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40 CFR 265 Interim Status Indicator-Evaluation Ground-Water Monitoring Plan for the 216-B-63 Trench

B. N. Bjornstad
S. Dudziak

March 1989

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

Pacific Northwest Laboratory
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SUMMARY

This document outlines a ground-water monitoring plan for the 216-B-63 trench located in the northeast corner of the 200-East Area on the Hanford Site in southeastern Washington State. It has been determined that hazardous materials (corrosives) were disposed of to the trench during past operations. Installation of an interim-status ground-water monitoring system is required to determine whether hazardous chemicals are leaching to the ground water from beneath the trench.

This document summarizes the existing data that are available from near the 216-B-63 trench and presents a plan to determine the extent of ground-water contamination, if any, derived from the trench. The plan calls for the installation of four new monitoring wells located near the west end of the trench. These wells will be used to monitor ground-water levels and water quality immediately adjacent to the trench. Two existing RCRA monitoring wells, which are located near the trench and hydraulically upgradient of it, will be used as background wells.

CONTENTS

FIGURES

TABLES

1.0 INTRODUCTION

This document presents a ground-water monitoring plan for the 216-B-63 trench located on the Hanford Site in southeastern Washington State. The ground-water monitoring plan, prepared for Westinghouse Hanford Company (Westinghouse Hanford) under subcontract to the U.S. Department of Energy, Richland Operations (DOE-RL), is based on requirements for interim-status facilities, as defined by the Resource Conservation and Recovery Act (RCRA) of 1976 and amended by the Hazardous and Solid Waste Amendments of 1984. These regulations are promulgated by the U.S. Environmental Protection Agency (EPA) in 40 CFR Part 265, Subpart F, and by the Washington State Department of Ecology (hereafter called Ecology) in WAC 173-303-400 (Ecology 1986).

Under RCRA interim status, the 216-B-63 trench requires a ground-water monitoring program. This section presents the purpose, objectives, and scope of the plan for this program. The 216-B-63 trench receives waste water from the B Plant in the 200-East Area. In the past, this waste water has contained hazardous waste and materials; since 1985, physical controls and operating procedures have been modified to avoid inadvertent discharge of chemicals to the waste-water stream. Because the 216-B-63 trench is not expected to receive additional hazardous substances, DOE-RL has proposed that the trench be closed under RCRA interim status, although it will continue to receive waste water not regulated under RCRA (DOE 1987).

1.1 PURPOSE AND OBJECTIVES

The purpose of this plan is to present a program that is capable of determining the impact of the 216-B-63 trench on the quality of the uppermost aquifer underlying the facility to comply with RCRA regulation (40 CFR Part 265, Subpart F). Specific objectives include:

- Presenting an initial ground-water monitoring system that is able to provide a preliminary indication if any hazardous constituents have migrated from the site to ground water
- Presenting an initial hydrogeologic characterization plan.

This document presents an overview of the 216-B-63 trench, the waste characteristics of the discharges to the trench, the geology and hydrology of the area, the ground-water monitoring indicator evaluation program, and an outline of a ground-water quality assessment program.

The hydrogeologic characterization activities and ground-water monitoring system presented in this plan constitute an initial program. Hydrogeologic data and information and ground-water chemistry data will be interpreted and evaluated before initiating additional hydrogeologic characterization and well-installation activities.

2.0 BACKGROUND INFORMATION

The U.S. Department of Energy's Hanford Site is located in southeastern Washington State (Figure 2.1). The Hanford Site is used for nuclear reactor operations, spent fuel reprocessing, and radioactive waste management. The fuel reprocessing and radioactive waste management facilities in the 200-East and 200-West Areas (the Separations Areas) are operated by Westinghouse Hanford.

2.1 FACILITY DESCRIPTION

The following description of the facility includes a discussion of the physical layout of the 216-B-63 trench as well as the documented history of operation within B Plant, the source of effluent discharged to the trench. Most of the following facility description is from DOE (1987). Other sources of information on effluents discharged to the trench are Maxfield (1979), Jungfleisch (1988), and Coony et al. (1988).

2.1.1 Location and Physical Description

The 216-B-63 trench is located in the northeast portion of the 200-East Area (Figure 2.1). The 216-B-63 trench parallels the western end of the 216-B-2 ditches (Figure 2.2). It is an open, artificial, earthen trench approximately 4 ft wide at the bottom, 10 ft deep, and 1400 ft long. The trench is unlined and has been used to dispose of radioactive (low-level) waste water, which is allowed to evaporate and percolate into the underlying soils. The B Plant chemical sewer discharges into the west end of the trench through a 15-in.-diameter vitrified clay pipe. The first 10 ft of the trench is lined with gravel for erosion control. Only the first 860 ft of the trench contains water, as a result of the placement of a small earthen dam at this point. The depth of water varies from approximately 1.5 ft at the head end to 1 ft at the lower end. The trench is closed at the east end and does not convey effluent to any other facilities.

2.1.2 History of Operation

The 216-B-63 trench receives liquid waste from a B Plant waste stream commonly known as the B Plant chemical sewer. Sources of waste water

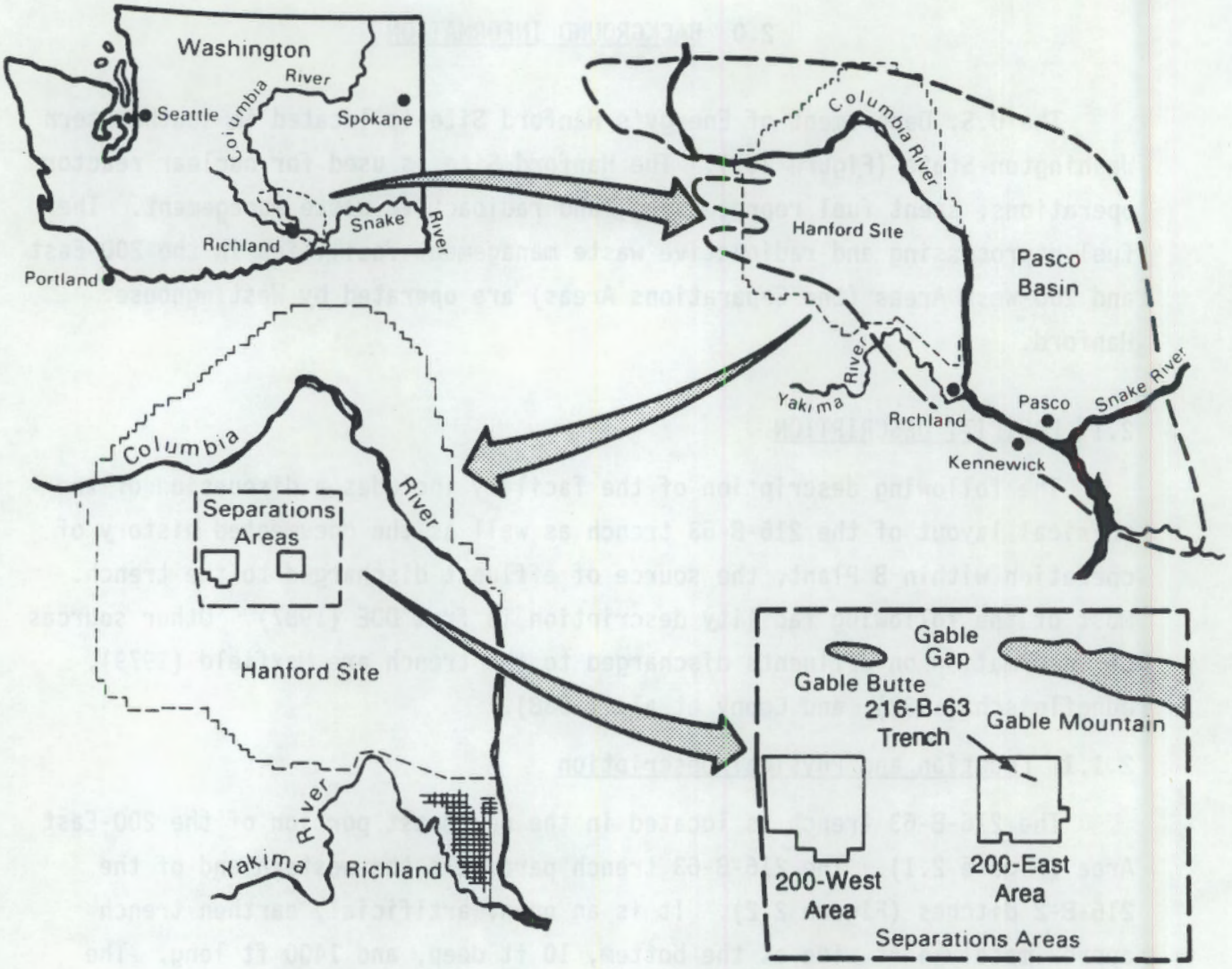


FIGURE 2.1. Separations Areas Location Map

discharged to the chemical sewer at B Plant include drains from chemical storage and chemical makeup areas, effluents from the plant water demineralizers, steam condensate from tank heating coils, cooling water from air compressors, rain water, office floor drains, and overflow from the B Plant water tower (Table 2.1). The approximate average flow rate of waste water discharged to the 216-B-63 trench varies from 100,000 to 400,000 gallons per day (gpd). As a result, some water is present in the trench most of the time. Flow rates are monitored by a 1.5-in. flowmeter installed near the point where the effluent enters the trench.

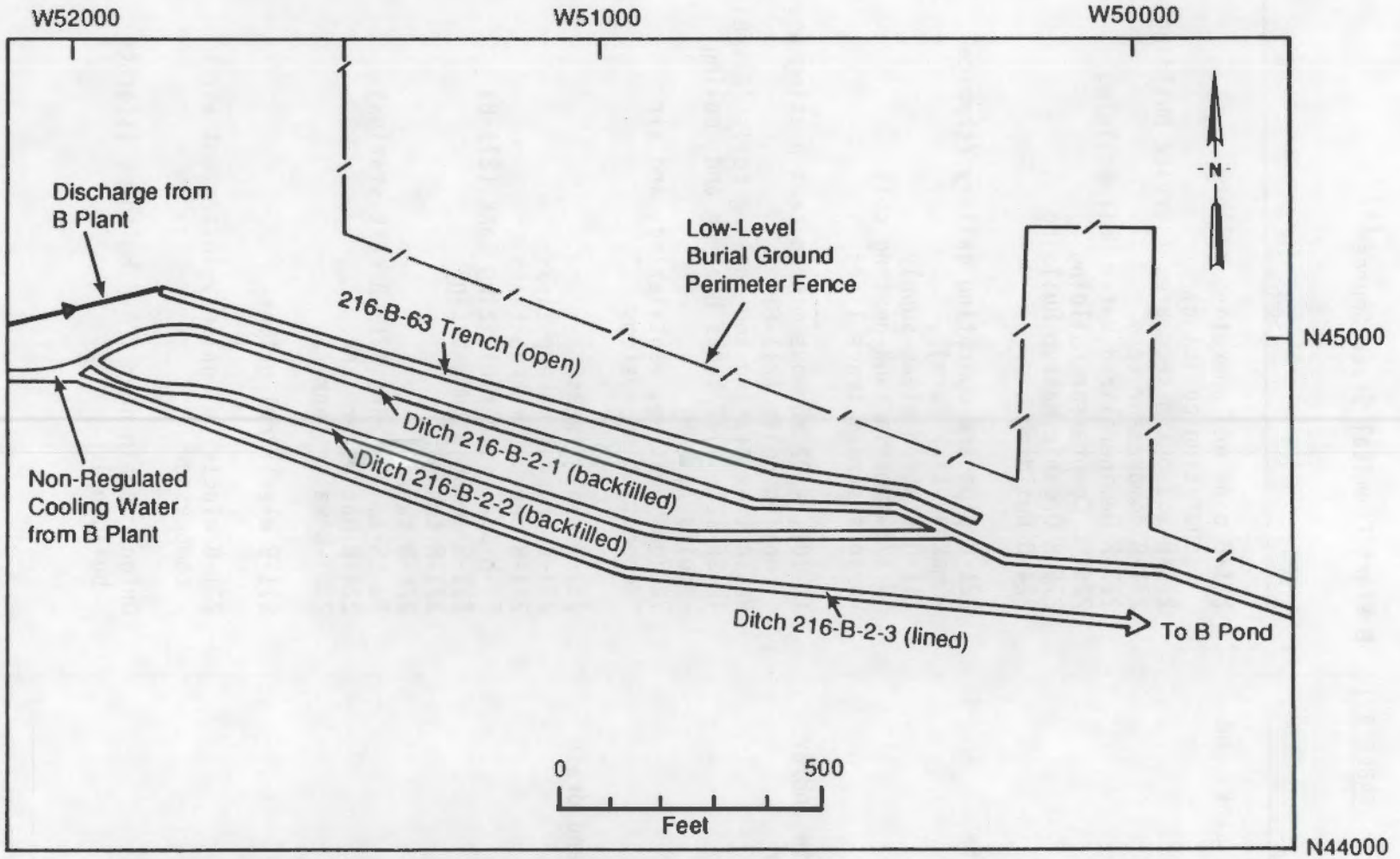


FIGURE 2.2. Location of the 216-B-63 Trench in Relation to the 216-B-2-1, 216-B-2-2, and 216-B-2-3 Ditches

TABLE 2.1. B Plant Chemical Sewer Sources[a]

Stream	Source
Floor, funnel, sink, and drains	221-B pipe and operating gallery (separation building) 271-B aqueous makeup area (service building) 271-B compressor room 217-B Demineralized Water Unit Building 225-BC Compressor Building 276-B Organic Makeup Building 224-B Building
Steam condensate	221-B pipe and operating gallery (chemical makeup tank farm) 211-B station steam supply SN-172 ammonia tank heating coil Various stream trace lines
Steam condensate and/or cooling water	TK-101, -102 aqueous makeup tank heating and cooling coils (211-B) HEDTA tank heating and cooling coils (211-B) TK-SF-121, -122 tanks heating and cooling coils (211-B) Various heating, ventilating, and air conditioning systems
Tank overflow and drain effluent	221-B scale tanks 221-B aqueous makeup tanks 271-B aqueous makeup tanks TK-H-317 resin fluidizing tank (271-B) 211-B ammonia pump basin 271-B tanks[b] 276-B tanks TJ-CS-1, -2 tanks (212-B cask station) 224-B hot water tank 2901-B water tank
Sump effluent	211-B electrical gallery
Cooling water	211-B electrical gallery instrument air compressor
Rainwater	Outdoor drain near 224-B Building (storage building)

(a) From DOE (1987).
(b) Includes neutralized demineralizer recharge effluent.

The 216-B-63 trench has been in operation since March 1970. Since that time, the only documented hazardous effluent discharged consisted of regeneration solutions from the B Plant demineralizers. These effluents were routine corrosive discharges of aqueous sulfuric acid and sodium hydroxide solutions. Demineralizer effluents were released sequentially from anion and cation columns, a procedure that produced effluent beyond the pH limits of 2.0 and 12.5. These corrosive discharges occurred from 1970 until October 1985.

The current practice is to divert each effluent to a holding tank where the cation column effluent is neutralized with sodium carbonate and the anion column effluent is neutralized with monosodium phosphate. Once neutralized to a pH between 4 and 10, the effluents are released to the chemical sewer. Procedural controls instituted since 1984 also require neutralization of corrosive chemicals before they are released from storage or makeup tanks, and they forbid the intentional release of hazardous materials to the chemical sewer. The waste stream currently has inline monitors, for beta and gamma radiation and for pH (Coony et al. 1988).

In the past, floor drains, funnel drains, and tank overflow/drain and heating and cooling coils in 225-B (encapsulation facility portion of B Plant) were discharged into the chemical sewer. This facility has been shut down and no longer produces waste. All its drains and discharges have been covered or plugged.

Although the 216-B-63 trench was placed in service in March 1970, the bottom and sides of the 216-B-63 trench were dredged out in August 1970 and the dredgings buried in the Low-Level Burial Grounds in the 200-East Area. The dredgings were found to be contaminated with approximately 3000 counts per minute of beta-gamma activity at that time (PNL 1987).

2.1.3 Waste Characteristics

Water, the principal substance making up discharge to the 216-B-63 trench, consists of 70% steam condensate from tank heating coils and air compressors, and 30% raw water from such sources as rainwater and overflow from the B Plant water tower. Contaminants mixed with this waste water may be derived from chemical storage and chemical makeup areas, effluent from

plant water demineralizers, and/or floor, funnel, and sink drains connected to B Plant facilities (Table 2.1). It is estimated that the B Plant chemical sewer transported nearly 4700 kg of nitrate and 715 kg of total organic carbon in 1987 (Coony et al. 1988). Maximum discharge temperatures for all individual sources are less than 100°F, except for the 221-B Pipe and Operating (P&O) Gallery steam condensate, which is 212°F. This condensate contributes 1,000 to 2,000 gpd under normal operating conditions.

The effluent stream is monitored continuously at two locations for radiation and sampled weekly for chemical analysis. Concentrations of chemical constituents, as well as other water quality parameters, are listed for a period from 1985 to 1986 in Table 2.2. As demonstrated in Table 2.2, concentrations of most constituents, as well as pH, showed considerable variation over a relatively short sampling period (less than 1 year). According to Jungfleisch (1988), none of the sampled discharges into the 216-B-63 trench are classified as dangerous waste or extremely hazardous waste as specified by the Dangerous Waste Regulations of the State of Washington (Ecology 1986).

2.2 GEOLOGY

This section provides background information on the geology of the Hanford Site, the Separations Areas, and the 216-B-63 trench to support the preparation of the indicator-evaluation ground-water monitoring program presented in Chapter 3.0. The geology of the Columbia Plateau and particularly the Pasco Basin has been studied in detail for DOE as a part of the siting studies for a deep geologic repository for nuclear waste. The Consultation Draft, Site Characterization Plan (DOE 1988) summarizes much of the information known about the Hanford Site, especially near the 200-West Area, where the candidate repository site was located. Studies have also been done in support of nuclear power plant licensing efforts, including those for the Washington Public Power Supply System (Supply System 1981) and the Skagit/Hanford Project (PSPL 1982). More detailed information is available in the following reports:

- on the structural geology and tectonics - Caggiano and Duncan (1983); Reidel et al. (1982); and Tolan (1986)

TABLE 2.2. Analytical Data from B Plant Laboratory Waste Water

Parameter	Sept. 12, 1985	April 9, 1986	April 15, 1986	June 30, 1986
Aluminum	<150	500	160	<150
Ammonium	<20	<50	<50	<50
Antimony	<100	<100	<100	<100
Barium	28	120	23	28
Beryllium	<5.0	<5.0	<5.0	<5.0
Cadmium	2.0	<2.0	2.0	<2.0
Calcium	17,000	170,000	18,000	17,000
Chlorine	1,100	1,400	14,000	960
Chromium	<10	<10	<10	<10
Copper	10	89	15	<10
Cyanide	17	<10	<10	<10
Fluorine	1,500	2,800	7,500	<500
Iron	160	1,700	230	77
Lead	<30	--	--	--
Mercury	<0.1	0.1	<0.1	<0.1
Magnesium	3,600	48,000	4,200	4,000
Manganese	14	44	8.0	10
Nickel	<10	<10	11	<11
Nitrate	530	<500	1,900	2,600
Phosphate	<1,000	<1,000	<1,000	<1,000
Potassium	1,200	6,600	960	820
Osmium	<300	<300	<300	<300
Silver	<10	<10	<10	<10
Sulfate	10,000	2,900,000	130,000	11,000
Sulfur	<1,000	<1,000	500	<1,000
Sodium	150,000	410,000	650,000	2,900
Strontium	<300	670	<300	<300
Tin	<300	--	--	--
Uranium	0.51	4.6	3.5	0.47
Vanadium	<5.0	<5.0	<5.0	<5.0
Zinc	12	420	67	9.0
Acetone	<10	<10	29	<10
Alkanes	<10	13	210	<10
Butyraldehyde	12	<10	<10	<10
Chloroform	<10	<10	10	<10
Phenol	<10	<10	8.4	<10
pH	11.60	2.28	12.67	6.40
Water volume (L/mo)	20,000,000	38,000,000	38,000,000	38,000,000
Temperature (°F)	75.2	59.0	59.0	78.8
Alpha activity (pCi/L)	0.37	3.1	13	<4.0
Beta activity (pCi/L)	15	51	27	310
Conductivity (µS/cm)	1,200	--	--	130
Total organic carbon	1,800	2,800	51,000	2,500

(a) All values are reported in units of parts per billion (ppb) unless otherwise indicated, except pH, which is dimensionless.
Source: DOE 1987.

- on the basalt stratigraphy and chemistry - Swanson et al. (1979) and Reidel et al. (1982)

- on the sedimentary units interfingered with and overlying the basalts - Bjornstad (1984, 1985); Fecht et al. (1985); Myers/Price et al. (1979); Myers and Price (1981); and Graham et al. (1984). Tallman et al. (1979) is the only in-depth study of the geology of the Separations Areas.

2.2.1 Regional Geologic Setting

The Hanford Site lies within the Columbia Plateau, which is generally characterized by a thick sequence of tholeiitic basalt flows called the Columbia River Basalt Group (Swanson et al. 1979). These flows have been folded and faulted, creating broad structural and topographic basins separated by asymmetric anticlinal structures (i.e., ridges). The Hanford Site lies within one of these basins, the Pasco Basin (Figure 2.3).

Principal geologic units within the Pasco Basin include, in ascending order, the Columbia River Basalt Group (Miocene), the Ringold Formation (Miocene-Pliocene), and the Hanford formation (Pleistocene). A regionally discontinuous veneer of recent alluvium, colluvium, and/or eolian sediments overlies the principal geologic units.

2.2.2 Geology of the Separations Areas

The surface topography of the Separations Areas is primarily the result of two geomorphic processes: 1) Pleistocene cataclysmic flooding, and 2) Holocene eolian activity. Cataclysmic flooding, which ended about 13,000 years ago (Mullineaux et al. 1978), created Cold Creek bar (Bretz et al. 1956), a prominent flood feature within the Separations Areas (Figure 2.4). The last cataclysimic flood(s) covered the Separations Areas with a blanket of coarse-grained deposits, which become finer-grained to the south. The northern boundary of the Cold Creek bar is defined by an erosional channel running east-southeast, which formed during waning stages of flooding as floodwaters drained from the basin (Bjornstad et al. 1987).

Since the end of the Pleistocene, winds have reworked the surface of the glaciofluvial sediments locally, depositing a thin veneer of eolian sand in places. Holocene sand dunes are present along the southern boundary of the 200-East Area (Figure 2.4). Holocene alluvium, associated with the Cold Creek-Dry Creek alluvial plain, was deposited less than 1 mi southwest of the 200-West Area (Figure 2.4).

The Separations Areas lie within the Cold Creek syncline, which is bounded on the north by the Umtanum Ridge-Gable Mountain anticlinal structure and on the south by the Yakima Ridge anticlinal structure (Figure 2.3).

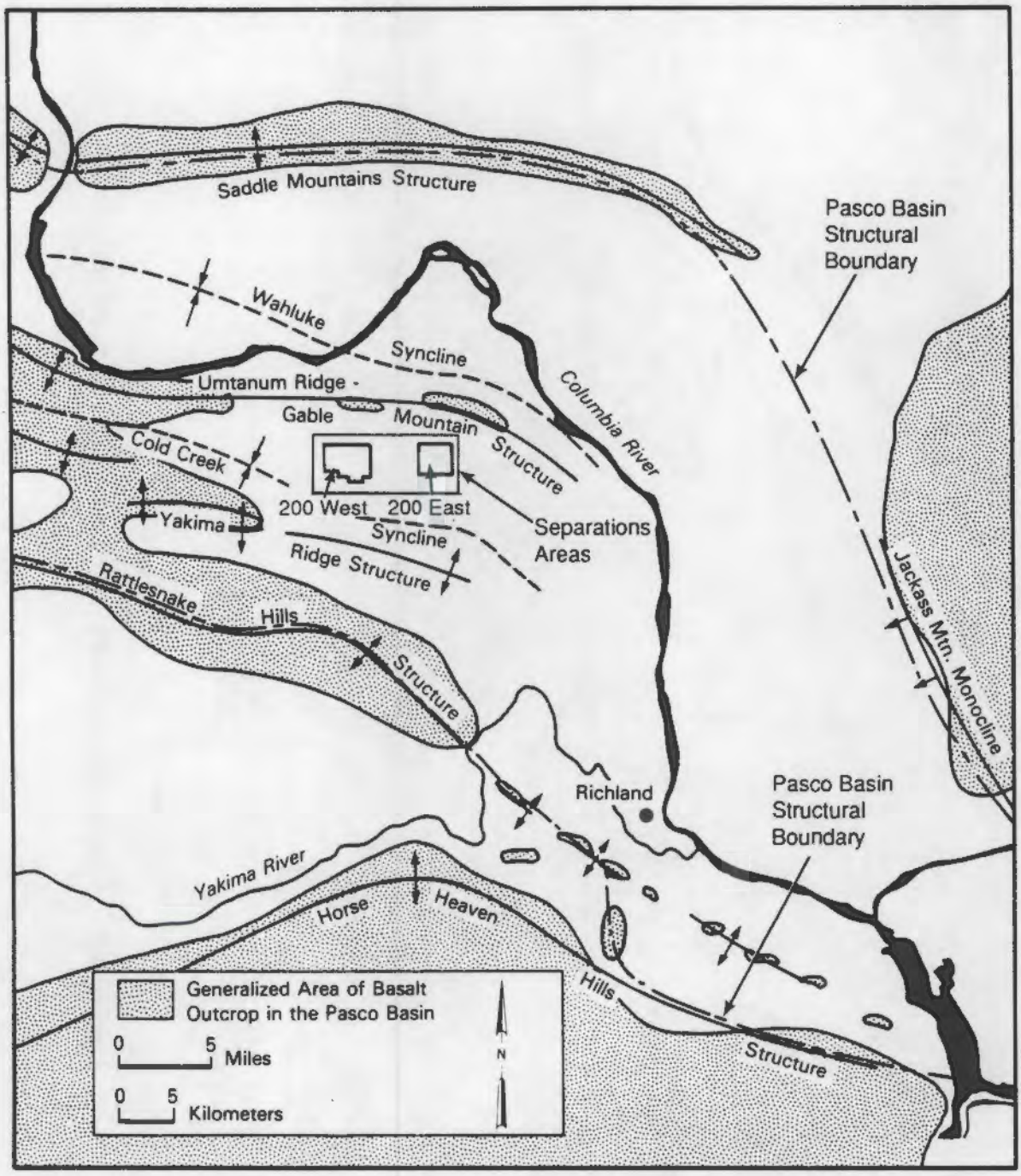


FIGURE 2.3. Location Map of the Hanford Site Within the Pasco Basin Showing Major Structures Within the Basin

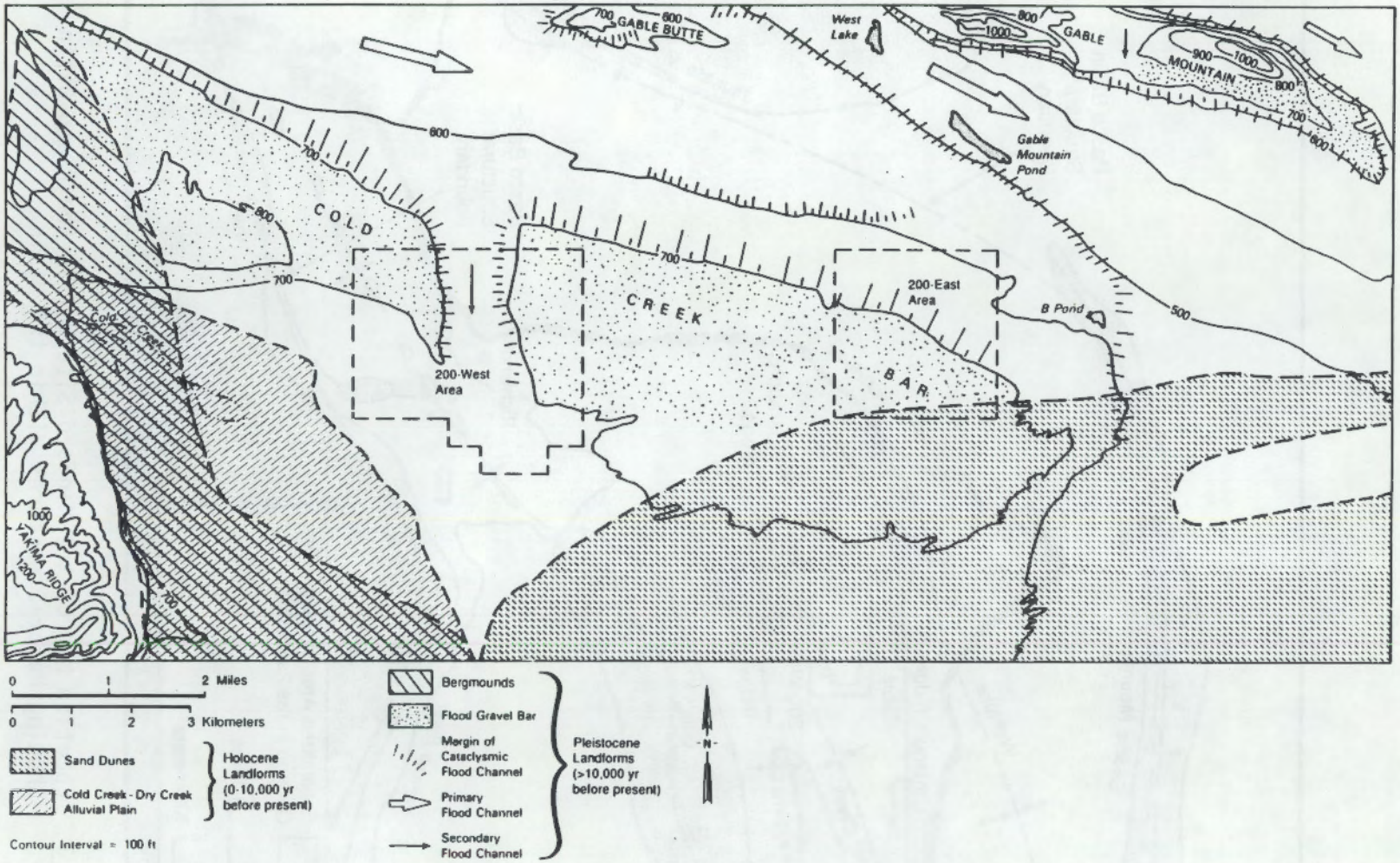


FIGURE 2.4. Geomorphic Features Surrounding the Separations Areas

In the Separations Areas, the top of basalt generally dips gently (less than 5°) to the south-southwest, except in the southwest corner of the 200-West Area, where beds are nearly horizontal along the axis of the Cold Creek syncline.

The generalized stratigraphy of the Separations Areas is shown in Figure 2.5. Bedrock is composed of basalt flows and sedimentary interbeds, which belong to the Columbia River Basalt Group and Ellensburg Formation, respectively. Overlying Columbia River basalt is the fluvial-lacustrine Ringold Formation consisting of variably mixed and interbedded layers of gravel, sand, and mud (i.e., silt and clay). The thickness of the Ringold Formation ranges from 0 ft in the northern part of the 200-East Area to about 500 ft in the southwest portion of the 200-West Area near the axis of the Cold Creek syncline (DOE 1988; Tallman et al. 1979).

The Ringold Formation is divided into four stratigraphic units: basal, lower, middle, and upper. The basal Ringold unit consists of silty sandy gravel overlain by a fining upward sequence of sand and mud. Overlying the basal Ringold is the lower Ringold unit, another fine-grained unit consisting of mostly mud. Sediments of the lower Ringold and upper basal Ringold units have been recognized locally as a potential confining layer.

Where present, the Ringold Formation is dominated by the middle unit in the vicinity of the Separations Areas. The predominant texture consists of well-rounded sandy gravel with some sand and silty sand lenses. The gravels typically range from pebble to cobble in size; however, boulders are locally common (Tallman et al. 1979). Because of their textures and the similarity of their gravel lithologies, the coarse-grained basal and middle Ringold units are difficult to distinguish unless separated by the fine-grained sediments of the upper basal Ringold unit or the lower Ringold unit. The uppermost unit, the upper Ringold, is another sequence of thinly bedded, well-sorted sand and/or mud (DOE 1988; Tallman et al. 1979).

Not all of the units of the Ringold Formation are present throughout the Separations Areas. Erosion by the ancestral Columbia River and later cataclysmic flooding during the Pleistocene Epoch have removed some or all of the Ringold Formation in areas (DOE 1988; Tallman et al. 1979). All four

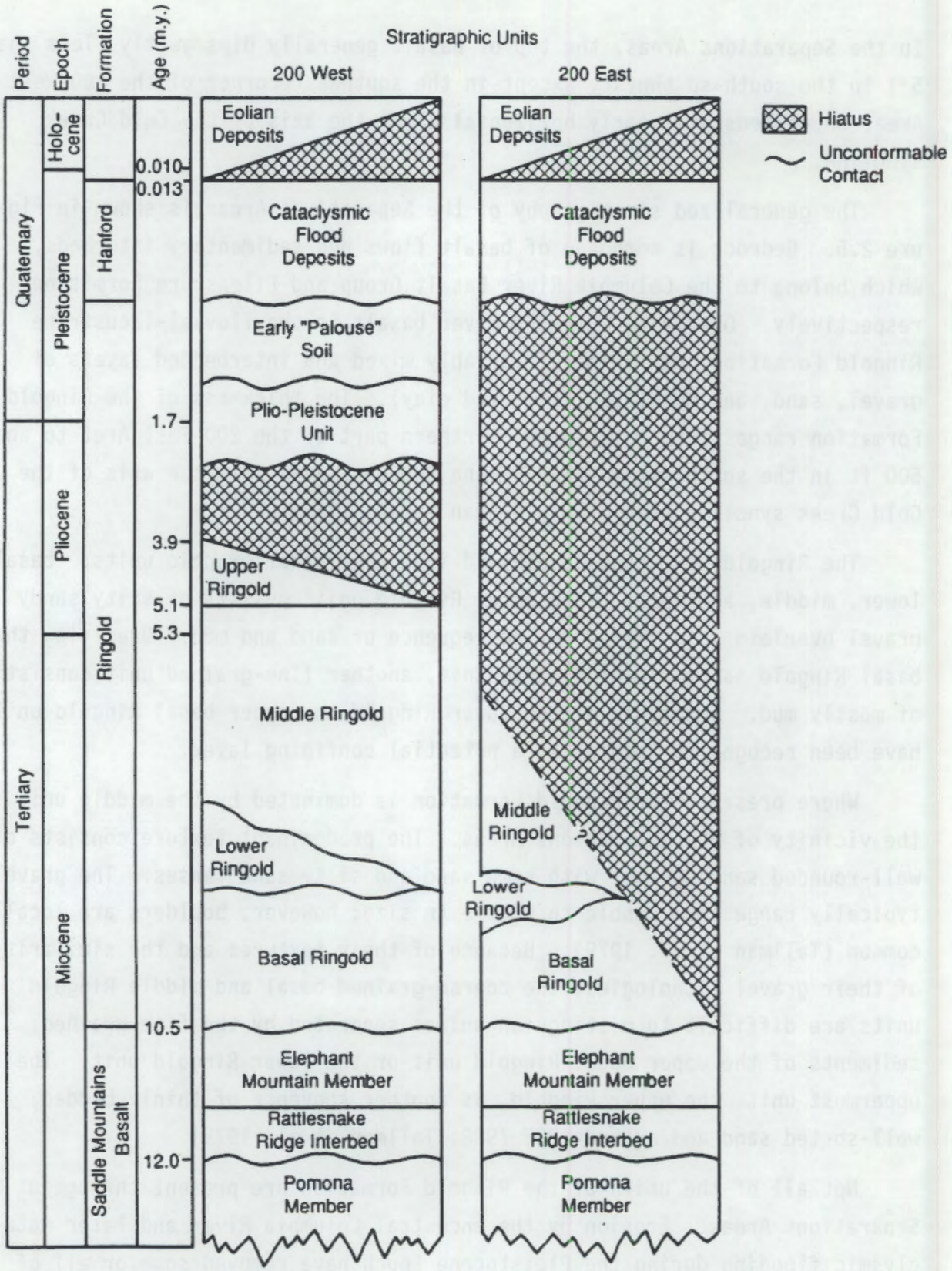


FIGURE 2.5. Generalized Geologic Columns for the Separations Areas

units are currently identified only in the western and southern portion of the 200-West Area, while little or no Ringold is present in the northeastern part of the 200-East Area (Tallman et al. 1979; Last et al. 1989).

A well-developed calcrete belonging to the Plio-Pleistocene unit is found on the uppermost surface of the eroded Ringold sediments in the 200-West Area (Bjornstad 1984; Last et al. 1989). In places, the Plio-Pleistocene unit is overlain by as much as 30 ft of early "Palouse" soil, an eolian deposit of fine-grained sand and silt. Both of these units are present over most of the 200-West Area, but they have apparently eroded from the 200-East Area.

The cataclysmic flooding that eroded the Ringold Formation also deposited a sequence of relatively unconsolidated mud, sand, and gravel informally called the Hanford formation. At least four major flood events occurred in the Pasco Basin during the Pleistocene (Fecht et al. 1985). Near flood channels (e.g., in the northern 200-East Area), the Hanford formation consists of dominantly coarse gravel and sand (Pasco Gravels facies), while to the south and west more slack-water type deposits of sand and silt lie between or beneath coarse-grained flood deposits (Last et al. 1989). Within much of the southern portion of the Separations Areas, the Hanford formation consists predominantly of sand. Thickness of the formation ranges from approximately 70 ft in part of the 200-West Area to a maximum of about 350 ft east of the 200-East Area (Tallman et al. 1979).

The contact between the Hanford and Ringold formations is commonly a transition upward from more indurated deposits containing a variety of lithologies (Ringold Formation) to very weakly cemented or unconsolidated sediments with a higher proportion of basaltic clasts (Hanford formation). The textures of the Pasco Gravels and the middle Ringold are similar, although the difference in gravel lithologies can sometimes be used to distinguish between the two. However, in some places, basalt-rich gravel layers have been found in the middle Ringold unit, and if the middle Ringold and Pasco Gravels are not separated by the upper Ringold, the Plio-Pleistocene unit, and/or the early "Palouse" soil, they can be difficult to

distinguish. This is particularly true where considerable reworking and incorporation of the Ringold sediments into the Hanford formation has occurred.

Graham et al. (1984) indicate the possibility that the Elephant Mountain Member has been completely eroded near the northeast corner of the 200-East Area, with partial erosion over a larger area. This may result in the Hanford formation directly overlying the Rattlesnake Ridge interbed northeast of the 200-East Area.

2.2.3 Site Geology

The 216-B-63 trench lies at an elevation of about 640 ft along the northern flank of Cold Creek bar. Cold Creek bar formed along the margin of a Pleistocene-age cataclysmic flood channel, located in the northeastern portion of the 200-East Area (see Figure 2.4). The land surface in the vicinity of the trench dips at ~145 ft/mi (<2°) to the northeast, toward the axis of the paleochannel.

An interpretation of the subsurface geology near the site is based on an examination of sieve data, drillers' logs, and natural gamma logs from 25 wells nearest the 216-B-63 trench, shown in Figure 2.6. An inventory of the data on these wells, used to generate contour maps in this report, is listed in Table 2.3. Well-construction and geologic logs for three of these wells, located within 1000 ft of the trench, are presented in Appendix A.

A three-dimensional representation of the subsurface geology is presented in Figure 2.7. Essentially, only a single stratigraphic unit, the Hanford formation, overlies basalt beneath the site; according to Last et al. (1989), the Ringold Formation pinches out ~2000 ft to the southwest (Figure 2.8). Based on the limited borehole data presented in Figure 2.7, the sediments directly beneath the 216-B-63 trench appear to be mostly mixtures of sand and gravel associated with high-energy deposition by cataclysmic floods. Lateral facies changes occur in the flood deposits to the south and west, however, away from the axis of the main flood channel. Along the southern margin of the flood channel, deposits become finer grained and include layers of fine sand, silt, and occasionally mud, which could act locally as aquitards leading to perched-water conditions. The thickness of

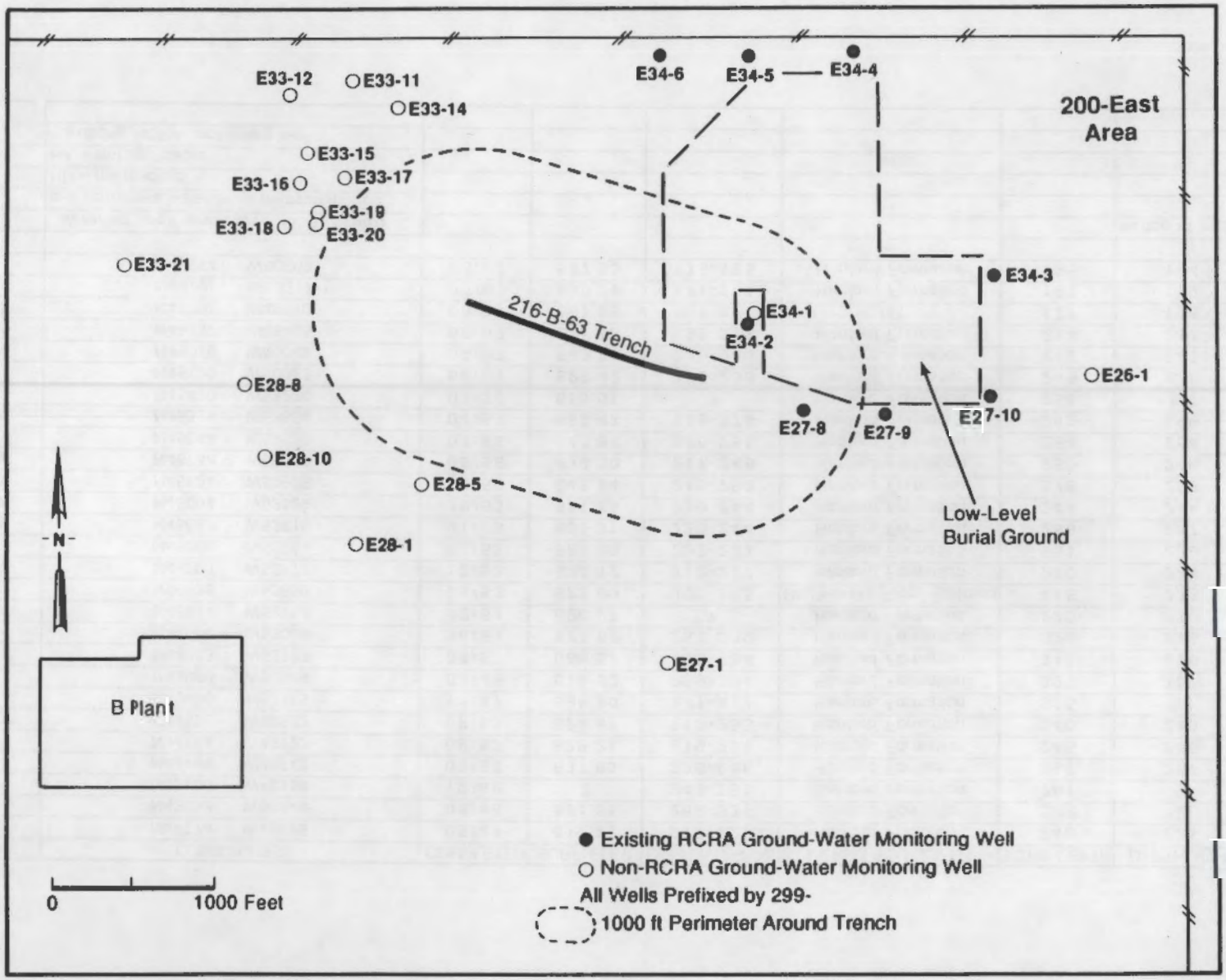


FIGURE 2.6. Borehole Location Map in the Vicinity of the 216-B-63 Trench

TABLE 2.3. Borehole Inventory of Wells Near the 216-B-63 Trench

BOREHOLE	COORDINATES	COMPLETED	SURF. ELEV.	OPEN INTERVAL	MEASURED AQUIFER	TOTAL DEPTH	DEPTH TOB#	ELEV. TOB
E26-1	N44774 W48025	05/48	617.25	217-227	Hanford Formation	248	225	392
E27-1	N42833 W50440	04/48	681.05	262-331	Hanford Formation	332	NR	<349
E27-7	N43100 W48150	10/82	?	241-281	Hanford Formation	281	?	?
E27-8*	N44496 W49742	09/87	637.83	226-246	Hanford Formation	257	257	381
E27-9*	N44484 W49122	08/87	629.21	219-239	Hanford Formation	245	245	384
E27-10*	N44520 W48522	08/87	624.47	213-233	Hanford Formation	240	240	384
E28-1	N43480 W52355	11/47	685.20	277-311	Hanford Formation	325	NR	<360
E28-5	N43980 W51989	03/48	672.32	259-304	Hanford Formation	327	307	365
E28-8	N44603 W53127	09/57	668.52	250-294	Hanford Formation	315	296	373
E28-10	N44000 W53000	08/61	677.67	257-309	Hanford Formation	325	315	363
E33-11	N46444 W52452	02/54	620.27	?	Hanford Formation	230	230	390
E33-12	N46436 W52850	09/53	623.00	305-385	Rattlesnake Ridge interbed	415	232	391
E33-14	N46223 W52177	12/53	622.12	212-227	Hanford Formation	230	228	394
E33-15	N46066 W52751	02/53	627.40	222-237	Hanford Formation	251	239	388
E33-16	N45887 W52815	01/53	635.51	220-244	Hanford Formation	258	247	389
E33-17	N45894 W52529	10/53	631.65	220-244	Hanford Formation	244	244	388
E33-18	N45624 W52825	02/50	643.84	240-260	Hanford Formation	278	258	386
E33-19	N45744 W52629	06/56	639.00	217-248	Hanford Formation	252	249	390
E33-20	N45664 W52629	07/56	640.87	225-251	Hanford Formation	254	254	387
E33-21	N45321 W53856	04/57	663.43	235-275	Hanford Formation	282	279	384
E33-27	N45470 W53220	07/70	656.01	?	Hanford Formation	255	NR	NR
E34-1	N45129 W50023	06/61	629.42	215-230	Hanford Formation	245	235	394
E34-2*	N45076 W50048	09/87	630.80	220-240	Hanford Formation	242	241	390
E34-3*	N45337 W48488	08/87	611.52	193-213	Hanford Formation	214	213	399
E34-4*	N46791 W49419	08/87	587.56	157-177	NR	177	176	412
E34-5*	N46791 W50014	08/87	590.79	171-191	Hanford Formation	192	189	402
E34-6*	N46784 W50609	08/87	597.83	175-195	Hanford Formation	195	194	404

detailed logs presented in Appendix C

a = no recent water-level measurement

NR = not reached

NA = not applicable

* existing RCRA monitoring well

#= top of basalt

TABLE 2.3. (contd)

BOREHOLE	WATER DEPTH	WATER TABLE	MEASURED	SAT. THICK.	SIEVE DATA	NATGAM. LOG	DRILLERS LOG	USED
E26-1	210.92	406.33	3/31/88	14.3	Y	Y	Y	Y
E27-1	275.24	405.81	3/31/88	>56.8	Y	N	Y	Y
E27-7	a	a	a	a	N	N	Y	N
*E27-8**	232.46	405.37	3/31/88	24.4	Y	Y	Y	Y
E27-9*	223.68	405.53	3/31/88	21.5	Y	Y	Y	Y
E27-10*	218.54	405.93	3/31/88	21.9	Y	Y	Y	Y
E28-1	a	a	a	a	Y	Y	Y	Y
E28-5	266.69	405.63	3/31/88	40.6	Y	Y	Y	Y
E28-8	362.99	405.53	3/31/88	32.5	Y	Y	Y	Y
E28-10	272.04	405.63	3/31/88	42.6	N	Y	Y	Y
E33-11	a	a	a	a	Y	Y	Y	Y
E33-12	217.47	405.53	3/31/88	14.5	Y	Y	Y	Y
E33-14	216.65	405.47	3/31/88	11.5	Y	Y	Y	Y
E33-15	a	a	a	a	Y	Y	Y	Y
E33-16	a	a	a	a	Y	Y	Y	Y
E33-17	226.65	405.00	12/11/87	17.4	Y	Y	Y	Y
E33-18	239.31	404.53	11/9/88	18.5	Y	Y	Y	Y
E33-19	a	a	a	a	Y	Y	Y	Y
E33-20	235.57	405.30	2/4/86	18.3	Y	Y	N	Y
E33-21	262.82	400.61	11/9/88	17.0	80-260'	Y	Y	Y
E33-27	a	a	a	a	N	N	Y	N
E34-1	223.83	405.59	3/31/88	11.6	Y	Y	Y	Y
*E34-2**	225.43	405.37	3/31/88	15.4	Y	Y	Y	Y
E34-3*	205.53	405.99	3/31/88	7.0	Y	Y	Y	Y
E34-4*	DRY	NR	NA	0.0	Y	Y	Y	Y
E34-5*	184.75	406.04	3/31/88	4.0	Y	Y	Y	Y
E34-6*	192.53	405.30	3/31/88	1.3	Y	Y	Y	Y

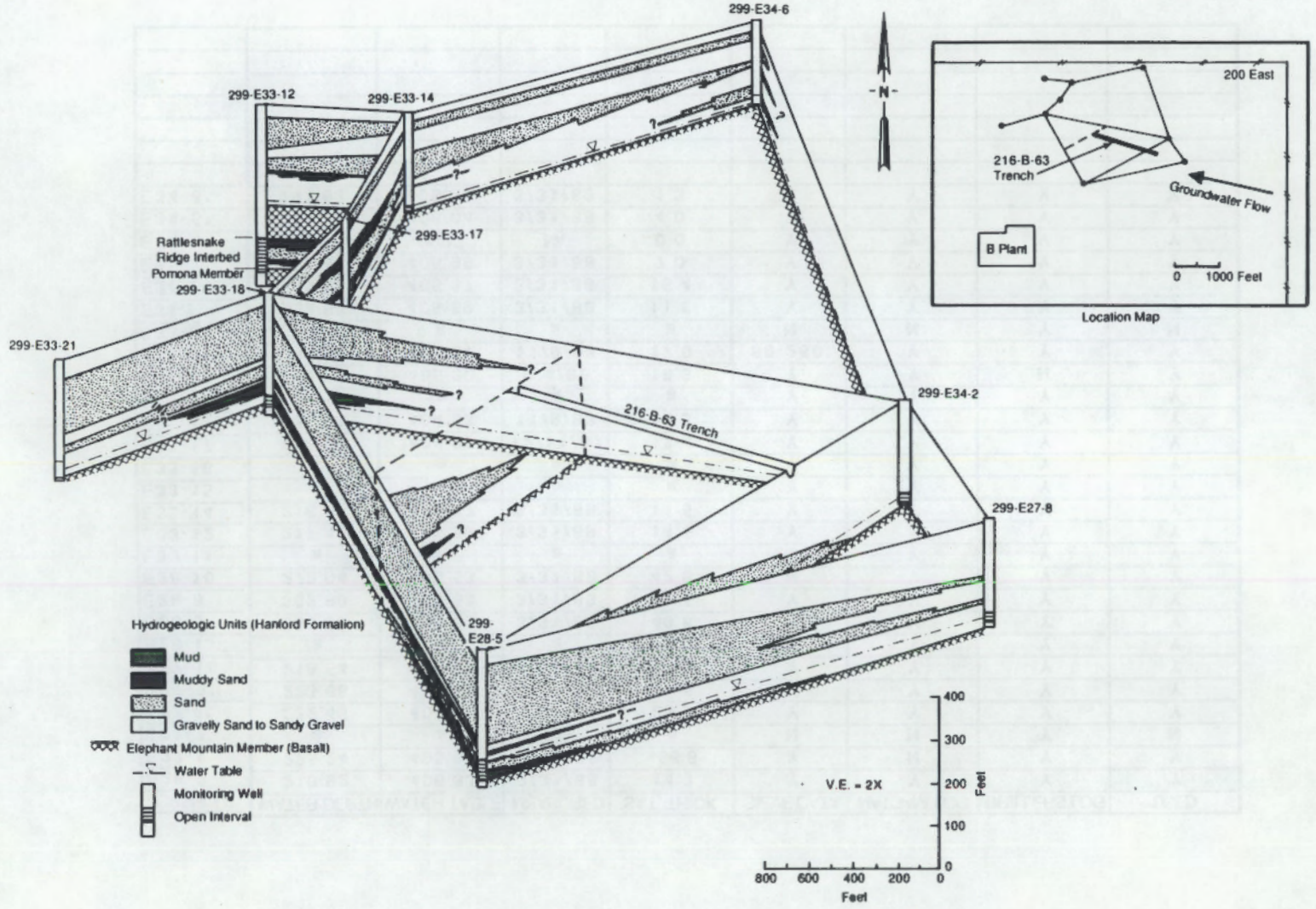


FIGURE 2.7. Fence Diagram Around the 216-B-63 Trench

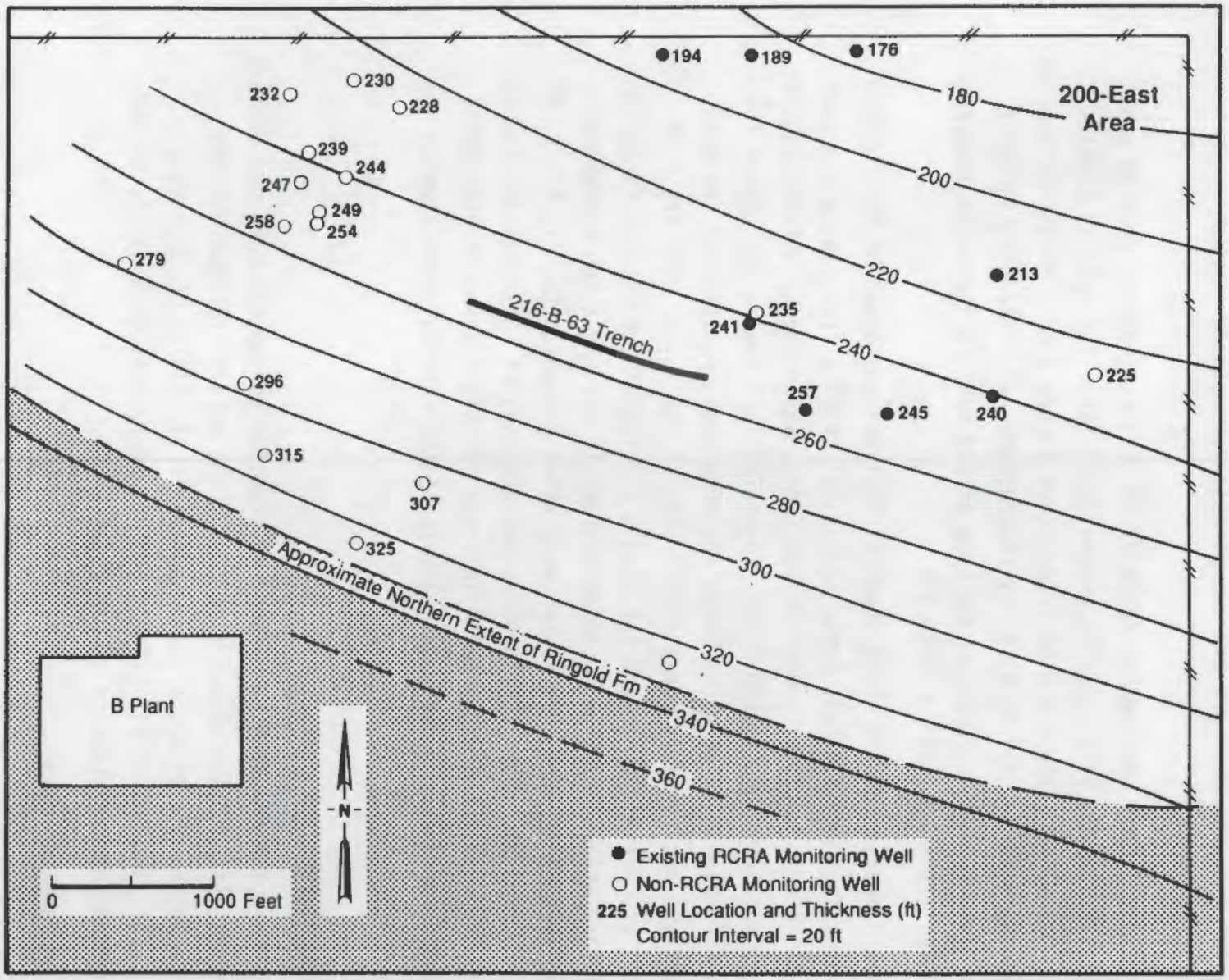


FIGURE 2.8. Isopach Map of the Post-Basalt Sediments (after Last et al. 1989).

the sediments overlying the basalt becomes progressively thinner to the northeast. The sediments are 250-260 ft thick beneath the trench (Figure 2.8).

Results of bulk geochemical analyses on sediment samples from an existing well (299-E34-2) have recently become available. The well is located ~500 ft northeast of the 216-B-63 trench (see Figure 2.6). Hard-tool samples from this well were analyzed by x-ray fluorescence at three stratigraphic levels: toward the top, middle, and base of the Hanford formation sequence. The results are tabulated in Table 2.4.

When compared to other bulk chemical analyses performed on the Hanford formation within the 200-East Area, analytical results from toward the base of the Hanford formation sequence in 299-E34-2, where the unconfined aquifer lies, are about average (Table 2.4). Concentrations toward the top of the Hanford formation, on the other hand, are more than one standard deviation above the average for many constituents (Ca, Fe, C, Zn, Ga, and Zr). In contrast, concentrations toward the middle portion of the Hanford formation sequence are only significantly above average in Ni, while the difference from the average is less than 1σ for many other elements (Ca, Ti, Fe, V, Mn, Cu, Zn, Y, Zr, Nb). More bulk geochemical analyses of sediments are needed, however, to establish the degree of internal variation among stratigraphic units and determine true background levels of the chemical constituents present.

2.3 HYDROGEOLOGY

This section provides background information on the hydrogeology beneath the Hanford Site. Detailed descriptions of the area's hydrogeology are available in reports by DOE (1988), Gephart et al. (1979), Graham et al. (1981, 1984), and Law et al. (1987), and in water-level data collected and reported semiannually (Schatz and Ammerman 1988).

2.3.1 Regional Setting

The Hanford Site has a semiarid climate and receives an average of 6.25 in. of precipitation per year. Some evapotranspiration measurements have been made at Hanford, but a detailed study has not been made near the

TABLE 2.4. Bulk Major- and Trace-Element Geochemistry of Sediment Samples of the Hanford Formation from Well 299-E34-2

	Depth, ft			
	49-50	145-150	230	Average[a]
Major Elements (wt%)				
Si	28.9	30.4	29.5	29.64 ± 6.92
Al	7.04	6.61	6.52[b]	6.92 ± 0.30
K	1.56	1.76	1.50	1.59 ± 0.22
Ca	3.83[c]	2.70[b]	3.19	3.28 ± 0.48
Ti	0.68	0.35[b]	0.57	0.55 ± 0.13
Fe	5.57[c]	3.13[b]	5.03	4.53 ± 1.01
C	0.22[c]	0.14	0.09	0.12 ± 0.07
Trace Elements (ppm)				
V	229	92[b]	161	171 ± 60
Cr	30	55	<25	NC[d]
Mn	901	618[b]	843	805 ± 182
Co	<47	<34	<43	NC
Ni	18.2	24.7[c]	21.4	20.0 ± 3.3
Cu	44.6	20.7[b]	43.5	37.1 ± 15.9
Zn	87.7[c]	46.0[b]	72.7	69.7 ± 12.8
Ga	17.9[c]	14.6	15.5	15.8 ± 1.3
As	4.42	4.53	3.79	4.27 ± 0.95
Se	<0.95	0.99	<0.92	NC
Br	<0.91	<0.77	<0.89	NC
Rb	55.1	66.5	51.7	56.3 ± 11.3
Sr	377	411	356[b]	402 ± 37
Y	26.0	17.7[b]	24.2	24.1 ± 4.0
Zr	158.0[c]	106.6[b]	139.1	139.9 ± 16.8
Nb	10.76	7.24[b]	9.94	10.39 ± 1.17
Mo	3.02	<1.5	2.73	NC
Ru	<4.8	<4.8	<4.9	NC
Rh	<5.1	<5.2	<5.2	NC
In	<6.7	<7.0	<6.6	NC
Sn	<7.3	<7.2	<7.5	NC
I	<12	<12	<12	NC
Ba	744	810	809	795 ± 84
La	25	37	<22	NC
Ce	43	42	48	43 ± 11
Pb	8.0	9.8	9.5	9.2 ± 1.9
U	<3.9	<3.9	<3.6	NC

(a) Average of 13 samples of Hanford formation from 200-East Area.
(b) More than 1σ below average of 200-East Area samples.
(c) More than 1σ above average of 200-East Area samples.
(d) NC = not calculable.

Separations Areas. Wallace (1977) used Hanford Meteorology Station data to compute average potential evapotranspiration for the Hanford Site using three different methods: the Penman, Thornthwaite-Maither, and Morton methods. The potential evapotranspiration values calculated by Wallace were from five to nine times the mean annual precipitation. Calculations for monthly potential evapotranspiration compared with average monthly precipitation values from Stone et al. (1983) indicate that precipitation may exceed evapotranspiration within the months of November through February.

Recharge rates range from near zero to more than 4 in./yr, depending on surface conditions (Gee 1987). Small recharge rates occur where fine-textured sediments and deep-rooted plants occur (e.g., much of the 200 Areas). The larger values are associated with areas having a coarse gravelly surface and no vegetative cover. The Hanford Site is drained by the Yakima and Columbia rivers (Figure 2.1).

Ground water beneath the Hanford Site occurs under both unconfined and confined conditions. The unconfined aquifer is contained primarily within the middle unit of the Ringold Formation and the Hanford formation. The base of the unconfined aquifer is the basalt surface of the Elephant Mountain Member of the Columbia River Basalt Group, or, in some areas, the clay of the lower Ringold unit. The confined aquifers beneath the Hanford Site include sedimentary interbeds and interflow zones that occur between dense basalt flows of the Columbia River Basalt Group.

The source of natural recharge to the unconfined aquifer and some of the confined aquifers is rainfall from areas of high relief west of the Hanford Site and ephemeral streams in the Cold Creek and Dry Creek valleys. Discharge from the unconfined aquifer is primarily to the Columbia River (Graham et al. 1981).

2.3.2 Ground-Water Hydrology of the Separations Areas

As more characterization efforts are undertaken on the Hanford Site, the understanding of the geologic framework and its relation to the hydrogeologic system will continue to be developed and refined. This document does not attempt to integrate or present all that is known of the hydrogeologic system within the Separations Areas. Instead, this discussion is limited to

the hydrologic properties of the uppermost portion of the unconfined aquifer contained in the Hanford and Ringold formations.

In addition to natural recharge, the unconfined aquifer receives artificial recharge from liquid disposal areas. This artificial recharge is estimated to be 10 times greater than natural recharge (Graham et al. 1981). Graham et al. estimated natural recharge from Cold Creek Valley to the Separations Areas to be approximately 1.3×10^6 gpd. The total volume of artificial recharge in 1987 was approximately 6.1×10^9 gal (Serkowski et al. 1988), corresponding to a rate of approximately 1.7×10^7 gpd. The major sources of artificial recharge in the central Hanford Site have been three waste ponds, designated U Pond, Gable Mountain Pond, and B Pond, all located near or in the Separations Areas. These sources of artificial recharge have had a major effect on the flow system of the unconfined aquifer. U Pond and Gable Mountain Pond were deactivated in 1984 and 1987, respectively. B Pond is scheduled for decommissioning in the mid-1990s.

Ground-water elevation contours for December 1987 (Schatz and Ammerman 1988) for the unconfined aquifer in the Separations Areas are shown in Figure 2.9. The regional flow direction in the Separations Areas is from west to east, but it is affected by the two ground-water mounds that have resulted from discharges to U Pond and B Pond. Ground-water flow beneath the 200-West Area is generally toward the north and east, away from the mound created by past discharges to U Pond. As this mound dissipates as a result of the discontinuance of discharge to U Pond, the hydraulic gradient will decrease and shift to the east. The hydraulic gradient in the 200-West Area is sufficiently high (a minimum of approximately 10^{-3} ft/ft) to determine flow directions with a large degree of certainty. Vertical hydraulic gradients are presumed to be present within the unconfined aquifer in portions of the 200-West Area as a result of the ground-water mound (Graham et al. 1981).

Ground-water flow beneath the 200-East Area is complex because flow converges from the west and east and then diverges, with a component flowing northward between Gable Butte and Gable Mountain and the other component flowing southeast toward the Columbia River. In addition, the high transmissivity beneath most of the 200-East Area results in very small hydraulic

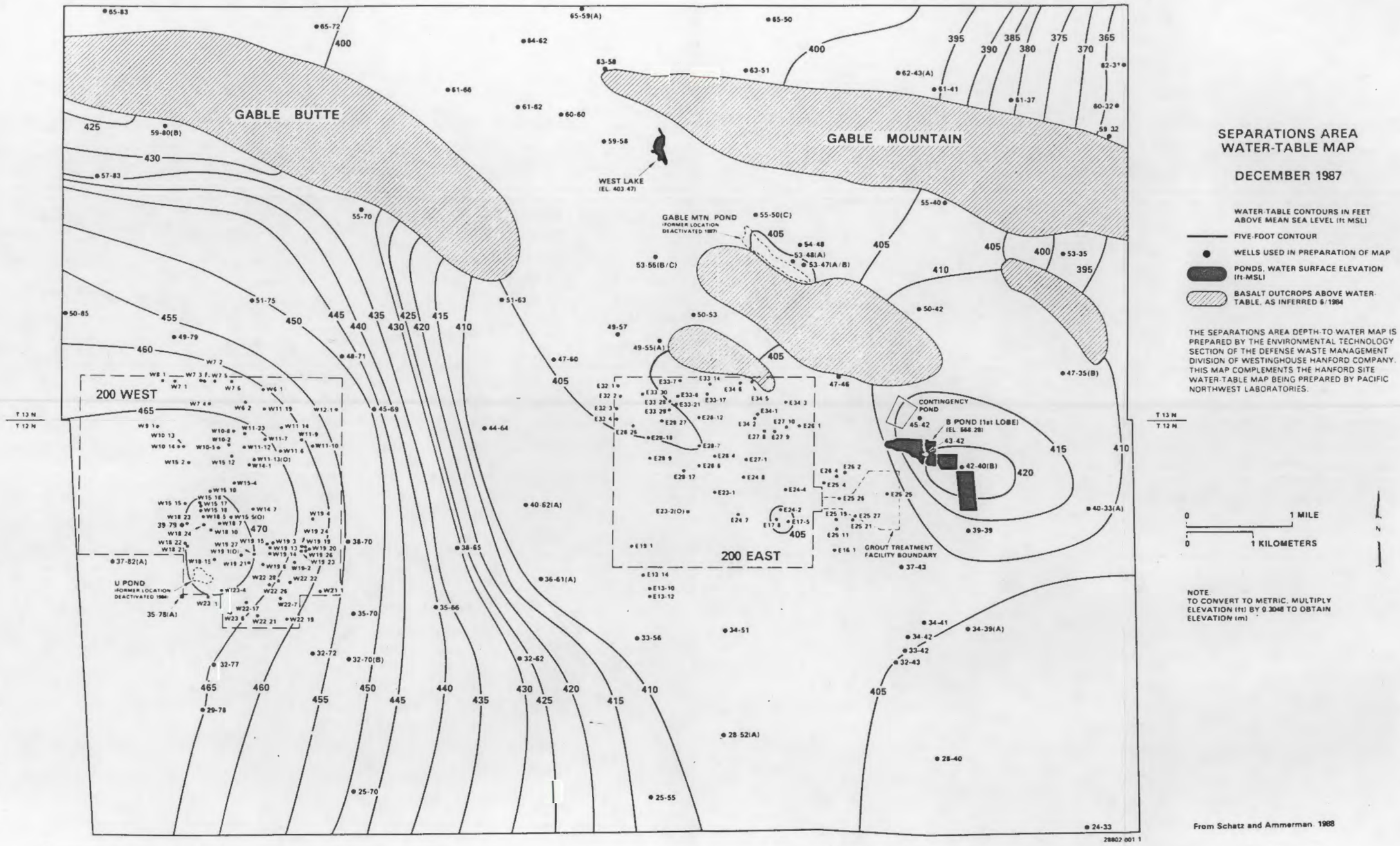
gradients. Flow directions may shift because of changing rates of waste water discharged into B Pond and other disposal sites. Therefore, it is often difficult to define flow directions at specific sites.

The principal geologic units (Figure 2.5) controlling ground-water flow in the Separations Areas are, in ascending order, the Elephant Mountain Member, which acts as a confining layer except where it has been locally eroded, and the Ringold and Hanford formations, which contain the unconfined aquifer. Basalt of the Elephant Mountain Member is assumed to be the base of the unconfined or uppermost aquifer near the 200-East Area. However, two studies (Graham et al. 1984; Jensen 1987) present results indicating aquifer intercommunication between the unconfined aquifer and the Rattlesnake Ridge confined aquifer near the 200-East Area. The Elephant Mountain Member has possibly been eroded in or near the northeast corner of the 200-East Area, providing a means for aquifer intercommunication.

The depth to water of the unconfined aquifer within the Separations Areas ranges from approximately 19 ft beneath the former U Pond to approximately 340 ft west of the 200-East Area. The thickness of the unconfined aquifer ranges from 0 ft at the north edge of the 200-East Area to more than 250 ft in the northwest part of the 200-West Area.

In general, the transmissivity tends to increase from west to east across the Separations Areas as a result of a larger portion of the unconfined aquifer being contained within the more permeable Hanford formation.

The Ringold Formation exhibits a variety of hydrologic characteristics, including hydraulic conditions ranging from confined to unconfined. In some areas, the lower Ringold unit is the base of the unconfined aquifer. In the southern portion of the 200-East Area and much of the 200-West Area, the basal Ringold unit is locally confined by the overlying lower Ringold unit (Graham et al. 1984). In other areas, the lower Ringold unit is missing, and the basal and middle Ringold units contain the unconfined aquifer. In the northeastern portion of the 200-East Area, the Ringold Formation is completely eroded. Here, the unconfined aquifer lies within the Hanford formation, which lies directly on top of basalt (Tallman et al. 1979). The lithologies in the unconfined aquifer exhibit widely varying hydrogeologic



SEPARATIONS AREA WATER-TABLE MAP

DECEMBER 1987

WATER-TABLE CONTOURS IN FEET ABOVE MEAN SEA LEVEL (ft MSL)

FIVE-FOOT CONTOUR

WELLS USED IN PREPARATION OF MAP

PONDS, WATER SURFACE ELEVATION (ft-MSL)

BASALT OUTCROPS ABOVE WATER-TABLE, AS INFERRED 6/1984

THE SEPARATIONS AREA DEPTH-TO-WATER MAP IS PREPARED BY THE ENVIRONMENTAL TECHNOLOGY SECTION OF THE DEFENSE WASTE MANAGEMENT DIVISION OF WESTINGHOUSE HANFORD COMPANY. THIS MAP COMPLEMENTS THE HANFORD SITE WATER-TABLE MAP BEING PREPARED BY PACIFIC NORTHWEST LABORATORIES.

NOTE
TO CONVERT TO METRIC, MULTIPLY ELEVATION (ft) BY 0.3048 TO OBTAIN ELEVATION (m)

From Schatz and Ammerman 1988

FIGURE 2.9. Water Table Map for the Separations Areas, December 1987

properties (Table 2.5). The values given in this table are generalizations; in some locations hydraulic properties lie beyond the ranges given.

In the 200-West Area, the unconfined aquifer occurs within the middle Ringold unit, which is compacted and often partially cemented. Transmissivities range from 300 to 5400 ft^2/d. In the 200-East Area, the aquifer is in either the unconsolidated Hanford formation, the middle Ringold unit, or both, leading to a range of transmissivities from 5 to 135,000 ft^2/d (Graham et al. 1981).

The measured storativity values for the unconfined aquifer range from 0.002 to 0.7 (Table 2.5); the lower values are associated with the lower Ringold unit and the higher values with the Hanford formation (Graham et al. 1981).

The effective porosity of the sediments in the unconfined aquifer ranges from 10 to 30%. The lower value can be correlated with sediments of the lower Ringold unit, and the upper range approaches the total porosity of the sediments in the Hanford formation (Graham et al. 1981). The water in the aquifer is principally of a calcium-bicarbonate type, but there is considerable variability in chemical composition among individual samples.

Discontinuous perched-water tables occur in parts of the 200-West Area, often lying above a calcrete belonging to the Plio-Pleistocene unit or above markedly finer-grained sediments in the upper Ringold and Hanford formations. The lateral extent of these perched-water tables has not been defined in

TABLE 2.5. Ranges of Hydraulic Properties in the 200-East Area

Interval Tested	Hydraulic Conductivity (ft/d)	Storativity	Porosity (%)
Hanford Formation	2,000-10,000	0.07	30
Middle Ringold Unit	9-230	--	--
Lower Ringold Unit	1-12	0.002	10

Source: Graham et al. 1981.

detail, but they are generally found only near sources of discharge of large quantities of water to the sediment column and where fine-grained sediments occur.

2.3.3 Hydrogeology Beneath the Site

The unconfined aquifer lies at a depth of about 240 ft (Figure 2.10) beneath the site. The aquifer thins to the northeast in response to the sloping basalt surface, which is folded upward in this direction (Figure 2.11). The thickness of the unconfined aquifer ranges from about 20 to 30 ft in the vicinity of the trench (Figure 2.12). The aquifer lies entirely within the coarse-grained Hanford formation deposits, except south of the trench (e.g., 299-E28-5) where slack-water deposits of sand to muddy sand lie within the aquifer (see Figure 2.7) Discontinuous fine-grained layers of sand and mud occur above the water table also, but these appear to be restricted to areas south and west of the trench.

Near the 216-B-63 trench, aquifer tests have been performed on wells associated with the Low-Level Burial Ground waste management area, located north and east of the trench (Last et al. 1989). Results of these tests, performed on two wells within 1000 ft of the trench (299-E27-8 and 299-E34-2), along with estimated aquifer thickness and calculated hydraulic conductivity, are presented in Table 2.6.

Based on the potentiometric map in Figure 2.13, ground water flows west-northwest, roughly parallel to the axis of the 216-B-63 trench. The ground-water flow is driven in this direction by the recharge mound beneath B Pond to the east (Figure 2.9). The differences in head are relatively minor, however, and the flow of ground water could change significantly after B Pond is decommissioned.

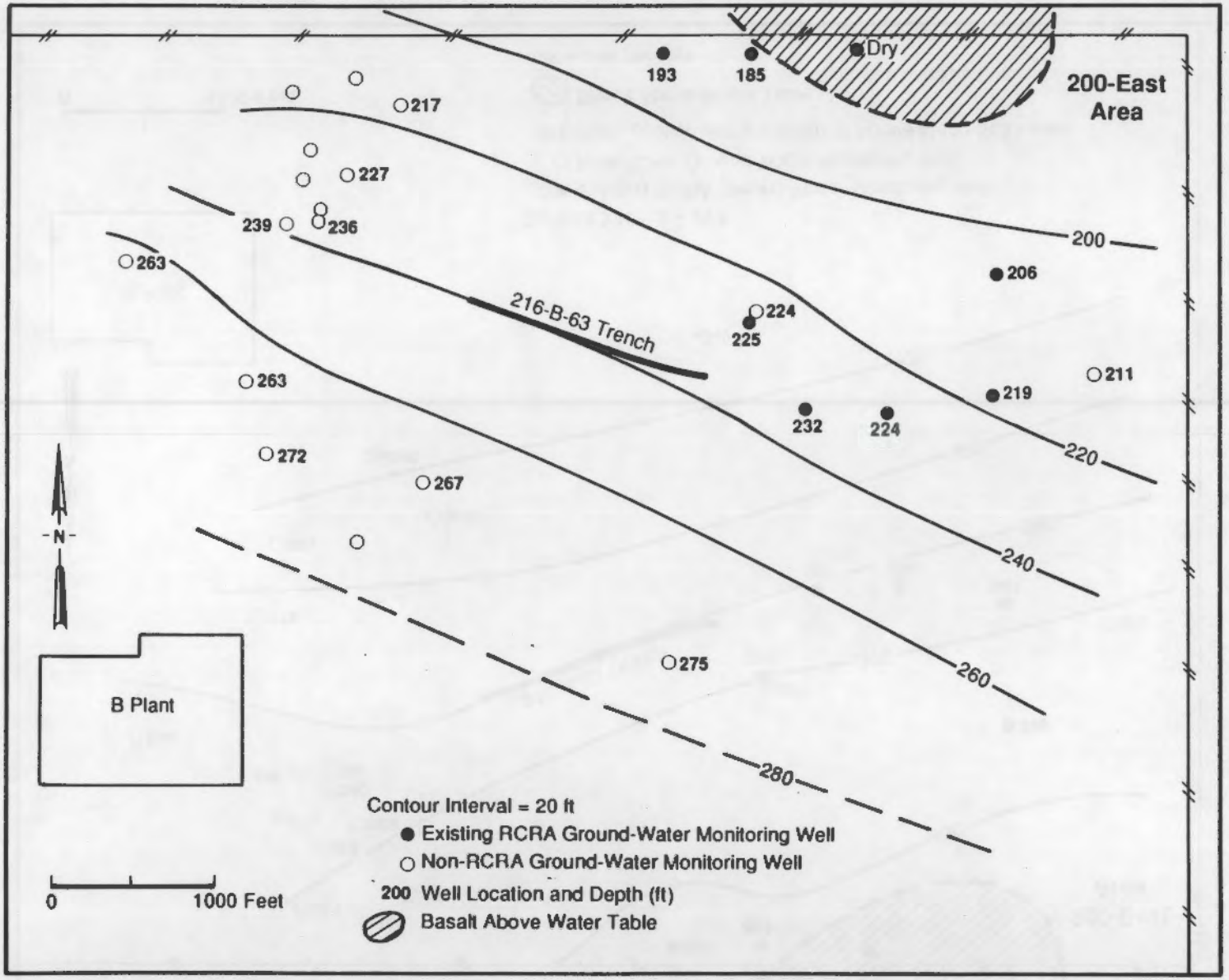


FIGURE 2.10. Depth to the Water Table in the Vicinity of the 216-B-63 Trench, March 1988

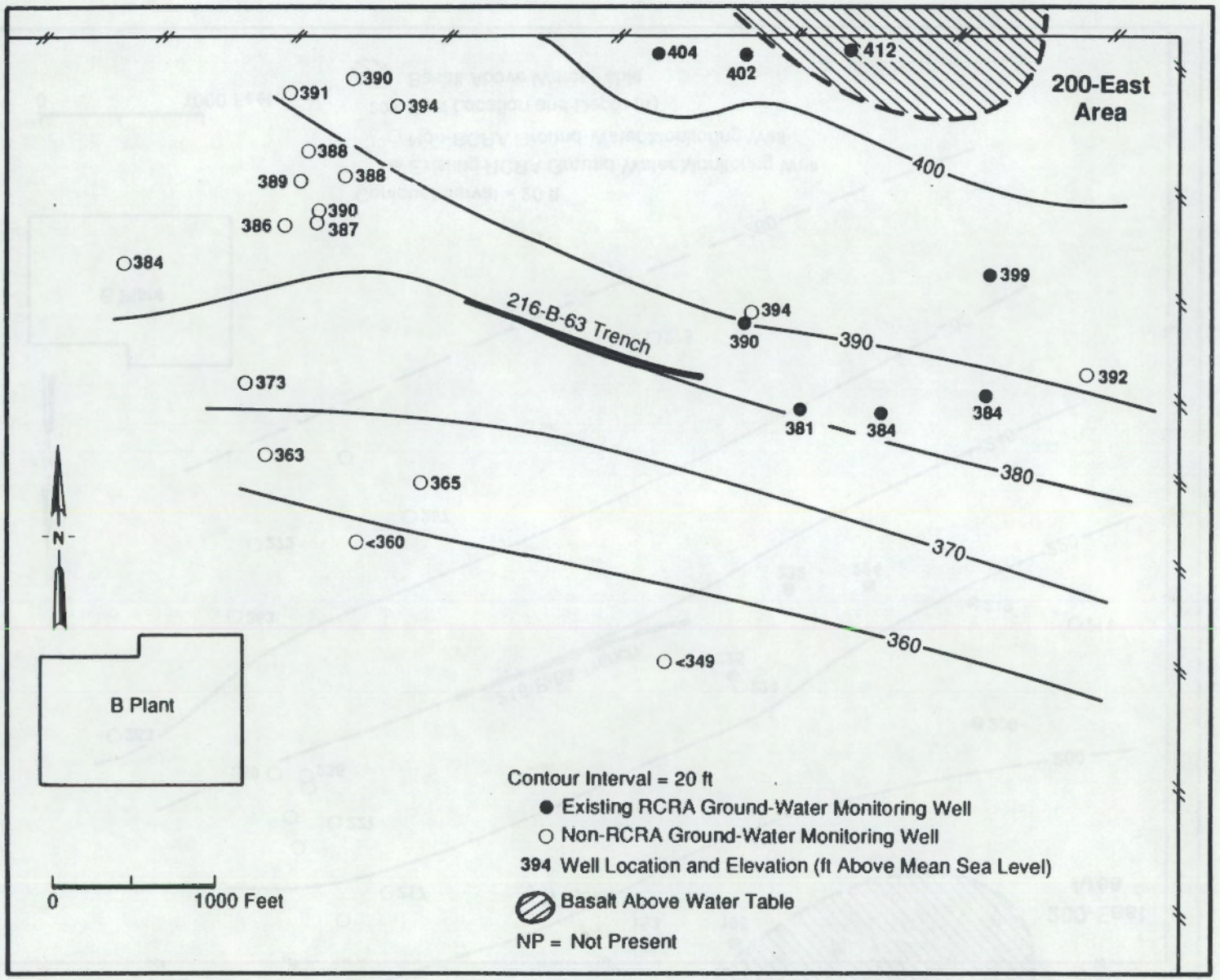


FIGURE 2.11. Base of Unconfined Aquifer (top of basalt) in the Vicinity of the 216-B-63 Trench

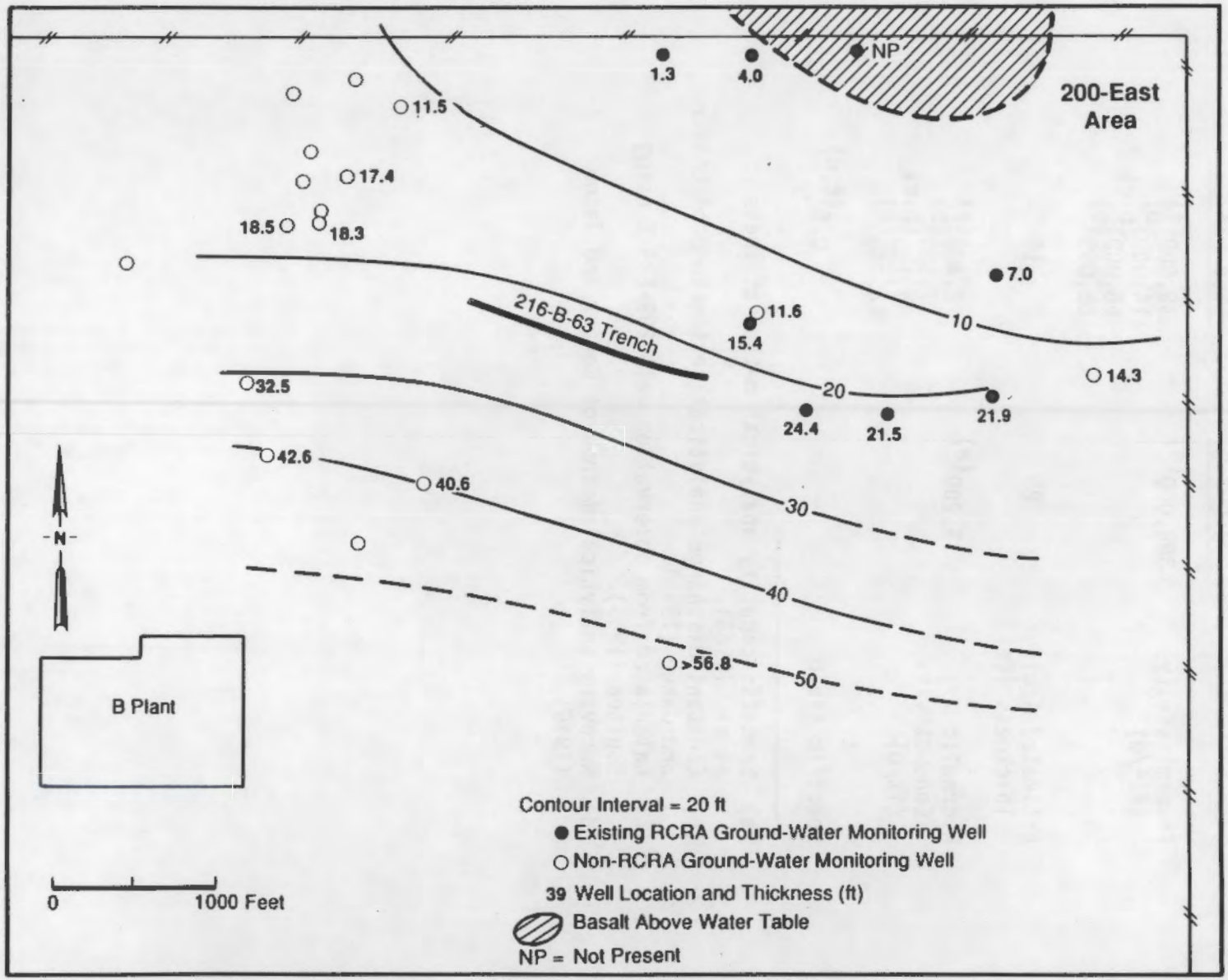


FIGURE 2.12. Saturated Thickness of the Unconfined Aquifer in the Vicinity of the 216-B-63 Trench, March 1988

TABLE 2.6. Hydraulic Properties From Wells Near the 216-B-63 Trench (from Last et al. 1989)

	299-E27-8	299-E34-2
Transmissivity (ft^2/d)	380,000[a]	39,000[a] 114,000[b] 66,000[b,c] 85,000[d]
Estimated Aquifer Thickness (ft)	25	16
Hydraulic Conductivity (ft/d)	15,200[a]	2,400[a] 7,100[b] 4,100[b,c] 4,250[d]
Specific Yield	--	0.5[c,d]

(a) Specific-capacity analytical method of Theis et al. (1963).
(b) Constant discharge analytical test method of Cooper and Jacob (1946).
(c) Calculated from observation well 299-E34-1 using Boulton (1963).
(d) Recovery analytical method of Cooper and Jacob (1946).

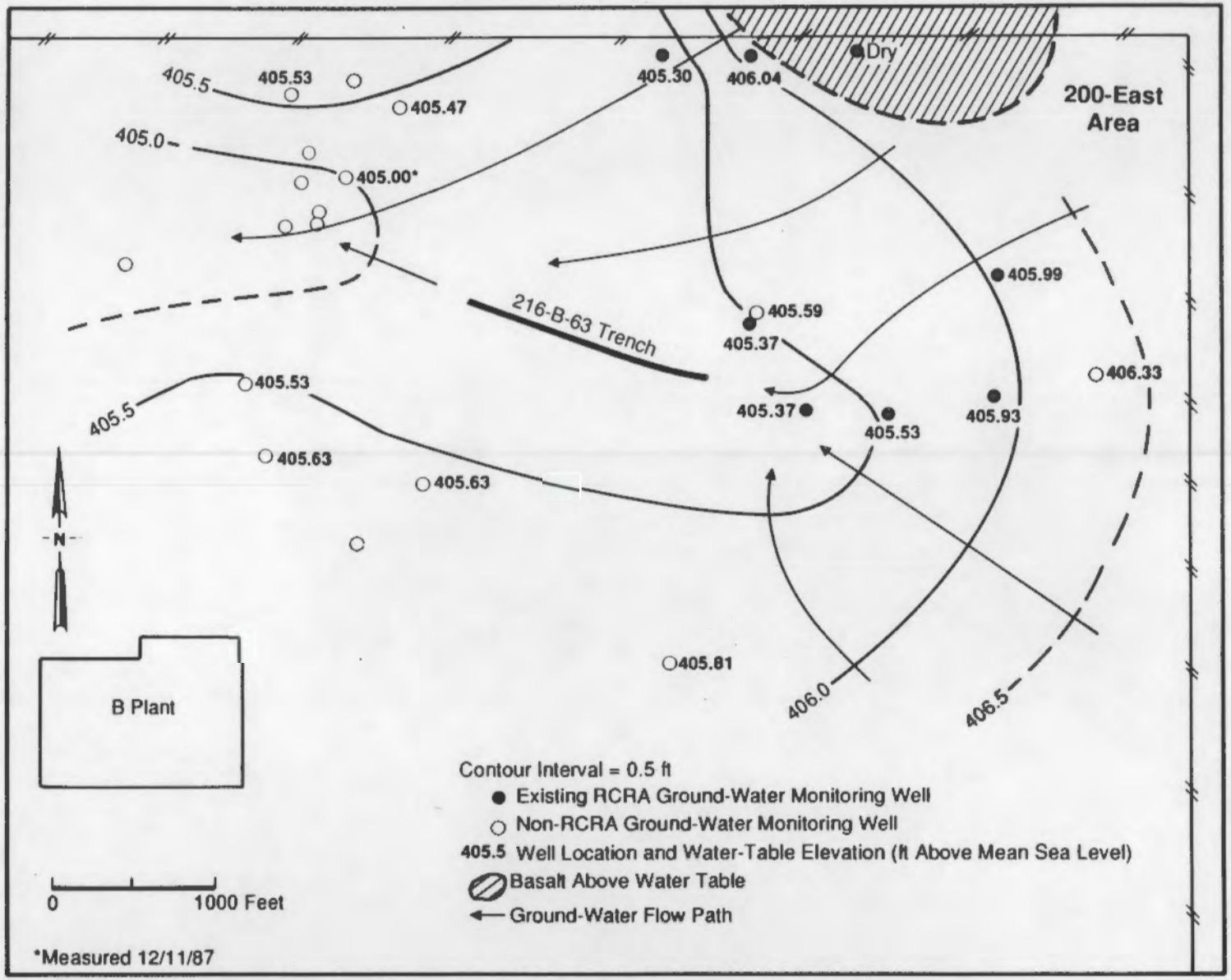
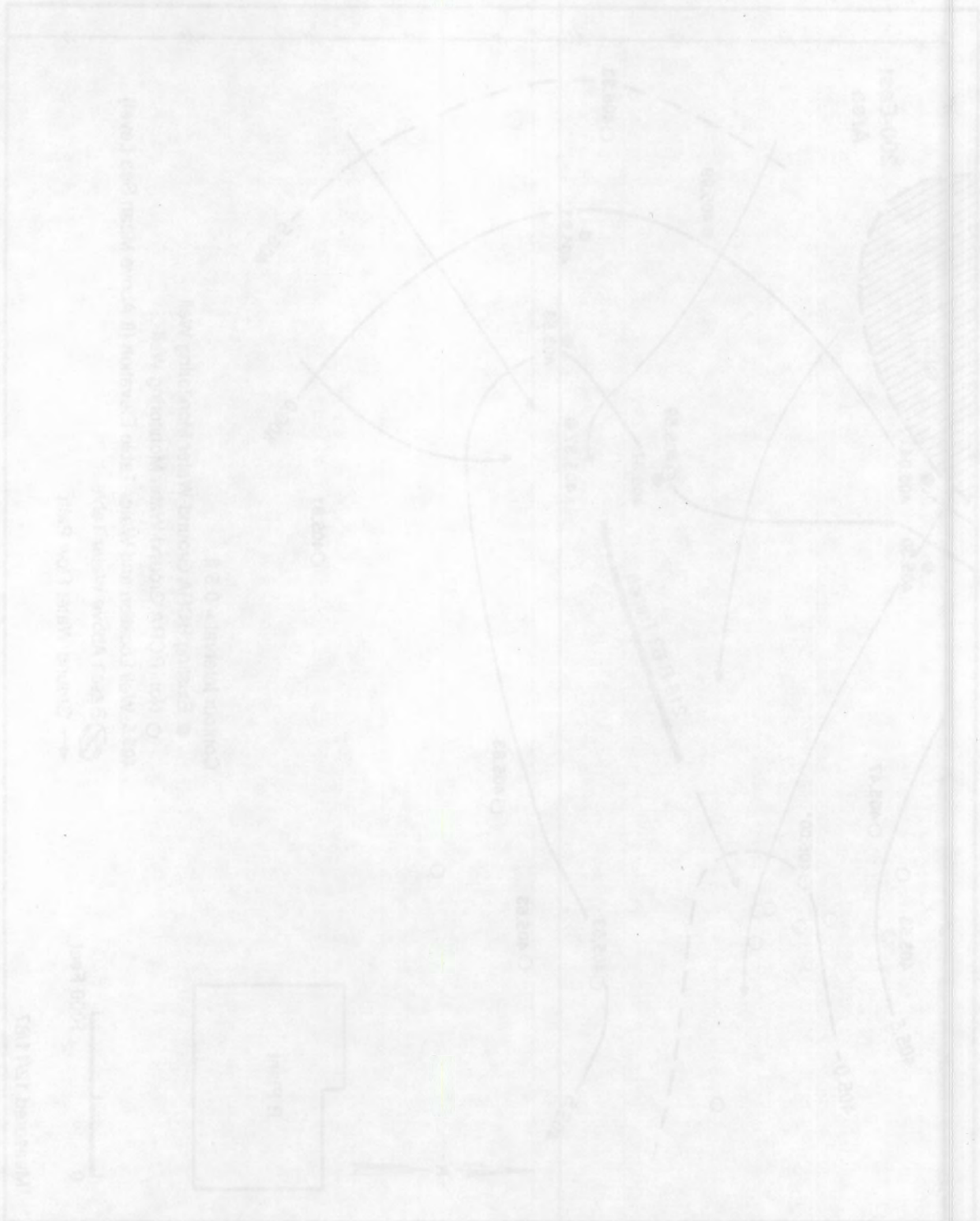


FIGURE 2.13. Water-Table Surface and Directions of Ground-Water Flow in the Vicinity of the 216-B-63 Trench, March 1988



3.0 PHASE I. GROUND-WATER MONITORING PROGRAM

This plan has been developed in accordance with RCRA, as described by 40 CFR Part 265, Subpart F, and Ecology (1986) to establish a ground-water monitoring plan for an indicator-evaluation program for the 216-B-63 trench and, if necessary, to initiate an ground-water quality assessment program.

3.1 OBJECTIVES

The objectives of the ground-water monitoring program for the 216-B-63 trench are to:

- Characterize the sedimentary deposits and the ground-water flow direction and rate beneath the trench. The focus will be on the unconfined aquifer.
- Implement a monitoring program to determine if statistically significant amounts of hazardous waste constituents above background occur in the ground water downgradient from the trench.
- Initiate, if necessary, the development of an assessment-level monitoring program to determine the nature and extent of contamination from the trench.

3.2 APPROACH

The initial indicator-evaluation ground-water monitoring network for the 216-B-63 trench will utilize eight wells (Figure 3.1). Two wells already in existence (299-E27-8 and 299-E-34-2) will be used as upgradient wells to establish background concentrations of constituents. Four new wells will be drilled, via the cable-tool method, west and south of the trench to serve as detection wells. Three additional wells (2-D1, 2-D3, and 2-D4) are planned but not yet installed immediately north of the trench to monitor one of the Low-Level Burial Ground waste-management areas (Last et al. 1989). Depending on the direction of ground-water flow, these wells may also be utilized for detection of contaminants from the 216-B-63 trench. All eight monitoring wells will penetrate into the top of basalt.

As part of characterization, subsurface soil samples will be obtained every 5 ft or at major changes in lithology during drilling at each location.

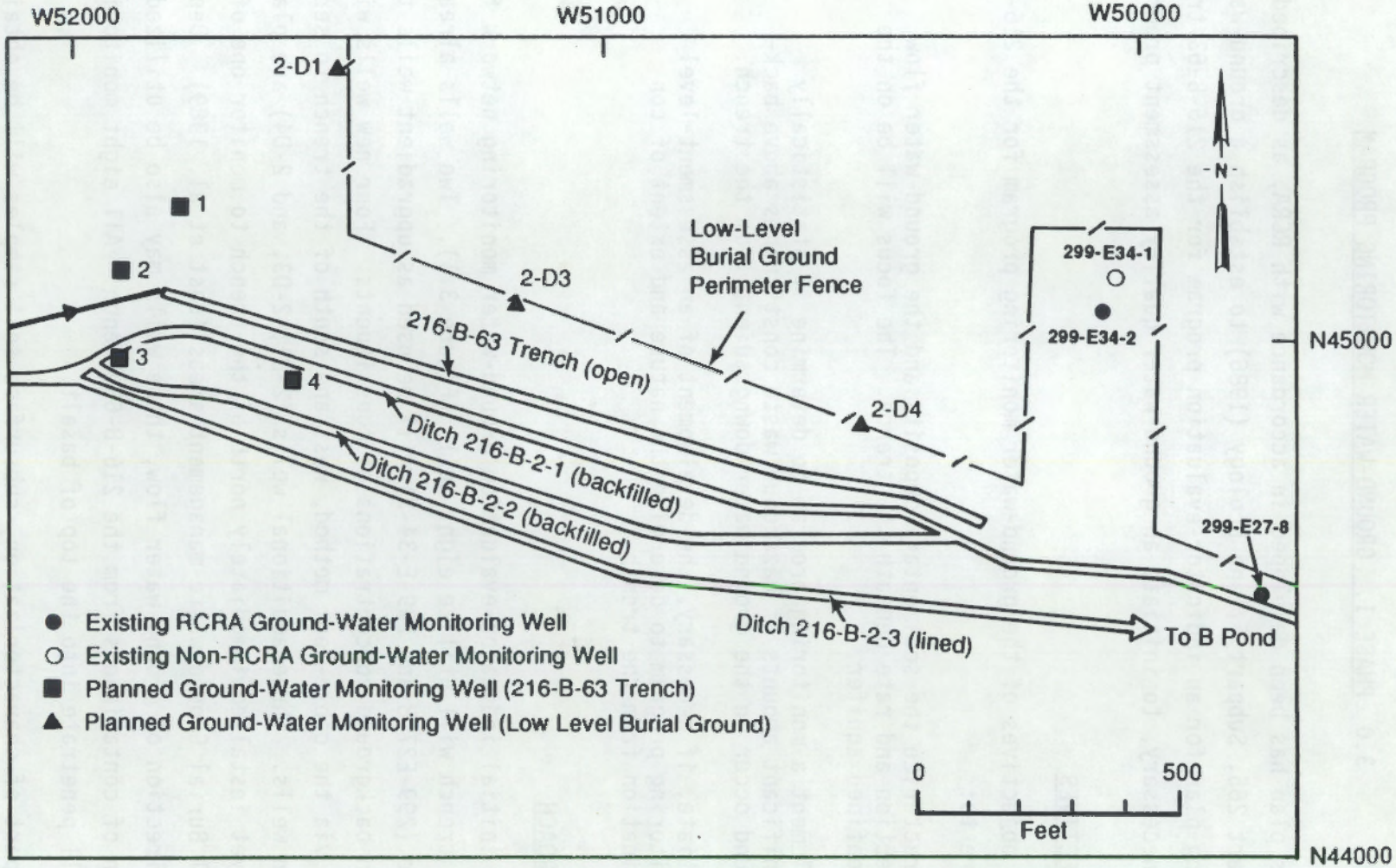


FIGURE 3.1. Existing and Planned Wells Near the 216-B-63 Trench

Detailed descriptions of these samples will be made at the drill site and summarized on lithologic logs. Samples will be collected, where appropriate, for grain-size analysis, moisture content, and/or other physical and chemical properties. Ground-water samples will be collected when drilling reaches the water table. These samples will be analyzed for contamination indicator parameters (noted later in this section) before aquifer testing. If contamination is not detected, aquifer tests will be conducted to provide estimates of transmissivity and hydraulic conductivity of materials beneath the site. Each of the monitoring wells will be tested geophysically with a natural gamma log, once for each different size casing and again upon final well completion.

Ground water within the new wells, plus that in appropriate existing wells, will be monitored at approximately 3-month intervals in order to establish background levels. After one year, sampling will occur semi-annually to look for statistically significant changes in water quality and/or ground-water flow. If contamination is detected, then an assessment-level monitoring program, outlined in Chapter 4.0 of this document, will be implemented.

Procedures to be used during this ground-water investigation appear in PNL (1989). The most recent versions of procedures will be followed; periodic updates of procedures will appear.

3.3 GROUND-WATER MONITORING SYSTEM

This section discusses the indicator-evaluation ground-water monitoring system, including locations and justifications for new wells, drilling and well installation, planned ground-water monitoring, and the types of indicator parameters to be monitored.

3.3.1 Uppermost Aquifer

The uppermost aquifer beneath the 216-B-63 trench is the unconfined aquifer, discussed previously in Section 2.3.3. The unconfined aquifer lies at a depth of about 240 ft beneath the trench (see Figure 2.10). At the present time there is no evidence to suggest the presence of any perched water in the immediate vicinity of the trench. The unconfined aquifer is

absent northeast of the 216-B-63 trench where the top of the basalt rises above the surface of the water table (Figure 2.12). The unconfined aquifer is only about 20-30 ft thick in the vicinity of the trench, but it becomes progressively thicker to the southwest.

Very few wells are located near the 216-B-63 trench. Only one well (299-E34-2) is within 500 ft, and only three wells lie within 1000 ft of the trench. For this reason it is not possible to evaluate the detailed geology and hydrology of the area immediately adjacent to the trench with available information. Installation of the new monitoring wells is needed to better understand the geologic and hydrologic characteristics of the site.

3.3.2 Background (Upgradient) Wells

Under the present ground-water flow regime, the movement of ground water appears to be roughly east to west in the vicinity of the 216-B-63 trench (Figure 2.13). Two existing upgradient wells, 299-E27-8 and 299-E34-2, will serve as background wells. As discussed in Section 2.3.3, the present flow direction is primarily the result of a temporary ground-water mound that exists as a result of artificial recharge from B Pond, located 1.5 mi east of the 216-B-63 trench. In the future, the ground-water flow may change direction drastically after B Pond is decommissioned in the mid-1990s. The monitoring system will be reevaluated at that time to determine whether these wells remain appropriate background wells.

3.3.3 Detection (Downgradient) Wells

The placement of detection-monitoring wells is complicated by the fact that the present ground-water flow direction appears to roughly parallel the trench (see Figure 2.13). Furthermore, because the data are limited, the exact direction and the degree of variation in ground-water flow are uncertain at this time.

A total of four new detection wells will be installed at the west (hydraulically downgradient) end of the 216-B-63 trench (Figure 3.1). Three of the wells are placed west of trench and the fourth is south. Three other wells located north of the trench are planned to monitor an adjacent

waste-management area (Last et al. 1989). These wells may also be used as detection wells, depending on the direction of ground-water flow.

3.3.4 Use of Existing Wells

Only three existing wells lie within 1000 ft of the 216-B-63 trench (Figure 3.1). Two of these wells, 299-E34-2 and 299-E27-8, currently monitor the uppermost aquifer and were constructed according to RCRA specifications (EPA 1986) to monitor one of the Low-Level Burial Ground waste-management areas (Last et al. 1989). A third well, 299-E34-1, is much older and not constructed according to RCRA specifications.

Use of the two existing RCRA monitoring wells is justified for several reasons. First, their construction is identical to that of wells planned to monitor the 216-B-63 trench. Furthermore, these wells appear to lie in the present flow path of planned downgradient wells and are close ($\leq$500 ft) to the trench.

As-built diagrams and geohydrologic information for all three existing wells are presented in Appendix A.

3.3.5 Installation of New Characterization/Monitoring Wells

Four new wells are planned to monitor the 216-B-63 trench. Planned well locations and depths of these wells are presented in Table 3.1. The purpose of these wells is to 1) provide downgradient ground-water quality information from the upper portion of the unconfined aquifer, 2) provide a means of evaluating the hydraulic properties of the aquifer, 3) provide information needed to define the subsurface stratigraphy beneath the site, and 4) provide samples to determine the moisture content of the unsaturated zone.

Because the unconfined aquifer is relatively thin (20-30 ft) in the vicinity of the 216-B-63 trench, all four wells will be drilled into the uppermost basalt flow (Elephant Mountain Member). Total depths should be within the range from 255 to 265 ft. Drilling to basalt will allow aquifer testing of the full saturated thickness of the unconfined aquifer. Furthermore, these wells will provide information on the hydrostratigraphic units, direction of ground-water flow, and water quality within the unconfined aquifer.

TABLE 3.1. Planned Well Locations and Depths for the 216-B-63 Trench

Well No.	Type of Well	Approximate Location (Hanford Coordinates)	Approximate Depth to Water (ft)	Approximate Depth of Borehole (ft)	Length of Screen (ft)
1	Shallow monitoring	N45250 W51780	235	255	15
2	Shallow monitoring	N45150 W51900	240	260	15
3	Shallow monitoring	N44990 W51890	245	265	15
4	Shallow monitoring	N44910 W51560	245	265	15

3.3.5.1 Justification for Locations

Locations of the new wells are along the western end of the 216-B-63 trench (Figure 3.1). Three of the wells (#1, 2, and 3) are located west of the trench in order to provide the minimum number of detection wells required (three) in the case where ground-water flow is parallel to the trench, as it appears to be. However, because water-level data in the vicinity of the trench are limited, the true flow direction may not be exactly parallel to the trench; it may instead be at a slightly acute angle to the trench. If this is the case, then either well #4, located south of the trench, or the planned wells 2-D1 and/or 2-D3 north of the trench can serve as detection wells.

In order to prevent excessive dilution of contaminants by the ground water (EPA 1986), the wells will be placed close to the trench. Each of the four wells is planned to be located within 200 ft of the trench, for the following reasons: As liquid wastes move vertically through the vadose zone, the contaminant plume will spread laterally. This spreading will be greatest atop aquitards and/or along lithologic contacts between sediments of differing particle-size distribution. Initial moisture analyses from samples

and chemical monitoring during drilling at the 216-A-36B crib indicates that this lateral spreading has occurred at least 100 ft from the crib but not as far as 200 ft from the crib.

The final and exact locations of the monitoring wells are contingent upon their ability to not interfere with underground or overhead utilities, any nearby burial sites, or potential high-contamination zones.

Problems may result with the installation of wells #3 and 4 because of their proximity to the backfilled ditches that parallel the 216-B-63 trench (see Figure 3.1). Any new wells drilled in this area will be closely surveyed and monitored with respect to past waste-management operations. The history of these ditches has been summarized by Maxfield (1979).

The 216-B-2-1 ditch, the ditch closest to the 216-B-63 trench, was an unlined trench 15 ft wide at ground level, 6 ft deep, and approximately 3500 ft long. The ditch, which received B Plant process cooling water from April 1945 to November 1963, was backfilled in 1964 after a radioactive leak occurred. The leak resulted in the gross contamination of the head end of the 216-B-2-1 ditch with cerium-rare earth fission products (principally cerium-144). The contaminated surface of the ditch was either scraped clean or covered with clean soil. When plants growing over the buried ditch were found to be contaminated in 1969-1970, a 10-mil-thick layer of plastic sheeting 32 ft wide and 2400 ft long was placed above the trench as a root barrier. Then approximately 18 in. of sand followed by 4 in. of gravel were placed over the plastic sheeting.

A new ditch, 216-B-2-2, was dug parallel to the 216-B-2-1 ditch when the older ditch was abandoned. Like the original ditch, the 216-B-2-2 ditch was also an unlined trench approximately 15 ft wide at ground level, 6-8 ft deep, and 3500 ft long and designed to transport water from B Plant to the 216-B-3 pond. The trench was abandoned in March 1970 after an estimated 1000 curies of strontium-90 were accidentally released from B Plant to the 216-B-2-2 ditch and 216-B-3 pond. Like the older ditch, the 216-B-2-2 ditch was covered to ground level and a similar root barrier emplaced over the first 2400 ft of the buried length of the ditch. Cooling water from B Plant was subsequently diverted to the 216-B-2-3 ditch currently in use.

3.3.5.2 Drilling and Well Installation

A schematic diagram of a completed ground-water monitoring well is presented in Figure 3.2. Procedures concerning geologic sampling and inspection of well construction are given by Last and Liikala (1987) and PNL (1989). The wells will be drilled with the cable-tool drilling method. Cable-tool drilling is desirable because 1) drill cuttings are easily contained (important in contaminated material), 2) moderately to well representative geologic samples can be collected, 3) moisture samples can be collected from above the water table using drive-barrel techniques, 4) disturbance to the borehole wall is minimized, 5) a straight and plumb borehole is produced, and 6) the borehole can be kept open until final construction.

The drive-barrel method of sampling is the preferred method for the unsaturated sediments, because it provides relatively intact and representative geologic samples in comparison with the hard-tool method, which tends to pulverize and mix the sediments. Both above and below the water table, split-barrel samples, which provide the most representative samples, may be collected occasionally to provide samples for permeameter and bulk porosity testing.

Sediment samples collected during drilling will be monitored periodically for radioactive and hazardous contamination. If the sediments are contaminated, they will be handled, contained, transported, and disposed of in accordance with existing Westinghouse Hanford procedures.

Temporary carbon-steel casing will be driven to the well's total depth as each borehole is advanced. When the water table is reached, ground-water samples will be collected and the following contamination indicator parameters will be analyzed after sampling: 1) total organic carbon, 2) gross alpha, 3) gross beta, 4) gamma scan, 5) nitrate, and 6) iodine-129. In addition, manganese, chromium, nickel, and iron will be analyzed to determine baseline chemistry conditions for these constituents before beginning well-completion activities.

If concentrations of the first set of six constituents exceed the limits stated in the Effluent Monitoring Plan, which will be written before

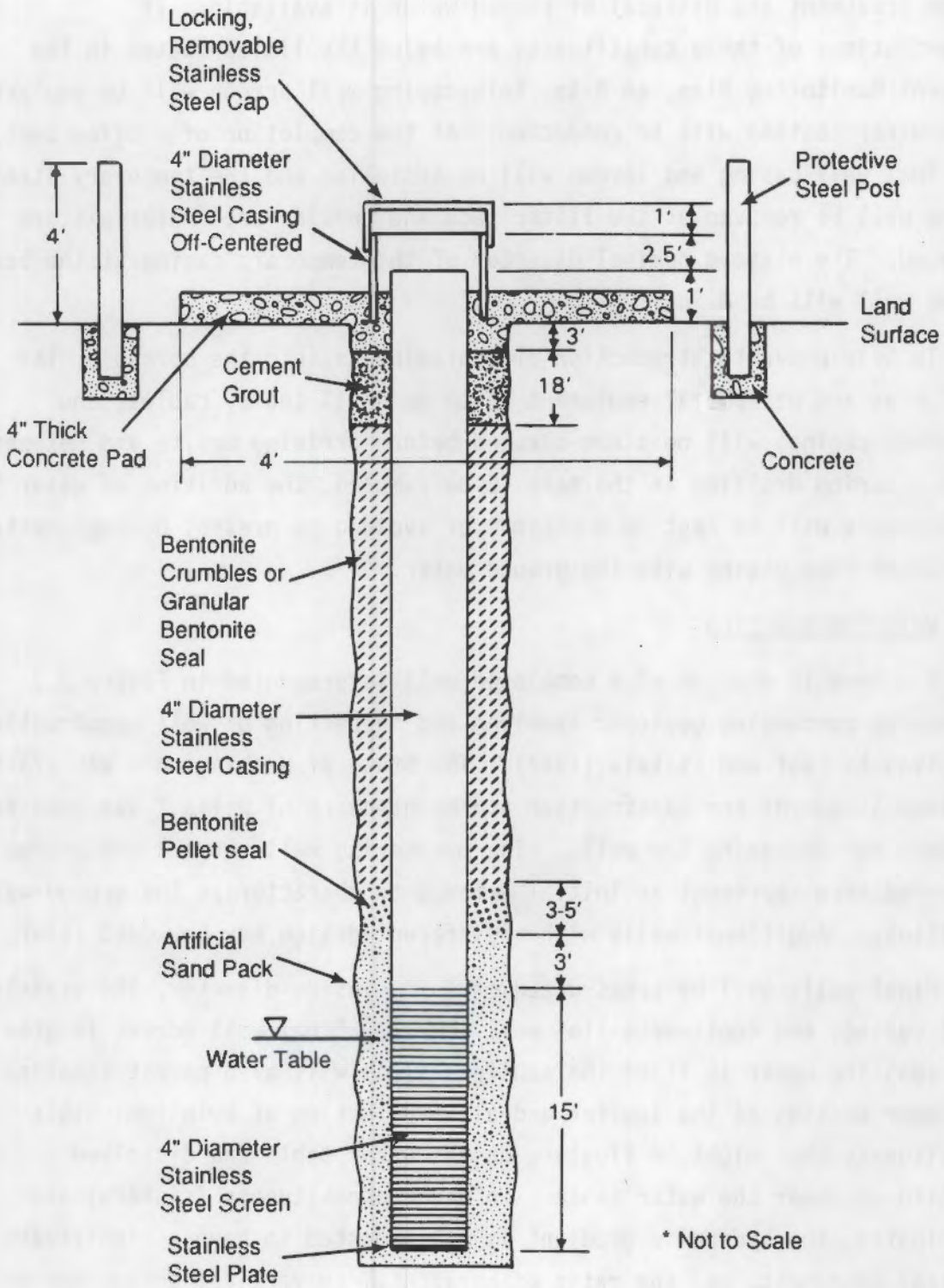


FIGURE 3.2. Schematic Diagram of a Completed Ground-Water Monitoring Well

hydrologic testing begins, aquifer testing will not be conducted until proper treatment and disposal of pumped water is available. If concentrations of these constituents are below the limits stated in the Effluent Monitoring Plan, an 8-in. telescoping well screen will be emplaced and aquifer testing will be conducted. At the completion of aquifer testing, the final well casing and screen will be installed and the temporary steel casing will be removed as the filter pack and annular seal materials are emplaced. The minimum nominal diameter of the temporary casing at the bottom of the well will be 8 in.

To help prevent introduction of contaminants into the borehole, the drill rigs and peripheral equipment (such as drill tools, cables, and temporary casing) will be steam-cleaned before arriving onsite and between wells. During drilling in the zone to be sampled, the addition of water to the borehole will be kept to a minimum or avoided to prevent nonrepresentative water from mixing with the ground water.

Well Construction

A schematic diagram of a completed well is presented in Figure 3.2. Procedures concerning geologic sampling and inspection of well construction are given by Last and Liikala (1987). The State of Washington's WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," was used for guidance for designing the wells. The monitoring well network and design presented here represent an initial attempt to characterize the ground-water conditions. Additional wells with a different design may be added later.

Final wells will be constructed of 4-in.-inside-diameter, 304 stainless-steel casing, and continuous-slot well screen. Final well screen lengths will span the upper 15 ft of the aquifer. This will also permit sampling of the upper portion of the aquifer and allow detection of both immiscible constituents that might be floating on the water table and dissolved constituents near the water table. No dense constituents (sinkers) are anticipated, the hydraulic gradient is not expected to have a significant vertical component, and the ratio of horizontal to vertical anisotropy is greater than 10 (Graham et al. 1981). The width of the screened interval will allow for possible future fluctuations of the unconfined aquifer from

variations in discharges to B Pond. The bottom of the screened interval will lie approximately 5-15 ft above the base of the aquifer (i.e., the top of basalt). This will allow detection of constituents near the bottom of the unconfined aquifer. The screen length will be limited to 15 ft to minimize excessive dilution of the samples.

A 10-slot screen is expected to be used for the wells at the 216-B-63 trench. The onsite geologist will determine the filter pack size and screen slot size based on guidelines outlined by Last and Liikala (1987). Sand filter packs will be placed in the annulus between the 8-in. telescoping screen or the temporary (8-in.) casing and the permanent (4-in.) casing and screen as the temporary casing is withdrawn. If a telescoping screen is used during the shallow well aquifer tests, it will be left in the hole. The sand filter pack will be placed from total well depth to approximately 3 ft above the top of the screen, except where the well is drilled to a depth deeper than the screened depth. In wells drilled more than 2 ft below screen depth, bentonite will be placed from the total depth of the borehole to 2 ft below the bottom of the screen.

A 2- to 3-ft-thick bentonite pellet seal will be placed on top of the sand pack. The annulus between the bentonite pellet seal and 18 ft below ground surface will be filled with bentonite. Cement grout will then be installed to within 2 ft of the ground surface. The well casing will extend 1 to 2 ft above ground surface and will be protected by an outer steel casing and a locking cap. The casing will be set into the ground and cemented in place with a 4-ft by 4-ft concrete well pad. All protective casings will be permanently marked with well identification numbers.

Well Development

All wells will be developed following completion. Development water will be monitored and handled according to an Effluent Monitoring Plan, which will be prepared before water is removed from the well. Wells will be developed by surge-and-bail technique, overpumping, or any other techniques deemed necessary until turbidity is less than 5 NTU and sediment content is less than 8 mg/L. If the water cannot be developed to a turbidity of less than 5 NTU, an explanation will be documented by a qualified hydrogeologist.

Other hydrochemical indicators, such as total iron and drilling fluid tracers will be monitored to assess the adequacy of development pumping for trace constituent sampling.

Surveying

After monitoring well installation is completed, all wells will be surveyed for location and elevation by qualified surveyors. The elevation of the top of the stainless-steel casing and a brass marker in the concrete pad will be determined within 0.04 ft. A mark will be placed on the casing to indicate the location that was surveyed. The areal location will be determined to the nearest 0.5 ft. All measurements will be referenced to a common datum (preferably a Hanford Site datum).

3.3.6 Monitoring Parameters

Ground-water samples will be collected during each quarter at a minimum for the constituents listed in Table 3.2. Monitoring of these constituents is required by 40 CFR Part 265, Subpart F. In addition, constituents from the long list in Appendix C will be analyzed once during the first year of sampling.

3.4 HYDROGEOLOGIC CHARACTERIZATION

Hydrogeologic characterization will be conducted to describe the geologic and hydrogeologic conditions and properties that control contaminant flow paths. Work performed will follow approved procedures, in accordance with a Quality Assurance Project Plan approved by PNL and Westinghouse Hanford that meets U.S. Environmental Protection Agency guidance of QAMS 005/80 (Stanley and Verner 1983).

Data collection and interpretation will focus on geology, geochemistry, hydrogeology, hydrochemistry, ground-water monitoring, and ground-water modeling. The characterization will be performed during and after construction of the planned ground-water monitoring network. An outline of the work to be performed is included below. Information obtained from the existing wells and wells drilled at the 216-B-63 trench will be integrated into the characterization and interpretation effort as well. The

TABLE 3.2. EPA Interim Primary Drinking Water Standards from 40 CFR Part 265, Subpart F[a]

Interim Primary Drinking Water Standards	Maximum Level[b]
Arsenic	50.0
Barium	1000.0
Cadmium	10.0
Chromium	50.0
Fluoride	1400-2400
Lead	50.0
Mercury	2.0
Nitrate (as N)	10,000.0
Selenium	10.0
Silver	50.0
Endrin	0.2
Lindane	4.0
Methoxychlor	100.0
Toxaphene	5.0
2,4-D	100.0
2,4,5-TP Silvex	10.0
Radium	5.0 pCi/L
Gross alpha	15.0 pCi/L
Gross beta	4.0 millirem/yr
Coliform bacteria	1/100 mL
Ground-Water Quality Parameters[c]	
Chloride	
Iron	
Manganese	
Phenols	
Sodium	
Sulfate	
Ground-Water Contamination Indicator Parameters[c]	
pH	
Specific conductance	
Total organic carbon	
Total organic halogen	

(a) Regulatory requirements for sampling parameters are subject to change because of federal regulations.
(b) Unless otherwise noted, levels are in $\mu g/L$ = parts per billion (ppb).
(c) Maximum (or minimum pH) levels not yet established.

characterization effort is a discovery process and data collection in particular areas may expand or decrease at the discretion of Westinghouse Hanford, depending on the information obtained.

3.4.1 Geologic Characterization

Geologic characterization will include a lithologic description of borehole materials, a variety of physical and chemical laboratory analyses, and geophysical borehole logging (gross gamma log).

3.4.1.1 Geologic Sampling

Geologic samples will be collected at 5-ft intervals and at changes in lithology. Guidance for geologic sample collection is provided by Last and Liikala (1987). Samples will be collected with a drive barrel in the unsaturated sediments whenever possible. No drilling water or other material will be added to the borehole during drive-barrel drilling unless necessary and approved by the well-site geologist, so that perched-water zones can be detected, representative moisture samples can be taken, and water chemistry will not be affected. If hard-tool drilling is necessary, a bailer will be used to collect the sediment samples. Split-barrel samples will be collected where the aquifer materials are expected to be heterogeneous (containing materials with hydraulic conductivities ranging over several orders of magnitude), or where a potential confining layer is encountered. Other split-barrel samples may be collected on an ad hoc basis. The geologic samples will be archived for possible future analyses.

Samples for moisture content determinations will be collected at 5-ft intervals and at moist or wet zones, wherever drive-barrel techniques are used and/or the moisture contents are considered representative.

3.4.1.2 Lithologic Description

The well-site geologist will log the sediments and samples as they are collected at the drill site. Detailed lithologic descriptions of geologic samples will include color, texture, sorting, mineralogy, roundness, relative calcium-carbonate concentration, consolidation, and cementation. Besides a lithologic description, information on drill logs will document drilling and well-construction information plus the locations where special samples (e.g.,

moisture content) were collected. Procedures for documentation, collection, and description of geologic samples have been presented by PNL (1989).

3.4.1.3 Laboratory Analysis

Geologic samples will be analyzed in the laboratory using the following test methods:

- sieve particle size
- pipette and/or hydrometer analyses
- permeameter testing
- calcium carbonate content
- moisture content
- bulk porosity
- petrography
- x-ray diffraction
- x-ray fluorescence
- atomic absorption analysis
- hazardous chemical analysis
- radionuclide analysis.

Some of these tests will be performed on every 5-ft sample (e.g., sieve particle size, calcium carbonate), while other tests apply to particular types of samples. Table 3.3 summarizes the frequency, limitations, and requirements for samples to be analyzed by the various methods.

3.4.1.4 Borehole Logging

After each casing is emplaced and when the monitoring wells have been drilled to the final depth, the borehole will be geophysically logged with a gross gamma log. Procedures for geophysical well logging that are approved by Westinghouse Hanford will be used. The primary purpose of the logging will be for qualitative stratigraphic interpretation and correlation. Specifically, the gross gamma log is useful as a method of confirming the presence of fine-grained sedimentary layers, which normally produce a higher

TABLE 3.3. Laboratory Analyses to be Performed as Part of Hydrogeologic Characterization

Laboratory Analysis	Parameter Measured	Sample Requirements/ Limitations	Potential Uses	Sample Frequency	Method of Sample Collection*
Sieving	Particle-size distribution of sand to gravel-size particles	Individual soil particles must be disaggregated and unbroken to yield accurate results	Proxy for hydraulic parameters; ground-water modeling	All samples	SS, DB, HT
Hydrometer	Particle-size distribution of mud-size particles (i.e., silt and clay)	Fine grained; undisturbed/intact soils	Characterize aquitards; ground-water modeling	All fine-grained intervals	SS, DB
Permeameter	Saturated hydraulic conductivity	Undisturbed/intact soils	Determine rate of ground-water movement; check for aquifer tests; ground-water modeling	Selected intervals	SS
Calcium carbonate	%$CaCO_3$	Soils of fine sand or smaller particles	Aquitard identification; stratigraphic marker horizons	All samples	SS, DB, HT
Moisture content	% Water	Undisturbed/intact soils	Evaluate vadose water movement; aquitard identification; ground-water modeling	All fine-grained intact intervals	SS, DB
Petrography	Mineral content/ concentration	Soils with sand and larger particles	Differentiate among hydrostratigraphic units	Selected samples where major geologic contacts are suspected	SS, DB, HT
X-ray diffraction (XRD)	Clay mineral identification	Soils with mud-size particles	Sorptive characteristics; hydrostratigraphic unit identification	Selected fine-grained intervals	SS, DB, HT
X-ray fluorescence (XRF)	Major and trace element concentrations (except sodium and magnesium)	Intact soils or soils uncontaminated with overlying material	Hydrostratigraphic unit identification; determine background levels of constituents in soils	Selected intervals where lithology changes	SS, DB, HT
Atomic absorption	Sodium and magnesium concentrations	Intact soils or soils uncontaminated with overlying material	Hydrostratigraphic unit identification; determine background levels of constituents in soils	Selected intervals where lithology changes	SS, DB, HT
Bulk mass density	Bulk porosity	Undisturbed/intact soils	Determine hydraulic parameters; ground-water modeling	Selected intervals	SS
Hazardous chemicals	Concentrations of hazardous constituents in ground water	Nonturbid ground water; soil samples	Determine presence/ absence of ground-water contamination	All ground-water-bearing zones at regular intervals	Pump from completed well
Radionuclides	Concentrations of radionuclides in ground water	Nonturbid ground water; soil samples	Determine presence/ absence of ground-water contamination	All ground-water-bearing zones at regular intervals	Pump from completed well

* SS = split-spoon drill method
DB = drive-barrel drill method
HT = hard-tool drill method

gamma activity than coarse-grained sediments. Another potential use is to identify zones of subsurface contamination by gamma-emitting radiation. After completion, each well will be viewed with a downhole video camera to ensure that the well is clean and undamaged.

3.4.1.5 Data Interpretation and Presentation

Following an analysis and interpretation of the geologic data collected during the installation and initial monitoring of wells, an interim site characterization report will be prepared. In this report, the detailed stratigraphy in the immediate vicinity of the 216-B-63 trench will be presented in both narrative and graphic (i.e., cross sections, fence diagrams, contour maps) forms. Appendices will present the results of field and laboratory analyses, including geochemistry, lithology, moisture content, grain-size distribution, mineralogy, and petrology. An interpretation of the lithologic characteristics at each well will be presented based on sample analyses plus the visual inspection of the gross gamma log. Any gross gamma logs used previously shall be marked "uncalibrated" and the logs will be properly labeled to identify the well environment at the time of logging. Maps showing the thickness and elevation of the various stratigraphic units will be updated to reflect the new data. The geologic setting will be discussed in relation to potential contaminant flow paths. Information from the adjacent Low-Level Burial Ground waste-management area characterization activities (Last et al. 1989) will be integrated with data from this effort.

3.4.2 Hydrogeologic Characterization

Hydrogeologic characterization will include in situ aquifer testing to determine hydrologic properties and the determination of the rate and direction of ground-water flow in the vicinity of the 216-B-63 trench. These data will also be summarized in an interim site characterization report.

3.4.2.1 Aquifer Testing

If the amounts of contamination in the ground water are below drinking water standards, aquifer testing will be conducted in the four new wells. These tests will provide estimates of the hydrologic properties (i.e.,

transmissivity, hydraulic conductivity, storativity) of the aquifer. Aquifer tests have already been performed on two wells upgradient from the 216-B-63 trench. The results of these tests were presented in Table 2.6. This information will also be used to make estimates of the direction and magnitude of ground-water flow at each well location. The purpose of aquifer testing is to determine the large-scale hydraulic characteristics of in situ geologic materials. A carefully designed field testing program is essential to optimize the collection of hydrologic data.

Possible aquifer-test methods include bailer, step-drawdown, 8- to 24-hour constant discharge, and 8- to 24-hour recovery tests. The actual time of the constant discharge test will depend upon site-specific field conditions. A trained geologist or hydrogeologist will determine when to end each constant discharge test. Observation wells will be used wherever possible to estimate storativity and vertical anisotropy values. A pretest analysis based on an estimated range of transmissivities will be conducted to determine the type of test and the size of pump most suitable to the given field situation. The aquifer test will not be performed until a pretest trend has been established for a period of time equal to the duration of the test. Aquifer test procedures have been presented by PNL (1989).

Proper disposal of discharge water from pumping tests can be a problem at hazardous waste sites. Ground water will be monitored and handled according to the Effluent Monitoring Plan, which will be written before water is removed from any well. If ground-water contamination is detected, aquifer testing will not continue until the water can be properly treated and disposed of.

The analytical method to be applied to the time-drawdown data will depend on the responses observed in the pumping wells and available observation wells. If both pumping and observation well data are available, hydrologic parameters will be determined by methods identified by Neuman (1974, 1975) or Weeks (1969). If observation wells show a response and the pumping well partially penetrates the aquifer, it will be necessary to evaluate the distances from the pumping well to the observation well, the thickness of the aquifer, and the percentage of partial penetration, and consideration will be

given to analysis methods such as those in Neuman (1974, 1975) or Weeks (1969). The Neuman method of analysis evaluates the delayed-yield response of an unconfined aquifer to estimate vertical anisotropy, transmissivity, and specific yield. The Weeks method of analysis evaluates transmissivity, storativity (or specific yield), and anisotropy in confined or unconfined aquifers, taking into account partial penetration effects of the pumping well and the observation well.

Pumping well data will undergo Theis and Cooper/Jacob analysis (Lohman 1979) to estimate transmissivity at the pumped well. Extreme care must be taken in interpreting data from these wells because the saturated thickness of the aquifer is relatively thin (20-30 ft). If drawdowns exceed 10% of the saturated thickness, a correction must be made before the data can be interpreted. The equation used to correct the drawdown is reported by Fetter (1980, p. 290). Boundary analysis will also be performed if the data show positive or negative deviations from the type curves.

3.4.2.2 Determination of Ground-Water Flow Paths

Water levels will be measured in the four new monitoring wells and in several existing wells in and around the 216-B-63 trench to calculate the elevation and configuration of the water table. The direction of ground-water flow will be determined from these data. The degree of uncertainty associated with both the water-level measurements and the calculated ground-water flow directions will also be evaluated. As discussed in Section 2.3.3, the direction of ground-water flow is expected to change over the next decade, as a result of the diminishing effects of B Pond on local ground-water flow.

Water levels in wells adjacent to the 216-B-63 trench will be measured at a frequency of at least every 3 months. Water levels may be measured more often if trends or ground-water fluctuations occurring at shorter intervals are suspected. They may also be measured more often if the data yield ambiguous results or the volumes of artificial recharge change significantly.

The surface of the water table and an interpretation of the direction of ground-water flow will be reported annually as required by 40 CFR Part 265, Subpart F.

3.4.2.3 Data Interpretation and Presentation

Hydrogeologic data, interpretations, and recommendations will be presented in an interim site characterization report after well installation and initial monitoring are completed. Specifically, this report will include 1) descriptions of hydrostratigraphic units, 2) water-level data and water-table maps, 3) test data and results of analyses, 4) as-built diagrams of wells, 5) hydrochemistry data, and 6) recommendations for further characterization or construction of additional monitoring wells, if necessary.

The data will be used to evaluate whether the characterization effort and the ground-water monitoring system are adequate to define the hydrogeology in the vicinity of the trench. The hydrogeologic data will be integrated to form an initial conceptual model of the ground-water flow system(s) in the vicinity of the 216-B-63 trench. Components of the model will include the determination and description of hydrostratigraphic units, the ground-water flow paths and their possible changes over time, estimates of ground-water velocity, unsaturated zone conditions as they relate to the ground-water monitoring system, and hydrochemical characterization.

3.5 SAMPLING AND ANALYSIS

Ground water from the four new monitoring wells and two existing RCRA ground-water monitoring wells (299-E27-8 and 299-E34-2) will be sampled quarterly for one year and semiannually thereafter. HydroStar™[a] sampling pumps will be installed in the four new wells soon after construction is complete. The ground-water samples will be analyzed for the parameters listed in Table 3.2. Water quality samples will be analyzed by United States Testing Company (UST). After one year of quarterly monitoring, background levels for these parameters will be determined and compared with downgradient water quality results. The data will be analyzed to evaluate the ground-water quality beneath the 216-B-63 trench. After this evaluation, a decision

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

will be made either to continue quarterly monitoring of the same wells and analytical parameters, or to modify the monitoring well network and/or increase the parameters analyzed.

The samples will be analyzed according to the methods and procedures given in UST (1986). Sample analyses must meet federal (40 CFR Part 265, Subpart F) and state (Ecology 1986) requirements. Sampling, preservation, and chain-of-custody procedures are included in Appendix C.

3.6 STATISTICAL ANALYSIS OF GROUND-WATER MONITORING DATA

This section discusses the method of establishing background and the statistical methods that will be used to evaluate the water-chemistry data.

3.6.1 Methods

Quarterly samples will be collected for one year from the four new and two existing ground-water monitoring wells (299-E34-2, 299-E27-8) for chemical analyses for the constituents listed in Table 3.2. The first set of samples will be collected after all the new wells have been completed, developed, and had sampling pumps installed. Also, once during the first year of sampling, ground-water samples will be analyzed for additional constituents listed in Appendix C.

After one year of quarterly monitoring, background levels for indicator parameters will be determined and compared with downgradient indicator parameters. The data will be analyzed to evaluate whether ground water is affected by the 216-B-63 trench.

3.6.2 Establishing Background

The approach used for establishing background values for the 216-B-63 trench will be based on the results of quarterly water-level measurements of all nearby wells for one year. As of March 1988, the ground water appears to be moving west-northwest, approximately parallel to the trend of the 216-B-63 trench (see Figure 2.13). Under the present flow regime, two existing wells (299-E34-2 and 299-E27-8) can be used as background wells. Accordingly, new wells #1, 2, and 3 would be considered downgradient wells (see Figure 3.1).

The present ground-water flow direction, however, will probably only continue as long as the area is under the influence of the ground-water mound centered beneath B Pond. The direction of ground-water flow beneath the 216-B-63 trench will likely change, over time, once B Pond is decommissioned. As a result, other wells may have to be used to determine background levels in the future. Ground-water levels will be closely monitored to determine if and when it is appropriate to shift to the use of a different background well(s).

Recent analytical results from wells 299-E33-1 and 299-E34-2, presented in Appendix B, suggest levels in the ground water are already above the drinking water standards for nitrate. Therefore, data from upgradient wells will have to be evaluated against the results from downgradient wells to determine what the true background levels are. Establishment of background must factor out the effects of contamination from upgradient sources to prevent premature initiation of an assessment-level program.

During each quarterly sampling period, four samples will be obtained from each well for analysis of indicator parameters including total organic carbon and total organic halogen, field pH, and specific conductance (Table 3.2). In addition, background levels will be established for chloride, iron, manganese, phenols, and sodium.

Background summary statistics (mean, variance, and coefficient of variation) will be calculated from five quarters (16 months) of data for the indicator parameters from upgradient wells. The method used for calculating summary statistics will depend on the distribution of the data and the presence of any data that are reported as less than the limit of detection. Replicate summary statistics will be calculated each quarter. Background comparison summary statistics will be calculated from the five sets of quarterly summary statistics.

3.6.3 Evaluation of Data

Wells will be sampled at least twice each year after background has been established. A minimum of four replicate measurements will be obtained from each downgradient well for the indicator parameters, and the arithmetic mean and variance will be calculated for the indicator parameters for each sample.

The Student's t-test will be used to determine statistically significant changes in the concentration of indicator-parameter constituents of downgradient wells relative to initial background concentrations or values. This comparison will consider each of the wells in the monitoring system individually. Wells downgradient of the trench will be evaluated against the upgradient well(s). For three of the indicator parameters (specific conductance, total organic carbon, and total organic halogen), a single-tailed Student's t-test will be used to test for significant increases over background at the 0.01 level of significance. The difference test for pH will be a two-tailed Student's t-test at the overall 0.01 level of significance.

3.6.4 Notification and Reports

Reports to be provided during the course of the ground-water monitoring program are summarized in Table 3.4.

TABLE 3.4. Reports Required by 40 CFR Part 265, Subpart F, for Indicator-Evaluation Ground-Water Monitoring

Submittal	Submittal Period
First year of sampling only: Concentrations of interim primary drinking water standards, identifying those that exceed the limits listed in Table 3.2.	Within 15 days of completion of each quarterly analysis
Concentrations and statistical analyses of ground-water contamination indicator parameters, noting significant differences between upgradient and downgradient wells.	Annually by March 1 of following year
Results of ground-water surface-elevation evaluation, and description of response if appropriate.	Annually by March 1 of following year

4.0 PHASE II. INITIATION OF GROUND-WATER QUALITY ASSESSMENT PROGRAM

This chapter discusses the development of criteria that would dictate notification of regulatory agencies and initiation of an assessment-level monitoring program. The notifications required by 40 CFR Part 265, Subpart F, are presented and the assessment-level monitoring plan is outlined.

4.1 INITIATION CRITERIA

As indicated in Chapter 3.0, ground-water samples from all monitoring wells will be tested quarterly for interim primary drinking water standards, ground-water quality parameters, ground-water contamination indicator parameters, and site-specific parameters for the first year.

Under the indicator-evaluation monitoring program, ground-water surface elevation data will be evaluated at least annually to determine if the existing monitoring wells are appropriately located. If the evaluation indicates that existing wells are no longer adequate, the ground-water monitoring system must be modified to bring it into compliance with regulations (40 CFR Part 265, Subpart F).

Statistically significant changes in both the upgradient and downgradient wells must be tested for validity and documented (40 CFR Part 265, Subpart F). Statistically significant increases (or pH decreases) from initial background levels are those that surpass a 0.01 level of significance using the Student's t-test. If significant increases (or pH decreases) are noted in the downgradient wells, those wells must be immediately resampled, and the samples split in two and analyzed by independent laboratories to ensure that anomalous concentrations are not the result of laboratory error. If this second set of samples confirms significant downgradient increase (or pH decrease), EPA and Ecology must be notified in writing within 7 days. Upon this notification, the assessment-level ground-water monitoring program outlined below shall be initiated.

4.2 GROUND-WATER QUALITY ASSESSMENT PROGRAM

An assessment-level ground-water monitoring plan will be implemented if a release of hazardous constituents is detected by the indicator-evaluation monitoring system. The decision to implement the assessment-level plan will be based on the criteria just described. The assessment-level ground-water monitoring plan will be certified by a qualified hydrogeologist or geotechnical engineer. This plan will address the following:

- Additional ground-water monitoring wells to be drilled, as necessary, to determine the nature and extent of contamination. The number, location, and depth of each well will be identified.
- Additional ground-water samples to be collected and analyzed at a minimum for constituents presented in Table 3.2.
- Detailed procedures to describe how analytical results will be evaluated, including the analysis of any previously gathered ground-water quality information.
- A schedule for implementation of the assessment-level ground-water monitoring plan.

A sample outline for an assessment-level ground-water monitoring plan is shown in Table 4.1. At sites where contaminants are known to have entered the ground water, regulations require that the rate and extent of contaminant movement be determined (40 CFR Part 265, Subpart F). The methods used to determine these variables will depend on the quantity and quality of the field data base. The methods will include installation of additional monitoring wells and field testing, continued chemical analyses of selected constituents in existing and new well installations, ground-water flow and contaminant transport modeling, and statistical evaluation of chemical analyses.

4.2.1 Nature and Extent of Contamination

Analytical data from new and existing wells will be evaluated to determine the specific hazardous and nonhazardous constituents and levels of these constituents found in the ground water. In addition, the hazardous constituents will be statistically evaluated to determine which of these constituents

TABLE 4.1. Sample Outline for an Assessment-Level Ground-Water Monitoring Plan

- Introduction
- Background Information
  - Facility Description
  - Geology and Hydrology of 200-East Area
    - Geology
    - Hydrology
- Interim-Status Work Conducted to Date
  - Scope and Description
    - Well Network
    - Sample Collection
    - Water-Level Measurements
    - Sample Analysis
    - Data Handling and Verification
    - Analytical Data Evaluation
    - Quality Assurance (QA)
    - Quality Control (QC)
  - Results
    - Sampling Schedule
    - Constituent Lists
    - Constituents Detected
    - Constituent Concentrations
    - Graphs of the Data
    - General Observations
    - QC Program Results
    - Factors Potentially Affecting the Data
- Planned Expansion of Ground-Water Monitoring Program
  - Planned Approach
    - Evaluation of Existing Data
    - Installation of New Monitoring Wells
    - Collection and Analysis of Geologic Data
    - Collection and Analysis of Water Quality Data
    - Hydrologic and Water Quality Interpretation
    - Method of Determining Rate and Extent of Contamination Movement
  - Schedule of Implementation
  - Reports and Notifications
- References
- Appendices

exceed background concentrations. The data will be further evaluated to determine if the source of contamination is the 216-B-63 trench or some other waste-management facility.

The lateral extent of contamination will be estimated by developing contour maps of concentrations of the various constituents. The concentrationsof hazardous constituents will be contoured to estimate the actual contamination distributions; the concentrations of nonhazardous constituents will be contoured and evaluated as indicators of ground-water and contaminant movement. The rate and extent of contamination will be conceptually evaluated based on existing data and modeling results.

4.2.2 Rate of Movement

The rate of contaminant movement will be estimated initially using values of hydraulic conductivity determined from aquifer testing, the hydraulic gradient determined from water-level measurements, and an estimated effective porosity based on the nature of the geologic material. This will provide a gross estimate for application in modeling studies and additional monitoring programs. The rate and extent of contamination will be conceptually evaluated based on existing data and modeling results. The results of the evaluation will provide insight into the areas of greatest uncertainty and thus those areas where additional data are needed. Additional wells and field testing will probably be necessary to quantify the rate and extent of contamination.

4.2.3 Additional Well Installations

Examination of the analytical results obtained under Phase I, coupled with preliminary flow and transport modeling, will provide the information from which the locations of additional monitoring wells will be determined. Data from these additional wells will be used to further define and quantify the rate and extent of contamination.

4.2.4 Additional Field and Laboratory Testing

Samples will be collected from new and existing wells and analyzed for known hazardous waste or hazardous waste constituents and other constituents that will be useful for evaluating the rate and extent of contamination. The

primary focus of additional field or laboratory testing will be those parameters with the highest uncertainty and that most affect flow and transport. These factors will be evaluated by preliminary modeling and sensitivity analyses. Further field and/or laboratory testing may be conducted to obtain additional information on:

- hydrostratigraphic facies distribution
- hydraulic conductivity
- porosity
- hydraulic head distribution
- retardation characteristics
- dispersivity
- other contaminant sources.

4.2.5 Modeling

Simple analytical models that include terms for dispersion, retardation, and radioactive decay will be used to simulate the extent and rate of contaminant plume movement, based on assumed hydraulic and retardation parameters. Numerical models that can accommodate heterogeneities in the hydrogeologic system and more complex transport conditions will also be used, if necessary, to estimate the rate and direction of flow under various hydrologic conditions. The results of modeling will be used to choose the locations of additional wells, to identify data needs and help in planning for their collection, to provide additional insight into the conceptual model of the northeastern portion of the 200-East Area, and to help in planning any corrective action, if necessary.

4.3 CONTINUED ANALYSIS AND EVALUATION

This section discusses the review and evaluation that will be conducted on the initiation of assessment-level monitoring. It also discusses the required notifications and reports.

4.3.1 Review of Methods and Procedures

If contamination in ground-water monitoring wells is verified, the monitoring system, data evaluation methods, and sampling and analysis procedures will be reviewed. This review will evaluate whether the indicator-evaluation monitoring system is adequate to distinguish contamination derived from a source other than the 216-B-63 trench. The method of establishing background will be reviewed for its appropriateness within the hydrogeologic system. This review will consider what potential effects of other facilities may result in trends in background water quality that have not been taken into account to establish the background. Finally, the review will evaluate the current sampling and analysis procedures and whether sample bias may result from inadequacies in the procedures.

4.3.2 Review of Sampling Parameters and Frequency

The sampling plan will be reviewed to evaluate whether the appropriate parameters are being analyzed and whether the frequency is adequate. The assessment-level monitoring program will require additional analysis of any hazardous constituents that have been detected. During assessment-level monitoring, the sampling frequency will be increased to quarterly until it is determined that no hazardous waste from the 216-B-63 trench has entered the ground water, or until final closure of the facility, as required by 40 CFR Part 265, Subpart F.

4.3.3 Notification and Reports

Table 4.2 lists the reports and notifications that must be submitted if the facility is suspected of affecting ground water as determined by the Student's t-test. In addition to the notifications and reports provided during the indicator-evaluation program (Table 4.2, part 1), submittal of additional notification and a plan on how to assess the contamination to EPA and Ecology (Table 4.2, part 2) is also required.

Records of the ground-water quality analyses, associated ground-water surface elevations, and the various data analyses (including the statistical analyses) will be provided in these reports.

TABLE 4.2. Reports and Notifications to be Submitted During the Assessment-Level Monitoring Program (Phase II)

Submittal	Submittal Period
1. Required whether or not facility might be affecting ground water.	
First year of sampling only: Concentrations of interim primary drinking water standards, identifying those that exceed the limits listed in Table 3.2	Within 15 days of completion of each quarterly analysis
Concentration of and statistical analyses of ground-water contamination indicator parameters, noting significant differences between upgradient and downgradient wells	Annually by March 1 of following year
Results of ground-water surface elevation evaluation, and description of response if appropriate	Annually by March 1 of following year
2. Required if the facility might be affecting ground water.	
Notification to EPA and Ecology that the facility might affect ground water	Within 7 days of confirmation of a significant increase in any parameter (or a decrease in pH)
Submittal of ground-water assessment plan to EPA and Ecology	Within 15 days of the above notification
Submittal to EPA and Ecology of a written report on assessment of ground-water quality, including concentrations of hazardous waste constituents and their rate and extent of migration	Within 15 days of first determination of a significant increase in any parameter (or a decrease in pH) as soon as technically feasible
Results of the ground-water quality assessment program	Annually, by March 1 of following year, until closure of facility

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APPENDIX A

GEOLOGIC AND WELL CONSTRUCTION DIAGRAMS FOR EXISTING WELLS

APPENDIX A

GEOLOGIC AND WELL CONSTRUCTION DIAGRAMS FOR EXISTING WELLS

Drilling logs from the three existing wells within 1000 ft of the 216-B-63 trench are included here for reference. The following well logs were reviewed and are included in this appendix:

Well	Date Completed	Location (by Hanford Plant Coordinates)
299-E27-8	9/87	N44496/W49742
299-E34-1	6/61	N45129/W50023
299-E34-2	9/87	N45076/W50048

Two of the existing wells are recent wells drilled by PNL to monitor the Low-Level Burial Ground waste-management area northeast of the 216-B-63 trench (Last et al. 1989). The drilling and well-construction information presented in this appendix, including well completion reports, as-built diagrams, and geologic and geophysical logs, is from Last et al. (1989). Information presented on well 299-E34-1 is limited to a single diagram.

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Well Completion Report/Title III Inspection List

Project: 200 Area RCRA Monitoring Wells	Well Number: 299-E27-8
Location: 200 E	Temporary Well Number: N/A
Driller: Felix Murphy / Ralph Robinson	Coordinates: N44 341, W49 642
Drilling Co.: Kaiser Engineering	Casing Elevation: 637.22'
Geologist: G M Goodwin / P [illegible]; K R O[illegible]; M A Chamness	Ground Elevation: 634.64'

DRILLING METHOD	COMPLETION DATA
Rotary Air: N/A — Mud: N/A	Drilled Depth: 257' (below land surface)
Cable Tool: D 100'-195' — H 0'-100' 195'-257'	Completion Depth: 245'6" (below land surface)
Drilling Fluid: 200 E Drilling Supply H2O	Date Started: 9/1/87 — Completed: 9/30/87
Other:	Static Water Level/Date: 229.4' / 8/14/87 (E-TAPE) (#11044)

CASING DATA

Type	Size	to
Carbon Steel (Temporary)	16"	0 to 40' 3/4"
Carbon Steel (Temporary)	12"	0 to 103' 11 1/2"
Carbon Steel (Temporary)	10"	0 to 165' 10 1/4"
Carbon Steel (Temporary)	5"	0 to 226'
Stainless Steel	4"	To 226' + 3.19' stickup

Approved By: [signature] Date: 8/24/87

PERFORMATIONS	SCREEN	ANNULAR SEAL
Type:	Type: Stainless Steel	Type / Interval / Volume
Depth / Schedule: N/A	Length: 8" 10'3" — 4" 20'	Sand — 221'-257' — 14 [illegible]
	Slot Size: 50 — 20	Bentonite [illegible] — 216'-221' — 3-50lb buckets
	Depths: 8" 247'-257'	Granular Bentonite — 4.5'-216' — [illegible]
	4" 225'6"-245'6"	Cement — 4.5'-0' — unknown
App. By: [signature] Date: 8/24/87	App. By: [signature] Date: 8/24/87	App. By: MAC Date: 12/1/87

GEOPHYSICAL LOGGING

Sondes	Interval	Date
N[illegible]	257 - 0	8/14/87
Neutron	256 - 2	8/14/87
[illegible]	254' - 0'	8/14/87

Approved By: MAC Date: 11/24/87

AQUIFER TESTING

Type of Test: Constant discharge / recovery test
Length of Test: 8.4 hrs.
Volume Pumped: 90,000 gal
Drawdown: 0.12 ft

Approved By: [signature] Date: 2/1/88

OTHER APPLICABLE ITEMS

- SMG Steam Cleaning
- SMG Storage of Const. Material
- SMG Tool Lubricants
- MAC Concrete Pad
- MAC Protective Steel Posts
- MAC Safety Paint
- MAC Straightness Test
- MAC Well Development
- VXM Downhole TV Inspection
- N/A Well Abandonment
- ✓ Complete As-Built Diagram, Driller's and Geologist's Logs

Approved By: M A Chamness Date: 12/1/87

Reviewed By: [signature] Date: 12-18-87

A-1800-187 (3/87)

FIGURE A.1. Well Completion Report for Well 299-E27-8

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AS-BUILT DIAGRAM

Well Number 299-E27-8 Geologist S.M. Goodwin/P White Page 1 of 2
K.R. Oster, M.A. Chamness

Reviewed by T.K. McLean Date 12-18-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data		Thickness
Description	Diagram		Diagram Litho.	Lithologic Description	
cement 0-45'		5'		silty sandy gravel	1.7'
16" carbon steel casing		10'		" " "	2.5'
		15'		" " "	3.3'
		20'		" " "	5.0'
		25'		SL. SILTY GRAVELLY SAND	3.9'
bentonite crumbles 45'-216'		30'		SILTY SANDY GRAVEL	5.5'
		35'		" "	2.0'
		40'		" "	10.0'
		45'		" "	7.5'
		50'		SLIGHTLY SILTY GRAVELLY SAND	1.7'
12" carbon steel casing		55'		SILTY SANDY GRAVEL	12.0
		60'		" "	2.0
		65'		" "	3.0
		70'		SL. SILTY GRAVELLY SAND	6.0
		75'		" "	9.6'
		80'		SILTY SANDY GRAVEL	10.1
		85'		" " "	7.5'
		90'		" " "	2.2
		95'		GRAVELLY SILTY SAND	6.0
		100		SILTY SANDY GRAVEL	4.3
		105'		" " "	3.5
10" carbon steel casing		110'		SL. SILTY GRAVELLY SAND	2.5
		115'		GRAVELLY SAND	2.5
		120'		SL. SILTY GRAVELLY SAND	2.5
		125'		" "	4.0
8" carbon steel casing		130'		" " "	6.7

A-1800-186 (3/87)

FIGURE A.2 As-Built Diagram for Well 299-E27-8 (page 1 of 2)

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AS-BUILT DIAGRAM

Well Number 299-F27-8 Geologist Goodwin / White
K.R. Oster, M.A. Chamness
Page 2 of 2

Reviewed by V.L. McThren Date

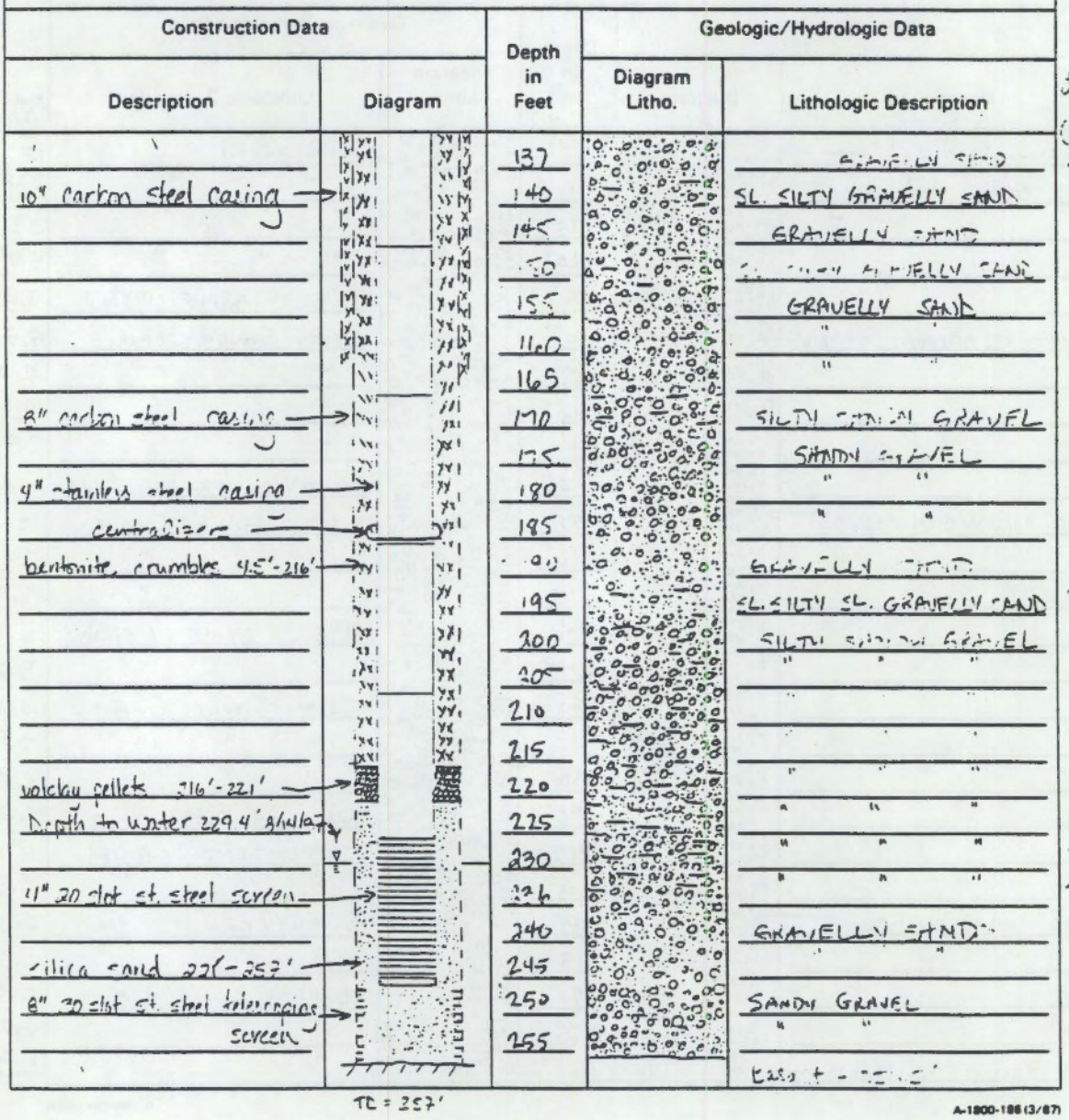
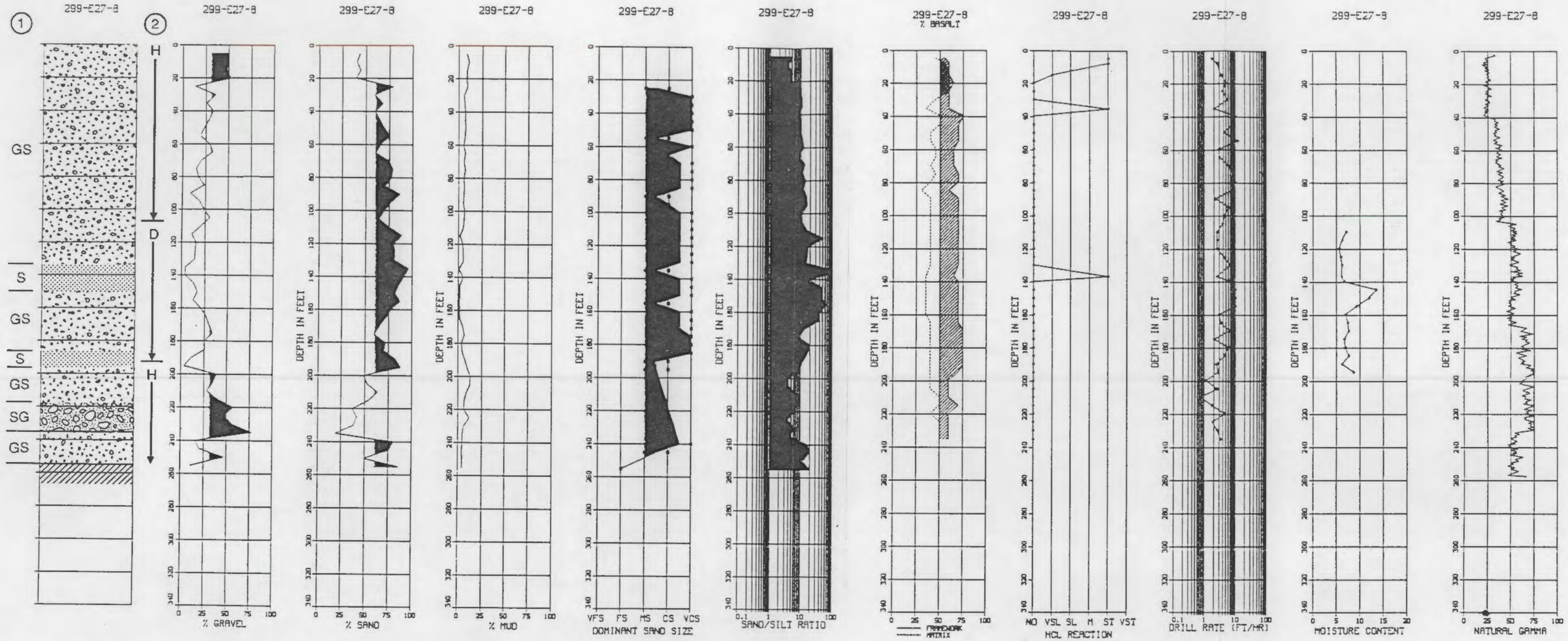


FIGURE A.2. (contd) (page 2 of 2)



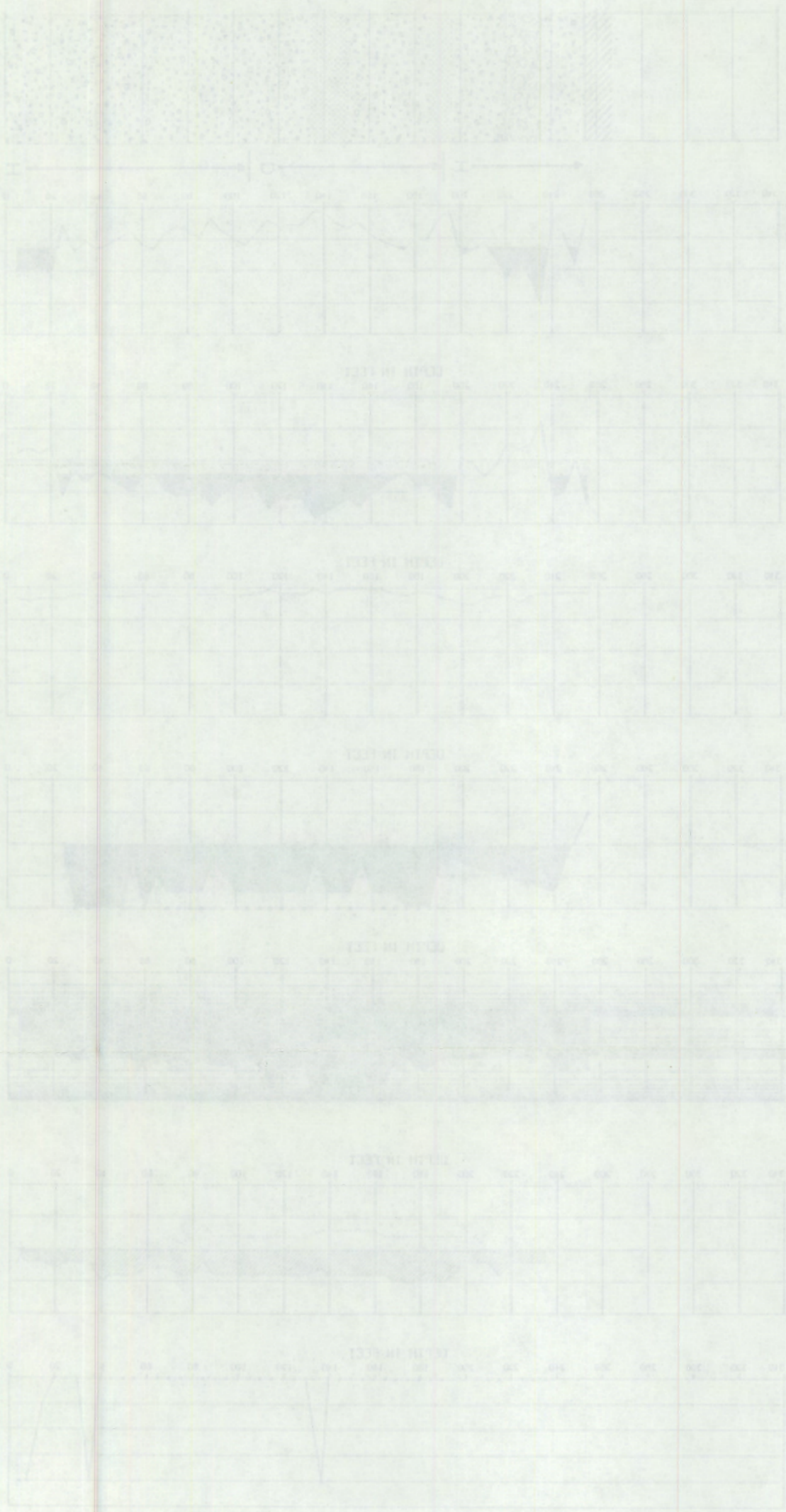
(1) LITHOFACIES

S = Sand
GS = Gravelly Sand
SG = Sandy Gravel
//// = Basalt

(2) DRILL METHOD

H = Hard Tool
D = Drive Barrel

FIGURE A.3. Geologic and Geophysical Data for Well 299-E27-8



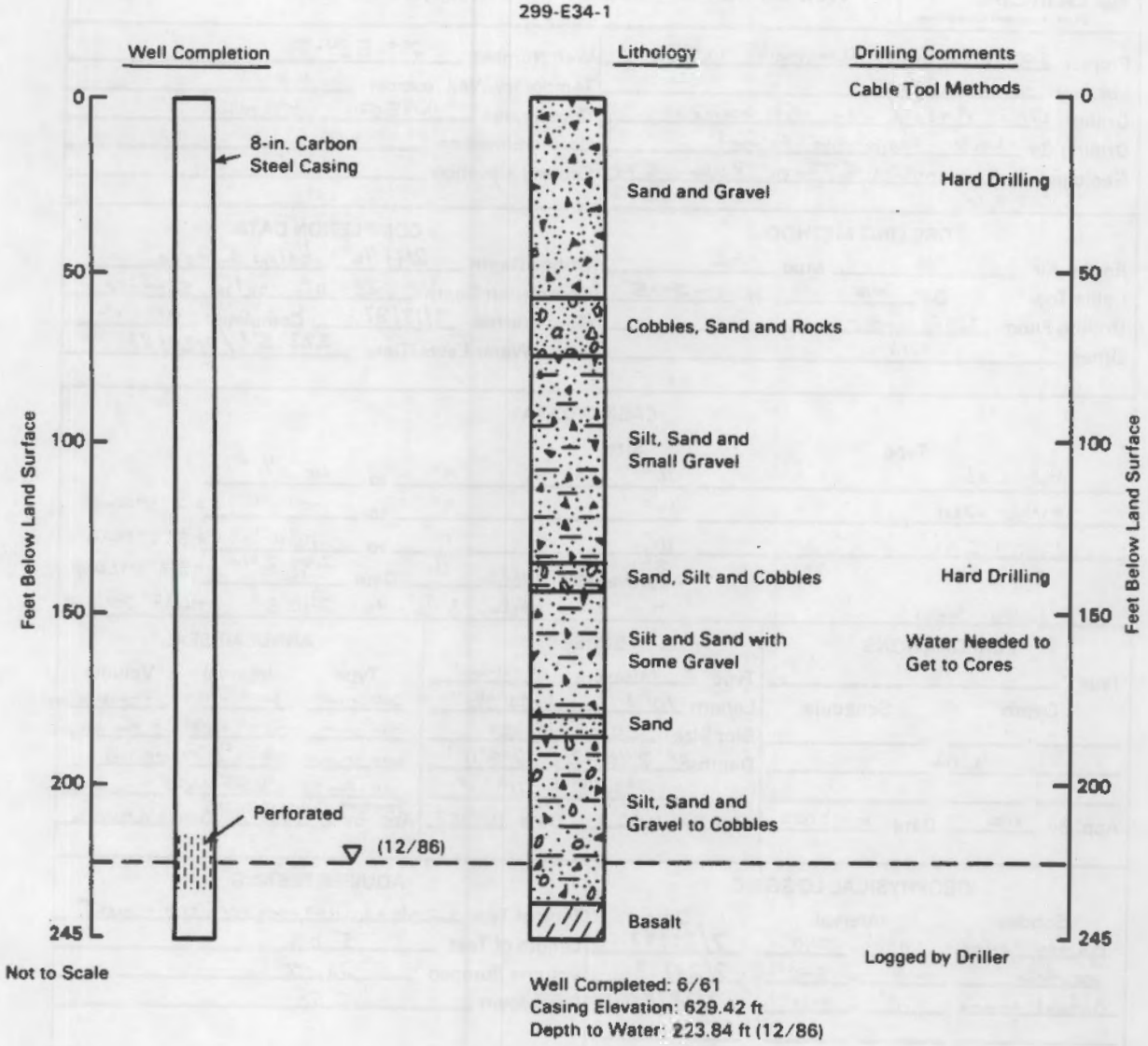


FIGURE A.4. Summary Lithologic and Well-Construction Log for Well 299-E34-1

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Well Completion Report/Title III Inspection List

Project 200 Area RCRA Monitoring Wells
Location 200-EAST
Driller Olin Amos / Don St. George
Drilling Co. Kaiser Engineering Hanford
Geologist M.A. Chamness, R. Fremore, P. White, R. Hager, K.R. Oster

Well Number 299-E34-2
Temporary Well Number N/A
Coordinates N45,076 W50,048
Casing Elevation 630.8'
Ground Elevation 629.03'

DRILLING METHOD

Rotary Air N/A Mud N/A
Cable Tool D N/A H 0-241.5'
Drilling Fluid 200E water
Other N/A

COMPLETION DATA

Drilled Depth 241 ½' below surface
Completion Depth 239' 11". below surface
Date Started 7/18/87 Completed 9/30/87
Static Water Level/Date 223.5' / 7/28/87

CASING DATA

Type	Size			
carbon steel	16"	0' to 40' 1½"		
carbon steel	12"	0' to 105' ½"	+ 3" stickup	
carbon steel	10"	0' to [illegible]	+ 5" stickup	
"	8"	0' to 240' 2¾	+ 3'2" stickup	
Stainless Steel	4"	stickup 2' ½" to 240' 3"	+1.73' stickup	

Approved By MAC Date 11/24/87

PERFORATIONS

Type
Depth	Schedule
-	
- N/A	
-	

App. By MAC Date 10/27/87

SCREEN

Type 8" telescoping | 4" st. steel
Length 10' 3" | 20' 2½"
Slot Size 30 | 20
Depths 8" 240.42' | 220' 11"
230.17' | 219' 11"
App. By MAC Date 11/19/87

ANNULAR SEAL

Type	Interval	Volume
20/50 sand	241'½"-[illegible]	[illegible] 100 lb. bags
bentonite	[illegible]-205'5'	5 5 gal buckets
bent. crumbles	[illegible]	25 bags
bent. grout	136.58'-[illegible].75'	[illegible] gallons
Portland Cement	5'-0'	

App. By MAC Date 11/24/87

GEOPHYSICAL LOGGING

Sondes	Interval	Date
gamma gamma	0' - 240'	7/28/87
neutron	0' - 240'	7/28/87
natural gamma	0' - 240'	7/28/87

Approved By MAC Date 11/24/87

AQUIFER TESTING

Type of Test Constant Discharge / Development
Length of Test 5 hrs
Volume Pumped 26,700
Drawdown 0.58
Approved By [signature] Date 8/7/87

OTHER APPLICABLE ITEMS

MAC Steam Cleaning
✓ Storage of Const. Material
✓ Tool Lubricants
MAC Concrete Pad
MAC Protective Steel Posts
MAC Safety Paint
✓ Straightness Test 7/28/87
✓ Well Development 7/28/87
[illegible] Downhole TV Inspection
NA Well Abandonment
✓ Complete As-Built Diagram, Driller's and Geologist's Logs

Approved By M.A. Chamness Date 12/4/87

Reviewed By [signature] Date 12-23-87

A-1900-187 (3/87)

FIGURE A.5. Well Completion Report for Well 299-E34-2

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

Well Number 299-E34-2 Geologist M.A. Chamness + R. Fromzic, K. Hagen, T. White, K. Oster Page 1 of 2

Reviewed by T.L. McLean Date 12-23-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data		Drill rate (ft/hr)
Description	Diagram		Diagram Litho.	Lithologic Description	
Cement 3'-0'		5'		SILTY SANDY GRAVEL	
		12'		SANDY Gravel	1.1'/hr
		15'		" "	1.7'/hr
		20'		" "	1.7'/hr
		25'		" "	3.3'/hr
		30'		" "	2.5'/hr
		35'		" "	8.5'/hr
16" carbon steel		40'		" "	7.5'/hr
		45'		" "	33'/hr
		50'		silty sandy gravel	6.6'/hr
bentonite crumbles 2'-136.6'		55'		" " "	5'/hr
		60'		sandy gravel	10'/hr
		65		" " "	6''/hr
		70'		Silty Sandy Gravel	8.5'/hr
		75'		(55) (40) Sandy Gravel	5.4'/hr
		80'		" "	10'/hr
		85'		" "	8.5'/hr
		90'		" "	2.8'/hr
		95'		sandy gravel	6.7'/hr
		100'		" " "	6.7'/hr
12" carbon steel		105'		" "	7.5'/hr
10" carbon steel casing		110'		" "	6.7'/hr
8" carbon steel casing		115'		" "	10.2'/hr
4" stainless steel casing		120'		sandy gravel	6.3'/hr
		125'		clean silty sandy gravel	10.2'/hr
		130'		sandy gravel	10.2'/hr

A-1800-156 (3/87)

FIGURE A.6. As-Built Diagram for Well 299-E34-2 (page 1 of 2)

Battelle
Pacific Northwest Laboratories

AS-BUILT DIAGRAM

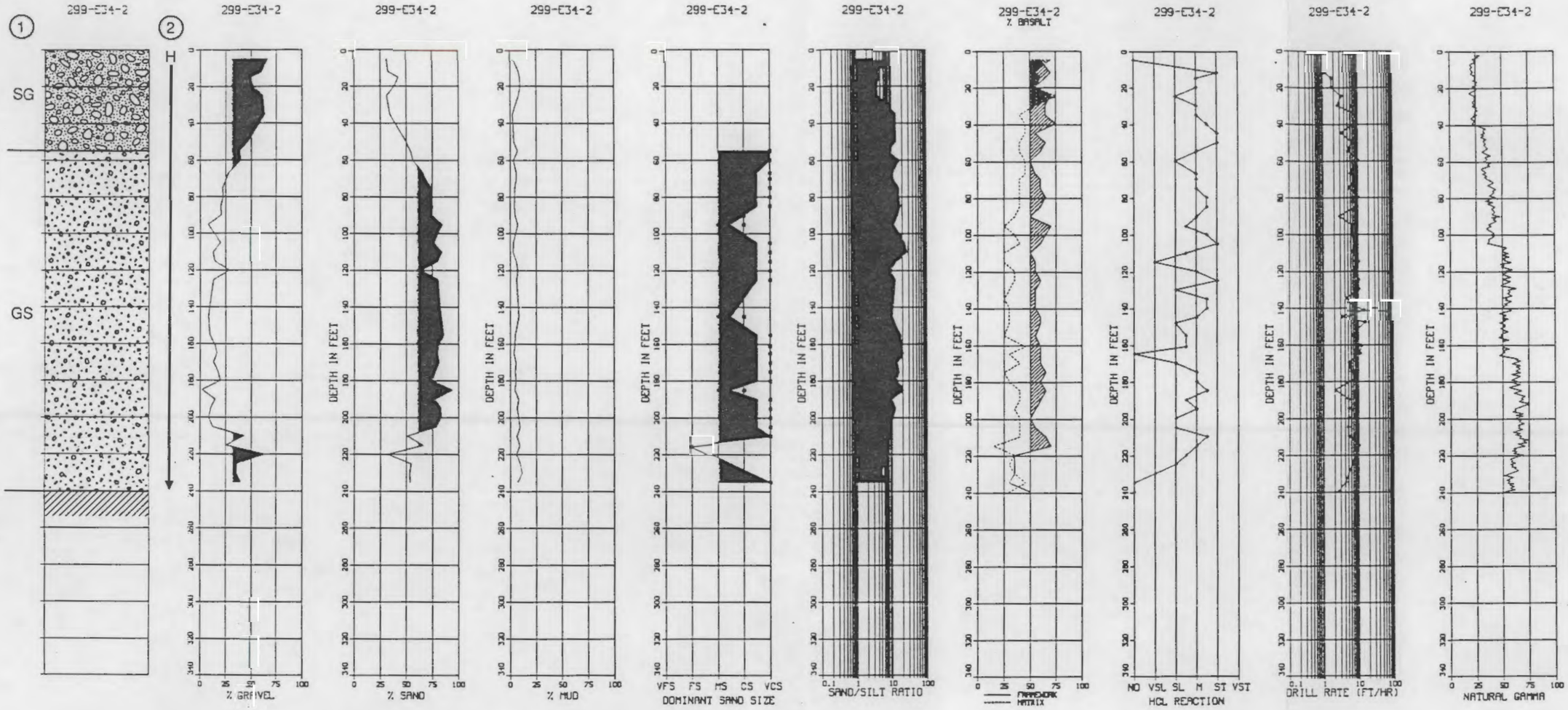
Well Number 299-E24-2 Geologist M A. Chamness + R. Tiernan, R. Haren Page 2 of 2

Reviewed by W E McLaren Date 12-23-87

Construction Data		Depth in Feet	Geologic/Hydrologic Data		Drill rate (ft/hr.)
Description	Diagram		Diagram Litho.	Lithologic Description	
bentonite crumbles 3'-136.6'		135'		slightly silty gravelly sand	4.3'/hr
		140'		slightly gravelly slightly silty sand	15.3'/hr
		145'		slightly silty gravelly sand	2.2'/hr
volclay grout 136.6'-166'0"		150'			15.2'/hr
		155'		gravelly sand	6.6'/hr
		160'		" "	12'/hr
		165'		" "	11.1'/hr
10" carbon steel		170'		slightly silty gravelly sand	5'/hr
		175'		" " " "	6'/hr
		180'		gravelly sand	~6'/hr
bentonite crumbles 166'3"-205'5"		185'		slightly silty gravelly sand	2'/hr
		190'		silty sandy gravel	5'/hr
8" carbon steel casing		195'		slightly (10) silty (25) gravelly (65) sand	5'/hr
centralizers		200'		" " " "	5'/hr
4" stainless steel casing		205'		" " " "	4.8'/hr
		210'		silty sandy gravel	~1'/hr
volclay pellets 205'5"-212'9"		215'		" " "	12'/hr
silica sand 212'9"-241'6"		220'		" " "	
water level 222.5' 7/28/87		225'		" " "	
		230'		" " "	
4" 20 slot stainless steel screen		235'		" " "	11'/hr
2" stainless steel 20 slot telescoping screen		240'		slightly silty sand	2.2'/hr
	TD = 241'6"		T.D. = 241'6"	Basalt at ~241'	

A-1800-186 (3/87)

FIGURE A.6. (contd) (page 2 of 2)



(1) LITHOFACIES

GS = Gravelly Sand
SG = Sandy Gravel
▨ = Basalt

(2) DRILL METHOD

H = Hard Tool
D = Drive Barrel

FIGURE A.7. Geologic and Geophysical Data for Well 299-E34-2

REFERENCES

Last, G. V., B. N. Bjornstad, M. P. Bergeron, M. A. Chamness, A. S. Cline, S. P. Airhart, and J. S. Wilbur. 19B9. Interim Characterization Report for the 200 Area Low-Level Burial Ground Detection-Level Monitoring Project. PNL-6820, Pacific Northwest Laboratory, Richland, Washington.

APPENDIX B

WATER-CHEMISTRY DATA LISTINGS AND SUMMARIES

APPENDIX B

WATER-CHEMISTRY DATA LISTINGS AND SUMMARIES

This appendix presents recent chemical data available from all existing wells within 1000 ft of the 216-B-63 trench. These include:

- 299-E27-8
- 299-E34-1
- 299-E34-2.

However, because these wells are all currently upgradient (east) of the trench, data from one downgradient well (299-E33-18) are included for completeness, even though it is more than 1000 ft from the trench and may not be representative of ground-water quality immediately downgradient of the trench.

Ground-water samples from the 200-East Area wells have been analyzed for the various constituents listed in Table B.1, although not all samples have been analyzed for all constituents. The most recent concentrations of constituents present in samples from the four wells are listed in Table B.2. The "less-than" flag indicates that samples were below the detection limit for that constituent. Negative analysis values, associated with certain radiological constituents, indicate samples were below background radiation levels.

TABLE B.1. List of Possible Constituents Analyzed for in Separations Areas Ground-Water Samples

Constituent Code	Constituent Name	Analysis Units	Constituent Long name
C02	METBISC	PPB	4,4'-methylenebis(2-chloroaniline)
B78	DINCRES	PPB	4,6-dinitro-o-cresol and salts
B23	AMINOYL	PPB	4-aminobyphenyl
B41	BROPHEN	PPB	4-bromophenyl phenyl ether
C13	NITPHEN	PPB	4-nitrophenol
B24	AMISOX	PPB	5-(aminomethyl)-3-isoxazolol
C55	NITRTOL	PPB	5-nitro-o-toluidine
B71	DIMBENZ	PPB	7,12-dimethylbenz[a]anthracene
B56	DIBCGCA	PPB	7H-dibenzo[c,g]carbazole
B19	ACETILE	PPB	Acetonitrile
B20	ACETONE	UG/G	Acetophenone
A72	ACROLIN	PPB	Acrolein
C94	ACRYIDE	PPB	Acrylamide
A73	ACRYILE	PPB	Acrylonitrile
A47	ALDRIN	PPB	Aldrin
C95	ALLYLAL	PPB	Allyl alcohol
B74	DIMPHAM	PPB	Alpha,alpha-dimethylphenethylamine
A36	a-BHC	PPB	Alpha-BHC
H28	FALUMIN	PPB	Aluminum, filtered
B25	AMITROL	PPB	Amitrole
C80	AMMONIU	PPB	Ammonium ion
B26	ANILINE	PPB	Aniline
A15	ANTIONY	PPB	Antimony
H36	FANTIMO	PPB	Antimony, filtered
B27	ARAMITE	PPB	Aramite
A54	AR1016	PPB	Arochlor 1016
A55	AR1221	PPB	Arochlor 1221
A56	AR1232	PPB	Arochlor 1232
A57	AR1242	PPB	Arochlor 1242
A58	AR1248	PPB	Arochlor 1248
A59	AR1254	PPB	Arochlor 1254
A60	AR1260	PPB	Arochlor 1260
A20	ARSENIC	PPB	Arsenic
H37	FARSENI	PPB	Arsenic, filtered
B08	AURAMIN	PPB	Auramine
H20	FBARIUM	PPB	Barium, filtered
B30	BENZAAN	PPB	Benz[a]anthracene
B29	BENZCAC	PPB	Benz[c]acridine
A62	BENZENE	PPB	Benzene
B31	BENDICM	PPB	Benzene, dichloromethyl
B32	BENTHOL	PPB	Benzenethoil
B33	BENDINE	PPB	Benzidine
C49	BENZOPY	PPB	Benzo[a]pyrene
B34	BENZBFL	PPB	Benzo[b]fluoranthene
B35	BENZJFL	PPB	Benzo[j]fluoranthene
B37	BENZCHL	PPB	Benzyl chloride
A01	BERYLAM	PPB	Beryllium
H33	FBERYLL	PPB	Beryllium, filtered
A37	b-BHC	PPB	Beta-BHC
B38	BIS2CHM	PPB	Bis(2-chloroethoxy) methane
B39	BIS2CHE	PPB	Bis(2-chloroethyl) ether
C51	BIS2ETH	PPB	Bis(2-chloroisopropyl)ether
B40	BIS2EPH	PPB	Bis(2-ethylhexyl) phthalate
A74	BISTHER	PPB	Bis(chloromethyl) ether
A75	BROMONE	PPB	Bromoacetone
B08	BROMORM	PPB	Bromoform
B42	BUTBENP	PPB	Butyl benzyl phthalate
H21	FCADMIU	PPB	Cadmium, filtered
H19	FCALCIU	PPB	Calcium, filtered
A77	CARBIDE	PPB	Carbon disulfide
C63	CARBPHT	PPB	Carbophenothion
024	CS-137	PCI/L	Cesium-137
C96	CHLORAL	PPB	Chloral
A48	CHLOANE	PPB	Chlordane
C75	CHLORID	PPB	Chloride

TABLE B.1. (contd)

Constituent Code	Constituent Name	Analysis Units	Constituent Long name
C50	CHLNAPH	UG/G	Chlornaphazine
C97	CHLACET	PPB	Chloroacetaldehyde
B44	CHALETH	PPB	Chloroalkyl ethers
A73	CHLBENZ	PPB	Chlorobenzene
C62	CHLLATE	PPB	Chlorobenzilate
A80	CHLFORM	PPB	Chloroform
A82	CHMTHER	PPB	Chloromethyl methyl ether
H22	FCHROMI	PPB	Chromium, filtered
B50	CHRYSEN	PPB	Chrysene
C87	CITRUSR	PPB	Citrus red
010	CO 60	PCI/L	Cobalt-60
109	COLIFRM	MPN	Coliform bacteria
H26	FCOPPER	PPB	Copper, filtered
B51	CRESOLS	PPB	Cresols
A83	CROTONA	PPB	Crotonaldehyde
C70	CYANIDE	PPB	Cyanide
C99	CYANOGN	PPB	Cyanogen
C88	CYANBRO	PPB	Cyanogen bromide
C89	CYANCHL	PPB	Cyanogen chloride
A40	DDD	PPB	DDD
A41	DDE	PPB	DDE
A42	DDT	PPB	DDT
A39	d-BHC	PPB	Delta-BHC
B60	DIBPHTH	PPB	Di-n-butyl phthalate
B82	DIOPHTH	PPB	Di-n-octyl phthalate
B85	DIPRNIT	PPB	Di-n-propylnitrosamine
B53	DIBAHAC	PPB	Dibenz[a,h]acridine
B55	DIBAHAN	PPB	Dibenz[a,h]anthracene
B54	DIBAJAC	PPB	Dibenz[a,j]acridine
B57	DIBAEPY	PPB	Dibenzo[a,e]pyrene
B58	DIBAHPY	PPB	Dibenzo[a,h]pyrene
B59	DIBAIPY	PPB	Dibenzo[a,i]pyrene
A86	DIBRMET	PPB	Dibromomethane
A88	DICDIFM	PPB	Dichlorodifluoromethane
H01	DICPROP	PPB	Dichloropropanol
A46	DIELRIN	PPB	Dieldrin
B67	DIEPHTH	PPB	Diethyl phthalate
B15	DIETHY	PPB	Diethylarsine
A27	DIETROL	PPB	Diethylstilbesterol
B68	DIHYSAF	PPB	Dihydrosafrole
C65	DIMETHO	PPB	Dimethoate
B76	DIMPHTH	PPB	Dimethyl phthalate
B77	DINBENZ	PPB	Dinitrobenzene
A63	DIOXANE	PPB	Dioxane
C86	DIOXIN	PPB	Dioxin
B83	DIPHAMI	PPB	Diphenylamine
C64	DISULFO	PPB	Disulfoton
A49	ENDO1	PPB	Endosulfan I
A52	ENDO2	PPB	Endosulfan II
A33	ENDRIN	PPB	Endrin
H03	ETHCARB	PPB	Ethyl carbamate
H04	ETHCYAN	PPB	Ethyl cyanide
H06	ETHMETH	PPB	Ethyl methacrylate
B87	ETHMETS	PPB	Ethyl methanesulfonate
C81	ETHYGLY	PPB	Ethylene glycol
H05	ETHOXID	PPB	Ethylene oxide
B86	ETHMINE	PPB	Ethyleneimine
A28	ETHYREA	PPB	Ethylenethiourea
B88	FLUORAN	PPB	Fluoranthene
C74	FLUORID	PPB	Fluoride
H07	FLUOROA	PPB	Fluoroacetic acid
C71	FORMALN	PPB	Formalin
A38	g-BHC	PPB	Gamma-BHC
H08	GLYCIDY	PPB	Glycidylaldehyde
212	LOALPHA	PCI/L	Gross alpha

TABLE B.1. (contd)

Constituent Code	Constituent Name	Analysis Units	Constituent Long name
111	BETA	PCI/L	Gross beta
A43	HEPTLOR	PPB	Heptachlor
A44	HEPTIDE	PPB	Heptchlor epoxide
B89	HEXCBEN	PPB	Hexachlorobenzene
B90	HEXCBUT	PPB	Hexachlorobutadiene
B91	HEXCCYC	PPB	Hexachlorocyclopentadiene
B92	HEXCETH	PPB	Hexachloroethane
C54	HEXACHL	PPB	Hexachlorophene
C52	HEXAENE	PPB	Hexachloropropene
C53	HYDRAZI	PPB	Hydrazine
A99	HYDRSUL	PPB	Hydrogen sulfide
B93	INDENOP	PPB	Indeno(1,2,3-cd)pyrene
B01	IODOMET	PPB	Iodomethane
H31	FIRON	PPB	Iron, filtered
H09	ISOBUTY	PPB	Isobutyl alcohol
B94	ISOSOLE	PPB	Isosafrole
C79	KEROSEN	PPB	Kerosene
A51	LEADGF	PPB	Lead (graphite furnace)
H41	FLEAD	PPB	Lead, filtered
H32	FMAGNES	PPB	Magnesium, filtered
C92	MALHYDR	PPB	Maleic hydrizide
B95	MALOILE	PPB	Malononitrile
H29	FMANGAN	PPB	Manganese, filtered
B96	MELPHAL	PPB	Melphalan
A21	MERCURY	PPB	Mercury
H38	FMERCUR	PPB	Mercury, filtered
B02	METHACR	PPB	Methacrylonitrile
B03	METHTHI	PPB	Methanethiol
B97	METHAPY	PPB	Methapyrilene
B98	METHNYL	PPB	Metholonyl
A34	METHLOR	PPB	Methoxychlor
A76	METHBRO	PPB	Methyl bromide
A81	METHCHL	PPB	Methyl chloride
A64	METHONE	PPB	Methyl ethyl ketone
H10	METZINE	PPB	Methyl hydrazine
C04	METACRY	PPB	Methyl methacrylate
C05	METMSUL	PPB	Methyl methanesulfonate
C66	METHPAR	PPB	Methyl parathion
A93	METHYCH	PPB	Methylene chloride
C07	METHIOU	PPB	Methylthiouracil
A96	NNDIEHY	PPB	N,N-diethylhydrazine
A30	NITRREA	UG/G	N-nitroso-N-ethylurea
A31	NITRMET	UG/G	N-nitroso-N-methylurea
C19	NNIURET	PPB	N-nitroso-N-methylurethane
C14	NNIBUTY	PPB	N-nitrosodi-n-butylamine
C15	NNIDIEA	PPB	N-nitrosodiethanolamine
C16	NNIDIEY	PPB	N-nitrosodiethylamine
C17	NNIDIME	PPB	N-nitrosodimethylamine
C18	NNIMETH	PPB	N-nitrosomethylethylamine
C20	NNIVINY	PPB	N-nitrosomethylvinylamine
C21	NNIMORP	PPB	N-nitrosomorpholine
C22	NNINICO	PPB	N-nitrosonornicotine
C23	NNIPIPE	PPB	N-nitrosopiperidine
A32	PHENREA	PPB	N-phenylthiourea
H11	PROPYLA	PPB	N-propylamine
C55	NAPHTHA	PPB	Naphthalene
124	U-CHEM	UG/L	Natural uranium
H25	FNICKEL	PPB	Nickel, filtered
C93	NICOTIN	PPB	Nicotinic acid
C72	NITRATE	PPB	Nitrate
C12	NITBENZ	PPB	Nitrobenzine
C24	NITRPYR	PPB	Nitrosopyrrolidine
C46	TRIPHOS	PPB	O,O,O-triethyl phosphorothioate
C42	OTOLHYD	PPB	O-toluidine hydrochloride
A02	OSMIUM	PPB	Osmium

TABLE B.1. (contd)

Constituent Code	Constituent Name	Analysis Units	Constituent Long name
H34	FOSMIUM	PPB	Osmium, filtered
B36	PBENZQU	PPB	P benzoquinone
B46	CHLCRES	PPB	P-chloro-m-cresol
B45	CHLANIL	PPB	P-chloroaniline
B70	DIMEAMB	PPB	P-dimethylaminoazobenzene
B11	NITRANI	PPB	P-nitroaniline
C90	PARALDE	PPB	Paraldegyce
C67	PARATHI	PPB	Parathion
C26	PENTCHB	PPB	Pentachlorobenzene
B04	PENTACH	PPB	Pentachloroethane
C27	PENTCHN	PPB	Pentachloronitrobenzene
C28	PENTCHP	PPB	Pentachlorophenol
C77	PERCHLO	PPB	Perchlorate
A70	PERCENE	PPB	Perchloroethylene
C29	PHENTIN	PPB	Phenacetin
C57	PHENOL	PPB	Phenol
H57	LPHENOL	PPB	Phenol, low DL
C30	PHENINE	PPB	Phenylenediamine
C76	PHOSPHA	PPB	Phosphate
C31	PHTHEST	PPB	Phthalic acid esters
H30	FPOTASS	PPB	Potassium, filtered
C33	PRONIDE	PPB	Pronamide
A65	PYRIDIN	PPB	Pyridine
181	RADIUM	PCI/L	Radium
C34	RESERPI	PPB	Reserpine
C35	RESORCI	PPB	Resorcinol
034	RU 106	PCI/L	Ruthenium-106
C36	SAFROL	PPB	Safrol
A22	SELENUM	PPB	Selenium
H39	FSELENI	PPB	Selenium, filtered
H23	FSILVER	PPB	Silver, filtered
H24	FSODIUM	PPB	Sodium, filtered
191	CONDFLD	UMHO	Specific conductance
A03	STRONUM	PPB	Strontium
H35	FSTRONT	PPB	Strontium, filtered
121	SR 90	PCI/L	Strontium-90
C91	STRYCHN	PPB	Strychnine
C73	SULFATE	PPB	Sulfate
C78	SULFIDE	PPB	Sulfide
C47	SYMTRIN	PPB	Sym-trinitrobenzene
A61	TETRANE	PPB	Tetrachloromethane
C61	TETEPYR	PPB	Tetraethylpyrophosphate
A23	THALIUM	PPB	Thallium
H40	FTHALLI	PPB	Thallium, filtered
B73	THIONOX	PPB	Thiofanox
A24	THIOURA	PPB	Thiourea
C40	THIURAM	PPB	Thiuram
A66	TOLUENE	PPB	Toluene
C41	TOLUDIA	PPB	Toluenediamine
H16	TC	PPB	Total carbon
H17	TDS		Total dissolved solids
C69	TOC	PPB	Total organic carbon
C68	TOX	PPB	Total organic halogen
A35	TOXAENE	PPB	Toxaphene
A91	TRANDCE	PPB	Trans-1,2-dichloroethene
A69	TRICENE	PPB	Trichloroethylene
B09	TRCMEOL	PPB	Trichloromethanethiol
B10	TRCMFLM	PPB	Trichloromonofluoromethane
B11	TRCPANE	PPB	Trichloropropane
C48	TRISPHO	PPB	Tris(2,3-dibromopropyl) phosphate
H27	FVANADI	PPB	Vanadium, filtered
B13	VINYIDE	PPB	Vinyl chloride
B21	WARFRIN	PPB	Warfarin
B14	M-XYLE	PPB	Xylene-m
A71	OPXYLE	PPB	Xylene-o,p
H18	FZINC	PPB	Zinc, filtered
199	PHFIELD		pH

TABLE B.2. Chemistry Data for Wells in 200-East Area

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E27-8	9/22/88	1,1,1-T	<	5.0000E+00	PPB
2-E27-8	9/22/88	1,1,2-T	<	5.0000E+00	PPB
2-E27-8	9/22/88	1,1-DIC	<	1.0000E+01	PPB
2-E27-8	9/22/88	1,2-DIC	<	1.0000E+01	PPB
2-E27-8	9/22/88	1-napha	<	1.0000E+01	PPB
2-E27-8	9/22/88	1112-tc	<	1.0000E+01	PPB
2-E27-8	9/22/88	1122-tc	<	1.0000E+01	PPB
2-E27-8	9/22/88	12-dben	<	1.0000E+01	PPB
2-E27-8	9/22/88	123-trp	<	1.0000E+01	PPB
2-E27-8	9/22/88	1234TE	<	1.0000E+01	PPB
2-E27-8	9/22/88	1235TE	<	1.0000E+01	PPB
2-E27-8	9/22/88	123TRI	<	1.0000E+01	PPB
2-E27-8	9/22/88	13-dben	<	1.0000E+01	PPB
2-E27-8	9/22/88	135TRI	<	1.0000E+01	PPB
2-E27-8	9/22/88	14-dben	<	1.0000E+01	PPB
2-E27-8	9/22/88	2,4,5-T	<	2.0000E+00	PPB
2-E27-8	9/22/88	2,4,5TP	<	2.0000E+00	PPB
2-E27-8	9/22/88	2,4-D	<	2.0000E+00	PPB
2-E27-8	9/22/88	2-napha	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E27-8	9/22/88	24-dchp	<	1.0000E+01	PPB
2-E27-8	9/22/88	24-dint	<	1.0000E+01	PPB
2-E27-8	9/22/88	245-trp	<	5.0000E+01	PPB
2-E27-8	9/22/88	246-trp	<	1.0000E+01	PPB
2-E27-8	9/22/88	26-dchp	<	1.0000E+01	PPB
2-E27-8	9/22/88	26-dint	<	1.0000E+01	PPB
2-E27-8	9/22/88	ACEFENE	<	1.0000E+01	PPB
2-E27-8	9/22/88	ACETILE	<	3.0000E+03	PPB
2-E27-8	9/22/88	ACETOPH	<	1.0000E+01	PPB
2-E27-8	9/22/88	ACETREA	<	2.0000E+02	PPB
2-E27-8	9/22/88	ACROLIN	<	1.0000E+01	PPB
2-E27-8	9/22/88	ACRYIOE	<	1.0000E+04	PPB
2-E27-8	9/22/88	ACRYILE	<	1.0000E+01	PPB
2-E27-8	9/22/88	ALDRIN	<	1.0000E-01	PPB
2-E27-8	9/22/88	ALLYLAL	<	2.5000E+03	PPB
2-E27-8	9/22/88	ALPHA		1.4600E+00	PCI/L
2-E27-8	9/22/88	ALPHA		2.4700E+00	PCI/L
2-E27-8	9/22/88	ALUMNUM	<	1.5000E+02	PPB
2-E27-8	9/22/88	AMIISOX	<	1.0000E+01	PPB
2-E27-8	9/22/88	AMINOYL	<	1.0000E+01	PPB
2-E27-8	9/22/88	AMITROL	<	1.0000E+01	PPB
2-E27-8	9/22/88	AMMONIU	<	5.0000E+01	PPB
2-E27-8	9/22/88	ANILINE	<	1.0000E+01	PPB
2-E27-8	9/22/88	ANTIONY	<	1.0000E+02	PPB
2-E27-8	9/22/88	AR1016	<	1.0000E+00	PPB
2-E27-8	9/22/88	AR1221	<	1.0000E+00	PPB
2-E27-8	9/22/88	AR1232	<	1.0000E+00	PPB
2-E27-8	9/22/88	AR1242	<	1.0000E+00	PPB
2-E27-8	9/22/88	AR1248	<	1.0000E+00	PPB
2-E27-8	9/22/88	AR1254	<	1.0000E+00	PPB
2-E27-8	9/22/88	AR1260	<	1.0000E+00	PPB
2-E27-8	9/22/88	ARAMITE	<	1.0000E+01	PPB
2-E27-8	9/22/88	ARSENIC		5.0000E+00	PPB
2-E27-8	9/22/88	AURAMIN	<	1.0000E+01	PPB
2-E27-8	9/22/88	BARIUM		4.0000E+01	PPB
2-E27-8	9/22/88	BENOICM	<	1.0000E+01	PPB
2-E27-8	9/22/88	BENDINE	<	1.0000E+01	PPB
2-E27-8	9/22/88	BENTHOL	<	1.0000E+01	PPB
2-E27-8	9/22/88	BENZAAN	<	1.0000E+01	PPB
2-E27-8	9/22/88	BENZBFL	<	1.0000E+01	PPB
2-E27-8	9/22/88	BENZCAC	<	1.0000E+01	PPB
2-E27-8	9/22/88	BENZCHL	<	1.0000E+01	PPB
2-E27-8	9/22/88	BENZENE	<	5.0000E+00	PPB
2-E27-8	9/22/88	BENZJFL	<	1.0000E+01	PPB
2-E27-8	9/22/88	BENZOPY	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E27-8	9/22/88	BERYLUM	<	5.0000E+00	PPB
2-E27-8	9/22/88	BETA		1.0200E+01	PCI/L
2-E27-8	9/22/88	BETA		1.0500E+01	PCI/L
2-E27-8	9/22/88	BIS2CHE	<	1.0000E+01	PPB
2-E27-8	9/22/88	BIS2CHM	<	1.0000E+01	PPB
2-E27-8	9/22/88	BIS2EPH	<	1.0000E+01	PPB
2-E27-8	9/22/88	BIS2ETH	<	1.0000E+01	PPB
2-E27-8	9/22/88	BISTHER	<	1.0000E+01	PPB
2-E27-8	9/22/88	BROMONE	<	1.0000E+01	PPB
2-E27-8	9/22/88	BROMORM	<	1.0000E+01	PPB
2-E27-8	9/22/88	BROPHEN	<	1.0000E+01	PPB
2-E27-8	9/22/88	BUTBENP	<	1.0000E+01	PPB
2-E27-8	9/22/88	BUTDINP	<	1.0000E+01	PPB
2-E27-8	9/22/88	CADMIUM	<	2.0000E+00	PPB
2-E27-8	9/22/88	CALCIUM		3.8800E+04	PPB
2-E27-8	9/22/88	CARBIDE	<	1.0000E+01	PPB
2-E27-8	9/22/88	CARBPHT	<	2.0000E+00	PPB
2-E27-8	9/22/88	CHALETH	<	1.0000E+01	PPB
2-E27-8	9/22/88	CHLACET	<	1.6000E+04	PPB
2-E27-8	9/22/88	CHLANIL	<	1.0000E+01	PPB
2-E27-8	9/22/88	CHLBENZ	<	1.0000E+01	PPB
2-E27-8	9/22/88	CHLCRES	<	1.0000E+01	PPB
2-E27-8	9/22/88	CHLEPOX	<	1.0000E+01	PPB
2-E27-8	9/22/88	CHLFORM	<	5.0000E+00	PPB
2-E27-8	9/22/88	CHLLATE	<	3.0000E+01	PPB
2-E27-8	9/22/88	CHLNAPH	<	1.0000E+01	PPB
2-E27-8	9/22/88	CHLNAPZ	<	1.0000E+01	PPB
2-E27-8	9/22/88	CHLOANE	<	1.0000E+00	PPB
2-E27-8	9/22/88	CHLOREA	<	2.0000E+02	PPB
2-E27-8	9/22/88	CHLORID		6.0100E+03	PPB
2-E27-8	9/22/88	CHLORID		6.3700E+03	PPB
2-E27-8	9/22/88	CHLPHEN	<	1.0000E+01	PPB
2-E27-8	9/22/88	CHLPROP	<	4.0000E+03	PPB
2-E27-8	9/22/88	CHLTHER	<	1.0000E+01	PPB
2-E27-8	9/22/88	CHMTHER	<	1.0000E+01	PPB
2-E27-8	9/22/88	CHROMUM		2.6000E+01	PPB
2-E27-8	9/22/88	CHRYSEN	<	1.0000E+01	PPB
2-E27-8	9/22/88	CITRUSR	<	1.0000E+03	PPB
2-E27-8	9/22/88	CO-60		6.4000E+00	PCI/L
2-E27-8	9/22/88	COLIFRM	<	2.2000E+00	MPN
2-E27-8	9/22/88	CONDFLD		2.7200E+02	UMHO
2-E27-8	9/22/88	CONDLAB		3.3000E+02	UMHO
2-E27-8	9/22/88	CONDLAB		3.3100E+02	UMHO
2-E27-8	9/22/88	CONDLAB		3.3400E+02	UMHO
2-E27-8	9/22/88	CONDLAB		3.3500E+02	UMHO

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E27-8	9/22/88	COPPER	<	1.0000E+01	PPB
2-E27-8	9/22/88	CRESOLS	<	1.0000E+01	PPB
2-E27-8	9/22/88	CROTONA	<	1.0000E+01	PPB
2-E27-8	9/22/88	CS-137	<	-9.9300E-01	PCI/L
2-E27-8	9/22/88	CYANIDE	<	1.0000E+01	PPB
2-E27-8	9/22/88	CYCHDIN	<	1.0000E+01	PPB
2-E27-8	9/22/88	DDD	<	1.0000E-01	PPB
2-E27-8	9/22/88	DDE	<	1.0000E-01	PPB
2-E27-8	9/22/88	DOT	<	1.0000E-01	PPB
2-E27-8	9/22/88	DIBAEPY	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIBAHAC	<	1.0000E+01	PPB
2-E27-8	9/22/88	OIBAHAN	<	1.0000E+01	PPB
2-E27-8	9/22/88	OIBAHPY	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIBAIPY	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIBAJAC	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIBCGCA	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIBPHTH	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIBRCHL	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIBRETH	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIBRMET	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIBUTEN	<	1.0000E+01	PPB
2-E27-8	9/22/88	DICDIFM	<	1.0000E+01	PPB
2-E27-8	9/22/88	DICETHY	<	1.0000E+01	PPB
2-E27-8	9/22/88	DICHBEN	<	2.0000E+01	PPB
2-E27-8	9/22/88	DICPANE	<	1.0000E+01	PPB
2-E27-8	9/22/88	DICPENE	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIELRIN	<	1.0000E-01	PPB
2-E27-8	9/22/88	DIEPHTH	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIETHY	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIETROL	<	2.0000E+02	PPB
2-E27-8	9/22/88	DIHYSAF	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIMBENZ	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIMEAMB	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIMETHB	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIMETHO	<	2.0000E+00	PPB
2-E27-8	9/22/88	DIMEYLB	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIMPHAM	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIMPHEN	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIMPHTH	<	1.0000E+01	PPB
2-E27-8	9/22/88	DINBENZ	<	1.0000E+01	PPB
2-E27-8	9/22/88	DINCRES	<	1.0000E+01	PPB
2-E27-8	9/22/88	DINPHEN	<	5.0000E+01	PPB
2-E27-8	9/22/88	DIOPHTH	<	1.0000E+01	PPB
2-E27-8	9/22/88	OIOXANE	<	5.0000E+02	PPB
2-E27-8	9/22/88	OIOXIN	<	1.0000E-01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E27-8	9/22/88	DIPHAMI	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIPHHYD	<	1.0000E+01	PPB
2-E27-8	9/22/88	DIPRNIT	<	1.0000E+01	PPB
2-E27-8	9/22/88	DISULFO	<	2.0000E+00	PPB
2-E27-8	9/22/88	END01	<	1.0000E-01	PPB
2-E27-8	9/22/88	END02	<	1.0000E-01	PPB
2-E27-8	9/22/88	ENDRIN	<	1.0000E-01	PPB
2-E27-8	9/22/88	ETHCARB	<	5.0000E+03	PPB
2-E27-8	9/22/88	ETHCYAN	<	2.0000E+03	PPB
2-E27-8	9/22/88	ETHMETH	<	1.0000E+01	PPB
2-E27-8	9/22/88	ETHMETS	<	1.0000E+01	PPB
2-E27-8	9/22/88	ETHMINE	<	1.0000E+01	PPB
2-E27-8	9/22/88	ETHOXID	<	3.0000E+03	PPB
2-E27-8	9/22/88	ETHYGLY	<	1.0000E+04	PPB
2-E27-8	9/22/88	ETHYREA	<	2.0000E+02	PPB
2-E27-8	9/22/88	FALUMIN	<	1.5000E+02	PPB
2-E27-8	9/22/88	FANTIMO	<	1.0000E+02	PPB
2-E27-8	9/22/88	FARSENI		8.0000E+00	PPB
2-E27-8	9/22/88	FBARIUM		3.9000E+01	PPB
2-E27-8	9/22/88	FBARIUM		4.1000E+01	PPB
2-E27-8	9/22/88	FBERYLL	<	5.0000E+00	PPB
2-E27-8	9/22/88	FCADMIU	<	2.0000E+00	PPB
2-E27-8	9/22/88	FCALCIU		3.9800E+04	PPB
2-E27-8	9/22/88	FCALCIU		4.1600E+04	PPB
2-E27-8	9/22/88	FCHROMI	<	1.0000E+01	PPB
2-E27-8	9/22/88	FCOPPER	<	1.0000E+01	PPB
2-E27-8	9/22/88	FIRON	<	3.0000E+01	PPB
2-E27-8	9/22/88	FLEAD	<	5.0000E+00	PPB
2-E27-8	9/22/88	FLUORAN	<	1.0000E+01	PPB
2-E27-8	9/22/88	FLUORID	<	5.0000E+02	PPB
2-E27-8	9/22/88	FMAGNES		1.1100E+04	PPB
2-E27-8	9/22/88	FMAGNES		1.1600E+04	PPB
2-E27-8	9/22/88	FMANGAN	<	5.0000E+00	PPB
2-E27-8	9/22/88	FMERCUR	<	1.0000E-01	PPB
2-E27-8	9/22/88	FNICKEL	<	1.0000E+01	PPB
2-E27-8	9/22/88	FORMALN	<	5.0000E+02	PPB
2-E27-8	9/22/88	FPOTASS		7.6000E+03	PPB
2-E27-8	9/22/88	FPOTASS		7.9300E+03	PPB
2-E27-8	9/22/88	FSELENI	<	5.0000E+00	PPB
2-E27-8	9/22/88	FSILVER	<	1.0000E+01	PPB
2-E27-8	9/22/88	FSODIUM		1.6500E+04	PPB
2-E27-8	9/22/88	FSODIUM		1.6900E+04	PPB
2-E27-8	9/22/88	FSTRONT		1.9200E+02	PPB
2-E27-8	9/22/88	FSTRONT		1.9800E+02	PPB
2-E27-8	9/22/88	FTHALLI	<	5.0000E+00	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E27-8	9/22/88	FVANAOI		2.9000E+01	PPB
2-E27-8	9/22/88	FVANAOI		3.2000E+01	PPB
2-E27-8	9/22/88	FZINC		1.7000E+01	PPB
2-E27-8	9/22/88	FZINC		2.0000E+01	PPB
2-E27-8	9/22/88	HEPTIOE	<	1.0000E-01	PPB
2-E27-8	9/22/88	HEPTLOR	<	1.0000E-01	PPB
2-E27-8	9/22/88	HEXACHL	<	1.0000E+01	PPB
2-E27-8	9/22/88	HEXAENE	<	1.0000E+01	PPB
2-E27-8	9/22/88	HEXCBEN	<	1.0000E+01	PPB
2-E27-8	9/22/88	HEXCBUT	<	1.0000E+01	PPB
2-E27-8	9/22/88	HEXCCYC	<	1.0000E+01	PPB
2-E27-8	9/22/88	HEXCETH	<	1.0000E+01	PPB
2-E27-8	9/22/88	HEXONE	<	1.0000E+01	PPB
2-E27-8	9/22/88	HYORAZI	<	3.0000E+03	PPB
2-E27-8	9/22/88	HYORSUL	<	1.0000E+01	PPB
2-E27-8	9/22/88	INDENOP	<	1.0000E+01	PPB
2-E27-8	9/22/88	IODOMET	<	1.0000E+01	PPB
2-E27-8	9/22/88	IRON		2.4600E+02	PPB
2-E27-8	9/22/88	ISOBUTY	<	1.0000E+03	PPB
2-E27-8	9/22/88	ISOSOLE	<	1.0000E+01	PPB
2-E27-8	9/22/88	KEROSEN	<	1.0000E+04	PPB
2-E27-8	9/22/88	LEAOGF	<	5.0000E+00	PPB
2-E27-8	9/22/88	M-XYLE	<	5.0000E+00	PPB
2-E27-8	9/22/88	MAGNES		1.0600E+04	PPB
2-E27-8	9/22/88	MALHYOR	<	5.0000E+02	PPB
2-E27-8	9/22/88	MALOILE	<	1.0000E+01	PPB
2-E27-8	9/22/88	MANGESE	<	5.0000E+00	PPB
2-E27-8	9/22/88	MELPHAL	<	1.0000E+01	PPB
2-E27-8	9/22/88	MERCURY	<	1.0000E-01	PPB
2-E27-8	9/22/88	METACRY	<	1.0000E+01	PPB
2-E27-8	9/22/88	METACTO	<	1.0000E+01	PPB
2-E27-8	9/22/88	METAZIR	<	1.0000E+01	PPB
2-E27-8	9/22/88	METB1SC	<	1.0000E+01	PPB
2-E27-8	9/22/88	METCHAN	<	1.0000E+01	PPB
2-E27-8	9/22/88	METHACR	<	1.0000E+01	PPB
2-E27-8	9/22/88	METHAPY	<	1.0000E+01	PPB
2-E27-8	9/22/88	METHBRO	<	1.0000E+01	PPB
2-E27-8	9/22/88	METHCHL	<	1.0000E+01	PPB
2-E27-8	9/22/88	METHIOU	<	1.0000E+01	PPB
2-E27-8	9/22/88	METHLOR	<	3.0000E+00	PPB
2-E27-8	9/22/88	METHNYL	<	1.0000E+01	PPB
2-E27-8	9/22/88	METHONE	<	1.0000E+01	PPB
2-E27-8	9/22/88	METHPAR	<	2.0000E+00	PPB
2-E27-8	9/22/88	METHTH1	<	1.0000E+01	PPB
2-E27-8	9/22/88	METHYCH	<	5.0000E+00	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E27-8	9/22/88	METHYCH	<	7.0000E+00	PPB
2-E27-8	9/22/88	METMSUL	<	1.0000E+01	PPB
2-E27-8	9/22/88	METPROP	<	1.0000E+01	PPB
2-E27-8	9/22/88	NAPHQUI	<	1.0000E+01	PPB
2-E27-8	9/22/88	NAPHREA	<	2.0000E+02	PPB
2-E27-8	9/22/88	NAPHTHA	<	1.0000E+01	PPB
2-E27-8	9/22/88	NICKEL		1.1000E+01	PPB
2-E27-8	9/22/88	NICOTIN	<	1.0000E+02	PPB
2-E27-8	9/22/88	NIT8ENZ	<	1.0000E+01	PPB
2-E27-8	9/22/88	NITPHEN	<	5.0000E+01	PPB
2-E27-8	9/22/88	NITRANI	<	5.0000E+01	PPB
2-E27-8	9/22/88	NITRATE		7.3100E+03	PPB
2-E27-8	9/22/88	NITRATE		7.4300E+03	PPB
2-E27-8	9/22/88	NITRPYR	<	1.0000E+01	PPB
2-E27-8	9/22/88	NITRTOL	<	1.0000E+01	PPB
2-E27-8	9/22/88	NNDIEHY	<	1.0000E+01	PPB
2-E27-8	9/22/88	NNIBUTY	<	1.0000E+01	PPB
2-E27-8	9/22/88	NNIDIEA	<	1.0000E+01	PPB
2-E27-8	9/22/88	NNIDIEY	<	1.0000E+01	PPB
2-E27-8	9/22/88	NNIDIME	<	1.0000E+01	PPB
2-E27-8	9/22/88	NNIMETH	<	1.0000E+01	PPB
2-E27-8	9/22/88	NNIMORP	<	1.0000E+01	PPB
2-E27-8	9/22/88	NNINICO	<	1.0000E+01	PPB
2-E27-8	9/22/88	NNIPIPE	<	1.0000E+01	PPB
2-E27-8	9/22/88	NNIURET	<	1.0000E+01	PPB
2-E27-8	9/22/88	NNIVINY	<	1.0000E+01	PPB
2-E27-8	9/22/88	OPXYLE	<	5.0000E+00	PPB
2-E27-8	9/22/88	OTOLHYD	<	1.0000E+01	PPB
2-E27-8	9/22/88	PARALDE	<	2.0000E+03	PPB
2-E27-8	9/22/88	PARATHI	<	2.0000E+00	PPB
2-E27-8	9/22/88	PBENZQU	<	1.0000E+01	PPB
2-E27-8	9/22/88	PENTACH	<	1.0000E+01	PPB
2-E27-8	9/22/88	PENTCHB	<	1.0000E+01	PPB
2-E27-8	9/22/88	PENTCHN	<	1.0000E+01	PPB
2-E27-8	9/22/88	PENTCHP	<	5.0000E+01	PPB
2-E27-8	9/22/88	PERCENE	<	5.0000E+00	PPB
2-E27-8	9/22/88	PERCHLO	<	1.0000E+03	PPB
2-E27-8	9/22/88	PH-LAB		7.8000E+00	
2-E27-8	9/22/88	PHENINE	<	1.0000E+01	PPB
2-E27-8	9/22/88	PHENOL	<	1.0000E+01	PPB
2-E27-8	9/22/88	PHENREA	<	5.0000E+02	PPB
2-E27-8	9/22/88	PHENTIN	<	1.0000E+01	PPB
2-E27-8	9/22/88	PHFIELD		7.9000E+00	
2-E27-8	9/22/88	PHOSPHA	<	1.0000E+03	PPB
2-E27-8	9/22/88	PHTHEST	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E27-8	9/22/88	PICOLIN	<	1.0000E+01	PPB
2-E27-8	9/22/88	POTASUM		7.0000E+03	PPB
2-E27-8	9/22/88	PRONIDE	<	1.0000E+01	PPB
2-E27-8	9/22/88	PROPYLA	<	1.0000E+04	PPB
2-E27-8	9/22/88	PROPYNO	<	8.0000E+03	PPB
2-E27-8	9/22/88	PYRIDIN	<	5.0000E+02	PPB
2-E27-8	9/22/88	RAOIUM		1.4600E-01	PCI/L
2-E27-8	9/22/88	RESERPI	<	1.0000E+01	PPB
2-E27-8	9/22/88	RESORCI	<	1.0000E+01	PPB
2-E27-8	9/22/88	RU-106	<	-1.1100E+01	PCI/L
2-E27-8	9/22/88	SAFROL	<	1.0000E+01	PPB
2-E27-8	9/22/88	SELENUM	<	5.0000E+00	PPB
2-E27-8	9/22/88	SILVER	<	1.0000E+01	PPB
2-E27-8	9/22/88	SODIUM		1.5600E+04	PPB
2-E27-8	9/22/88	SR 90	<	9.0200E-02	PCI/L
2-E27-8	9/22/88	STRONUM		1.8600E+02	PPB
2-E27-8	9/22/88	STRYCHN	<	5.0000E+01	PPB
2-E27-8	9/22/88	SULFATE		4.6200E+04	PPB
2-E27-8	9/22/88	SULFATE		4.7300E+04	PPB
2-E27-8	9/22/88	SULFIDE	<	1.0000E+03	PPB
2-E27-8	9/22/88	SYMTRIN	<	1.0000E+01	PPB
2-E27-8	9/22/88	TC		1.9900E+04	PPB
2-E27-8	9/22/88	TC-99	<	1.1300E+00	PCI/L
2-E27-8	9/22/88	TETEPYR	<	2.0000E+00	PPB
2-E27-8	9/22/88	TETRANE	<	5.0000E+00	PPB
2-E27-8	9/22/88	TETRCHB	<	1.0000E+01	PPB
2-E27-8	9/22/88	TETRCHP	<	1.0000E+01	PPB
2-E27-8	9/22/88	THALIUM	<	5.0000E+00	PPB
2-E27-8	9/22/88	THIONOX	<	1.0000E+01	PPB
2-E27-8	9/22/88	THIOURA	<	2.0000E+02	PPB
2-E27-8	9/22/88	THIURAM	<	1.0000E+01	PPB
2-E27-8	9/22/88	TOC	<	4.0000E+02	PPB
2-E27-8	9/22/88	TOC	<	5.0000E+02	PPB
2-E27-8	9/22/88	TOC	<	6.0000E+02	PPB
2-E27-8	9/22/88	TOC	<	7.0000E+02	PPB
2-E27-8	9/22/88	TOLUOIA	<	1.0000E+01	PPB
2-E27-8	9/22/88	TOLUENE	<	5.0000E+00	PPB
2-E27-8	9/22/88	TOXAENE	<	1.0000E+00	PPB
2-E27-8	9/22/88	TOXLOL	<	4.0000E+00	PPB
2-E27-8	9/22/88	TOXLOL	<	5.0000E+00	PPB
2-E27-8	9/22/88	TOXLOL	<	7.0000E+00	PPB
2-E27-8	9/22/88	TRANOCE	<	1.0000E+01	PPB
2-E27-8	9/22/88	TRCMEOL	<	1.0000E+01	PPB
2-E27-8	9/22/88	TRCMFLM	<	1.0000E+01	PPB
2-E27-8	9/22/88	TRCPANE	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E27-8	9/22/88	TRIBUPH	<	1.0000E+01	PPB
2-E27-8	9/22/88	TRICENE	<	5.0000E+00	PPB
2-E27-8	9/22/88	TRICHLB	<	1.0000E+01	PPB
2-E27-8	9/22/88	TRIPHOS	<	1.0000E+01	PPB
2-E27-8	9/22/88	TRISPHO	<	1.0000E+01	PPB
2-E27-8	9/22/88	TRITIUM		1.0500E+04	PCI/L
2-E27-8	9/22/88	U-CHEM		2.6000E+00	UG/L
2-E27-8	9/22/88	U-CHEM		2.8500E+00	UG/L
2-E27-8	9/22/88	VANADUM		2.8000E+01	PPB
2-E27-8	9/22/88	VINYIDE	<	1.0000E+01	PPB
2-E27-8	9/22/88	WARFRIN	<	1.0000E+01	PPB
2-E27-8	9/22/88	ZINC		2.8000E+01	PPB
2-E27-8	9/22/88	a-BHC	<	1.0000E-01	PPB
2-E27-8	9/22/88	b-BHC	<	1.0000E-01	PPB
2-E27-8	9/22/88	d-BHC	<	1.0000E-01	PPB
2-E27-8	9/22/88	g-BHC	<	1.0000E-01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	1/21/85	ALPHA		1.6500E+00	PCI/L
2-E34-1	1/21/85	BETA		8.7600E+00	PCI/L
2-E34-1	1/21/85	CO-60		4.5100E+00	PCI/L
2-E34-1	1/21/85	CS-137		-3.7800E+00	PCI/L
2-E34-1	1/21/85	NO3-ION		1.4000E+01	MG/L
2-E34-1	1/21/85	RU-106		1.4400E+01	PCI/L
2-E34-1	1/21/85	TRITIUM		3.9000E+02	PCI/L
2-E34-1	2/11/85	NO3-ION		1.4000E+01	MG/L
2-E34-1	2/12/85	ALPHA		3.0900E+00	PCI/L
2-E34-1	2/12/85	BETA		1.0000E+01	PCI/L
2-E34-1	2/12/85	CO-60		3.0500E+00	PCI/L
2-E34-1	2/12/85	CS-137		3.2000E-01	PCI/L
2-E34-1	2/12/85	RU-106		-3.0100E+01	PCI/L
2-E34-1	2/12/85	TRITIUM		1.8900E+02	PCI/L
2-E34-1	3/18/85	ALPHA		2.5900E+00	PCI/L
2-E34-1	3/18/85	BETA		7.8500E+00	PCI/L
2-E34-1	3/18/85	CO-60		-5.0900E+00	PCI/L

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	3/18/85	CS-137		2.4100E+00	PCI/L
2-E34-1	3/18/85	NO3-ION		1.8000E+01	MG/L
2-E34-1	3/18/85	RU-106		-2.3500E+01	PCI/L
2-E34-1	3/18/85	TRITIUM		2.9700E+02	PCI/L
2-E34-1	4/01/85	ALPHA		1.8700E+00	PCI/L
2-E34-1	4/01/85	BETA		9.0800E+00	PCI/L
2-E34-1	4/01/85	CO-60		-1.0200E+01	PCI/L
2-E34-1	4/01/85	CS-137		1.0300E+00	PCI/L
2-E34-1	4/01/85	NO3-ION		2.8000E+00	MG/L
2-E34-1	4/01/85	RU-106		-4.1000E+01	PCI/L
2-E34-1	4/01/85	TRITIUM		8.4100E+02	PCI/L
2-E34-1	5/14/85	ALPHA		1.8300E+00	PCI/L
2-E34-1	5/14/85	BETA		8.0000E+00	PCI/L
2-E34-1	5/14/85	CO-60		-7.0800E+00	PCI/L
2-E34-1	5/14/85	CS-137		9.5900E-01	PCI/L
2-E34-1	5/14/85	NO3-ION		2.3000E+01	MG/L
2-E34-1	5/14/85	RU-106		0.0000E+00	PCI/L
2-E34-1	5/14/85	TRITIUM		5.3200E+02	PCI/L
2-E34-1	6/24/85	ALPHA		5.2000E-01	PCI/L
2-E34-1	6/24/85	BETA		6.4900E+00	PCI/L
2-E34-1	6/24/85	CO-60		-2.8300E+00	PCI/L
2-E34-1	6/24/85	CS-137		-2.0700E+00	PCI/L
2-E34-1	6/24/85	NITRATE		9.3800E+00	MG/L
2-E34-1	6/24/85	RU-106		-3.2200E+01	PCI/L
2-E34-1	6/24/85	TRITIUM		3.4400E+02	PCI/L
2-E34-1	8/05/85	ALPHA		1.7300E+00	PCI/L
2-E34-1	8/05/85	BETA		1.1300E+01	PCI/L
2-E34-1	8/05/85	CO-60	<	-3.9500E+00	PCI/L
2-E34-1	8/05/85	CS-137		5.5100E+00	PCI/L
2-E34-1	8/05/85	RU-106	<	8.6800E+00	PCI/L
2-E34-1	8/05/85	TRITIUM	<	-3.2200E+01	PCI/L
2-E34-1	8/06/85	NO3-ION		2.9000E+01	MG/L
2-E34-1	8/16/85	ALPHA		1.3500E+00	PCI/L
2-E34-1	8/16/85	BETA		6.5700E+00	PCI/L
2-E34-1	8/16/85	CO-60	<	-1.7000E+00	PCI/L
2-E34-1	8/16/85	CS-137	<	3.1000E+00	PCI/L
2-E34-1	8/16/85	NITRATE		1.3300E+01	MG/L
2-E34-1	8/16/85	RU-106	<	-3.2600E+01	PCI/L
2-E34-1	8/16/85	TRITIUM		6.8800E+02	PCI/L
2-E34-1	9/05/85	ALPHA		2.4400E+00	PCI/L
2-E34-1	9/05/85	BETA		5.4300E+00	PCI/L
2-E34-1	9/05/85	CO-60	<	-2.5300E+00	PCI/L
2-E34-1	9/05/85	CS-137	<	0.0000E+00	PCI/L
2-E34-1	9/05/85	NO3-ION		3.2000E+01	MG/L
2-E34-1	9/05/85	RU-106	<	-1.3300E+01	PCI/L

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	9/05/85	TRITIUM	<	1.3100E+03	PCI/L
2-E34-1	10/15/85	ALPHA		1.5800E+00	PCI/L
2-E34-1	10/15/85	BETA		8.5300E+00	PCI/L
2-E34-1	10/15/85	CO-60	<	4.5200E+00	PCI/L
2-E34-1	10/15/85	CS-137	<	-5.5100E+00	PCI/L
2-E34-1	10/15/85	NO3-ION		3.5000E+01	MG/L
2-E34-1	10/15/85	RU-106	<	3.2100E+01	PCI/L
2-E34-1	10/15/85	TRITIUM		3.3000E+02	PCI/L
2-E34-1	11/11/85	ALPHA		2.0500E+00	PCI/L
2-E34-1	11/11/85	BETA		7.2500E+00	PCI/L
2-E34-1	11/11/85	CO-60	<	-7.0800E+00	PCI/L
2-E34-1	11/11/85	CS-137	<	6.3900E-01	PCI/L
2-E34-1	11/11/85	NO3-ION		3.8000E+01	MG/L
2-E34-1	11/11/85	RU-106	<	2.4000E+01	PCI/L
2-E34-1	11/11/85	TRITIUM		2.9400E+02	PCI/L
2-E34-1	12/18/85	ALPHA		2.6600E+00	PCI/L
2-E34-1	12/18/85	BETA		6.8200E+00	PCI/L
2-E34-1	12/18/85	CO-60	<	-3.5400E+00	PCI/L
2-E34-1	12/18/85	CS-137		3.8300E+00	PCI/L
2-E34-1	12/18/85	NO3-ION		5.8000E+01	MG/L
2-E34-1	12/18/85	RU-106	<	-2.1200E+01	PCI/L
2-E34-1	12/18/85	TRITIUM		3.2100E+02	PCI/L
2-E34-1	1/07/86	ALPHA		7.1700E+00	PCI/L
2-E34-1	1/07/86	BETA		5.1600E+00	PCI/L
2-E34-1	1/07/86	CO-60	<	4.0300E+00	PCI/L
2-E34-1	1/07/86	CS-137		5.1100E+00	PCI/L
2-E34-1	1/07/86	RU-106		4.2000E+01	PCI/L
2-E34-1	1/07/86	TRITIUM		5.4400E+02	PCI/L
2-E34-1	2/11/86	ALPHA		2.3700E+00	PCI/L
2-E34-1	2/11/86	BETA		5.7100E+00	PCI/L
2-E34-1	2/11/86	CO-60	<	2.3600E+00	PCI/L
2-E34-1	2/11/86	CS-137		5.6900E+00	PCI/L
2-E34-1	2/11/86	RU-106	<	4.1500E+01	PCI/L
2-E34-1	2/11/86	TRITIUM		5.0700E+02	PCI/L
2-E34-1	2/19/86	NO3-ION		4.4000E+01	MG/L
2-E34-1	3/12/86	ALPHA		2.4500E+00	PCI/L
2-E34-1	3/12/86	BETA		3.3400E+00	PCI/L
2-E34-1	3/12/86	CO-60	<	4.5200E+00	PCI/L
2-E34-1	3/12/86	CS-137	<	-4.1300E+00	PCI/L
2-E34-1	3/12/86	RU-106	<	8.7400E+00	PCI/L
2-E34-1	3/12/86	TRITIUM		7.3700E+02	PCI/L
2-E34-1	4/10/86	ALPHA		2.2700E+00	PCI/L
2-E34-1	4/10/86	BETA		6.7500E+00	PCI/L
2-E34-1	4/10/86	CO-60	<	3.0300E+00	PCI/L
2-E34-1	4/10/86	CS-137		8.3100E+00	PCI/L

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	4/10/86	RU-106	<	1.6000E+01	PCI/L
2-E34-1	4/10/86	TRITIUM		5.9700E+02	PCI/L
2-E34-1	5/14/86	ALPHA		2.1800E+00	PCI/L
2-E34-1	5/14/86	BETA		5.9100E+00	PCI/L
2-E34-1	5/14/86	CO-60	<	-2.8300E+00	PCI/L
2-E34-1	5/14/86	CS-137	<	1.3800E+00	PCI/L
2-E34-1	5/14/86	RU-106		4.1200E+01	PCI/L
2-E34-1	5/14/86	TRITIUM		6.3300E+02	PCI/L
2-E34-1	6/09/86	ALPHA		2.2600E+00	PCI/L
2-E34-1	6/09/86	BETA		7.0300E+00	PCI/L
2-E34-1	6/09/86	CO-60		9.6000E+00	PCI/L
2-E34-1	6/09/86	CS-137	<	-1.1300E+01	PCI/L
2-E34-1	6/09/86	RU-106	<	3.0400E+01	PCI/L
2-E34-1	6/09/86	TRITIUM		4.4800E+02	PCI/L
2-E34-1	7/01/86	ALPHA		2.0400E+00	PCI/L
2-E34-1	7/01/86	BETA		6.7700E+00	PCI/L
2-E34-1	7/01/86	CO-60	<	-1.4500E+01	PCI/L
2-E34-1	7/01/86	CS-137		7.3300E+00	PCI/L
2-E34-1	7/01/86	RU-106	<	5.7200E+00	PCI/L
2-E34-1	7/01/86	TRITIUM		5.0200E+02	PCI/L
2-E34-1	8/08/86	ALPHA		2.2600E+00	PCI/L
2-E34-1	8/08/86	BETA		4.8100E+00	PCI/L
2-E34-1	8/08/86	CO-60	<	1.4100E+00	PCI/L
2-E34-1	8/08/86	CS-137	<	2.1400E+00	PCI/L
2-E34-1	8/08/86	RU-106	<	-1.5000E+01	PCI/L
2-E34-1	8/08/86	TRITIUM		3.6000E+02	PCI/L
2-E34-1	9/19/86	ALPHA		2.0700E+00	PCI/L
2-E34-1	9/19/86	BETA		6.2900E+00	PCI/L
2-E34-1	9/19/86	CO-60	<	3.0400E+00	PCI/L
2-E34-1	9/19/86	CS-137	<	-4.7900E+00	PCI/L
2-E34-1	9/19/86	RU-106	<	-1.0700E+01	PCI/L
2-E34-1	9/19/86	TRITIUM	<	-4.0400E+02	PCI/L
2-E34-1	10/15/86	ALPHA		2.0600E+00	PCI/L
2-E34-1	10/15/86	BETA		7.0900E+00	PCI/L
2-E34-1	10/15/86	CO-60	<	-1.6000E+00	PCI/L
2-E34-1	10/15/86	CS-137	<	-6.6600E-01	PCI/L
2-E34-1	10/15/86	RU-106	<	-1.6900E+01	PCI/L
2-E34-1	10/15/86	TRITIUM	<	1.3300E+02	PCI/L
2-E34-1	11/07/86	ALPHA		3.7300E+00	PCI/L
2-E34-1	11/07/86	BETA		5.8300E+00	PCI/L
2-E34-1	11/07/86	CO-60	<	2.2800E+00	PCI/L
2-E34-1	11/07/86	CS-137		4.8300E+00	PCI/L
2-E34-1	11/07/86	RU-106		3.6900E+01	PCI/L
2-E34-1	11/07/86	TRITIUM	<	9.2000E+01	PCI/L
2-E34-1	12/16/86	ALPHA		1.7600E+00	PCI/L

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	12/16/86	BETA		6.9600E+00	PCI/L
2-E34-1	12/16/86	CO-60	<	1.1400E+00	PCI/L
2-E34-1	12/16/86	CS-137	<	1.7200E+00	PCI/L
2-E34-1	12/16/86	RU-106	<	2.1000E+01	PCI/L
2-E34-1	12/16/86	TRITIUM	<	3.5400E+01	PCI/L
2-E34-1	1/06/87	ALPHA		2.4700E+00	PCI/L
2-E34-1	1/06/87	BETA		9.3300E+00	PCI/L
2-E34-1	1/06/87	CO-60	<	4.2200E+00	PCI/L
2-E34-1	1/06/87	CS-137	<	0.0000E+00	PCI/L
2-E34-1	1/06/87	RU-106	<	-1.8300E+01	PCI/L
2-E34-1	1/06/87	TRITIUM	<	2.6300E+02	PCI/L
2-E34-1	2/19/87	ALPHA		2.9400E+00	PCI/L
2-E34-1	2/19/87	BETA		1.0600E+01	PCI/L
2-E34-1	2/19/87	CO-60	<	-2.1000E+00	PCI/L
2-E34-1	2/19/87	CS-137	<	1.7100E+00	PCI/L
2-E34-1	2/19/87	RU-106	<	-5.7800E+01	PCI/L
2-E34-1	2/19/87	TRITIUM		5.0000E+02	PCI/L
2-E34-1	3/06/87	ALPHA		2.3300E+00	PCI/L
2-E34-1	3/06/87	BETA		9.9800E+00	PCI/L
2-E34-1	3/06/87	CO-60	<	2.8000E+00	PCI/L
2-E34-1	3/06/87	CS-137	<	-8.5500E-01	PCI/L
2-E34-1	3/06/87	RU-106	<	-7.2000E+00	PCI/L
2-E34-1	3/06/87	TRITIUM	<	2.5400E+02	PCI/L
2-E34-1	3/30/87	NITRATE		2.2800E+04	PPB
2-E34-1	4/12/87	ALPHA		2.4100E+00	PCI/L
2-E34-1	4/12/87	BETA		9.6000E+00	PCI/L
2-E34-1	4/12/87	CO-60	<	3.3900E+00	PCI/L
2-E34-1	4/12/87	CS-137	<	-5.1700E+00	PCI/L
2-E34-1	4/12/87	RU-106	<	-8.8400E+00	PCI/L
2-E34-1	4/12/87	TRITIUM		6.3500E+02	PCI/L
2-E34-1	5/10/87	ALPHA		1.9000E+00	PCI/L
2-E34-1	5/10/87	BETA		1.2100E+01	PCI/L
2-E34-1	5/10/87	CO-60	<	4.8500E+00	PCI/L
2-E34-1	5/10/87	CS-137	<	-3.7800E-01	PCI/L
2-E34-1	5/10/87	RU-106	<	3.4400E+01	PCI/L
2-E34-1	5/10/87	TRITIUM		9.9600E+02	PCI/L
2-E34-1	6/09/87	ALPHA		2.2300E+00	PCI/L
2-E34-1	6/09/87	BETA		9.0800E+00	PCI/L
2-E34-1	6/09/87	CO-60	<	-1.0800E+01	PCI/L
2-E34-1	6/09/87	CS-137	<	3.4400E-01	PCI/L
2-E34-1	6/09/87	RU-106	<	-3.8400E+01	PCI/L
2-E34-1	6/09/87	TRITIUM		5.3500E+02	PCI/L
2-E34-1	7/21/87	1,1,1-T	<	1.0000E+01	PPB
2-E34-1	7/21/87	1,1,2-T	<	1.0000E+01	PPB
2-E34-1	7/21/87	1,1-DIC	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	7/21/87	1,2-DIC	<	1.0000E+01	PPB
2-E34-1	7/21/87	1112-tc	<	1.0000E+01	PPB
2-E34-1	7/21/87	1122-tc	<	1.0000E+01	PPB
2-E34-1	7/21/87	12-dben	<	1.0000E+01	PPB
2-E34-1	7/21/87	123-trp	<	1.0000E+01	PPB
2-E34-1	7/21/87	1234TE	<	1.0000E+01	PPB
2-E34-1	7/21/87	1235TE	<	1.0000E+01	PPB
2-E34-1	7/21/87	123TRI	<	1.0000E+01	PPB
2-E34-1	7/21/87	13-dben	<	1.0000E+01	PPB
2-E34-1	7/21/87	135TRI	<	1.0000E+01	PPB
2-E34-1	7/21/87	14-dben	<	1.0000E+01	PPB
2-E34-1	7/21/87	ACROLIN	<	1.0000E+01	PPB
2-E34-1	7/21/87	ACRYILE	<	1.0000E+01	PPB
2-E34-1	7/21/87	ALKALIN		9.2200E+04	
2-E34-1	7/21/87	ALPHA		1.8200E+00	PCI/L
2-E34-1	7/21/87	ALPHA	<	-1.8200E-01	PCI/L
2-E34-1	7/21/87	AMMONIU	<	5.0000E+01	PPB
2-E34-1	7/21/87	BENZENE	<	1.0000E+01	PPB
2-E34-1	7/21/87	BETA		1.1000E+01	PCI/L
2-E34-1	7/21/87	BETA		1.8100E+01	PCI/L
2-E34-1	7/21/87	BISTHER	<	1.0000E+01	PPB
2-E34-1	7/21/87	BROMONE	<	1.0000E+01	PPB
2-E34-1	7/21/87	BROMORM	<	1.0000E+01	PPB
2-E34-1	7/21/87	CARBIOE	<	1.0000E+01	PPB
2-E34-1	7/21/87	CHLBENZ	<	1.0000E+01	PPB
2-E34-1	7/21/87	CHLFORM	<	1.0000E+01	PPB
2-E34-1	7/21/87	CHLORID		1.7200E+04	PPB
2-E34-1	7/21/87	CHLTHER	<	1.0000E+01	PPB
2-E34-1	7/21/87	CHMTHER	<	1.0000E+01	PPB
2-E34-1	7/21/87	CO-60	<	3.0600E+00	PCI/L
2-E34-1	7/21/87	CONDFLD		5.4600E+02	UMHO
2-E34-1	7/21/87	CROTONA	<	1.0000E+01	PPB
2-E34-1	7/21/87	CS-137	<	6.4000E-01	PCI/L
2-E34-1	7/21/87	CYANIDE	<	1.0000E+01	PPB
2-E34-1	7/21/87	DIBRCHL	<	1.0000E+01	PPB
2-E34-1	7/21/87	DIBRETH	<	1.0000E+01	PPB
2-E34-1	7/21/87	DIBRMET	<	1.0000E+01	PPB
2-E34-1	7/21/87	DIBUTEN	<	1.0000E+01	PPB
2-E34-1	7/21/87	DICDIFM	<	1.0000E+01	PPB
2-E34-1	7/21/87	DICETHY	<	1.0000E+01	PPB
2-E34-1	7/21/87	DICPANE	<	1.0000E+01	PPB
2-E34-1	7/21/87	DICPENE	<	1.0000E+01	PPB
2-E34-1	7/21/87	DIETHY	<	1.0000E+01	PPB
2-E34-1	7/21/87	DIOXANE	<	5.0000E+02	PPB
2-E34-1	7/21/87	ETHMETH	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	7/21/87	FALUMIN	<	1.5000E+02	PPB
2-E34-1	7/21/87	FANTIMO	<	1.0000E+02	PPB
2-E34-1	7/21/87	FARSENI	<	5.0000E+00	PPB
2-E34-1	7/21/87	FBARIUM		3.6000E+01	PPB
2-E34-1	7/21/87	FBERYLL	<	5.0000E+00	PPB
2-E34-1	7/21/87	FCADMIU	<	2.0000E+00	PPB
2-E34-1	7/21/87	FCALCIU		5.8100E+04	PPB
2-E34-1	7/21/87	FCHROMI	<	3.0000E+00	PPB
2-E34-1	7/21/87	FCOPPER	<	1.0000E+01	PPB
2-E34-1	7/21/87	FIRON		1.1800E+02	PPB
2-E34-1	7/21/87	FLEAD	<	5.0000E+00	PPB
2-E34-1	7/21/87	FLUORID		6.8200E+02	PPB
2-E34-1	7/21/87	FMAGNES		1.7200E+04	PPB
2-E34-1	7/21/87	FMANGAN		1.2000E+01	PPB
2-E34-1	7/21/87	FMERCUR	<	1.0000E-01	PPB
2-E34-1	7/21/87	FNICKEL	<	1.0000E+01	PPB
2-E34-1	7/21/87	FORMALN	<	5.0000E+02	PPB
2-E34-1	7/21/87	FOSMIUM	<	3.0000E+02	PPB
2-E34-1	7/21/87	FPOTASS		8.0100E+03	PPB
2-E34-1	7/21/87	FSELENI	<	5.0000E+00	PPB
2-E34-1	7/21/87	FSILVER	<	1.0000E+01	PPB
2-E34-1	7/21/87	FSODIUM		2.4900E+04	PPB
2-E34-1	7/21/87	FSTRONT		3.0500E+02	PPB
2-E34-1	7/21/87	FVANADI		1.3000E+01	PPB
2-E34-1	7/21/87	FZINC		1.7000E+01	PPB
2-E34-1	7/21/87	HEXACHL	<	1.0000E+01	PPB
2-E34-1	7/21/87	HEXCBEN	<	1.0000E+01	PPB
2-E34-1	7/21/87	HYDRSUL	<	1.0000E+01	PPB
2-E34-1	7/21/87	IODOMET	<	1.0000E+01	PPB
2-E34-1	7/21/87	KEROSEN	<	1.0000E+04	PPB
2-E34-1	7/21/87	LFLUORD		4.7000E+02	PPB
2-E34-1	7/21/87	LHYDRAZ	<	3.0000E+01	PPB
2-E34-1	7/21/87	M-XYLE	<	1.0000E+01	PPB
2-E34-1	7/21/87	METACRY	<	1.0000E+01	PPB
2-E34-1	7/21/87	METHACR	<	1.0000E+01	PPB
2-E34-1	7/21/87	METHBRO	<	1.0000E+01	PPB
2-E34-1	7/21/87	METHCHL	<	1.0000E+01	PPB
2-E34-1	7/21/87	METHONE	<	1.0000E+01	PPB
2-E34-1	7/21/87	METHTHI	<	1.0000E+01	PPB
2-E34-1	7/21/87	METHYCH	<	1.0000E+01	PPB
2-E34-1	7/21/87	NAPHTHA	<	1.0000E+01	PPB
2-E34-1	7/21/87	NITRATE		1.9400E+04	PPB
2-E34-1	7/21/87	NNOIEHY	<	1.0000E+01	PPB
2-E34-1	7/21/87	OPXYLE	<	1.0000E+01	PPB
2-E34-1	7/21/87	PENTACH	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	7/21/87	PENTCHB	<	1.0000E+01	PPB
2-E34-1	7/21/87	PERCENE	<	1.0000E+01	PPB
2-E34-1	7/21/87	PH-LAB		7.6800E+00	
2-E34-1	7/21/87	PHENOL	<	1.0000E+01	PPB
2-E34-1	7/21/87	PHFIELD		7.0000E+00	
2-E34-1	7/21/87	PHOSPHA	<	1.0000E+03	PPB
2-E34-1	7/21/87	PYRIDIN	<	5.0000E+02	PPB
2-E34-1	7/21/87	RU-106		7.2100E+01	PCI/L
2-E34-1	7/21/87	SULFATE		2.0500E+05	PPB
2-E34-1	7/21/87	TC		2.2400E+04	PPB
2-E34-1	7/21/87	TETRANE	<	1.0000E+01	PPB
2-E34-1	7/21/87	TETRCHB	<	1.0000E+01	PPB
2-E34-1	7/21/87	TOC	<	5.0300E+02	PPB
2-E34-1	7/21/87	TOLUENE	<	1.0000E+01	PPB
2-E34-1	7/21/87	TOXLDL	<	7.1000E+00	PPB
2-E34-1	7/21/87	TRANDCE	<	1.0000E+01	PPB
2-E34-1	7/21/87	TRCMEOL	<	1.0000E+01	PPB
2-E34-1	7/21/87	TRCMFLM	<	1.0000E+01	PPB
2-E34-1	7/21/87	TRCPANE	<	1.0000E+01	PPB
2-E34-1	7/21/87	TRICENE	<	1.0000E+01	PPB
2-E34-1	7/21/87	TRICHLB	<	1.0000E+01	PPB
2-E34-1	7/21/87	TRITIUM		1.0200E+03	PCI/L
2-E34-1	7/21/87	VINYIDE	<	1.0000E+01	PPB
2-E34-1	8/13/87	ALPHA		1.4300E+00	PCI/L
2-E34-1	8/13/87	BETA		8.7000E+00	PCI/L
2-E34-1	8/13/87	CO-60		5.6500E+00	PCI/L
2-E34-1	8/13/87	CS-137	<	-1.7200E+00	PCI/L
2-E34-1	8/13/87	RU-106	<	-1.7500E+01	PCI/L
2-E34-1	8/13/87	TRITIUM		9.5600E+02	PCI/L
2-E34-1	9/15/87	ALPHA		2.1500E+00	PCI/L
2-E34-1	9/15/87	BETA		8.0100E+00	PCI/L
2-E34-1	9/15/87	CO-60	<	3.3900E+00	PCI/L
2-E34-1	9/15/87	CS-137		4.8200E+00	PCI/L
2-E34-1	9/15/87	RU-106		4.1000E+01	PCI/L
2-E34-1	9/15/87	TRITIUM		1.0000E+03	PCI/L
2-E34-1	10/07/87	ALPHA		2.6600E+00	PCI/L
2-E34-1	10/07/87	BETA		8.8200E+00	PCI/L
2-E34-1	10/07/87	CO-60		6.8300E+00	PCI/L
2-E34-1	10/07/87	CS-137		9.9600E+00	PCI/L
2-E34-1	10/07/87	RU-106	<	9.0300E+00	PCI/L
2-E34-1	10/07/87	TRITIUM		1.1300E+04	PCI/L
2-E34-1	11/10/87	ALPHA		2.0900E+00	PCI/L
2-E34-1	11/10/87	BETA		9.2100E+00	PCI/L
2-E34-1	11/10/87	CO-60	<	2.0200E+00	PCI/L
2-E34-1	11/10/87	CS-137	<	-6.0400E+00	PCI/L

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	11/10/87	RU-106	<	4.0100E+01	PCI/L
2-E34-1	11/10/87	TRITIUM		1.1200E+03	PCI/L
2-E34-1	12/03/87	ALPHA		2.7200E+00	PCI/L
2-E34-1	12/03/87	BETA		7.6100E+00	PCI/L
2-E34-1	12/03/87	CO-60	<	-1.7000E+00	PCI/L
2-E34-1	12/03/87	CS-137	<	1.4100E+00	PCI/L
2-E34-1	12/03/87	RU-106	<	-1.7900E+01	PCI/L
2-E34-1	12/03/87	TRITIUM		1.3400E+03	PCI/L
2-E34-1	1/27/88	1,1,1-T	<	5.0000E+00	PPB
2-E34-1	1/27/88	1,1,2-T	<	5.0000E+00	PPB
2-E34-1	1/27/88	1,1-DIC	<	1.0000E+01	PPB
2-E34-1	1/27/88	1,2-DIC	<	1.0000E+01	PPB
2-E34-1	1/27/88	1-napha	<	1.0000E+01	PPB
2-E34-1	1/27/88	1112-tc	<	1.0000E+01	PPB
2-E34-1	1/27/88	1122-tc	<	1.0000E+01	PPB
2-E34-1	1/27/88	12-dben	<	1.0000E+01	PPB
2-E34-1	1/27/88	123-trp	<	1.0000E+01	PPB
2-E34-1	1/27/88	1234TE	<	1.0000E+01	PPB
2-E34-1	1/27/88	1235TE	<	1.0000E+01	PPB
2-E34-1	1/27/88	123TRI	<	1.0000E+01	PPB
2-E34-1	1/27/88	13-dben	<	1.0000E+01	PPB
2-E34-1	1/27/88	135TRI	<	1.0000E+01	PPB
2-E34-1	1/27/88	14-dben	<	1.0000E+01	PPB
2-E34-1	1/27/88	2-napha	<	1.0000E+01	PPB
2-E34-1	1/27/88	24-dchp	<	1.0000E+01	PPB
2-E34-1	1/27/88	24-dint	<	1.0000E+01	PPB
2-E34-1	1/27/88	245-trp	<	5.0000E+01	PPB
2-E34-1	1/27/88	246-trp	<	1.0000E+01	PPB
2-E34-1	1/27/88	26-dchp	<	1.0000E+01	PPB
2-E34-1	1/27/88	26-dint	<	1.0000E+01	PPB
2-E34-1	1/27/88	ACEFENE	<	1.0000E+01	PPB
2-E34-1	1/27/88	ACETILE	<	3.0000E+03	PPB
2-E34-1	1/27/88	ACETOPH	<	1.0000E+01	PPB
2-E34-1	1/27/88	ACROLIN	<	1.0000E+01	PPB
2-E34-1	1/27/88	ACRYILE	<	1.0000E+01	PPB
2-E34-1	1/27/88	ALKALIN		8.9100E+04	
2-E34-1	1/27/88	ALPHA		1.5500E+00	PCI/L
2-E34-1	1/27/88	ALUMNUM	<	1.5000E+02	PPB
2-E34-1	1/27/88	AMIISOX	<	1.0000E+01	PPB
2-E34-1	1/27/88	AMINOYL	<	1.0000E+01	PPB
2-E34-1	1/27/88	AMITROL	<	1.0000E+01	PPB
2-E34-1	1/27/88	AMMONIU	<	5.0000E+01	PPB
2-E34-1	1/27/88	ANILINE	<	1.0000E+01	PPB
2-E34-1	1/27/88	ARAMITE	<	1.0000E+01	PPB
2-E34-1	1/27/88	ARSENIC	<	5.0000E+00	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	1/27/88	AURAMIN	<	1.0000E+01	PPB
2-E34-1	1/27/88	BARIUM		2.8000E+01	PPB
2-E34-1	1/27/88	BENDICM	<	1.0000E+01	PPB
2-E34-1	1/27/88	BENOINE	<	1.0000E+01	PPB
2-E34-1	1/27/88	BENTHOL	<	1.0000E+01	PPB
2-E34-1	1/27/88	BENZAAN	<	1.0000E+01	PPB
2-E34-1	1/27/88	BENZBFL	<	1.0000E+01	PPB
2-E34-1	1/27/88	BENZCAC	<	1.0000E+01	PPB
2-E34-1	1/27/88	BENZCHL	<	1.0000E+01	PPB
2-E34-1	1/27/88	BENZENE	<	5.0000E+00	PPB
2-E34-1	1/27/88	BENZJFL	<	1.0000E+01	PPB
2-E34-1	1/27/88	BENZOPY	<	1.0000E+01	PPB
2-E34-1	1/27/88	BETA		8.9100E+00	PCI/L
2-E34-1	1/27/88	BIS2CHE	<	1.0000E+01	PPB
2-E34-1	1/27/88	BIS2CHM	<	1.0000E+01	PPB
2-E34-1	1/27/88	BIS2EPH		1.0000E+01	PPB
2-E34-1	1/27/88	BIS2ETH	<	1.0000E+01	PPB
2-E34-1	1/27/88	BISTHER	<	1.0000E+01	PPB
2-E34-1	1/27/88	BROMONE	<	1.0000E+01	PPB
2-E34-1	1/27/88	BROMORM	<	1.0000E+01	PPB
2-E34-1	1/27/88	BROPHEN	<	1.0000E+01	PPB
2-E34-1	1/27/88	BUTBENP	<	1.0000E+01	PPB
2-E34-1	1/27/88	BUTDINP	<	1.0000E+01	PPB
2-E34-1	1/27/88	CADMIUM	<	2.0000E+00	PPB
2-E34-1	1/27/88	CALCIUM		5.8000E+04	PPB
2-E34-1	1/27/88	CARBIDE	<	1.0000E+01	PPB
2-E34-1	1/27/88	CHALETH	<	1.0000E+01	PPB
2-E34-1	1/27/88	CHLANIL	<	1.0000E+01	PPB
2-E34-1	1/27/88	CHLBENZ	<	1.0000E+01	PPB
2-E34-1	1/27/88	CHLCRES	<	1.0000E+01	PPB
2-E34-1	1/27/88	CHLEPOX	<	1.0000E+01	PPB
2-E34-1	1/27/88	CHLFORM	<	5.0000E+00	PPB
2-E34-1	1/27/88	CHLNAPH	<	1.0000E+01	PPB
2-E34-1	1/27/88	CHLNAPZ	<	1.0000E+01	PPB
2-E34-1	1/27/88	CHLORID		1.6600E+04	PPB
2-E34-1	1/27/88	CHLPHEN	<	1.0000E+01	PPB
2-E34-1	1/27/88	CHLTHER	<	1.0000E+01	PPB
2-E34-1	1/27/88	CHMTHER	<	1.0000E+01	PPB
2-E34-1	1/27/88	CHROMUM	<	1.0000E+01	PPB
2-E34-1	1/27/88	CHRYSEN	<	1.0000E+01	PPB
2-E34-1	1/27/88	CO-60	<	-1.9000E+00	PCI/L
2-E34-1	1/27/88	CONDFLD		4.6400E+02	UMHO
2-E34-1	1/27/88	COPPER	<	1.0000E+01	PPB
2-E34-1	1/27/88	CRESOLS	<	1.0000E+01	PPB
2-E34-1	1/27/88	CROTONA	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	1/27/88	CS-137	<	-3.3000E+00	PCI/L
2-E34-1	1/27/88	CYANIDE	<	1.0000E+01	PPB
2-E34-1	1/27/88	CYCHDIN	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIBAEPY	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIBAHAC	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIBAHAN	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIBAHPY	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIBAIPY	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIBAJAC	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIBCGCA	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIBPHTH	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIBRCHL	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIBRETH	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIBRMET	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIBUTEN	<	1.0000E+01	PPB
2-E34-1	1/27/88	DICDIFM	<	1.0000E+01	PPB
2-E34-1	1/27/88	DICETHY	<	1.0000E+01	PPB
2-E34-1	1/27/88	DICHBEN	<	2.0000E+01	PPB
2-E34-1	1/27/88	DICPANE	<	1.0000E+01	PPB
2-E34-1	1/27/88	DICPENE	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIEPHTH	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIETHY	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIHYSAF	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIMBENZ	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIMEAMB	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIMETHB	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIMEYLB	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIMPHAM	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIMPHEN	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIMPHTH	<	1.0000E+01	PPB
2-E34-1	1/27/88	DINBENZ	<	1.0000E+01	PPB
2-E34-1	1/27/88	DINCRES	<	1.0000E+01	PPB
2-E34-1	1/27/88	DINPHEN	<	5.0000E+01	PPB
2-E34-1	1/27/88	DIOPHTH	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIOXANE	<	5.0000E+02	PPB
2-E34-1	1/27/88	DIPHAMI	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIPHHYD	<	1.0000E+01	PPB
2-E34-1	1/27/88	DIPRNIT	<	1.0000E+01	PPB
2-E34-1	1/27/88	ETHMETH	<	1.0000E+01	PPB
2-E34-1	1/27/88	ETHMETS	<	1.0000E+01	PPB
2-E34-1	1/27/88	ETHMINE	<	1.0000E+01	PPB
2-E34-1	1/27/88	ETHOXID	<	3.0000E+03	PPB
2-E34-1	1/27/88	FALUMIN	<	1.5000E+02	PPB
2-E34-1	1/27/88	FANTIMO	<	1.0000E+02	PPB
2-E34-1	1/27/88	FARSENI	<	5.0000E+00	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	1/27/88	FBARIUM		2.7000E+01	PPB
2-E34-1	1/27/88	FBERYLL	<	5.0000E+00	PPB
2-E34-1	1/27/88	FCADMIU	<	2.0000E+00	PPB
2-E34-1	1/27/88	FCALCIU		6.1900E+04	PPB
2-E34-1	1/27/88	FCHROMI	<	1.0000E+01	PPB
2-E34-1	1/27/88	FCOPPER	<	1.0000E+01	PPB
2-E34-1	1/27/88	FIRON		5.0000E+01	PPB
2-E34-1	1/27/88	FLEAD	<	5.0000E+00	PPB
2-E34-1	1/27/88	FLUORAN	<	1.0000E+01	PPB
2-E34-1	1/27/88	FLUORID		7.2400E+02	PPB
2-E34-1	1/27/88	FMAGNES		1.6200E+04	PPB
2-E34-1	1/27/88	FMANGAN		2.2000E+01	PPB
2-E34-1	1/27/88	FMERCUR	<	1.0000E-01	PPB
2-E34-1	1/27/88	FNICKEL	<	1.0000E+01	PPB
2-E34-1	1/27/88	FORMALN	<	5.0000E+02	PPB
2-E34-1	1/27/88	FPOTASS		8.1300E+03	PPB
2-E34-1	1/27/88	FSELENI		7.0000E+00	PPB
2-E34-1	1/27/88	FSILVER	<	1.0000E+01	PPB
2-E34-1	1/27/88	FSODIUM		2.7100E+04	PPB
2-E34-1	1/27/88	FSTRONT		2.8300E+02	PPB
2-E34-1	1/27/88	FVANADI		7.0000E+00	PPB
2-E34-1	1/27/88	FZINC	<	5.0000E+00	PPB
2-E34-1	1/27/88	HEXACHL	<	1.0000E+01	PPB
2-E34-1	1/27/88	HEXAENE	<	1.0000E+01	PPB
2-E34-1	1/27/88	HEXCBEN	<	1.0000E+01	PPB
2-E34-1	1/27/88	HEXCBUT	<	1.0000E+01	PPB
2-E34-1	1/27/88	HEXCCYC	<	1.0000E+01	PPB
2-E34-1	1/27/88	HEXCETH	<	1.0000E+01	PPB
2-E34-1	1/27/88	HEXONE	<	1.0000E+01	PPB
2-E34-1	1/27/88	HYDRSUL	<	1.0000E+01	PPB
2-E34-1	1/27/88	INDENOP	<	1.0000E+01	PPB
2-E34-1	1/27/88	IODOMET	<	1.0000E+01	PPB
2-E34-1	1/27/88	IRON		1.0600E+03	PPB
2-E34-1	1/27/88	ISOSOLE	<	1.0000E+01	PPB
2-E34-1	1/27/88	KEROSEN	<	1.0000E+04	PPB
2-E34-1	1/27/88	LEADGF	<	5.0000E+00	PPB
2-E34-1	1/27/88	M-XYLE	<	5.0000E+00	PPB
2-E34-1	1/27/88	MAGNES		1.6300E+04	PPB
2-E34-1	1/27/88	MALHYDR	<	5.0000E+02	PPB
2-E34-1	1/27/88	MALOILE	<	1.0000E+01	PPB
2-E34-1	1/27/88	MANGESE		3.2000E+01	PPB
2-E34-1	1/27/88	MELPHAL	<	1.0000E+01	PPB
2-E34-1	1/27/88	MERCURY	<	1.0000E-01	PPB
2-E34-1	1/27/88	METACRY	<	1.0000E+01	PPB
2-E34-1	1/27/88	METACTO	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	1/27/88	METAZIR	<	1.0000E+01	PPB
2-E34-1	1/27/88	METBISC	<	1.0000E+01	PPB
2-E34-1	1/27/88	METCHAN	<	1.0000E+01	PPB
2-E34-1	1/27/88	METHACR	<	1.0000E+01	PPB
2-E34-1	1/27/88	METHAPY	<	1.0000E+01	PPB
2-E34-1	1/27/88	METHBRO	<	1.0000E+01	PPB
2-E34-1	1/27/88	METHCHL	<	1.0000E+01	PPB
2-E34-1	1/27/88	METHIOU	<	1.0000E+01	PPB
2-E34-1	1/27/88	METHNYL	<	1.0000E+01	PPB
2-E34-1	1/27/88	METHONE	<	1.0000E+01	PPB
2-E34-1	1/27/88	METHTHI	<	1.0000E+01	PPB
2-E34-1	1/27/88	METHYCH	<	1.0000E+01	PPB
2-E34-1	1/27/88	METMSUL	<	1.0000E+01	PPB
2-E34-1	1/27/88	METPROP	<	1.0000E+01	PPB
2-E34-1	1/27/88	NAPHQUI	<	1.0000E+01	PPB
2-E34-1	1/27/88	NAPHTHA	<	1.0000E+01	PPB
2-E34-1	1/27/88	NICKEL	<	1.0000E+01	PPB
2-E34-1	1/27/88	NICOTIN	<	1.0000E+02	PPB
2-E34-1	1/27/88	NITBENZ	<	1.0000E+01	PPB
2-E34-1	1/27/88	NITPHEN	<	5.0000E+01	PPB
2-E34-1	1/27/88	NITRANI	<	5.0000E+01	PPB
2-E34-1	1/27/88	NITRATE		1.3400E+04	PPB
2-E34-1	1/27/88	NITRPYR	<	1.0000E+01	PPB
2-E34-1	1/27/88	NITRTOL	<	1.0000E+01	PPB
2-E34-1	1/27/88	NNDIEHY	<	1.0000E+01	PPB
2-E34-1	1/27/88	NNIBUTY	<	1.0000E+01	PPB
2-E34-1	1/27/88	NNIDIEA	<	1.0000E+01	PPB
2-E34-1	1/27/88	NNIDIEY	<	1.0000E+01	PPB
2-E34-1	1/27/88	NNIDIME	<	1.0000E+01	PPB
2-E34-1	1/27/88	NNIMETH	<	1.0000E+01	PPB
2-E34-1	1/27/88	NNIMORP	<	1.0000E+01	PPB
2-E34-1	1/27/88	NNINICO	<	1.0000E+01	PPB
2-E34-1	1/27/88	NNIPIPE	<	1.0000E+01	PPB
2-E34-1	1/27/88	NNIURET	<	1.0000E+01	PPB
2-E34-1	1/27/88	NNIVINY	<	1.0000E+01	PPB
2-E34-1	1/27/88	OPXYLE	<	5.0000E+00	PPB
2-E34-1	1/27/88	OTOLHYD	<	1.0000E+01	PPB
2-E34-1	1/27/88	PBENZQU	<	1.0000E+01	PPB
2-E34-1	1/27/88	PENTACH	<	1.0000E+01	PPB
2-E34-1	1/27/88	PENTCHB	<	1.0000E+01	PPB
2-E34-1	1/27/88	PENTCHN	<	1.0000E+01	PPB
2-E34-1	1/27/88	PENTCHP	<	5.0000E+01	PPB
2-E34-1	1/27/88	PERCENE	<	5.0000E+00	PPB
2-E34-1	1/27/88	PH-LAB		7.7000E+00	
2-E34-1	1/27/88	PHENINE	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	1/27/88	PHENOL	<	1.0000E+01	PPB
2-E34-1	1/27/88	PHENTIN	<	1.0000E+01	PPB
2-E34-1	1/27/88	PHFIELD		7.6000E+00	
2-E34-1	1/27/88	PHOSPHA	<	1.0000E+03	PPB
2-E34-1	1/27/88	PHTHEST	<	1.0000E+01	PPB
2-E34-1	1/27/88	PICOLIN	<	1.0000E+01	PPB
2-E34-1	1/27/88	POTASUM		8.8000E+03	PPB
2-E34-1	1/27/88	PRONIDE	<	1.0000E+01	PPB
2-E34-1	1/27/88	PYRIDIN	<	5.0000E+02	PPB
2-E34-1	1/27/88	RADIUM	<	1.6400E-01	PCI/L
2-E34-1	1/27/88	RESERPI	<	1.0000E+01	PPB
2-E34-1	1/27/88	RESORCI	<	1.0000E+01	PPB
2-E34-1	1/27/88	RU-106	<	3.7000E+01	PCI/L
2-E34-1	1/27/88	SAFROL	<	1.0000E+01	PPB
2-E34-1	1/27/88	SELENUM		5.0000E+00	PPB
2-E34-1	1/27/88	SILVER	<	1.0000E+01	PPB
2-E34-1	1/27/88	SODIUM		3.0300E+04	PPB
2-E34-1	1/27/88	STRYCHN	<	5.0000E+01	PPB
2-E34-1	1/27/88	SULFATE		1.5300E+05	PPB
2-E34-1	1/27/88	SYMTRIN	<	1.0000E+01	PPB
2-E34-1	1/27/88	TC		2.3000E+04	PPB
2-E34-1	1/27/88	TETRANE	<	5.0000E+00	PPB
2-E34-1	1/27/88	TETRCHB	<	1.0000E+01	PPB
2-E34-1	1/27/88	TETRCHP	<	1.0000E+01	PPB
2-E34-1	1/27/88	THIONOX	<	1.0000E+01	PPB
2-E34-1	1/27/88	THIURAM	<	1.0000E+01	PPB
2-E34-1	1/27/88	TOC	<	4.2100E+02	PPB
2-E34-1	1/27/88	TOLUDIA	<	1.0000E+01	PPB
2-E34-1	1/27/88	TOLUENE	<	5.0000E+00	PPB
2-E34-1	1/27/88	TOXLDL		2.6500E+01	PPB
2-E34-1	1/27/88	TRANDCE	<	1.0000E+01	PPB
2-E34-1	1/27/88	TRCMEOL	<	1.0000E+01	PPB
2-E34-1	1/27/88	TRCMFLM	<	1.0000E+01	PPB
2-E34-1	1/27/88	TRCPANE	<	1.0000E+01	PPB
2-E34-1	1/27/88	TRIBUPH	<	1.0000E+01	PPB
2-E34-1	1/27/88	TRICENE	<	5.0000E+00	PPB
2-E34-1	1/27/88	TRICHLB	<	1.0000E+01	PPB
2-E34-1	1/27/88	TRIPHOS	<	1.0000E+01	PPB
2-E34-1	1/27/88	TRISPHO	<	1.0000E+01	PPB
2-E34-1	1/27/88	TRITIUM		1.4600E+03	PCI/L
2-E34-1	1/27/88	VANADUM		9.0000E+00	PPB
2-E34-1	1/27/88	VINYIDE	<	1.0000E+01	PPB
2-E34-1	1/27/88	WARFRIN	<	1.0000E+01	PPB
2-E34-1	1/27/88	ZINC	<	5.0000E+00	PPB
2-E34-1	6/03/88	ALPHA		1.8700E+00	PCI/L

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-1	6/03/88	BETA		9.0500E+00	PCI/L
2-E34-1	6/03/88	CO-60	<	-1.5200E+00	PCI/L
2-E34-1	6/03/88	CS-137	<	2.4700E+00	PCI/L
2-E34-1	6/03/88	RU-106	<	-1.8000E+01	PCI/L
2-E34-1	6/03/88	TRITIUM		1.5100E+03	PCI/L
2-E34-1	7/26/88	ALPHA		1.5500E+00	PCI/L
2-E34-1	7/26/88	BETA		5.8900E+00	PCI/L
2-E34-1	7/26/88	CO-60	<	-4.1300E+00	PCI/L
2-E34-1	7/26/88	CS-137	<	-2.9800E+00	PCI/L
2-E34-1	7/26/88	RU-106	<	3.1200E+00	PCI/L
2-E34-1	7/26/88	TRITIUM		1.6900E+03	PCI/L
2-E34-1	10/25/88	ALPHA		1.7600E+00	PCI/L
2-E34-1	10/25/88	BETA		9.8300E+00	PCI/L
2-E34-1	10/25/88	CO-60	<	-1.6300E+00	PCI/L
2-E34-1	10/25/88	CS-137	<	-8.8100E-01	PCI/L
2-E34-1	10/25/88	RU-106	<	1.3600E+01	PCI/L
2-E34-1	10/25/88	TRITIUM		1.9000E+03	PCI/L
2-E34-1	11/09/88	ALKALIN		9.7000E+04	
2-E34-1	11/09/88	AMMONIU	<	5.0000E+01	PPB
2-E34-1	11/09/88	CHLORID		1.3200E+04	PPB
2-E34-1	11/09/88	CONDFLO		4.4000E+02	UMHO
2-E34-1	11/09/88	CYANIDE	<	1.0000E+01	PPB
2-E34-1	11/09/88	FLUORID	<	5.0000E+02	PPB
2-E34-1	11/09/88	NITRATE		1.2000E+04	PPB
2-E34-1	11/09/88	PH-LAB		7.7000E+00	
2-E34-1	11/09/88	PHFIELD		7.9000E+00	
2-E34-1	11/09/88	PHOSPHA	<	1.0000E+03	PPB
2-E34-1	11/09/88	SULFATE		1.1100E+05	PPB
2-E34-1	11/09/88	TOC	<	5.0000E+02	PPB
2-E34-2	9/23/88	1,1,1-T	<	5.0000E+00	PPB
2-E34-2	9/23/88	1,1,2-T	<	5.0000E+00	PPB
2-E34-2	9/23/88	1,1-DIC	<	1.0000E+01	PPB
2-E34-2	9/23/88	1,2-DIC	<	1.0000E+01	PPB
2-E34-2	9/23/88	1-napha	<	1.0000E+01	PPB
2-E34-2	9/23/88	1112-tc	<	1.0000E+01	PPB
2-E34-2	9/23/88	1122-tc	<	1.0000E+01	PPB
2-E34-2	9/23/88	12-dben	<	1.0000E+01	PPB
2-E34-2	9/23/88	123-trp	<	1.0000E+01	PPB
2-E34-2	9/23/88	1234TE	<	1.0000E+01	PPB
2-E34-2	9/23/88	1235TE	<	1.0000E+01	PPB
2-E34-2	9/23/88	123TRI	<	1.0000E+01	PPB
2-E34-2	9/23/88	13-dben	<	1.0000E+01	PPB
2-E34-2	9/23/88	135TRI	<	1.0000E+01	PPB
2-E34-2	9/23/88	14-dben	<	1.0000E+01	PPB
2-E34-2	9/23/88	2,4,5-T	<	2.0000E+00	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-2	9/23/88	2,4,5TP	<	2.0000E+00	PPB
2-E34-2	9/23/88	2,4-D	<	2.0000E+00	PPB
2-E34-2	9/23/88	2-napha	<	1.0000E+01	PPB
2-E34-2	9/23/88	24-dchp	<	1.0000E+01	PPB
2-E34-2	9/23/88	24-dint	<	1.0000E+01	PPB
2-E34-2	9/23/88	245-trp	<	5.0000E+01	PPB
2-E34-2	9/23/88	246-trp	<	1.0000E+01	PPB
2-E34-2	9/23/88	26-dchp	<	1.0000E+01	PPB
2-E34-2	9/23/88	26-dint	<	1.0000E+01	PPB
2-E34-2	9/23/88	ACEFENE	<	1.0000E+01	PPB
2-E34-2	9/23/88	ACETILE	<	3.0000E+03	PPB
2-E34-2	9/23/88	ACETOPH	<	1.0000E+01	PPB
2-E34-2	9/23/88	ACETREA	<	2.0000E+02	PPB
2-E34-2	9/23/88	ACROLIN	<	1.0000E+01	PPB
2-E34-2	9/23/88	ACRYIDE	<	1.0000E+04	PPB
2-E34-2	9/23/88	ACRYILE	<	1.0000E+01	PPB
2-E34-2	9/23/88	ALDRIN	<	1.0000E-01	PPB
2-E34-2	9/23/88	ALLYLAL	<	2.5000E+03	PPB
2-E34-2	9/23/88	ALPHA	<	1.5000E+00	PCI/L
2-E34-2	9/23/88	ALUMNUM		4.7000E+02	PPB
2-E34-2	9/23/88	AMILSOX	<	1.0000E+01	PPB
2-E34-2	9/23/88	AMINOYL	<	1.0000E+01	PPB
2-E34-2	9/23/88	AMITROL	<	1.0000E+01	PPB
2-E34-2	9/23/88	AMMONIU	<	5.0000E+01	PPB
2-E34-2	9/23/88	ANILINE	<	1.0000E+01	PPB
2-E34-2	9/23/88	ANTIONY	<	1.0000E+02	PPB
2-E34-2	9/23/88	AR1016	<	1.0000E+00	PPB
2-E34-2	9/23/88	AR1221	<	1.0000E+00	PPB
2-E34-2	9/23/88	AR1232	<	1.0000E+00	PPB
2-E34-2	9/23/88	AR1242	<	1.0000E+00	PPB
2-E34-2	9/23/88	AR1248	<	1.0000E+00	PPB
2-E34-2	9/23/88	AR1254	<	1.0000E+00	PPB
2-E34-2	9/23/88	AR1260	<	1.0000E+00	PPB
2-E34-2	9/23/88	ARAMITE	<	1.0000E+01	PPB
2-E34-2	9/23/88	ARSENIC		6.0000E+00	PPB
2-E34-2	9/23/88	AURAMIN	<	1.0000E+01	PPB
2-E34-2	9/23/88	BARIUM		5.8000E+01	PPB
2-E34-2	9/23/88	BENDICM	<	1.0000E+01	PPB
2-E34-2	9/23/88	BENDINE	<	1.0000E+01	PPB
2-E34-2	9/23/88	BENTHOL	<	1.0000E+01	PPB
2-E34-2	9/23/88	BENZAAN	<	1.0000E+01	PPB
2-E34-2	9/23/88	BENZBFL	<	1.0000E+01	PPB
2-E34-2	9/23/88	BENZCAC	<	1.0000E+01	PPB
2-E34-2	9/23/88	BENZCHL	<	1.0000E+01	PPB
2-E34-2	9/23/88	BENZENE	<	5.0000E+00	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-2	9/23/88	BENZJFL	<	1.0000E+01	PPB
2-E34-2	9/23/88	BENZOPY	<	1.0000E+01	PPB
2-E34-2	9/23/88	BERYLUM	<	5.0000E+00	PPB
2-E34-2	9/23/88	BETA		1.0600E+01	PCI/L
2-E34-2	9/23/88	BIS2CHE	<	1.0000E+01	PPB
2-E34-2	9/23/88	BIS2CHM	<	1.0000E+01	PPB
2-E34-2	9/23/88	BIS2EPH	<	1.0000E+01	PPB
2-E34-2	9/23/88	BIS2ETH	<	1.0000E+01	PPB
2-E34-2	9/23/88	BISTHER	<	1.0000E+01	PPB
2-E34-2	9/23/88	BROMONE	<	1.0000E+01	PPB
2-E34-2	9/23/88	BROMORM	<	1.0000E+01	PPB
2-E34-2	9/23/88	BROPHEN	<	1.0000E+01	PPB
2-E34-2	9/23/88	BUTBENP	<	1.0000E+01	PPB
2-E34-2	9/23/88	BUTDINP	<	1.0000E+01	PPB
2-E34-2	9/23/88	CADMIUM	<	2.0000E+00	PPB
2-E34-2	9/23/88	CALCIUM		6.2300E+04	PPB
2-E34-2	9/23/88	CARBIDE	<	1.0000E+01	PPB
2-E34-2	9/23/88	CARBPHT	<	2.0000E+00	PPB
2-E34-2	9/23/88	CHALETH	<	1.0000E+01	PPB
2-E34-2	9/23/88	CHLACET	<	1.6000E+04	PPB
2-E34-2	9/23/88	CHLANIL	<	1.0000E+01	PPB
2-E34-2	9/23/88	CHLBENZ	<	1.0000E+01	PPB
2-E34-2	9/23/88	CHLCRES	<	1.0000E+01	PPB
2-E34-2	9/23/88	CHLEPOX	<	1.0000E+01	PPB
2-E34-2	9/23/88	CHLFORM	<	5.0000E+00	PPB
2-E34-2	9/23/88	CHLLATE	<	3.0000E+01	PPB
2-E34-2	9/23/88	CHLNAPH	<	1.0000E+01	PPB
2-E34-2	9/23/88	CHLNAPZ	<	1.0000E+01	PPB
2-E34-2	9/23/88	CHLOANE	<	1.0000E+00	PPB
2-E34-2	9/23/88	CHLOREA	<	2.0000E+02	PPB
2-E34-2	9/23/88	CHLORID		1.1400E+04	PPB
2-E34-2	9/23/88	CHLPHEN	<	1.0000E+01	PPB
2-E34-2	9/23/88	CHLPROP	<	4.0000E+03	PPB
2-E34-2	9/23/88	CHLTHER	<	1.0000E+01	PPB
2-E34-2	9/23/88	CHMTHER	<	1.0000E+01	PPB
2-E34-2	9/23/88	CHROMUM		4.9000E+01	PPB
2-E34-2	9/23/88	CHRYSEN	<	1.0000E+01	PPB
2-E34-2	9/23/88	CITRUSR	<	1.0000E+03	PPB
2-E34-2	9/23/88	CO-60	<	-3.9700E+00	PCI/L
2-E34-2	9/23/88	COLIFRM	<	2.2000E+00	MPN
2-E34-2	9/23/88	CONDFLD		4.3800E+02	UMHO
2-E34-2	9/23/88	CONDLAB		5.5300E+02	UMHO
2-E34-2	9/23/88	CONDLAB		5.5500E+02	UMHO
2-E34-2	9/23/88	CONDLAB		5.5600E+02	UMHO
2-E34-2	9/23/88	CONDLAB		5.5700E+02	UMHO

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-2	9/23/88	COPPER	<	1.0000E+01	PPB
2-E34-2	9/23/88	CRESOLS	<	1.0000E+01	PPB
2-E34-2	9/23/88	CROTONA	<	1.0000E+01	PPB
2-E34-2	9/23/88	CS-137	<	-4.7100E+00	PCI/L
2-E34-2	9/23/88	CYANIDE	<	1.0000E+01	PPB
2-E34-2	9/23/88	CYCHDIN	<	1.0000E+01	PPB
2-E34-2	9/23/88	DDD	<	1.0000E-01	PPB
2-E34-2	9/23/88	DDE	<	1.0000E-01	PPB
2-E34-2	9/23/88	DDT	<	1.0000E-01	PPB
2-E34-2	9/23/88	DIBAEPY	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIBAHAC	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIBAHAN	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIBAHPY	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIBAIPY	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIBAJAC	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIBCGCA	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIBPHTH	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIBRCHL	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIBRETH	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIBRMET	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIBUTEN	<	1.0000E+01	PPB
2-E34-2	9/23/88	DICDIFM	<	1.0000E+01	PPB
2-E34-2	9/23/88	DICETHY	<	1.0000E+01	PPB
2-E34-2	9/23/88	DICHBEN	<	2.0000E+01	PPB
2-E34-2	9/23/88	DICPANE	<	1.0000E+01	PPB
2-E34-2	9/23/88	DICPENE	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIELRIN	<	1.0000E-01	PPB
2-E34-2	9/23/88	DIEPHTH	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIETHY	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIETROL	<	2.0000E+02	PPB
2-E34-2	9/23/88	DIHYSAF	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIMBENZ	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIMEAMB	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIMETHB	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIMETHO	<	2.0000E+00	PPB
2-E34-2	9/23/88	DIMEYLB	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIMPHAM	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIMPHEN	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIMPHTH	<	1.0000E+01	PPB
2-E34-2	9/23/88	DINBENZ	<	1.0000E+01	PPB
2-E34-2	9/23/88	DINCRES	<	1.0000E+01	PPB
2-E34-2	9/23/88	DINPHEN	<	5.0000E+01	PPB
2-E34-2	9/23/88	DIOPHTH	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIOXANE	<	5.0000E+02	PPB
2-E34-2	9/23/88	DIOXIN	<	1.0000E-01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-2	9/23/88	DIPHAMI	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIPHHYD	<	1.0000E+01	PPB
2-E34-2	9/23/88	DIPRNIT	<	1.0000E+01	PPB
2-E34-2	9/23/88	DISULFO	<	2.0000E+00	PPB
2-E34-2	9/23/88	ENDO1	<	1.0000E-01	PPB
2-E34-2	9/23/88	ENDO2	<	1.0000E-01	PPB
2-E34-2	9/23/88	ENDRIN	<	1.0000E-01	PPB
2-E34-2	9/23/88	ETHCARB	<	5.0000E+03	PPB
2-E34-2	9/23/88	ETHCYAN	<	2.0000E+03	PPB
2-E34-2	9/23/88	ETHMETH	<	1.0000E+01	PPB
2-E34-2	9/23/88	ETHMETS	<	1.0000E+01	PPB
2-E34-2	9/23/88	ETHMINE	<	1.0000E+01	PPB
2-E34-2	9/23/88	ETHOXID	<	3.0000E+03	PPB
2-E34-2	9/23/88	ETHYGLY	<	1.0000E+04	PPB
2-E34-2	9/23/88	ETHYREA	<	2.0000E+02	PPB
2-E34-2	9/23/88	FALUMIN	<	1.5000E+02	PPB
2-E34-2	9/23/88	FANTIMO	<	1.0000E+02	PPB
2-E34-2	9/23/88	FARSENI		6.0000E+00	PPB
2-E34-2	9/23/88	FBARIUM		4.1000E+01	PPB
2-E34-2	9/23/88	FBERYLL	<	5.0000E+00	PPB
2-E34-2	9/23/88	FCADMIU	<	2.0000E+00	PPB
2-E34-2	9/23/88	FCALCIU		5.6500E+04	PPB
2-E34-2	9/23/88	FCHROMI	<	1.0000E+01	PPB
2-E34-2	9/23/88	FCOPPER	<	1.0000E+01	PPB
2-E34-2	9/23/88	FIRON	<	3.0000E+01	PPB
2-E34-2	9/23/88	FLEAD	<	5.0000E+00	PPB
2-E34-2	9/23/88	FLUORAN	<	1.0000E+01	PPB
2-E34-2	9/23/88	FLUORID	<	5.0000E+02	PPB
2-E34-2	9/23/88	FMAGNES		1.6000E+04	PPB
2-E34-2	9/23/88	FMANGAN	<	5.0000E+00	PPB
2-E34-2	9/23/88	FMERCUR	<	1.0000E-01	PPB
2-E34-2	9/23/88	FNICKEL	<	1.0000E+01	PPB
2-E34-2	9/23/88	FORMALN	<	5.0000E+02	PPB
2-E34-2	9/23/88	FPOTASS		8.1700E+03	PPB
2-E34-2	9/23/88	FSELENI		8.0000E+00	PPB
2-E34-2	9/23/88	FSILVER	<	1.0000E+01	PPB
2-E34-2	9/23/88	FSODIUM		3.1300E+04	PPB
2-E34-2	9/23/88	FSTRONT		2.6700E+02	PPB
2-E34-2	9/23/88	FTHALLI	<	5.0000E+00	PPB
2-E34-2	9/23/88	FVANADI		2.2000E+01	PPB
2-E34-2	9/23/88	FZINC	<	5.0000E+00	PPB
2-E34-2	9/23/88	HEPTIDE	<	1.0000E-01	PPB
2-E34-2	9/23/88	HEPTLOR	<	1.0000E-01	PPB
2-E34-2	9/23/88	HEXACHL	<	1.0000E+01	PPB
2-E34-2	9/23/88	HEXAENE	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-2	9/23/88	HEXCBEN	<	1.0000E+01	PPB
2-E34-2	9/23/88	HEXCBUT	<	1.0000E+01	PPB
2-E34-2	9/23/88	HEXCCYC	<	1.0000E+01	PPB
2-E34-2	9/23/88	HEXCETH	<	1.0000E+01	PPB
2-E34-2	9/23/88	HEXONE	<	1.0000E+01	PPB
2-E34-2	9/23/88	HYORAZI	<	3.0000E+03	PPB
2-E34-2	9/23/88	HYORSUL	<	1.0000E+01	PPB
2-E34-2	9/23/88	INDENOP	<	1.0000E+01	PPB
2-E34-2	9/23/88	IODOMET	<	1.0000E+01	PPB
2-E34-2	9/23/88	IRON		1.2500E+03	PPB
2-E34-2	9/23/88	ISOBUTY	<	1.0000E+03	PPB
2-E34-2	9/23/88	ISOSOLE	<	1.0000E+01	PPB
2-E34-2	9/23/88	KEROSEN	<	1.0000E+04	PPB
2-E34-2	9/23/88	LEADGF	<	5.0000E+00	PPB
2-E34-2	9/23/88	M-XYLE	<	5.0000E+00	PPB
2-E34-2	9/23/88	MAGNES		1.7100E+04	PPB
2-E34-2	9/23/88	MALHYDR	<	5.0000E+02	PPB
2-E34-2	9/23/88	MALOILE	<	1.0000E+01	PPB
2-E34-2	9/23/88	MANGESE		3.0000E+01	PPB
2-E34-2	9/23/88	MELPHAL	<	1.0000E+01	PPB
2-E34-2	9/23/88	MERCURY	<	1.0000E-01	PPB
2-E34-2	9/23/88	METACRY	<	1.0000E+01	PPB
2-E34-2	9/23/88	METACTO	<	1.0000E+01	PPB
2-E34-2	9/23/88	METAZIR	<	1.0000E+01	PPB
2-E34-2	9/23/88	METBISC	<	1.0000E+01	PPB
2-E34-2	9/23/88	METCHAN	<	1.0000E+01	PPB
2-E34-2	9/23/88	METHACR	<	1.0000E+01	PPB
2-E34-2	9/23/88	METHAPY	<	1.0000E+01	PPB
2-E34-2	9/23/88	METHBRO	<	1.0000E+01	PPB
2-E34-2	9/23/88	METHCHL	<	1.0000E+01	PPB
2-E34-2	9/23/88	METHIOU	<	1.0000E+01	PPB
2-E34-2	9/23/88	METHLOR	<	3.0000E+00	PPB
2-E34-2	9/23/88	METHNYL	<	1.0000E+01	PPB
2-E34-2	9/23/88	METHONE	<	1.0000E+01	PPB
2-E34-2	9/23/88	METHPAR	<	2.0000E+00	PPB
2-E34-2	9/23/88	METHTHI	<	1.0000E+01	PPB
2-E34-2	9/23/88	METHYCH	<	1.0000E+01	PPB
2-E34-2	9/23/88	METMSUL	<	1.0000E+01	PPB
2-E34-2	9/23/88	METPROP	<	1.0000E+01	PPB
2-E34-2	9/23/88	NAPHQUI	<	1.0000E+01	PPB
2-E34-2	9/23/88	NAPHREA	<	2.0000E+02	PPB
2-E34-2	9/23/88	NAPHTHA	<	1.0000E+01	PPB
2-E34-2	9/23/88	NICKEL		2.2000E+01	PPB
2-E34-2	9/23/88	NICOTIN	<	1.0000E+02	PPB
2-E34-2	9/23/88	NITBENZ	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-2	9/23/88	NITPHEN	<	5.0000E+01	PPB
2-E34-2	9/23/88	NITRANI	<	5.0000E+01	PPB
2-E34-2	9/23/88	NITRATE		1.1800E+04	PPB
2-E34-2	9/23/88	NITRPYR	<	1.0000E+01	PPB
2-E34-2	9/23/88	NITRTOL	<	1.0000E+01	PPB
2-E34-2	9/23/88	NNDIEHY	<	1.0000E+01	PPB
2-E34-2	9/23/88	NNIBUTY	<	1.0000E+01	PPB
2-E34-2	9/23/88	NNIDIEA	<	1.0000E+01	PPB
2-E34-2	9/23/88	NNIOIEY	<	1.0000E+01	PPB
2-E34-2	9/23/88	NNIDIME	<	1.0000E+01	PPB
2-E34-2	9/23/88	NNIMETH	<	1.0000E+01	PPB
2-E34-2	9/23/88	NNIMORP	<	1.0000E+01	PPB
2-E34-2	9/23/88	NNINICO	<	1.0000E+01	PPB
2-E34-2	9/23/88	NNIPIPE	<	1.0000E+01	PPB
2-E34-2	9/23/88	NNIURET	<	1.0000E+01	PPB
2-E34-2	9/23/88	NNIVINY	<	1.0000E+01	PPB
2-E34-2	9/23/88	OPXYLE	<	5.0000E+00	PPB
2-E34-2	9/23/88	OTOLHYD	<	1.0000E+01	PPB
2-E34-2	9/23/88	PARALDE	<	2.0000E+03	PPB
2-E34-2	9/23/88	PARATHI	<	2.0000E+00	PPB
2-E34-2	9/23/88	PBENZQU	<	1.0000E+01	PPB
2-E34-2	9/23/88	PENTACH	<	1.0000E+01	PPB
2-E34-2	9/23/88	PENTCHB	<	1.0000E+01	PPB
2-E34-2	9/23/88	PENTCHN	<	1.0000E+01	PPB
2-E34-2	9/23/88	PENTCHP	<	5.0000E+01	PPB
2-E34-2	9/23/88	PERCENE	<	5.0000E+00	PPB
2-E34-2	9/23/88	PERCHLO	<	1.0000E+03	PPB
2-E34-2	9/23/88	PH-LAB		7.8000E+00	
2-E34-2	9/23/88	PH-LAB		7.9000E+00	
2-E34-2	9/23/88	PHENINE	<	1.0000E+01	PPB
2-E34-2	9/23/88	PHENOL	<	1.0000E+01	PPB
2-E34-2	9/23/88	PHENREA	<	5.0000E+02	PPB
2-E34-2	9/23/88	PHENTIN	<	1.0000E+01	PPB
2-E34-2	9/23/88	PHFIELD		8.0000E+00	
2-E34-2	9/23/88	PHOSPHA	<	1.0000E+03	PPB
2-E34-2	9/23/88	PHTHEST	<	1.0000E+01	PPB
2-E34-2	9/23/88	PICOLIN	<	1.0000E+01	PPB
2-E34-2	9/23/88	POTASUM		8.8600E+03	PPB
2-E34-2	9/23/88	PRONIDE	<	1.0000E+01	PPB
2-E34-2	9/23/88	PROPYLA	<	1.0000E+04	PPB
2-E34-2	9/23/88	PROPYNO	<	8.0000E+03	PPB
2-E34-2	9/23/88	PYRIDIN	<	5.0000E+02	PPB
2-E34-2	9/23/88	RADIUM	<	1.3900E-01	PCI/L
2-E34-2	9/23/88	RESERPI	<	1.0000E+01	PPB
2-E34-2	9/23/88	RESORCI	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-2	9/23/88	RU-106	<	-2.9700E+00	PCI/L
2-E34-2	9/23/88	SAFROL	<	1.0000E+01	PPB
2-E34-2	9/23/88	SELENUM		9.0000E+00	PPB
2-E34-2	9/23/88	SILVER	<	1.0000E+01	PPB
2-E34-2	9/23/88	SODIUM		3.3300E+04	PPB
2-E34-2	9/23/88	SR 90	<	1.7400E-01	PCI/L
2-E34-2	9/23/88	STRONUM		2.8300E+02	PPB
2-E34-2	9/23/88	STRYCHN	<	5.0000E+01	PPB
2-E34-2	9/23/88	SULFATE		1.5000E+05	PPB
2-E34-2	9/23/88	SULFIDE	<	1.0000E+03	PPB
2-E34-2	9/23/88	SYMTRIN	<	1.0000E+01	PPB
2-E34-2	9/23/88	TC		2.0900E+04	PPB
2-E34-2	9/23/88	TC-99	<	-3.6300E+00	PCI/L
2-E34-2	9/23/88	TETEPYR	<	2.0000E+00	PPB
2-E34-2	9/23/88	TETRANE	<	5.0000E+00	PPB
2-E34-2	9/23/88	TETRCHB	<	1.0000E+01	PPB
2-E34-2	9/23/88	TETRCHP	<	1.0000E+01	PPB
2-E34-2	9/23/88	THALIUM	<	5.0000E+00	PPB
2-E34-2	9/23/88	THIONOX	<	1.0000E+01	PPB
2-E34-2	9/23/88	THIOURA	<	2.0000E+02	PPB
2-E34-2	9/23/88	THIURAM	<	1.0000E+01	PPB
2-E34-2	9/23/88	TOC	<	3.0000E+02	PPB
2-E34-2	9/23/88	TOC	<	4.0000E+02	PPB
2-E34-2	9/23/88	TOC	<	5.0000E+02	PPB
2-E34-2	9/23/88	TOLUOIA	<	1.0000E+01	PPB
2-E34-2	9/23/88	TOLUENE	<	5.0000E+00	PPB
2-E34-2	9/23/88	TOXAENE	<	1.0000E+00	PPB
2-E34-2	9/23/88	TOXLDL	<	4.0000E+00	PPB
2-E34-2	9/23/88	TOXLDL	<	6.0000E+00	PPB
2-E34-2	9/23/88	TOXLDL	<	7.0000E+00	PPB
2-E34-2	9/23/88	TRANOCE	<	1.0000E+01	PPB
2-E34-2	9/23/88	TRCMEOL	<	1.0000E+01	PPB
2-E34-2	9/23/88	TRCMFLM	<	1.0000E+01	PPB
2-E34-2	9/23/88	TRCPANE	<	1.0000E+01	PPB
2-E34-2	9/23/88	TRIBUPH	<	1.0000E+01	PPB
2-E34-2	9/23/88	TRICENE	<	5.0000E+00	PPB
2-E34-2	9/23/88	TRICHLB	<	1.0000E+01	PPB
2-E34-2	9/23/88	TRIPHOS	<	1.0000E+01	PPB
2-E34-2	9/23/88	TRISPHO	<	1.0000E+01	PPB
2-E34-2	9/23/88	TRITIUM		2.1000E+03	PCI/L
2-E34-2	9/23/88	U-CHEM		3.4500E+00	UG/L
2-E34-2	9/23/88	VANADUM		2.7000E+01	PPB
2-E34-2	9/23/88	VINYIOE	<	1.0000E+01	PPB
2-E34-2	9/23/88	WARFRIN	<	1.0000E+01	PPB
2-E34-2	9/23/88	ZINC		1.9000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E34-2	9/23/88	a-BHC	<	1.0000E-01	PPB
2-E34-2	9/23/88	b-BHC	<	1.0000E-01	PPB
2-E34-2	9/23/88	d-BHC	<	1.0000E-01	PPB
2-E34-2	9/23/88	g-BHC	<	1.0000E-01	PPB
2-E34-3	9/23/88	1,1,1-T	<	5.0000E+00	PPB
2-E34-3	9/23/88	1,1,2-T	<	5.0000E+00	PPB
2-E34-3	9/23/88	1,1-DIC	<	1.0000E+01	PPB
2-E34-3	9/23/88	1,2-DIC	<	1.0000E+01	PPB
2-E34-3	9/23/88	1-napha	<	1.0000E+01	PPB
2-E34-3	9/23/88	1112-tc	<	1.0000E+01	PPB
2-E34-3	9/23/88	1122-tc	<	1.0000E+01	PPB
2-E34-3	9/23/88	12-dben	<	1.0000E+01	PPB
2-E34-3	9/23/88	123-trp	<	1.0000E+01	PPB
2-E34-3	9/23/88	1234TE	<	1.0000E+01	PPB
2-E34-3	9/23/88	1235TE	<	1.0000E+01	PPB
2-E34-3	9/23/88	123TRI	<	1.0000E+01	PPB
2-E34-3	9/23/88	13-dben	<	1.0000E+01	PPB
2-E34-3	9/23/88	135TRI	<	1.0000E+01	PPB
2-E34-3	9/23/88	14-dben	<	1.0000E+01	PPB
2-E34-3	9/23/88	2,4,5-T	<	2.0000E+00	PPB
2-E34-3	9/23/88	2,4,5TP	<	2.0000E+00	PPB
2-E34-3	9/23/88	2,4-D	<	2.0000E+00	PPB
2-E34-3	9/23/88	2-napha	<	1.0000E+01	PPB
2-E34-3	9/23/88	24-dchp	<	1.0000E+01	PPB
2-E34-3	9/23/88	24-dint	<	1.0000E+01	PPB
2-E34-3	9/23/88	245-trp	<	5.0000E+01	PPB
2-E34-3	9/23/88	246-trp	<	1.0000E+01	PPB
2-E34-3	9/23/88	26-dchp	<	1.0000E+01	PPB
2-E34-3	9/23/88	26-dint	<	1.0000E+01	PPB
2-E34-3	9/23/88	ACEFENE	<	1.0000E+01	PPB
2-E34-3	9/23/88	ACETILE	<	3.0000E+03	PPB
2-E34-3	9/23/88	ACETOPH	<	1.0000E+01	PPB
2-E34-3	9/23/88	ACETREA	<	2.0000E+02	PPB
2-E34-3	9/23/88	ACROLIN	<	1.0000E+01	PPB
2-E34-3	9/23/88	ACRYIDE	<	1.0000E+04	PPB
2-E34-3	9/23/88	ACRYILE	<	1.0000E+01	PPB
2-E34-3	9/23/88	ALDRIN	<	1.0000E-01	PPB
2-E34-3	9/23/88	ALLYLAL	<	2.5000E+03	PPB
2-E34-3	9/23/88	ALPHA		1.2700E+00	PCI/L
2-E34-3	9/23/88	ALUMNUM	<	1.5000E+02	PPB
2-E34-3	9/23/88	AMIISOX	<	1.0000E+01	PPB
2-E34-3	9/23/88	AMINOYL	<	1.0000E+01	PPB
2-E34-3	9/23/88	AMITROL	<	1.0000E+01	PPB
2-E34-3	9/23/88	AMMONIU	<	5.0000E+01	PPB
2-E34-3	9/23/88	ANILINE	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E33-18	1/03/85	BETA		1.1800E+01	PCI/L
2-E33-18	1/03/85	CO-60		4.5100E+00	PCI/L
2-E33-18	1/03/85	CS-137		3.7900E+00	PCI/L
2-E33-18	1/03/85	RU-106		-8.7100E+00	PCI/L
2-E33-18	1/03/85	SR 90		-4.8200E-01	PCI/L
2-E33-18	2/13/85	BETA		1.1200E+01	PCI/L
2-E33-18	2/13/85	CO-60		-1.7000E+00	PCI/L
2-E33-18	2/13/85	CS-137		-2.0700E+00	PCI/L
2-E33-18	2/13/85	RU-106		2.9700E+01	PCI/L
2-E33-18	2/13/85	SR 90		6.3800E-01	PCI/L
2-E33-18	4/15/85	BETA		1.4100E+01	PCI/L
2-E33-18	4/15/85	CO-60		-3.0200E+00	PCI/L
2-E33-18	4/15/85	CS-137		7.6500E+00	PCI/L
2-E33-18	4/15/85	RU-106		6.0700E+01	PCI/L
2-E33-18	4/15/85	SR 90		1.4100E-01	PCI/L
2-E33-18	9/05/85	BETA		1.1000E+01	PCI/L
2-E33-18	9/05/85	CO-60	<	-4.5500E+00	PCI/L
2-E33-18	9/05/85	CS-137	<	4.7900E+00	PCI/L
2-E33-18	9/05/85	RU-106	<	8.0100E+00	PCI/L
2-E33-18	9/05/85	SR 90	<	3.5400E-01	PCI/L
2-E33-18	12/19/85	BETA		1.0800E+01	PCI/L
2-E33-18	12/19/85	CO-60	<	-2.9500E+00	PCI/L
2-E33-18	12/19/85	CS-137	<	1.0700E+00	PCI/L

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E33-18	12/19/85	RU-106	<	-2.3600E+01	PCI/L
2-E33-18	12/19/85	SR 90	<	2.5400E-01	PCI/L
2-E33-18	2/27/86	BETA		1.1400E+01	PCI/L
2-E33-18	2/27/86	CO-60	<	-1.5100E+00	PCI/L
2-E33-18	2/27/86	CS-137	<	-8.6200E+00	PCI/L
2-E33-18	2/27/86	RU-106	<	-1.5800E+01	PCI/L
2-E33-18	2/27/86	SR 90	<	4.2700E-01	PCI/L
2-E33-18	5/05/86	BETA		1.4900E+01	PCI/L
2-E33-18	5/05/86	CO-60		6.7700E+00	PCI/L
2-E33-18	5/05/86	CS-137	<	6.1900E+00	PCI/L
2-E33-18	5/05/86	RU-106	<	-3.7700E+01	PCI/L
2-E33-18	5/05/86	SR 90	<	-2.1100E-01	PCI/L
2-E33-18	8/11/86	BETA		1.3000E+01	PCI/L
2-E33-18	8/11/86	CO-60		6.8200E+00	PCI/L
2-E33-18	8/11/86	CS-137	<	-6.8900E-01	PCI/L
2-E33-18	8/11/86	RU-106	<	-1.5100E+01	PCI/L
2-E33-18	8/11/86	SR 90		2.6600E+00	PCI/L
2-E33-18	10/29/86	BETA		8.7700E+00	PCI/L
2-E33-18	10/29/86	CO-60	<	5.6300E-01	PCI/L
2-E33-18	10/29/86	CS-137		4.8200E+00	PCI/L
2-E33-18	10/29/86	RU-106	<	1.4400E+01	PCI/L
2-E33-18	10/29/86	SR 90	<	3.7100E-01	PCI/L
2-E33-18	3/24/87	1,1,1-T	<	1.0000E+01	PPB
2-E33-18	3/24/87	1,1,2-T	<	1.0000E+01	PPB
2-E33-18	3/24/87	ALKALIN		9.6000E+04	
2-E33-18	3/24/87	ALPHA		2.6200E+00	PCI/L
2-E33-18	3/24/87	AMMONIU	<	5.0000E+01	PPB
2-E33-18	3/24/87	BETA		8.6300E+00	PCI/L
2-E33-18	3/24/87	BETA		1.4900E+01	PCI/L
2-E33-18	3/24/87	CHLFORM	<	1.0000E+01	PPB
2-E33-18	3/24/87	CHLORID		2.6700E+03	PPB
2-E33-18	3/24/87	CO-60	<	-1.8300E+00	PCI/L
2-E33-18	3/24/87	CONDFLD		2.3300E+02	UMHO
2-E33-18	3/24/87	CS-137	<	3.0200E+00	PCI/L
2-E33-18	3/24/87	CYANIDE	<	1.0000E+01	PPB
2-E33-18	3/24/87	FALUMIN	<	1.5000E+02	PPB
2-E33-18	3/24/87	FANTIMO	<	1.0000E+02	PPB
2-E33-18	3/24/87	FARSENI		8.0000E+00	PPB
2-E33-18	3/24/87	FBARIUM		1.9000E+01	PPB
2-E33-18	3/24/87	FBERYLL	<	5.0000E+00	PPB
2-E33-18	3/24/87	FCADMIU	<	2.0000E+00	PPB
2-E33-18	3/24/87	FCALCIU		2.5200E+04	PPB
2-E33-18	3/24/87	FCHROMI	<	1.0000E+01	PPB
2-E33-18	3/24/87	FCOPPER	<	1.0000E+01	PPB
2-E33-18	3/24/87	FIRON	<	5.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E33-18	3/24/87	FLEAD	<	5.0000E+00	PPB
2-E33-18	3/24/87	FLUORID	<	5.0000E+02	PPB
2-E33-18	3/24/87	FMAGNES		8.6300E+03	PPB
2-E33-18	3/24/87	FMANGAN	<	5.0000E+00	PPB
2-E33-18	3/24/87	FMERCUR	<	1.0000E-01	PPB
2-E33-18	3/24/87	FNICKEL	<	1.0000E+01	PPB
2-E33-18	3/24/87	FOSMIUM	<	3.0000E+02	PPB
2-E33-18	3/24/87	FPOTASS		4.6200E+03	PPB
2-E33-18	3/24/87	FSELENI	<	5.0000E+00	PPB
2-E33-18	3/24/87	FSILVER	<	1.0000E+01	PPB
2-E33-18	3/24/87	FSODIUM		1.3800E+04	PPB
2-E33-18	3/24/87	FSTRONT	<	3.0000E+02	PPB
2-E33-18	3/24/87	FVANADI		2.7000E+01	PPB
2-E33-18	3/24/87	FZINC	<	5.0000E+00	PPB
2-E33-18	3/24/87	M-XYLE	<	1.0000E+01	PPB
2-E33-18	3/24/87	METHONE	<	1.0000E+01	PPB
2-E33-18	3/24/87	METHYCH	<	1.0000E+01	PPB
2-E33-18	3/24/87	NITRATE		1.7200E+04	PPB
2-E33-18	3/24/87	OPXYLE	<	1.0000E+01	PPB
2-E33-18	3/24/87	PERCENE	<	1.0000E+01	PPB
2-E33-18	3/24/87	PH-LAB		7.8800E+00	
2-E33-18	3/24/87	PHFIELD		8.1000E+00	
2-E33-18	3/24/87	PHOSPHA	<	1.0000E+03	PPB
2-E33-18	3/24/87	PU-238	<	0.0000E+00	PCI/L
2-E33-18	3/24/87	PU39-40	<	-5.7100E-03	PCI/L
2-E33-18	3/24/87	RADIUM	<	4.0200E-02	PCI/L
2-E33-18	3/24/87	RU-106	<	4.7700E+01	PCI/L
2-E33-18	3/24/87	SR 90	<	6.6500E-01	PCI/L
2-E33-18	3/24/87	SULFATE		2.6800E+04	PPB
2-E33-18	3/24/87	TETRANE	<	1.0000E+01	PPB
2-E33-18	3/24/87	TOC	<	5.2900E+02	PPB
2-E33-18	3/24/87	TOXLDL	<	2.0000E+01	PPB
2-E33-18	3/24/87	TRICENE	<	1.0000E+01	PPB
2-E33-18	3/24/87	TRITIUM		4.6700E+02	PCI/L
2-E33-18	3/24/87	U		1.1800E+00	PCI/L
2-E33-18	5/19/87	1,1,1-T	<	1.0000E+01	PPB
2-E33-18	5/19/87	1,1,2-T	<	1.0000E+01	PPB
2-E33-18	5/19/87	ALKALIN		9.4000E+04	
2-E33-18	5/19/87	ALPHA		1.1900E+00	PCI/L
2-E33-18	5/19/87	AMMONIU		5.9000E+01	PPB
2-E33-18	5/19/87	BETA		8.8500E+00	PCI/L
2-E33-18	5/19/87	BETA		1.1500E+01	PCI/L
2-E33-18	5/19/87	CHLFORM	<	1.0000E+01	PPB
2-E33-18	5/19/87	CHLORID		2.2300E+03	PPB
2-E33-18	5/19/87	CO-60	<	2.8100E+00	PCI/L

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E33-18	5/19/87	CONDFLD		2.2100E+02	UMHO
2-E33-18	5/19/87	CS-137	<	-8.5500E-01	PCI/L
2-E33-18	5/19/87	CYANIDE	<	1.0000E+01	PPB
2-E33-18	5/19/87	FALUMIN	<	1.5000E+02	PPB
2-E33-18	5/19/87	FANTIMO	<	1.0000E+02	PPB
2-E33-18	5/19/87	FARSENI		8.0000E+00	PPB
2-E33-18	5/19/87	FBARIUM		2.4000E+01	PPB
2-E33-18	5/19/87	FBERYLL	<	5.0000E+00	PPB
2-E33-18	5/19/87	FCADMIU	<	2.0000E+00	PPB
2-E33-18	5/19/87	FCALCIU		2.7700E+04	PPB
2-E33-18	5/19/87	FCHROMI	<	1.0000E+01	PPB
2-E33-18	5/19/87	FCOPPER	<	1.0000E+01	PPB
2-E33-18	5/19/87	FIRON	<	5.0000E+01	PPB
2-E33-18	5/19/87	FLEAD	<	5.0000E+00	PPB
2-E33-18	5/19/87	FLUORID	<	5.0000E+02	PPB
2-E33-18	5/19/87	FMAGNES		9.4800E+03	PPB
2-E33-18	5/19/87	FMANGAN	<	5.0000E+00	PPB
2-E33-18	5/19/87	FMERCUR	<	1.0000E-01	PPB
2-E33-18	5/19/87	FNICKEL	<	1.0000E+01	PPB
2-E33-18	5/19/87	FOSMIUM	<	3.0000E+02	PPB
2-E33-18	5/19/87	FPOTASS		4.8500E+03	PPB
2-E33-18	5/19/87	FSELENI	<	5.0000E+00	PPB
2-E33-18	5/19/87	FSILVER	<	1.0000E+01	PPB
2-E33-18	5/19/87	FSODIUM		1.4700E+04	PPB
2-E33-18	5/19/87	FSTRONT	<	3.0000E+02	PPB
2-E33-18	5/19/87	FVANADI		2.6000E+01	PPB
2-E33-18	5/19/87	FZINC		5.0000E+00	PPB
2-E33-18	5/19/87	M-XYLE	<	1.0000E+01	PPB
2-E33-18	5/19/87	METHONE	<	1.0000E+01	PPB
2-E33-18	5/19/87	METHYCH	<	1.0000E+01	PPB
2-E33-18	5/19/87	NITRATE		1.6700E+04	PPB
2-E33-18	5/19/87	OPXYLE	<	1.0000E+01	PPB
2-E33-18	5/19/87	PERCENE	<	1.0000E+01	PPB
2-E33-18	5/19/87	PH-LAB		7.8400E+00	
2-E33-18	5/19/87	PHFIELD		7.8000E+00	
2-E33-18	5/19/87	PHOSPHA	<	1.0000E+03	PPB
2-E33-18	5/19/87	RADIUM	<	9.0500E-03	PCI/L
2-E33-18	5/19/87	RU-106	<	-5.7900E+01	PCI/L
2-E33-18	5/19/87	SULFATE		2.7600E+04	PPB
2-E33-18	5/19/87	TETRANE	<	1.0000E+01	PPB
2-E33-18	5/19/87	TOC	<	4.1200E+02	PPB
2-E33-18	5/19/87	TOXLDL	<	2.0000E+01	PPB
2-E33-18	5/19/87	TRICENE	<	1.0000E+01	PPB
2-E33-18	8/04/87	1,1,1-T	<	1.0000E+01	PPB
2-E33-18	8/04/87	1,1,2-T	<	1.0000E+01	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E33-18	8/04/87	1,1-DIC	<	1.0000E+01	PPB
2-E33-18	8/04/87	1,2-DIC	<	1.0000E+01	PPB
2-E33-18	8/04/87	1112-tc	<	1.0000E+01	PPB
2-E33-18	8/04/87	1122-tc	<	1.0000E+01	PPB
2-E33-18	8/04/87	123-trp	<	1.0000E+01	PPB
2-E33-18	8/04/87	ACROLIN	<	1.0000E+01	PPB
2-E33-18	8/04/87	ACRYILE	<	1.0000E+01	PPB
2-E33-18	8/04/87	ALKALIN		9.6600E+04	
2-E33-18	8/04/87	ALPHA		1.5000E+00	PCI/L
2-E33-18	8/04/87	AMMONIU	<	5.0000E+01	PPB
2-E33-18	8/04/87	BENZENE	<	1.0000E+01	PPB
2-E33-18	8/04/87	BETA		1.0800E+01	PCI/L
2-E33-18	8/04/87	BETA		1.4500E+01	PCI/L
2-E33-18	8/04/87	BISMUTH	<	5.0000E+00	PPB
2-E33-18	8/04/87	BISTHER	<	1.0000E+01	PPB
2-E33-18	8/04/87	BROMONE	<	1.0000E+01	PPB
2-E33-18	8/04/87	BROMORM	<	1.0000E+01	PPB
2-E33-18	8/04/87	CARBIDE	<	1.0000E+01	PPB
2-E33-18	8/04/87	CHLBENZ	<	1.0000E+01	PPB
2-E33-18	8/04/87	CHLFORM	<	1.0000E+01	PPB
2-E33-18	8/04/87	CHLORID		3.5600E+03	PPB
2-E33-18	8/04/87	CHLTHER	<	1.0000E+01	PPB
2-E33-18	8/04/87	CHMTHER	<	1.0000E+01	PPB
2-E33-18	8/04/87	CO-60	<	-6.0900E-01	PCI/L
2-E33-18	8/04/87	CONDFLD		2.7700E+02	UMHO
2-E33-18	8/04/87	CROTONA	<	1.0000E+01	PPB
2-E33-18	8/04/87	CS-137	<	-1.8900E+00	PCI/L
2-E33-18	8/04/87	CYANIDE	<	1.0000E+01	PPB
2-E33-18	8/04/87	DIBRCHL	<	1.0000E+01	PPB
2-E33-18	8/04/87	DIBRETH	<	1.0000E+01	PPB
2-E33-18	8/04/87	DIBRMET	<	1.0000E+01	PPB
2-E33-18	8/04/87	DIBUTEN	<	1.0000E+01	PPB
2-E33-18	8/04/87	DICDIFM	<	1.0000E+01	PPB
2-E33-18	8/04/87	DICETHY	<	1.0000E+01	PPB
2-E33-18	8/04/87	DICPANE	<	1.0000E+01	PPB
2-E33-18	8/04/87	DICPENE	<	1.0000E+01	PPB
2-E33-18	8/04/87	DIETHY	<	1.0000E+01	PPB
2-E33-18	8/04/87	DIOXANE	<	5.0000E+02	PPB
2-E33-18	8/04/87	ETHMETH	<	1.0000E+01	PPB
2-E33-18	8/04/87	FALUMIN	<	1.5000E+02	PPB
2-E33-18	8/04/87	FANTIMO	<	1.0000E+02	PPB
2-E33-18	8/04/87	FARSENI		5.0000E+00	PPB
2-E33-18	8/04/87	FBARIUM		1.2000E+01	PPB
2-E33-18	8/04/87	FBERYLL	<	5.0000E+00	PPB
2-E33-18	8/04/87	FCADMIU	<	2.0000E+00	PPB

TABLE 8.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E33-18	8/04/87	FCALCIU		8.6800E+03	PPB
2-E33-18	8/04/87	FCHROMI	<	1.0000E+01	PPB
2-E33-18	8/04/87	FCOPPER	<	1.0000E+01	PPB
2-E33-18	8/04/87	FIRON	<	5.0000E+01	PPB
2-E33-18	8/04/87	FLEAD	<	5.0000E+00	PPB
2-E33-18	8/04/87	FLUORID	<	5.0000E+02	PPB
2-E33-18	8/04/87	FMAGNES		7.5900E+03	PPB
2-E33-18	8/04/87	FMANGAN	<	5.0000E+00	PPB
2-E33-18	8/04/87	FMERCUR	<	1.0000E-01	PPB
2-E33-18	8/04/87	FNICKEL	<	1.0000E+01	PPB
2-E33-18	8/04/87	FORMALN	<	5.0000E+02	PPB
2-E33-18	8/04/87	FOSMIUM	<	3.0000E+02	PPB
2-E33-18	8/04/87	FPOTASS		4.7800E+03	PPB
2-E33-18	8/04/87	FSELENI	<	5.0000E+00	PPB
2-E33-18	8/04/87	FSILVER	<	1.0000E+01	PPB
2-E33-18	8/04/87	FSODIUM		2.9100E+05	PPB
2-E33-18	8/04/87	FSTRONT	<	3.0000E+02	PPB
2-E33-18	8/04/87	FVANADI		2.1000E+01	PPB
2-E33-18	8/04/87	FZINC		6.0000E+00	PPB
2-E33-18	8/04/87	HYDRSUL	<	1.0000E+01	PPB
2-E33-18	8/04/87	IODOMET	<	1.0000E+01	PPB
2-E33-18	8/04/87	LFLUORD		3.3500E+02	PPB
2-E33-18	8/04/87	M-XYLE	<	1.0000E+01	PPB
2-E33-18	8/04/87	METACRY	<	1.0000E+01	PPB
2-E33-18	8/04/87	METHACR	<	1.0000E+01	PPB
2-E33-18	8/04/87	METHBRO	<	1.0000E+01	PPB
2-E33-18	8/04/87	METHCHL	<	1.0000E+01	PPB
2-E33-18	8/04/87	METHONE	<	1.0000E+01	PPB
2-E33-18	8/04/87	METHTHI	<	1.0000E+01	PPB
2-E33-18	8/04/87	METHYCH	<	1.0000E+01	PPB
2-E33-18	8/04/87	NITRATE		1.5700E+04	PPB
2-E33-18	8/04/87	NNDIEHY	<	1.0000E+01	PPB
2-E33-18	8/04/87	OPXYLE	<	1.0000E+01	PPB
2-E33-18	8/04/87	PENTACH	<	1.0000E+01	PPB
2-E33-18	8/04/87	PERCENE	<	1.0000E+01	PPB
2-E33-18	8/04/87	PH-LAB		7.9400E+00	
2-E33-18	8/04/87	PHFIELD		7.5000E+00	
2-E33-18	8/04/87	PHOSPHA	<	1.0000E+03	PPB
2-E33-18	8/04/87	PU-238	<	6.1500E-03	PCI/L
2-E33-18	8/04/87	PU39-40	<	9.1700E-04	PCI/L
2-E33-18	8/04/87	PYRIDIN	<	5.0000E+02	PPB
2-E33-18	8/04/87	RU-106	<	6.3900E+00	PCI/L
2-E33-18	8/04/87	SR 90		2.4100E+00	PCI/L
2-E33-18	8/04/87	SULFATE		3.0300E+04	PPB
2-E33-18	8/04/87	TC		2.2100E+04	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E33-18	8/04/87	TETRANE	<	1.0000E+01	PPB
2-E33-18	8/04/87	TOC	<	5.4300E+02	PPB
2-E33-18	8/04/87	TOLUENE	<	1.0000E+01	PPB
2-E33-18	8/04/87	TOXLDL	<	5.4000E+00	PPB
2-E33-18	8/04/87	TRANDCE	<	1.0000E+01	PPB
2-E33-18	8/04/87	TRCMEOL	<	1.0000E+01	PPB
2-E33-18	8/04/87	TRCMFLM	<	1.0000E+01	PPB
2-E33-18	8/04/87	TRCPANE	<	1.0000E+01	PPB
2-E33-18	8/04/87	TRICENE	<	1.0000E+01	PPB
2-E33-18	8/04/87	TRITIUM		1.9100E+03	PCI/L
2-E33-18	8/04/87	U		1.3400E+00	PCI/L
2-E33-18	8/04/87	VINYIDE	<	1.0000E+01	PPB
2-E33-18	10/26/87	BETA		1.0600E+01	PCI/L
2-E33-18	10/26/87	CO-60	<	2.2600E+00	PCI/L
2-E33-18	10/26/87	CS-137	<	-4.4500E+00	PCI/L
2-E33-18	10/26/87	RU-106	<	-4.6700E+01	PCI/L
2-E33-18	3/01/88	BETA		1.0400E+01	PCI/L
2-E33-18	3/01/88	CO-60	<	1.4200E+00	PCI/L
2-E33-18	3/01/88	CS-137	<	-3.7600E+00	PCI/L
2-E33-18	3/01/88	HNITRAT		1.3700E+04	PPB
2-E33-18	3/01/88	RU-106	<	-3.1800E+01	PCI/L
2-E33-18	3/01/88	SR 90	<	-3.3700E-01	PCI/L
2-E33-18	3/01/88	TC-99		3.2300E+01	PCI/L
2-E33-18	3/01/88	TRITIUM		4.9200E+03	PCI/L
2-E33-18	3/01/88	U		1.6300E+00	PCI/L
2-E33-18	9/02/88	BETA		8.3500E+00	PCI/L
2-E33-18	9/02/88	CO-60	<	-2.6500E+00	PCI/L
2-E33-18	9/02/88	CS-137	<	-2.7100E+00	PCI/L
2-E33-18	9/02/88	HNITRAT		1.7600E+04	PPB
2-E33-18	9/02/88	I-129DW		9.4900E-01	PCI/L
2-E33-18	9/02/88	RU-106	<	3.3600E+01	PCI/L
2-E33-18	9/02/88	SR 90	<	-3.4400E-02	PCI/L
2-E33-18	9/02/88	TC-99		2.1200E+01	PCI/L
2-E33-18	9/02/88	TRITIUM		5.4700E+03	PCI/L
2-E33-18	9/02/88	U		1.6600E+00	PCI/L
2-E33-18	11/09/88	ALKALIN		1.1100E+05	
2-E33-18	11/09/88	AMMONIU	<	5.0000E+01	PPB
2-E33-18	11/09/88	CHLORID		5.0000E+03	PPB
2-E33-18	11/09/88	CONDFLO		2.8800E+02	UMHO
2-E33-18	11/09/88	CYANIDE	<	1.0000E+01	PPB
2-E33-18	11/09/88	FALUMIN	<	1.5000E+02	PPB
2-E33-18	11/09/88	FANTIMO	<	1.0000E+02	PPB
2-E33-18	11/09/88	FBARIUM		2.4000E+01	PPB
2-E33-18	11/09/88	FBERYLL	<	5.0000E+00	PPB
2-E33-18	11/09/88	FCADMIU	<	2.0000E+00	PPB

TABLE B.2. (contd)

WELL NAME	COLLECTION DATE	CONSTITUENT NAME	LESS THAN FLAG	ANALYSIS VALUE	ANALYSIS UNITS
2-E33-18	11/09/88	FCALCIU		3.3500E+04	PPB
2-E33-18	11/09/88	FCHROMI	<	1.0000E+01	PPB
2-E33-18	11/09/88	FCOPPER	<	1.0000E+01	PPB
2-E33-18	11/09/88	FIRON	<	3.0000E+01	PPB
2-E33-18	11/09/88	FLUORID	<	5.0000E+02	PPB
2-E33-18	11/09/88	FMAGNES		1.0900E+04	PPB
2-E33-18	11/09/88	FMANGAN	<	5.0000E+00	PPB
2-E33-18	11/09/88	FNICKEL	<	1.0000E+01	PPB
2-E33-18	11/09/88	FPOTASS		5.6200E+03	PPB
2-E33-18	11/09/88	FSILVER	<	1.0000E+01	PPB
2-E33-18	11/09/88	FSODIUM		1.3400E+04	PPB
2-E33-18	11/09/88	FSTRONT		1.7800E+02	PPB
2-E33-18	11/09/88	FVANADI		2.0000E+01	PPB
2-E33-18	11/09/88	FZINC	<	5.0000E+00	PPB
2-E33-18	11/09/88	NITRATE		1.9900E+04	PPB
2-E33-18	11/09/88	PH-LAB		7.9000E+00	
2-E33-18	11/09/88	PHFIELD		8.0000E+00	
2-E33-18	11/09/88	PHOSPHA	<	1.0000E+03	PPB
2-E33-18	11/09/88	SULFATE		2.4600E+04	PPB
2-E33-18	11/09/88	TOC	<	5.0000E+02	PPB

APPENDIX C

SAMPLING AND ANALYSIS PLAN

APPENDIX C

SAMPLING AND ANALYSIS PLAN

This plan introduces the procedures and methods that will be used for sample collection (including well evacuation and sample withdrawal methods), field measurements, sample preservation and shipment, chemical analysis, chain of custody, and quality control.

All sampling activities are currently performed by Pacific Northwest Laboratory (PNL). United States Testing Company, Incorporated (UST), currently conducts sample analyses for most constituents.

C.1 SAMPLE COLLECTION PROCEDURES

The procedures for ground-water sample collection, water-level measurements, and field measurements are contained in Procedures for Ground-Water Investigations (PNL 1989). Specific applicable procedures are:

- GC-1 - Ground-Water Sample Collection Procedure
- GC-2 - In-Line Sample Filtration Procedure
- GC-3 - Disposal of Purge Water from Monitoring Wells
- FA-1 - Temperature Measurement Procedure
- FA-2 - Calibration of Conductivity Meter and Measurement of Field Conductivity
- FA-3 - Calibration of pH Meter and Measurement of Field pH
- WL-1 - Water-Level Measurement Procedure
- WL-2 - Procedure for Standardizing Steel Tapes.

C.2 CHAIN-OF-CUSTODY PROCEDURES

Chain-of-custody procedures are contained in Procedures for Ground-Water Investigations (PNL 1989). The specific applicable procedure is number

AD-2, Ground-Water Sample Chain-of-Custody Procedure. The history of the custody of each sample will be documented according to this procedure.

C.3 ANALYTICAL METHODS

TABLE C 1. Preservation Techniques, Analytical Methods Used, and the Current Detection Levels for Listed Constituents as of January 1, 1989

Constituent	Collection and Preservation[a,b]	Analysis Methods[c]	Detection Limit, ppb[d]
ICP METALS - Unfiltered/Filtered			
Beryllium	P, HNO_3 to pH<2	SW-846,[e] #6010	3
Strontium			10
Zinc			5
Calcium			50
Barium			6
Cadmium			5
Chromium			10
Lead			30
Silver			10
Sodium			200
Nickel			10
Copper			10
Vanadium			5
Antimony			100
Aluminum			150
Manganese			5
Potassium			100
Iron			30
Magnesium			50
Boron			10
Cobalt			20
Lithium			10
Molybdenum			40
Silicon			50
Tin			30
Titanium			60
Zirconium			50
Arsenic	P, HNO_3 to pH<2	SW-846, #7060	5
Mercury	G, HNO_3 to pH<2	SW-846, #7470	0.1
Selenium	P, HNO_3 to pH<2	SW-846, #7740	5
Lead	P, HNO_3 to pH<2	SW-846, #7421	5

TABLE C.1. (contd)

Constituent	Collection and Preservation[a,b]	Analysis Methods[c]	Detection Limit, ppb[d]
ANIONS BY IC[f]			
Nitrate	P, None	EPA Method 300.0[g]	500
Sulfate			500
Fluoride			500
Chloride			500
Phosphate			1000
Bromide			1000
Nitrite			1000
PESTICIDES			
Endrin	G, None	SW-846, #8080	0.1
Methoxychlor			3
Toxaphene			1
Lindane (four isomers)			0.1
HERBICIDES			
2,4-D	G, None	SW-846, #8150	2
2,4-5-TP silvex			2
2,4,5-T			2
VOLATILE ORGANICS (VOA)			
Carbon tetrachloride	G, No headspace	SW-846, #8240	5
Benzene			5
Methylethyl ketone			10
Toluene			5
1,1,1-trichloroethane			5
1,1,2-trichloroethane			5
Trichloroethylene			5
Tetrachloroethylene			5
Xylene (O, P)			5
Chloroform			5
1,1 dichloroethane			5
1,2 dichloroethane			5
Trans-1,2 dichloroethylene			5
Methylene chloride			5
Vinyl chloride			10
Xylene (M)			5
p-dichlorobenzene			5
Methyl isobutyl ketone			10

TABLE C.1. (contd)

Constituent	Collection and Preservation[a,b]	Analysis Methods[c]	Detection Limit, ppb[d]
RADIOLOGICAL			
Radium	P, HNO_3 to pH<2	SW-846,[h] #9315	1 pCi/L
Gross alpha	P, HNO_3 to pH<2	SW-846, #9310	4 pCi/L
Gross beta	P, HNO_3 to pH<2	SW-846, #9310	8 pCi/L
Tritium	P, None	ASTM, D2476-81	500 pCi/L
OTHER			
Coliform bacteria	P, None	SW-846, #9131	2.2 MPN
Temperature	Field measurement	PNL-MA-567,[i] FA-1	
Specific conductance	Field measurement	PNL-MA-567, FA-2	
pH	Field measurement	PNL-MA-567, FA-3	
Total organic halogen, low detection level	G, H_2SO_4 to pH<2 No headspace	SW-846, #9020	10
Total organic carbon	G, H_3PO_4 to pH<2	SW-846, #9060	2000
Total carbon	G, None	SW-846, #9060	2000
Ammonium ion	G, H_2SO_4 to pH<2	ASTM D1426-D[j]	50
Phenol	G, None	SW-846, #8040	10
Cyanide	P, NaOH to pH<2	SW-846, #9010	10
Hydrazine	G, HCl	ASTM D1385	30
Total dissolved solids	P, None	Std. Methods 209B[k]	--

(a) P, plastic; G, glass.
(b) All samples will be cooled to 4°C upon collection.
(c) Constituents grouped together are analyzed by the same method.
(d) Detection limit units except where indicated.
(e) Adapted from USEPA Method 6010; (EPA 1986).
(f) IC, ion chromatography.
(g) In-house analytical method from UST Procedure Manual UST-RD-PM; adapted from Method 300.0, EPA 600/4-84-017 (March 1984).
(h) The method also references ASTM D2460, "Standard Test Method for Radionuclides of Radium in Water"; and "Prescribed Procedures for Measurement of Radioactivity in Drinking Water," EPA-600/4-80-032, edited by Herman L. Krieger and Earl L. Whittaker, 1980, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio.
(i) (PNL 1989).
(j) By ion selective electrode.
(k) Standard Methods for the Examination of Water and Wastewater, 16th ed., 1985, published jointly by the American Public Health Association, American Water Works Association and Water Pollution Control Federation (ALPHA 1985).

TABLE C.2. Preservation Techniques, Analytical Methods Used, and the Current Detection Levels for Additional Constituents on the 9905 and Appendix IX Lists[a]

Constituent	Collection and Preservation[b,c]	Analysis Methods[d]	Detection Limit, ppb[e]
ICP METALS, ENHANCED ADDITIONS			
Thallium	P, HNO_3 to pH<2	SW-846, #7840	5
THIOUREA GROUP, ENHANCED ADDITIONS			
Thiourea	G, None	SW-846, #8330 (modified)	200
1-Acetyl-2-thiourea			200
1-(O-Chlorophenyl) thiourea			200
Diethylstilbesterol			200
Ethylenethiourea			200
1-Naphthyl-2-thiourea			200
N-Phenylthiourea			500
PESTICIDES, ENHANCED ADDITIONS			
Aldrin	G, None	SW-846, #8080	0.1
Chlordane			I
4,4'-DDD			0.1
4,4'-DDE			0.1
g4,4'-DDT			0.1
Endosulfan I			0.1
Endosulfan II			0.1
Endosulfan sulfate			0.5
Haptachlor			0.1
Heptachlor epoxide			0.1
Kepone			1
Dieldrin			0.1
Chlorobenzilate			300
PHOSPHOROUS PESTICIDES			
Carbophenothion	G, None	SW-846, #8140	2
Tetraethylpyrophosphate			2
Disulfoton			2
Dimethoate			2
Methyl parathion			2
Parathion			2
Phorate			2

TABLE C.2. (contd)

Constituent	Collection and Preservation[b,a]	Analysis Methods[d]	Detection Limit, ppb[e]
DIRECT AQUEOUS INJECTION			
Acrylamide	G, None	SW-846, #8240 DAI[f]	10,000
Allyl alcohol			2,500
Chloroacetaldehyde			16,000
3-chloroproprionitrile			4,000
Ethyl carbamate			5,000
Ethyl cyanide			2,000
Ethylene glycol			10,000
Isobutyl alcohol			1,000
Paralydehyde			2,000
N-proprylamine			10,000
2-probyb-1-ol			8,000
DIOXINS			
PCDDs	G, None	SW-846, #8280	0.01
PCDFs			0.01
2,3,7,8 TCDD			0.01
VOAs, ENHANCED ADDITIONS			
1,4-dioxane	G, No headspace	SW-846, #8240	500
Pryidine			500
Acrolein			10
Acrylonitrile			10
Bis(chloromethyl) ether			5
Bromoacetone			5
Methyl bromide			10
Carbon disulfide			10
Chlorobenzene			5
2-chloroethylvinyl-ether			5
Methyl chloride			10
Chloromethylmethyl-ether			5
Crotonaldehyde			10
1,2-dibromo-3-chloropropane			10
1,2-Dibromoethane			10
Dibromomethane			10
1,4-dichloro-2-butene			10
Dichlorodiflouro-methane			10
1,2-dichloropropane			5
N-N-diethylhydrazine			10
1,1-dimethylhydrazine			10

TABLE C.2. (contd)

Constituent	Collection and Preservation[b,c]	Analysis Methods[d]	Detection Limit, ppb[e]
1,2-dimethylhydrazine			10
Iodomethane			10
Methacrylonitrile			10
Methanethiol			10
Pentachloroethane			10
1,1,2,2-tetrachloroethane			5
Bromoform			5
Trichloromethanethiol			
Trichloromonofluoromethane			10
1,2,3-trichloropropane			10
Acetonitrile			10
Formaldehyde			500
Ethylene oxide			10
Ethyl methacrylate			10
Ethyl benzene	G, No headspace	SW-846, #8240	5
Styrene			5
Bromodichloromethane			5
Dibromochloromethane			5
2-hexanone			50
1,3-dichloropropene			5
Allyl chloride			100
Chlorethane			10
Propionitrile			5
Vinyl acetate			5
Additional VOAs[g]			

SEMIVOLATILE ORGANIC ANALYSIS (ABN)

Chlorobenzene			10
Cresol			10
1,2-dichlorobenzene			10
1,3-dichlorobenzene			10
P-dichlorobenzene			10
Hexachlorobenzene			10
Pentachlorobenzene			10
Pentachlorophenol			10
Pentachlorophenol			50
1,2,4,5-tetrachlorobenzene			10
1,2,4-trichlorobenzene			10
Hexachlorophene			10
Naphthalene			10
1,2,3-trichlorobenzene			10
Phenol			10
1,3,5-trichlorobenzene			10
1,2,3,4-tetrachlorobenzene			10

TABLE C.2. (contd)

Constituent	Collection and Preservation[b,c]	Analysis Methods[d]	Detection Limit, ppb[e]
1,2,3,5-tetrachlorobenzene			10
Kerosene			10
Strychnine			50
Maleic hydrazide			500
Nicotinie acid			100
Tributylphosphate			10
Additional semivolatiles[h]			
OTHER			
Polychlorinated biphenyls	G, None	SW-846, #8080	1
Perchlorate	P, None	70-IC[i,j]	500
Sulfide	P, NaOH/Zinc acetate	SW-846, #9030	1,000
Citrus red #2	G, None	AOAC #34.015B	1,000

(a) WAC 173-303-9905, Dangerous Waste Constituents list; and EPA Appendix IX, Ground-Water Monitoring List, 40 CFR 264.
(b) P, plastic; G, glass.
(c) All samples will be cooled to 4°C upon collection.
(d) Constituents grouped together are analyzed by the same method.
(e) Detection limit units except where indicated.
(f) DAI, direct aqueous injection.
(g) Tentatively identified compounds are listed when seen, but there are no established detection limits for these.
(h) There are more than 100 additional semivolatile compounds on the "long list" that are not listed here. Most of these analyses have a detection level of 10 ppb.
(i) In-house analytical method from UST Procedure Manual, UST-RD-PM, adapted from Method 300.0, EPA-600/4-84-017 (March 1984).
(j) IC, ion chromatography.

C.4 QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance

Quality assurance (QA) will be conducted in accordance with the PNL quality assurance manual. A generic QA plan describing the manner in which generic QA requirements are to be met has been prepared in accordance with that manual. Any site-specific requirements are presented in the Project Management Plan.

Quality Control

The purpose of quality control is to determine and document the quality of the analytical results being produced by the laboratory and to bring potential problems with analyses to the attention of UST for corrective actions as needed. The QC effort has two main components: 1) routine internal checks performed by UST, and 2) external checks conducted by PNL to independently evaluate UST performance. The scope of these efforts is described in the following sections.

United States Testing Company, Incorporated, Internal Quality Control

Internal quality control at UST includes general practices applicable to a wide range of analyses, as well as specific procedures stipulated for particular analyses. The quality control and quality assurance programs at UST are documented in the UST Quality Control Manual (Hembree et al. 1986) and the Quality Assurance Manual (Hembree and Lardy 1986). UST produces a quarterly Quality Control Report of Hazardous Substance Analyses and submits it to PNL for review by subcontracts, sample analyses management, quality control, and statistical task leaders of the ground-water monitoring program.

UST External Quality Control

Pacific Northwest Laboratory will use both interlaboratory comparisons and spiked, replicate, and blank samples in evaluating the accuracy of results from UST. The purpose and scope of each of these is as follows.

Interlaboratory comparisons using field samples are conducted to determine if the results obtained by the primary laboratory, UST, are comparable to those obtained from other laboratories. Comparisons are currently being conducted for anions, volatile organic constituents, metals, and gross alpha and beta. Each month, replicate samples from selected wells are delivered to four different PNL laboratories. The results from these PNL laboratories are then compared with the results from UST. Samples sent to PNL laboratories are from the same sampling set as those to be analyzed in duplicate by UST.

Replicate analyses of field samples are conducted to establish how much variability might be expected in the laboratory measurements performed on

nearly identical samples. Trip (transport) blanks and transfer blanks are submitted to UST to determine whether environmental conditions encountered during collection and transportation of samples have affected the results obtained by analysis. One set of trip blanks and transfer blanks are submitted each sample period per sample area at the rate of at least one for 1 to 20 wells. These blanks are analyzed for volatile organic constituents. Blanks for a wide range of analytes are submitted to UST monthly to check for container or laboratory contamination.

Blind samples are submitted to UST to estimate the bias of analytical laboratory procedures and to determine when this bias exceeds control limits. Blind standard samples prepared by PNL containing metals, anions, herbicides, pesticides, and volatile organic compounds have been submitted quarterly since January 1986. These samples were prepared by PNL with materials supplied by Environmental Resource Associates. Additional blind samples prepared with materials supplied by the U.S. Environmental Protection Agency (EPA) were added in June 1986. The constituents included are ammonium ion, cyanide, semivolatile compounds, and an expanded number of pesticides and volatile organic compounds. Other constituents, not available in EPA performance samples, have been added. These include thiourea, phosphorous pesticides, ethylene glycol, sulfide, perchlorate, and dioxin.

United States Testing Company, Incorporated, has also participated in the EPA-sponsored Water Pollution Laboratory Performance Evaluation Studies and the Water Supply Laboratory Performance Evaluation Studies since 1986.

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