				199-H4-5	16SEP86		< 150
					27OCT86		< 150
					19NOV86		< 150
				199-H4-6	15SEP86		< 150
					29OCT86		< 150
					17NOV86		< 150

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
A18	POTASUM	PPB	100	199-H3-1	16SEP86		6,870
					24OCT86		6,780
					19NOV86		6,810
				199-H4-3	15SEP86		8,080
					24OCT86		4,780
					17NOV86		4,550
				199-H4-4	15SEP86		7,060
					24OCT86		7,430
					19NOV86		5,360
				199-H4-5	16SEP86		4,370
					27OCT86		4,460
					19NOV86		4,720
				199-H4-6	15SEP86		6,230
					29OCT86		6,160
					17NOV86		6,300

TABLE A.1 (contd)

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
A50	MAGNES	PPB	0	199-H3-1	16SEP86		21,800
					24OCT86		20,700
					19NOV86		19,900
				199-H4-3	15SEP86		8,670
					24OCT86		3,540
					17NOV86		3,250
				199-H4-4	15SEP86		9,490
					24OCT86		9,830
					19NOV86		5,730
				199-H4-5	16SEP86		10,000
					27OCT86		9,570
					19NOV86		9,930
				199-H4-6	15SEP86		14,100
					29OCT86		13,600
					17NOV86		14,200

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
A80	CHLFORM	PPB	10	199-H3-1	16SEP86		< 10.0
					24OCT86		< 10.0
					19NOV86		< 10.0
				199-H4-3	15SEP86		22.0
					24OCT86		25.0
					17NOV86		21.0
				199-H4-4	15SEP86		19.0
					24OCT86		25.0
					19NOV86		17.0
				199-H4-5	16SEP86		22.0
					27OCT86		23.0
					19NOV86		21.0
				199-H4-6	15SEP86		13.0
					29OCT86		12.0
					17NOV86		11.0

TABLE A.1 (contd)

Constituent List = Site Specific

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
C80 AMMONIU PPB	50	199-H3-1	16SEP86		< 50.0
			24OCT86		80.0
			19NOV86		< 50.0
		199-H4-3	15SEP86		< 50.0
			24OCT86		158
			17NOV86		< 50.0
		199-H4-4	15SEP86		< 50.0
			24OCT86		61.0
			19NOV86		< 50.0
		199-H4-5	16SEP86		< 50.0
			27OCT86		97.0
			19NOV86		< 50.0
		199-H4-6	15SEP86		58.0
			29OCT86		845
			17NOV86		117

Constituent List = Site Specific

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
H18 FZINC PPB	5	199-H3-1	16SEP86		31.0
			24OCT86		< 5.00
			19NOV86		< 5.00
		199-H4-3	15SEP86		< 5.00
			24OCT86		< 5.00
			17NOV86		< 5.00
		199-H4-4	24OCT86		99.0
			19NOV86		66.0
		199-H4-5	16SEP86		47.0
			27OCT86		46.0
			19NOV86		44.0
		199-H4-6	15SEP86		110
			29OCT86		176
			17NOV86		118

TABLE A.1 (contd)

Constituent List = Site Specific

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
H19 FCALCIU PPB	50	199-H3-1	16SEP86		75,700
			24OCT86		77,400
			19NOV86		80,300
		199-H4-3	15SEP86		54,100
			24OCT86		19,900
			17NOV86		16,400
		199-H4-4	24OCT86		72,000
			19NOV86		38,500
		199-H4-5	16SEP86		57,900
			27OCT86		55,900
			19NOV86		54,800
		199-H4-6	15SEP86		62,200
			29OCT86		58,100
			17NOV86		66,400

Constituent List = Site Specific

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
H25 FNICKEL PPB	10	199-H3-1	16SEP86		< 10.0
			24OCT86		< 10.0
			19NOV86		< 10.0
		199-H4-3	15SEP86		50.0
			24OCT86		23.0
			17NOV86		20.0
		199-H4-4	24OCT86		26.0
			19NOV86		13.0
		199-H4-5	16SEP86		< 10.0
			27OCT86		< 10.0
			19NOV86		< 10.0
		199-H4-6	15SEP86		< 10.0
			29OCT86		< 10.0
			17NOV86		< 10.0

TABLE A.1 (contd)

Constituent List = Site Specific
Proposed EPA Limit = 1300

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
H26 FCOPPER PPB	10	199-H3-1	16SEP86		< 10.0
			24OCT86		< 10.0
			19NOV86		< 10.0
		199-H4-3	15SEP86		68.0
			24OCT86		28.0
			17NOV86		23.0
		199-H4-4	24OCT86		< 10.0
			19NOV86		< 10.0
		199-H4-5	16SEP86		< 10.0
			27OCT86		< 10.0
			19NOV86		< 10.0
		199-H4-6	15SEP86		< 10.0
			29OCT86		< 10.0
			17NOV86		< 10.0

Constituent List = Site Specific

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
H27 FVANADI PPB	5	199-H3-1	16SEP86		7.00
			24OCT86		9.00
			19NOV86		8.00
		199-H4-3	15SEP86		< 5.00
			24OCT86		10.0
			17NOV86		14.0
		199-H4-4	24OCT86		< 5.00
			19NOV86		< 5.00
		199-H4-5	16SEP86		< 5.00
			27OCT86		< 5.00
			19NOV86		6.00
		199-H4-6	15SEP86		6.00
			29OCT86		7.00
			17NOV86		10.0

TABLE A.1 (contd)

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
H30	FPOTASS	PPB	100	199-H3-1	16SEP86		6,690
					24OCT86		6,420
					19NOV86		6,810
				199-H4-3	15SEP86		8,540
					24OCT86		4,720
					17NOV86		4,380
				199-H4-4	24OCT86		7,170
					19NOV86		5,270
				199-H4-5	16SEP86		4,500
					27OCT86		4,480
					19NOV86		4,370
				199-H4-6	15SEP86		5,990
					29OCT86		5,860
					17NOV86		6,220

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Replicate	Concentration
H32	FMAGNES	PPB	0	199-H3-1	16SEP86		20,000
					24OCT86		19,000
					19NOV86		19,900
				199-H4-3	15SEP86		8,710
					24OCT86		3,270
					17NOV86		2,720
				199-H4-4	24OCT86		9,230
					19NOV86		5,500
				199-H4-5	16SEP86		10,200
					27OCT86		9,520
					19NOV86		9,420
				199-H4-6	15SEP86		14,200
					29OCT86		13,200
					17NOV86		14,200

TABLE A.1 (contd)

Constituent List = Site Specific

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
H35 FSTRONT PPB	300	199-H3-1	16SEP86		468
			24OCT86		459
		199-H4-3	15SEP86		324
			24OCT86	<	300
		199-H4-4	15SEP86		380
		199-H4-5	16SEP86	<	300
		199-H4-6	15SEP86		324

Constituent List = Site Specific tag-alongs

Constituent Code Abbrev Units	Detection Limit	Well	Date	Replicate	Concentration
A01 BERYLAM PPB	5	199-H3-1	24OCT86		5.00
			19NOV86	<	5.00
		199-H4-3	24OCT86	<	5.00
			17NOV86	<	5.00
		199-H4-4	24OCT86	<	5.00
			19NOV86	<	5.00
		199-H4-5	27OCT86	<	5.00
			19NOV86	<	5.00
		199-H4-6	29OCT86	<	5.00
			17NOV86	<	5.00

TABLE A.2 Raw Analytical Data for Ground-Water Samples Collected from Wells in the 300 Area for September, October, and November 1986

Constituent List = Contamination Indicators

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
191	CONDUCT	UMHO	.	399-1-1	18SEP86 21OCT86 12NOV86		173 173 180
				399-1-2	18SEP86 13OCT86 12NOV86		210 251 197
				399-1-3	17SEP86 28OCT86 14NOV86		211 219 220
				399-1-4	18SEP86 21OCT86 14NOV86		174 170 173
				399-1-5	17SEP86 23OCT86 17NOV86		193 225 220
				399-1-6	18SEP86 20OCT86 14NOV86		167 166 166
				399-1-7	17SEP86 28OCT86 13NOV86		212 220 217
				399-1-8	17SEP86 28OCT86 13NOV86		278 276 259
				399-2-1	22SEP86 21OCT86 12NOV86		221 227 222
				399-3-10	19SEP86 22OCT86 11NOV86		238 268 256
				399-3-7	19SEP86 20OCT86 10NOV86		360 381 346
				399-4-1	23SEP86 23OCT86 11NOV86		332 348 334
				399-4-7	19SEP86 22OCT86 10NOV86		287 348 315
				399-8-2	22SEP86 22OCT86 13NOV86		343 393 369
				699-S19-E13	22SEP86 21OCT86 11NOV86		440 418 407
				699-S30E15A	22SEP86 23OCT86 11NOV86		496 481 478

TABLE A.2 (contd)

Constituent List = Contamination Indicators

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
199 PH	.	399-1-1	18SEP86		7.20
			21OCT86		7.50
			12NOV86		7.20
		399-1-2	18SEP86		7.10
			13OCT86		7.20
			12NOV86		6.70
		399-1-3	17SEP86		7.00
			28OCT86		7.10
			14NOV86		6.90
		399-1-4	18SEP86		6.50
			21OCT86		7.20
			14NOV86		6.70
		399-1-5	17SEP86		6.70
			23OCT86		6.80
			17NOV86		7.30
		399-1-6	18SEP86		6.50
			20OCT86		5.90
			14NOV86		6.50
		399-1-7	17SEP86		7.10
			28OCT86		7.00
			13NOV86		6.90
		399-1-8	17SEP86		7.90
			28OCT86		7.90
			13NOV86		7.60
		399-2-1	22SEP86		5.90
			21OCT86		6.80
			12NOV86		6.40
		399-3-10	19SEP86		6.60
			22OCT86		6.90
			11NOV86		6.50
		399-3-7	19SEP86		7.60
			20OCT86		7.00
			10NOV86		7.10
		399-4-1	23SEP86		7.70
			23OCT86		7.60
			11NOV86		7.40
		399-4-7	19SEP86		7.30
			22OCT86		7.30
			10NOV86		6.90
		399-8-2	22SEP86		7.10
			22OCT86		7.60
			13NOV86		7.60
		699-S19-E13	22SEP86		7.80
			21OCT86		8.10
			11NOV86		7.40
		699-S30E15A	22SEP86		6.90
			23OCT86		7.40
			11NOV86		6.80

TABLE A.2 (contd)

Constituent List = Contamination Indicators

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
C89	TOC	PPB	1000	399-1-1	18SEP86 21OCT86 12NOV86		< 789 < 892 M
				399-1-2	18SEP86 13OCT86 12NOV86		< 506 1,270 M
				399-1-3	17SEP86 28OCT86 14NOV86		< 670 < 368 M
				399-1-4	18SEP86 21OCT86 14NOV86		< 637 < 685 M
				399-1-5	17SEP86 23OCT86 17NOV86		< 754 < 506 M
				399-1-6	18SEP86 20OCT86 14NOV86		< 841 1,480 M
				399-1-7	17SEP86 28OCT86 13NOV86		< 562 < 708 M
				399-1-8	17SEP86 28OCT86 13NOV86		< 593 < 274 M
				399-2-1	22SEP86 21OCT86 12NOV86		< 588 < 463 M
				399-3-10	19SEP86 22OCT86 11NOV86		< 621 < 489 < 486
				399-3-7	19SEP86 20OCT86 10NOV86		1,370 2,100 < 641
				399-4-1	23SEP86 23OCT86 11NOV86		< 243 < 92.0 < 322
				399-4-7	19SEP86 22OCT86 10NOV86		< 543 < 232 < 501
				399-8-2	22SEP86 22OCT86 13NOV86		< 398 < 882 M
				699-S19-E13	22SEP86 21OCT86 11NOV86		< 392 < 88.0 < 201
				699-S30E15A	22SEP86 22OCT86 11NOV86		1,640 < 940 < 946

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 1

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
109 COLIFRM MPN	2.2	399-1-1	18SEP86		< 2.20
			21OCT86		< 2.20
			12NOV86		< 2.20
		399-1-2	18SEP86		< 2.20
			13OCT86		9.20
			12NOV86		5.10
		399-1-3	17SEP86		< 2.20
			28OCT86		< 2.20
			14NOV86		< 2.20
		399-1-4	18SEP86		< 2.20
			21OCT86		16.0
			14NOV86		< 2.20
		399-1-5	17SEP86		< 2.20
			23OCT86		< 2.20
			17NOV86		< 2.20
		399-1-6	18SEP86		< 2.20
			20OCT86		< 2.20
			14NOV86		< 2.20
		399-1-7	17SEP86		< 2.20
			28OCT86		< 2.20
			13NOV86		< 2.20
		399-1-8	17SEP86		< 2.20
			28OCT86		< 2.20
			13NOV86		< 2.20
		399-2-1	22SEP86		16.0
			21OCT86		2.20
			12NOV86		< 2.20
		399-3-10	19SEP86		< 2.20
			22OCT86		< 2.20
			11NOV86		< 2.20
		399-3-7	19SEP86		< 2.20
			20OCT86		< 2.20
			10NOV86		< 2.20
		399-4-1	23SEP86		2.20
			23OCT86		5.10
			11NOV86		< 2.20
		399-4-7	19SEP86		9.20
			22OCT86		2.20
			10NOV86		5.10
		399-8-2	22SEP86		16.0
			22OCT86		16.0
			13NOV86		< 2.20
		699-S19-E13	22SEP86		< 2.20
			21OCT86		< 2.20
			11NOV86		< 2.20
		699-S30E15A	22SEP86		2.20
			22OCT86		9.20
			11NOV86		< 2.20

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 50

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
111	BETA	PCI/L	8	399-1-1	18SEP86 21OCT86 12NOV86		9.88 8.68 7.17
				399-1-2	18SEP86 13OCT86 12NOV86		9.38 13.0 18.5
				399-1-3	17SEP86 28OCT86 14NOV86		24.9 22.8 28.6
				399-1-4	18SEP86 21OCT86 14NOV86		8.76 14.5 20.6
				399-1-5	17SEP86 23OCT86 17NOV86		8.72 11.6 18.3
				399-1-6	18SEP86 20OCT86 14NOV86		12.4 8.58 7.29
				399-1-7	17SEP86 28OCT86 13NOV86		23.6 30.1 21.1
				399-1-8	17SEP86 28OCT86 13NOV86		14.5 15.7 10.4
				399-2-1	22SEP86 21OCT86 12NOV86		16.3 18.3 16.0
				399-3-10	19SEP86 22OCT86 11NOV86		14.2 10.0 15.8
				399-3-7	18SEP86 20OCT86 10NOV86		7.77 10.7 10.5
				399-4-1	23SEP86 23OCT86 11NOV86		9.16 8.98 12.7
				399-4-7	19SEP86 22OCT86 10NOV86		18.8 15.7 16.4
				399-8-2	22SEP86 22OCT86 13NOV86		5.39 10.8 10.9
				699-S19-E13	22SEP86 21OCT86 11NOV86		12.5 11.5 10.5
				699-S30E15A	22SEP86 23OCT86 11NOV86		20.5 38.4 10.0

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 5

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
181	RADIUM	PCI/L	1	399-1-1	18SEP86 21OCT86 12NOV86	< < <	-0.009 0.029 0.000
				399-1-2	18SEP86 13OCT86 12NOV86	< < <	-0.027 0.016 0.078
				399-1-3	17SEP86 28OCT86 14NOV86	< < <	0.028 0.046 -0.053
				399-1-4	18SEP86 21OCT86 14NOV86	< < <	-0.053 0.034 0.093
				399-1-5	17SEP86 23OCT86 17NOV86	< < <	-0.101 0.097 -0.003
				399-1-6	18SEP86 20OCT86 14NOV86	< < <	0.040 0.000 -0.009
				399-1-7	17SEP86 28OCT86 13NOV86	< < <	0.069 0.062 0.019
				399-1-8	17SEP86 28OCT86 13NOV86	< < <	0.031 0.045 -0.052
				399-2-1	22SEP86 21OCT86 12NOV86	< < <	0.130 0.008 0.050
				399-3-10	19SEP86 22OCT86 11NOV86	< < <	-0.002 -0.013 0.017
				399-3-7	18SEP86 20OCT86 10NOV86	< < <	0.050 0.168 0.101
				399-4-1	23SEP86 23OCT86 11NOV86	< < <	0.058 -0.011 -0.065
				399-4-7	19SEP86 22OCT86 10NOV86	< < <	0.082 0.028 0.031
				399-8-2	22SEP86 22OCT86 13NOV86	<	0.321 0.034 0.145
				699-S19-E13	22SEP86 21OCT86 11NOV86	< < <	0.004 0.056 -0.049
				699-S30E15A	22SEP86 23OCT86 11NOV86	< < <	0.057 0.167 0.092

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 15

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
212 LOALPHA PCI/L	4	399-1-1	18SEP86		11.6
			21OCT86		10.6
			12NOV86		8.92
		399-1-2	18SEP86		6.85
			13OCT86		7.21
			12NOV86		6.41
		399-1-3	17SEP86		17.5
			28OCT86		15.6
			14NOV86		19.0
		399-1-4	18SEP86		3.96
			21OCT86		5.26
			14NOV86		7.77
		399-1-5	17SEP86		7.35
			23OCT86		12.3
			17NOV86		14.7
		399-1-6	18SEP86		3.45
			20OCT86		4.89
			14NOV86		3.48
		399-1-7	17SEP86		18.7
			28OCT86		15.2
			13NOV86		20.2
		399-1-8	17SEP86		5.47
			28OCT86		7.76
			13NOV86		6.51
		399-2-1	22SEP86		5.39
			21OCT86		6.99
			12NOV86		7.48
		399-3-10	19SEP86		13.7
			22OCT86		14.2
			11NOV86		14.8
		399-3-7	18SEP86		6.80
			20OCT86		8.28
			10NOV86		9.32
		399-4-1	23SEP86		11.0
			23OCT86		11.9
			11NOV86		10.7
		399-4-7	19SEP86		20.5
			22OCT86		33.4
			10NOV86		33.9
		399-8-2	22SEP86		< 1.09
			22OCT86		1.78
			13NOV86		2.14
		699-S19-E13	22SEP86		3.82
			21OCT86		3.10
			11NOV86		2.87
		699-S30E15A	22SEP86		3.20
			23OCT86		1.99
			11NOV86		< 0.820

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 1000

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
A06 BARIUM PPB	6	399-1-1	18SEP86		29.0
			21OCT86		27.0
			12NOV86		28.0
		399-1-2	18SEP86		20.0
			13OCT86		22.0
			12NOV86		21.0
		399-1-3	17SEP86		18.0
			28OCT86		20.0
			14NOV86		22.0
		399-1-4	18SEP86		18.0
			21OCT86		15.0
			14NOV86		19.0
		399-1-5	17SEP86		20.0
			23OCT86		22.0
			17NOV86		23.0
		399-1-6	18SEP86		18.0
			20OCT86		16.0
			14NOV86		17.0
		399-1-7	17SEP86		17.0
			28OCT86		20.0
			13NOV86		20.0
		399-1-8	17SEP86		29.0
			28OCT86		30.0
			13NOV86		30.0
		399-2-1	22SEP86		42.0
			21OCT86		42.0
			12NOV86		41.0
		399-3-10	19SEP86		42.0
			22OCT86		40.0
			11NOV86		44.0
		399-3-7	19SEP86		38.0
			20OCT86		38.0
			10NOV86		38.0
		399-4-1	23SEP86		35.0
			23OCT86		34.0
			11NOV86		34.0
		399-4-7	19SEP86		38.0
			22OCT86		37.0
			10NOV86		39.0
		399-8-2	22SEP86		39.0
			22OCT86		39.0
			13NOV86		38.0
		699-S19-E13	22SEP86		45.0
			21OCT86		44.0
			11NOV86		44.0
		699-S30E15A	22SEP86		65.0
			22OCT86		61.0
			11NOV86		58.0

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 10

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
A07 CADMIUM PPB	2	399-1-1	18SEP86		< 2.00
			21OCT86		< 2.00
			12NOV86		< 2.00
		399-1-2	18SEP86		< 2.00
			13OCT86		< 2.00
			12NOV86		< 2.00
		399-1-3	17SEP86		< 2.00
			28OCT86		< 2.00
			14NOV86		< 2.00
		399-1-4	18SEP86		< 2.00
			21OCT86		< 2.00
			14NOV86		< 2.00
		399-1-5	17SEP86		< 2.00
			23OCT86		< 2.00
			17NOV86		< 2.00
		399-1-6	18SEP86		< 2.00
			20OCT86		< 2.00
			14NOV86		< 2.00
		399-1-7	17SEP86		< 2.00
			28OCT86		< 2.00
			13NOV86		< 2.00
		399-1-8	17SEP86		< 2.00
			28OCT86		< 4.00
			13NOV86		< 2.00
		399-2-1	22SEP86		< 2.00
			21OCT86		< 2.00
			12NOV86		< 2.00
		399-3-10	19SEP86		< 2.00
			22OCT86		< 2.00
			11NOV86		< 2.00
		399-3-7	19SEP86		< 2.00
			20OCT86		< 2.00
			10NOV86		< 2.00
		399-4-1	23SEP86		< 2.00
			23OCT86		< 4.00
			11NOV86		< 2.00
		399-4-7	19SEP86		< 2.00
			22OCT86		< 2.00
			10NOV86		< 2.00
		399-8-2	22SEP86		< 2.00
			22OCT86		< 2.00
			13NOV86		< 2.00
		699-S19-E13	22SEP86		< 2.00
			21OCT86		< 2.00
			11NOV86		< 2.00
		699-S30E15A	22SEP86		< 2.00
			22OCT86		< 4.00
			11NOV86		< 2.00

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 50

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
A20 ARSENIC PPB	5	399-1-1	18SEP86		< 5.00
			21OCT86		< 5.00
			12NOV86		< 5.00
		399-1-2	18SEP86		< 5.00
			13OCT86		< 5.00
			12NOV86		< 5.00
		399-1-3	17SEP86		< 5.00
			28OCT86		< 5.00
			14NOV86		< 5.00
		399-1-4	18SEP86		< 5.00
			21OCT86		< 5.00
			14NOV86		< 5.00
		399-1-5	17SEP86		< 5.00
			23OCT86		< 5.00
			17NOV86		< 5.00
		399-1-6	18SEP86		< 5.00
			20OCT86		< 5.00
			14NOV86		< 5.00
		399-1-7	17SEP86		< 5.00
			28OCT86		< 5.00
			13NOV86		< 5.00
		399-1-8	17SEP86		< 5.00
			28OCT86		< 5.00
			13NOV86		< 5.00
		399-2-1	22SEP86		< 5.00
			21OCT86		< 5.00
			12NOV86		< 5.00
		399-3-10	19SEP86		< 5.00
			22OCT86		< 5.00
			11NOV86		< 5.00
		399-3-7	19SEP86		< 5.00
			20OCT86		< 5.00
			10NOV86		< 5.00
		399-4-1	23SEP86		< 5.00
			23OCT86		< 5.00
			11NOV86		< 5.00
		399-4-7	19SEP86		< 5.00
			22OCT86		< 5.00
			10NOV86		< 5.00
		399-8-2	22SEP86		< 5.00
			22OCT86		< 5.00
			13NOV86		5.70
		699-S19-E13	22SEP86		< 5.00
			21OCT86		< 5.00
			11NOV86		< 5.00
		699-S30E15A	22SEP86		< 5.00
			22OCT86		< 5.00
			11NOV86		< 5.00

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 50

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
A51	LEADGF	PPB	5	399-1-1	18SEP86 21OCT86 12NOV86		< 5.00 7.70 < 5.00
				399-1-2	18SEP86 13OCT86 12NOV86		< 5.00 < 5.00 < 5.00
				399-1-3	17SEP86 28OCT86 14NOV86		< 5.00 < 5.00 < 5.00
				399-1-4	18SEP86 21OCT86 14NOV86		< 5.00 < 5.00 < 5.00
				399-1-5	17SEP86 23OCT86 17NOV86		7.50 < 5.00 < 5.00
				399-1-6	18SEP86 20OCT86 14NOV86		< 5.00 < 5.00 < 5.00
				399-1-7	17SEP86 28OCT86 13NOV86		< 5.00 < 5.00 < 5.00
				399-1-8	17SEP86 28OCT86 13NOV86		5.60 < 5.00 < 5.00
				399-2-1	22SEP86 21OCT86 12NOV86		< 5.00 < 5.00 < 5.00
				399-3-10	19SEP86 22OCT86 11NOV86		< 5.00 < 5.00 < 5.00
				399-3-7	19SEP86 20OCT86 10NOV86		< 5.00 < 5.00 < 5.00
				399-4-1	23SEP86 23OCT86 11NOV86		< 5.00 < 5.00 < 5.00
				399-4-7	19SEP86 22OCT86 10NOV86		< 5.00 < 5.00 < 5.00
				399-8-2	22SEP86 22OCT86 13NOV86		< 5.00 < 5.00 < 5.00
				699-S19-E13	22SEP86 21OCT86 11NOV86		< 5.00 < 5.00 < 5.00
				699-S30E15A	22SEP86 22OCT86 11NOV86		< 5.00 < 5.00 < 5.00

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 45000

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
C72 NITRATE PPB	500	399-1-1	18SEP86		11,600
			21OCT86		18,500
			12NOV86		9,740
		399-1-2	18SEP86		10,500
			13OCT86		17,200
			12NOV86		10,500
		399-1-3	17SEP86		11,300
			28OCT86		7,280
			14NOV86		9,580
		399-1-4	18SEP86		21,800
			21OCT86		5,820
			14NOV86		14,500
		399-1-5	17SEP86		18,000
			23OCT86		4,390
			17NOV86		16,100
		399-1-6	18SEP86		21,400
			20OCT86		6,030
			14NOV86		16,000
		399-1-7	17SEP86		10,700
			28OCT86		7,630
			13NOV86		9,310
		399-1-8	17SEP86		4,960
			28OCT86		3,380
			13NOV86		3,540
		399-2-1	22SEP86		20,700
			21OCT86		23,700
			12NOV86		20,800
		399-3-10	22OCT86		18,700
			11NOV86		20,900
		399-3-7	19SEP86		15,500
			20OCT86		14,800
			10NOV86		16,600
		399-4-1	23SEP86		14,800
			23OCT86		13,500
			11NOV86		17,000
		399-4-7	19SEP86		17,500
			22OCT86		18,000
			10NOV86		18,500
		399-8-2	22SEP86		20,500
			22OCT86		21,900
			13NOV86		21,700
		699-S19-E13	22SEP86		20,500
			21OCT86		21,400
			11NOV86		22,700
		699-S30E15A	22SEP86		11,900
			23OCT86		11,300
			11NOV86		12,700

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 1400

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
C74	FLUORID	PPB	500	399-1-1	18SEP86 21OCT86 12NOV86		< 500 < 500 < 500
				399-1-2	18SEP86 13OCT86 12NOV86		< 500 < 500 < 500
				399-1-3	17SEP86 28OCT86 14NOV86		550 < 500 < 500
				399-1-4	18SEP86 21OCT86 14NOV86		504 < 500 < 500
				399-1-5	17SEP86 23OCT86 17NOV86		604 < 500 < 500
				399-1-6	18SEP86 20OCT86 14NOV86		< 500 < 500 < 500
				399-1-7	17SEP86 28OCT86 13NOV86		530 < 500 < 500
				399-1-8	17SEP86 28OCT86 13NOV86		< 500 < 500 < 500
				399-2-1	22SEP86 21OCT86 12NOV86		< 500 < 500 < 500
				399-3-10	22OCT86 11NOV86		< 500 < 500
				399-3-7	19SEP86 20OCT86 10NOV86		< 500 < 500 < 500
				399-4-1	23SEP86 23OCT86 11NOV86		< 500 < 500 < 500
				399-4-7	19SEP86 22OCT86 10NOV86		< 500 < 500 < 500
				399-8-2	22SEP86 22OCT86 13NOV86		< 500 < 500 < 500
				699-S19-E13	22SEP86 21OCT86 11NOV86		< 500 < 500 < 500
				699-S30E15A	22SEP86 22OCT86 11NOV86		< 500 < 500 < 500

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 1000

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
H2O FBARIUM PPB	6	399-1-1	18SEP86		30.0
			21OCT86		27.0
			12NOV86		27.0
		399-1-2	18SEP86		20.0
			13OCT86		20.0
			12NOV86		20.0
		399-1-3	17SEP86		18.0
			28OCT86		20.0
			14NOV86		19.0
		399-1-4	18SEP86		17.0
			21OCT86		15.0
			14NOV86		17.0
		399-1-5	17SEP86		19.0
			23OCT86		21.0
			17NOV86		24.0
		399-1-6	18SEP86		18.0
			20OCT86		16.0
			14NOV86		18.0
		399-1-7	28OCT86		21.0
		399-1-8	17SEP86		30.0
			28OCT86		29.0
			13NOV86		33.0
		399-2-1	22SEP86		42.0
			21OCT86		42.0
			12NOV86		41.0
		399-3-10	19SEP86		44.0
			22OCT86		41.0
			11NOV86		43.0
		399-3-7	19SEP86		16.0
			20OCT86		16.0
			10NOV86		20.0
		399-4-1	23SEP86		33.0
			23OCT86		30.0
			11NOV86		34.0
		399-4-7	19SEP86		35.0
			22OCT86		38.0
			10NOV86		35.0
		399-8-2	22SEP86		36.0
			22OCT86		37.0
			13NOV86		38.0
		699-S19-E13	22SEP86		45.0
			21OCT86		44.0
			11NOV86		45.0
		699-S30E15A	22SEP86		65.0
			22OCT86		62.0
			11NOV86		61.0

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 10

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
H21	FCADMIU	PPB	2	399-1-1	18SEP86		< 2.00
					21OCT86		< 2.00
					12NOV86		< 2.00
				399-1-2	18SEP86		< 2.00
					13OCT86		< 2.00
					12NOV86		< 2.00
				399-1-3	17SEP86		< 2.00
					28OCT86		< 2.00
					14NOV86		< 2.00
				399-1-4	18SEP86		< 2.00
					21OCT86		< 2.00
					14NOV86		< 2.00
				399-1-5	17SEP86		< 2.00
					23OCT86		< 2.00
					17NOV86		< 2.00
				399-1-6	18SEP86		< 2.00
					20OCT86		< 2.00
					14NOV86		< 2.00
				399-1-7	28OCT86		< 2.00
				399-1-8	17SEP86		< 2.00
					28OCT86		< 2.00
					13NOV86		< 2.00
				399-2-1	22SEP86		< 2.00
					21OCT86		< 2.00
					12NOV86		< 2.00
				399-3-10	19SEP86		< 2.00
					22OCT86		< 2.00
					11NOV86		< 2.00
				399-3-7	19SEP86		< 2.00
					20OCT86		< 2.00
					10NOV86		< 2.00
				399-4-1	23SEP86		< 2.00
					23OCT86		< 2.00
					11NOV86		< 2.00
				399-4-7	19SEP86		< 2.00
					22OCT86		< 2.00
					10NOV86		< 2.00
				399-8-2	22SEP86		< 2.00
					22OCT86		< 2.00
					13NOV86		< 2.00
				699-S19-E13	22SEP86		< 2.00
					21OCT86		< 2.00
					11NOV86		< 2.00
				699-S30E15A	22SEP86		< 2.00
					22OCT86		< 4.00
					11NOV86		< 2.00

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 50

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
H37 FARSENI PPB	5	399-1-1	18SEP86		< 5.00
			21OCT86		< 5.00
			12NOV86		< 5.00
		399-1-2	18SEP86		< 5.00
			13OCT86		< 5.00
			12NOV86		< 5.00
		399-1-3	17SEP86		< 5.00
			28OCT86		< 5.00
			14NOV86		< 5.00
		399-1-4	18SEP86		< 5.00
			21OCT86		< 5.00
			14NOV86		< 5.00
		399-1-5	17SEP86		< 5.00
			23OCT86		< 5.00
			17NOV86		< 5.00
		399-1-6	18SEP86		< 5.00
			20OCT86		< 5.00
			14NOV86		< 5.00
		399-1-7	28OCT86		< 5.00
		399-1-8	17SEP86		< 5.00
			28OCT86		< 5.00
			13NOV86		< 5.00
		399-2-1	22SEP86		< 5.00
			21OCT86		< 5.00
			12NOV86		< 5.00
		399-3-10	19SEP86		< 5.00
			22OCT86		< 5.00
			11NOV86		< 5.00
		399-3-7	19SEP86		< 5.00
			20OCT86		< 5.00
			10NOV86		< 5.00
		399-4-1	23SEP86		< 5.00
			23OCT86		< 5.00
			11NOV86		< 5.00
		399-4-7	19SEP86		< 5.00
			22OCT86		< 5.00
			10NOV86		< 5.00
		399-8-2	22SEP86		< 5.00
			22OCT86		5.30
			13NOV86		< 5.00
		699-S19-E13	22SEP86		< 5.00
			21OCT86		5.50
			11NOV86		< 5.00
		699-S30E15A	22SEP86		< 5.00
			22OCT86		5.00
			11NOV86		< 5.00

TABLE A.2 (contd)

Constituent List = Drinking Water Standards
 Primary Drinking Water Standard = 50

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
H41 FLEAD PPB	5	399-1-1	18SEP86		< 5.00
			21OCT86		< 5.00
			12NOV86		< 5.00
		399-1-2	18SEP86		< 5.00
			13OCT86		5.90
			12NOV86		< 5.00
		399-1-3	17SEP86		< 5.00
			28OCT86		< 5.00
			14NOV86		< 5.00
		399-1-4	18SEP86		< 5.00
			21OCT86		< 5.00
			14NOV86		< 5.00
		399-1-5	17SEP86		< 5.00
			23OCT86		< 5.00
			17NOV86		< 5.00
		399-1-6	18SEP86		< 5.00
			20OCT86		6.10
			14NOV86		< 5.00
		399-1-7	28OCT86		< 5.00
		399-1-8	17SEP86		< 5.00
			28OCT86		< 5.00
			13NOV86		< 5.00
		399-2-1	22SEP86		< 5.00
			21OCT86		< 5.00
			12NOV86		< 5.00
		399-3-10	19SEP86		< 5.00
			22OCT86		< 5.00
			11NOV86		< 5.00
		399-3-7	19SEP86		< 5.00
			20OCT86		< 5.00
			10NOV86		< 5.00
		399-4-1	23SEP86		< 5.00
			23OCT86		< 5.00
			11NOV86		< 5.00
		399-4-7	19SEP86		< 5.00
			22OCT86		< 5.00
			10NOV86		< 5.00
		399-8-2	22SEP86		< 5.00
			22OCT86		< 5.00
			13NOV86		< 5.00
		699-S19-E13	22SEP86		< 5.00
			21OCT86		< 5.00
			11NOV86		< 5.00
		699-S30E15A	22SEP86		6.30
			22OCT86		< 5.00
			11NOV86		< 5.00

TABLE A.2 (contd)

Constituent List = Quality Characteristics

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
A11	SODIUM	PPB	100	399-1-1	18SEP86 21OCT86 12NOV86		11,500 9,750 9,870
				399-1-2	18SEP86 13OCT86 12NOV86		10,300 10,200 10,800
				399-1-3	17SEP86 28OCT86 14NOV86		15,300 14,600 15,100
				399-1-4	18SEP86 21OCT86 14NOV86		8,130 6,360 7,390
				399-1-5	17SEP86 23OCT86 17NOV86		10,700 9,560 11,600
				399-1-6	18SEP86 20OCT86 14NOV86		7,420 5,550 6,450
				399-1-7	17SEP86 28OCT86 13NOV86		14,300 14,400 14,300
				399-1-8	17SEP86 28OCT86 13NOV86		25,500 26,000 25,700
				399-2-1	22SEP86 21OCT86 12NOV86		14,200 13,700 13,400
				399-3-10	19SEP86 22OCT86 11NOV86		12,300 11,300 11,200
				399-3-7	19SEP86 20OCT86 10NOV86		20,000 19,600 19,600
				399-4-1	23SEP86 23OCT86 11NOV86		18,700 16,600 16,500
				399-4-7	19SEP86 22OCT86 10NOV86		18,700 17,400 17,800
				399-8-2	22SEP86 22OCT86 13NOV86		20,300 18,300 17,500
				699-S19-E13	22SEP86 21OCT86 11NOV86		21,400 21,500 20,600
				699-S30E15A	22SEP86 22OCT86 11NOV86		13,300 13,000 12,500

TABLE A.2 (contd)

Constituent List = Quality Characteristics

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
A17 MANGESE PPB	5	399-1-1	18SEP86		< 5.00
			21OCT86		< 5.00
			12NOV86		< 5.00
		399-1-2	18SEP86		< 5.00
			13OCT86		< 5.00
			12NOV86		< 5.00
		399-1-3	17SEP86		< 5.00
			28OCT86		< 5.00
			14NOV86		< 5.00
		399-1-4	18SEP86		< 5.00
			21OCT86		< 5.00
			14NOV86		< 5.00
		399-1-5	17SEP86		< 5.00
			23OCT86		< 5.00
			17NOV86		< 5.00
		399-1-6	18SEP86		< 5.00
			20OCT86		< 5.00
			14NOV86		< 5.00
		399-1-7	17SEP86		< 5.00
			28OCT86		< 5.00
			13NOV86		< 5.00
		399-1-8	17SEP86		24.0
			28OCT86		21.0
			13NOV86		23.0
		399-2-1	22SEP86		5.00
			21OCT86		< 5.00
			12NOV86		< 5.00
		399-3-10	19SEP86		6.00
			22OCT86		6.00
			11NOV86		< 5.00
		399-3-7	19SEP86		< 5.00
			20OCT86		< 5.00
			10NOV86		< 5.00
		399-4-1	23SEP86		< 5.00
			23OCT86		< 5.00
			11NOV86		< 5.00
		399-4-7	19SEP86		< 5.00
			22OCT86		< 5.00
			10NOV86		< 5.00
		399-8-2	22SEP86		< 5.00
			22OCT86		< 5.00
			13NOV86		< 5.00
		699-S19-E13	22SEP86		< 5.00
			21OCT86		< 5.00
			11NOV86		< 5.00
		699-S30E15A	22SEP86		< 5.00
			22OCT86		< 5.00
			11NOV86		< 5.00

TABLE A.2 (contd)

Constituent List = Quality Characteristics

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
A19	IRON	PPB	50	399-1-1	18SEP86 21OCT86 12NOV86		< 50.0 < 50.0 < 50.0
				399-1-2	18SEP86 13OCT86 12NOV86		130 < 50.0 60.0
				399-1-3	17SEP86 28OCT86 14NOV86		74.0 162 50.0
				399-1-4	18SEP86 21OCT86 14NOV86		317 86.0 < 50.0
				399-1-5	17SEP86 23OCT86 17NOV86		< 50.0 < 50.0 < 50.0
				399-1-6	18SEP86 20OCT86 14NOV86		< 50.0 159 < 50.0
				399-1-7	17SEP86 28OCT86 13NOV86		53.0 102 < 50.0
				399-1-8	17SEP86 28OCT86 13NOV86		50.0 < 50.0 < 50.0
				399-2-1	22SEP86 21OCT86 12NOV86		271 < 50.0 < 50.0
				399-3-10	19SEP86 22OCT86 11NOV86		193 175 97.0
				399-3-7	19SEP86 20OCT86 10NOV86		< 50.0 < 50.0 84.0
				399-4-1	23SEP86 23OCT86 11NOV86		< 50.0 < 50.0 < 50.0
				399-4-7	19SEP86 22OCT86 10NOV86		61.0 < 50.0 < 50.0
				399-8-2	22SEP86 22OCT86 13NOV86		88.0 58.0 < 50.0
				699-S19-E13	22SEP86 21OCT86 11NOV86		62.0 < 50.0 50.0
				699-S30E15A	22SEP86 22OCT86 11NOV86		104 54.0 < 50.0

TABLE A.2 (contd)

Constituent List = Quality Characteristics

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
C73	SULFATE	PPB	500	399-1-1	18SEP86 21OCT86 12NOV86		13,900 13,200 13,000
				399-1-2	18SEP86 13OCT86 12NOV86		16,700 18,200 13,200
				399-1-3	17SEP86 28OCT86 14NOV86		14,100 12,500 12,400
				399-1-4	18SEP86 21OCT86 14NOV86		12,700 12,600 13,200
				399-1-5	17SEP86 23OCT86 17NOV86		12,800 11,400 14,100
				399-1-6	18SEP86 20OCT86 14NOV86		12,600 12,800 13,000
				399-1-7	17SEP86 28OCT86 13NOV86		13,900 13,000 12,400
				399-1-8	17SEP86 28OCT86 13NOV86		7,930 6,330 5,290
				399-2-1	22SEP86 21OCT86 12NOV86		16,900 14,900 13,600
				399-3-10	22OCT86 11NOV86		18,900 21,300
				399-3-7	19SEP86 20OCT86 10NOV86		36,200 35,900 40,100
				399-4-1	23SEP86 23OCT86 11NOV86		31,300 27,100 29,200
				399-4-7	19SEP86 22OCT86 10NOV86		29,800 31,900 36,400
				399-8-2	22SEP86 22OCT86 13NOV86		29,300 29,400 29,200
				699-S19-E13	22SEP86 21OCT86 11NOV86		44,000 46,400 52,100
				699-S30E15A	22SEP86 22OCT86 11NOV86		16,600 16,600 18,800

TABLE A.2 (contd)

Constituent List = Quality Characteristics

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
C75	CHLORID	PPB	500	399-1-1	18SEP86 21OCT86 12NOV86		8,190 7,780 8,110
				399-1-2	18SEP86 13OCT86 12NOV86		8,580 8,760 17,800
				399-1-3	17SEP86 28OCT86 14NOV86		9,010 18,100 19,600
				399-1-4	18SEP86 21OCT86 14NOV86		5,950 6,020 9,660
				399-1-5	17SEP86 23OCT86 17NOV86		7,290 29,400 23,200
				399-1-6	18SEP86 20OCT86 14NOV86		4,540 7,190 8,570
				399-1-7	17SEP86 28OCT86 13NOV86		9,150 18,900 18,700
				399-1-8	17SEP86 28OCT86 13NOV86		9,290 14,100 9,640
				399-2-1	22SEP86 21OCT86 12NOV86		9,890 9,370 9,760
				399-3-10	22OCT86 11NOV86		8,870 8,820
				399-3-7	19SEP86 20OCT86 10NOV86		15,400 16,500 17,300
				399-4-1	23SEP86 23OCT86 11NOV86		12,900 9,540 9,740
				399-4-7	19SEP86 22OCT86 10NOV86		13,600 14,000 14,700
				399-8-2	22SEP86 22OCT86 13NOV86		978 9,780 9,400
				699-S19-E13	22SEP86 21OCT86 11NOV86		12,100 17,100 18,200
				699-S30E15A	22SEP86 22OCT86 11NOV86		4,740 4,970 5,600

TABLE A.2 (contd)

Constituent List = Quality Characteristics

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
H24 FSODIUM PPB	100	399-1-1	18SEP86		11,100
			21OCT86		9,650
			12NOV86		9,510
		399-1-2	18SEP86		10,600
			13OCT86		10,000
			12NOV86		10,600
		399-1-3	17SEP86		15,800
			28OCT86		14,700
			14NOV86		13,600
		399-1-4	18SEP86		7,800
			21OCT86		5,790
			14NOV86		6,870
		399-1-5	17SEP86		10,200
			23OCT86		9,180
			17NOV86		12,700
		399-1-6	18SEP86		7,510
			20OCT86		5,720
			14NOV86		6,300
		399-1-7	28OCT86		14,900
		399-1-8	17SEP86		26,700
			28OCT86		27,700
			13NOV86		28,500
		399-2-1	22SEP86		13,800
			21OCT86		13,000
			12NOV86		13,300
		399-3-10	19SEP86		12,500
			22OCT86		11,000
			11NOV86		10,900
		399-3-7	19SEP86		3,910
			20OCT86		5,290
			10NOV86		8,060
		399-4-1	23SEP86		17,100
			23OCT86		16,300
			11NOV86		16,500
		399-4-7	19SEP86		18,300
			22OCT86		18,000
			10NOV86		17,400
		399-8-2	22SEP86		18,000
			22OCT86		17,800
			13NOV86		18,200
		699-S19-E13	22SEP86		21,500
			21OCT86		21,500
			11NOV86		21,900
		699-S30E15A	22SEP86		13,700
			22OCT86		13,100
			11NOV86		13,300

TABLE A.2 (contd)

Constituent List = Quality Characteristics

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
H29 FMANGAN PPB	5	399-1-1	18SEP86		< 5.00
			21OCT86		< 5.00
			12NOV86		< 5.00
		399-1-2	18SEP86		< 5.00
			13OCT86		< 5.00
			12NOV86		< 5.00
		399-1-3	17SEP86		< 5.00
			28OCT86		< 5.00
			14NOV86		< 5.00
		399-1-4	18SEP86		< 5.00
			21OCT86		< 5.00
			14NOV86		< 5.00
		399-1-5	17SEP86		< 5.00
			23OCT86		< 5.00
			17NOV86		< 5.00
		399-1-6	18SEP86		< 5.00
			20OCT86		< 5.00
			14NOV86		< 5.00
		399-1-7	28OCT86		< 5.00
		399-1-8	17SEP86		26.0
			28OCT86		28.0
			13NOV86		29.0
		399-2-1	22SEP86		< 5.00
			21OCT86		< 5.00
			12NOV86		< 5.00
		399-3-10	19SEP86		10.0
			22OCT86		14.0
			11NOV86		< 5.00
		399-3-7	19SEP86		< 5.00
			20OCT86		< 5.00
			10NOV86		< 5.00
		399-4-1	23SEP86		< 5.00
			23OCT86		< 5.00
			11NOV86		< 5.00
		399-4-7	19SEP86		6.00
			22OCT86		< 5.00
			10NOV86		< 5.00
		399-8-2	22SEP86		< 5.00
			22OCT86		< 5.00
			13NOV86		< 5.00
		699-S19-E13	22SEP86		< 5.00
			21OCT86		< 5.00
			11NOV86		< 5.00
		699-S30E15A	22SEP86		< 5.00
			22OCT86		< 5.00
			11NOV86		< 5.00

TABLE A.2 (contd)

Constituent List = Quality Characteristics

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
H31	FIRON	PPB	50	399-1-1	18SEP86		< 50.0
					21OCT86		< 50.0
					12NOV86		< 50.0
				399-1-2	18SEP86		< 50.0
					13OCT86		< 50.0
					12NOV86		< 50.0
				399-1-3	17SEP86		61.0
					28OCT86		< 50.0
					14NOV86		< 50.0
				399-1-4	18SEP86		56.0
					21OCT86		< 50.0
					14NOV86		< 50.0
				399-1-5	17SEP86		< 50.0
					23OCT86		< 50.0
					17NOV86		< 50.0
				399-1-6	18SEP86		< 50.0
					20OCT86		< 50.0
					14NOV86		< 50.0
				399-1-7	28OCT86		< 50.0
				399-1-8	17SEP86		< 50.0
					28OCT86		< 50.0
					13NOV86		< 50.0
				399-2-1	22SEP86		< 50.0
					21OCT86		< 50.0
					12NOV86		< 50.0
				399-3-10	19SEP86		64.0
					22OCT86		98.0
					11NOV86		< 50.0
				399-3-7	19SEP86		< 50.0
					20OCT86		< 50.0
					10NOV86		< 50.0
				399-4-1	23SEP86		< 50.0
					23OCT86		< 50.0
					11NOV86		< 50.0
				399-4-7	19SEP86		< 50.0
					22OCT86		< 50.0
					10NOV86		< 50.0
				399-8-2	22SEP86		< 50.0
					22OCT86		< 50.0
					13NOV86		< 50.0
				699-S19-E13	22SEP86		< 50.0
					21OCT86		< 50.0
					11NOV86		< 50.0
				699-S30E15A	22SEP86		< 50.0
					22OCT86		< 50.0
					11NOV86		< 50.0

TABLE A.2 (contd)

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
024	CS-137	PCI/L	20	399-1-3	280CT86		5.11
				699-S19-E13	210CT86		4.82

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
121	SR 90	PCI/L	5	399-1-3	280CT86		0.650
				699-S19-E13	210CT86		< 0.293

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
124	U-CHEM		.	399-1-3	280CT86		20.6
				699-S19-E13	210CT86		4.54

TABLE A.2 (contd)

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
A04	ZINC	PPB	5	399-1-1	18SEP86 21OCT86 12NOV86		< 5.00 < 5.00 < 5.00
				399-1-2	18SEP86 13OCT86 12NOV86		< 5.00 < 5.00 < 5.00
				399-1-3	17SEP86 28OCT86 14NOV86		11.0 8.00 5.00
				399-1-4	18SEP86 21OCT86 14NOV86		16.0 < 5.00 8.00
				399-1-5	17SEP86 23OCT86 17NOV86		10.0 6.00 < 5.00
				399-1-6	18SEP86 20OCT86 14NOV86		6.00 22.0 5.00
				399-1-7	17SEP86 28OCT86 13NOV86		7.00 6.00 < 5.00
				399-1-8	17SEP86 28OCT86 13NOV86		7.00 7.00 < 5.00
				399-2-1	22SEP86 21OCT86 12NOV86		10.0 < 5.00 8.00
				399-3-10	19SEP86 22OCT86 11NOV86		6.00 5.00 5.00
				399-3-7	19SEP86 20OCT86 10NOV86		< 5.00 25.0 < 5.00
				399-4-1	23SEP86 23OCT86 11NOV86		< 5.00 < 5.00 < 5.00
				399-4-7	19SEP86 22OCT86 10NOV86		< 5.00 9.00 < 5.00
				399-8-2	22SEP86 22OCT86 13NOV86		< 5.00 < 5.00 < 5.00
				699-S19-E13	22SEP86 21OCT86 11NOV86		< 5.00 < 5.00 < 5.00
				699-S30E15A	22SEP86 22OCT86 11NOV86		55.0 53.0 42.0

TABLE A.2 (contd)

Constituent List = Site Specific

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
A05 CALCIUM PPB	50	399-1-1	18SEP86		19,700
			21OCT86		18,800
			12NOV86		18,500
		399-1-2	18SEP86		22,900
			13OCT86		23,800
			12NOV86		22,600
		399-1-3	17SEP86		19,300
			28OCT86		21,400
			14NOV86		22,900
		399-1-4	18SEP86		19,000
			21OCT86		17,300
			14NOV86		21,500
		399-1-5	17SEP86		19,200
			23OCT86		25,300
			17NOV86		25,100
		399-1-6	18SEP86		19,100
			20OCT86		18,400
			14NOV86		20,300
		399-1-7	17SEP86		18,900
			28OCT86		20,800
			13NOV86		22,200
		399-1-8	17SEP86		19,300
			28OCT86		20,000
			13NOV86		18,800
		399-2-1	22SEP86		20,700
			21OCT86		21,800
			12NOV86		20,400
		399-3-10	19SEP86		29,800
			22OCT86		28,400
			11NOV86		30,700
		399-3-7	19SEP86		41,600
			20OCT86		42,300
			10NOV86		42,900
		399-4-1	23SEP86		40,600
			23OCT86		40,700
			11NOV86		39,900
		399-4-7	19SEP86		37,700
			22OCT86		37,200
			10NOV86		39,100
		399-8-2	22SEP86		40,900
			22OCT86		42,200
			13NOV86		40,200
		699-S19-E13	22SEP86		44,400
			21OCT86		42,000
			11NOV86		40,200
		699-S30E15A	22SEP86		76,100
			22OCT86		73,000
			11NOV86		69,300

TABLE A.2 (contd)

Constituent List = Site Specific
Proposed EPA Limit = 1300

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
A13 COPPER PPB	10	399-1-1	18SEP86		< 10.0
			21OCT86		< 10.0
			12NOV86		< 10.0
		399-1-2	18SEP86		< 10.0
			13OCT86		11.0
			12NOV86		< 10.0
		399-1-3	17SEP86		11.0
			28OCT86		10.0
			14NOV86		< 10.0
		399-1-4	18SEP86		17.0
			21OCT86		< 10.0
			14NOV86		19.0
		399-1-5	17SEP86		12.0
			23OCT86		10.0
			17NOV86		21.0
		399-1-6	18SEP86		14.0
			20OCT86		11.0
			14NOV86		13.0
		399-1-7	17SEP86		< 10.0
			28OCT86		11.0
			13NOV86		< 10.0
		399-1-8	17SEP86		< 10.0
			28OCT86		11.0
			13NOV86		< 10.0
		399-2-1	22SEP86		< 10.0
			21OCT86		< 10.0
			12NOV86		< 10.0
		399-3-10	19SEP86		< 10.0
			22OCT86		< 10.0
			11NOV86		< 10.0
		399-3-7	19SEP86		< 10.0
			20OCT86		< 10.0
			10NOV86		< 10.0
		399-4-1	23SEP86		< 10.0
			23OCT86		< 10.0
			11NOV86		< 10.0
		399-4-7	19SEP86		< 10.0
			22OCT86		< 10.0
			10NOV86		< 10.0
		399-8-2	22SEP86		< 10.0
			22OCT86		< 10.0
			13NOV86		< 10.0
		699-S19-E13	22SEP86		< 10.0
			21OCT86		< 10.0
			11NOV86		< 10.0
		699-S30E15A	22SEP86		< 10.0
			22OCT86		< 10.0
			11NOV86		< 10.0

TABLE A.2 (contd)

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
A50	MAGNES	PPB	0	399-1-1	18SEP86 21OCT86 12NOV86		3,690 3,390 3,370
				399-1-2	18SEP86 13OCT86 12NOV86		4,580 4,710 4,490
				399-1-3	17SEP86 28OCT86 14NOV86		3,650 3,960 4,240
				399-1-4	18SEP86 21OCT86 14NOV86		3,760 3,400 4,270
				399-1-5	17SEP86 23OCT86 17NOV86		3,600 4,730 4,680
				399-1-6	18SEP86 20OCT86 14NOV86		3,840 3,640 4,150
				399-1-7	17SEP86 28OCT86 13NOV86		3,520 3,860 4,000
				399-1-8	17SEP86 28OCT86 13NOV86		6,010 5,970 5,680
				399-2-1	22SEP86 21OCT86 12NOV86		4,500 4,390 4,170
				399-3-10	19SEP86 22OCT86 11NOV86		6,330 6,120 6,470
				399-3-7	19SEP86 20OCT86 10NOV86		8,640 8,630 8,690
				399-4-1	23SEP86 23OCT86 11NOV86		8,230 7,630 7,540
				399-4-7	19SEP86 22OCT86 10NOV86		7,340 7,140 7,310
				399-8-2	22SEP86 22OCT86 13NOV86		9,090 8,850 8,400
				699-S19-E13	22SEP86 21OCT86 11NOV86		12,900 12,400 11,400
				699-S30E15A	22SEP86 22OCT86 11NOV86		14,600 13,200 12,300

TABLE A.2 (contd)

Constituent List = Site Specific
Proposed EPA Limit = 200

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
A67 1,1,1-T PPB	10	399-1-1	18SEP86		< 10.0
			21OCT86		< 10.0
			12NOV86		< 10.0
		399-1-2	18SEP86		< 10.0
			13OCT86		< 10.0
			12NOV86		< 10.0
		399-1-3	17SEP86		< 10.0
			28OCT86		< 10.0
			14NOV86		< 10.0
		399-1-4	18SEP86		< 10.0
			21OCT86		< 10.0
			14NOV86		< 10.0
		399-1-5	17SEP86		< 10.0
			23OCT86		< 10.0
			17NOV86		< 10.0
		399-1-6	18SEP86		< 10.0
			20OCT86		< 10.0
			14NOV86		< 10.0
		399-1-7	17SEP86		< 10.0
			28OCT86		< 10.0
			13NOV86		< 10.0
		399-1-8	17SEP86		< 10.0
			28OCT86		< 10.0
			13NOV86		< 10.0
		399-2-1	22SEP86		< 10.0
			21OCT86		< 10.0
			12NOV86		< 10.0
		399-3-10	19SEP86		< 10.0
			22OCT86		< 10.0
			11NOV86		< 10.0
		399-3-7	19SEP86		< 10.0
			20OCT86		< 10.0
			10NOV86		< 10.0
		399-4-1	23SEP86		< 10.0
			23OCT86		< 10.0
			11NOV86		< 10.0
		399-4-7	19SEP86		< 10.0
			22OCT86		< 10.0
			10NOV86		< 10.0
		399-8-2	22SEP86		< 10.0
			22OCT86		< 10.0
			13NOV86		11.0
		699-S19-E13	22SEP86		< 10.0
			21OCT86		< 10.0
			11NOV86		< 10.0
		699-S30E15A	22SEP86		< 10.0
			22OCT86		< 10.0
			11NOV86		< 10.0

TABLE A.2 (contd)

Constituent List = Site Specific
Proposed EPA Limit = 5

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
A69 TRICENE PPB	10	399-1-1	18SEP86		< 10.0
			21OCT86		< 10.0
			12NOV86		< 10.0
		399-1-2	18SEP86		< 10.0
			13OCT86		< 10.0
			12NOV86		< 10.0
		399-1-3	17SEP86		< 10.0
			28OCT86		< 10.0
			14NOV86		< 10.0
		399-1-4	18SEP86		< 10.0
			21OCT86		< 10.0
			14NOV86		< 10.0
		399-1-5	17SEP86		< 10.0
			23OCT86		< 10.0
			17NOV86		< 10.0
		399-1-6	18SEP86		< 10.0
			20OCT86		< 10.0
			14NOV86		< 10.0
		399-1-7	17SEP86		< 10.0
			28OCT86		< 10.0
			13NOV86		< 10.0
		399-1-8	17SEP86		< 10.0
			28OCT86		< 10.0
			13NOV86		< 10.0
		399-2-1	22SEP86		< 10.0
			21OCT86		< 10.0
			12NOV86		< 10.0
		399-3-10	19SEP86		< 10.0
			22OCT86		< 10.0
			11NOV86		< 10.0
		399-3-7	19SEP86		< 10.0
			20OCT86		< 10.0
			10NOV86		< 10.0
		399-4-1	23SEP86		< 10.0
			23OCT86		< 17.0
			11NOV86		< 10.0
		399-4-7	19SEP86		< 10.0
			22OCT86		< 10.0
			10NOV86		< 10.0
		399-8-2	22SEP86		< 10.0
			22OCT86		< 10.0
			13NOV86		< 10.0
		699-S19-E13	22SEP86		< 10.0
			21OCT86		< 10.0
			11NOV86		< 10.0
		699-S30E15A	22SEP86		< 10.0
			22OCT86		< 10.0
			11NOV86		< 10.0

TABLE A.2 (contd)

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
C78	SULFIDE	PPB	1000	399-1-1	18SEP86 21OCT86 12NOV86		<1,000 <1,000 <1,000
				399-1-2	18SEP86 13OCT86 12NOV86		<1,000 <1,000 <1,000
				399-1-3	17SEP86 28OCT86 14NOV86		<1,000 <1,000 <1,000
				399-1-4	18SEP86 21OCT86 14NOV86		<1,000 <1,000 <1,000
				399-1-5	17SEP86 23OCT86 17NOV86		<1,000 <1,000 <1,000
				399-1-6	18SEP86 20OCT86 14NOV86		<1,000 <1,000 <1,000
				399-1-7	17SEP86 28OCT86 13NOV86		<1,000 <1,000 <1,000
				399-1-8	17SEP86 28OCT86 13NOV86		<1,000 <1,000 <1,000
				399-2-1	22SEP86 21OCT86 12NOV86		<1,000 <1,000 <1,000
				399-3-10	19SEP86 22OCT86 11NOV86		<1,000 <1,000 <1,000
				399-3-7	19SEP86 20OCT86 10NOV86		<1,000 <1,000 <1,000
				399-4-1	23SEP86 23OCT86 11NOV86		<1,000 <1,000 <1,000
				399-4-7	19SEP86 22OCT86 10NOV86		<1,000 <1,000 <1,000
				399-8-2	22SEP86 22OCT86 13NOV86		<1,000 <1,000 <1,000
				699-S19-E13	22SEP86 21OCT86 11NOV86		<1,000 <1,000 <1,000
				699-S30E15A	22SEP86 22OCT86 11NOV86		1,770 <1,000 <1,000

TABLE A.2 (contd)

Constituent List = Site Specific

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
C80 AMMONIU PPB	50	399-1-1	18SEP86		< 50.0
			21OCT86		< 50.0
			12NOV86		< 50.0
		399-1-2	18SEP86		< 50.0
			13OCT86		< 50.0
			12NOV86		< 50.0
		399-1-3	17SEP86		< 50.0
			28OCT86		777
			14NOV86		77.0
		399-1-4	18SEP86		< 50.0
			21OCT86		< 50.0
			14NOV86		< 50.0
		399-1-5	17SEP86		< 50.0
			23OCT86		124
			17NOV86		< 50.0
		399-1-6	18SEP86		< 50.0
			20OCT86		< 50.0
			14NOV86		114
		399-1-7	17SEP86		< 50.0
			28OCT86		1,630
			13NOV86		64.0
		399-1-8	17SEP86		< 50.0
			28OCT86		595
			13NOV86		102
		399-2-1	22SEP86		< 50.0
			21OCT86		< 50.0
			12NOV86		61.0
		399-3-10	19SEP86		< 50.0
			22OCT86		202
			11NOV86		< 50.0
		399-3-7	19SEP86		< 50.0
			20OCT86		88.0
			10NOV86		< 50.0
		399-4-1	23SEP86		< 50.0
			23OCT86		663
			11NOV86		< 50.0
		399-4-7	19SEP86		< 50.0
			22OCT86		123
			10NOV86		< 50.0
		399-8-2	22SEP86		< 50.0
			22OCT86		138
			13NOV86		70.0
		699-S19-E13	22SEP86		< 50.0
			21OCT86		121
			11NOV86		< 50.0
		699-S30E15A	22SEP86		< 50.0
			23OCT86		57.0
			11NOV86		< 50.0

TABLE A.2 (contd)

Constituent List = Site Specific

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
H18	FZINC	PPB	5	399-1-1	18SEP86		< 5.00
					21OCT86		< 5.00
					12NOV86		< 5.00
				399-1-2	18SEP86		44.0
					13OCT86		< 5.00
					12NOV86		< 5.00
				399-1-3	17SEP86		5.00
					28OCT86		< 5.00
					14NOV86		< 5.00
				399-1-4	18SEP86		6.00
					21OCT86		< 5.00
					14NOV86		< 5.00
				399-1-5	17SEP86		5.00
					23OCT86		< 5.00
					17NOV86		< 5.00
				399-1-6	18SEP86		25.0
					20OCT86		20.0
					14NOV86		< 5.00
				399-1-7	28OCT86		< 5.00
				399-1-8	17SEP86		5.00
					28OCT86		6.00
					13NOV86		< 5.00
				399-2-1	22SEP86		6.00
					21OCT86		< 5.00
					12NOV86		< 5.00
				399-3-10	19SEP86		10.0
					22OCT86		6.00
					11NOV86		< 5.00
				399-3-7	19SEP86		15.0
					20OCT86		10.0
					10NOV86		12.0
				399-4-1	23SEP86		< 5.00
					23OCT86		< 5.00
					11NOV86		< 5.00
				399-4-7	19SEP86		5.00
					22OCT86		5.00
					10NOV86		10.0
				399-8-2	22SEP86		< 5.00
					22OCT86		< 5.00
					13NOV86		< 5.00
				699-S19-E13	22SEP86		< 5.00
					21OCT86		< 5.00
					11NOV86		< 5.00
				699-S30E15A	22SEP86		88.0
					22OCT86		119
					11NOV86		122

TABLE A.2 (contd)

Constituent List = Site Specific

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
H19 FCALCIU PPB	50	399-1-1	18SEP86		19,900
			21OCT86		18,600
			12NOV86		18,000
		399-1-2	18SEP86		23,300
			13OCT86		23,100
			12NOV86		23,200
		399-1-3	17SEP86		19,500
			28OCT86		21,500
			14NOV86		19,900
		399-1-4	18SEP86		18,600
			21OCT86		16,800
			14NOV86		19,800
		399-1-5	17SEP86		18,500
			23OCT86		22,300
			17NOV86		25,700
		399-1-6	18SEP86		19,300
			20OCT86		18,500
			14NOV86		20,400
		399-1-7	28OCT86		22,800
		399-1-8	17SEP86		18,700
			28OCT86		20,000
			13NOV86		19,900
		399-2-1	22SEP86		21,800
			21OCT86		22,400
			12NOV86		20,600
		399-3-10	19SEP86		30,000
			22OCT86		28,400
			11NOV86		29,500
		399-3-7	19SEP86		24,100
			20OCT86		25,400
			10NOV86		29,600
		399-4-1	23SEP86		40,600
			23OCT86		39,400
			11NOV86		39,300
		399-4-7	19SEP86		35,200
			22OCT86		37,600
			10NOV86		38,000
		399-8-2	22SEP86		40,300
			22OCT86		40,200
			13NOV86		41,400
		699-S19-E13	22SEP86		43,600
			21OCT86		42,800
			11NOV86		43,600
		699-S30E15A	22SEP86		76,700
			22OCT86		72,200
			11NOV86		70,800

TABLE A.2 (contd)

Constituent List = Site Specific
Proposed EPA Limit = 1300

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
H26 FCOPPER PPB	10	399-1-1	18SEP86		10.0
			21OCT86	<	10.0
			12NOV86	<	10.0
		399-1-2	18SEP86	<	10.0
			13OCT86	<	10.0
			12NOV86	<	10.0
		399-1-3	17SEP86	<	10.0
			28OCT86	<	10.0
			14NOV86	<	10.0
		399-1-4	18SEP86		11.0
			21OCT86	<	10.0
			14NOV86		11.0
		399-1-5	17SEP86		12.0
			23OCT86		11.0
			17NOV86		20.0
		399-1-6	18SEP86		48.0
			20OCT86	<	10.0
			14NOV86		11.0
		399-1-7	28OCT86	<	10.0
		399-1-8	17SEP86	<	10.0
			28OCT86	<	10.0
			13NOV86	<	10.0
		399-2-1	22SEP86	<	10.0
			21OCT86	<	10.0
			12NOV86	<	10.0
		399-3-10	19SEP86	<	10.0
			22OCT86	<	10.0
			11NOV86	<	10.0
		399-3-7	19SEP86	<	10.0
			20OCT86	<	10.0
			10NOV86	<	10.0
		399-4-1	23SEP86	<	10.0
			23OCT86	<	10.0
			11NOV86	<	10.0
		399-4-7	19SEP86	<	10.0
			22OCT86	<	10.0
			10NOV86	<	10.0
		399-8-2	22SEP86	<	10.0
			22OCT86	<	10.0
			13NOV86	<	10.0
		699-S19-E13	22SEP86	<	10.0
			21OCT86	<	10.0
			11NOV86	<	10.0
		699-S30E15A	22SEP86	<	10.0
			22OCT86	<	10.0
			11NOV86	<	10.0

TABLE A.2 (contd)

Constituent List = Site Specific

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
H32 FMAGNES PPB	0	399-1-1	18SEP86		3,700
			21OCT86		3,280
			12NOV86		3,260
		399-1-2	18SEP86		4,680
			13OCT86		4,560
			12NOV86		4,550
		399-1-3	17SEP86		3,730
			28OCT86		3,970
			14NOV86		3,800
		399-1-4	18SEP86		3,700
			21OCT86		3,260
			14NOV86		3,980
		399-1-5	17SEP86		3,580
			23OCT86		4,300
			17NOV86		4,960
		399-1-6	18SEP86		3,850
			20OCT86		3,660
			14NOV86		4,130
		399-1-7	28OCT86		4,160
		399-1-8	17SEP86		6,050
			28OCT86		6,320
			13NOV86		6,300
		399-2-1	22SEP86		4,590
			21OCT86		4,470
			12NOV86		4,250
		399-3-10	19SEP86		6,420
			22OCT86		6,180
			11NOV86		6,270
		399-3-7	19SEP86		4,700
			20OCT86		4,910
			10NOV86		5,760
		399-4-1	23SEP86		7,960
			23OCT86		7,490
			11NOV86		7,430
		399-4-7	19SEP86		7,060
			22OCT86		7,270
			10NOV86		7,100
		399-8-2	22SEP86		8,600
			22OCT86		8,470
			13NOV86		8,680
		699-S19-E13	22SEP86		13,000
			21OCT86		12,600
			11NOV86		12,200
		699-S30E15A	22SEP86		14,800
			22OCT86		13,100
			11NOV86		13,000

TABLE A.2 (contd)

Constituent List = Tag-alongs

Constituent Code	Abbrev	Units	Detection Limit	Well	Date	Rep	Concentration
A14	VANADUM	PPB	5	399-1-1	18SEP86		< 5.00
					21OCT86		< 5.00
					12NOV86		< 5.00
				399-1-2	18SEP86		5.00
					13OCT86		7.00
					12NOV86		6.00
				399-1-3	17SEP86		5.00
					28OCT86	<	5.00
					14NOV86		5.00
				399-1-4	18SEP86		5.00
					21OCT86		5.00
					14NOV86	<	5.00
				399-1-5	17SEP86		6.00
					23OCT86	<	5.00
					17NOV86	<	5.00
				399-1-6	18SEP86		5.00
					20OCT86	<	5.00
					14NOV86		6.00
				399-1-7	17SEP86	<	5.00
					28OCT86		5.00
					13NOV86	<	5.00
				399-1-8	17SEP86	<	5.00
					28OCT86	<	5.00
					13NOV86	<	5.00
				399-2-1	22SEP86	<	5.00
					21OCT86	<	5.00
					12NOV86	<	5.00
				399-3-10	19SEP86	<	5.00
					22OCT86	<	5.00
					11NOV86	<	5.00
				399-3-7	19SEP86		10.0
					20OCT86		10.0
					10NOV86		10.0
				399-4-1	23SEP86		9.00
					23OCT86		9.00
					11NOV86		9.00
				399-4-7	19SEP86		5.00
					22OCT86		6.00
					10NOV86		7.00
				399-8-2	22SEP86		12.0
					22OCT86		12.0
					13NOV86		12.0
				699-S19-E13	22SEP86		15.0
					21OCT86		14.0
					11NOV86		13.0
				699-S30E15A	22SEP86		7.00
					22OCT86		8.00
					11NOV86		7.00

TABLE A.2 (contd)

Constituent List = Tag-alongs

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
A18 POTASUM PPB	100	399-1-1	18SEP86		2,380
			21OCT86		2,230
			12NOV86		2,260
		399-1-2	18SEP86		2,790
			13OCT86		3,110
			12NOV86		3,130
		399-1-3	17SEP86		2,470
			28OCT86		2,750
			14NOV86		2,800
		399-1-4	18SEP86		2,480
			21OCT86		2,130
			14NOV86		2,420
		399-1-5	17SEP86		2,520
			23OCT86		2,460
			17NOV86		2,420
		399-1-6	18SEP86		2,420
			20OCT86		2,080
			14NOV86		2,280
		399-1-7	17SEP86		2,330
			28OCT86		2,680
			13NOV86		2,740
		399-1-8	17SEP86		4,670
			28OCT86		5,170
			13NOV86		5,030
		399-2-1	22SEP86		3,250
			21OCT86		3,390
			12NOV86		3,300
		399-3-10	19SEP86		3,590
			22OCT86		3,470
			11NOV86		3,380
		399-3-7	19SEP86		4,830
			20OCT86		5,180
			10NOV86		4,960
		399-4-1	23SEP86		4,710
			23OCT86		4,640
			11NOV86		4,560
		399-4-7	19SEP86		4,320
			22OCT86		4,160
			10NOV86		4,270
		399-8-2	22SEP86		5,440
			22OCT86		5,260
			13NOV86		4,900
		699-S19-E13	22SEP86		5,930
			21OCT86		6,150
			11NOV86		5,900
		699-S30E15A	22SEP86		6,180
			22OCT86		6,270
			11NOV86		6,060

TABLE A.2 (contd)

Constituent List = Tag-alongs

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
A80 CHLFORM PPB	10	399-1-1	18SEP86		19.0
			21OCT86		16.0
			12NOV86		15.0
		399-1-2	18SEP86		16.0
			13OCT86		14.0
			12NOV86		15.0
		399-1-3	17SEP86		18.0
			28OCT86		17.0
			14NOV86		16.0
		399-1-4	18SEP86		16.0
			21OCT86		15.0
			14NOV86		11.0
		399-1-5	17SEP86		17.0
			23OCT86		17.0
			17NOV86		11.0
		399-1-6	18SEP86		15.0
			20OCT86		15.0
			14NOV86		12.0
		399-1-7	17SEP86		20.0
			28OCT86		15.0
			13NOV86		13.0
		399-1-8	17SEP86		< 10.0
			28OCT86		< 10.0
			13NOV86		< 10.0
		399-2-1	22SEP86		11.0
			21OCT86		11.0
			12NOV86		11.0
		399-3-10	19SEP86		< 10.0
			22OCT86		< 10.0
			11NOV86		< 10.0
		399-3-7	19SEP86		11.0
			20OCT86		< 10.0
			10NOV86		< 10.0
		399-4-1	23SEP86		< 10.0
			23OCT86		< 10.0
			11NOV86		< 10.0
		399-4-7	19SEP86		< 10.0
			22OCT86		< 10.0
			10NOV86		< 10.0
		399-8-2	22SEP86		< 10.0
			22OCT86		< 10.0
			13NOV86		< 10.0
		699-S19-E13	22SEP86		< 10.0
			21OCT86		< 10.0
			11NOV86		< 10.0
		699-S30E15A	22SEP86		< 10.0
			22OCT86		< 10.0
			11NOV86		< 10.0

TABLE A.2 (contd)

Constituent List = Tag-alongs

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
H27 FVANADI PPB	5	399-1-1	18SEP86		< 5.00
			21OCT86		< 5.00
			12NOV86		< 5.00
		399-1-2	18SEP86		5.00
			13OCT86		6.00
			12NOV86		< 5.00
		399-1-3	17SEP86		< 5.00
			28OCT86		5.00
			14NOV86		< 5.00
		399-1-4	18SEP86		5.00
			21OCT86		< 5.00
			14NOV86		< 5.00
		399-1-5	17SEP86		6.00
			23OCT86		< 5.00
			17NOV86		< 5.00
		399-1-6	18SEP86		5.00
			20OCT86		< 5.00
			14NOV86		< 5.00
		399-1-7	28OCT86		< 5.00
		399-1-8	17SEP86		< 5.00
			28OCT86		< 5.00
			13NOV86		< 5.00
		399-2-1	22SEP86		< 5.00
			21OCT86		< 5.00
			12NOV86		< 5.00
		399-3-10	19SEP86		< 5.00
			22OCT86		< 5.00
			11NOV86		< 5.00
		399-3-7	19SEP86		< 5.00
			20OCT86		5.00
			10NOV86		< 5.00
		399-4-1	23SEP86		8.00
			23OCT86		8.00
			11NOV86		9.00
		399-4-7	19SEP86		5.00
			22OCT86		5.00
			10NOV86		5.00
		399-8-2	22SEP86		10.0
			22OCT86		11.0
			13NOV86		10.0
		699-S19-E13	22SEP86		15.0
			21OCT86		15.0
			11NOV86		14.0
		699-S30E15A	22SEP86		8.00
			22OCT86		7.00
			11NOV86		7.00

TABLE A.2 (contd)

Constituent List = Tag-alongs

Constituent Code Abbrev Units	Detection Limit	Well	Date	Rep	Concentration
H30 FPOTASS PPB	100	399-1-1	18SEP86		2,320
			21OCT86		1,960
			12NOV86		2,130
		399-1-2	18SEP86		2,930
			13OCT86		3,040
			12NOV86		3,090
		399-1-3	17SEP86		2,620
			28OCT86		2,720
			14NOV86		2,570
		399-1-4	18SEP86		2,340
			21OCT86		1,870
			14NOV86		2,120
		399-1-5	17SEP86		2,380
			23OCT86		2,310
			17NOV86		2,330
		399-1-6	18SEP86		2,410
			20OCT86		2,130
			14NOV86		2,230
		399-1-7	28OCT86		2,760
		399-1-8	17SEP86		4,750
			28OCT86		5,450
			13NOV86		5,430
		399-2-1	22SEP86		3,320
			21OCT86		3,110
			12NOV86		3,210
		399-3-10	19SEP86		3,670
			22OCT86		3,370
			11NOV86		3,170
		399-3-7	19SEP86		2,050
			20OCT86		2,020
			10NOV86		2,480
		399-4-1	23SEP86		4,560
			23OCT86		4,580
			11NOV86		4,550
		399-4-7	19SEP86		4,230
			22OCT86		4,280
			10NOV86		4,130
		399-8-2	22SEP86		5,010
			22OCT86		5,110
			13NOV86		5,150
		699-S19-E13	22SEP86		5,880
			21OCT86		6,190
			11NOV86		6,300
		699-S30E15A	22SEP86		6,300
			22OCT86		6,370
			11NOV86		6,390