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Final Report: Phase II Expedited Site Characterization at Agenda, Kansas

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Final Report: Phase II Expedited Site Characterization at Agenda, Kansas

Applied Geosciences and Environmental Management Section,
Environmental Research Division,
Argonne National Laboratory, 9700 South Cass Avenue, Argonne, Illinois 60439

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Notation

AMSL	above mean sea level
BGL	below ground level
CCC	Commodity Credit Corporation
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CI	comprehensive investigation
CLP	Contract Laboratory Program
d	day
DOE	U.S. Department of Energy
ECPT	electronic cone penetrometer
EPA	U.S. Environmental Protection Agency
ESC	Expedited Site Characterization
ft	foot (feet)
gal	gallon(s)
gpm	gallons per minute
hr	hour
ID	inner diameter
in.	inch(es)
K_h	horizontal hydraulic conductivity
KDHE	Kansas Department of Health and Environment
MCL	maximum contaminant level
meq/L	milliequivalent(s) per liter
µg/kg	microgram(s) per kilogram
µg/L	microgram(s) per liter
mg/L	milligram(s) per liter
min	minute(s)
mS/m	millisiemens per meter
µS/cm	microsiemen(s) per centimeter
MS/MSD	matrix spike/matrix spike duplicate
NOAA	National Oceanic and Atmospheric Administration
ppb	part(s) per billion
ppm	part(s) per million
PVC	polyvinyl chloride
PWS	public water supply
QA/QC	quality assurance/quality control

RI	remedial investigation
RPD	relative percent difference
SDG	sample delivery group
sec	second
TU	tritium unit
USDA	U.S. Department of Agriculture
yr	year

Final Report: Phase II Expedited Site Characterization at Agenda, Kansas

1 Introduction

During the 1950s and 1960s, the Commodity Credit Corporation (CCC), a part of the U.S. Department of Agriculture (USDA), operated a grain storage facility in Agenda, Kansas (Figure 1.1). During this time, commercial grain fumigants containing carbon tetrachloride were commonly used by CCC/USDA and the private grain storage industry to preserve grain in their facilities. In 1987, during routine screening by the Kansas Department of Health and Environment (KDHE), carbon tetrachloride was detected in one of Agenda's public water supply (PWS) wells at a concentration above the maximum contaminant level (MCL) of 5 micrograms per liter (μg/L) promulgated by the U.S. Environmental Protection Agency (EPA) (KDHE 1992). Subsequent investigations guided by the KDHE detected carbon tetrachloride in both of Agenda's public water supply wells and in the groundwater at the site of the former CCC/USDA grain storage facility (PRC 1994a,b, 1995). Because this contamination might be linked to historical use of carbon tetrachloride-based grain fumigants at the former CCC/USDA facility, the CCC/USDA is conducting a remedial investigation (RI) to establish the source and extent of the carbon tetrachloride contamination at Agenda and to determine whether the contamination requires remedial action.

The RI is being performed by the Environmental Research Division of Argonne National Laboratory. Argonne is a nonprofit, multidisciplinary research center operated by the University of Chicago for the U.S. Department of Energy (DOE). The CCC/USDA entered into an interagency agreement with DOE, under which Argonne provides technical assistance to the CCC/USDA with environmental site characterization and remediation at its former grain storage sites. At these sites, Argonne is applying its Expedited Site Characterization (ESC) process to satisfy the requirements of an RI under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as specified in Title 40 of the *Code of Federal Regulations* Part 300.

The ESC process was developed by Argonne to optimize preremedial site characterization work at hazardous waste sites by obtaining, and then exploiting, a thorough understanding of a site's geology, physical hydrogeology, and hydrogeochemistry. This approach is essential to successful site characterization, because the geology, hydrogeology, and hydrogeochemistry of a

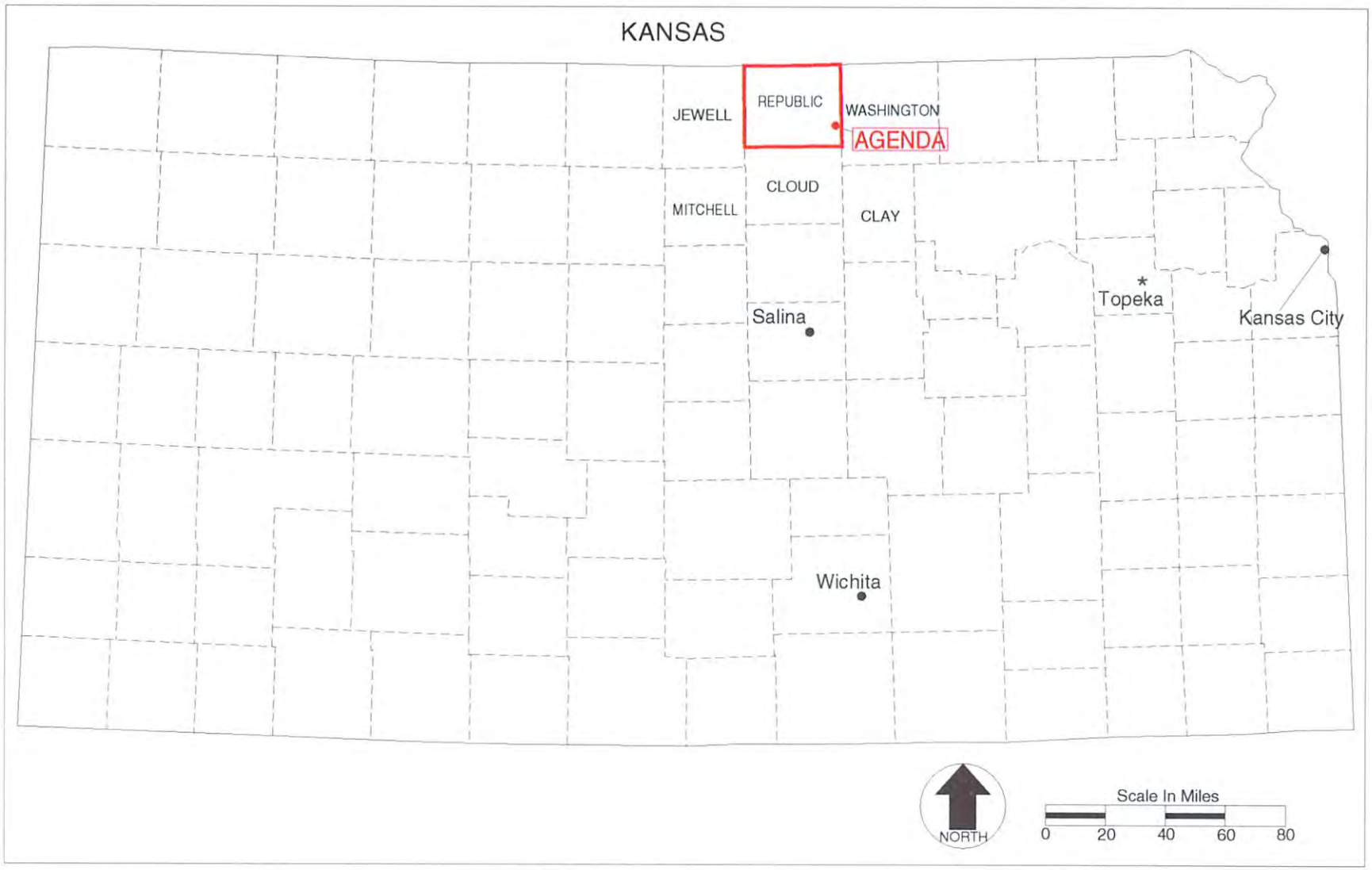


FIGURE 1.1 Map of Kansas Showing the Location of Republic County and the City of Agenda

site effectively govern the mobility and fate of the contaminants there. Throughout the ESC program, investigative work is guided by an integrated conceptual model of the geology, hydrogeology, and geochemistry of the site. The conceptual model is developed initially by critically reviewing existing data on the site and pertinent regional geologic, hydrogeologic, and geochemical data. This preliminary conceptual model is tested and revised by the first phase of the ESC investigation. The revised conceptual model is then used to guide the second phase of investigation, which focuses primarily on delineation of contamination at the site.

The initial phase of the ESC investigation (Phase I) at Agenda was conducted during April and May 1996. Detailed findings of Phase I and the objectives for Phase II of the investigation were presented in the *Phase I Report* (Argonne 1996b). Phase I of the investigation established the geology, physical hydrogeology, and hydrogeochemistry of the stratigraphic section in the vicinity of the former CCC/USDA site. Two aquifers were identified: an unconfined to semiconfined *upper aquifer*, hosted principally in an alluvial sand, and a confined *deep aquifer*, hosted by a bedrock sandstone. The two aquifers were found to be separated stratigraphically by approximately 30 ft of competent bedrock shale. Measured water levels in the upper-aquifer wells (Figure 1.2) indicate that groundwater in this aquifer flows generally southeast from the former CCC/USDA site. Water levels in the lower-aquifer wells indicate flow generally south-southwest. The water levels also indicate a hydraulic head difference (approximately 6 ft) between the upper and lower aquifers in the investigated area, so that water from the upper aquifer would flow downward into the lower aquifer if the two aquifers were connected hydraulically. Periodic drawdowns associated with pumping of Agenda's public water supply wells were observed on the hydrographs of all four deep-aquifer monitoring wells, but no such drawdowns were present on the hydrographs of the corresponding shallow-aquifer monitoring wells. This observation implies that no effective natural hydraulic communication exists between the two aquifers.

This report describes the findings of the second phase of the ESC investigation at Agenda. The principal objectives of this phase were (1) to obtain additional data about the distribution of carbon tetrachloride in groundwater and (2) to refine the site's conceptual geologic, hydrogeologic, and geochemical model as it relates to understanding and predicting the distribution of the carbon tetrachloride contamination.

Detailed findings of Phase II of the ESC investigation are described in Sections 2-5 of this report. Section 2 documents the investigative methods used during this phase of the investigation. Section 3 contains a synthesis of the geologic, geophysical, hydrogeologic, and geochemical

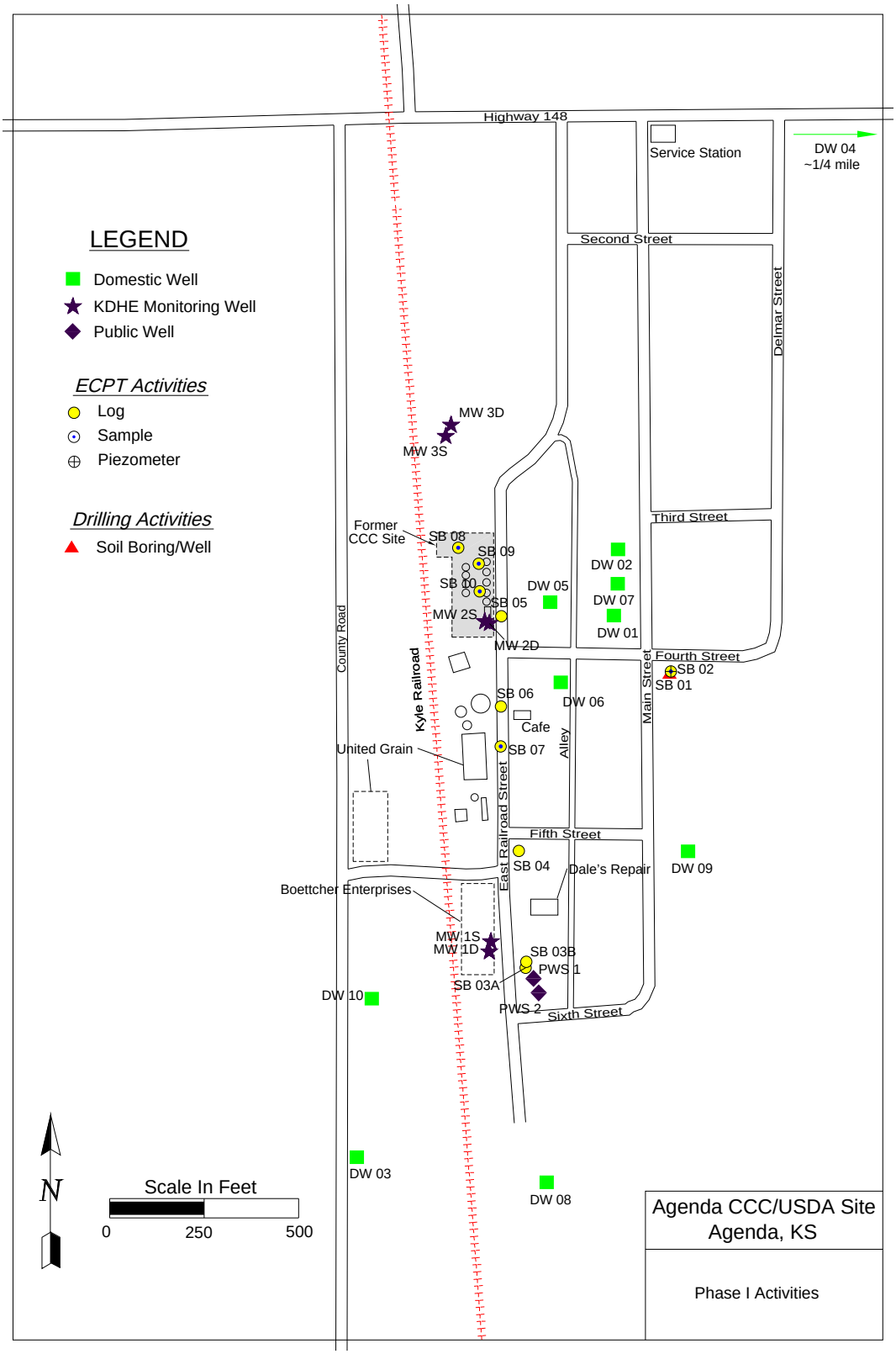


FIGURE 1.2 Map of Agenda, Kansas, Showing the Former CCC/USDA Site; the Locations of Wells PWS 1 and PWS 2, Domestic Wells, and KDHE Monitoring Wells; and the Locations of Phase I Temporary Well SB01 and Piezometer SB02

data obtained during Phases I and II for the area of investigation, which together provide the framework for interpreting the data on the distribution of carbon tetrachloride in soils and groundwater presented in Section 4. A summary of findings and conclusions is presented in Section 5 in conjunction with recommendations for future work at the site. To streamline the reporting process, material from the *Phase I Work Plan* (Argonne 1996a) and the *Phase I Report* (Argonne 1996b) and relevant sections of the *Master Work Plan* (Argonne 1994) are not repeated in detail in this report. Consequently, these documents must also be consulted to obtain the complete details of the Phase II investigative program.

2 Investigative Methods

This section describes the field and laboratory methods used to investigate the geology and hydrogeology and the distribution of carbon tetrachloride and chloroform in groundwater in the study area during Phase II. Detailed descriptions of the field and laboratory procedures associated with these methods were presented in the *Master Work Plan* (Argonne 1994).

2.1 Drilling Program

Three conventional boreholes, SB11, SB12, and SB13 (Figure 2.1), were drilled during Phase II to obtain additional lithologic and stratigraphic data and, where appropriate, to install temporary wells for groundwater sampling and water level monitoring. Drilling was performed by the Layne-Western Company of Wichita, Kansas. Borehole SB11, located approximately 300 ft west-southwest of the KDHE monitoring wells MW 1S and MW 1D, was drilled to 133 ft BGL with a mud rotary drill. Boreholes SB12 and SB13 are adjacent to one another and are located approximately 300 ft west-southwest of the southwest corner of the former CCC/USDA site. Boring SB12 was drilled to 44 ft below ground level (BGL) with a hollow-stem auger drill; SB13 was drilled initially to 49 ft BGL with the hollow-stem auger, then extended to 150 ft BGL with the mud rotary drill. Lithologic logs were prepared for each borehole during drilling by examining drill cuttings and, in SB11, cores over selected intervals. Copies of these lithologic logs are in Appendix A.

2.2 Electronic Cone Penetrometer Program

Three locations (SB14-SB16, Figure 2.1) were investigated by using a truck-mounted electronic cone penetrometer (ECPT). The ECPT operations were conducted by Applied Research Associates, Inc., with Argonne's 40-ton ECPT. Resistivity, tip stress, sleeve stress, and instantaneous pore pressure logs were recorded at two locations (SB14 and SB15). Copies of the ECPT logs are in Appendix A. On these logs, resistivity was converted to conductivity for consistency with the data obtained by the wireline induction logging performed during Phase I (Argonne 1996b). The ECPT logs were used to supplement existing stratigraphic information and to guide selection of groundwater sampling intervals. Groundwater samples were collected at all three ECPT locations to obtain information on groundwater geochemistry and contaminant distribution. Details of the ECPT groundwater sampling program are discussed in Section 2.6.

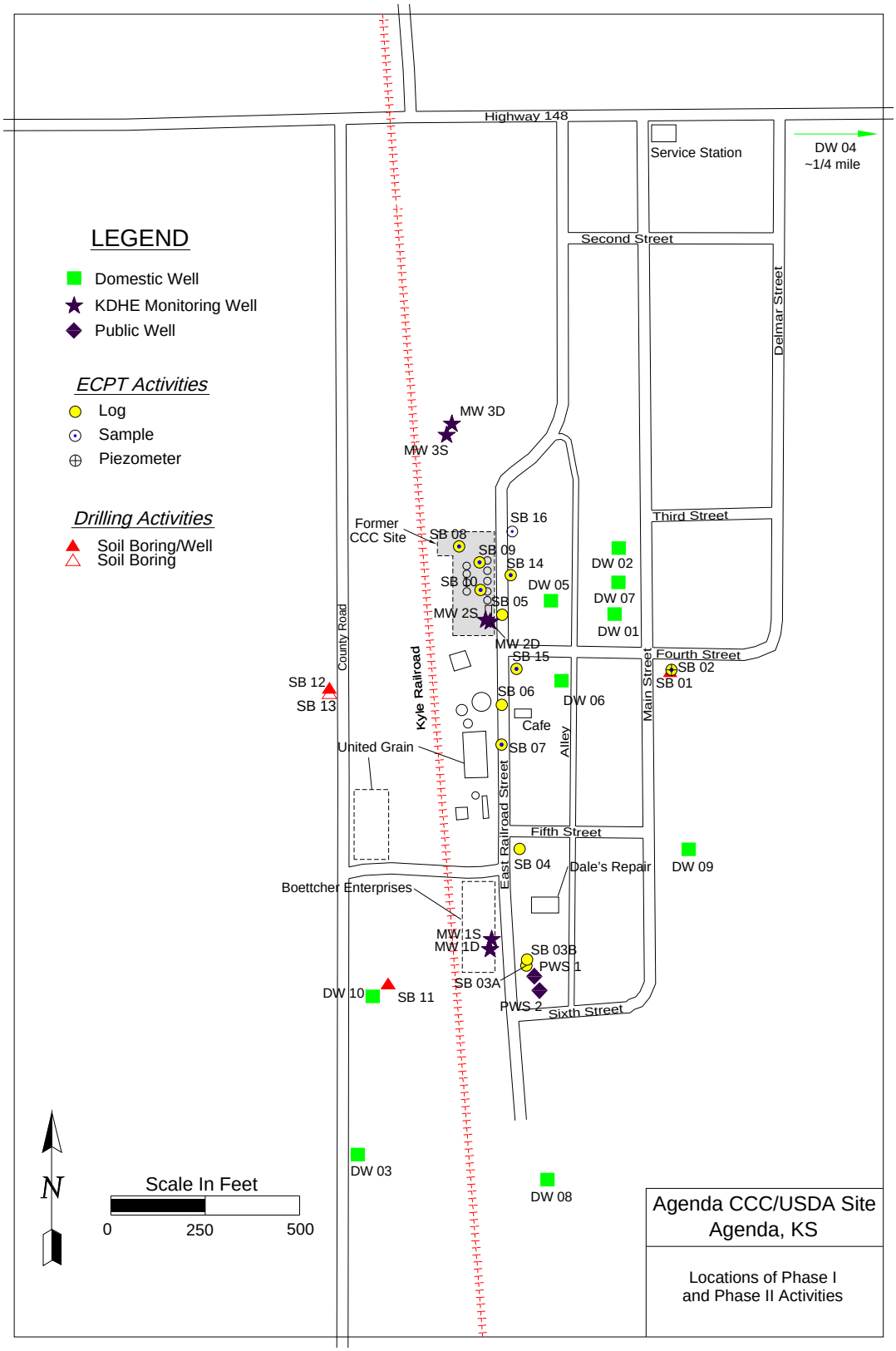


FIGURE 2.1 Map of Agenda, Kansas, Showing the Former CCC/USDA Site; the Locations of Domestic, Public Water Supply, and KDHE Monitoring Wells; and the Locations of Phase I and Phase II Boreholes, Cone Penetrometer Test Holes, Piezometer SB02, and Temporary Wells SB01, SB11, and SB12

2.3 Water Level Monitoring Program

2.3.1 Installation of Temporary Wells

Temporary wells were installed in boreholes SB11 and SB12 to collect groundwater samples and to monitor groundwater levels. Well SB12 was completed in the shallow aquifer by using 4-in.-ID flush-joint, Schedule 40 polyvinyl chloride (PVC) casing with a 0.010-in. slotted screen set from 31.5 to 41.5 ft BGL (1,364.4 to 1,354.4 ft above mean sea level [AMSL]). Well SB11 was completed in the deep aquifer by using 4-in.-ID flush-joint, Schedule 40 PVC casing with a 0.010-in. slotted screen set from 107 to 127 ft BGL (1,290.8 to 1,270.8 ft AMSL). A second deep-aquifer well, originally planned for SB13, was not installed, because the deep-aquifer sandstone was not encountered. In both deep-aquifer boreholes (SB11 and SB13), 8-in.-ID flush-joint, Schedule 40 PVC casing was installed to a depth below the base of the shallow aquifer to protect the deep aquifer from potential contamination in the shallow aquifer. After waiting a period of at least 24 hours to allow the grout to set, a 7.25-in.-diameter borehole was drilled through the 8-in. casing to the final depth. Construction diagrams for wells SB11 and SB13 are presented in Appendix B. After completion, the wells were developed initially by surging and bailing. Continuous cycles of surging and bailing were performed until the bailing water lacked fines. The wells were then purged with a submersible pump until the pH and conductivity of the water stabilized.

2.3.2 Water Level Measurements

Water levels in the network of monitoring wells and piezometers were measured to determine potential gradients and directions of groundwater flow in the aquifers. Pressure transducers and Well Sentinels™ were installed in SB11 and SB13 after the wells were developed to obtain a detailed record of water level fluctuations in these wells. The Well Sentinels were configured to record water levels hourly to correspond with the units installed previously in the KDHE monitoring wells and in SB01 and SB02 during Phase I (Argonne 1996b). The water level data recorded for the complete network of monitoring wells are tabulated in Appendix C. Findings from the water level monitoring program are discussed in Section 3.2.2.

2.4 Aquifer Test Program

Well response or "slug" tests, performed by causing a rapid change in water level within the well casing and then recording the subsequent recovery of the water column to its predisturbance level, were conducted on wells MW 1D, MW 1S, MW 3D, MW 3S, SB01, SB11, and SB12 to estimate the hydraulic conductivity of the shallow and deep aquifers. The tests were performed with a modification of the methods described by Prosser (1981) and Kelly (1991), in which air pressure, supplied from a storage tank via a suitable wellhead manifold, was used to depress and stabilize the water level within the well casing. To initiate the test, the pressure was released, creating a condition equivalent to an instantaneous drop in head. Water level recovery was monitored by using a pressure transducer and an automatic logger (Hermit 1000C) capable of data acquisition at a high rate. The slug test procedure was repeated three times for each well tested.

The slug test data were analyzed by using the method of Bouwer and Rice (1976) and Bouwer (1989), as implemented in the computer code BRISTA (Smith 1991). Time-versus-residual drawdown data for the tests, analysis parameters, and representative curve fits for each of the test data sets are presented in Appendix D. Test results are discussed in Section 3.2.3.

2.5 Surveying

At the conclusion of the field program, the locations and elevations of temporary monitoring wells SB11 and SB12, borehole SB13, and ECPT test holes SB14-SB16 were surveyed to provide horizontal and vertical control for stratigraphic correlation, water level monitoring, and geologic and hydrogeologic mapping. Surveying services were provided by Schwab-Eaton, Inc., of Manhattan, Kansas. Survey data are in Appendix E.

2.6 Collection and Analysis of Groundwater Samples

Additional groundwater sampling was performed during the Phase II field program to gather more information on aquifer geochemistry and contamination. Sample collection and analysis procedures were described in the *Master Work Plan* (Argonne 1994). A total of five groundwater samples were collected from five locations (SB11, SB12, and SB14-SB16;

Figure 2.1). A complete list of all groundwater samples, including locations, depths, and sampling dates, is given in Appendix F, Table F.1.

Groundwater samples collected for organic and inorganic analyses were shipped to the contract laboratory, Inchcape Testing Services Inc., Colchester, Vermont, for preservation and analysis. All samples were analyzed for carbon tetrachloride and chloroform according to Contract Laboratory Program (CLP) methods as described in the *Master Work Plan* (Argonne 1994). The results of these analyses are presented in Appendix F, Table F.2. Inorganic analyses were performed on Phase II groundwater samples to characterize groundwater geochemistry and to aid in determining whether the two aquifers at Agenda are distinct chemically. The analyses included dissolved anion concentrations (chloride, sulfate, nitrate, and phosphate) and metals (calcium, magnesium, sodium, potassium, aluminum, iron, manganese, phosphorus, zinc, and silicon). All samples were analyzed according to methods described in the *Master Work Plan* (Argonne 1994). The results of these analyses are given in Table F.3 of Appendix F.

Groundwater samples were also analyzed for tritium (^{3}H) and stable isotope ratios of hydrogen (D/H) and oxygen ($^{18}O/^{16}O$) by the procedures described in the *Master Work Plan* (Argonne 1994). The hydrogen (D/H) and oxygen ($^{18}O/^{16}O$) isotope ratio analyses were performed by Krueger Enterprises, Inc., Cambridge, Massachusetts. Tritium (^{3}H) analyses were performed at the University of Miami Tritium Laboratory, Miami, Florida. Results of the isotope analyses are in Appendix F, Table F.4.

Field parameters (temperature, pH, and conductivity) were measured by using a Checkmate Field Meter system after calibration with the appropriate standard solutions. Titrimetric techniques using commercial kits manufactured by CHEMetric, Inc., were used to determine the alkalinity, dissolved oxygen, and nitrate concentrations. The results of these measurements are given Appendix F, Table F.5.

2.6.1 Samples from Temporary Wells SB11 and SB12

Groundwater samples were collected from the two new temporary monitoring wells (SB11 and SB12; Figure 2.1). Both samples were analyzed for carbon tetrachloride, chloroform, anions, metals, tritium, and stable isotope ratios of hydrogen and oxygen. Analytical results are in Appendix F (Tables F.2-F.4).

2.6.2 Samples Collected with the Electronic Cone Penetrometer

The ECPT was used to collect three groundwater samples from the shallow aquifer at three locations (SB14-SB16; Figure 2.1). These samples were analyzed for carbon tetrachloride, chloroform, anions, metals, tritium, and stable isotope ratios of hydrogen and oxygen. Analytical results for these samples are in Tables F.2-F.4 of Appendix F.

2.7 Quality Control for Sample Collection, Handling, and Analysis

2.7.1 Quality Control for Sample Collection and Handling

Quality assurance/quality control (QA/QC) for sample collection and handling activities was monitored by collecting an equipment rinsate, trip blanks, and a field replicate (split) sample. These QA/QC samples are listed in Appendix G, Table G.1. Analytical results for the QA/QC samples are in Appendix G, Table G.2.

Water used for equipment decontamination and drilling was also sampled to verify that carbon tetrachloride and chloroform contamination detected in environmental samples did not derive from this source.

One equipment rinsate was collected and analyzed for carbon tetrachloride and chloroform in conjunction with the ECPT groundwater sampling effort (Appendix G, Table G.1). The rinsate did not contain quantifiable concentrations of these contaminants of concern (Appendix G, Table G.2), indicating that proper decontamination procedures were followed for the reusable sampling equipment during ECPT groundwater sampling activities. Disposable equipment was used during the sampling of temporary wells.

As an indicator of possible cross-contamination of samples during shipment, a trip blank was prepared and included in each of the shipments to the contract laboratory containing groundwater samples for carbon tetrachloride and chloroform analyses (Appendix G, Table G.1). Neither contaminant was detected in the trip blanks (Appendix G, Table G.2).

A field replicate (split) sample was also collected (Appendix G, Table G.1) at ECPT location SB15 as an indication of consistent sampling methodology as defined by the sampling

protocols in the *Master Work Plan* (Argonne 1994). This sample also provided a measure of the precision of the analytical process. Contaminants were not detected in either the sample or its replicate. Quality control for the organic and inorganic analyses is discussed in the following sections.

2.7.2 Quality Control for Organic Analyses

Samples submitted to the contract laboratory for organic analyses were analyzed in two sample delivery groups (SDGs). Complete CLP data packages were provided by the contract laboratory. The QA/QC procedures followed included initial and continuing calibration of instruments, analysis of laboratory blanks, monitoring of surrogate spike recovery, and matrix spike/matrix spike duplicate (MS/MSD) analyses. The QA/QC results were as follows:

- Analytical instruments were shown to be properly tuned; initial and continuing calibration checks remained within the 25% allowable limit.

- Contaminants of concern were not detected in laboratory method blanks.

- Surrogate standard determinations were performed on samples and blanks by using surrogate spike compounds toluene-d_8, 4-bromofluorobenzene, and 1,2-dichloroethane-d_4 to monitor sample preparation and analysis. Recoveries of the three system-monitoring compounds achieved during organic analysis are given in Appendix G, Table G.3. Recovery of the surrogate compounds was within the specified QC range for each compound.

- The MS/MSD analyses were performed in accordance with CLP protocols for organic analyses by using the matrix spike compounds 1,1-dichloroethene, trichloroethene, chlorobenzene, toluene, and benzene to evaluate the matrix effects of samples on the analytical method. Table G.4 (Appendix G) shows the percent recovery of the spike compounds for the two MS/MSD analyses performed, as well as the calculated relative percent difference (RPD) between the MS/MSD analyses.

  In both of the MS/MSD analyses, recovery of one of the spike compounds was outside the specified QC range. These deviations from CLP protocol

appear to be matrix related. Carbon tetrachloride and chloroform, the contaminants of concern, were included as constituents in the formulation used in performing the MS/MSD analyses. Recoveries of these compounds were acceptable in both MS/MSD analyses performed (Table G.4).

The calculated RPD for MS/MSD analyses met the QC target for all spike compounds in the two MS/MSD analyses (Table G.4).

2.7.3 Quality Control for Inorganic Analyses

Inorganic analyses were performed on groundwater samples to aid in characterizing the geochemistry of the aquifers. All samples were analyzed for dissolved concentration of metals (aluminum, calcium, iron, magnesium, manganese, phosphorus, potassium, silicon, sodium, and zinc) and anions (chloride, sulfate, nitrate, and phosphate). Upon arrival at the laboratory, groundwater samples for inorganic analyses were filtered and preserved by adjusting their pH to < 2.

Samples submitted for inorganic analyses were analyzed in two SDGs. The QA/QC procedures followed included initial and continuing calibration of instruments, analysis of laboratory control samples, and analysis of laboratory blanks. The QA/QC results were as follows:

- Initial and continuing calibration of analytical equipment was performed according to method protocol, with calibration of instruments verified throughout the analytical run by analyzing instrument check standards to determine instrument drift. Laboratory accuracy was evaluated by measuring the percent recovery of known concentrations of the metals and anions of concern added to laboratory control samples. The percent recovery of the spiked analytes of concern was within the acceptable range of 80-120%. Table G.5 (Appendix G) summarizes the recoveries achieved in laboratory control samples during the inorganic analyses.

- Laboratory preparation blanks did not contain the inorganic constituents of interest.

2.7.4 Quality Control for Isotope Analyses

Duplicate analyses were performed by the analytical laboratory on selected groundwater samples collected for isotope analyses, as shown in Appendix G, Table G.1. The results compared favorably, with the relative percent differences between the sample and duplicate results, shown in Table G.6 (Appendix G), ranging from 1.8 to 2.6.

2.8 Waste Characterization, Handling, and Disposal

Potentially contaminated waste soil from the drilling of boreholes SB11-SB12, as well as water purged during the development of wells SB11 and SB12, was accumulated in roll-off containers at each drill site. The wastes were sampled prior to disposal (Appendix G, Table G.1). The roll-off containers were rented from Waste Management, Inc., a licensed hazardous waste hauler. Neither carbon tetrachloride nor chloroform was detected in the composite soil samples from the two roll-off containers or in samples of the purge water (Appendix G, Table G.2).

Because nitrate contamination is present throughout the study area, the purge water from the temporary wells was analyzed for this contaminant to determine whether disposal as a special waste (with nitrate at ≥ 10 ppm [parts per million]) would be required. Nitrates were detected at a concentration of 1.6 mg/L (ppm) in the purge water from SB11 and at 5.4 mg/L (ppm) in the purge water from SB12.

The waste soil and water did not require disposal at a restricted landfill and were placed in a local fill area.

3 Geology and Hydrogeology

Phase I of this investigation established the geologic and hydrogeologic characteristics of the stratigraphic section penetrated by Agenda's public water supply wells. Two aquifers were identified: an unconfined to semiconfined *upper aquifer*, hosted principally in an alluvial sand, and a confined *deep aquifer*, hosted by a bedrock sandstone. The two aquifers are separated stratigraphically by approximately 30-35 ft of competent bedrock shale.

During Phase II, this conceptual understanding of the subsurface was refined by obtaining additional information on (1) the lithologies and distribution of the stratigraphic units that host the shallow and deep aquifers, (2) gradients and directions of groundwater flow in the two aquifers, (3) the hydraulic characteristics of the aquifers, and (4) the geochemical characteristics of the groundwater. Such a detailed understanding supplies the framework necessary to define and predict the distribution and migration of contaminants in the subsurface.

3.1 Geology

The geologic interpretation presented in the *Phase I Report* (Argonne 1996b) was based on regional stratigraphic data compiled by the Kansas Geological Survey (Wade 1992; Macfarlane et al. 1991); lithologic data from the logs of the boreholes drilled during the comprehensive investigation of the site (PRC 1994b); and the drillers' logs of Agenda's well PWS 2 (KDHE 1983), borehole SB01, and the ten ECPT test holes drilled in Phase I (Argonne 1996b). During Phase II, additional geologic information was obtained by drilling three boreholes (SB11-SB13; Figure 3.1) and acquiring ECPT resistivity and mechanical logs at two locations (SB14-SB15). This section describes the findings of and the conclusions drawn from the complete suite of geologic information.

3.1.1 Stratigraphy

Stratigraphic relationships within the geologic section penetrated by Agenda's public water supply wells are illustrated in three geologic cross sections (Figure 3.1). Section A-A´ is oriented west to east (Figure 3.2), section B-B´ north to south (Figure 3.3), and section C-C´ west to east (Figure 3.4). These cross sections and two isopach maps (Figures 3.5 and 3.6) were

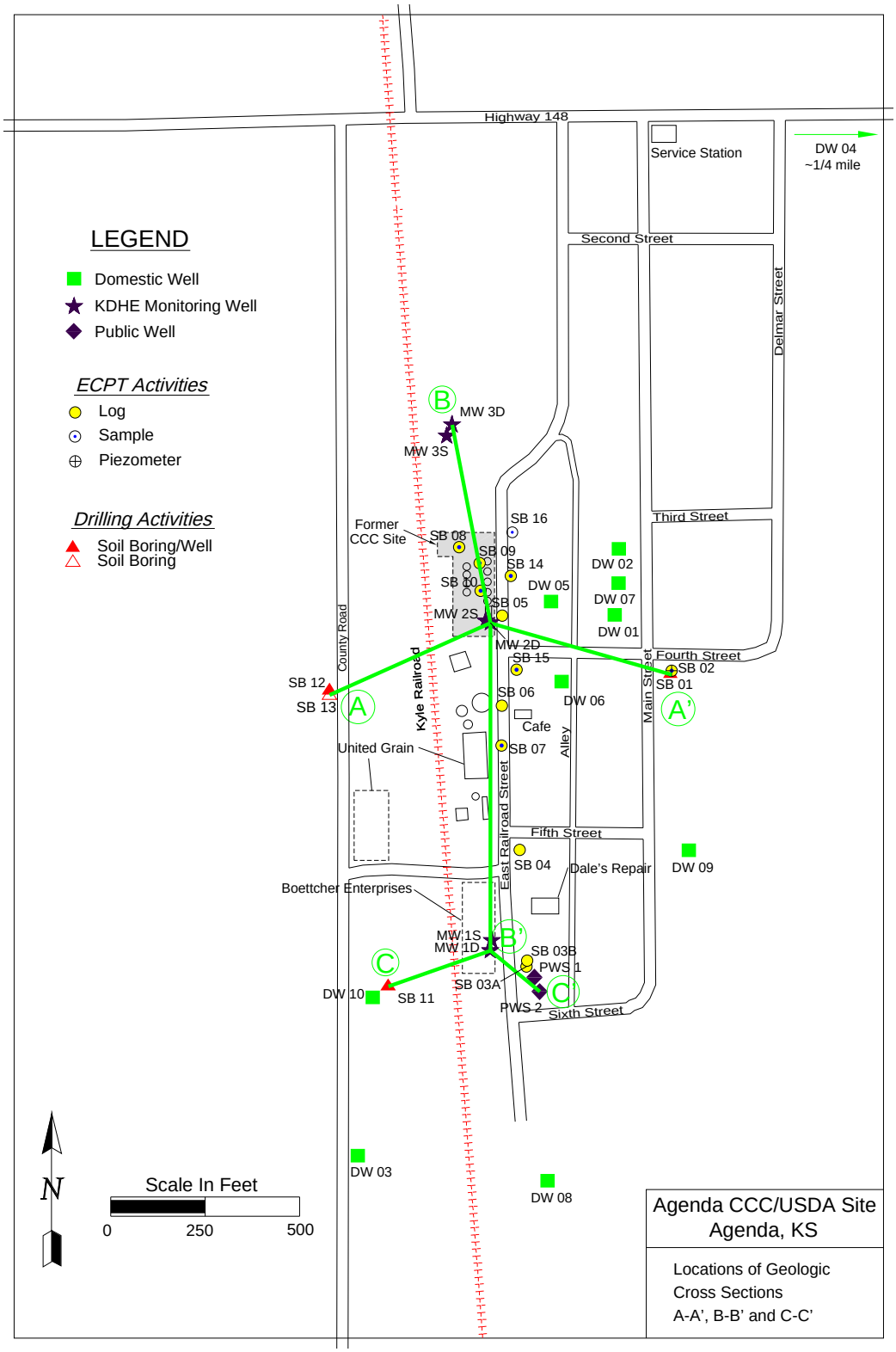


FIGURE 3.1 Map of Agenda, Kansas, Showing the Former CCC/USDA Site; the Locations of Domestic, Public Water Supply, and KDHE Monitoring Wells; the Locations of Phase I and Phase II Boreholes, Cone Penetrometer Test Holes, Piezometer SB02, and Temporary Wells SB01, SB11, and SB12; and the Locations of Geologic Cross Sections A-A´, B-B´, and C-C´

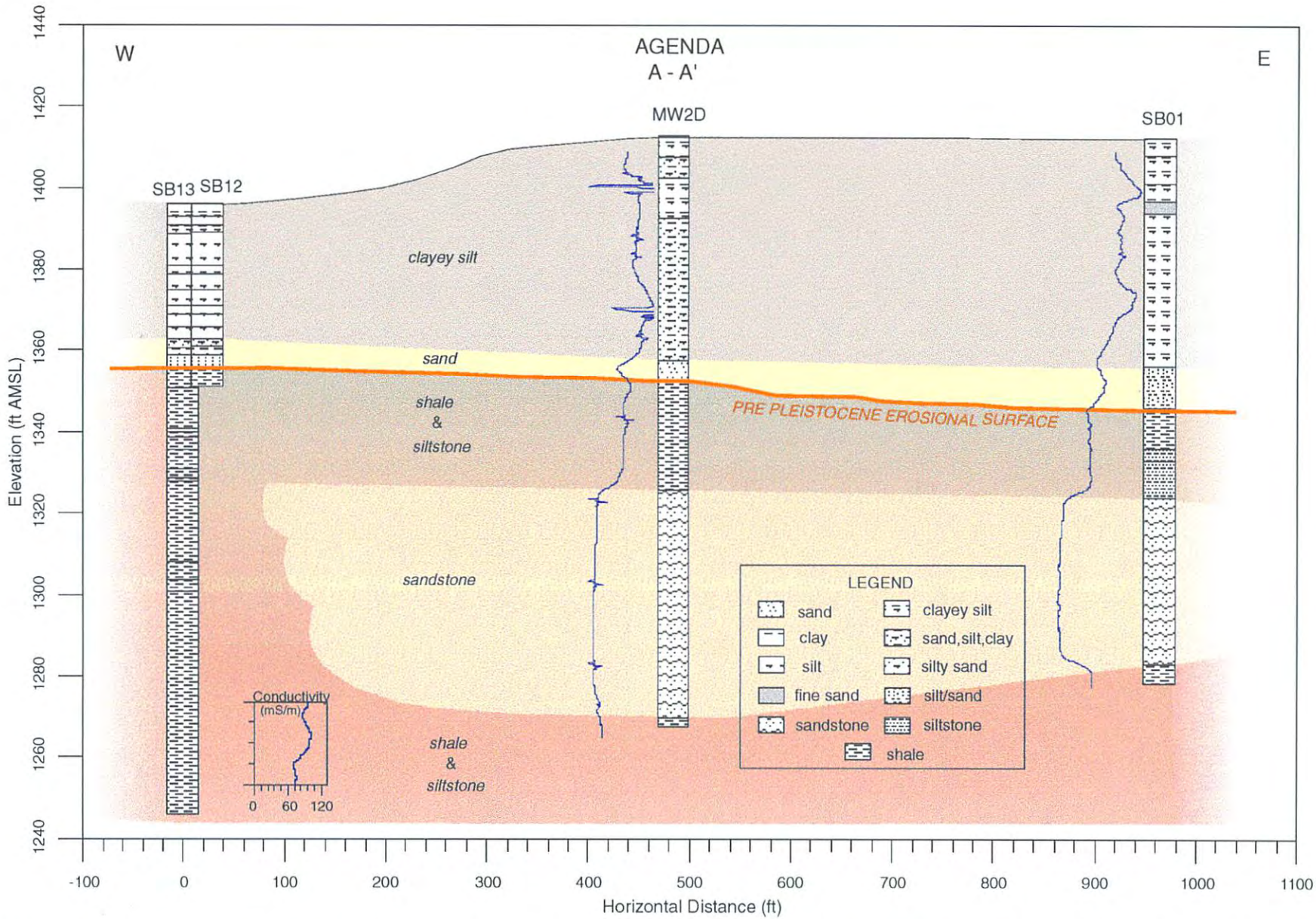


FIGURE 3.2 West-to-East Geologic Cross Section A-A´, Illustrating Stratigraphic Relationships in the Vicinity of the Former CCC/USDA Site at Agenda, Kansas

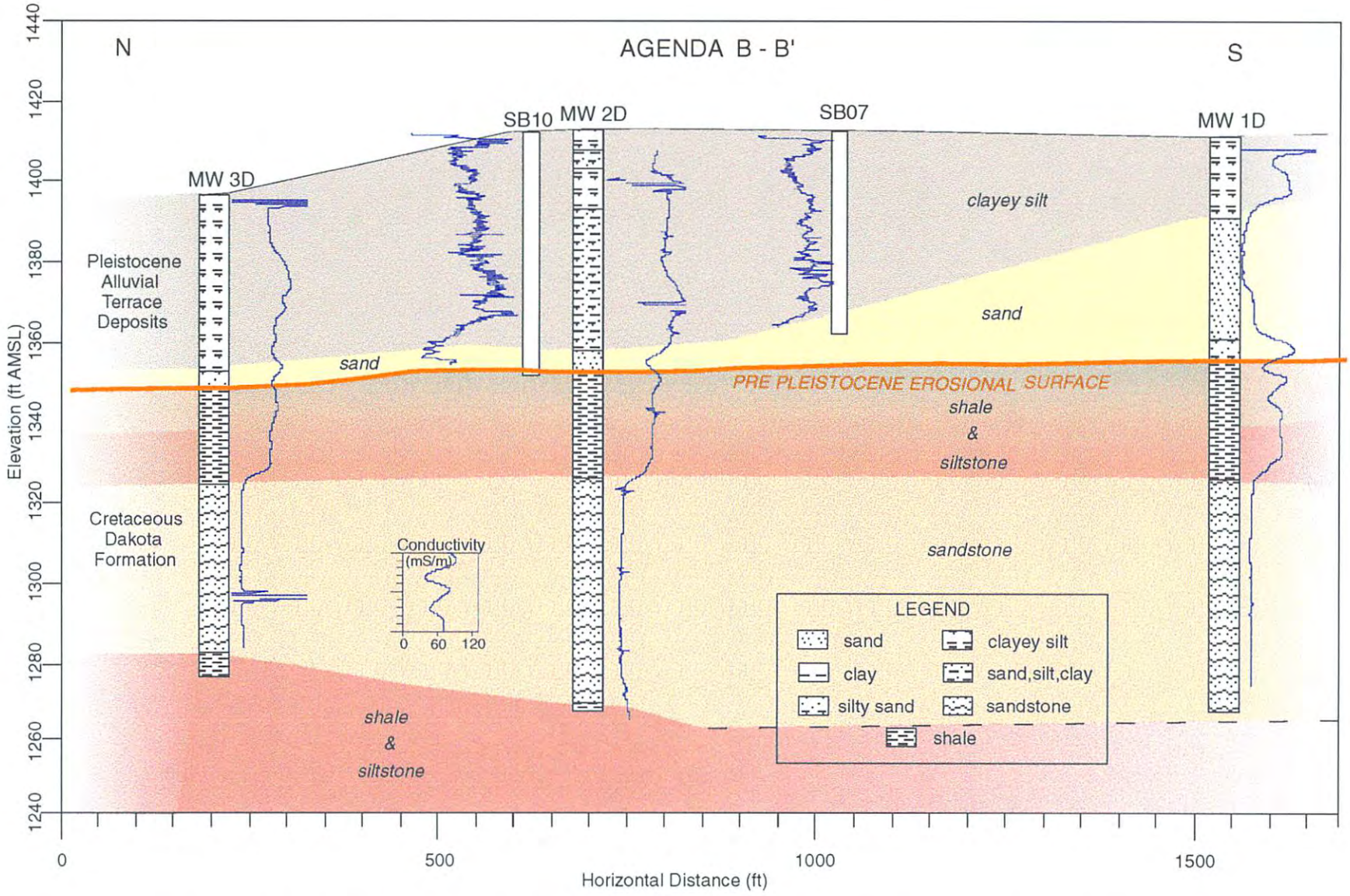


FIGURE 3.3 North-to-South Geologic Cross Section B-B´, Illustrating Stratigraphic Relationships in the Vicinity of the Former CCC/USDA Site at Agenda, Kansas

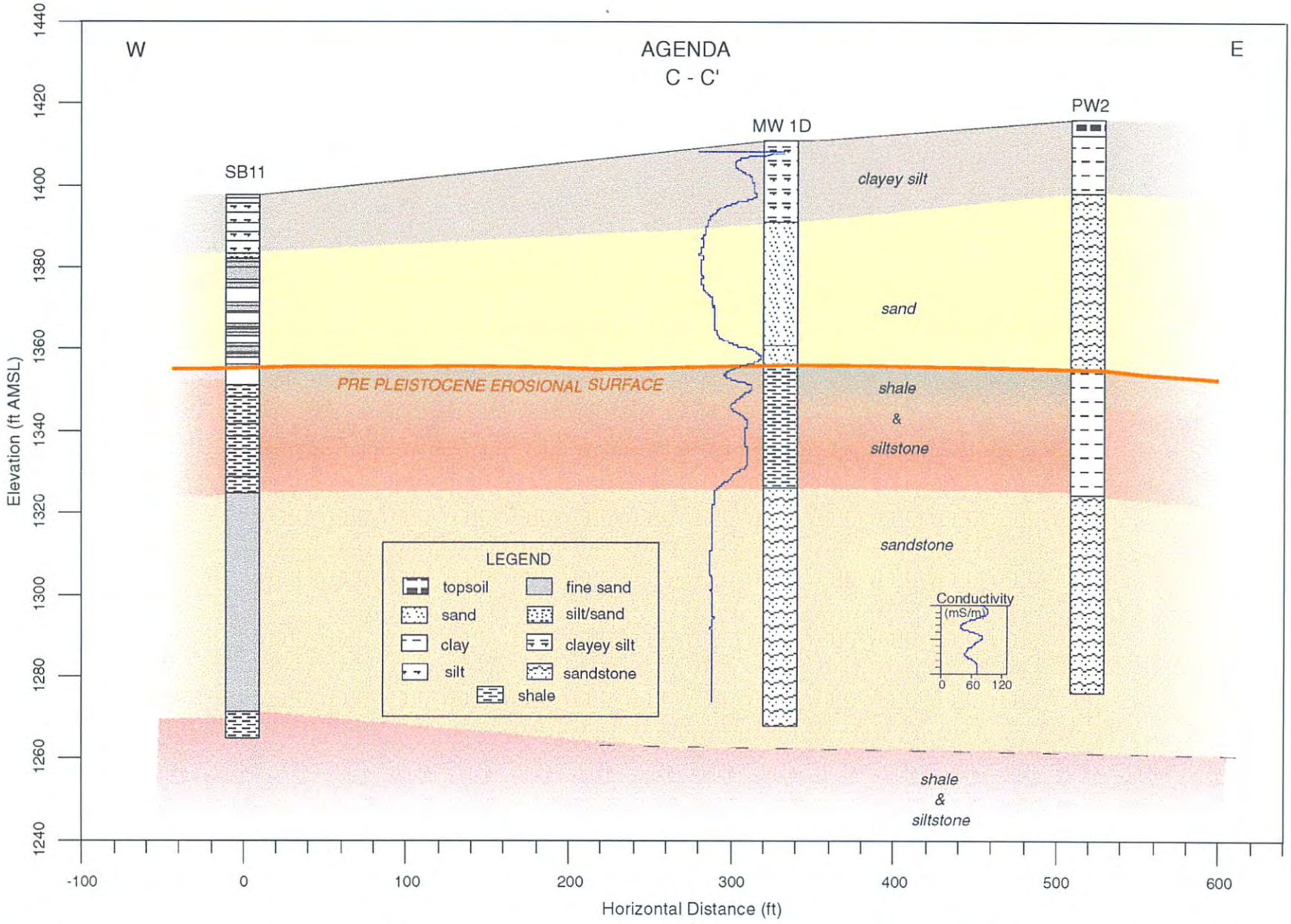


FIGURE 3.4 West-to-East Geologic Cross Section C-C´, Illustrating Local Stratigraphic Relationships in the Vicinity of Wells PWS 1 and PWS 2 at Agenda, Kansas

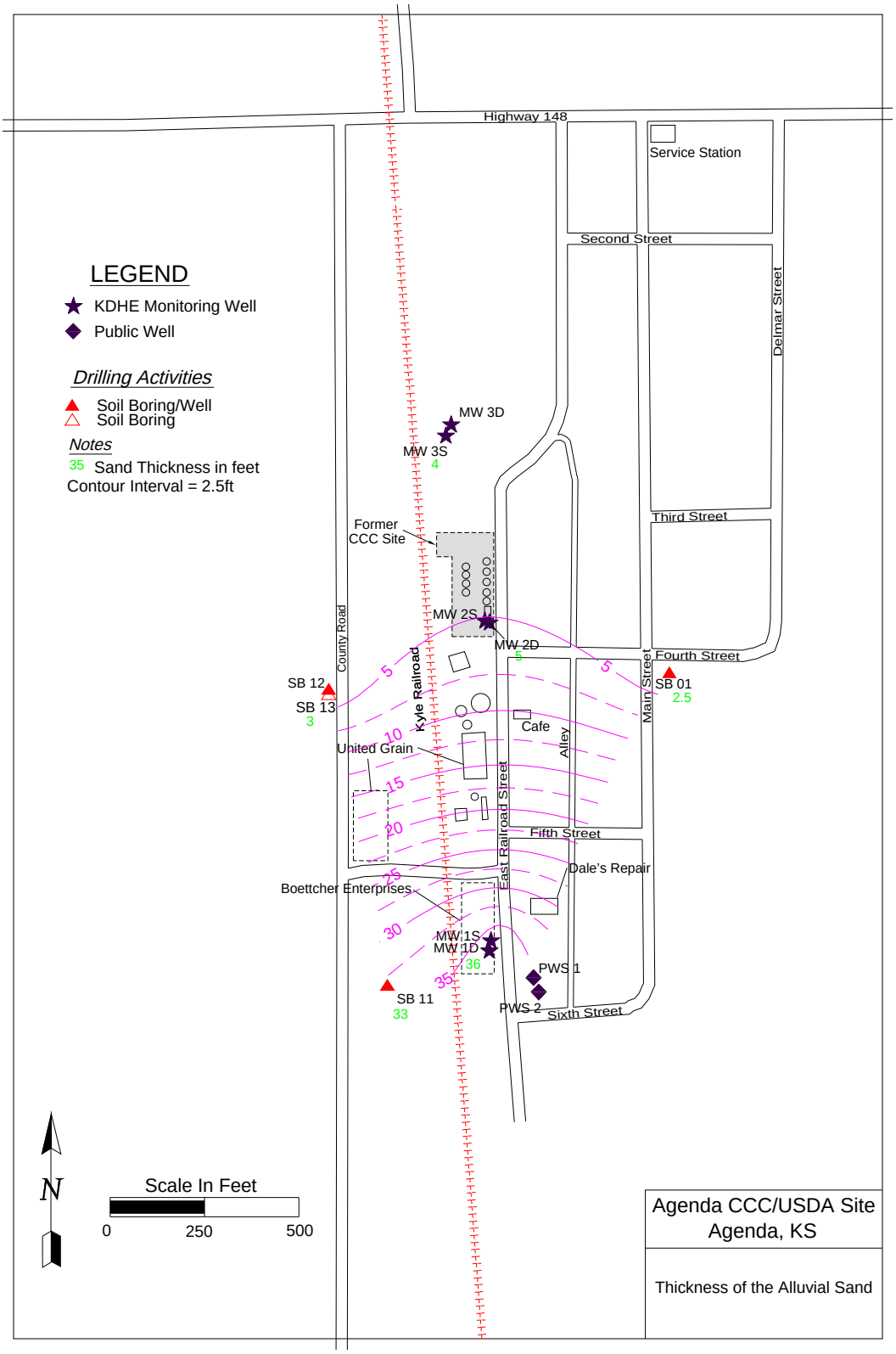


FIGURE 3.5 Map of Agenda, Kansas, Showing the Former CCC/USDA Site; the Locations of Public Water Supply and KDHE Monitoring Wells; the Locations of Phase I and Phase II Boreholes, Piezometer SB02, and Temporary Wells SB01, SB11, and SB12; and the Thickness of the Alluvial Sand

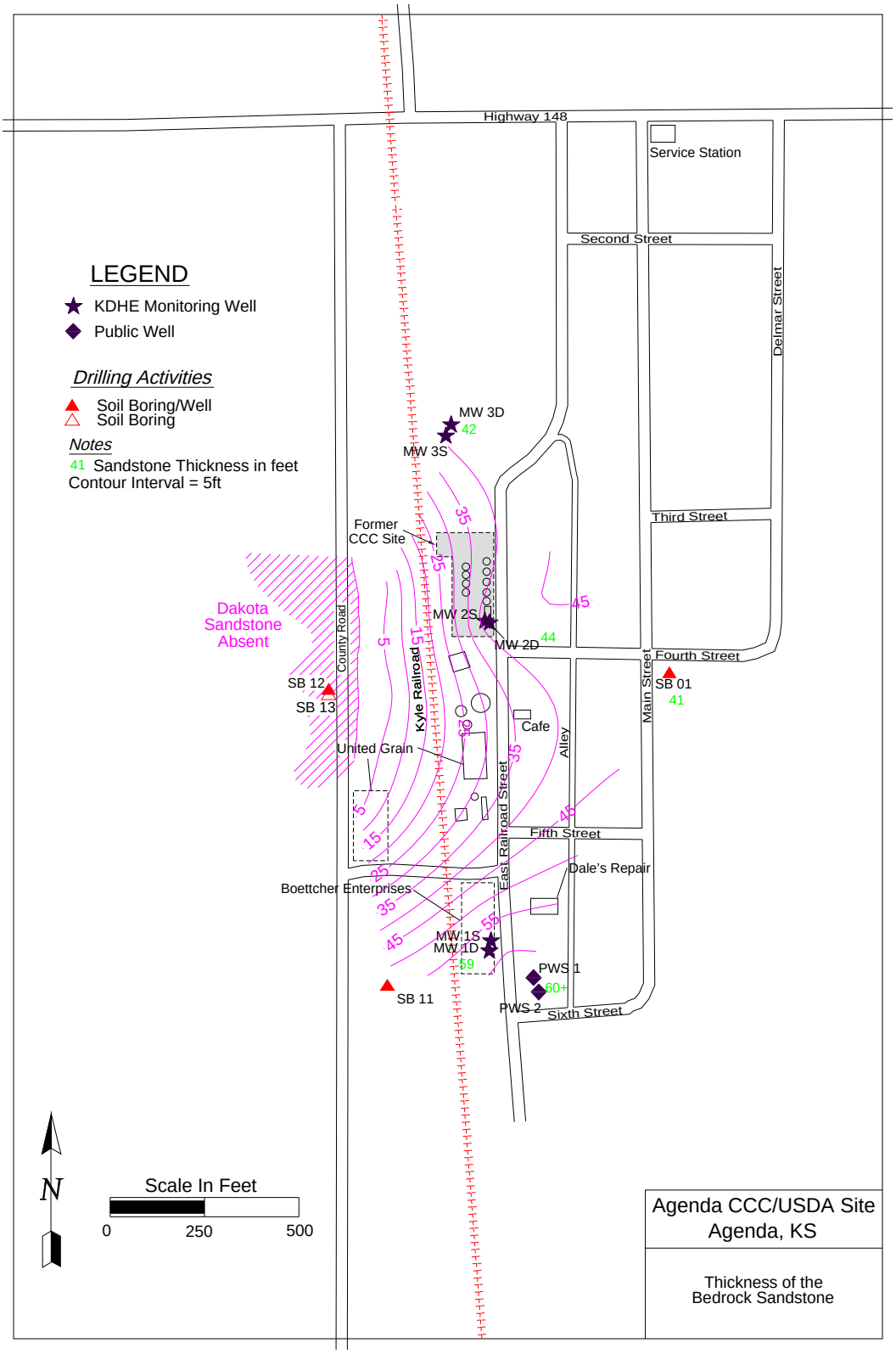


FIGURE 3.6 Map of Agenda, Kansas, Showing the Former CCC/USDA Site; the Locations of Public Water Supply and KDHE Monitoring Wells; the Locations of Phase I and Phase II Boreholes, Piezometer SB02, and Temporary Wells SB01, SB11, and SB12; and the Thickness of the Bedrock Sandstone

constructed by correlating the lithologic and geophysical data from SB01, SB11-SB13, the three deep KDHE boreholes (MW 1D, MW 2D, and MW 3D), the ECPT resistivity and mechanical property logs, and the driller's log from well PWS 2. Copies of the logs from Phase II are in Appendix A. Logs from Phase I and the prior investigations are in Appendix A of the *Phase I Report* (Argonne 1996b).

The uppermost stratigraphic unit consists of brown to red-brown unconsolidated silts and silty clays. This unit extends to approximately 55 ft BGL (1,342 ft AMSL) at the northern end of the study area (at MW 3D [section B-B´]), but only to approximately 20 ft BGL (1,391 ft AMSL) at the southern end of the area (at MW 1D [section B-B´] and SB11 [section C-C´]). At SB01 (eastern end of section A-A´), the unit contains a 2-ft-thick bed of light gray, silty sand at approximately 18 ft BGL (1,394 ft AMSL); at SB06 the unit contains a thin (< 0.1 ft) horizon of limestone gravel pebbles at approximately 50 ft BGL (1,363 ft AMSL).

Throughout the study area, the uppermost silt and silty clay unit is underlain by a quartz sand that is tan to orange-brown, very fine to medium grained, and slightly silty to silty. Along the line of section A-A´ and northward, this sand ranges from 2.5 to 5 ft thick (Figure 3.5), and at SB01 and MW 2D it is interbedded with a series of red-brown sandy silts. To the south along section C-C´, this sand thickens gradually to 33-36 ft. At SB11 (the western end of section C-C´), the sand contains several iron oxide-stained horizons, as well as possible clasts of sandstone. Sandstone clasts were also reported on the lithologic log of MW 1D (PRC 1994b).

Over most of the study area, this alluvial sand unit is underlain by a finely laminated gray shale (approximately 10 ft thick at SB01 [section A-A´]) that contains disseminated flakes and, at two locations (SB01 and MW 1D), thin seams of coal. At SB01, the upper 7 ft of this shale is mottled light and dark gray; the shale contains abundant vertical fractures stained by iron oxide, both characteristics of a weathered zone. This shale grades downward initially into a varicolored gray and red siltstone and shale and finally to a dark red siltstone. At SB13 (western end of section A-A´), the gray shale is absent, with the sand overlying a mottled red and gray shale.

At SB01 and SB11 and in the three KDHE boreholes (MW 1D-MW 3D), the shale-siltstone horizon is underlain by a tan, fine to medium grained, well-sorted, subrounded clear quartz sandstone. Where it is present, this sandstone ranges from approximately 41 ft thick at SB01 (Figure 3.6) to about 60 ft thick at MW 1D. At SB01, SB11, MW 2D, and MW 3D, this sandstone is underlain by a gray shale, which at SB01 exhibits some red mottling. The base of the sandstone was not encountered in MW 1D or PWS 2. At SB13 (the western end of

section A-A´), where this sandstone is not present, the equivalent stratigraphic section consists of a red-gray mottled shale to the depth of the borehole (150 ft BGL; 1,246 ft AMSL).

3.1.2 Depositional Environments

The unconsolidated silt and silty clay unit and the silty sand unit that overlie the bedrock shale together compose a Pleistocene age terrace. Regional mapping of Republic County and the adjacent counties by the Kansas Geological Survey (Bayne and Walters 1959; Walters and Bayne 1959; Fishel and Leonard 1955; Fishel 1948; Wing 1930), and the U.S. Geological Survey (Byrne et al. 1950) indicated that many alluvial terraces were formed in the valleys across northeastern Kansas during the repeated cycles of Pleistocene glaciation. The materials in these terraces were derived principally by erosion of nearby bedrock outcrops (Byrne et al. 1950). In some cases, alluvial materials are mantled by or interbedded with loess. At Agenda, the fine clayey silt that composes the uppermost portion of the unconsolidated section might be partly loess, while the limestone gravel encountered at SB06, the sand containing clasts of sandstone, and the interbedded silts and sands at the base of the sequence probably represent fluvial deposits. The weathered zone at the top of the shale at SB01 is likely to represent an erosional surface developed before the alluvial terrace was deposited.

Stratigraphic studies indicate that the bedrock at Agenda is the Cretaceous age Dakota formation (Wade 1992). This formation contains two distinct facies assemblages: a *deltaic* assemblage and a *fluvial* assemblage (Wade 1992; Macfarlane et al. 1991). These assemblages are separated by a flooding surface, above which sediments were deposited in the subaqueous portion of a river-dominated delta system and below which sediments were deposited by rivers in a coastal plain setting (Macfarlane et al. 1991).

Regionally, the deltaic facies assemblage consists of approximately 50% interlaminated shales, mudstones, and very fine to fine grained quartz sandstones, which have a high organic content (Wade 1992). The remainder is composed of relatively clean, fine grained quartz sandstones. Wade (1992) interpreted the interlaminated sequence as abandoned distributary channel and delta-front deposits, with the clean sandstones representing active distributary channels and distributary mouth bars. The characteristics of the shales immediately below the bedrock surface at Agenda (finely laminated with abundant disseminated flakes and occasional thin seams of coal) imply that these shales were deposited in the deltaic facies of the Dakota.

The underlying fluvial facies assemblage of the Dakota formation consists of approximately 60% varicolored mudstones, with some thin, very fine grained levee and crevasse splay sandstones that were deposited on coastal floodplains (Wade 1992). The remaining 40% of the formation is composed of fine to medium grained sandstones that commonly fine upward and contain large-scale cross beds, characteristics indicating that they were deposited as point bars in river channels (Wade 1992). The varicolored siltstones that underlie the organic-rich shales in SB01 (section A-A´) document the transition to the alluvial facies of the Dakota, representing sediments deposited on a floodplain, with the underlying sandstone having accumulated in a river channel as a series of point bars. The absence of sandstone at SB13 indicates that the western margin of this channel lies between SB13 to the west and SB11, MW 2D, and MW 3D to the east (Figure 3.6).

Regional studies indicate that the channel sandstone sequences in the Dakota formation's alluvial facies are discontinuous and ribbon-like (Macfarlane et al. 1991). Measured dips on the cross beds in the channel sandstones indicate that the rivers depositing these sandstones flowed west-southwesterly (Wade 1992; Karl 1976). Thus, both the observed western margin (Figure 3.6) and the eastern margin of the sandstone unit are expected to trend generally west-southwest.

Drillers' logs of nearby irrigation wells (see Appendix A in Argonne 1996a) show one to five sandstones interbedded with "red clay" and "blue clay" within the stratigraphic interval of the Dakota formation equivalent to the investigated section at Agenda. Red coloration (i.e., "red clay") is characteristic of the fluvial assemblage of the Dakota (Wade 1992), while "blue clay" probably indicates deltaic facies deposits. However, the sinuous, discontinuous distribution of sandstones deposited in these environments precludes reliable correlation over all but very short distances. Nevertheless, their frequency of occurrence suggests a significant potential for cross-cutting between the individual sandstones in the immediate area.

3.2 Hydrogeology

This section describes the findings of and conclusions drawn from the hydrogeologic portion of the ESC investigation. The hydrogeologic interpretation presented in the *Phase I Report* (Argonne 1996b) was based on the observed stratigraphic sequence and the water level measurements made during Phase I (Argonne 1996b). The objectives of the second phase of the hydrogeologic investigation were to confirm the hydrostratigraphy and to gather additional

information on the directions of groundwater flow, potential gradients, and the hydrogeochemistry of the aquifers. The locations where hydrogeologic data were obtained during Phases I and II are illustrated in Figure 3.1.

3.2.1 Hydrostratigraphy

Previous studies identified two aquifers, termed shallow and deep (PRC 1994b), within the stratigraphic sequence described in Section 3.1. Relationships between these aquifers and the stratigraphic units in this sequence are illustrated in Figures 3.7-3.9, where well construction data and water levels measured on February 6, 1997, are superimposing on geologic cross sections A-A´, B-B´, and C-C´.

Combined with the stratigraphic information, the water levels indicate that the shallow aquifer is hosted by the sand at the base of the Pleistocene alluvial terrace sequence. Water levels in wells MW 1S and SB11 (section C-C´; Figure 3.9) lie below the top of the sand, indicating that the aquifer is unconfined in this area. In contrast, water levels in wells SB01, SB12, MW 2S, and MW 3S (sections A-A´ and B-B´; Figures 3.7 and 3.8) occur above the top of the sand. During drilling of SB01 and SB12, the silt and clay samples collected above the basal interbedded silty sands were damp to moist; only the sands appeared to be water saturated (see logs in Appendix A and the *Phase I Report* [Argonne 1996b]). This observation is consistent with reports on the lithologic log for MW 3S (PRC 1994b) of a “moist-wet” soil at 44 ft BGL (approximately 1,353 ft AMSL), a depth that corresponds to the top of the basal sand at this location. These observations imply that the shallow aquifer is at least semiconfined at these locations.

The deep aquifer is hosted by the sandstone unit in the Dakota formation bedrock. The two aquifers are separated by approximately 30-35 ft of Dakota formation shales and siltstones. However, the water levels in the deep aquifer are lower by only approximately 5-8 ft than the corresponding shallow water levels, suggesting that the intervening shales and siltstones function as a confining horizon and that the two aquifers not interconnected hydraulically.

The data are insufficient to determine whether the intervening shales and siltstones are water saturated. In cores collected at SB01 and SB11, the shales and siltstones were damp, but because the core samples were obtained by the mud rotary method, visual observations of moisture might be misleading. At SB01, the shales immediately below the alluvial sand are vertically

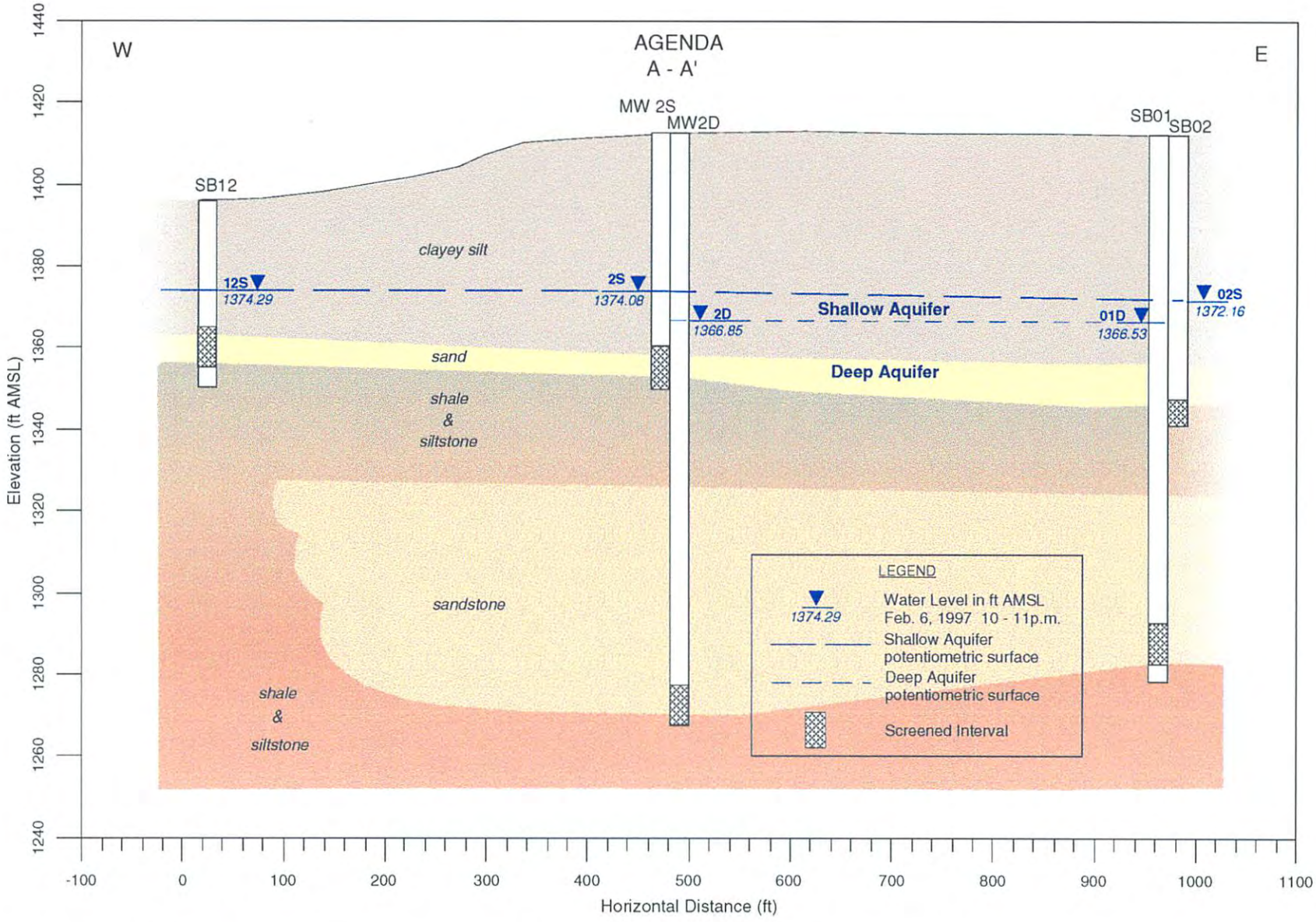


FIGURE 3.7 West-to-East Geologic Cross Section A-A´, Illustrating Relationships between Stratigraphy and the Shallow and Deep Aquifers in the Vicinity of the Former CCC/USDA Site at Agenda, Kansas

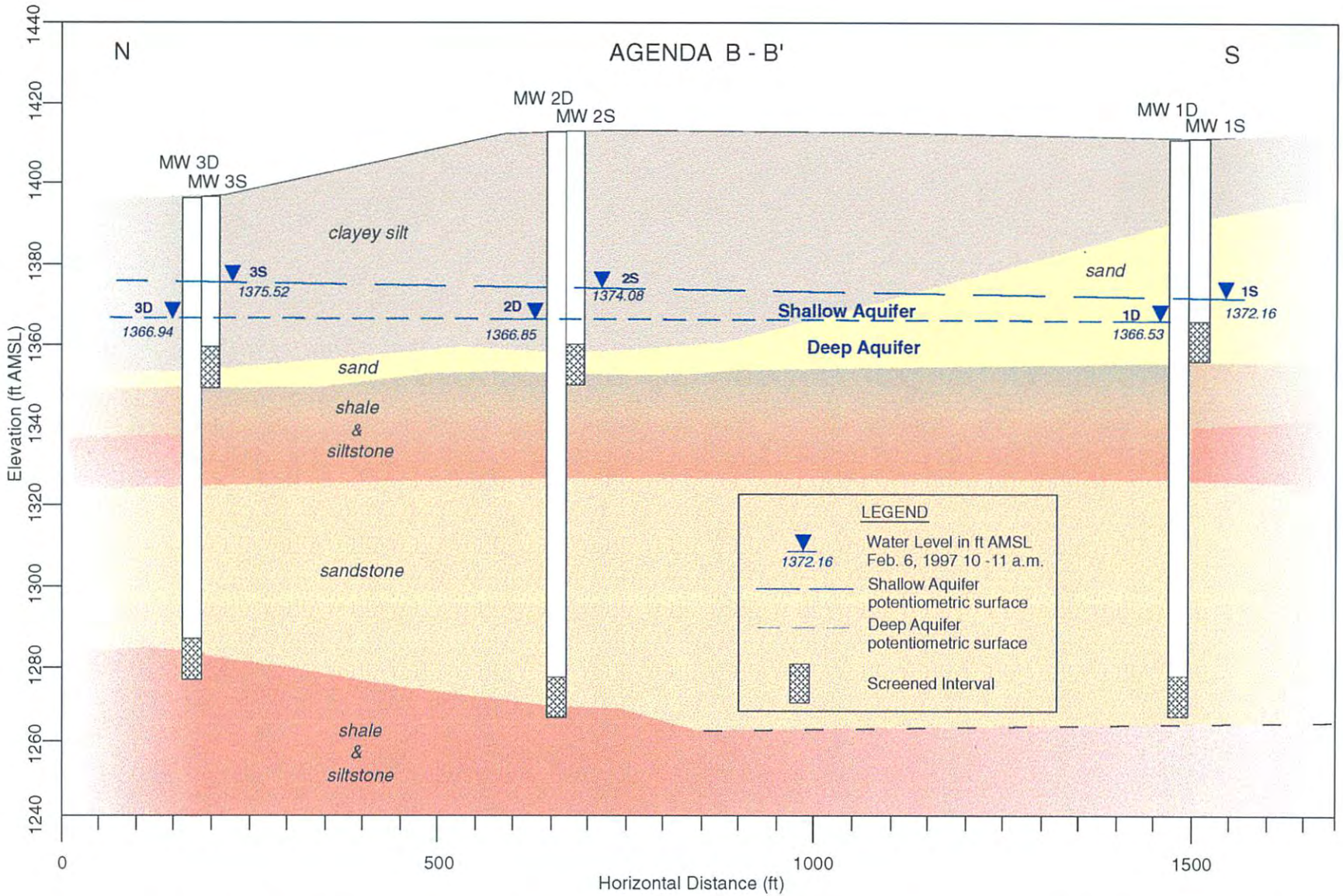


FIGURE 3.8 North-to-South Geologic Cross Section B-B´, Illustrating Relationships between Stratigraphy and the Shallow and Deep Aquifers in the Vicinity of the Former CCC/USDA Site at Agenda, Kansas

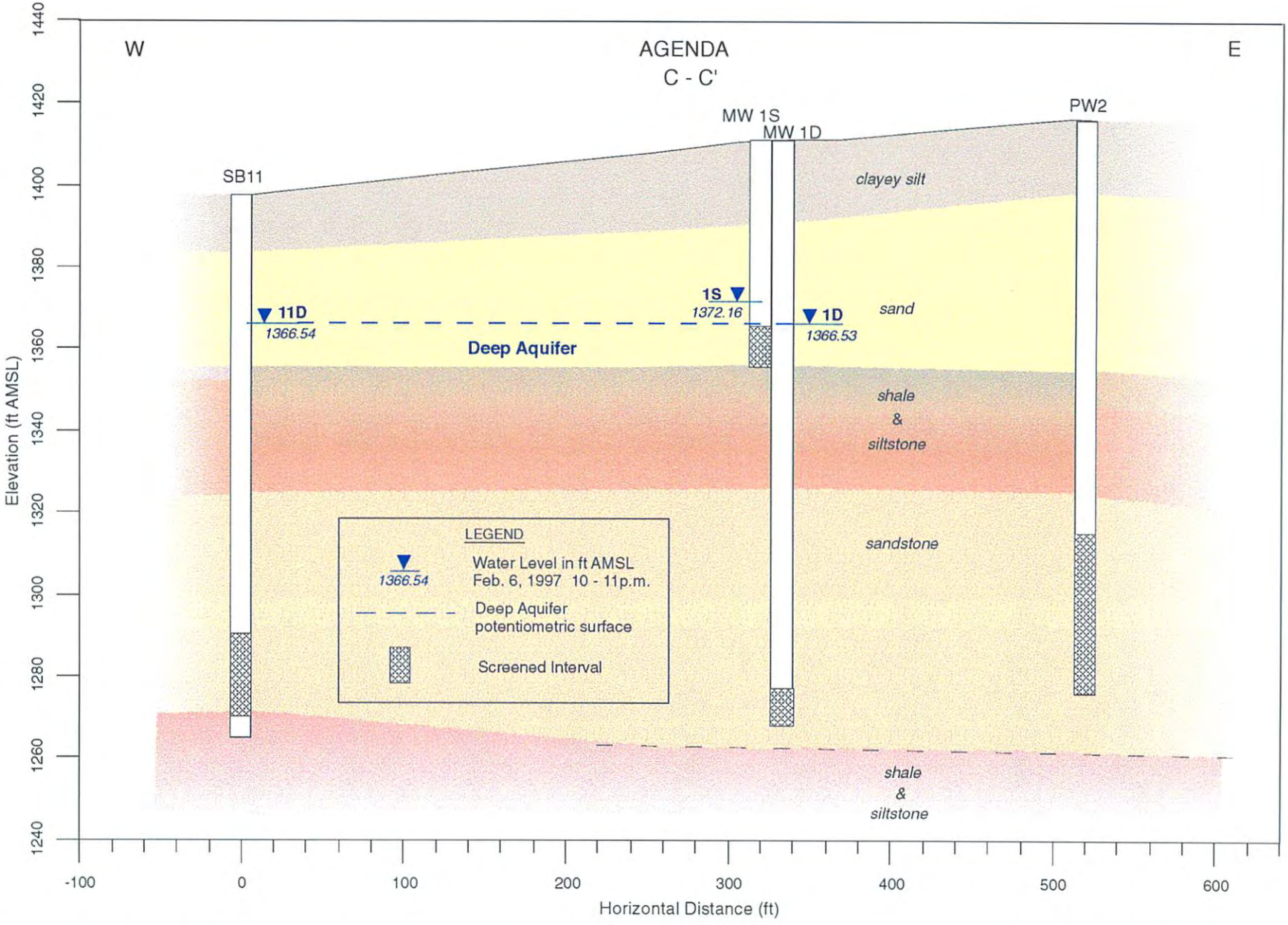


FIGURE 3.9 West-to-East Geologic Cross Section C-C′, Illustrating Relationships between Local Stratigraphy and the Shallow and Deep Aquifers in the Vicinity of Wells PWS 1 and PWS 2 at Agenda, Kansas

fractured and exhibit iron oxide staining, both of which could indicate water-saturated conditions within this zone. Alternatively, the iron oxide staining might have developed while the shale was exposed before the Pleistocene terrace was deposited. Below the fractured zone, the siltstones and shales are fresh, implying that they have not been exposed to oxygenated groundwater. Regionally, the Dakota aquifer is saturated throughout, with the lower-hydraulic-conductivity siltstones and shales contributing significantly to water storage in the aquifer but not to groundwater movement (Wade 1992). Thus, the shale-siltstone unit that separates the shallow and deep aquifers is probably water saturated.

The hydraulic heads in the shallow aquifer are typically about 5 ft higher than the heads in the deep aquifer at corresponding locations across the study area. This difference indicates that groundwater tends to flow downward from the shallow aquifer to the deep aquifer, although the magnitude of the downward flux through the intervening low-hydraulic-conductivity (K_h) silts and shales (typically with K_h values of 10^{-1} to 10^{-5} ft^3/ft^2 per year; Freeze and Cherry 1979) probably is not volumetrically significant locally (< 0.15 gal/yr·ft^2). However, an artificial conduit with higher conductivity, such as a well screened in both aquifers or a well that is gravel packed along its complete length, could produce a locally greater downward flux of shallow-aquifer water into the deep aquifer.

3.2.2 Water Levels

Figures 3.10 and 3.11 illustrate water levels recorded hourly by the Well Sentinel™ units for the period November 10 through December 10, 1996. The corresponding data are in Appendix C, Table C.1. No hourly data are available for SB02 because of an earlier malfunction of the transducer-Well Sentinel couple in this piezometer. A similar malfunction occurred in the monitoring equipment installed in SB11 on December 8, 1996 (Table C.1). Replacement transducers and Well Sentinel units have been ordered for these locations.

During the illustrated period, water levels in the shallow aquifer (Figure 3.10) experienced mostly small (0.1-0.4 ft) fluctuations of magnitude and duration consistent with variations in atmospheric pressure. On November 16, the water levels in MW 2S and MW 3S increased abruptly (by 1.6 and 0.6 ft, respectively). Rainfall records from Concordia, Kansas, indicate that this increase corresponded with a rainfall event of approximately 2 in. (NOAA 1996). This event is not reflected on the hydrograph for MW 1S. This observation is consistent with the inferred

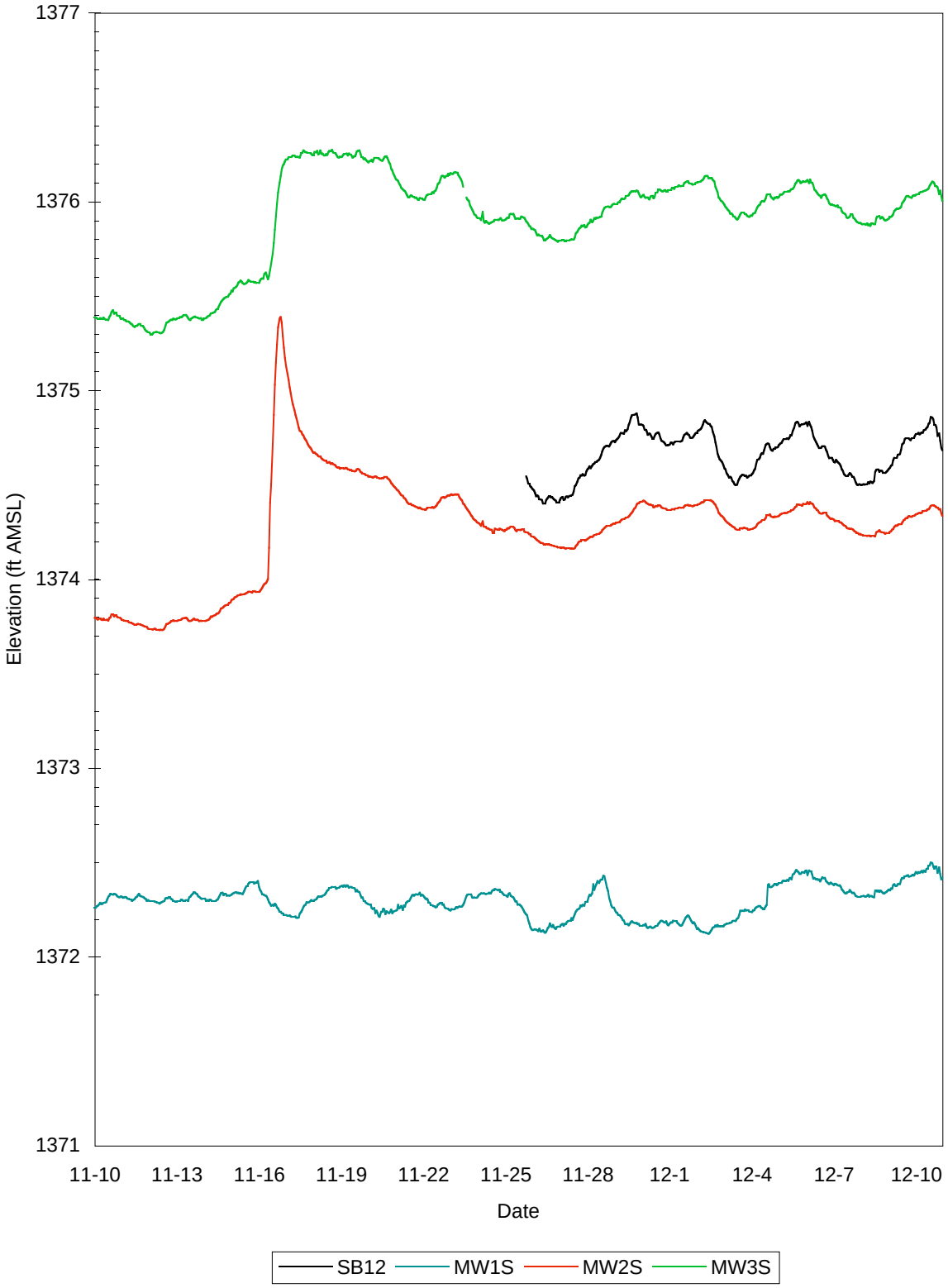


FIGURE 3.10 Variations in Groundwater Levels of the Shallow Aquifer from November 10 to December 10, 1996

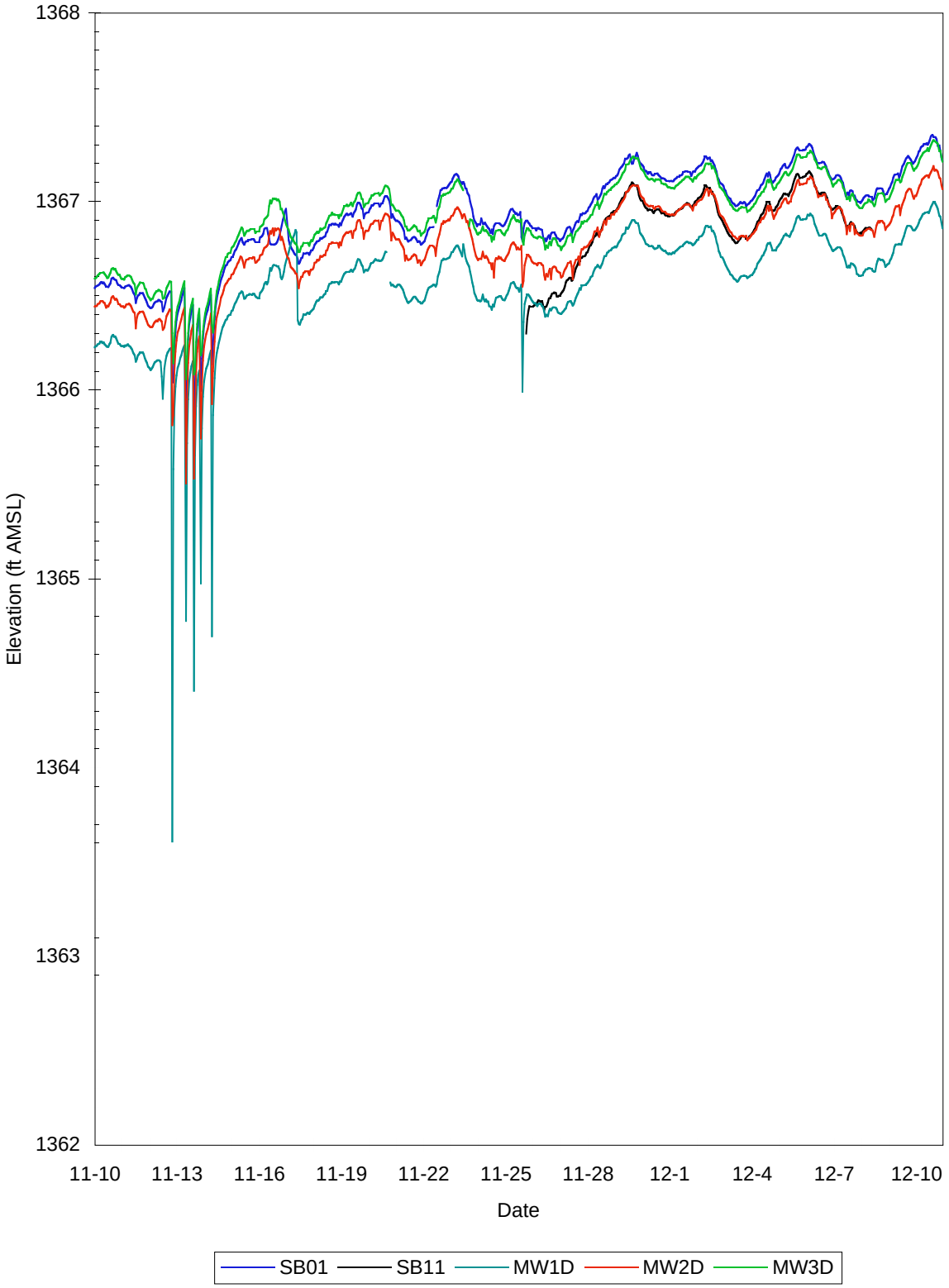


FIGURE 3.11 Variations in Groundwater Levels of the Deep Aquifer from November 10 to December 10, 1996

change in confining conditions of the shallow aquifer across the study area. At MW 2S and MW 3S, the aquifer exhibits confined or semiconfined behavior, while at MW 1S, the aquifer is unconfined. In a confined aquifer, water level changes are produced by pressure changes in the aquifer. Consequently, a change in head (i.e., pressure) in the recharge area of a confined aquifer can be transmitted rapidly through the aquifer. A similar response in an unconfined aquifer indicates a change in the volume of water stored in the aquifer, which requires the physical movement of water into the aquifer. Thus, the rapid response observed in MW 2S and MW 3S to the rainfall event effectively confirms the semiconfined character of the shallow aquifer at these locations.

Agenda's public water supply wells were removed from regular service when the city's water supply system was connected to a rural water supply line on October 25, 1996. Consequently, the hydrographs for the deep-aquifer wells (Figure 3.11) no longer exhibit the frequent (three to five cycles per day) drawdowns observed in May in conjunction with operation of these wells (Figure 4.5 in the *Phase I Report* [Argonne 1996b]). However, one of the public water supply wells apparently was in service temporarily from November 12 to 14, 1996 (Figure 3.11). During this time interval, the hydrographs exhibit drawdowns comparable to those observed before October 25, 1996 (Argonne 1996b); the largest drawdowns occurred at MW 1D (the monitoring well closest to the public water supply wells), and the magnitude of the drawdowns decreased with distance from the public water supply wells.

The coincident drawdowns in the deep-aquifer wells across the site during pumping of the public water supply wells (Figure 3.11) indicate that these locations are hydraulically interconnected and that the radius of influence of the public water supply wells extends at least to MW 3D and SB01. In contrast, no coincident drawdowns are present on the hydrographs of the shallow-aquifer wells (Figure 3.10), indicating that the deep aquifer is effectively separated hydraulically from the shallow aquifer over the area covered by the water level monitoring network. However, when they are not modified by pumping, the water levels in the deep aquifer do exhibit fluctuations parallel to those in the shallow aquifer, a behavior consistent with a barometric origin for the fluctuations.

The hydrographs for the deep-aquifer wells (Figure 3.11) also exhibit drawdowns associated with the development of well SB11 on November 25, 1996. In addition, the recovery of the deep aquifer from the developmental overpumping of SB11 is reflected on the hydrograph for SB11, with the water levels taking approximately two days to recover fully. After recovery, the water level in SB11 closely paralleled the water levels in the other four deep-aquifer wells.

3.2.3 Hydraulic Conductivities

Well response (i.e., slug) tests were performed on four wells (MW 1D, MW 3D, SB01, and SB11) in the deep aquifer and three wells (MW 1S, MW 3S, and SB12) in the shallow aquifer to obtain estimates of the horizontal hydraulic conductivity (K_h) of the aquifer materials in the vicinity of these wells. Each well was tested three times, except for well MW 1D, to evaluate the reproducibility of the casing pressurization slug test procedures. Only two tests were performed on well MW 1D. Measurements of time versus residual drawdown recorded for each of the slug tests are presented in Appendix D. Key well construction and analysis parameters used in interpreting the slug tests are summarized in Table 3.1.

The test data for well MW 1S revealed an irregular pattern of water level recovery. Water levels measured in the shallow aquifer prior to testing indicated that the static water level at MW 1S was below the top of the annular sand pack surrounding the well casing (but above the top of the well screen), allowing rapid drainage of water from the sand pack into the well screen during the tests. These conditions precluded use of the MW 1S test data for the reliable estimation of K_h, and no further analyses of the MW 1S results were carried out. Slug test data for the remaining six wells were analyzed by using the interpretive procedures developed by Bouwer and Rice (1976), Bouwer (1989), and Hvorslev (1951), which are based on the fitting of theoretical linear-response trends to the measured data sets. Results of the analyses are summarized in Table 3.2. The measured water level response curves for the three tests performed in each well were very similar; diagrams showing representative curve fits for each of the slug test data sets are included in Appendix D, Figures D.1-D.12.

The hydraulic conductivities determined for each of the deep-aquifer wells from the Hvorslev (basic time lag and variable-head methods) and Bouwer and Rice analyses are in close agreement, generally within 20%. Estimated K_h values for the deeper aquifer range from 6.5 to 8.9 feet per day (ft/d) at wells SB01 and MW 1D, 11.6 to 14.0 ft/d at SB11, and 16.7 to 20.3 ft/d at MW 3D. The hydraulic conductivity estimated for the shallow aquifer at well MW 3S (4.9-9.1 ft/d) is similar to values obtained for the deeper aquifer at wells SB01 and MW 1D. The K_h values estimated for SB12 by using the Hvorslev basic time lag method (4.1-5.7 ft/d) are two to four times higher than those determined by using either the Hvorslev variable-head method or the Bouwer and Rice analysis (2.1-2.3 ft/d and 1.5-1.6 ft/d, respectively). The basic time lag analysis is very sensitive to changes in water level occurring during the first few moments of the slug test. The higher K_h values calculated for the SB12 tests with this method reflect the influence

TABLE 3.1 Measured and Calculated Parameters Used in the Analysis of the Slug Tests for Agenda

	Well						
	MW 1S	MW 1D	MW 3S	MW 3D	SB01	SB11	SB12
Well Construction Data							
Saturated thickness (h), ft	31.0	58.0	4.0	42.0	40.5	53.5	3.0
Depth of well (Lw),[a] ft	31.0	56.0	4.0	42.0	40.5	53.5	3.0
Length of well screen (Le),[a] ft	14.0	15.0	4.0	15.0	15.0	22.4	3.0
Casing diameter (2*Rc), ft	0.167	0.333	0.167	0.333	0.333	0.333	0.333
Drilled-hole diameter (2*Rw), ft	0.688	0.750	0.688	0.750	0.625	0.646	1.000
Well/screen ratio (Le/Rw)	40.7	40.0	11.6	40.0	48.0	69.3	6.0
Bouwer and Rice Analysis Parameters							
Parameter (Rc2/2*Le), ft	NA[b]	0.000926	0.000868	0.000926	0.000926	0.00062	0.004629
Ratio [ln(Re/Rw)]	NA	3.255	1.772	3.393	3.539	3.803	1.293
Effective radius (Re), ft	NA	9.72	2.02	11.16	10.77	14.48	1.82
Volume tested [rw<Vol<Re], ft^3	NA	4,440	50	5,860	5,460	14,800	29
Dimensionless Parameter A	NA	2.78	NA	NA	NA	NA	NA
Dimensionless Parameter B	NA	0.43	NA	NA	NA	NA	NA
Dimensionless Parameter C	NA	NA	1.35	2.46	2.71	3.31	0.96

[a] Effective value relative to thickness of saturated sand.

[b] Not available.

TABLE 3.2 Summary of Hydraulic Conductivity Estimates Detemined from Slug Tests

	Bouwer and Rice Method (K_h, ft/d)			Hvorslev Basic Time Lag Method (K_h, ft/d)			Hvorslev Variable Head Method (K_h, ft/d)		
Well	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
Shallow Aquifer									
MW 1S	NA[a]	NA	NA	NA	NA	NA	NA	NA	NA
MW 3S	6.0	5.4	4.9	9.1	7.6	7.4	8.4	7.4	6.8
SB12	1.6	1.5	1.5	5.7	4.7	4.1	2.3	2.2	2.1
Deep Aquifer									
MW 1D	7.3	7.6	ND[b]	8.6	8.9	ND	8.2	8.6	ND
MW 3D	17.4	17.1	16.7	20.3	19.2	18.9	18.6	18.2	17.9
SB01	6.6	6.5	6.5	7.7	7.6	7.5	7.2	7.2	7.2
SB11	11.7	11.7	11.6	14.0	13.9	13.7	13.0	13.0	12.9

[a] NA, data could not be analyzed reliably.

[b] ND, test not performed.

of initial oscillations in water level in this well (possibly related to the construction of the well), which were damped out within the first 0.1 sec of each test. The lower K_h values determined from the very well-defined linear recovery trends observed after 0.04 sec in the SB12 tests, reflected in the Bouwer and Rice and the Hvorslev variable-head analyses, are considered more representative of the actual character of the aquifer materials at this location and are qualitatively consistent with the observed thinning of the shallow aquifer at this well.

3.2.4 Groundwater Movement

The configuration of the potentiometric surface of the shallow aquifer is illustrated in Figure 3.12. This map, constructed by using water levels recorded by hand between 10:00 and 11:13 a.m. on February 6, 1996, is comparable to the map constructed previously (Figure 4.6 in Argonne 1996b). The water levels indicate that within the limits of the water level monitoring network, groundwater in the shallow aquifer was flowing to the southeast under a mean gradient of approximately 0.004 ft/ft (Table 3.3). This gradient corresponds to Darcy velocities of approximately 3-15 ft/yr or flow rates (i.e., average linear velocities) of approximately 10-100 ft/yr (assuming pore fractions of 0.15-0.3 and K_h values of 2-10 ft/d).

The configuration of the deep aquifer's potentiometric surface shown in Figure 3.13 is based on water levels recorded by hand between 10:00 and 11:13 a.m. on February 6, 1996. The data from MW 2D were excluded from Figure 3.13 because further analysis of data collected during installation of the transducer-Well Sentinel couple in this well during Phase I implied that the well is inclined, so that measured water levels do not accurately reflect actual water levels in the aquifer.

When a transducer-Well Sentinel couple is installed, the equipment is initially calibrated to a hand-measured reference water level. After calibration, the equipment is tested for linearity by offsetting (i.e., raising or lowering) the transducer a fixed distance (typically 10 ft) from its calibration depth. In a vertical well, the change in the depth of water measured by the transducer will match the offset distance. However, during installation at MW 2D, the change in water level measured by the transducer differed from the offset distance by approximately 0.2 ft. The transducer measures the hydrostatic pressure of the overlying water column, and the Well Sentinel converts this measurement to an equivalent depth of the water. Thus, the measurement is necessarily vertical. If a well is inclined significantly, the offset distance might not be strictly

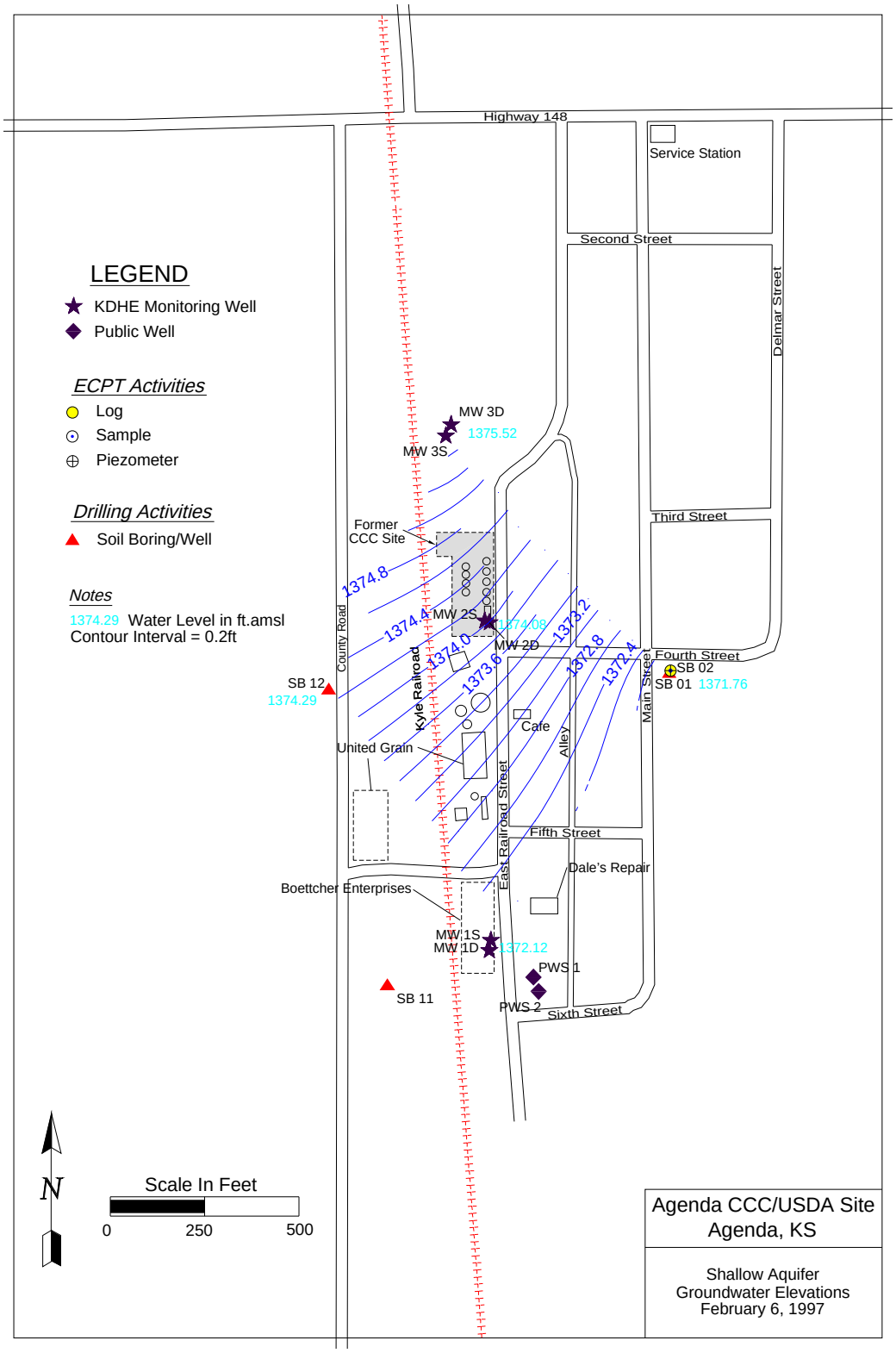


FIGURE 3.12 Map of Agenda, Kansas, Showing the Former CCC/USDA Site; the Locations of Public Water Supply and KDHE Monitoring Wells; the Locations of Phase I and Phase II Boreholes, Piezometer SB02, and Temporary Wells SB01, SB11, and SB12; and Groundwater Elevations in the Shallow Aquifer on February 6, 1997

TABLE 3.3 Results of Three-Point-Problem Calculations for Aquifer Flow Direction and Gradient

Well Set	Horizontal Location[a] Easting (ft)	Horizontal Location[a] Northing (ft)	Water Level Elevation[b] (ft AMSL)	Flow Direction (degrees, azimuth)	Gradient (ft/ft)
Shallow Aquifer					
MW3S	2159525.211	501692.938	1375.52	154	4.7E-03
SB02	2160103.417	501081.983	1371.76	(S26E)	
MW2S	2159618.394	501225.847	1374.08		
MW3S	2159525.211	501692.938	1375.52	147	3.3E-03
SB12	2159198.307	501029.278	1374.29	(S33E)	
MW2S	2159618.394	501225.847	1374.08		
SB12	2159198.307	501029.278	1374.29	114	3.1E-03
SB02	2160103.417	501081.983	1371.76	(S66E)	
MW1S	2159657.432	500391.881	1372.16		
Mean				138	3.7E-03
				(S42E)	
Deep Aquifer					
MW3D	2159525.369	501705.049	1366.94	215	2.7E-04
SB01	2160101.343	501073.495	1366.89	(S35W)	
MW2D	2159626.868	501220.947	1366.85		
SB01	2160101.343	501073.495	1366.89	208	4.4E-04
MW2D	2159626.868	501220.947	1366.85	(S28W)	
MW1D	2159657.127	500378.826	1366.53		
MW2D	2159626.868	501220.947	1366.85	205	4.3E-04
MW1D	2159657.127	500378.826	1366.53	(S25W)	
SB11	2159373.888	500247.173	1366.54		
Mean				209	3.8E-04
				(S29W)	

[a] Horizontal coordinates of target location centers are shown, not points selected to represent ground elevations or to provide reference elevations. Northings and Eastings are Kansas State Plane Coordinates shown in feet. Horizontal datum is converted North American Datum (NAD) 27.

[b] Vertical datum is National Geodetic Vertical Datum (NGVD) 29. Water levels were measured by hand between 10:00 and 11:13 a.m. on February 6, 1997.

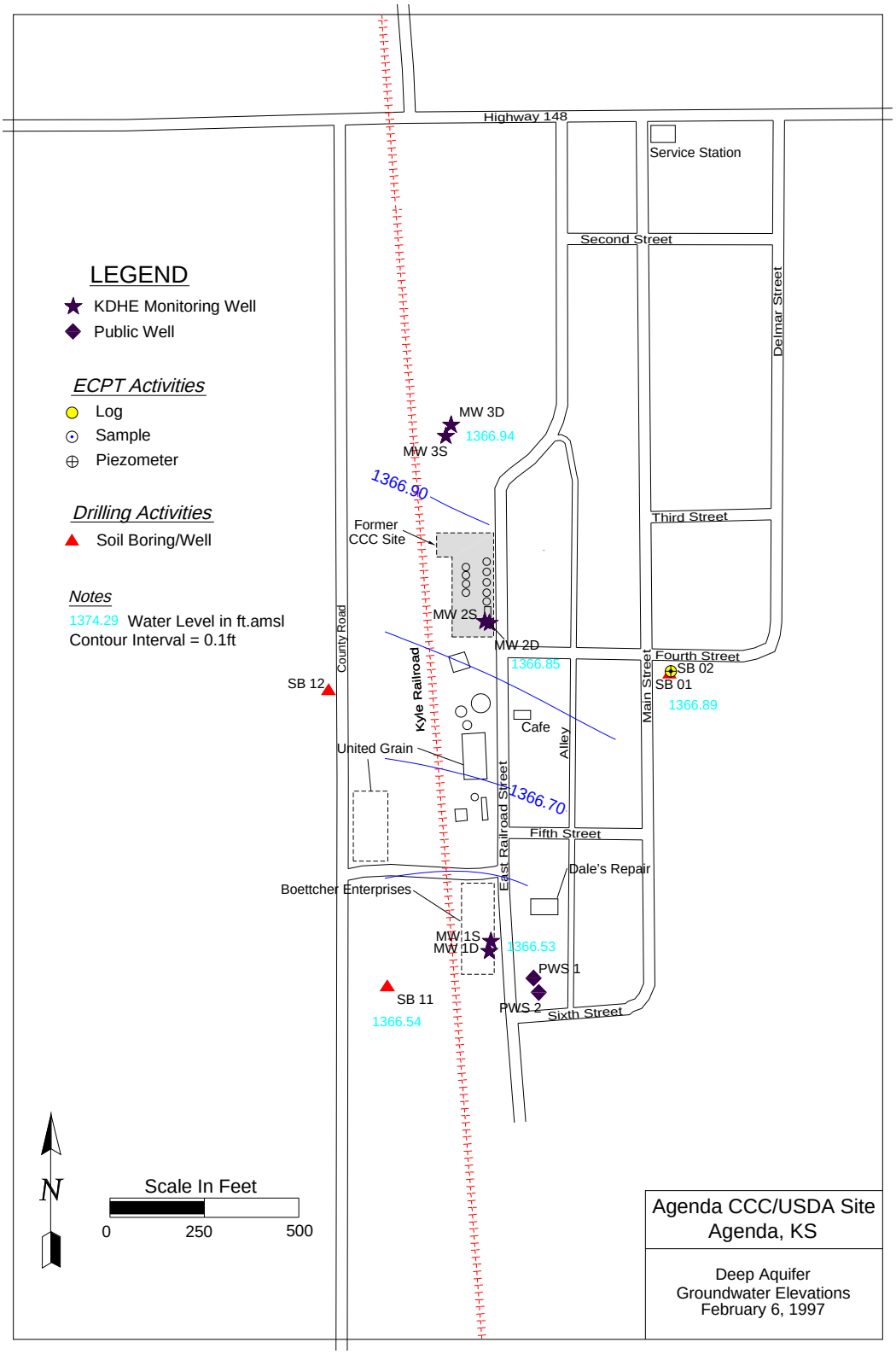


FIGURE 3.13 Map of Agenda, Kansas, Showing the Former CCC/USDA Site; the Locations of Public Water Supply and KDHE Monitoring Wells; the Locations of Phase I and Phase II Boreholes, Piezometer SB02, and Temporary Wells SB01, SB11, and SB12; and Groundwater Elevations in the Deep Aquifer on February 6, 1997

vertical; the result is a measurable difference between the offset distance and the change in water depth. In MW 2D, several combinations of transducers and Well Sentinels were tested, all yielding comparable results.

The water levels in the deep-aquifer wells, excluding MW 2D (Figure 3.13), indicate that within the limits of the water level monitoring network, the groundwater was flowing generally south-southwest under a mean gradient of approximately 0.0004 ft/ft (Table 3.3). This gradient corresponds to Darcy velocities of approximately 1.5-2.9 ft/yr or average linear velocities of approximately 5-20 ft/yr, with pore fractions of 0.15-0.3 and K_h of 10-20 ft/d. This pattern of groundwater flow is comparable to that observed during Phase I (Figure 4.9, Argonne 1996b).

3.2.5 Hydrogeochemistry

The objectives of the hydrogeochemistry program were (1) to characterize the geochemistry of the groundwater in the shallow and deep aquifers and (2) to seek geochemical evidence for hydraulic interconnections between the two aquifers from their geochemical characteristics. During Phase I, groundwater samples were collected from the six KDHE monitoring wells, temporary well SB01, PWS 1, and ten domestic wells and by using the ECPT (Figure 1.2). These samples were analyzed for their chemical and isotopic compositions. During Phase II, this database was supplemented by collecting and analyzing water samples from the two new temporary wells (SB11 and SB12) and from three additional ECPT test locations. Detailed descriptions of the samples and the analytical results are in Appendix F.

3.2.5.1 Ionic Compositions

The relative proportions of the major cations (calcium, magnesium, and sodium plus potassium) and anions (chloride, nitrate, sulfate, and bicarbonate plus carbonate) in the groundwater samples from the monitoring and temporary wells, ECPT test holes, domestic wells, and PWS 1 are illustrated on a Piper trilinear diagram in Figure 3.14. Concentrations (meq/L) used to construct this figure are in Table 3.4.

The water in both aquifers is dominated by calcium (Ca^{2+} > 50% equivalent) and bicarbonate (HCO_3^- > 50% equivalent), indicating that the aquifers are both of the calcium bicarbonate type (Back 1961). The deep-aquifer waters exhibit less total variation in their

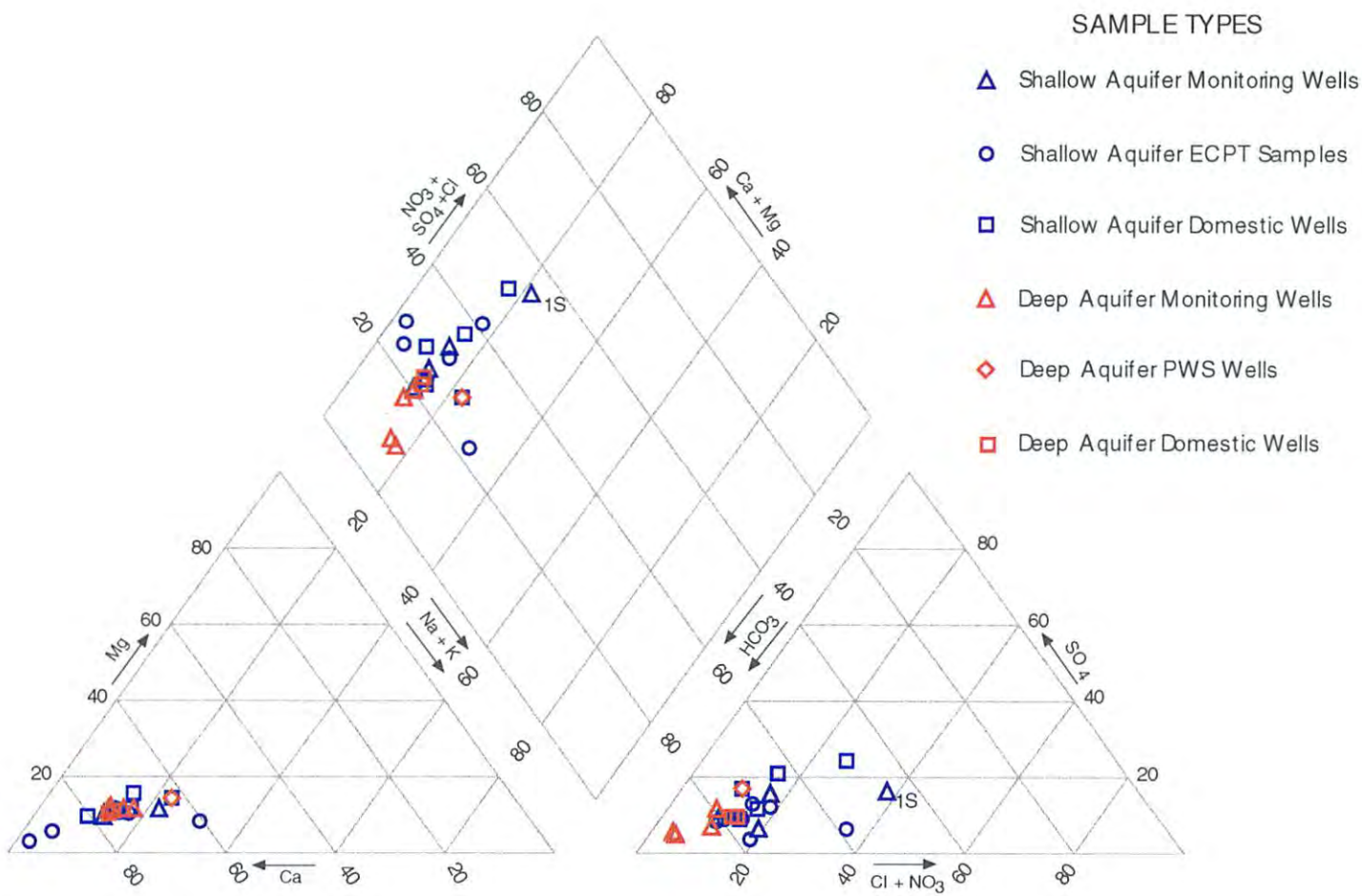


FIGURE 3.14 Piper Trilinear Plot Showing Major Cation and Anion Compositions (%) of Groundwater Samples from Agenda, Kansas

TABLE 3.4 Concentrations of Major Cations and Anions in Groundwater Samples, Agenda, Kansas

				Concentration (meq/L)							
Sample Type[a]	Location	Sample	Aquifer	Alkalinity (HCO_3^-)	Chloride (Cl^-)	Nitrate (NO_3^-)	Sulfate (SO_4^{2-})	Calcium (Ca^{2+})	Magnesium (Mg^{2+})	Potassium (K^+)	Sodium (Na^+)
DW	1	4850	Deep	6.99	1.04	0.16	0.85	6.74	0.96	< 0.46	1.28
DW	2	4851	Shallow	6.99	1.14	0.23	0.76	7.58	1.08	< 0.46	1.40
DW	3	4852	Shallow	5.20	0.63	0.22	1.18	5.14	1.18	0.56	1.36
DW	5	4862	Deep	5.00	0.72	0.22	0.62	6.79	0.91	< 0.46	1.21
DW	6	4863	Shallow	6.99	0.80	0.44	0.84	8.28	1.15	< 0.46	1.67
DW	8	4866	Shallow	4.50	0.56	0.60	1.46	7.14	1.59	< 0.46	1.59
DW	9	4868	Shallow	6.99	3.02	0.81	3.44	12.52	1.93	< 0.46	3.07
DW	10	4876	Shallow	5.00	0.70	0.47	0.78	7.68	0.90	< 0.46	0.97
PWS	1	4869	Deep	3.30	0.82	0.08	0.74	5.79	0.87	< 0.46	1.88
MW	1D	4890	Deep	5.00	0.50	0.10	0.69	5.64	0.88	< 0.46	1.01
MW	1S	4891	Shallow	5.00	2.59	1.57	1.70	10.98	1.88	< 0.46	3.66
MW	2D	4878	Deep	6.99	0.76	0.15	0.59	6.69	1.01	< 0.46	1.12
MW	2S	4877	Shallow	6.99	0.75	0.99	1.61	11.43	1.59	< 0.46	2.13
MW	3D	4902	Deep	6.99	0.38	0.04	0.35	4.80	0.73	< 0.46	1.04
MW	3S	4901	Shallow	7.19	0.74	0.23	0.86	7.29	0.87	< 0.46	1.23
SB	1	4879	Deep	5.50	0.26	0.01	0.33	4.58	0.71	< 0.46	1.14
SB	11	4965	Deep	5.99	0.34	0.10	0.52	4.54	0.67	< 0.46	1.17
SB	12	4966	Shallow	6.99	1.43	0.43	0.54	8.58	1.12	< 0.46	1.52
ECPT	2	4880	Shallow	5.99	1.00	0.22	0.67	6.39	0.96	< 0.46	1.24
ECPT	7	4881	Shallow	3.80	0.71	1.60	0.41	10.88	1.48	< 0.46	2.61
ECPT	8	4882	Shallow	4.50	1.00	0.13	0.21	20.01	2.55	1.31	8.96
ECPT	9	4883	Shallow	6.99	1.19	0.21	0.82	22.06	1.27	< 0.46	1.40
ECPT	10	4885	Shallow	5.99	1.02	0.24	1.07	48.00	1.33	< 0.46	1.53
ECPT	14	4961	Shallow	5.99	0.65	0.97	1.05	9.53	1.36	< 0.46	2.09
ECPT	15	4962	Shallow	6.99	0.87	0.17	0.77	6.94	0.91	< 0.46	1.31
ECPT	16	4964	Shallow	6.99	0.85	0.10	0.68	6.24	0.81	< 0.46	1.26

[a] Sample types: DW, drinking water; PWS, public water supply; SB, soil boring; ECPT, electronic cone penetrometer.

compositions than shallow-aquifer waters, and the former generally have a greater percentage of bicarbonate. The higher, more variable chloride (Cl^-), nitrate (NO_3^-), and sulfate (SO_4^{2-}) contents of shallow-aquifer waters are probably derived from anthropogenic nonpoint sources, except for MW 1S, in which the high nitrate concentration probably reflects the nitrogen fertilizer spill at the adjacent Boettcher Enterprises facility (PRC 1994b). The two aquifers are most readily distinguished by the relatively greater percentage of noncarbonate anions (nitrate, sulfate, and chloride) in the shallow-aquifer waters.

Geochemical calculations performed by using PHREEQC (Parkhurst 1995), an aqueous speciation and reactive transport model, indicate that deep-aquifer waters can be produced by mixing shallow-aquifer water with a more dilute solution, representative of direct recharge to the deep aquifer at an upgradient source. This conceptual model for the origin of the deep-aquifer water is in accord with regional information on the origin of the potable water in the Dakota aquifer (Wade 1992; Helgesen et al. 1982; Leonard et al. 1982).

3.2.5.2 Isotopic Compositions

The stable oxygen and hydrogen isotope compositions of the groundwater samples are shown in Figure 3.15. The corresponding analytical data are listed in Appendix F, Table F.4. The water compositions in both aquifers follow the trend for global meteoric water, which represents the oxygen and hydrogen isotopic composition of atmospheric precipitation on a global basis (Craig 1961). The position of the samples along the meteoric water trend indicates that groundwater in the aquifers originates principally from recharge of precipitation.

The isotopic compositions of the samples from the shallow aquifer are generally more positive for both oxygen and hydrogen than the compositions of samples from the deep aquifer, although the two groups overlap somewhat. These differences probably reflect somewhat different recharge areas for the two aquifers. The elevated nitrate concentrations and the locally unconfined character of the upper aquifer indicate that it is recharged by downward percolation of local precipitation, while the deeper aquifer is likely to receive its recharge some distance upgradient from Agenda, in an area free from significant nitrate contamination.

The tritium compositions of the groundwater samples are shown in Figure 3.16 and listed in Appendix F, Table F.4. Analytical results for enriched samples (having higher precision) are

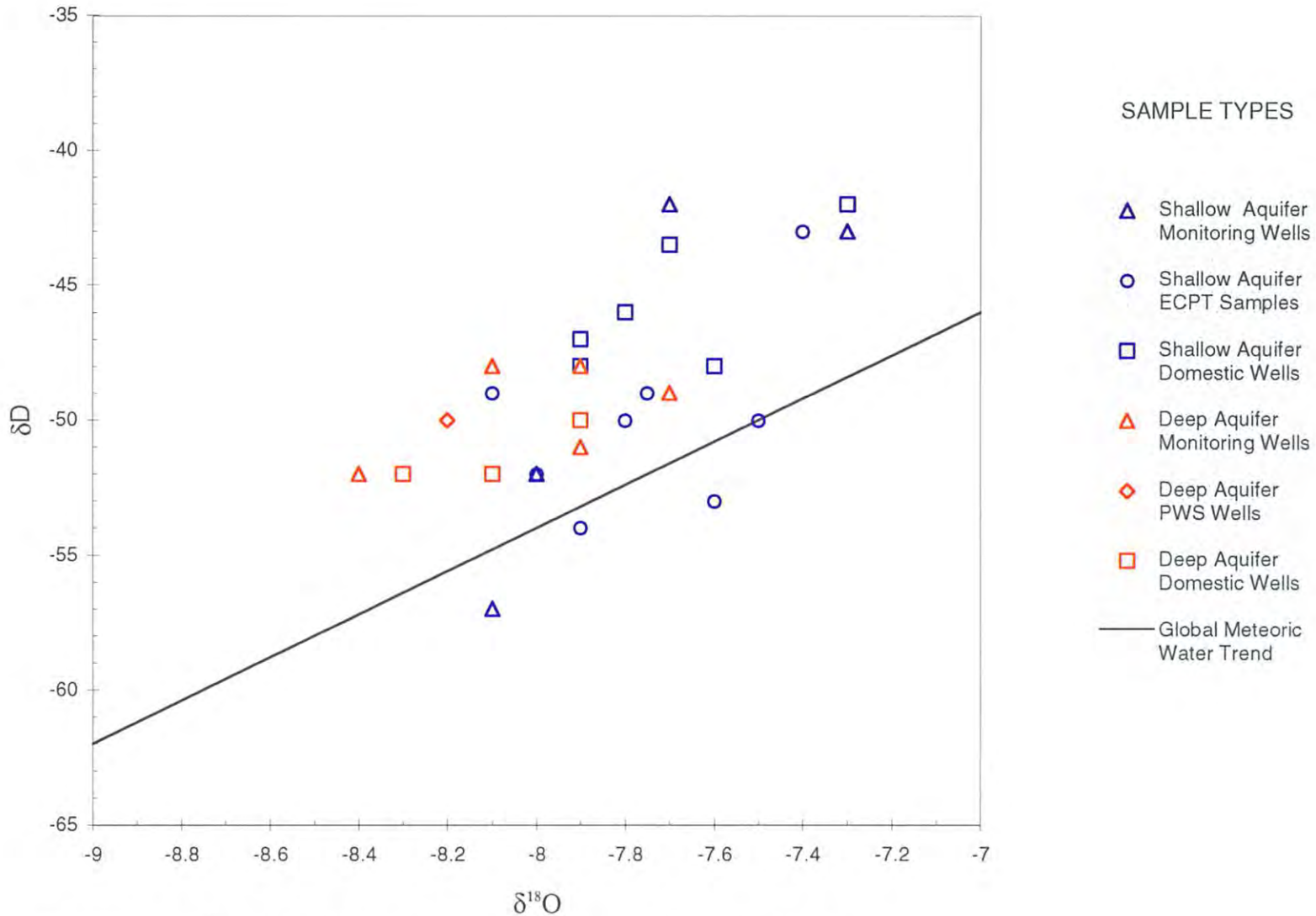


FIGURE 3.15 $\delta^{18}O$ and δD Values of Groundwater Samples from Agenda, Kansas

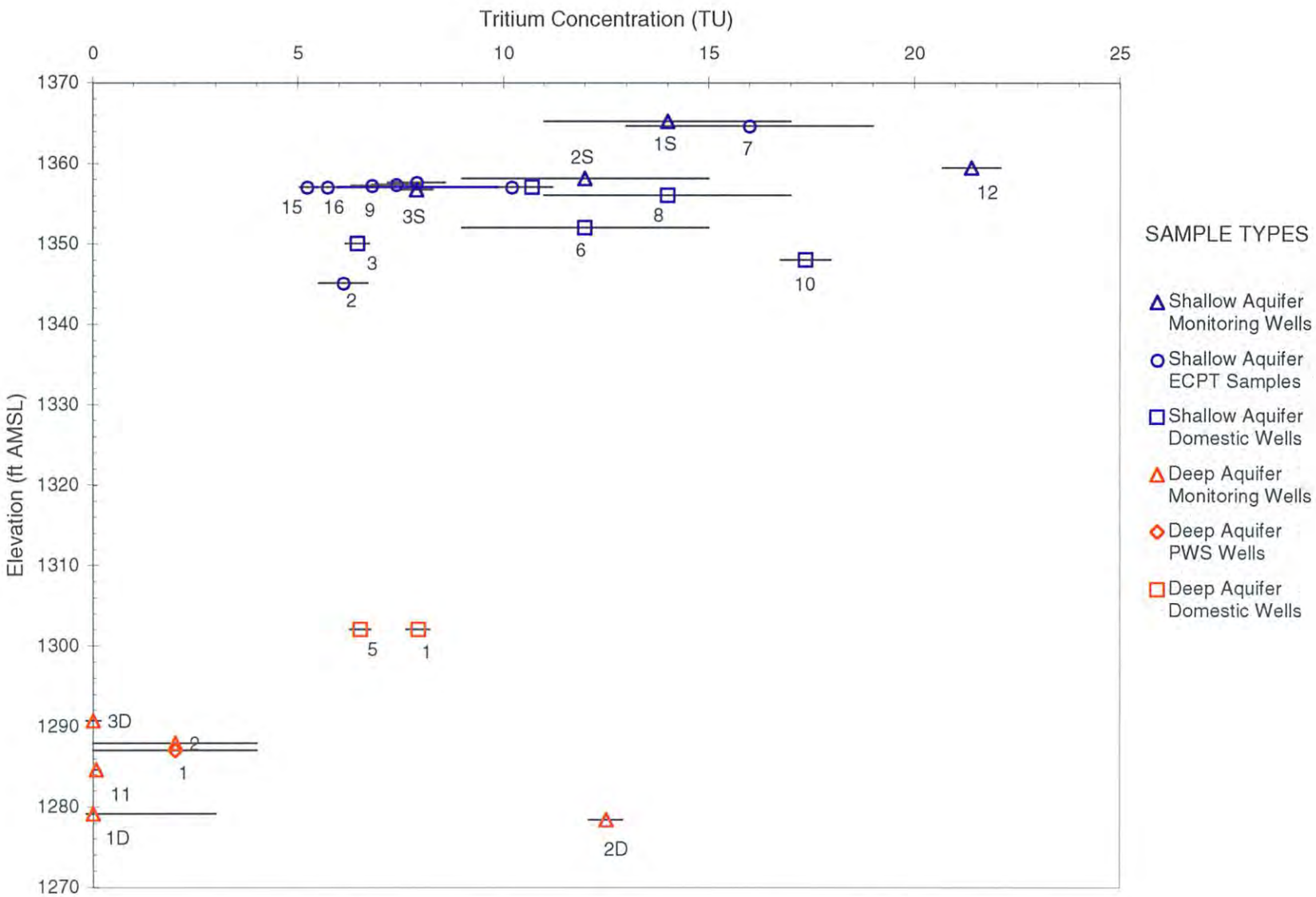


FIGURE 3.16 Tritium Compositions of Groundwater Samples from Agenda, Kansas, Plotted by Elevation

shown in preference to results from standard analyses whenever the former are available. The illustrated depth for the sample from PWS 1 is based on the original reported depth for the well (128 ft BGL or 1,287 ft AMSL; Stover 1994), rather than the reported completion depth (80 ft BGL or 1,335 ft AMSL), because pumping effects observed when the well was in use (Argonne 1996b) indicate that the well must be completed in the deep aquifer.

Tritium in groundwater is principally a result of atmospheric testing of thermonuclear weapons from 1953 to 1962 (Ferronsky and Polyakov 1982). Thus, water with a tritium concentration of 0 TU[1] indicates groundwater that originated before 1953. The shallow-aquifer compositions ranged from 5.2 ± 0.17 TU (SB15) to 21.4 ± 0.7 TU (SB12), while compositions in the deep aquifer ranged from -0.13 ± 0.19 TU (MW 3D) to 12.5 ± 0.4 (MW 2D). These ranges imply that both aquifers contain at least some younger (i.e., post 1953) water. The compositions of waters from deep-aquifer wells DW01, DW05, and MW 2D are similar to compositions of the waters from the shallow aquifer, while the compositions of samples from SB01, SB11, MW 1D, MW 3D, and PWS 1 are less tritiated. If wells DW01 and DW05 are gravel packed along their complete lengths, which is typical of older wells, then shallow-aquifer water with elevated tritium values might be flowing downward into the deep aquifer at these locations.

East of the former CCC/USDA site, the deep aquifer flows west-southwest, toward MW 2D. Additional, unidentified domestic wells existing in the area north of Fourth Street and east of the former CCC/USDA site could also function as conduits transmitting shallow-aquifer water to the deep aquifer, thereby contributing to the elevated tritium value at MW 2D.

3.3 Summary

The geologic section penetrated by the public water supply wells at Agenda consists of a Pleistocene age alluvial terrace overlying Dakota formation bedrock. The terrace deposits consist of clayey silt with some interbedded fine grained quartz sands, with a package of sand at the base of the sequence. The basal sand varies in thickness, from approximately 3 ft at the north end of the study area to approximately 35 ft at the south end. The bedrock sequence consists of approximately 30-35 ft of shale and siltstone, underlain by a package of sandstones approximately 40 ft thick in the fluvial facies of the Dakota formation. The bedrock sandstone is pinched out to the west of the city. The sinuous and irregular distribution of sands deposited in a

[1] 1 TU = 1 atom of tritium per 10^{18} atoms of hydrogen.

fluvial setting precludes reliable correlation of the bedrock sandstone over all but very short distances. Nevertheless, the abundance and stratigraphic positions of the sandstones in nearby irrigation wells suggest a significant potential for cross-cutting between the individual sandstones in the immediate area.

The two aquifers in the stratigraphic section penetrated by the public water supply and observation wells at Agenda are (1) a shallow, unconfined to partially confined aquifer, hosted by the sand at the base of the alluvial terrace, and (2) a deeper, confined aquifer, hosted by the bedrock sandstone. The two aquifers are separated by approximately 30-35 ft of generally unweathered bedrock shale and siltstone, which serves as the confining horizon for the deeper aquifer.

The coincident drawdowns in the deep-aquifer wells across the site, associated with pumping of the public water supply wells, indicate that these locations are hydraulically interconnected and that the radius of influence of the public water supply wells extends across the complete study area. In contrast, no coincident drawdowns are present on the hydrographs of the shallow-aquifer wells, indicating that the deep aquifer is effectively separated hydraulically from the shallow aquifer over the area covered by the water level monitoring network.

Analyses of well response tests for a subset of the monitoring wells yielded estimated ranges of horizontal hydraulic conductivity (K_h) of 1.5-9.1 ft/d for the shallow aquifer and 6.6-20.3 ft/d for the deep aquifer.

Within the limits of the water level monitoring network, groundwater flows generally southeast in the shallow aquifer under a gradient of approximately 0.004 ft/ft and south-southwest in the deep aquifer under a gradient of approximately 0.0004 ft/ft. The head difference between the two aquifers (approximately 5 ft) indicates that water would tend to flow from the shallow to the deeper aquifer in wells that access both.

The chemical composition of the water in both of the aquifers is dominated by calcium (Ca^{2+} > 50% equivalent) and bicarbonate (HCO_3^- > 50% equivalent), indicating that the waters are of the calcium bicarbonate type. The major element compositions of the two aquifers are most readily distinguished by the relatively greater equivalent percentage of noncarbonate anions (nitrate, sulfate, and chloride) in the shallow-aquifer waters.

The stable isotopic compositions of the samples from the shallow aquifer are generally more positive for both oxygen and hydrogen than the compositions of samples from the deep aquifer, although the two groups overlap somewhat. The tritium compositions of the water samples are more distinct, indicating that waters in the two aquifers are generally isolated from each other. This characteristic is consistent with the different responses exhibited by the two aquifers to the pumping of the public water supply wells; both observations indicate that the two aquifers are well separated hydraulically.

Some inflow of shallow-aquifer water to the deep aquifer is indicated in proximity to two domestic wells (DW01 and DW05) east of the CCC/USDA site, as would be expected if shallow-aquifer water was flowing downward to the deep aquifer through gravel packing in these wells. However, (1) the absence of any hydraulic response in the shallow aquifer to pumping of the deep-aquifer public water supply wells and (2) the overall distinct tritium compositions of the two aquifers together imply that there cannot be widespread hydraulic communication via wells across the study area.

4 Contaminant Distribution

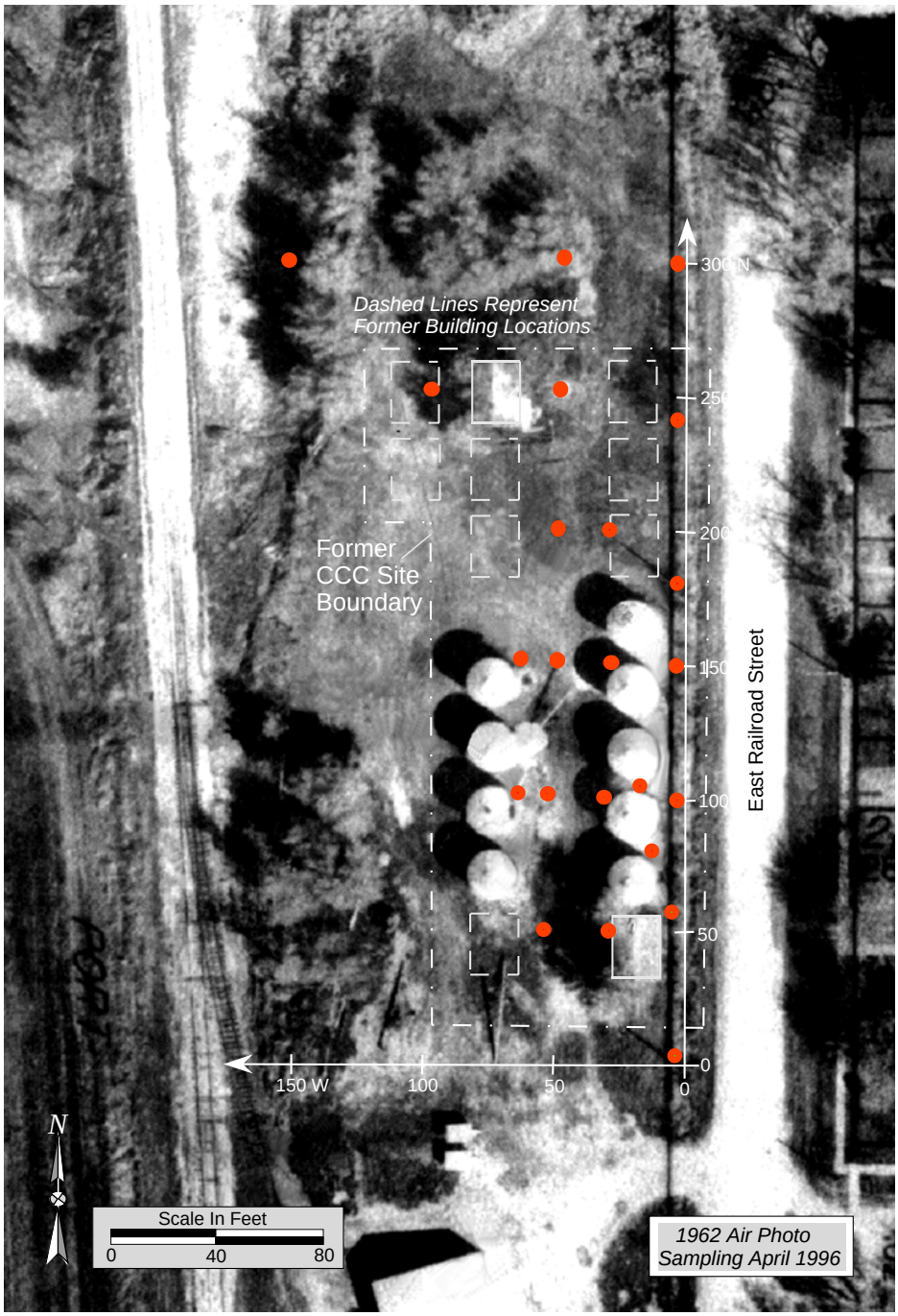
This section discusses the distribution of carbon tetrachloride and chloroform in vegetation, soils, and groundwater in the context of the conceptual geologic, hydrogeologic, and hydrogeochemical model described in Section 3.

4.1 Vegetation and Soils

Coordinated vegetation and soil sampling is being investigated as an adjunct method for mapping contaminant distribution and guiding subsurface sampling for carbon tetrachloride. Studies to date at former CCC/USDA sites have indicated that contaminant movement in the vadose zone is characteristically vertical, with no lateral component. Previous work has shown that low levels of carbon tetrachloride and chloroform (< 1 ppb [parts per billion; equivalent to µg/kg]) can be detected in various plants and grasses growing in contaminated areas (e.g., Argonne 1996c). During Phase I, vegetation and soil samples were collected at Agenda as part of this research to help assess shallow subsurface (< 2 ft BGL) contamination at the former CCC/USDA site, but analytical results were not available in time for inclusion in the *Phase I Report* (Argonne 1996b).

Vegetation and surface soil sampling was performed by using sample collection and analysis procedures described in the *Master Work Plan* (Argonne 1994). Descriptions of the vegetation and surface soil samples, including QA/QC replicate and standard samples, are in Appendix E, Table E.1 of the *Phase I Report* (Argonne 1996b). All analyses were performed by the Hazardous Waste Research and Information Center in Champaign, Illinois.

Figure 4.1 shows the locations of the vegetation and surface soil samples at the former CCC/USDA site and analytical results for carbon tetrachloride in those samples. Carbon tetrachloride was not detected in any of the vegetation and soil samples. Results for chloroform were considered suspect, because of the probable low-concentration (5 µg/L or less) chloroform contamination in the commercial distilled water used to rinse the vegetation samples. The data for carbon tetrachloride, like the results of the KDHE comprehensive investigation (PRC 1994b), indicate that no carbon tetrachloride contamination is in the near-surface soils at the former CCC/USDA site. The absence of contamination in the near-surface soils indicates that no potential health risk would arise from direct exposure to soils at the site.



LEGEND
Soil and Vegetation Sampling Locations
All Sample Values ND for CCl_4

FIGURE 4.1 Aerial Photograph of the Former CCC/USDA Site, Illustrating Existing Grain Bins, Existing and Former Locations of Wooden Storage Buildings, Locations of Vegetation and Soil Samples, and Analytical Results for Carbon Tetrachloride in Those Samples (Source: USDA 1962)

4.2 Groundwater Contamination

4.2.1 Contaminant Distribution

During Phase II, additional information on the distribution of carbon tetrachloride and chloroform in the shallow and deep aquifers was obtained by sampling groundwater with the ECPT at three locations (SB14, SB15, and SB16) east of the former CCC/USDA site, as well as by sampling the two new temporary wells (SB11 and SB12). Locations of and analytical results from shallow-aquifer samples are shown, together with results of Phase I sampling, in Figure 4.2. Locations of and analytical results from deep-aquifer samples are in Figure 4.3.

None of the groundwater samples collected during Phase II contained carbon tetrachloride or chloroform. During Phase I, carbon tetrachloride was detected in only three groundwater samples, while chloroform was detected in only one sample. Sample ANMW02D-W-04878, at 6 μg/L, was collected from MW 2D, in the southeast corner of the former CCC/USDA site. The remaining two carbon tetrachloride-bearing samples were collected 800 ft south of the former CCC/USDA site, at MW 1D (Sample ANMW01D-W-04890 at 65 μg/L) and at PWS 1 (Sample ANPW01-W-04869 at 6 μg/L). The sample from PWS 1 also contained chloroform at a concentration of 7 μg/L. Public supply well PWS 2 was not sampled, because the well was out of service. The observed distribution of carbon tetrachloride matched the findings of the KDHE comprehensive investigation (PRC 1994b).

The three groundwater samples that contained carbon tetrachloride were from the deep aquifer. No sample from the shallow aquifer, at the former CCC/USDA site or elsewhere, contained carbon tetrachloride or chloroform. This absence of contamination implies that no ongoing source of contamination exists in the vadose zone overlying the shallow aquifer at the former CCC/USDA site.

4.2.2 Potential Migration Pathways

The occurrence of carbon tetrachloride in MW 2D requires a source at or upgradient from this location and a migration pathway and mechanism to contaminate the deep aquifer. At least three potential migration pathways could reasonably account the contamination at MW 2D. These are (1) direct introduction of the carbon tetrachloride into the deep aquifer through an abandoned deep-aquifer well; (2) direct downward migration of carbon tetrachloride into the deep aquifer

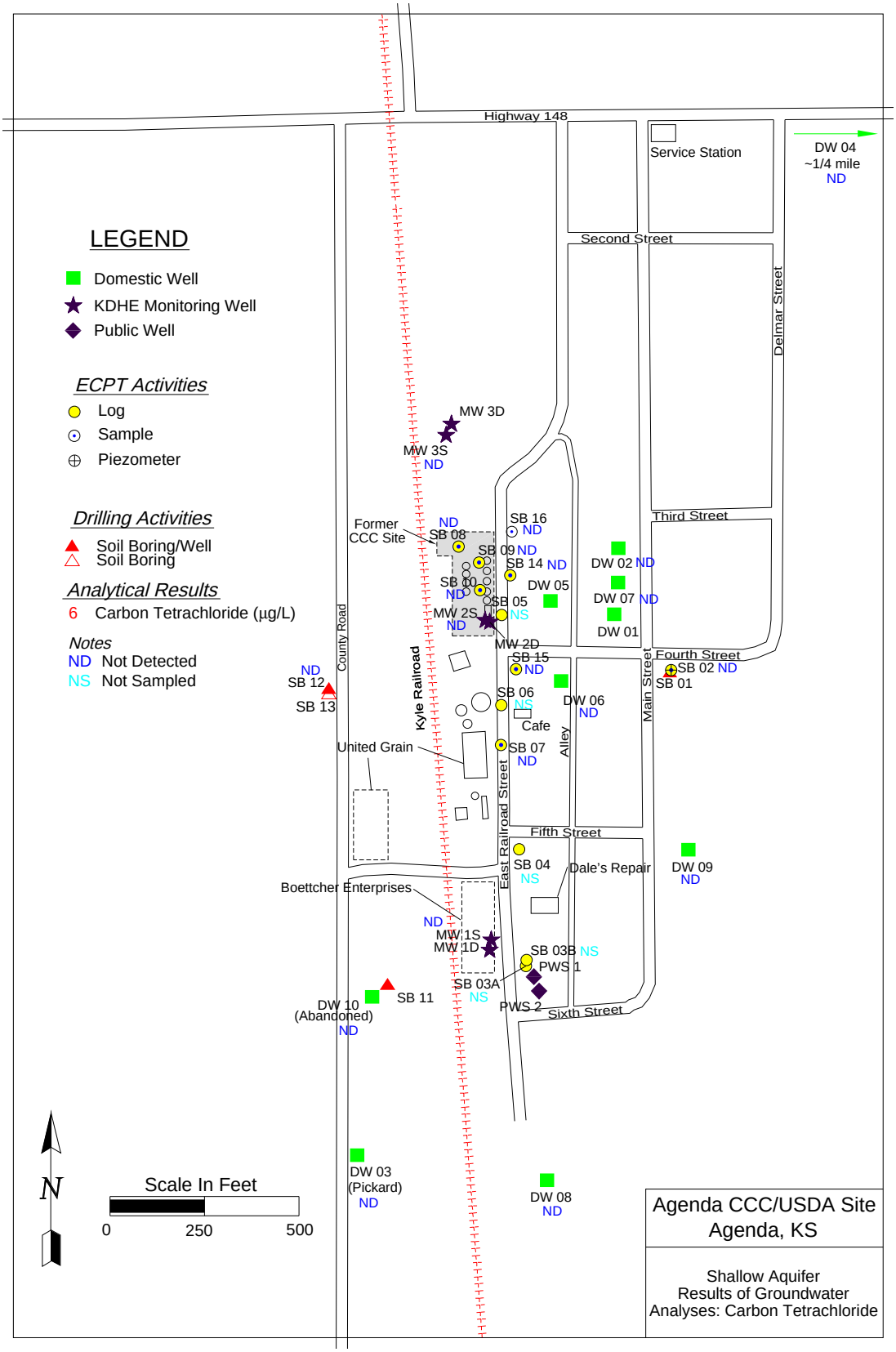


FIGURE 4.2 Map of Agenda, Kansas, Showing the Former CCC/USDA Site, Locations and Types of Shallow-Aquifer Groundwater Samples, and Results of Analyses for Carbon Tetrachloride

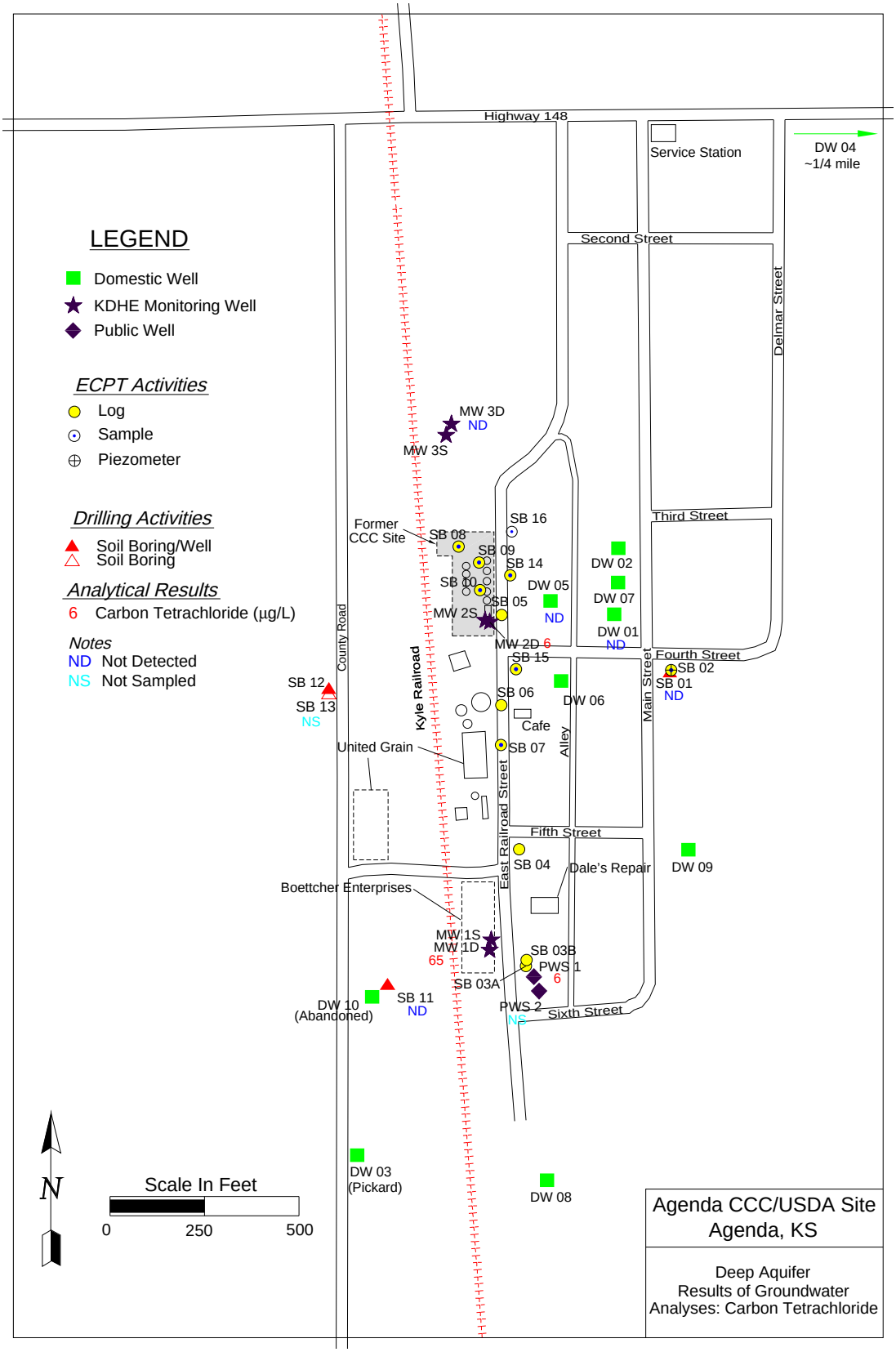


FIGURE 4.3 Map of Agenda, Kansas, Showing the Former CCC/USDA Site, Locations and Types of Deep-Aquifer Groundwater Samples, and Results of Analyses for Carbon Tetrachloride

through the shallow aquifer and the intervening shales; and (3) migration initially in the shallow aquifer to a suitable conduit through the intervening shales, such as an active or abandoned well, followed by downward migration to the deep aquifer.

Of these potential migration pathways, only the third can reasonably be supported within the conceptual geologic, hydrogeologic, and hydrogeochemical model established by this investigation. Although direct introduction cannot be conclusively ruled out, there is no evidence of an abandoned well at or immediately upgradient from the former CCC/USDA site.

The potentiometric surface (Figure 3.13) of the deep aquifer indicates that the area upgradient from MW 2D is east of the former CCC/USDA site, across East Railroad Street in the residential section of Agenda. This area is also downgradient from the former CCC/USDA site in the upper aquifer (Figure 3.12). Thus, the sum of the data indicates that the most likely migration route for the carbon tetrachloride in the deep aquifer runs away from the site, across East Railroad Street in the shallow aquifer, and to an existing (e.g., DW01 and DW05) or abandoned deep-aquifer domestic well. Downflow via the well would be followed by return flow to the CCC/USDA site in the deeper aquifer. The trace concentration of carbon tetrachloride (1.3 µg/L) detected in DW05 (a deep-aquifer well at the Berrier residence with an owner-reported depth of 110 ft BGL) during the KDHE site assessment (PRC 1994a) and the elevated tritium values of groundwater from deep-aquifer wells DW01, DW05, and MW 2D are consistent with this migration route.

4.2.3 Potential for Future Migration

The coincident drawdowns in wells MW 1D, MW 2D, MW 3D, and SB01 (Figure 4.2) resulting from pumping of the public water supply wells indicate that these deep-aquifer locations are hydraulically interconnected and that the radius of influence of the public water supply wells encompasses the known area of groundwater contamination. When these wells were in daily use, the maximum gradients observed in the deep aquifer, approximately 0.002 ft/ft, corresponded to the time of maximum drawdown; the lowest gradients, approximately 0.0004 ft/ft, occurred immediately before the next pumping-recovery cycle began (Argonne 1996b). Because the maximum gradients were generated by pumping the public water supply wells, these gradients were necessarily directed toward those wells. Under the maximum observed gradient, the corresponding maximum flow rates (i.e., average linear velocities) of approximately 25-100 ft/yr (assuming pore fractions of 0.15-0.3, with K_h of 10-20 ft/d) were

approximately five times the flow rates corresponding to lowest gradients (0.0004 ft/ft, with corresponding average linear velocities of 5-20 ft/yr). Given the observed frequency of pumping (3-5 cycles daily) and the nearly static character of the deep aquifer in the absence of pumping, it is probable that while the public water supply wells were in use, they were effectively capturing the carbon tetrachloride plume.

Now that the public water supply wells are shut down, the carbon tetrachloride plume is free to migrate away from these wells. The water levels observed in the deep aquifer (Figure 3.13) imply that the deep aquifer flows generally south-southwest; however, because of the low rate of flow, an extended period of time (50-200 yr) would be required for the plume to migrate an appreciable distance (> 1,000 ft) from its present location.

The nearest private well to the south-southwest of the city is DW10 (Figure 4.2), an abandoned shallow-aquifer well with a reported depth of 42.6 ft (PRC 1994b) in a pasture adjacent to deep-aquifer temporary well SB11. The nearest well to the south-southwest of the city that is used for drinking water is DW03, a shallow-aquifer well with an owner-reported depth of 40 ft (Argonne 1996b) at the Pickard residence (Figure 4.2). No deep-aquifer wells are known to lie immediately south-southwest of the known area of carbon tetrachloride contamination. Such wells could be affected by potential future migration of the carbon tetrachloride plume.

4.3 Summary

All of the vegetation and soil samples collected at the former CCC/USDA site during Phase I contained no quantifiable carbon tetrachloride. Results for chloroform were considered suspect, because of the probable low-concentration (less than 5 µg/L) chloroform contamination in commercial distilled water used to rinse the vegetation samples. The results for carbon tetrachloride, like the data from the KDHE comprehensive investigation (PRC 1994b), indicate that no contamination is in the near-surface soils at the former CCC/USDA site. The absence of contamination in the near-surface soils indicates that no potential health risk would arise from direct exposure to soils at the site.

Carbon tetrachloride was detected in three groundwater samples, while chloroform was detected in only one sample. Observed carbon tetrachloride contents were quite low, ranging from 6 to 65 µg/L. All of the contaminated groundwater samples were from the deep aquifer.

The absence of contamination in the shallow aquifer implies that no ongoing source of contamination exists in the vadose zone overlying the shallow aquifer at the former CCC/USDA site.

The coincident drawdowns in wells MW 1D, MW 2D, MW 3D, and SB01 (Figure 4.2) resulting from pumping of the public water supply wells indicate that the radius of influence of these wells encompasses the known area of groundwater contamination. Thus, it is probable that while the public water supply wells were in use, they were effectively capturing the carbon tetrachloride plume.

Now that the public water supply wells are shut down, the carbon tetrachloride plume is free to migrate to the south-southwest. However, given the apparent low rates of groundwater flow (20 ft/yr or less) in the deep aquifer, an extended period of time (50-200 yr) would probably be required for the carbon tetrachloride plume to migrate an appreciable distance (> 1,000 ft) from its present location. Argonne's survey of domestic well locations during Phase I indicated that no deep-aquifer wells lie immediately south-southwest of the known area of carbon tetrachloride contamination. Such wells could be affected by potential future migration of the low-concentration (65 µg/L or less) carbon tetrachloride plume.

5 Conclusions and Recommendations

This section summarizes the findings of the ESC investigation at the former CCC/USDA site in Agenda, Kansas, and presents recommendations for further action at the site. The objectives of this investigation were (1) to develop an integrated conceptual geologic, hydrogeologic, and hydrogeochemical model of the site and the surrounding area that is affected by carbon tetrachloride contamination and (2) to obtain an understanding of potential sources of and migration mechanisms and pathways for the carbon tetrachloride contamination detected in Agenda's public water supply wells, consistent with the documented geologic-hydrogeologic model of the site.

These objectives were achieved through the ESC investigative program, as documented in the *Phase I Work Plan* (Argonne 1996a), the *Phase I Report* (Argonne 1996b), the *Phase II Report* (this document), and the relevant sections of the *Master Work Plan* (Argonne 1994). In achieving these objectives, this investigation has established the framework necessary to guide subsequent actions at the site.

5.1 Conclusions

The following are the principal findings of and conclusions drawn from the ESC investigation of the former CCC/USDA site at Agenda:

- The geologic section penetrated by Agenda's public water supply and domestic wells consists of a Pleistocene alluvial terrace overlying Dakota formation bedrock.

- The alluvial terrace deposits consist predominantly of clayey silt, with some interbedded fine grained quartz sands and a package of alluvial sand at the base of the sequence. The thickness of the basal sand varies across the study area, ranging from approximately 3 ft at the north end of the area to approximately 35 ft at the south end.

- The bedrock consists of approximately 30-35 ft of shale and siltstone, underlain by a package of sandstones approximately 40-60 ft thick in the fluvial facies of the Dakota formation. The sandstone package is pinched out

to the west of the city. Although the sandstone can be correlated readily across the study area, the sinuous and irregular distribution of sands deposited in a fluvial setting precludes reliable correlation of the sandstone over all but very short distances. Nevertheless, the abundance and stratigraphic positions of the sandstones in nearby private wells suggest a significant potential for cross-cutting between the individual sandstones in the immediate area.

- Within the investigated stratigraphic section are two aquifers: (1) a shallow, unconfined to partially confined aquifer, hosted by the sand at the base of the alluvial terrace, and (2) a deeper, confined aquifer, hosted by the bedrock sandstone. The two aquifers are separated by approximately 30-35 ft of generally unweathered bedrock shale and siltstone, which serve as the confining horizon for the deeper aquifer.

- Coincident drawdowns on the hydrographs of the deep-aquifer monitoring wells produced by pumping of the public water supply wells indicate that these locations are hydraulically interconnected and that the radius of influence of the public water supply wells extends across the study area. In contrast, no coincident drawdowns are present on the hydrographs of the shallow-aquifer wells, indicating that the deep aquifer is effectively separated hydraulically from the shallow aquifer over the area covered by the water level monitoring network.

- Analyses of well response tests performed for a subset of the monitoring wells yielded estimated ranges of horizontal hydraulic conductivity (K_h) of 1.5-9.1 ft/d for the shallow aquifer and 6.6-20.3 ft/d for the deep aquifer.

- Within the limits of the water level monitoring network, groundwater flows generally southeast in the shallow aquifer, under a gradient of approximately 0.004 ft/ft, and south-southwest in the deep aquifer, under a gradient of approximately 0.0004 ft/ft.

- The head difference between the two aquifers averages approximately 5 ft across the area, indicating that groundwater would tend to flow from the shallow to the deep aquifer in wells that access both.

- The chemical composition of the water in both of the aquifers is dominated by calcium (Ca^{2+} > 50% equivalent) and bicarbonate (HCO_3^- > 50% equivalent), indicating that the waters are of the calcium bicarbonate type. The major element compositions of the two aquifers are distinguished most readily by the relatively greater equivalent percentage of noncarbonate anions (nitrate, sulfate, and chloride) in the shallow-aquifer waters.

- The stable isotope values ($\delta^{18}O$ and δD) of the water samples from the shallow aquifer are generally more positive, for both oxygen and hydrogen, than those for the deep aquifer, with some overlap between the two groups. The tritium compositions of the water samples are more distinct, indicating that the waters in the two aquifers are generally isolated from each other. This characteristic is consistent with the different responses of the two aquifers to the pumping of the public water supply wells, indicating that the two aquifers are well separated hydraulically.

- Some inflow of shallow-aquifer water to the deep aquifer is indicated in proximity to two domestic wells (DW01 and DW05) east of the CCC/USDA site, as would be expected if shallow-aquifer water was flowing downward to the deep aquifer through gravel packing in these wells. However, (1) the absence of any hydraulic response in the shallow aquifer to pumping of the deep-aquifer public water supply wells and (2) the overall distinct tritium compositions of the two aquifers together imply that hydraulic communication via wells across the study area cannot be widespread.

- None of the vegetation and soil samples collected at the former CCC/USDA site during Phase I contained carbon tetrachloride above the quantitation limit. Results for chloroform were considered suspect, because of the probable low-concentration (< 5 µg/L) chloroform contamination in the commercial distilled water used to rinse the vegetation samples. The results for carbon tetrachloride are consistent with data from the KDHE comprehensive investigation, indicating that no contamination is in the near-surface soils at the former CCC/USDA site. The absence of contamination in the near-surface soils indicates that no potential health risk would arise from direct exposure to soils at the site.

- Carbon tetrachloride was detected in three groundwater samples, while chloroform was detected in only one sample. All of the contaminated groundwater samples were from the deep aquifer.

- The absence of contamination in the shallow aquifer at the former CCC/USDA site implies that no ongoing source of contamination exists in the vadose zone overlying the shallow aquifer at the site.

- The presence of carbon tetrachloride in the deep aquifer beneath the former CCC/USDA site suggests that historically the site was a source of carbon tetrachloride contamination at Agenda. However, the known distribution of carbon tetrachloride in the deep aquifer to the south of the former CCC/USDA site (in MW 1D and in the public water supply wells) is also consistent with potential source areas associated with the grain storage facilities now operated by United Grain, Inc. The existing data are insufficient to establish the presence or absence of these potential additional source areas.

- The coincident drawdowns in the deep-aquifer monitoring wells, resulting from pumping of the public water supply wells, indicate that the radius of influence of these wells encompasses the known area of groundwater contamination. Thus, when the public water supply wells were in use, they probably captured the carbon tetrachloride plume.

- Now that the public water supply wells have been shut down, the carbon tetrachloride plume is free to migrate to the south-southwest. However, given the apparent low rates of groundwater flow (20 ft/yr or less) in the deep aquifer, an extended period of time (50-200 yr) would probably be required for the carbon tetrachloride plume to migrate an appreciable distance (> 1,000 ft) from its present location. Argonne's survey of domestic well locations during Phase I indicated that no deep-aquifer wells lie immediately south-southwest of the area affected by carbon tetrachloride contamination. Such wells could be affected by potential future migration of the low-concentration (65 µg/L or less) carbon tetrachloride plume.

5.2 Recommendations

The conceptual geologic, hydrogeologic, and hydrogeochemical model of the study area, together with data on the present distribution of carbon tetrachloride established through the ESC investigative program, provides the framework for subsequent investigative action at the site.

A feasibility study to model the potential future movement of the carbon tetrachloride plume in the deep aquifer does not appear necessary at this time. Observed concentrations of carbon tetrachloride are quite low (65 µg/L or less), and under the present hydrogeologic conditions at the site (i.e., with the public water supply wells shut down), the deep aquifer is essentially stagnant, so that an extended period of time (50-200 years) would be required for the carbon tetrachloride plume to migrate an appreciable distance (> 1,000 ft) from its current position. Under these conditions, detailed numerical modeling of groundwater flow and associated transport of carbon tetrachloride probably will not provide significantly more insight to the fate of the contaminant plume.

The absence of contamination in the shallow aquifer also implies that no ongoing source of contamination exists in the vadose zone at the former CCC/USDA site, and the absence of soil contamination indicates that no potential health risk will arise from direct exposure to soils at the site. In addition, because no deep-aquifer wells lie immediately south-southwest of the study area, in the likely path of potential future migration of the carbon tetrachloride plume, there is no immediate potential for exposure to the contaminated water.

Nevertheless, the low gradient in the deep aquifer does produce some uncertainty about the direction and magnitude of groundwater flow in this aquifer and consequently about the potential future movement of the carbon tetrachloride plume. Thus, additional data are needed to confirm both the direction and the magnitude of the groundwater flow in the deep aquifer. This information will be acquired by

1. Continuing automated water level monitoring in the deep-aquifer monitoring well network through May 1998 to obtain more information on the direction of flow and the gradient in the deep aquifer and

2. Resampling the monitoring wells in May 1997 and May 1998 to confirm the absence of carbon tetrachloride contamination in the shallow aquifer (MW 1S, MW 2S, MW 3S, and SB12) and to evaluate directly the possible movement

and compositional evolution of the carbon tetrachloride plume (MW 1D, MW 2D, MW 3D, SB01, and SB11).

Once the additional water levels and carbon tetrachloride data are obtained, a further assessment of the potential for contaminant migration will be made to determine whether a feasibility study is warranted, or whether a groundwater quality monitoring program or some other investigative action is needed for the site.

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Appendix A:

Lithologic and ECPT Logs

SB 11

Agenda CCC/USDA Site

Sec. 16 DBBB T4S R1W, Republic County, Kansas

Ground Surface Elevation: 1397.8 ft

Depth: 133 ft

Logged by: B. Sedivy, S. Cook

Company: Argonne National Laboratory

Argonne National Laboratory

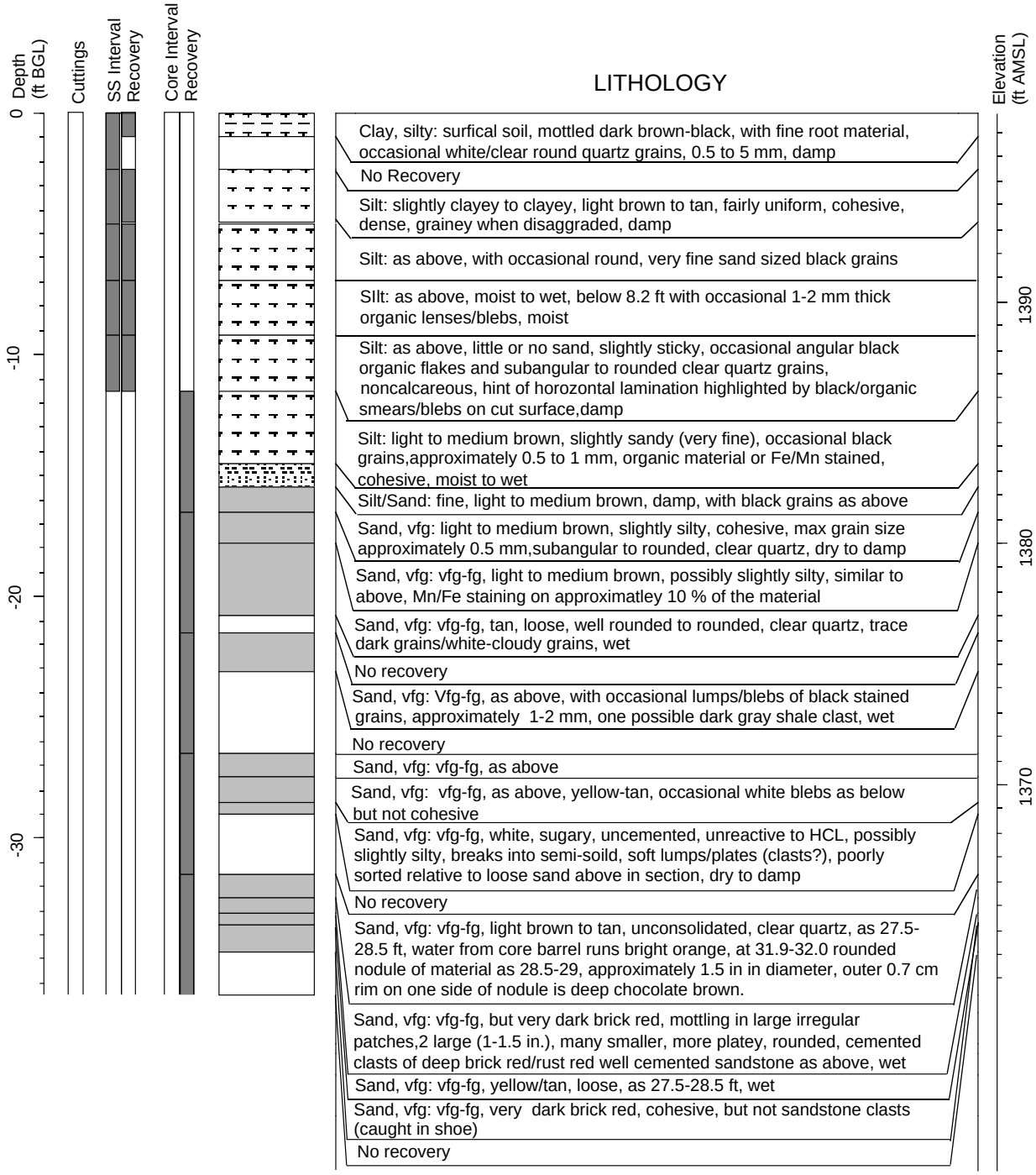
Environmental Research Division

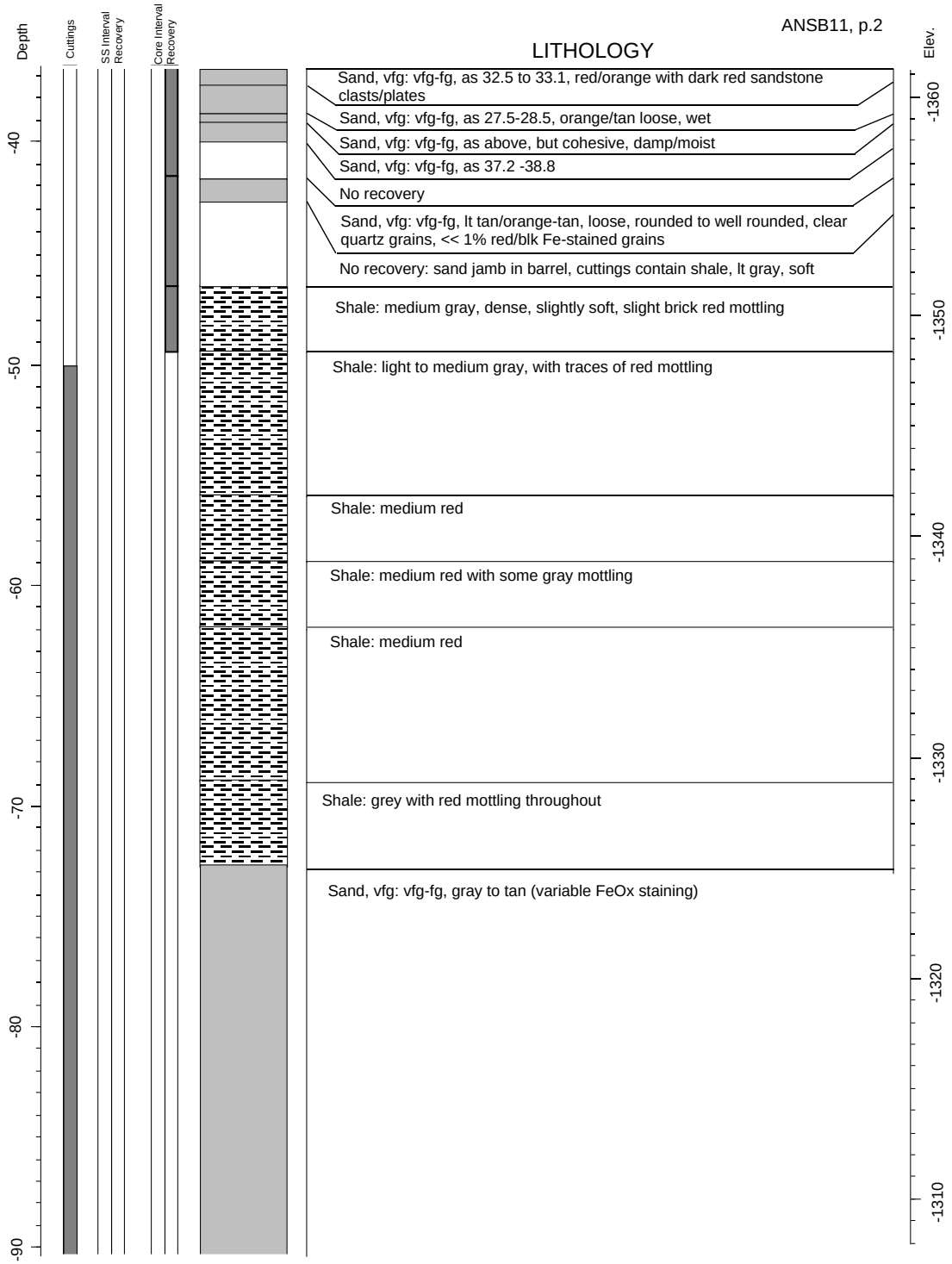
Log Date: November 19-22, 1996

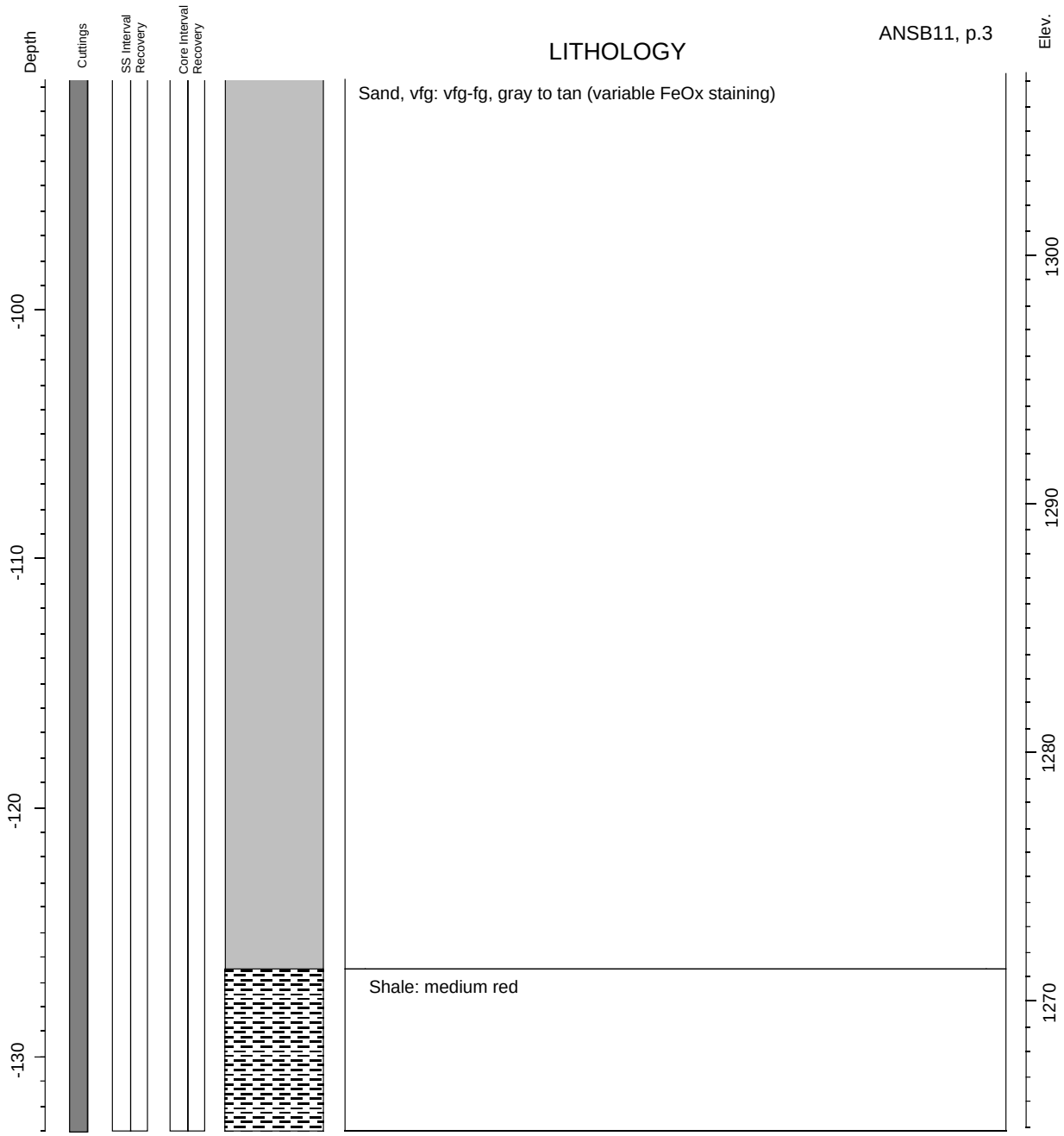
Drilled by: Dane

Drilling Company: Layne-Western

Rig Type: Mud-Rotary




ANSB11, p.2
LITHOLOGY
Depth
Cuttings
SS Interval Recovery
Core Interval Recovery
Elev.
-40
-50
-60
-70
-80
-90
-1360
-1350
-1340
-1330
-1320
-1310
Sand, vfg: vfg-fg, as 32.5 to 33.1, red/orange with dark red sandstone clasts/plates
Sand, vfg: vfg-fg, as 27.5-28.5, orange/tan loose, wet
Sand, vfg: vfg-fg, as above, but cohesive, damp/moist
Sand, vfg: vfg-fg, as 37.2 -38.8
No recovery
Sand, vfg: vfg-fg, lt tan/orange-tan, loose, rounded to well rounded, clear quartz grains, << 1% red/blk Fe-stained grains
No recovery: sand jamb in barrel, cuttings contain shale, lt gray, soft
Shale: medium gray, dense, slightly soft, slight brick red mottling
Shale: light to medium gray, with traces of red mottling
Shale: medium red
Shale: medium red with some gray mottling
Shale: medium red
Shale: grey with red mottling throughout
Sand, vfg: vfg-fg, gray to tan (variable FeOx staining)


Depth
Cuttings
SS Interval Recovery
Core Interval Recovery
LITHOLOGY
ANSB11, p.3
Elev.
Sand, vfg: vfg-fg, gray to tan (variable FeOx staining)
Shale: medium red
-100
-110
-120
-130
1300
1290
1280
1270

SB 12

Agenda CCC/USDA Site

Sec. 16 BDDA T4S R1W, Republic County, Kansas

Ground Surface Elevation: 1395.9 ft AMSL

Depth: 44 ft

Logged by: M. Krokosz, S. Cook

Company: Argonne National Laboratory

Argonne National Laboratory

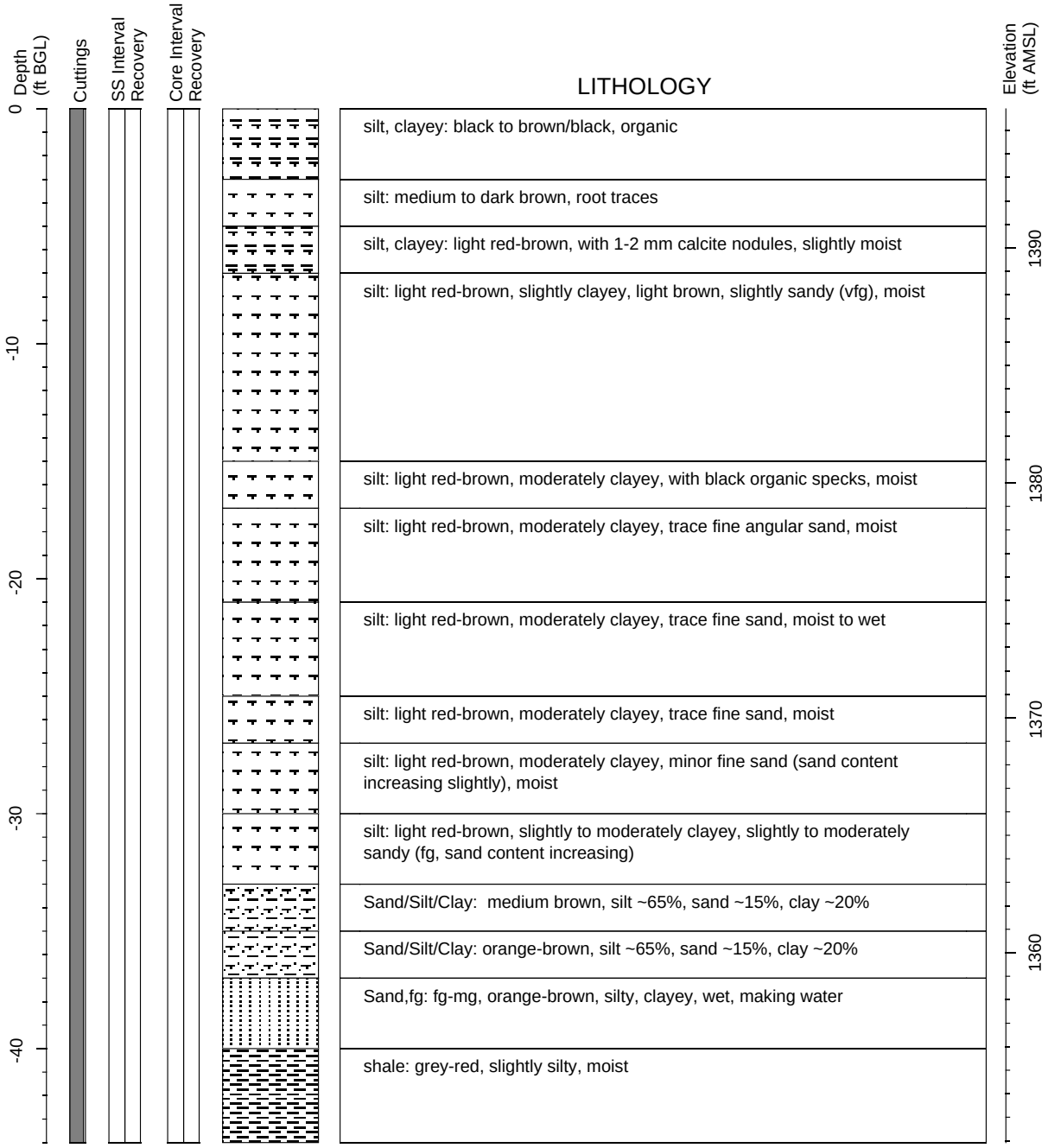
Environmental Research Division

Log Date: November 19-20, 1996

Drilled by: Bob

Drilling Company: Layne-Western

Rig Type: HSA



SB 13

Agenda CCC/USDA Site

Sec. 16 BDDA T4S R1W, Republic County, Kansas

Ground Surface Elevation: 1395.8 ft

Depth: 150 ft

Logged by: M. Krokosz, S. Cook

Company: Argonne National Laboratory

Argonne National Laboratory

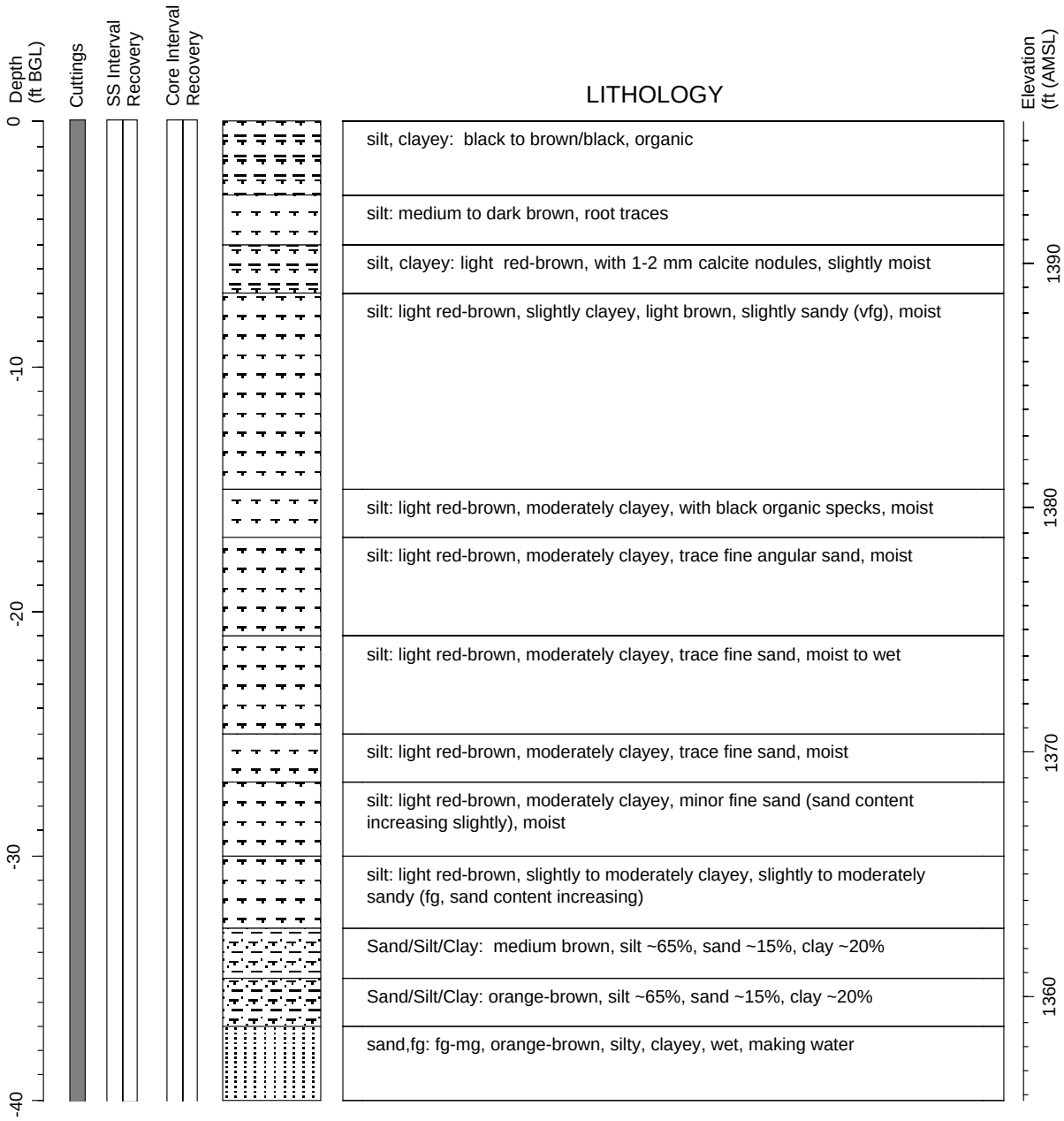
Environmental Research Division

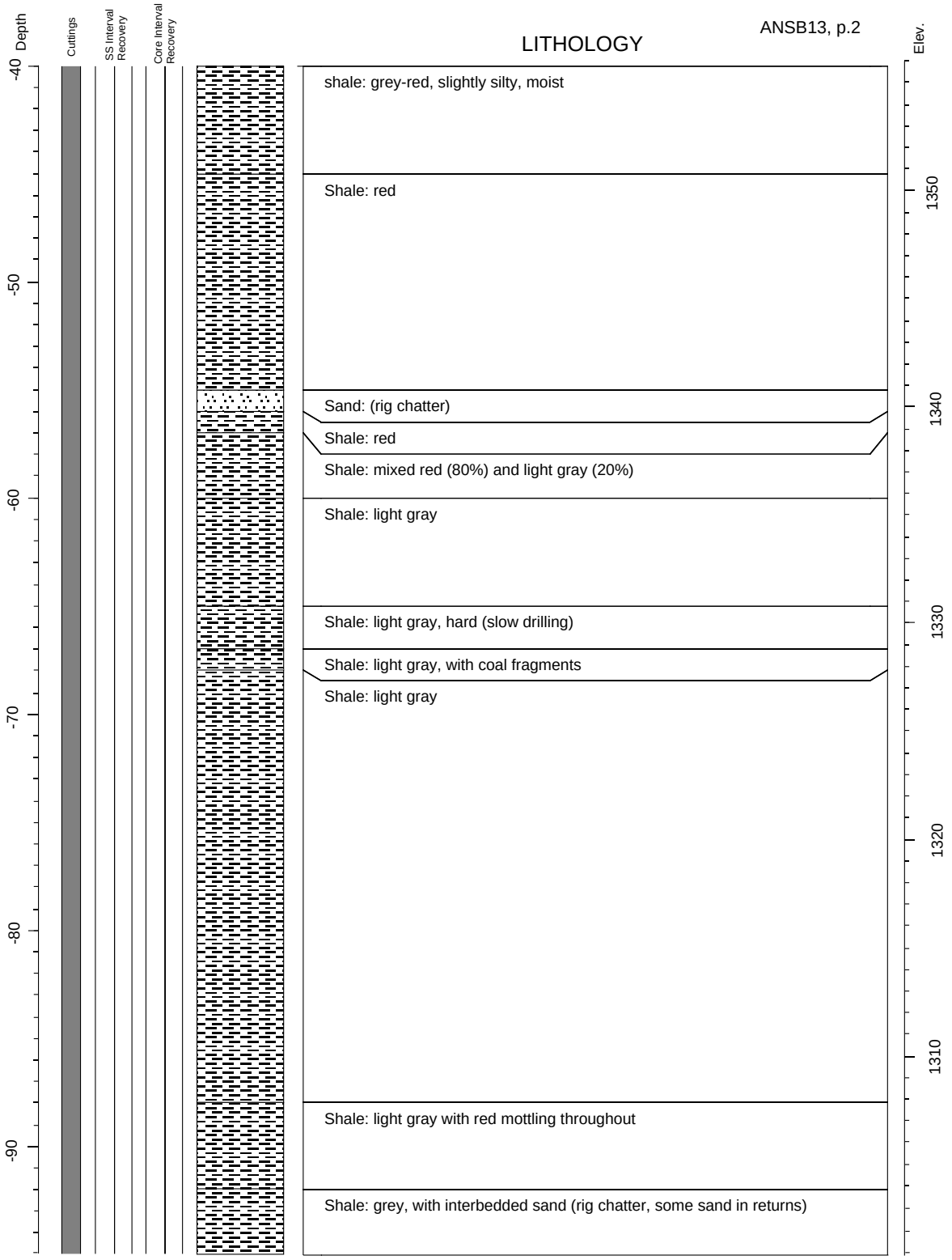
Log Date: November 23-24,1996

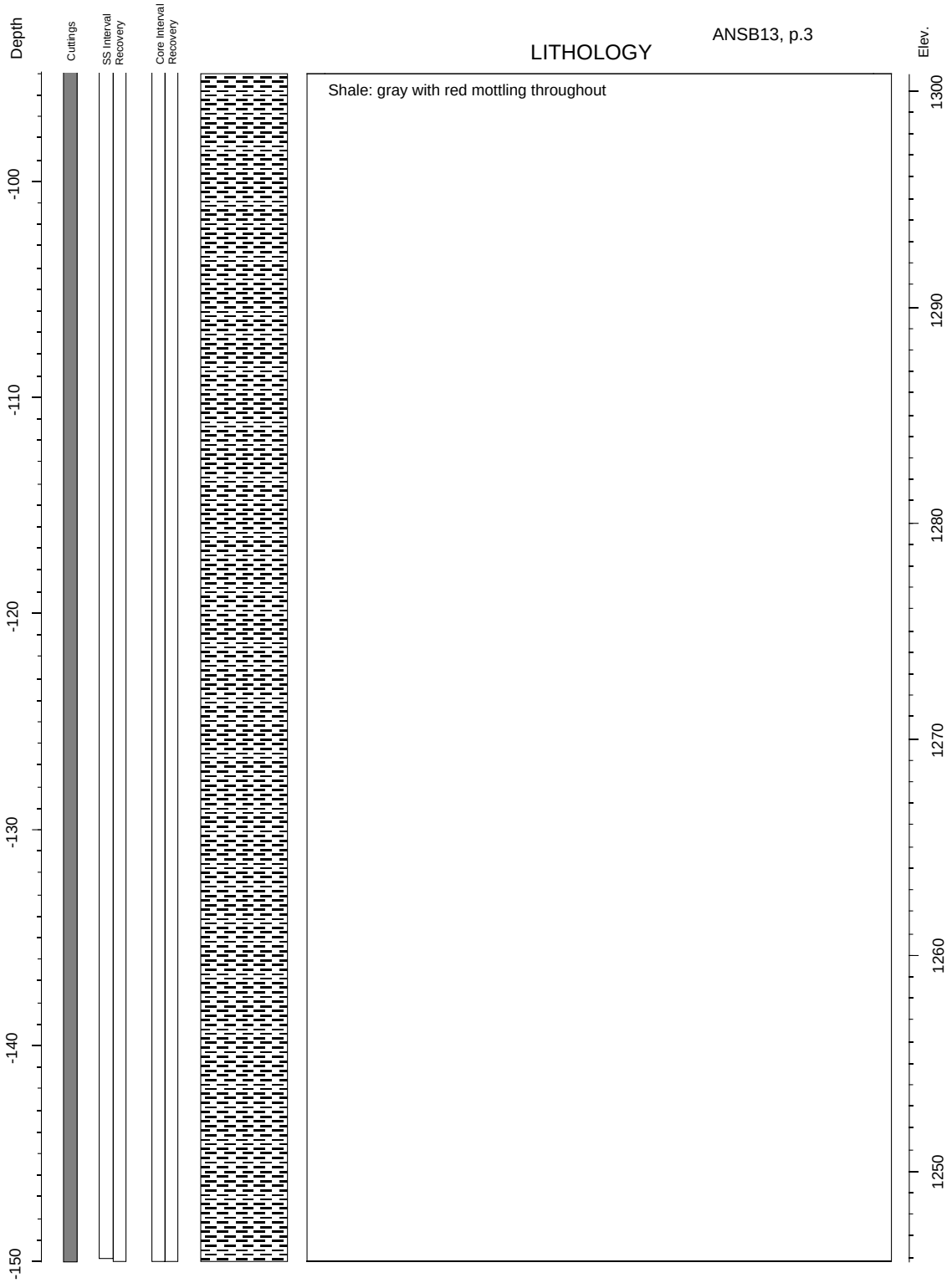
Drilled by: Bob, Dane

Drilling Company: Layne-Western

Rig Type: HSA to 45', Mud Rotary to TD




Depth
Cuttings
SS Interval Recovery
Core Interval Recovery
LITHOLOGY
ANSB13, p.2
Elev.
-40
-50
-60
-70
-80
-90
1350
1340
1330
1320
1310
shale: grey-red, slightly silty, moist
Shale: red
Sand: (rig chatter)
Shale: red
Shale: mixed red (80%) and light gray (20%)
Shale: light gray
Shale: light gray, hard (slow drilling)
Shale: light gray, with coal fragments
Shale: light gray
Shale: light gray with red mottling throughout
Shale: grey, with interbedded sand (rig chatter, some sand in returns)


Depth
Cuttings
SS Interval Recovery
Core Interval Recovery
LITHOLOGY
ANSB13, p.3
Elev.
Shale: gray with red mottling throughout
-100
-110
-120
-130
-140
-150
1300
1290
1280
1270
1260
1250

SB 14

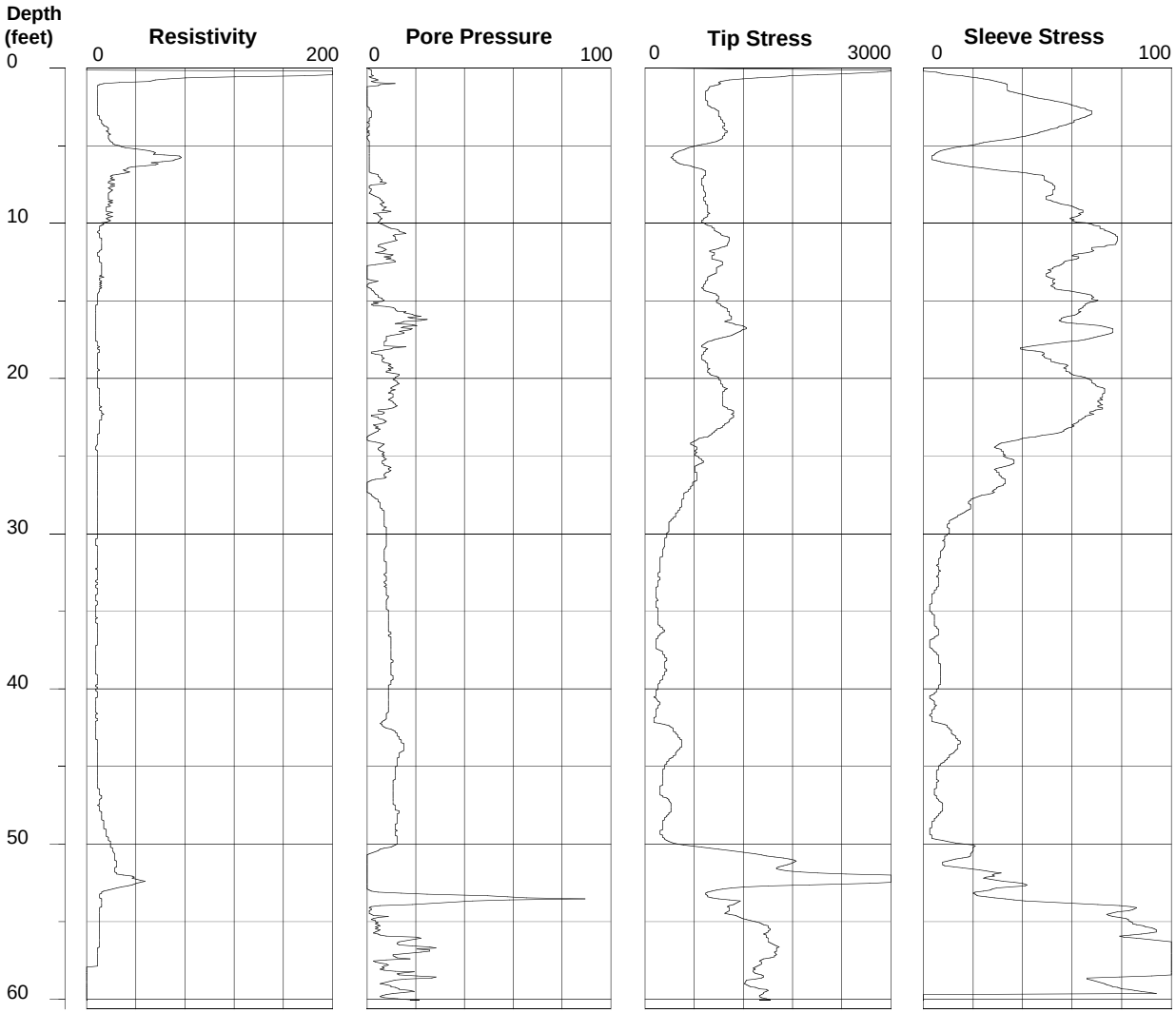
AGENDA CCC/USDA Site Investigation

Sec. 16 ACBA, T4S R1W, Republic County, Kansas

Ground Surface Elevation: 1412.63 ft
Depth: 60.64 ft
Interpreted by: S. Cook

Argonne National Laboratory
Environmental Research Division

ECPT Date: 12/05/96
ECPT by: ARA/Argonne
ECPT Operator: T. Bauder/S. Armstrong



SB14

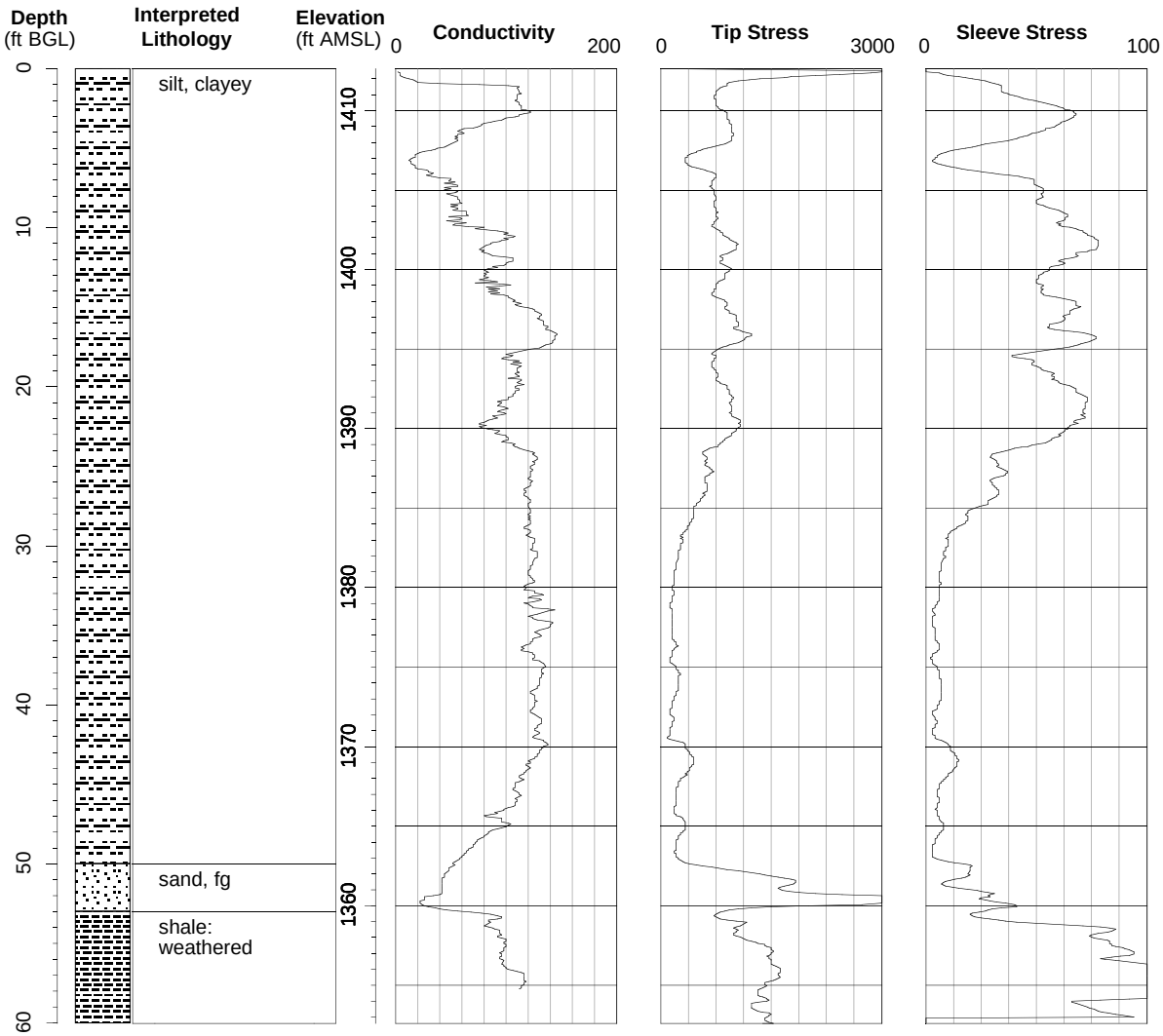
AGENDA CCC/USDA Site Investigation
Sec. 16 ACBA, T.4 S., R.1W, Republic County, Kansas

Ground Surface Elevation: 1412.63 ft
Depth: 60.04 ft.
Interpreted by: S. Cook

Argonne National Laboratory

Environmental Research Division

ECPT Date: 12/05/96
ECPT by: ARA/Argonne
ECPT Operator: T. Bauder/S.Armstrong



SB 15

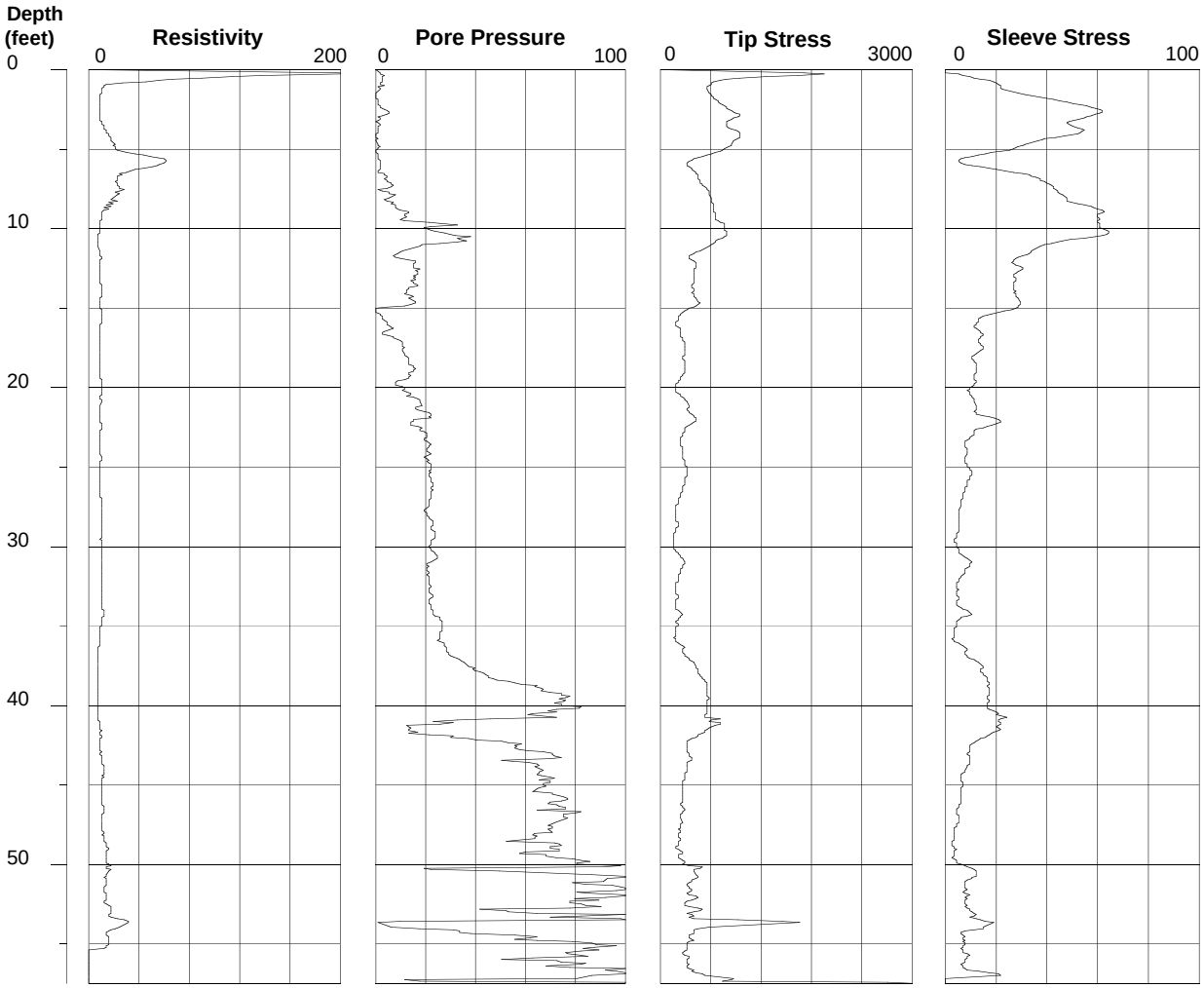
AGENDA CCC/USDA Site Investigation

Sec. 16 ABCD, T4S R1W, Republic County, Kansas

Ground Surface Elevation: 1412.30 ft
Depth: 57.48 ft
Interpreted by: S. Cook

Argonne National Laboratory
Environmental Research Division

ECPT Date: 12/05/96
ECPT by: ARA/Argonne
ECPT Operator: T. Bauder/S. Armstrong



SB15

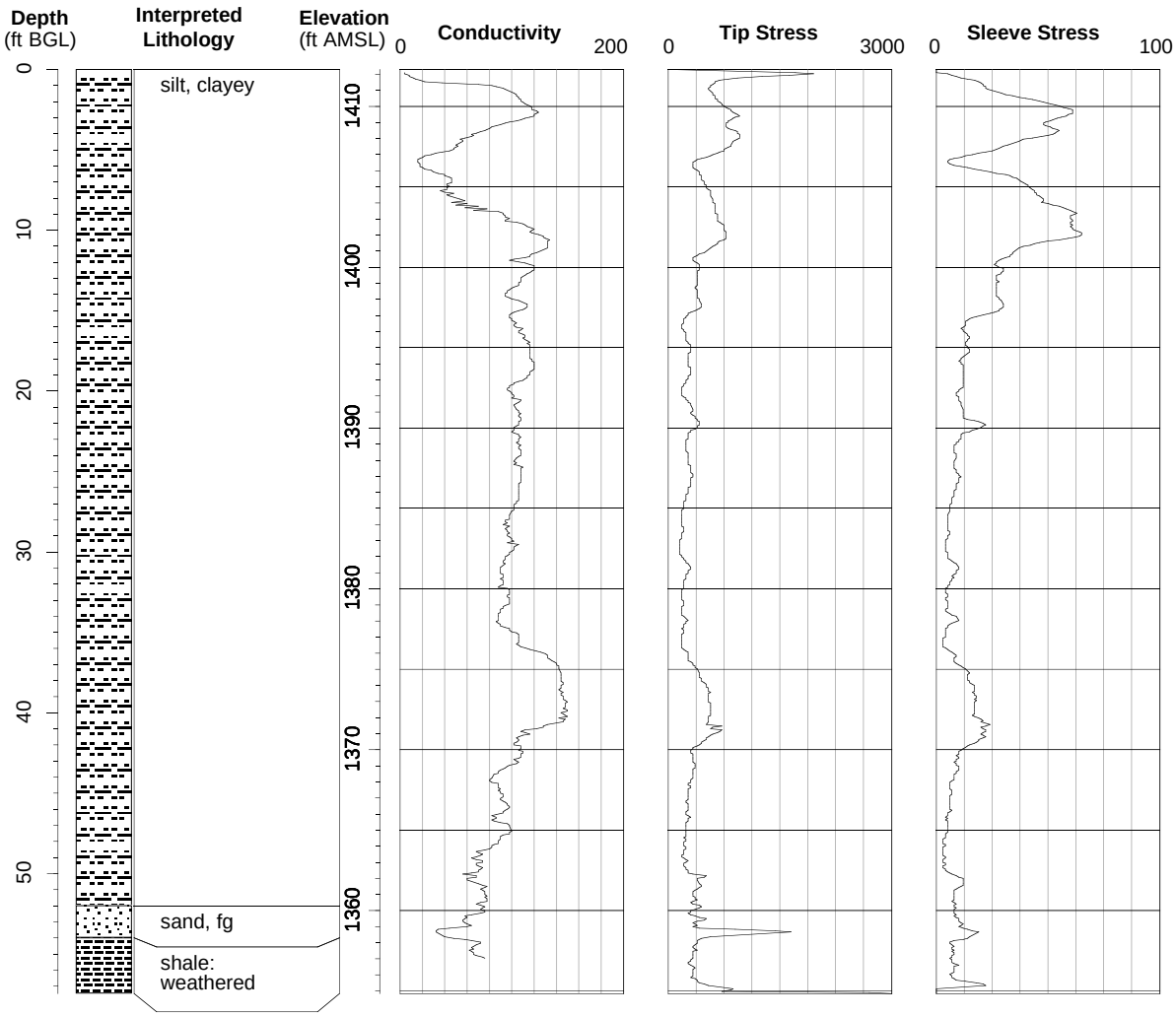
AGENDA CCC/USDA Site Investigation
Sec. 16 ABCD, T.4 S., R.1W, Republic County, Kansas

Ground Surface Elevation: 1412.30 ft
Depth: 57.48 ft.
Interpreted by: S. Cook

Argonne National Laboratory

Environmental Research Division

ECPT Date: 12/05/96
ECPT by: ARA/Argonne
ECPT Operator: T. Bauder/S.Armstrong



Appendix B:

Well Construction Data

SB 11

Agenda CCC/USDA Grain Storage Site

Sec. 16 DBBB, T4S R1W, Republic County, Kansas

Top of Casing Elevation: 1400.83 ft
Ground Surface Elevation: 1397.8 ft
Supervised by: S. Cook, M. Krokosz, R. Sedivy

Argonne National Laboratory

Environmental Research Division

Installed by: Dane, Bob **Date:** 11/19-11/22/96
Company: Layne-Western
Developed by: Bob **Date:** 11/25/96
Company: Layne-Western

Depth ft BGL

Casing Materials

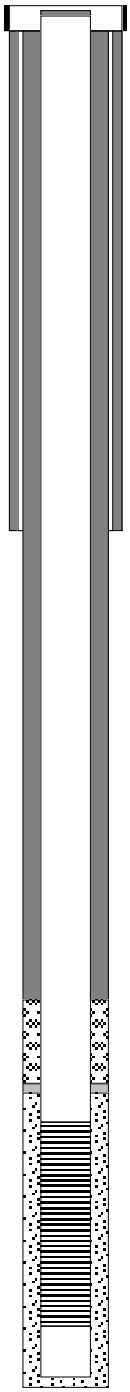
8 in. schedule 40 PVC stickup set in 3 ft diameter cement pad

8 in. schedule 40 flushjoint PVC conductor casing from 0 to 49 ft BGL

4 in. schedule 40 flushjoint PVC casing from 0 to 107 ft BGL

4 in. schedule 40 flushjoint PVC 0.010 slotted screen from 107 to 127 ft BGL

4 in. schedule 40 flushjoint PVC casing sump from 127 to 133 ft BGL



Annular Materials

11.75 in. diameter borehole from 0 to 50 ft BGL

Portland cement with 5% bentonite from 0 to 50 ft BGL

7.75 in. diameter borehole from 50 to 133 ft BGL

Portland cement with 5% bentonite from 0 to 95 ft BGL

Bentonite chips from 95 to 103.2 ft BGL

Fine silica sand buffer from 103.2 to 104.1 ft BGL

Coarse-graded silica sand filter pack from 104.1 to 133 ft BGL

Elevation ft AMSL

0, 10, 20, 30, 40, 50, 60, 70, 80, 90, 100, 110, 120, 130

1392, 1382, 1372, 1362, 1352, 1342, 1332, 1322, 1312, 1302, 1292, 1282, 1272

SB12

Agenda CCC/USDA Grain Storage Site

Sec. 16 BDDA, T4S R1W, Republic County, Kansas

Argonne National Laboratory

Environmental Research Division

Installed by: Bob **Date:** 11/20/96

Company: Layne-Western

Top of Casing Elevation: 1,398.49 ft

Ground Surface Elevation: 1,395.9 ft

Supervised by: M. Krokosz, S. Cook

Developed by: Bob **Date:** 11/21/96

Company: Layne-Western

Depth ft BGL

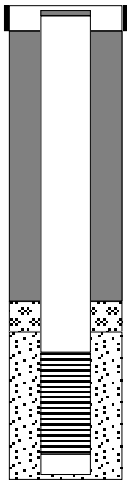
Casing Materials

8 in. schedule 40 PVC stickup set in 3 ft diameter cement pad

4 in. schedule 40 flushjoint PVC casing from 0 to 31.5 ft BGL

4 in. schedule 40 flushjoint PVC 0.010 slotted screen from 31.5 to 41.5 ft BGL

4 in. schedule 40 flushjoint PVC casing sump from 41.5 to 43.5 ft BGL



Annular Materials

12 in. diameter borehole from 0 to 44 ft BGL

Portland cement with 5% bentonite from 0 to 26.5 ft BGL

Bentonite chips from 26.5 to 29.5 ft BGL

Coarse-graded silica sand filter pack from 29.5 to 44 ft BGL

Elevation ft AMSL

0, 10, 20, 30, 40

1392, 1382, 1372, 1362, 1352

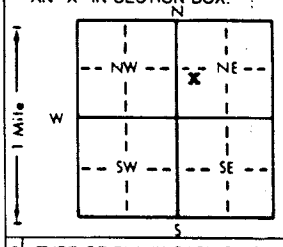
WATER WELL RECORD Form WWC-5 KSA 82a-1212

1 LOCATION OF WATER WELL: County: Republic	Fraction: NW ¼ SW ¼ NE ¼	Section Number: 16	Township Number: T 4 S	Range Number: R 1 E/W

Distance and direction from nearest town or city street address of well if located within city?
326' Southeast of the intersection of County Rd. & Railroad Street.

2 WATER WELL OWNER: USDA/CCC Farm Credit Service (SB11)
RR#, St. Address, Box # : 1400 Independence Ave, SW Stop 0513
City, State, ZIP Code : Washington, DC 202250-0513
Board of Agriculture, Division of Water Resources Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL ..... ft. ELEVATION: 1,397'
Depth(s) Groundwater Encountered 1. ..... ft. 2. ..... ft. 3. ..... ft.
WELL'S STATIC WATER LEVEL ... 31 ..... ft. below land surface measured on mo/day/yr 7-24-00
Pump test data: Well water was ..... ft. after ..... hours pumping ..... gpm
Est. Yield ..... gpm: Well water was ..... ft. after ..... hours pumping ..... gpm
Bore Hole Diameter ..... in. to ..... ft., and ..... in. to ..... ft.
WELL WATER TO BE USED AS: 5 Public water supply 8 Air conditioning 11 Injection well
1 Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering 12 Other (Specify below)
2 Irrigation 4 Industrial 7 Lawn and garden only 10 Monitoring well .....
Was a chemical/bacteriological sample submitted to Department? Yes ..... No ..... ; If yes, mo/day/yr sample was submitted
Water Well Disinfected? Yes No

5 TYPE OF BLANK CASING USED: 5 Wrought iron 8 Concrete tile CASING JOINTS: Glued ..... Clamped .....
1 Steel 3 RMP (SR) 6 Asbestos-Cement 9 Other (specify below) Welded .....
2 PVC 4 ABS 7 Fiberglass ..... Threaded .....
Blank casing diameter ..... in. to ..... ft., Dia ..... in. to ..... ft., Dia ..... in. to ..... ft.
Casing height above land surface ..... in., weight ..... lbs./ft. Wall thickness or gauge No. .....
TYPE OF SCREEN OR PERFORATION MATERIAL: 7 PVC 10 Asbestos-cement
1 Steel 3 Stainless steel 5 Fiberglass 8 RMP (SR) 11 Other (specify) .....
2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE: 5 Gauzed wrapped 8 Saw cut 11 None (open hole)
1 Continuous slot 3 Mill slot 6 Wire wrapped 9 Drilled holes
2 Louvered shutter 4 Key punched 7 Torch cut 10 Other (specify) .....
SCREEN-PERFORATED INTERVALS: From ..... ft. to ..... ft., From ..... ft. to ..... ft.
From ..... ft. to ..... ft., From ..... ft. to ..... ft.
GRAVEL PACK INTERVALS: From ..... ft. to ..... ft., From ..... ft. to ..... ft.
From ..... ft. to ..... ft., From ..... ft. to ..... ft.

6 GROUT MATERIAL: 1 Neat cement 2 Cement grout 3 Bentonite 4 Other .....
Grout Intervals: From 133 ft. to -3 ft., From ..... ft. to ..... ft., From ..... ft. to ..... ft.
What is the nearest source of possible contamination: 10 Livestock pens 14 Abandoned water well
1 Septic tank 4 Lateral lines 7 Pit privy 11 Fuel storage 15 Oil well/Gas well
2 Sewer lines 5 Cess pool 8 Sewage lagoon 12 Fertilizer storage 16 Other (specify below)
3 Watertight sewer lines 6 Seepage pit 9 Feedyard 13 Insecticide storage .....
Direction from well? West Southwest How many feet? 32'

FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
			133'	-3'	Well was filled with Neat
					Cement from T.D. (133') tp
					3' below the ground surface
					with neat cement using a 1"
					trimie. The casing was cut
					3' below the ground surface,
					then back filled with native
					soil & applied grass seed
					and watered.

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) July 24, 2000 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 680 This Water Well Record was completed on (mo/day/yr) July 28, 2000
under the business name of Delta Environmental by (signature)

INSTRUCTIONS: Use typewriter or ball point pen. *PLEASE PRESS FIRMLY* and *PRINT* clearly. Please fill in blanks, underline or circle the correct answers. Send top three copies to Kansas Department of Health and Environment, Bureau of Water, Topeka, Kansas 66620-0001. Telephone: 913-296-5545. Send one to WATER WELL OWNER and retain one for your records.

Kansas Geological Survey | Hydrology | Water Well Database Query

Specific Water Well Detail

Well T4S, R1W, Sec. 16, NWSWNE, Action: Constructed

Agenda SB11

Location Info

County: Republic	**Location:** T4S, R1W, Sec. 16, NWSWNE
Owner: CCC/USDA CEPD	**Status**: Constructed
Directions:	

General Info

Well Depth: 135 ft.	**Elevation:** 0 ft.
Static Water Level: 0 ft.	**Well Use:** Monitoring Well/Observation/Piezometer
Depths Groundwater Enountered: 0 ft., 0 ft., and 0 ft.	
Pump Test Data: water was 0 ft. after 0 hours pumping 0 gpm	
Est. Yield: 0 ft.	**Chem Analysis Done:** N

Driller Info

Driller: Brian J. Meier, Layne Western	**License #:** 581
Comp. Date: 23-Jan-1997	**DWR Applic. #:**

Casing Info

Casing Type: PVC
Diam: 4 in. to 107 ft.
Diam: 0 in. to 0 ft.
Diam: 0 in. to 0 ft.

Screen and Perforation Info

Screen Type: TORCH CUT	**Screen Openings:** MILL SLOT
From: 107 ft. to 127 ft.	**From:** 0 ft. to 0 ft.
From: 0 ft. to 0 ft.	**From:** 0 ft. to 0 ft.

Grout Info

Grout used: NEAT CEMENT and BENTONITE
From: 0 to 95 ft.
From: 95 to 103.2 ft.
From: 0 to 0 ft.

Contamination Info

Contamination type: LIVESTOCK PENS

Direction:	**Distance: 0**

Lithologic Log

From: 0 ft. **to** 2 ft.	**Type:** CLAY
From: 2 ft. **to** 16.5 ft.	**Type:** SILT
From: 16.5 ft. **to** 42.5 ft.	**Type:** SANDSTONE
From: 42.5 ft. **to** 73 ft.	**Type:** SHALE
From: 73 ft. **to** 125 ft.	**Type:** SAND
From: 125 ft. **to** 126.5 ft.	**Type:** SANDSTONE
From: 126.5 ft. **to** 135 ft.	**Type:** SHALE

Kansas Geological Survey
Comments to webadmin@kgs.ukans.edu
URL=http://magellan.kgs.ukans.edu/WaterWell/index.html
Display Programs Updated March 2000
Data added continuously.

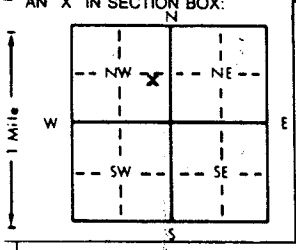
WATER WELL RECORD Form WWC-5 KSA 82a-1212

1 LOCATION OF WATER WELL:	Fraction	Section Number	Township Number	Range Number
County: Republic	Ne ¼ Se ¼ Nw ¼	166	T 4 S	R 1 E/W

Distance and direction from nearest town or city street address of well if located within city?
West side of County Rd. (57' West of Power Pole # 11504)

2 WATER WELL OWNER: USDA/CCC Fram Credit Service (SB12)
RR#, St. Address, Box # : 1400 Independence Ave, SW Stop 0513 Board of Agriculture, Division of Water Resources
City, State, ZIP Code : Washington, DC 202250-0513 Application Number:

3 LOCATE WELL'S LOCATION WITH AN "X" IN SECTION BOX:



4 DEPTH OF COMPLETED WELL 43.5 ft. ELEVATION: 1395.9'
Depth(s) Groundwater Encountered 1. ..... ft. 2. ..... ft. 3. ..... ft.
WELL'S STATIC WATER LEVEL 24.5 ft. below land surface measured on mo/day/yr 7/24/2000
Pump test data: Well water was ..... ft. after ..... hours pumping ..... gpm
Est. Yield ..... gpm: Well water was ..... ft. after ..... hours pumping ..... gpm
Bore Hole Diameter ..... in. to ..... ft., and ..... in. to ..... ft.
WELL WATER TO BE USED AS: 5 Public water supply 8 Air conditioning 11 Injection well
1 Domestic 3 Feedlot 6 Oil field water supply 9 Dewatering 12 Other (Specify below)
2 Irrigation 4 Industrial 7 Lawn and garden only 10 Monitoring well .....
Was a chemical/bacteriological sample submitted to Department? Yes.....No.....; If yes, mo/day/yr sample was submitted Water Well Disinfected? Yes No

5 TYPE OF BLANK CASING USED: 5 Wrought iron 8 Concrete tile CASING JOINTS: Glued ..... Clamped .....
1 Steel 3 RMP (SR) 6 Asbestos-Cement 9 Other (specify below) Welded .....
2 PVC 4 ABS 7 Fiberglass ..... Threaded .....
Blank casing diameter ..... in. to ..... ft., Dia ..... in. to ..... ft., Dia ..... in. to ..... ft.
Casing height above land surface ..... in., weight ..... lbs./ft. Wall thickness or gauge No. .....
TYPE OF SCREEN OR PERFORATION MATERIAL: 7 PVC 10 Asbestos-cement
1 Steel 3 Stainless steel 5 Fiberglass 8 RMP (SR) 11 Other (specify) .....
2 Brass 4 Galvanized steel 6 Concrete tile 9 ABS 12 None used (open hole)
SCREEN OR PERFORATION OPENINGS ARE: 5 Gauzed wrapped 8 Saw cut 11 None (open hole)
1 Continuous slot 3 Mill slot 6 Wire wrapped 9 Drilled holes
2 Louvered shutter 4 Key punched 7 Torch cut 10 Other (specify) .....
SCREEN-PERFORATED INTERVALS: From ..... ft. to ..... ft., From ..... ft. to ..... ft.
From ..... ft. to ..... ft., From ..... ft. to ..... ft.
GRAVEL PACK INTERVALS: From ..... ft. to ..... ft., From ..... ft. to ..... ft.
From ft. to ft., From ft. to ft.

6 GROUT MATERIAL: 43.5 Neat cement 3' BGL 2 Cement grout 3 Bentonite 4 Other .....
Grout Intervals: From ..... ft. to ..... ft., From ..... ft. to ..... ft., From ..... ft. to ..... ft.
What is the nearest source of possible contamination: 10 Livestock pens 14 Abandoned water well
1 Septic tank 4 Lateral lines 7 Pit privy 11 Fuel storage 15 Oil well/Gas well
2 Sewer lines 5 Cess pool 8 Sewage lagoon 12 Fertilizer storage 16 Other (specify below)
3 Watertight sewer lines 6 Seepage pit 9 Feedyard 13 Insecticide storage .....
Direction from well? How many feet?

FROM	TO	LITHOLOGIC LOG	FROM	TO	PLUGGING INTERVALS
			43.5	-3'	Well was filled with Neat
					Cement from TD (43.5') to 3'
					Below ground surface. w/Portlan
					Cement was mixed with 5.5 gal
					of clean city water per sk.
					Cement was place with a 1"
					trimie. Casing was removed
					3' BGL and the hole was fille
					with native soils and seeded
					grass.

7 CONTRACTOR'S OR LANDOWNER'S CERTIFICATION: This water well was (1) constructed, (2) reconstructed, or (3) plugged under my jurisdiction and was completed on (mo/day/year) July 24, 2000 and this record is true to the best of my knowledge and belief. Kansas Water Well Contractor's License No. 680 This Water Well Record was completed on (mo/day/yr) July 28, 2000 under the business name of Dell Environmental by (signature)

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Appendix C:

Water Level Data

TABLE C.1 Water Levels (ft AMSL) in Observation Wells at Agenda, Kansas, on November 10, 1996, to December 10, 1996

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/10/96	0:00	1372.26	1373.79	1375.39	NR[a]	-[b]	1366.23	1366.44	1366.59	1366.54	-
11/10/96	1:00	1372.26	1373.80	1375.39	NR	-	1366.23	1366.45	1366.59	1366.55	-
11/10/96	2:00	1372.27	1373.79	1375.38	NR	-	1366.23	1366.45	1366.60	1366.55	-
11/10/96	3:00	1372.27	1373.79	1375.38	NR	-	1366.24	1366.45	1366.61	1366.55	-
11/10/96	4:00	1372.28	1373.79	1375.38	NR	-	1366.25	1366.46	1366.62	1366.56	-
11/10/96	5:00	1372.29	1373.79	1375.38	NR	-	1366.26	1366.47	1366.62	1366.57	-
11/10/96	6:00	1372.28	1373.79	1375.38	NR	-	1366.26	1366.47	1366.62	1366.57	-
11/10/96	7:00	1372.28	1373.78	1375.38	NR	-	1366.25	1366.47	1366.62	1366.57	-
11/10/96	8:00	1372.29	1373.79	1375.39	NR	-	1366.25	1366.46	1366.62	1366.57	-
11/10/96	9:00	1372.29	1373.78	1375.38	NR	-	1366.24	1366.46	1366.62	1366.56	-
11/10/96	10:00	1372.29	1373.78	1375.37	NR	-	1366.23	1366.44	1366.60	1366.55	-
11/10/96	11:00	1372.30	1373.79	1375.37	NR	-	1366.23	1366.45	1366.59	1366.55	-
11/10/96	12:00	1372.32	1373.78	1375.37	NR	-	1366.23	1366.44	1366.60	1366.55	-
11/10/96	13:00	1372.32	1373.79	1375.39	NR	-	1366.24	1366.45	1366.61	1366.56	-
11/10/96	14:00	1372.33	1373.80	1375.40	NR	-	1366.25	1366.46	1366.62	1366.57	-
11/10/96	15:00	1372.33	1373.81	1375.42	NR	-	1366.28	1366.49	1366.64	1366.59	-
11/10/96	16:00	1372.33	1373.81	1375.43	NR	-	1366.29	1366.50	1366.65	1366.59	-
11/10/96	17:00	1372.33	1373.80	1375.41	NR	-	1366.28	1366.49	1366.64	1366.59	-
11/10/96	18:00	1372.33	1373.81	1375.41	NR	-	1366.28	1366.48	1366.64	1366.58	-
11/10/96	19:00	1372.33	1373.81	1375.41	NR	-	1366.27	1366.48	1366.63	1366.58	-
11/10/96	20:00	1372.32	1373.80	1375.40	NR	-	1366.26	1366.47	1366.62	1366.57	-
11/10/96	21:00	1372.32	1373.80	1375.40	NR	-	1366.25	1366.45	1366.61	1366.56	-
11/10/96	22:00	1372.31	1373.80	1375.40	NR	-	1366.25	1366.45	1366.61	1366.56	-
11/10/96	23:00	1372.32	1373.79	1375.38	NR	-	1366.23	1366.45	1366.59	1366.55	-
11/11/96	0:00	1372.32	1373.78	1375.38	NR	-	1366.23	1366.44	1366.59	1366.54	-
11/11/96	1:00	1372.31	1373.78	1375.38	NR	-	1366.23	1366.45	1366.59	1366.54	-
11/11/96	2:00	1372.31	1373.78	1375.37	NR	-	1366.23	1366.44	1366.58	1366.54	-
11/11/96	3:00	1372.32	1373.78	1375.37	NR	-	1366.24	1366.44	1366.60	1366.55	-
11/11/96	4:00	1372.31	1373.78	1375.37	NR	-	1366.23	1366.45	1366.60	1366.55	-
11/11/96	5:00	1372.31	1373.78	1375.37	NR	-	1366.24	1366.45	1366.61	1366.55	-

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/11/96	6:00	1372.31	1373.77	1375.36	NR	-	1366.23	1366.46	1366.61	1366.56	-
11/11/96	7:00	1372.30	1373.77	1375.36	NR	-	1366.23	1366.45	1366.60	1366.55	-
11/11/96	8:00	1372.30	1373.77	1375.35	NR	-	1366.22	1366.45	1366.60	1366.55	-
11/11/96	9:00	1372.30	1373.77	1375.35	NR	-	1366.21	1366.43	1366.58	1366.53	-
11/11/96	10:00	1372.30	1373.76	1375.34	NR	-	1366.20	1366.42	1366.57	1366.52	-
11/11/96	11:00	1372.31	1373.76	1375.33	NR	-	1366.18	1366.41	1366.56	1366.50	-
11/11/96	12:00	1372.31	1373.76	1375.34	NR	-	1366.15	1366.33	1366.51	1366.46	-
11/11/96	13:00	1372.32	1373.76	1375.34	NR	-	1366.16	1366.38	1366.54	1366.49	-
11/11/96	14:00	1372.33	1373.76	1375.35	NR	-	1366.18	1366.40	1366.55	1366.50	-
11/11/96	15:00	1372.33	1373.76	1375.35	NR	-	1366.19	1366.41	1366.56	1366.50	-
11/11/96	16:00	1372.32	1373.76	1375.35	NR	-	1366.20	1366.41	1366.57	1366.51	-
11/11/96	17:00	1372.32	1373.76	1375.34	NR	-	1366.20	1366.41	1366.57	1366.51	-
11/11/96	18:00	1372.32	1373.76	1375.34	NR	-	1366.20	1366.42	1366.57	1366.51	-
11/11/96	19:00	1372.31	1373.75	1375.33	NR	-	1366.19	1366.41	1366.56	1366.50	-
11/11/96	20:00	1372.31	1373.75	1375.33	NR	-	1366.17	1366.39	1366.54	1366.49	-
11/11/96	21:00	1372.31	1373.75	1375.32	NR	-	1366.16	1366.38	1366.53	1366.48	-
11/11/96	22:00	1372.30	1373.75	1375.31	NR	-	1366.14	1366.36	1366.51	1366.46	-
11/11/96	23:00	1372.30	1373.74	1375.31	NR	-	1366.12	1366.35	1366.50	1366.45	-
11/12/96	0:00	1372.30	1373.74	1375.31	NR	-	1366.12	1366.34	1366.49	1366.44	-
11/12/96	1:00	1372.29	1373.74	1375.30	NR	-	1366.11	1366.33	1366.48	1366.43	-
11/12/96	2:00	1372.30	1373.74	1375.30	NR	-	1366.11	1366.33	1366.48	1366.44	-
11/12/96	3:00	1372.30	1373.73	1375.30	NR	-	1366.12	1366.34	1366.48	1366.44	-
11/12/96	4:00	1372.29	1373.74	1375.31	NR	-	1366.14	1366.35	1366.50	1366.46	-
11/12/96	5:00	1372.29	1373.74	1375.31	NR	-	1366.15	1366.36	1366.51	1366.46	-
11/12/96	6:00	1372.29	1373.73	1375.31	NR	-	1366.15	1366.37	1366.52	1366.47	-
11/12/96	7:00	1372.29	1373.73	1375.31	NR	-	1366.16	1366.36	1366.52	1366.47	-
11/12/96	8:00	1372.29	1373.73	1375.31	NR	-	1366.16	1366.38	1366.53	1366.48	-
11/12/96	9:00	1372.28	1373.73	1375.31	NR	-	1366.16	1366.38	1366.53	1366.48	-
11/12/96	10:00	1372.29	1373.73	1375.30	NR	-	1366.15	1366.37	1366.52	1366.47	-
11/12/96	11:00	1372.29	1373.73	1375.31	NR	-	1366.07	1366.36	1366.52	1366.47	-
11/12/96	12:00	1372.29	1373.73	1375.31	NR	-	1365.95	1366.32	1366.48	1366.42	-

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/12/96	13:00	1372.30	1373.74	1375.32	NR	-	1366.11	1366.33	1366.49	1366.44	-
11/12/96	14:00	1372.31	1373.75	1375.34	NR	-	1366.15	1366.36	1366.51	1366.46	-
11/12/96	15:00	1372.31	1373.76	1375.36	NR	-	1366.18	1366.39	1366.54	1366.49	-
11/12/96	16:00	1372.31	1373.76	1375.36	NR	-	1366.20	1366.40	1366.55	1366.50	-
11/12/96	17:00	1372.31	1373.77	1375.36	NR	-	1366.21	1366.41	1366.56	1366.51	-
11/12/96	18:00	1372.31	1373.77	1375.37	NR	-	1366.22	1366.43	1366.58	1366.52	-
11/12/96	19:00	1372.31	1373.78	1375.37	NR	-	1366.22	1366.42	1366.57	1366.52	-
11/12/96	20:00	1372.30	1373.78	1375.37	NR	-	1363.61	1365.81	1366.30	1366.05	-
11/12/96	21:00	1372.29	1373.78	1375.38	NR	-	1365.58	1365.87	1366.14	1366.04	-
11/12/96	22:00	1372.30	1373.78	1375.38	NR	-	1365.90	1366.10	1366.28	1366.23	-
11/12/96	23:00	1372.29	1373.78	1375.37	NR	-	1366.02	1366.20	1366.36	1366.31	-
11/13/96	0:00	1372.29	1373.78	1375.38	NR	-	1366.08	1366.26	1366.41	1366.37	-
11/13/96	1:00	1372.29	1373.78	1375.38	NR	-	1366.12	1366.31	1366.44	1366.41	-
11/13/96	2:00	1372.29	1373.78	1375.38	NR	-	1366.14	1366.33	1366.47	1366.44	-
11/13/96	3:00	1372.29	1373.78	1375.39	NR	-	1366.17	1366.36	1366.49	1366.46	-
11/13/96	4:00	1372.30	1373.79	1375.39	NR	-	1366.18	1366.38	1366.52	1366.48	-
11/13/96	5:00	1372.30	1373.79	1375.39	NR	-	1366.21	1366.40	1366.54	1366.50	-
11/13/96	6:00	1372.30	1373.79	1375.40	NR	-	1366.22	1366.42	1366.56	1366.52	-
11/13/96	7:00	1372.30	1373.79	1375.40	NR	-	1366.24	1366.44	1366.58	1366.54	-
11/13/96	8:00	1372.30	1373.80	1375.40	NR	-	1364.78	1365.50	1366.06	1365.82	-
11/13/96	9:00	1372.30	1373.79	1375.39	NR	-	1365.72	1365.95	1366.18	1366.11	-
11/13/96	10:00	1372.30	1373.78	1375.38	NR	-	1365.95	1366.15	1366.30	1366.27	-
11/13/96	11:00	1372.31	1373.78	1375.37	NR	-	1366.05	1366.23	1366.38	1366.35	-
11/13/96	12:00	1372.32	1373.78	1375.37	NR	-	1366.09	1366.27	1366.42	1366.38	-
11/13/96	13:00	1372.33	1373.78	1375.38	NR	-	1366.12	1366.31	1366.45	1366.42	-
11/13/96	14:00	1372.33	1373.79	1375.39	NR	-	1366.15	1366.34	1366.48	1366.45	-
11/13/96	15:00	1372.34	1373.79	1375.39	NR	-	1364.41	1365.53	1366.08	1365.83	-
11/13/96	16:00	1372.34	1373.79	1375.39	NR	-	1365.65	1365.86	1366.11	1366.03	-
11/13/96	17:00	1372.33	1373.78	1375.39	NR	-	1365.92	1366.09	1366.25	1366.22	-
11/13/96	18:00	1372.33	1373.79	1375.39	NR	-	1366.03	1366.20	1366.35	1366.32	-
11/13/96	19:00	1372.32	1373.78	1375.38	NR	-	1366.08	1366.26	1366.40	1366.37	-

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/13/96	20:00	1372.32	1373.78	1375.38	NR	-	1366.10	1366.29	1366.43	1366.40	-
11/13/96	21:00	1372.31	1373.78	1375.38	NR	-	1364.98	1365.74	1366.18	1365.99	-
11/13/96	22:00	1372.31	1373.78	1375.37	NR	-	1365.80	1366.02	1366.22	1366.17	-
11/13/96	23:00	1372.31	1373.78	1375.37	NR	-	1365.96	1366.15	1366.31	1366.27	-
11/14/96	0:00	1372.31	1373.78	1375.38	NR	-	1366.04	1366.23	1366.37	1366.34	-
11/14/96	1:00	1372.31	1373.78	1375.38	NR	-	1366.08	1366.27	1366.40	1366.37	-
11/14/96	2:00	1372.29	1373.78	1375.38	NR	-	1366.11	1366.29	1366.43	1366.40	-
11/14/96	3:00	1372.30	1373.78	1375.39	NR	-	1366.14	1366.32	1366.46	1366.42	-
11/14/96	4:00	1372.30	1373.79	1375.40	NR	-	1366.16	1366.35	1366.48	1366.45	-
11/14/96	5:00	1372.30	1373.79	1375.40	NR	-	1366.19	1366.37	1366.51	1366.48	-
11/14/96	6:00	1372.30	1373.80	1375.41	NR	-	1366.21	1366.40	1366.54	1366.50	-
11/14/96	7:00	1372.30	1373.80	1375.41	NR	-	1364.69	1365.92	1366.34	1366.14	-
11/14/96	8:00	1372.30	1373.80	1375.41	NR	-	1365.87	1366.10	1366.31	1366.24	-
11/14/96	9:00	1372.29	1373.81	1375.42	NR	-	1366.06	1366.26	1366.41	1366.37	-
11/14/96	10:00	1372.29	1373.81	1375.42	NR	-	1366.15	1366.33	1366.48	1366.44	-
11/14/96	11:00	1372.30	1373.82	1375.43	NR	-	1366.19	1366.38	1366.52	1366.48	-
11/14/96	12:00	1372.30	1373.82	1375.43	NR	-	1366.22	1366.41	1366.55	1366.51	-
11/14/96	13:00	1372.31	1373.82	1375.44	NR	-	1366.25	1366.43	1366.58	1366.53	-
11/14/96	14:00	1372.33	1373.83	1375.46	NR	-	1366.27	1366.45	1366.60	1366.56	-
11/14/96	15:00	1372.34	1373.85	1375.47	NR	-	1366.30	1366.49	1366.62	1366.58	-
11/14/96	16:00	1372.34	1373.85	1375.48	NR	-	1366.33	1366.51	1366.65	1366.61	-
11/14/96	17:00	1372.33	1373.85	1375.48	NR	-	1366.34	1366.53	1366.66	1366.63	-
11/14/96	18:00	1372.33	1373.86	1375.49	NR	-	1366.36	1366.55	1366.68	1366.65	-
11/14/96	19:00	1372.33	1373.86	1375.49	NR	-	1366.37	1366.56	1366.71	1366.66	-
11/14/96	20:00	1372.32	1373.87	1375.50	NR	-	1366.37	1366.57	1366.71	1366.66	-
11/14/96	21:00	1372.33	1373.87	1375.50	NR	-	1366.39	1366.58	1366.72	1366.68	-
11/14/96	22:00	1372.32	1373.87	1375.51	NR	-	1366.40	1366.59	1366.73	1366.68	-
11/14/96	23:00	1372.33	1373.87	1375.51	NR	-	1366.40	1366.59	1366.73	1366.69	-
11/15/96	0:00	1372.33	1373.89	1375.53	NR	-	1366.42	1366.61	1366.75	1366.70	-
11/15/96	1:00	1372.33	1373.89	1375.52	NR	-	1366.42	1366.61	1366.76	1366.70	-
11/15/96	2:00	1372.34	1373.89	1375.54	NR	-	1366.44	1366.62	1366.76	1366.72	-

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/15/96	3:00	1372.34	1373.90	1375.54	NR	-	1366.45	1366.64	1366.78	1366.74	-
11/15/96	4:00	1372.34	1373.91	1375.55	NR	-	1366.47	1366.65	1366.79	1366.75	-
11/15/96	5:00	1372.34	1373.91	1375.56	NR	-	1366.48	1366.67	1366.81	1366.76	-
11/15/96	6:00	1372.34	1373.91	1375.57	NR	-	1366.49	1366.68	1366.82	1366.77	-
11/15/96	7:00	1372.33	1373.91	1375.57	NR	-	1366.51	1366.69	1366.84	1366.79	-
11/15/96	8:00	1372.34	1373.92	1375.58	NR	-	1366.51	1366.71	1366.85	1366.80	-
11/15/96	9:00	1372.33	1373.92	1375.58	NR	-	1366.52	1366.70	1366.86	1366.81	-
11/15/96	10:00	1372.33	1373.92	1375.57	NR	-	1366.52	1366.68	1366.85	1366.78	-
11/15/96	11:00	1372.35	1373.92	1375.56	NR	-	1366.48	1366.65	1366.82	1366.77	-
11/15/96	12:00	1372.36	1373.92	1375.57	NR	-	1366.49	1366.68	1366.83	1366.78	-
11/15/96	13:00	1372.37	1373.93	1375.57	NR	-	1366.50	1366.69	1366.84	1366.79	-
11/15/96	14:00	1372.37	1373.93	1375.57	NR	-	1366.50	1366.69	1366.84	1366.79	-
11/15/96	15:00	1372.39	1373.93	1375.59	NR	-	1366.50	1366.69	1366.84	1366.79	-
11/15/96	16:00	1372.39	1373.93	1375.58	NR	-	1366.51	1366.70	1366.85	1366.79	-
11/15/96	17:00	1372.40	1373.93	1375.58	NR	-	1366.51	1366.70	1366.85	1366.80	-
11/15/96	18:00	1372.40	1373.93	1375.58	NR	-	1366.50	1366.70	1366.85	1366.80	-
11/15/96	19:00	1372.40	1373.94	1375.58	NR	-	1366.51	1366.71	1366.85	1366.80	-
11/15/96	20:00	1372.39	1373.94	1375.57	NR	-	1366.51	1366.70	1366.85	1366.79	-
11/15/96	21:00	1372.39	1373.93	1375.57	NR	-	1366.50	1366.68	1366.83	1366.78	-
11/15/96	22:00	1372.39	1373.93	1375.57	NR	-	1366.49	1366.68	1366.84	1366.78	-
11/15/96	23:00	1372.40	1373.93	1375.57	NR	-	1366.49	1366.69	1366.84	1366.78	-
11/16/96	0:00	1372.37	1373.93	1375.57	NR	-	1366.49	1366.69	1366.84	1366.78	-
11/16/96	1:00	1372.35	1373.94	1375.58	NR	-	1366.51	1366.71	1366.86	1366.81	-
11/16/96	2:00	1372.35	1373.95	1375.59	NR	-	1366.52	1366.72	1366.87	1366.81	-
11/16/96	3:00	1372.33	1373.96	1375.59	NR	-	1366.53	1366.72	1366.87	1366.82	-
11/16/96	4:00	1372.33	1373.97	1375.59	NR	-	1366.54	1366.74	1366.88	1366.83	-
11/16/96	5:00	1372.33	1373.97	1375.62	NR	-	1366.56	1366.75	1366.90	1366.85	-
11/16/96	6:00	1372.32	1373.98	1375.63	NR	-	1366.57	1366.76	1366.91	1366.86	-
11/16/96	7:00	1372.32	1373.99	1375.61	NR	-	1366.56	1366.76	1366.92	1366.86	-
11/16/96	8:00	1372.30	1374.00	1375.59	NR	-	1366.57	1366.77	1366.93	1366.83	-
11/16/96	9:00	1372.29	1374.17	1375.61	NR	-	1366.61	1366.82	1366.97	1366.80	-

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/16/96	10:00	1372.28	1374.41	1375.64	NR	-	1366.65	1366.84	1367.01	1366.77	-
11/16/96	11:00	1372.27	1374.50	1375.67	NR	-	1366.63	1366.83	1366.99	1366.77	-
11/16/96	12:00	1372.28	1374.72	1375.73	NR	-	1366.66	1366.86	1367.01	1366.77	-
11/16/96	13:00	1372.27	1374.87	1375.78	NR	-	1366.66	1366.82	1367.01	1366.77	-
11/16/96	14:00	1372.28	1375.03	1375.85	NR	-	1366.66	1366.86	1367.01	1366.77	-
11/16/96	15:00	1372.28	1375.15	1375.92	NR	-	1366.66	1366.85	1367.01	1366.77	-
11/16/96	16:00	1372.26	1375.24	1375.99	NR	-	1366.65	1366.85	1367.01	1366.78	-
11/16/96	17:00	1372.26	1375.33	1376.05	NR	-	1366.65	1366.86	1367.01	1366.80	-
11/16/96	18:00	1372.24	1375.38	1376.10	NR	-	1366.64	1366.85	1367.00	1366.82	-
11/16/96	19:00	1372.24	1375.39	1376.13	NR	-	1366.60	1366.80	1366.96	1366.85	-
11/16/96	20:00	1372.23	1375.36	1376.17	NR	-	1366.59	1366.81	1366.96	1366.87	-
11/16/96	21:00	1372.23	1375.29	1376.19	NR	-	1366.60	1366.80	1366.94	1366.90	-
11/16/96	22:00	1372.22	1375.23	1376.20	NR	-	1366.63	1366.77	1366.93	1366.92	-
11/16/96	23:00	1372.22	1375.17	1376.21	NR	-	1366.66	1366.75	1366.90	1366.95	-
11/17/96	0:00	1372.22	1375.13	1376.23	NR	-	1366.68	1366.73	1366.88	1366.96	-
11/17/96	1:00	1372.22	1375.09	1376.23	NR	-	1366.71	1366.70	1366.86	1366.86	-
11/17/96	2:00	1372.22	1375.06	1376.24	NR	-	1366.73	1366.70	1366.85	1366.79	-
11/17/96	3:00	1372.22	1375.02	1376.23	NR	-	1366.75	1366.67	1366.83	1366.77	-
11/17/96	4:00	1372.21	1374.99	1376.23	NR	-	1366.78	1366.65	1366.81	1366.76	-
11/17/96	5:00	1372.21	1374.95	1376.24	NR	-	1366.79	1366.65	1366.80	1366.75	-
11/17/96	6:00	1372.21	1374.93	1376.24	NR	-	1366.81	1366.64	1366.80	1366.74	-
11/17/96	7:00	1372.21	1374.89	1376.24	NR	-	1366.82	1366.63	1366.78	1366.72	-
11/17/96	8:00	1372.21	1374.87	1376.24	NR	-	1366.85	1366.62	1366.77	1366.72	-
11/17/96	9:00	1372.20	1374.85	1376.24	NR	-	1366.83	1366.61	1366.77	1366.71	-
11/17/96	10:00	1372.20	1374.83	1376.24	NR	-	1366.37	1366.59	1366.75	1366.69	-
11/17/96	11:00	1372.21	1374.80	1376.23	NR	-	1366.35	1366.54	1366.73	1366.67	-
11/17/96	12:00	1372.23	1374.79	1376.23	NR	-	1366.35	1366.58	1366.73	1366.68	-
11/17/96	13:00	1372.24	1374.78	1376.26	NR	-	1366.37	1366.60	1366.76	1366.70	-
11/17/96	14:00	1372.25	1374.77	1376.26	NR	-	1366.38	1366.60	1366.76	1366.70	-
11/17/96	15:00	1372.27	1374.76	1376.27	NR	-	1366.40	1366.62	1366.78	1366.73	-
11/17/96	16:00	1372.27	1374.75	1376.27	NR	-	1366.40	1366.62	1366.78	1366.72	-

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/17/96	17:00	1372.28	1374.74	1376.26	NR	-	1366.40	1366.63	1366.78	1366.72	-
11/17/96	18:00	1372.29	1374.73	1376.26	NR	-	1366.40	1366.63	1366.78	1366.73	-
11/17/96	19:00	1372.29	1374.72	1376.26	NR	-	1366.41	1366.63	1366.78	1366.73	-
11/17/96	20:00	1372.29	1374.70	1376.26	NR	-	1366.40	1366.61	1366.76	1366.72	-
11/17/96	21:00	1372.29	1374.70	1376.26	NR	-	1366.41	1366.63	1366.78	1366.73	-
11/17/96	22:00	1372.30	1374.69	1376.25	NR	-	1366.42	1366.64	1366.79	1366.74	-
11/17/96	23:00	1372.29	1374.68	1376.25	NR	-	1366.43	1366.64	1366.79	1366.74	-
11/18/96	0:00	1372.30	1374.67	1376.25	NR	-	1366.43	1366.65	1366.81	1366.75	-
11/18/96	1:00	1372.30	1374.67	1376.26	NR	-	1366.45	1366.68	1366.82	1366.77	-
11/18/96	2:00	1372.30	1374.66	1376.26	NR	-	1366.47	1366.68	1366.83	1366.78	-
11/18/96	3:00	1372.31	1374.66	1376.27	NR	-	1366.47	1366.69	1366.84	1366.79	-
11/18/96	4:00	1372.32	1374.65	1376.25	NR	-	1366.47	1366.68	1366.83	1366.79	-
11/18/96	5:00	1372.32	1374.65	1376.25	NR	-	1366.48	1366.69	1366.84	1366.79	-
11/18/96	6:00	1372.32	1374.65	1376.27	NR	-	1366.49	1366.71	1366.86	1366.81	-
11/18/96	7:00	1372.32	1374.64	1376.25	NR	-	1366.49	1366.71	1366.85	1366.80	-
11/18/96	8:00	1372.32	1374.63	1376.25	NR	-	1366.49	1366.71	1366.85	1366.81	-
11/18/96	9:00	1372.33	1374.63	1376.24	NR	-	1366.51	1366.72	1366.86	1366.81	-
11/18/96	10:00	1372.33	1374.63	1376.24	NR	-	1366.51	1366.71	1366.86	1366.82	-
11/18/96	11:00	1372.34	1374.63	1376.25	NR	-	1366.53	1366.74	1366.88	1366.84	-
11/18/96	12:00	1372.35	1374.62	1376.25	NR	-	1366.53	1366.74	1366.90	1366.84	-
11/18/96	13:00	1372.35	1374.62	1376.26	NR	-	1366.55	1366.76	1366.91	1366.86	-
11/18/96	14:00	1372.37	1374.62	1376.27	NR	-	1366.56	1366.78	1366.92	1366.88	-
11/18/96	15:00	1372.37	1374.61	1376.27	NR	-	1366.56	1366.78	1366.93	1366.87	-
11/18/96	16:00	1372.37	1374.62	1376.27	NR	-	1366.57	1366.78	1366.94	1366.88	-
11/18/96	17:00	1372.37	1374.61	1376.26	NR	-	1366.57	1366.78	1366.93	1366.88	-
11/18/96	18:00	1372.37	1374.61	1376.26	NR	-	1366.57	1366.78	1366.93	1366.88	-
11/18/96	19:00	1372.37	1374.61	1376.26	NR	-	1366.57	1366.78	1366.93	1366.88	-
11/18/96	20:00	1372.36	1374.60	1376.25	NR	-	1366.57	1366.78	1366.93	1366.88	-
11/18/96	21:00	1372.37	1374.59	1376.24	NR	-	1366.57	1366.78	1366.93	1366.88	-
11/18/96	22:00	1372.37	1374.59	1376.23	NR	-	1366.56	1366.75	1366.91	1366.86	-
11/18/96	23:00	1372.37	1374.58	1376.24	NR	-	1366.58	1366.78	1366.93	1366.88	-

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/19/96	0:00	1372.37	1374.59	1376.24	NR	-	1366.57	1366.77	1366.92	1366.87	-
11/19/96	1:00	1372.38	1374.59	1376.24	NR	-	1366.59	1366.79	1366.94	1366.89	-
11/19/96	2:00	1372.37	1374.59	1376.25	NR	-	1366.60	1366.81	1366.96	1366.91	-
11/19/96	3:00	1372.38	1374.58	1376.25	NR	-	1366.62	1366.82	1366.97	1366.92	-
11/19/96	4:00	1372.37	1374.59	1376.25	NR	-	1366.62	1366.83	1366.97	1366.93	-
11/19/96	5:00	1372.38	1374.59	1376.25	NR	-	1366.63	1366.84	1366.98	1366.93	-
11/19/96	6:00	1372.38	1374.58	1376.24	NR	-	1366.63	1366.83	1366.97	1366.93	-
11/19/96	7:00	1372.37	1374.58	1376.25	NR	-	1366.63	1366.84	1366.98	1366.93	-
11/19/96	8:00	1372.37	1374.58	1376.25	NR	-	1366.63	1366.84	1366.98	1366.93	-
11/19/96	9:00	1372.37	1374.58	1376.25	NR	-	1366.64	1366.84	1366.99	1366.94	-
11/19/96	10:00	1372.37	1374.57	1376.23	NR	-	1366.63	1366.81	1366.97	1366.92	-
11/19/96	11:00	1372.37	1374.57	1376.24	NR	-	1366.64	1366.84	1366.99	1366.94	-
11/19/96	12:00	1372.36	1374.57	1376.24	NR	-	1366.64	1366.85	1367.00	1366.95	-
11/19/96	13:00	1372.35	1374.57	1376.25	NR	-	1366.66	1366.85	1367.01	1366.96	-
11/19/96	14:00	1372.35	1374.58	1376.27	NR	-	1366.68	1366.89	1367.03	1366.98	-
11/19/96	15:00	1372.35	1374.58	1376.27	NR	-	1366.69	1366.90	1367.04	1366.99	-
11/19/96	16:00	1372.34	1374.58	1376.27	NR	-	1366.69	1366.90	1367.05	1366.99	-
11/19/96	17:00	1372.33	1374.57	1376.25	NR	-	1366.68	1366.89	1367.04	1366.98	-
11/19/96	18:00	1372.31	1374.56	1376.24	NR	-	1366.66	1366.86	1367.01	1366.96	-
11/19/96	19:00	1372.31	1374.56	1376.23	NR	-	1366.65	1366.86	1367.01	1366.96	-
11/19/96	20:00	1372.29	1374.56	1376.23	NR	-	1366.62	1366.80	1366.97	1366.91	-
11/19/96	21:00	1372.29	1374.56	1376.23	NR	-	1366.63	1366.83	1366.98	1366.93	-
11/19/96	22:00	1372.29	1374.55	1376.22	NR	-	1366.64	1366.85	1366.99	1366.94	-
11/19/96	23:00	1372.28	1374.55	1376.21	NR	-	1366.63	1366.84	1366.99	1366.94	-
11/20/96	0:00	1372.28	1374.54	1376.21	NR	-	1366.64	1366.85	1366.99	1366.94	-
11/20/96	1:00	1372.28	1374.54	1376.22	NR	-	1366.65	1366.86	1367.01	1366.96	-
11/20/96	2:00	1372.28	1374.54	1376.22	NR	-	1366.67	1366.88	1367.02	1366.97	-
11/20/96	3:00	1372.26	1374.54	1376.22	NR	-	1366.67	1366.88	1367.03	1366.98	-
11/20/96	4:00	1372.25	1374.54	1376.21	NR	-	1366.67	1366.88	1367.03	1366.98	-
11/20/96	5:00	1372.26	1374.54	1376.23	NR	-	1366.69	1366.89	1367.04	1366.99	-
11/20/96	6:00	1372.23	1374.54	1376.23	NR	-	1366.69	1366.90	1367.04	1366.99	-

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/20/96	7:00	1372.24	1374.54	1376.23	NR	-	1366.69	1366.89	1367.04	1366.99	-
11/20/96	8:00	1372.23	1374.54	1376.23	NR	-	1366.69	1366.89	1367.04	1366.99	-
11/20/96	9:00	1372.22	1374.54	1376.23	NR	-	1366.69	1366.90	1367.04	1366.99	-
11/20/96	10:00	1372.21	1374.54	1376.23	NR	-	1366.68	1366.85	1367.03	1366.97	-
11/20/96	11:00	1372.24	1374.54	1376.22	NR	-	1366.69	1366.89	1367.04	1366.99	-
11/20/96	12:00	1372.24	1374.54	1376.22	NR	-	1366.69	1366.89	1367.04	1366.99	-
11/20/96	13:00	1372.26	1374.54	1376.23	NR	-	1366.70	1366.91	1367.06	1367.00	-
11/20/96	14:00	1372.25	1374.54	1376.23	NR	-	1366.72	1366.93	1367.08	1367.02	-
11/20/96	15:00	1372.22	1374.54	1376.24	NR	-	1366.73	1366.94	1367.08	1367.03	-
11/20/96	16:00	1372.24	1374.54	1376.24	NR	-	1366.73	1366.93	1367.08	1367.03	-
11/20/96	17:00	1372.24	1374.54	1376.23	NR	-	-	1366.93	1367.08	1367.02	-
11/20/96	18:00	1372.23	1374.53	1376.21	NR	-	-	1366.92	1367.06	1367.01	-
11/20/96	19:00	1372.24	1374.52	1376.20	NR	-	1366.57	1366.87	1367.03	1366.98	-
11/20/96	20:00	1372.25	1374.51	1376.17	NR	-	1366.55	1366.79	1366.98	1366.91	-
11/20/96	21:00	1372.23	1374.50	1376.16	NR	-	1366.56	1366.83	1366.98	1366.93	-
11/20/96	22:00	1372.24	1374.50	1376.15	NR	-	1366.55	1366.82	1366.97	1366.92	-
11/20/96	23:00	1372.24	1374.49	1376.14	NR	-	1366.55	1366.81	1366.96	1366.91	-
11/21/96	0:00	1372.24	1374.48	1376.12	NR	-	1366.55	1366.80	1366.95	1366.90	-
11/21/96	1:00	1372.25	1374.47	1376.12	NR	-	1366.55	1366.80	1366.95	1366.90	-
11/21/96	2:00	1372.28	1374.47	1376.11	NR	-	1366.56	1366.80	1366.95	1366.89	-
11/21/96	3:00	1372.26	1374.46	1376.10	NR	-	1366.56	1366.80	1366.95	1366.89	-
11/21/96	4:00	1372.26	1374.45	1376.09	NR	-	1366.55	1366.78	1366.94	1366.88	-
11/21/96	5:00	1372.27	1374.44	1376.07	NR	-	1366.55	1366.77	1366.93	1366.87	-
11/21/96	6:00	1372.25	1374.44	1376.06	NR	-	1366.53	1366.76	1366.92	1366.86	-
11/21/96	7:00	1372.27	1374.43	1376.06	NR	-	1366.51	1366.75	1366.90	1366.84	-
11/21/96	8:00	1372.27	1374.43	1376.06	NR	-	1366.49	1366.68	1366.87	1366.80	-
11/21/96	9:00	1372.29	1374.42	1376.04	NR	-	1366.48	1366.71	1366.87	1366.81	-
11/21/96	10:00	1372.29	1374.41	1376.03	NR	-	1366.47	1366.70	1366.85	1366.80	-
11/21/96	11:00	1372.30	1374.40	1376.02	NR	-	1366.46	1366.69	1366.84	1366.79	-
11/21/96	12:00	1372.29	1374.40	1376.02	NR	-	1366.47	1366.69	1366.84	1366.79	-
11/21/96	13:00	1372.31	1374.40	1376.03	NR	-	1366.47	1366.70	1366.85	1366.79	-

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/21/96	14:00	1372.32	1374.39	1376.03	NR	-	1366.48	1366.71	1366.86	1366.80	-
11/21/96	15:00	1372.33	1374.39	1376.03	NR	-	1366.49	1366.71	1366.86	1366.81	-
11/21/96	16:00	1372.32	1374.39	1376.03	NR	-	1366.49	1366.72	1366.87	1366.81	-
11/21/96	17:00	1372.33	1374.39	1376.02	NR	-	1366.49	1366.72	1366.87	1366.81	-
11/21/96	18:00	1372.33	1374.38	1376.02	NR	-	1366.49	1366.71	1366.86	1366.80	-
11/21/96	19:00	1372.33	1374.38	1376.01	NR	-	1366.47	1366.67	1366.84	1366.78	-
11/21/96	20:00	1372.33	1374.37	1376.01	NR	-	1366.47	1366.69	1366.84	1366.79	-
11/21/96	21:00	1372.34	1374.38	1376.02	NR	-	1366.47	1366.69	1366.84	1366.79	-
11/21/96	22:00	1372.32	1374.37	1376.02	NR	-	1366.46	1366.66	1366.82	1366.77	-
11/21/96	23:00	1372.33	1374.37	1376.02	NR	-	1366.46	1366.67	1366.83	1366.77	-
11/22/96	0:00	1372.33	1374.37	1376.01	NR	-	1366.47	1366.68	1366.83	1366.78	-
11/22/96	1:00	1372.31	1374.37	1376.01	NR	-	1366.47	1366.69	1366.84	1366.79	-
11/22/96	2:00	1372.31	1374.37	1376.02	NR	-	1366.49	1366.71	1366.86	1366.81	-
11/22/96	3:00	1372.31	1374.37	1376.03	NR	-	1366.51	1366.73	1366.88	1366.82	-
11/22/96	4:00	1372.30	1374.38	1376.04	NR	-	1366.53	1366.75	1366.90	1366.84	-
11/22/96	5:00	1372.29	1374.38	1376.04	NR	-	1366.54	1366.75	1366.91	1366.85	-
11/22/96	6:00	1372.29	1374.38	1376.04	NR	-	1366.55	1366.76	1366.91	1366.86	-
11/22/96	7:00	1372.27	1374.38	1376.04	NR	-	1366.55	1366.76	1366.91	1366.86	-
11/22/96	8:00	1372.27	1374.38	1376.05	NR	-	1366.55	1366.76	1366.92	1366.86	-
11/22/96	9:00	1372.27	1374.38	1376.04	NR	-	1366.56	1366.76	1366.92	1366.86	-
11/22/96	10:00	1372.27	1374.38	1376.06	NR	-	1366.56	1366.75	1366.91	-	-
11/22/96	11:00	1372.26	1374.39	1376.06	NR	-	1366.55	1366.71	1366.89	-	-
11/22/96	12:00	1372.27	1374.39	1376.07	NR	-	1366.56	1366.76	1366.91	1366.98	-
11/22/96	13:00	1372.28	1374.40	1376.09	NR	-	1366.60	1366.80	1366.95	1367.00	-
11/22/96	14:00	1372.28	1374.41	1376.10	NR	-	1366.63	1366.82	1366.97	1367.03	-
11/22/96	15:00	1372.29	1374.42	1376.12	NR	-	1366.66	1366.85	1367.00	1367.06	-
11/22/96	16:00	1372.29	1374.43	1376.13	NR	-	1366.69	1366.88	1367.03	1367.06	-
11/22/96	17:00	1372.28	1374.43	1376.14	NR	-	1366.69	1366.88	1367.03	1367.07	-
11/22/96	18:00	1372.28	1374.44	1376.13	NR	-	1366.70	1366.89	1367.04	1367.07	-
11/22/96	19:00	1372.26	1374.43	1376.13	NR	-	1366.69	1366.89	1367.03	1367.07	-
11/22/96	20:00	1372.26	1374.44	1376.14	NR	-	1366.69	1366.89	1367.04	1367.07	-

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/22/96	21:00	1372.26	1374.44	1376.14	NR	-	1366.70	1366.89	1367.04	1367.08	-
11/22/96	22:00	1372.25	1374.44	1376.15	NR	-	1366.70	1366.90	1367.05	1367.08	-
11/22/96	23:00	1372.25	1374.44	1376.14	NR	-	1366.70	1366.90	1367.05	1367.09	-
11/23/96	0:00	1372.24	1374.45	1376.15	NR	-	1366.71	1366.91	1367.06	1367.10	-
11/23/96	1:00	1372.25	1374.45	1376.15	NR	-	1366.73	1366.92	1367.07	1367.10	-
11/23/96	2:00	1372.25	1374.44	1376.14	NR	-	1366.73	1366.92	1367.07	1367.12	-
11/23/96	3:00	1372.25	1374.45	1376.15	NR	-	1366.75	1366.94	1367.09	1367.14	-
11/23/96	4:00	1372.26	1374.45	1376.16	NR	-	1366.76	1366.96	1367.10	1367.14	-
11/23/96	5:00	1372.27	1374.45	1376.15	NR	-	1366.76	1366.96	1367.11	1367.15	-
11/23/96	6:00	1372.26	1374.45	1376.15	NR	-	1366.77	1366.97	1367.12	1367.14	-
11/23/96	7:00	1372.27	1374.45	1376.14	NR	-	1366.76	1366.96	1367.11	1367.13	-
11/23/96	8:00	1372.27	1374.43	1376.13	NR	-	1366.74	1366.95	1367.10	1367.11	-
11/23/96	9:00	1372.27	1374.42	1376.12	NR	-	1366.72	1366.93	1367.08	1367.10	-
11/23/96	10:00	1372.27	1374.42	1376.10	NR	-	1366.71	1366.91	1367.07	1367.09	-
11/23/96	11:00	1372.28	1374.40	1376.08	NR	-	1366.77	1366.93	1367.06	1367.10	-
11/23/96	12:00	1372.29	1374.40	-	NR	-	1366.74	1366.93	-	1367.09	-
11/23/96	13:00	1372.30	1374.39	-	NR	-	1366.71	1366.91	-	1367.07	-
11/23/96	14:00	1372.32	1374.38	1376.02	NR	-	1366.69	1366.89	-	1367.07	-
11/23/96	15:00	1372.33	1374.37	1376.01	NR	-	1366.67	1366.89	-	1367.04	-
11/23/96	16:00	1372.33	1374.36	1376.00	NR	-	1366.65	1366.86	1366.87	1367.03	-
11/23/96	17:00	1372.33	1374.35	1375.98	NR	-	1366.63	1366.85	1366.90	1367.00	-
11/23/96	18:00	1372.33	1374.34	1375.97	NR	-	1366.60	1366.82	1366.90	1366.98	-
11/23/96	19:00	1372.31	1374.33	1375.96	NR	-	1366.57	1366.80	1366.90	1366.96	-
11/23/96	20:00	1372.31	1374.32	1375.95	NR	-	1366.55	1366.77	1366.88	1366.92	-
11/23/96	21:00	1372.31	1374.32	1375.93	NR	-	1366.51	1366.74	1366.86	1366.90	-
11/23/96	22:00	1372.31	1374.31	1375.93	NR	-	1366.49	1366.71	1366.84	1366.89	-
11/23/96	23:00	1372.31	1374.30	1375.92	NR	-	1366.48	1366.70	1366.83	1366.87	-
11/24/96	0:00	1372.32	1374.30	1375.91	NR	-	1366.47	1366.69	1366.82	1366.88	-
11/24/96	1:00	1372.33	1374.30	1375.91	NR	-	1366.47	1366.70	1366.84	1366.88	-
11/24/96	2:00	1372.33	1374.29	1375.91	NR	-	1366.47	1366.70	1366.83	1366.88	-
11/24/96	3:00	1372.34	1374.28	1375.90	NR	-	1366.47	1366.69	1366.84	1366.91	-

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/24/96	4:00	1372.33	1374.31	1375.95	NR	-	1366.51	1366.73	1366.87	1366.88	-
11/24/96	5:00	1372.34	1374.28	1375.90	NR	-	1366.48	1366.71	1366.84	1366.88	-
11/24/96	6:00	1372.33	1374.28	1375.89	NR	-	1366.47	1366.70	1366.84	1366.89	-
11/24/96	7:00	1372.33	1374.28	1375.90	NR	-	1366.48	1366.71	1366.85	1366.88	-
11/24/96	8:00	1372.33	1374.27	1375.89	NR	-	1366.47	1366.70	1366.84	1366.87	-
11/24/96	9:00	1372.33	1374.27	1375.89	NR	-	1366.47	1366.69	1366.83	1366.86	-
11/24/96	10:00	1372.34	1374.26	1375.88	NR	-	1366.45	1366.68	1366.82	1366.85	-
11/24/96	11:00	1372.33	1374.26	1375.89	NR	-	1366.44	1366.67	1366.82	1366.83	-
11/24/96	12:00	1372.35	1374.26	1375.89	NR	-	1366.43	1366.64	1366.79	1366.85	-
11/24/96	13:00	1372.35	1374.25	1375.89	NR	-	1366.45	1366.67	1366.81	1366.82	-
11/24/96	14:00	1372.35	1374.24	1375.90	NR	-	1366.44	1366.59	1366.80	1366.87	-
11/24/96	15:00	1372.36	1374.27	1375.91	NR	-	1366.47	1366.68	1366.83	1366.88	-
11/24/96	16:00	1372.36	1374.26	1375.91	NR	-	1366.49	1366.70	1366.85	1366.89	-
11/24/96	17:00	1372.35	1374.26	1375.91	NR	-	1366.49	1366.69	1366.85	1366.89	-
11/24/96	18:00	1372.35	1374.26	1375.90	NR	-	1366.49	1366.71	1366.85	1366.89	-
11/24/96	19:00	1372.36	1374.27	1375.91	NR	-	1366.50	1366.70	1366.85	1366.88	-
11/24/96	20:00	1372.34	1374.26	1375.91	NR	-	1366.50	1366.70	1366.84	1366.88	-
11/24/96	21:00	1372.34	1374.26	1375.90	NR	-	1366.49	1366.69	1366.84	1366.87	-
11/24/96	22:00	1372.33	1374.26	1375.90	NR	-	1366.48	1366.69	1366.83	1366.87	-
11/24/96	23:00	1372.33	1374.26	1375.90	NR	-	1366.47	1366.68	1366.82	1366.88	-
11/25/96	0:00	1372.33	1374.26	1375.91	NR	-	1366.49	1366.70	1366.84	1366.89	-
11/25/96	1:00	1372.32	1374.26	1375.91	NR	-	1366.50	1366.71	1366.84	1366.90	-
11/25/96	2:00	1372.32	1374.27	1375.92	NR	-	1366.51	1366.72	1366.85	1366.91	-
11/25/96	3:00	1372.33	1374.27	1375.91	NR	-	1366.53	1366.73	1366.87	1366.93	-
11/25/96	4:00	1372.34	1374.27	1375.93	NR	-	1366.54	1366.75	1366.88	1366.95	-
11/25/96	5:00	1372.32	1374.28	1375.93	NR	-	1366.56	1366.77	1366.90	1366.96	-
11/25/96	6:00	1372.32	1374.28	1375.93	NR	-	1366.57	1366.78	1366.91	1366.96	-
11/25/96	7:00	1372.31	1374.28	1375.93	NR	-	1366.57	1366.78	1366.93	1366.95	-
11/25/96	8:00	1372.30	1374.27	1375.92	NR	-	1366.56	1366.77	1366.91	1366.94	-
11/25/96	9:00	1372.29	1374.26	1375.91	NR	-	1366.55	1366.77	1366.90	1366.93	-
11/25/96	10:00	1372.29	1374.26	1375.91	NR	-	1366.54	1366.75	1366.89	1366.94	-

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/25/96	11:00	1372.28	1374.26	1375.91	NR	-	1366.54	1366.75	1366.90	1366.93	-
11/25/96	12:00	1372.28	1374.26	1375.91	NR	-	1366.52	1366.75	1366.89	1366.93	-
11/25/96	13:00	1372.27	1374.26	1375.91	NR	-	1366.54	1366.75	1366.90	1366.94	-
11/25/96	14:00	1372.27	1374.26	1375.92	NR	-	1366.56	1366.76	1366.90	1366.81	-
11/25/96	15:00	1372.26	1374.26	1375.92	NR	-	1365.99	1366.55	1366.79	1366.79	-
11/25/96	16:00	1372.25	1374.26	1375.92	NR	-	1366.36	1366.58	1366.77	1366.86	-
11/25/96	17:00	1372.24	1374.25	1375.91	NR	-	1366.45	1366.66	1366.82	1366.89	-
11/25/96	18:00	1372.22	1374.25	1375.90	NR	1374.54	1366.49	1366.70	1366.85	1366.90	1366.30
11/25/96	19:00	1372.22	1374.25	1375.89	NR	1374.53	1366.51	1366.72	1366.86	1366.90	1366.38
11/25/96	20:00	1372.19	1374.24	1375.88	NR	1374.51	1366.51	1366.72	1366.86	1366.89	1366.42
11/25/96	21:00	1372.18	1374.24	1375.87	NR	1374.51	1366.50	1366.71	1366.85	1366.88	1366.45
11/25/96	22:00	1372.16	1374.24	1375.87	NR	1374.49	1366.49	1366.70	1366.84	1366.87	1366.44
11/25/96	23:00	1372.15	1374.23	1375.85	NR	1374.49	1366.48	1366.68	1366.83	1366.87	1366.44
11/26/96	0:00	1372.14	1374.23	1375.86	NR	1374.48	1366.47	1366.68	1366.82	1366.86	1366.44
11/26/96	1:00	1372.14	1374.22	1375.85	NR	1374.47	1366.46	1366.67	1366.81	1366.86	1366.45
11/26/96	2:00	1372.15	1374.22	1375.85	NR	1374.46	1366.46	1366.67	1366.81	1366.86	1366.45
11/26/96	3:00	1372.14	1374.21	1375.83	NR	1374.44	1366.45	1366.67	1366.81	1366.84	1366.45
11/26/96	4:00	1372.14	1374.21	1375.82	NR	1374.44	1366.45	1366.66	1366.80	1366.86	1366.46
11/26/96	5:00	1372.14	1374.20	1375.83	NR	1374.44	1366.45	1366.67	1366.81	1366.86	1366.47
11/26/96	6:00	1372.15	1374.20	1375.82	NR	1374.42	1366.46	1366.68	1366.82	1366.85	1366.47
11/26/96	7:00	1372.13	1374.19	1375.82	NR	1374.42	1366.45	1366.67	1366.81	1366.85	1366.47
11/26/96	8:00	1372.14	1374.19	1375.82	NR	1374.42	1366.45	1366.66	1366.81	1366.85	1366.47
11/26/96	9:00	1372.14	1374.19	1375.81	NR	1374.40	1366.44	1366.66	1366.80	1366.81	1366.45
11/26/96	10:00	1372.13	1374.18	1375.80	NR	1374.40	1366.42	1366.61	1366.78	1366.78	1366.43
11/26/96	11:00	1372.13	1374.18	1375.80	NR	1374.40	1366.39	1366.59	1366.75	1366.80	1366.44
11/26/96	12:00	1372.13	1374.19	1375.80	NR	1374.42	1366.40	1366.61	1366.77	1366.79	1366.44
11/26/96	13:00	1372.15	1374.18	1375.81	NR	1374.43	1366.39	1366.60	1366.75	1366.81	1366.46
11/26/96	14:00	1372.16	1374.19	1375.81	NR	1374.44	1366.42	1366.63	1366.78	1366.82	1366.49
11/26/96	15:00	1372.18	1374.18	1375.82	NR	1374.44	1366.43	1366.64	1366.79	1366.80	1366.49
11/26/96	16:00	1372.16	1374.18	1375.81	NR	1374.43	1366.42	1366.59	1366.77	1366.83	1366.50
11/26/96	17:00	1372.16	1374.18	1375.81	NR	1374.44	1366.43	1366.64	1366.79	1366.83	1366.51

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/26/96	18:00	1372.17	1374.18	1375.80	NR	1374.43	1366.44	1366.65	1366.80	1366.83	1366.51
11/26/96	19:00	1372.16	1374.17	1375.80	NR	1374.42	1366.44	1366.66	1366.80	1366.83	1366.52
11/26/96	20:00	1372.15	1374.17	1375.80	NR	1374.42	1366.44	1366.65	1366.80	1366.82	1366.52
11/26/96	21:00	1372.16	1374.17	1375.79	NR	1374.41	1366.43	1366.63	1366.78	1366.81	1366.49
11/26/96	22:00	1372.16	1374.17	1375.79	NR	1374.41	1366.41	1366.63	1366.77	1366.80	1366.49
11/26/96	23:00	1372.16	1374.17	1375.79	NR	1374.41	1366.41	1366.62	1366.76	1366.80	1366.50
11/27/96	0:00	1372.16	1374.17	1375.79	NR	1374.42	1366.40	1366.62	1366.76	1366.79	1366.50
11/27/96	1:00	1372.17	1374.16	1375.79	NR	1374.43	1366.40	1366.59	1366.74	1366.80	1366.51
11/27/96	2:00	1372.18	1374.17	1375.80	NR	1374.44	1366.41	1366.60	1366.76	1366.80	1366.52
11/27/96	3:00	1372.16	1374.17	1375.80	NR	1374.42	1366.42	1366.62	1366.76	1366.81	1366.53
11/27/96	4:00	1372.18	1374.16	1375.79	NR	1374.42	1366.43	1366.64	1366.77	1366.83	1366.55
11/27/96	5:00	1372.17	1374.16	1375.79	NR	1374.44	1366.43	1366.65	1366.79	1366.84	1366.57
11/27/96	6:00	1372.18	1374.16	1375.80	NR	1374.44	1366.45	1366.66	1366.81	1366.86	1366.58
11/27/96	7:00	1372.19	1374.16	1375.80	NR	1374.43	1366.47	1366.67	1366.82	1366.86	1366.58
11/27/96	8:00	1372.19	1374.16	1375.80	NR	1374.44	1366.47	1366.68	1366.82	1366.87	1366.60
11/27/96	9:00	1372.19	1374.16	1375.80	NR	1374.44	1366.47	1366.68	1366.83	1366.86	1366.60
11/27/96	10:00	1372.20	1374.16	1375.80	NR	1374.44	1366.46	1366.66	1366.82	1366.82	1366.58
11/27/96	11:00	1372.19	1374.16	1375.80	NR	1374.45	1366.45	1366.59	1366.78	1366.84	1366.58
11/27/96	12:00	1372.21	1374.16	1375.80	NR	1374.46	1366.45	1366.66	1366.81	1366.86	1366.60
11/27/96	13:00	1372.22	1374.16	1375.81	NR	1374.49	1366.47	1366.68	1366.82	1366.87	1366.63
11/27/96	14:00	1372.24	1374.17	1375.83	NR	1374.50	1366.49	1366.69	1366.84	1366.89	1366.65
11/27/96	15:00	1372.25	1374.18	1375.84	NR	1374.52	1366.51	1366.69	1366.84	1366.89	1366.66
11/27/96	16:00	1372.25	1374.19	1375.85	NR	1374.53	1366.52	1366.71	1366.85	1366.89	1366.68
11/27/96	17:00	1372.26	1374.20	1375.86	NR	1374.54	1366.54	1366.66	1366.86	1366.91	1366.68
11/27/96	18:00	1372.27	1374.20	1375.86	NR	1374.55	1366.53	1366.73	1366.87	1366.93	1366.70
11/27/96	19:00	1372.27	1374.21	1375.87	NR	1374.55	1366.55	1366.75	1366.89	1366.93	1366.70
11/27/96	20:00	1372.28	1374.21	1375.87	NR	1374.56	1366.55	1366.74	1366.88	1366.94	1366.71
11/27/96	21:00	1372.27	1374.21	1375.88	NR	1374.55	1366.56	1366.76	1366.90	1366.93	1366.71
11/27/96	22:00	1372.29	1374.20	1375.86	NR	1374.55	1366.56	1366.75	1366.89	1366.94	1366.71
11/27/96	23:00	1372.29	1374.21	1375.87	NR	1374.57	1366.56	1366.76	1366.89	1366.95	1366.73

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/28/96	0:00	1372.29	1374.21	1375.88	NR	1374.58	1366.57	1366.76	1366.90	1366.95	1366.73
11/28/96	1:00	1372.31	1374.22	1375.89	NR	1374.59	1366.58	1366.77	1366.91	1366.97	1366.75
11/28/96	2:00	1372.33	1374.22	1375.89	NR	1374.60	1366.58	1366.78	1366.92	1366.97	1366.76
11/28/96	3:00	1372.32	1374.23	1375.91	NR	1374.59	1366.60	1366.79	1366.93	1366.98	1366.77
11/28/96	4:00	1372.34	1374.22	1375.89	NR	1374.60	1366.60	1366.80	1366.93	1367.00	1366.78
11/28/96	5:00	1372.38	1374.23	1375.90	NR	1374.61	1366.62	1366.82	1366.95	1367.01	1366.80
11/28/96	6:00	1372.35	1374.24	1375.91	NR	1374.61	1366.64	1366.84	1366.97	1367.02	1366.81
11/28/96	7:00	1372.37	1374.24	1375.91	NR	1374.62	1366.65	1366.84	1366.98	1367.03	1366.82
11/28/96	8:00	1372.38	1374.24	1375.92	NR	1374.62	1366.65	1366.84	1366.98	1367.04	1366.83
11/28/96	9:00	1372.40	1374.24	1375.91	NR	1374.63	1366.66	1366.86	1367.00	1367.01	1366.82
11/28/96	10:00	1372.39	1374.24	1375.92	NR	1374.63	1366.65	1366.81	1366.96	1367.02	1366.82
11/28/96	11:00	1372.40	1374.24	1375.92	NR	1374.64	1366.65	1366.84	1366.98	1367.03	1366.84
11/28/96	12:00	1372.41	1374.25	1375.92	NR	1374.66	1366.66	1366.85	1366.99	1367.04	1366.85
11/28/96	13:00	1372.41	1374.26	1375.94	NR	1374.68	1366.67	1366.85	1367.00	1367.07	1366.87
11/28/96	14:00	1372.43	1374.26	1375.95	NR	1374.69	1366.69	1366.88	1367.02	1367.08	1366.89
11/28/96	15:00	1372.43	1374.27	1375.97	NR	1374.70	1366.71	1366.90	1367.04	1367.07	1366.89
11/28/96	16:00	1372.39	1374.28	1375.97	NR	1374.71	1366.71	1366.88	1367.04	1367.09	1366.91
11/28/96	17:00	1372.37	1374.28	1375.97	NR	1374.71	1366.73	1366.91	1367.05	1367.09	1366.91
11/28/96	18:00	1372.35	1374.28	1375.97	NR	1374.71	1366.73	1366.91	1367.05	1367.10	1366.92
11/28/96	19:00	1372.31	1374.28	1375.97	NR	1374.70	1366.74	1366.91	1367.06	1367.10	1366.92
11/28/96	20:00	1372.30	1374.28	1375.97	NR	1374.71	1366.74	1366.91	1367.06	1367.11	1366.92
11/28/96	21:00	1372.27	1374.29	1375.97	NR	1374.73	1366.74	1366.93	1367.07	1367.11	1366.94
11/28/96	22:00	1372.26	1374.29	1375.98	NR	1374.73	1366.75	1366.93	1367.08	1367.12	1366.94
11/28/96	23:00	1372.26	1374.30	1375.99	NR	1374.73	1366.76	1366.93	1367.08	1367.13	1366.95
11/29/96	0:00	1372.25	1374.29	1375.99	NR	1374.73	1366.76	1366.95	1367.09	1367.12	1366.94
11/29/96	1:00	1372.24	1374.30	1375.99	NR	1374.74	1366.76	1366.95	1367.09	1367.13	1366.95
11/29/96	2:00	1372.23	1374.30	1375.99	NR	1374.74	1366.76	1366.96	1367.10	1367.14	1366.96
11/29/96	3:00	1372.22	1374.30	1376.00	NR	1374.75	1366.78	1366.96	1367.10	1367.15	1366.97
11/29/96	4:00	1372.22	1374.30	1376.00	NR	1374.75	1366.79	1366.97	1367.11	1367.17	1366.99
11/29/96	5:00	1372.21	1374.31	1376.01	NR	1374.77	1366.80	1366.99	1367.12	1367.18	1367.00
11/29/96	6:00	1372.20	1374.32	1376.02	NR	1374.77	1366.82	1367.00	1367.14	1367.18	1367.01

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/29/96	7:00	1372.19	1374.32	1376.01	NR	1374.77	1366.82	1367.01	1367.15	1367.19	1367.02
11/29/96	8:00	1372.19	1374.32	1376.01	NR	1374.77	1366.83	1367.01	1367.16	1367.20	1367.02
11/29/96	9:00	1372.18	1374.32	1376.02	NR	1374.79	1366.83	1367.03	1367.17	1367.23	1367.04
11/29/96	10:00	1372.17	1374.33	1376.03	NR	1374.78	1366.86	1367.05	1367.19	1367.22	1367.05
11/29/96	11:00	1372.18	1374.33	1376.03	NR	1374.79	1366.85	1367.05	1367.19	1367.23	1367.05
11/29/96	12:00	1372.17	1374.33	1376.03	NR	1374.82	1366.86	1367.06	1367.20	1367.24	1367.06
11/29/96	13:00	1372.18	1374.34	1376.04	NR	1374.83	1366.88	1367.07	1367.21	1367.25	1367.08
11/29/96	14:00	1372.18	1374.35	1376.05	NR	1374.85	1366.89	1367.08	1367.22	1367.22	1367.09
11/29/96	15:00	1372.19	1374.35	1376.06	NR	1374.87	1366.90	1367.08	1367.23	1367.20	1367.10
11/29/96	16:00	1372.18	1374.36	1376.05	NR	1374.87	1366.90	1367.09	1367.24	1367.20	1367.09
11/29/96	17:00	1372.18	1374.37	1376.06	NR	1374.87	1366.90	1367.09	1367.23	1367.22	1367.09
11/29/96	18:00	1372.18	1374.38	1376.05	NR	1374.87	1366.89	1367.08	1367.23	1367.24	1367.08
11/29/96	19:00	1372.18	1374.39	1376.06	NR	1374.88	1366.89	1367.08	1367.23	1367.26	1367.08
11/29/96	20:00	1372.17	1374.40	1376.06	NR	1374.86	1366.89	1367.08	1367.23	1367.24	1367.06
11/29/96	21:00	1372.18	1374.40	1376.04	NR	1374.82	1366.87	1367.07	1367.21	1367.22	1367.03
11/29/96	22:00	1372.16	1374.41	1376.03	NR	1374.82	1366.83	1367.04	1367.19	1367.20	1367.02
11/29/96	23:00	1372.16	1374.41	1376.02	NR	1374.82	1366.82	1367.03	1367.17	1367.20	1367.01
11/30/96	0:00	1372.16	1374.41	1376.03	NR	1374.82	1366.81	1367.02	1367.17	1367.19	1367.00
11/30/96	1:00	1372.17	1374.42	1376.04	NR	1374.81	1366.80	1367.01	1367.16	1367.18	1366.99
11/30/96	2:00	1372.17	1374.41	1376.03	NR	1374.79	1366.79	1367.00	1367.15	1367.16	1366.98
11/30/96	3:00	1372.18	1374.41	1376.02	NR	1374.79	1366.78	1366.98	1367.13	1367.16	1366.97
11/30/96	4:00	1372.16	1374.40	1376.02	NR	1374.78	1366.77	1366.98	1367.13	1367.16	1366.96
11/30/96	5:00	1372.15	1374.40	1376.02	NR	1374.76	1366.77	1366.98	1367.12	1367.15	1366.95
11/30/96	6:00	1372.16	1374.39	1376.01	NR	1374.77	1366.76	1366.97	1367.11	1367.15	1366.96
11/30/96	7:00	1372.16	1374.40	1376.03	NR	1374.77	1366.76	1366.98	1367.12	1367.15	1366.95
11/30/96	8:00	1372.16	1374.39	1376.03	NR	1374.75	1366.76	1366.97	1367.12	1367.14	1366.95
11/30/96	9:00	1372.15	1374.39	1376.03	NR	1374.74	1366.76	1366.97	1367.12	1367.14	1366.95
11/30/96	10:00	1372.16	1374.38	1376.02	NR	1374.74	1366.75	1366.96	1367.11	1367.14	1366.94
11/30/96	11:00	1372.16	1374.38	1376.03	NR	1374.76	1366.75	1366.96	1367.11	1367.15	1366.95
11/30/96	12:00	1372.16	1374.39	1376.05	NR	1374.77	1366.75	1366.97	1367.12	1367.15	1366.95
11/30/96	13:00	1372.16	1374.39	1376.05	NR	1374.77	1366.75	1366.97	1367.11	1367.15	1366.96

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
11/30/96	14:00	1372.18	1374.39	1376.06	NR	1374.78	1366.76	1366.97	1367.12	1367.14	1366.96
11/30/96	15:00	1372.18	1374.39	1376.06	NR	1374.77	1366.76	1366.97	1367.11	1367.13	1366.95
11/30/96	16:00	1372.19	1374.39	1376.06	NR	1374.75	1366.75	1366.96	1367.11	1367.13	1366.95
11/30/96	17:00	1372.19	1374.38	1376.06	NR	1374.73	1366.75	1366.95	1367.10	1367.12	1366.93
11/30/96	18:00	1372.19	1374.38	1376.05	NR	1374.73	1366.74	1366.95	1367.10	1367.12	1366.93
11/30/96	19:00	1372.18	1374.37	1376.06	NR	1374.73	1366.74	1366.95	1367.09	1367.12	1366.93
11/30/96	20:00	1372.18	1374.37	1376.06	NR	1374.72	1366.74	1366.94	1367.09	1367.11	1366.93
11/30/96	21:00	1372.19	1374.37	1376.05	NR	1374.71	1366.73	1366.94	1367.09	1367.11	1366.92
11/30/96	22:00	1372.17	1374.37	1376.05	NR	1374.71	1366.72	1366.93	1367.08	1367.11	1366.92
11/30/96	23:00	1372.17	1374.37	1376.06	NR	1374.71	1366.72	1366.93	1367.07	1367.11	1366.92
12/1/96	0:00	1372.18	1374.37	1376.06	NR	1374.71	1366.72	1366.93	1367.08	1367.11	1366.92
12/1/96	1:00	1372.18	1374.37	1376.06	NR	1374.73	1366.72	1366.93	1367.07	1367.11	1366.93
12/1/96	2:00	1372.18	1374.37	1376.07	NR	1374.72	1366.72	1366.93	1367.07	1367.11	1366.93
12/1/96	3:00	1372.19	1374.37	1376.07	NR	1374.71	1366.73	1366.93	1367.07	1367.11	1366.92
12/1/96	4:00	1372.19	1374.37	1376.07	NR	1374.73	1366.72	1366.93	1367.07	1367.11	1366.93
12/1/96	5:00	1372.19	1374.37	1376.08	NR	1374.73	1366.74	1366.93	1367.08	1367.12	1366.94
12/1/96	6:00	1372.19	1374.37	1376.08	NR	1374.73	1366.74	1366.94	1367.08	1367.12	1366.95
12/1/96	7:00	1372.18	1374.37	1376.08	NR	1374.73	1366.74	1366.95	1367.09	1367.13	1366.95
12/1/96	8:00	1372.17	1374.38	1376.09	NR	1374.73	1366.75	1366.96	1367.10	1367.13	1366.96
12/1/96	9:00	1372.17	1374.38	1376.08	NR	1374.73	1366.76	1366.96	1367.10	1367.14	1366.96
12/1/96	10:00	1372.16	1374.38	1376.08	NR	1374.73	1366.76	1366.96	1367.10	1367.14	1366.96
12/1/96	11:00	1372.17	1374.38	1376.08	NR	1374.73	1366.76	1366.97	1367.11	1367.14	1366.96
12/1/96	12:00	1372.18	1374.38	1376.08	NR	1374.75	1366.77	1366.97	1367.11	1367.16	1366.97
12/1/96	13:00	1372.19	1374.39	1376.10	NR	1374.76	1366.78	1366.98	1367.12	1367.16	1366.98
12/1/96	14:00	1372.21	1374.39	1376.10	NR	1374.77	1366.78	1366.98	1367.13	1367.16	1366.99
12/1/96	15:00	1372.21	1374.39	1376.11	NR	1374.77	1366.79	1366.98	1367.13	1367.16	1366.99
12/1/96	16:00	1372.22	1374.39	1376.11	NR	1374.77	1366.78	1366.98	1367.13	1367.16	1366.99
12/1/96	17:00	1372.21	1374.39	1376.10	NR	1374.76	1366.78	1366.98	1367.13	1367.16	1366.99
12/1/96	18:00	1372.20	1374.39	1376.10	NR	1374.75	1366.78	1366.98	1367.12	1367.15	1366.98
12/1/96	19:00	1372.19	1374.39	1376.10	NR	1374.75	1366.78	1366.97	1367.12	1367.13	1366.97
12/1/96	20:00	1372.18	1374.39	1376.09	NR	1374.75	1366.77	1366.95	1367.10	1367.16	1366.98

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
12/1/96	21:00	1372.18	1374.39	1376.09	NR	1374.76	1366.77	1366.98	1367.12	1367.16	1366.98
12/1/96	22:00	1372.18	1374.39	1376.09	NR	1374.77	1366.78	1366.98	1367.13	1367.16	1367.00
12/1/96	23:00	1372.16	1374.39	1376.10	NR	1374.77	1366.79	1366.98	1367.12	1367.17	1367.00
12/2/96	0:00	1372.15	1374.39	1376.10	NR	1374.77	1366.80	1367.00	1367.13	1367.18	1367.01
12/2/96	1:00	1372.15	1374.40	1376.10	NR	1374.79	1366.80	1367.00	1367.14	1367.18	1367.02
12/2/96	2:00	1372.14	1374.40	1376.10	NR	1374.79	1366.81	1367.01	1367.15	1367.19	1367.02
12/2/96	3:00	1372.14	1374.40	1376.11	NR	1374.79	1366.81	1367.01	1367.15	1367.19	1367.02
12/2/96	4:00	1372.13	1374.41	1376.11	NR	1374.80	1366.82	1367.01	1367.15	1367.20	1367.04
12/2/96	5:00	1372.13	1374.41	1376.12	NR	1374.82	1366.82	1367.02	1367.16	1367.21	1367.04
12/2/96	6:00	1372.13	1374.41	1376.12	NR	1374.84	1366.84	1367.03	1367.17	1367.22	1367.06
12/2/96	7:00	1372.13	1374.42	1376.13	NR	1374.84	1366.86	1367.05	1367.19	1367.24	1367.08
12/2/96	8:00	1372.13	1374.42	1376.14	NR	1374.84	1366.87	1367.06	1367.20	1367.24	1367.08
12/2/96	9:00	1372.12	1374.42	1376.14	NR	1374.83	1366.87	1367.07	1367.20	1367.22	1367.07
12/2/96	10:00	1372.12	1374.42	1376.12	NR	1374.82	1366.86	1367.03	1367.19	1367.23	1367.07
12/2/96	11:00	1372.13	1374.42	1376.13	NR	1374.82	1366.86	1367.05	1367.20	1367.23	1367.07
12/2/96	12:00	1372.14	1374.42	1376.12	NR	1374.81	1366.87	1367.06	1367.20	1367.21	1367.05
12/2/96	13:00	1372.14	1374.41	1376.13	NR	1374.81	1366.84	1367.04	1367.17	1367.22	1367.05
12/2/96	14:00	1372.16	1374.41	1376.12	NR	1374.78	1366.85	1367.04	1367.19	1367.21	1367.04
12/2/96	15:00	1372.16	1374.40	1376.11	NR	1374.75	1366.83	1367.03	1367.17	1367.19	1367.02
12/2/96	16:00	1372.17	1374.39	1376.08	NR	1374.73	1366.81	1367.01	1367.16	1367.17	1367.00
12/2/96	17:00	1372.16	1374.38	1376.06	NR	1374.70	1366.78	1367.00	1367.14	1367.16	1366.98
12/2/96	18:00	1372.17	1374.37	1376.05	NR	1374.67	1366.77	1366.98	1367.12	1367.13	1366.95
12/2/96	19:00	1372.16	1374.35	1376.02	NR	1374.65	1366.74	1366.95	1367.10	1367.11	1366.93
12/2/96	20:00	1372.16	1374.35	1376.02	NR	1374.64	1366.72	1366.93	1367.08	1367.10	1366.92
12/2/96	21:00	1372.16	1374.34	1376.01	NR	1374.63	1366.71	1366.92	1367.07	1367.09	1366.91
12/2/96	22:00	1372.16	1374.33	1376.00	NR	1374.62	1366.70	1366.92	1367.06	1367.09	1366.90
12/2/96	23:00	1372.16	1374.33	1375.99	NR	1374.61	1366.69	1366.91	1367.06	1367.08	1366.88
12/3/96	0:00	1372.17	1374.32	1375.98	NR	1374.59	1366.68	1366.90	1367.05	1367.06	1366.87
12/3/96	1:00	1372.17	1374.31	1375.97	NR	1374.58	1366.66	1366.89	1367.03	1367.06	1366.86
12/3/96	2:00	1372.18	1374.30	1375.97	NR	1374.56	1366.65	1366.88	1367.02	1367.04	1366.84
12/3/96	3:00	1372.18	1374.30	1375.96	NR	1374.55	1366.64	1366.86	1367.01	1367.02	1366.83

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
12/3/96	4:00	1372.18	1374.29	1375.95	NR	1374.54	1366.63	1366.85	1367.00	1367.02	1366.82
12/3/96	5:00	1372.18	1374.29	1375.93	NR	1374.54	1366.61	1366.84	1366.98	1367.01	1366.81
12/3/96	6:00	1372.18	1374.28	1375.94	NR	1374.54	1366.61	1366.83	1366.98	1367.00	1366.81
12/3/96	7:00	1372.19	1374.28	1375.93	NR	1374.52	1366.60	1366.82	1366.97	1366.99	1366.80
12/3/96	8:00	1372.19	1374.28	1375.92	NR	1374.52	1366.59	1366.82	1366.96	1366.99	1366.80
12/3/96	9:00	1372.19	1374.27	1375.92	NR	1374.50	1366.59	1366.82	1366.96	1366.98	1366.79
12/3/96	10:00	1372.19	1374.26	1375.91	NR	1374.50	1366.58	1366.81	1366.95	1366.98	1366.78
12/3/96	11:00	1372.20	1374.26	1375.91	NR	1374.50	1366.57	1366.80	1366.95	1366.98	1366.78
12/3/96	12:00	1372.20	1374.26	1375.91	NR	1374.52	1366.58	1366.80	1366.95	1366.98	1366.79
12/3/96	13:00	1372.22	1374.26	1375.92	NR	1374.53	1366.59	1366.81	1366.96	1366.99	1366.80
12/3/96	14:00	1372.24	1374.27	1375.93	NR	1374.54	1366.60	1366.82	1366.96	1367.00	1366.80
12/3/96	15:00	1372.24	1374.27	1375.94	NR	1374.55	1366.60	1366.82	1366.97	1366.99	1366.81
12/3/96	16:00	1372.24	1374.27	1375.94	NR	1374.55	1366.60	1366.82	1366.97	1366.99	1366.82
12/3/96	17:00	1372.24	1374.27	1375.94	NR	1374.55	1366.61	1366.81	1366.97	1367.00	1366.81
12/3/96	18:00	1372.25	1374.27	1375.93	NR	1374.54	1366.60	1366.82	1366.97	1366.99	1366.81
12/3/96	19:00	1372.24	1374.27	1375.93	NR	1374.55	1366.60	1366.82	1366.97	1366.98	1366.80
12/3/96	20:00	1372.25	1374.27	1375.93	NR	1374.54	1366.59	1366.79	1366.94	1366.98	1366.80
12/3/96	21:00	1372.25	1374.26	1375.92	NR	1374.54	1366.60	1366.80	1366.95	1366.99	1366.80
12/3/96	22:00	1372.24	1374.26	1375.92	NR	1374.55	1366.60	1366.81	1366.95	1366.99	1366.81
12/3/96	23:00	1372.24	1374.26	1375.93	NR	1374.55	1366.61	1366.82	1366.96	1367.00	1366.82
12/4/96	0:00	1372.24	1374.26	1375.93	NR	1374.56	1366.61	1366.82	1366.97	1367.00	1366.83
12/4/96	1:00	1372.24	1374.27	1375.93	NR	1374.56	1366.62	1366.83	1366.97	1367.01	1366.84
12/4/96	2:00	1372.24	1374.27	1375.94	NR	1374.58	1366.63	1366.84	1366.99	1367.02	1366.85
12/4/96	3:00	1372.26	1374.27	1375.94	NR	1374.59	1366.64	1366.85	1366.99	1367.03	1366.86
12/4/96	4:00	1372.26	1374.28	1375.95	NR	1374.61	1366.65	1366.85	1367.00	1367.05	1366.87
12/4/96	5:00	1372.27	1374.29	1375.97	NR	1374.63	1366.67	1366.87	1367.01	1367.06	1366.89
12/4/96	6:00	1372.27	1374.30	1375.98	NR	1374.64	1366.68	1366.89	1367.03	1367.06	1366.90
12/4/96	7:00	1372.27	1374.30	1375.98	NR	1374.64	1366.69	1366.89	1367.03	1367.07	1366.91
12/4/96	8:00	1372.26	1374.30	1376.00	NR	1374.66	1366.70	1366.90	1367.04	1367.09	1366.93
12/4/96	9:00	1372.26	1374.31	1376.00	NR	1374.67	1366.71	1366.91	1367.05	1367.09	1366.93
12/4/96	10:00	1372.25	1374.31	1376.00	NR	1374.66	1366.71	1366.91	1367.05	1367.10	1366.94

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
12/4/96	11:00	1372.25	1374.31	1376.00	NR	1374.68	1366.73	1366.92	1367.06	1367.11	1366.95
12/4/96	12:00	1372.27	1374.32	1376.02	NR	1374.71	1366.74	1366.94	1367.08	1367.14	1366.98
12/4/96	13:00	1372.28	1374.34	1376.04	NR	1374.72	1366.77	1366.96	1367.11	1367.15	1367.00
12/4/96	14:00	1372.38	1374.34	1376.04	NR	1374.72	1366.78	1366.98	1367.11	1367.13	1367.00
12/4/96	15:00	1372.38	1374.34	1376.04	NR	1374.72	1366.78	1366.95	1367.10	1367.15	1367.00
12/4/96	16:00	1372.37	1374.34	1376.04	NR	1374.70	1366.78	1366.98	1367.12	1367.14	1366.98
12/4/96	17:00	1372.37	1374.33	1376.03	NR	1374.69	1366.76	1366.97	1367.10	1367.11	1366.95
12/4/96	18:00	1372.37	1374.33	1376.02	NR	1374.68	1366.74	1366.93	1367.08	1367.10	1366.95
12/4/96	19:00	1372.38	1374.33	1376.01	NR	1374.69	1366.74	1366.91	1367.06	1367.11	1366.95
12/4/96	20:00	1372.38	1374.33	1376.02	NR	1374.69	1366.74	1366.92	1367.07	1367.11	1366.95
12/4/96	21:00	1372.38	1374.33	1376.02	NR	1374.70	1366.74	1366.93	1367.07	1367.13	1366.97
12/4/96	22:00	1372.38	1374.33	1376.03	NR	1374.70	1366.76	1366.95	1367.09	1367.13	1366.98
12/4/96	23:00	1372.39	1374.33	1376.02	NR	1374.70	1366.76	1366.96	1367.10	1367.14	1366.98
12/5/96	0:00	1372.39	1374.34	1376.03	NR	1374.71	1366.77	1366.96	1367.10	1367.15	1367.00
12/5/96	1:00	1372.39	1374.34	1376.04	NR	1374.72	1366.78	1366.97	1367.11	1367.17	1367.01
12/5/96	2:00	1372.39	1374.35	1376.04	NR	1374.72	1366.80	1366.99	1367.12	1367.18	1367.02
12/5/96	3:00	1372.40	1374.35	1376.04	NR	1374.73	1366.80	1367.00	1367.13	1367.19	1367.03
12/5/96	4:00	1372.40	1374.35	1376.05	NR	1374.74	1366.82	1367.01	1367.15	1367.19	1367.04
12/5/96	5:00	1372.40	1374.35	1376.05	NR	1374.74	1366.82	1367.01	1367.15	1367.20	1367.04
12/5/96	6:00	1372.40	1374.35	1376.05	NR	1374.74	1366.83	1367.02	1367.16	1367.18	1367.04
12/5/96	7:00	1372.41	1374.35	1376.05	NR	1374.75	1366.82	1366.99	1367.14	1367.18	1367.04
12/5/96	8:00	1372.40	1374.36	1376.06	NR	1374.74	1366.82	1366.99	1367.14	1367.18	1367.03
12/5/96	9:00	1372.42	1374.36	1376.05	NR	1374.75	1366.81	1367.00	1367.15	1367.19	1367.04
12/5/96	10:00	1372.42	1374.36	1376.06	NR	1374.76	1366.82	1367.00	1367.15	1367.20	1367.05
12/5/96	11:00	1372.41	1374.37	1376.07	NR	1374.76	1366.84	1367.03	1367.16	1367.21	1367.06
12/5/96	12:00	1372.44	1374.37	1376.07	NR	1374.78	1366.85	1367.04	1367.17	1367.23	1367.09
12/5/96	13:00	1372.44	1374.37	1376.08	NR	1374.80	1366.87	1367.06	1367.20	1367.25	1367.11
12/5/96	14:00	1372.45	1374.38	1376.10	NR	1374.83	1366.89	1367.08	1367.22	1367.27	1367.13
12/5/96	15:00	1372.46	1374.39	1376.10	NR	1374.83	1366.91	1367.10	1367.24	1367.28	1367.14
12/5/96	16:00	1372.45	1374.40	1376.11	NR	1374.84	1366.92	1367.11	1367.25	1367.29	1367.15
12/5/96	17:00	1372.45	1374.40	1376.12	NR	1374.83	1366.92	1367.11	1367.25	1367.28	1367.14

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
12/5/96	18:00	1372.44	1374.39	1376.11	NR	1374.81	1366.91	1367.09	1367.24	1367.27	1367.12
12/5/96	19:00	1372.44	1374.39	1376.10	NR	1374.82	1366.90	1367.09	1367.23	1367.27	1367.13
12/5/96	20:00	1372.45	1374.39	1376.10	NR	1374.82	1366.90	1367.09	1367.23	1367.27	1367.13
12/5/96	21:00	1372.45	1374.40	1376.11	NR	1374.82	1366.91	1367.09	1367.23	1367.27	1367.13
12/5/96	22:00	1372.44	1374.40	1376.10	NR	1374.82	1366.91	1367.10	1367.23	1367.27	1367.13
12/5/96	23:00	1372.45	1374.40	1376.10	NR	1374.83	1366.91	1367.10	1367.23	1367.27	1367.13
12/6/96	0:00	1372.46	1374.40	1376.11	NR	1374.83	1366.91	1367.10	1367.24	1367.29	1367.15
12/6/96	1:00	1372.43	1374.41	1376.12	NR	1374.81	1366.93	1367.12	1367.26	1367.29	1367.15
12/6/96	2:00	1372.46	1374.40	1376.10	NR	1374.84	1366.92	1367.12	1367.26	1367.31	1367.16
12/6/96	3:00	1372.45	1374.41	1376.12	NR	1374.82	1366.93	1367.13	1367.27	1367.30	1367.15
12/6/96	4:00	1372.45	1374.40	1376.10	NR	1374.81	1366.93	1367.12	1367.26	1367.29	1367.14
12/6/96	5:00	1372.44	1374.40	1376.10	NR	1374.79	1366.92	1367.12	1367.26	1367.28	1367.13
12/6/96	6:00	1372.41	1374.39	1376.09	NR	1374.76	1366.91	1367.11	1367.25	1367.26	1367.11
12/6/96	7:00	1372.42	1374.38	1376.06	NR	1374.74	1366.88	1367.08	1367.22	1367.24	1367.09
12/6/96	8:00	1372.41	1374.37	1376.06	NR	1374.73	1366.86	1367.07	1367.21	1367.22	1367.07
12/6/96	9:00	1372.41	1374.37	1376.05	NR	1374.72	1366.85	1367.05	1367.19	1367.20	1367.05
12/6/96	10:00	1372.41	1374.36	1376.04	NR	1374.71	1366.83	1367.02	1367.18	1367.20	1367.04
12/6/96	11:00	1372.41	1374.35	1376.03	NR	1374.69	1366.82	1367.03	1367.18	1367.20	1367.04
12/6/96	12:00	1372.40	1374.35	1376.03	NR	1374.69	1366.82	1367.03	1367.17	1367.20	1367.04
12/6/96	13:00	1372.41	1374.35	1376.02	NR	1374.70	1366.82	1367.03	1367.17	1367.20	1367.04
12/6/96	14:00	1372.42	1374.35	1376.03	NR	1374.71	1366.82	1367.03	1367.18	1367.21	1367.05
12/6/96	15:00	1372.42	1374.35	1376.04	NR	1374.71	1366.83	1367.04	1367.18	1367.21	1367.05
12/6/96	16:00	1372.42	1374.35	1376.04	NR	1374.70	1366.83	1367.04	1367.19	1367.20	1367.04
12/6/96	17:00	1372.40	1374.35	1376.03	NR	1374.69	1366.82	1367.01	1367.18	1367.18	1367.03
12/6/96	18:00	1372.40	1374.34	1376.02	NR	1374.67	1366.80	1367.01	1367.16	1367.17	1367.02
12/6/96	19:00	1372.39	1374.33	1376.01	NR	1374.65	1366.79	1366.99	1367.14	1367.16	1367.00
12/6/96	20:00	1372.39	1374.33	1375.99	NR	1374.64	1366.77	1366.98	1367.13	1367.14	1366.98
12/6/96	21:00	1372.39	1374.32	1375.98	NR	1374.64	1366.76	1366.96	1367.11	1367.12	1366.97
12/6/96	22:00	1372.39	1374.32	1375.99	NR	1374.64	1366.74	1366.91	1367.10	1367.11	1366.95
12/6/96	23:00	1372.39	1374.32	1375.98	NR	1374.63	1366.74	1366.93	1367.08	1367.12	1366.96

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
12/7/96	0:00	1372.38	1374.32	1375.98	NR	1374.62	1366.74	1366.94	1367.09	1367.12	1366.96
12/7/96	1:00	1372.39	1374.31	1375.98	NR	1374.62	1366.74	1366.95	1367.10	1367.13	1366.97
12/7/96	2:00	1372.38	1374.31	1375.97	NR	1374.63	1366.75	1366.96	1367.10	1367.14	1366.98
12/7/96	3:00	1372.38	1374.31	1375.98	NR	1374.62	1366.76	1366.96	1367.11	1367.14	1366.98
12/7/96	4:00	1372.38	1374.31	1375.97	NR	1374.62	1366.76	1366.97	1367.11	1367.14	1366.97
12/7/96	5:00	1372.38	1374.30	1375.97	NR	1374.61	1366.76	1366.96	1367.11	1367.13	1366.97
12/7/96	6:00	1372.37	1374.30	1375.97	NR	1374.60	1366.75	1366.96	1367.11	1367.12	1366.95
12/7/96	7:00	1372.36	1374.30	1375.95	NR	1374.58	1366.74	1366.95	1367.10	1367.11	1366.94
12/7/96	8:00	1372.35	1374.29	1375.94	NR	1374.57	1366.72	1366.93	1367.07	1367.10	1366.92
12/7/96	9:00	1372.34	1374.28	1375.94	NR	1374.56	1366.71	1366.91	1367.06	1367.07	1366.90
12/7/96	10:00	1372.34	1374.28	1375.93	NR	1374.55	1366.68	1366.88	1367.04	1367.03	1366.88
12/7/96	11:00	1372.34	1374.27	1375.92	NR	1374.54	1366.65	1366.82	1367.01	1367.04	1366.86
12/7/96	12:00	1372.34	1374.27	1375.91	NR	1374.54	1366.65	1366.86	1367.01	1367.05	1366.87
12/7/96	13:00	1372.34	1374.27	1375.92	NR	1374.55	1366.66	1366.87	1367.02	1367.03	1366.87
12/7/96	14:00	1372.35	1374.26	1375.92	NR	1374.56	1366.65	1366.84	1367.00	1367.06	1366.88
12/7/96	15:00	1372.35	1374.27	1375.93	NR	1374.56	1366.67	1366.88	1367.03	1367.06	1366.89
12/7/96	16:00	1372.34	1374.26	1375.93	NR	1374.54	1366.67	1366.89	1367.04	1367.05	1366.88
12/7/96	17:00	1372.34	1374.26	1375.91	NR	1374.54	1366.66	1366.88	1367.03	1367.03	1366.88
12/7/96	18:00	1372.33	1374.26	1375.91	NR	1374.53	1366.66	1366.82	1367.01	1367.03	1366.87
12/7/96	19:00	1372.32	1374.25	1375.90	NR	1374.52	1366.65	1366.85	1367.01	1367.01	1366.84
12/7/96	20:00	1372.32	1374.24	1375.89	NR	1374.50	1366.62	1366.83	1366.98	1367.00	1366.84
12/7/96	21:00	1372.32	1374.24	1375.89	NR	1374.50	1366.61	1366.83	1366.98	1367.00	1366.83
12/7/96	22:00	1372.32	1374.24	1375.89	NR	1374.50	1366.60	1366.82	1366.97	1367.00	1366.83
12/7/96	23:00	1372.32	1374.24	1375.89	NR	1374.50	1366.60	1366.82	1366.96	1366.99	1366.83
12/8/96	0:00	1372.32	1374.24	1375.88	NR	1374.50	1366.61	1366.82	1366.96	1367.00	1366.83
12/8/96	1:00	1372.32	1374.24	1375.88	NR	1374.50	1366.61	1366.82	1366.97	1367.01	1366.84
12/8/96	2:00	1372.32	1374.23	1375.88	NR	1374.50	1366.62	1366.84	1366.98	1367.02	1366.84
12/8/96	3:00	1372.32	1374.23	1375.88	NR	1374.50	1366.63	1366.84	1366.99	1367.02	1366.85
12/8/96	4:00	1372.32	1374.23	1375.88	NR	1374.50	1366.64	1366.85	1366.99	1367.03	1366.86
12/8/96	5:00	1372.32	1374.23	1375.89	NR	1374.50	1366.64	1366.85	1366.99	1367.03	1366.86
12/8/96	6:00	1372.33	1374.23	1375.87	NR	1374.52	1366.65	1366.85	1367.01	1367.03	1366.86

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
12/8/96	7:00	1372.32	1374.23	1375.88	NR	1374.51	1366.65	1366.86	1367.01	1367.02	1366.86
12/8/96	8:00	1372.32	1374.23	1375.87	NR	1374.52	1366.64	1366.85	1367.00	1367.02	1366.86
12/8/96	9:00	1372.32	1374.23	1375.89	NR	1374.52	1366.64	1366.85	1367.00	1367.02	1366.85
12/8/96	10:00	1372.32	1374.23	1375.89	NR	1374.51	1366.63	1366.85	1366.99	1367.00	NR
12/8/96	11:00	1372.32	1374.23	1375.88	NR	1374.52	1366.63	1366.81	1366.97	1367.02	NR
12/8/96	12:00	1372.35	1374.23	1375.88	NR	1374.57	1366.63	1366.84	1366.99	1367.04	NR
12/8/96	13:00	1372.35	1374.25	1375.91	NR	1374.58	1366.66	1366.87	1367.02	1367.06	NR
12/8/96	14:00	1372.35	1374.25	1375.92	NR	1374.58	1366.68	1366.89	1367.03	1367.07	NR
12/8/96	15:00	1372.35	1374.26	1375.92	NR	1374.58	1366.70	1366.89	1367.04	1367.07	NR
12/8/96	16:00	1372.34	1374.26	1375.93	NR	1374.57	1366.69	1366.89	1367.04	1367.07	NR
12/8/96	17:00	1372.35	1374.25	1375.91	NR	1374.58	1366.69	1366.89	1367.04	1367.07	NR
12/8/96	18:00	1372.34	1374.25	1375.92	NR	1374.57	1366.69	1366.89	1367.04	1367.07	NR
12/8/96	19:00	1372.34	1374.25	1375.91	NR	1374.56	1366.69	1366.89	1367.04	1367.05	NR
12/8/96	20:00	1372.34	1374.24	1375.91	NR	1374.56	1366.68	1366.88	1367.03	1367.03	NR
12/8/96	21:00	1372.34	1374.24	1375.90	NR	1374.56	1366.65	1366.85	1367.00	1367.04	NR
12/8/96	22:00	1372.34	1374.25	1375.90	NR	1374.57	1366.66	1366.86	1367.01	1367.04	NR
12/8/96	23:00	1372.35	1374.25	1375.91	NR	1374.57	1366.67	1366.87	1367.01	1367.05	NR
12/9/96	0:00	1372.36	1374.25	1375.91	NR	1374.59	1366.67	1366.88	1367.01	1367.07	NR
12/9/96	1:00	1372.35	1374.25	1375.92	NR	1374.59	1366.69	1366.89	1367.03	1367.08	NR
12/9/96	2:00	1372.36	1374.26	1375.92	NR	1374.60	1366.70	1366.89	1367.04	1367.09	NR
12/9/96	3:00	1372.36	1374.26	1375.93	NR	1374.61	1366.71	1366.91	1367.06	1367.10	NR
12/9/96	4:00	1372.38	1374.26	1375.93	NR	1374.63	1366.73	1366.93	1367.07	1367.13	NR
12/9/96	5:00	1372.39	1374.28	1375.95	NR	1374.64	1366.76	1366.96	1367.09	1367.14	NR
12/9/96	6:00	1372.37	1374.28	1375.96	NR	1374.64	1366.77	1366.97	1367.11	1367.14	NR
12/9/96	7:00	1372.38	1374.28	1375.96	NR	1374.64	1366.77	1366.97	1367.11	1367.14	NR
12/9/96	8:00	1372.38	1374.29	1375.96	NR	1374.66	1366.77	1366.97	1367.11	1367.15	NR
12/9/96	9:00	1372.39	1374.29	1375.96	NR	1374.66	1366.78	1366.98	1367.12	1367.13	NR
12/9/96	10:00	1372.39	1374.29	1375.97	NR	1374.66	1366.77	1366.93	1367.10	1367.14	NR
12/9/96	11:00	1372.41	1374.29	1375.97	NR	1374.69	1366.77	1366.96	1367.11	1367.16	NR
12/9/96	12:00	1372.42	1374.30	1375.99	NR	1374.71	1366.79	1366.98	1367.13	1367.18	NR
12/9/96	13:00	1372.42	1374.31	1376.00	NR	1374.72	1366.81	1367.01	1367.15	1367.20	NR

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
12/9/96	14:00	1372.43	1374.32	1376.01	NR	1374.74	1366.83	1367.02	1367.17	1367.21	NR
12/9/96	15:00	1372.43	1374.32	1376.03	NR	1374.75	1366.85	1367.04	1367.19	1367.23	NR
12/9/96	16:00	1372.43	1374.32	1376.03	NR	1374.75	1366.87	1367.05	1367.20	1367.23	NR
12/9/96	17:00	1372.43	1374.33	1376.03	NR	1374.75	1366.87	1367.06	1367.21	1367.24	NR
12/9/96	18:00	1372.42	1374.34	1376.03	NR	1374.74	1366.87	1367.07	1367.21	1367.23	NR
12/9/96	19:00	1372.43	1374.33	1376.02	NR	1374.74	1366.87	1367.06	1367.21	1367.22	NR
12/9/96	20:00	1372.43	1374.33	1376.02	NR	1374.75	1366.86	1367.05	1367.19	1367.21	NR
12/9/96	21:00	1372.44	1374.34	1376.03	NR	1374.75	1366.85	1367.03	1367.17	1367.20	NR
12/9/96	22:00	1372.43	1374.34	1376.03	NR	1374.75	1366.85	1367.01	1367.16	1367.21	NR
12/9/96	23:00	1372.44	1374.34	1376.03	NR	1374.76	1366.85	1367.03	1367.17	1367.21	NR
12/10/96	0:00	1372.45	1374.34	1376.04	NR	1374.77	1366.86	1367.03	1367.18	1367.23	NR
12/10/96	1:00	1372.44	1374.35	1376.04	NR	1374.77	1366.87	1367.05	1367.19	1367.24	NR
12/10/96	2:00	1372.45	1374.35	1376.04	NR	1374.77	1366.89	1367.07	1367.21	1367.26	NR
12/10/96	3:00	1372.44	1374.35	1376.05	NR	1374.77	1366.90	1367.08	1367.22	1367.27	NR
12/10/96	4:00	1372.45	1374.35	1376.05	NR	1374.77	1366.91	1367.09	1367.23	1367.29	NR
12/10/96	5:00	1372.45	1374.35	1376.05	NR	1374.78	1366.92	1367.11	1367.24	1367.29	NR
12/10/96	6:00	1372.45	1374.36	1376.05	NR	1374.77	1366.93	1367.12	1367.26	1367.29	NR
12/10/96	7:00	1372.46	1374.36	1376.06	NR	1374.79	1366.93	1367.12	1367.26	1367.31	NR
12/10/96	8:00	1372.45	1374.36	1376.06	NR	1374.79	1366.94	1367.13	1367.27	1367.30	NR
12/10/96	9:00	1372.47	1374.36	1376.06	NR	1374.80	1366.94	1367.14	1367.27	1367.31	NR
12/10/96	10:00	1372.47	1374.37	1376.06	NR	1374.81	1366.94	1367.14	1367.28	1367.30	NR
12/10/96	11:00	1372.48	1374.37	1376.07	NR	1374.82	1366.94	1367.12	1367.27	1367.31	NR
12/10/96	12:00	1372.48	1374.38	1376.08	NR	1374.83	1366.95	1367.14	1367.28	1367.32	NR
12/10/96	13:00	1372.50	1374.39	1376.09	NR	1374.86	1366.97	1367.15	1367.30	1367.34	NR
12/10/96	14:00	1372.50	1374.39	1376.11	NR	1374.86	1366.98	1367.17	1367.32	1367.35	NR
12/10/96	15:00	1372.48	1374.39	1376.10	NR	1374.85	1367.00	1367.19	1367.32	1367.34	NR
12/10/96	16:00	1372.47	1374.39	1376.10	NR	1374.82	1367.00	1367.16	1367.32	1367.34	NR
12/10/96	17:00	1372.48	1374.39	1376.08	NR	1374.82	1366.98	1367.17	1367.32	1367.34	NR
12/10/96	18:00	1372.48	1374.38	1376.08	NR	1374.80	1366.98	1367.17	1367.31	1367.33	NR
12/10/96	19:00	1372.44	1374.38	1376.08	NR	1374.76	1366.96	1367.16	1367.30	1367.29	NR
12/10/96	20:00	1372.47	1374.37	1376.04	NR	1374.77	1366.92	1367.12	1367.27	1367.30	NR

TABLE C.1 (Cont.)

		Shallow-Aquifer Wells					Deep-Aquifer Wells				
Date	Time	MW 1S	MW 2S	MW 3S	SB02	SB12	MW 1D	MW 2D	MW 3D	SB01	SB11
12/10/96	21:00	1372.44	1374.37	1376.06	NR	1374.73	1366.92	1367.12	1367.27	1367.27	NR
12/10/96	22:00	1372.41	1374.35	1376.03	NR	1374.70	1366.89	1367.09	1367.23	1367.23	NR
12/10/96	23:00	1372.42	1374.34	1376.00	NR	1374.68	1366.86	1367.06	1367.21	1367.21	NR

[a] Not recorded.

[b] No data.

Appendix D:

Well Response Test Data

TABLE D.1 Slug Test Data for Agenda Monitoring Well MW 1D

Elapsed Time (min)	Residual Drawdown (ft)		H/H_o	
	Test 1	Test 2	Test 1	Test 2
0	13.465	11.124	1.0000	1.0000
0.0033	13.515	10.64	1.0037	0.9565
0.0066	12.999	10.269	0.9654	0.9231
0.01	12.867	10.237	0.9556	0.9203
0.0133	12.93	10.369	0.9603	0.9321
0.0166	12.892	10.294	0.9574	0.9254
0.02	12.754	10.149	0.9472	0.9124
0.0233	12.622	10.036	0.9374	0.9022
0.0266	12.578	10.005	0.9341	0.8994
0.03	12.534	9.973	0.9309	0.8965
0.0333	12.446	9.904	0.9243	0.8903
0.0366	12.352	9.816	0.9173	0.8824
0.04	12.276	9.747	0.9117	0.8762
0.0433	12.219	9.696	0.9075	0.8716
0.0466	12.157	9.64	0.9029	0.8666
0.05	12.068	9.583	0.8962	0.8615
0.0533	11.993	9.514	0.8907	0.8553
0.0566	11.93	9.451	0.8860	0.8496
0.06	11.867	9.394	0.8813	0.8445
0.0633	11.798	9.338	0.8762	0.8394
0.0666	11.722	9.281	0.8706	0.8343
0.07	11.653	9.224	0.8654	0.8292
0.0733	11.59	9.168	0.8608	0.8242
0.0766	11.521	9.111	0.8556	0.8190
0.08	11.452	9.055	0.8505	0.8140
0.0833	11.389	8.998	0.8458	0.8089
0.0866	11.32	8.941	0.8407	0.8038
0.09	11.257	8.891	0.8360	0.7993
0.0933	11.194	8.834	0.8313	0.7941
0.0966	11.131	8.778	0.8267	0.7891
0.1	11.062	8.728	0.8215	0.7846
0.1033	10.999	8.671	0.8169	0.7795
0.1066	10.936	8.62	0.8122	0.7749
0.11	10.873	8.564	0.8075	0.7699
0.1133	10.81	8.514	0.8028	0.7654
0.1166	10.754	8.463	0.7987	0.7608
0.12	10.691	8.413	0.7940	0.7563
0.1233	10.628	8.363	0.7893	0.7518
0.1266	10.571	8.312	0.7851	0.7472
0.13	10.508	8.262	0.7804	0.7427
0.1333	10.445	8.212	0.7757	0.7382
0.1366	10.389	8.161	0.7716	0.7336
0.14	10.326	8.111	0.7669	0.7291
0.1433	10.269	8.061	0.7626	0.7246
0.1466	10.213	8.017	0.7585	0.7207
0.15	10.15	7.966	0.7538	0.7161

TABLE D.1 (Cont.)

Elapsed Time (min)	Residual Drawdown (ft)		H/H_o	
	Test 1	Test 2	Test 1	Test 2
0.1533	10.093	7.916	0.7496	0.7116
0.1566	10.037	7.872	0.7454	0.7077
0.16	9.98	7.822	0.7412	0.7032
0.1633	9.923	7.778	0.7369	0.6992
0.1666	9.867	7.727	0.7328	0.6946
0.17	9.81	7.683	0.7286	0.6907
0.1733	9.753	7.639	0.7243	0.6867
0.1766	9.697	7.589	0.7202	0.6822
0.18	9.646	7.545	0.7164	0.6783
0.1833	9.59	7.501	0.7122	0.6743
0.1866	9.533	7.457	0.7080	0.6704
0.19	9.483	7.413	0.7043	0.6664
0.1933	9.426	7.369	0.7000	0.6624
0.1966	9.376	7.324	0.6963	0.6584
0.2	9.319	7.28	0.6921	0.6544
0.2033	9.269	7.236	0.6884	0.6505
0.2066	9.212	7.192	0.6841	0.6465
0.21	9.162	7.148	0.6804	0.6426
0.2133	9.112	7.104	0.6767	0.6386
0.2166	9.061	7.06	0.6729	0.6347
0.22	9.011	7.022	0.6692	0.6312
0.2233	8.954	6.978	0.6650	0.6273
0.2266	8.904	6.934	0.6613	0.6233
0.23	8.854	6.897	0.6576	0.6200
0.2333	8.804	6.853	0.6538	0.6161
0.2366	8.753	6.815	0.6501	0.6126
0.24	8.703	6.771	0.6463	0.6087
0.2433	8.659	6.733	0.6431	0.6053
0.2466	8.608	6.689	0.6393	0.6013
0.25	8.558	6.651	0.6356	0.5979
0.2533	8.508	6.614	0.6319	0.5946
0.2566	8.464	6.576	0.6286	0.5912
0.26	8.413	6.532	0.6248	0.5872
0.2633	8.369	6.494	0.6215	0.5838
0.2666	8.319	6.456	0.6178	0.5804
0.27	8.269	6.418	0.6141	0.5770
0.2733	8.225	6.381	0.6108	0.5736
0.2766	8.181	6.343	0.6076	0.5702
0.28	8.13	6.305	0.6038	0.5668
0.2833	8.086	6.267	0.6005	0.5634
0.2866	8.042	6.23	0.5973	0.5601
0.29	7.992	6.192	0.5935	0.5566
0.2933	7.948	6.154	0.5903	0.5532
0.2966	7.904	6.116	0.5870	0.5498
0.3	7.86	6.079	0.5837	0.5465
0.3033	7.816	6.047	0.5805	0.5436

TABLE D.1 (Cont.)

Elapsed Time (min)	Residual Drawdown (ft)		H/H_o	
	Test 1	Test 2	Test 1	Test 2
0.3066	7.772	6.009	0.5772	0.5402
0.31	7.728	5.972	0.5739	0.5369
0.3133	7.684	5.934	0.5707	0.5334
0.3166	7.64	5.903	0.5674	0.5307
0.32	7.596	5.865	0.5641	0.5272
0.3233	7.552	5.833	0.5609	0.5244
0.3266	7.507	5.796	0.5575	0.5210
0.33	7.47	5.764	0.5548	0.5182
0.3333	7.426	5.726	0.5515	0.5147
0.35	7.218	5.563	0.5361	0.5001
0.3666	7.017	5.399	0.5211	0.4853
0.3833	6.828	5.242	0.5071	0.4712
0.4	6.639	5.091	0.4931	0.4577
0.4166	6.457	4.946	0.4795	0.4446
0.4333	6.274	4.801	0.4659	0.4316
0.45	6.104	4.657	0.4533	0.4186
0.4666	5.935	4.525	0.4408	0.4068
0.4833	5.771	4.392	0.4286	0.3948
0.5	5.607	4.267	0.4164	0.3836
0.5166	5.45	4.141	0.4048	0.3723
0.5333	5.299	4.021	0.3935	0.3615
0.55	5.154	3.902	0.3828	0.3508
0.5666	5.01	3.788	0.3721	0.3405
0.5833	4.871	3.675	0.3618	0.3304
0.6	4.733	3.568	0.3515	0.3207
0.6166	4.601	3.461	0.3417	0.3111
0.6333	4.475	3.36	0.3323	0.3020
0.65	4.343	3.26	0.3225	0.2931
0.6666	4.223	3.165	0.3136	0.2845
0.6833	4.103	3.077	0.3047	0.2766
0.7	3.99	2.983	0.2963	0.2682
0.7166	3.877	2.895	0.2879	0.2602
0.7333	3.764	2.813	0.2795	0.2529
0.75	3.663	2.731	0.2720	0.2455
0.7666	3.556	2.649	0.2641	0.2381
0.7833	3.455	2.574	0.2566	0.2314
0.8	3.355	2.498	0.2492	0.2246
0.8166	3.267	2.423	0.2426	0.2178
0.8333	3.172	2.354	0.2356	0.2116
0.85	3.084	2.284	0.2290	0.2053
0.8666	2.996	2.215	0.2225	0.1991
0.8833	2.908	2.152	0.2160	0.1935
0.9	2.826	2.089	0.2099	0.1878
0.9166	2.744	2.026	0.2038	0.1821
0.9333	2.669	1.97	0.1982	0.1771
0.95	2.593	1.913	0.1926	0.1720

TABLE D.1 (Cont.)

Elapsed Time (min)	Residual Drawdown (ft)		H/H_o	
	Test 1	Test 2	Test 1	Test 2
0.9666	2.518	1.856	0.1870	0.1668
0.9833	2.448	1.8	0.1818	0.1618
1	2.379	1.749	0.1767	0.1572
1.2	1.737	1.259	0.1290	0.1132
1.4	1.234	0.887	0.0916	0.0797
1.6	0.881	0.629	0.0654	0.0565
1.8	0.63	0.447	0.0468	0.0402
2	0.46	0.321	0.0342	0.0289
2.2	0.334	0.233	0.0248	0.0209
2.4	0.246	0.17	0.0183	0.0153
2.6	0.183	0.126	0.0136	0.0113
2.8	0.139	0.094	0.0103	0.0085
3	0.107	0.069	0.0079	0.0062
3.2	0.082	0.056	0.0061	0.0050
3.4	0.063	0.044	0.0047	0.0040
3.6	0.051	0.038	0.0038	0.0034
3.8	0.038	0.031	0.0028	0.0028
4	0.032	0.025	0.0024	0.0022
4.2	0.032	0.019	0.0024	0.0017
4.4	0.026	0.019	0.0019	0.0017
4.6	0.019	0.012	0.0014	0.0011
4.8	0.019	0.012	0.0014	0.0011
5	0.019	0.012	0.0014	0.0011
5.2	0.013	0.012	0.0010	0.0011
5.4	0.013	0.006	0.0010	0.0005
5.6	0.013	0.006	0.0010	0.0005
5.8	0.013	0.006	0.0010	0.0005
6	0.013	0.006	0.0010	0.0005

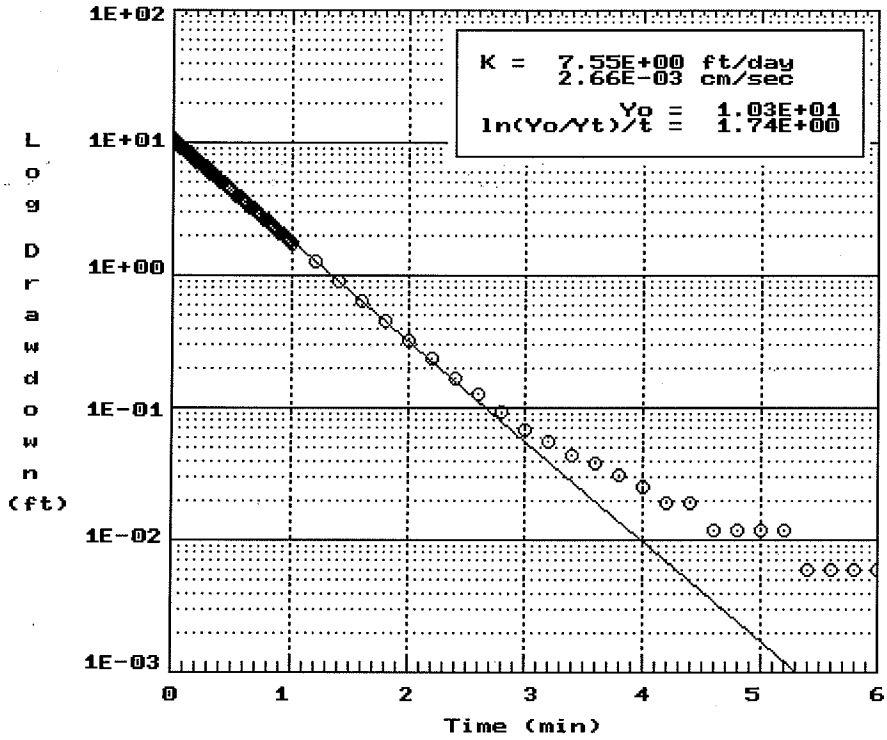

FIGURE D.1 Bouwer and Rice Slug Test Analysis for Agenda Monitoring Well MW 1D, Test 2

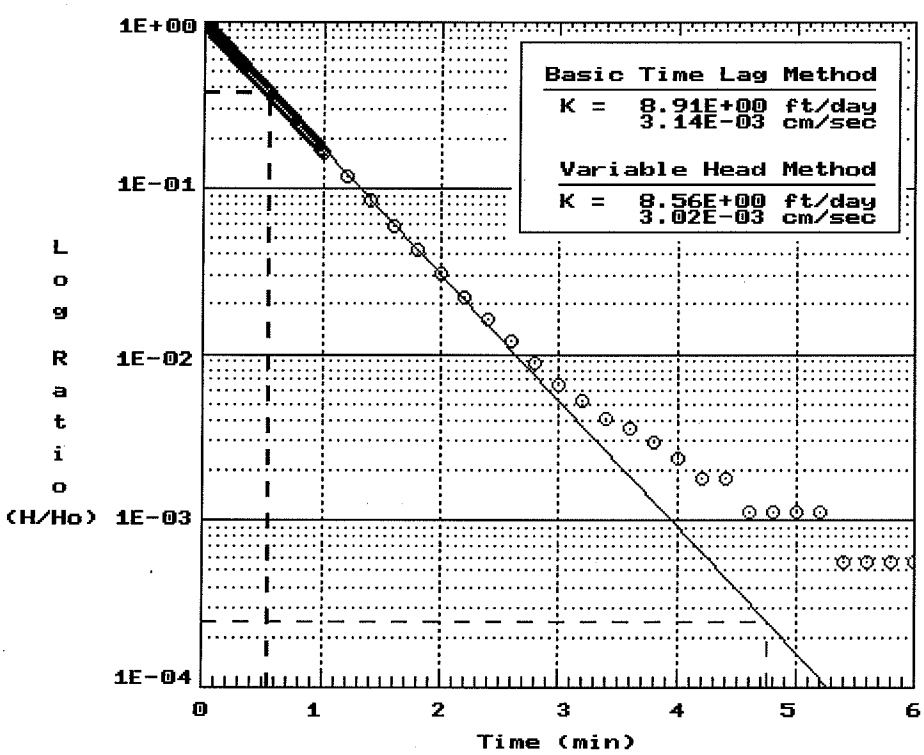

FIGURE D.2 Hvorslev Slug Test Analysis for Agenda Monitoring Well MW 1D, Test 2

TABLE D.2 Slug Test Data for Agenda Monitoring Well MW 1S

Elapsed Time (min)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0	3.46	3.441	3.479	1.0000	1.0000	1.0000
0.0033	3.108	2.78	3.284	0.8983	0.8079	0.9439
0.0066	3.076	2.73	3.309	0.8890	0.7934	0.9511
0.01	3.007	2.654	3.271	0.8691	0.7713	0.9402
0.0133	2.944	2.566	3.234	0.8509	0.7457	0.9296
0.0166	2.844	2.484	3.196	0.8220	0.7219	0.9187
0.02	2.749	2.384	3.152	0.7945	0.6928	0.9060
0.0233	2.655	2.271	3.101	0.7673	0.6600	0.8913
0.0266	2.542	2.183	3.051	0.7347	0.6344	0.8770
0.03	2.428	2.069	2.995	0.7017	0.6013	0.8609
0.0333	2.428	2	2.932	0.7017	0.5812	0.8428
0.0366	2.24	1.918	2.831	0.6474	0.5574	0.8137
0.04	2.215	1.83	2.724	0.6402	0.5318	0.7830
0.0433	2.114	1.774	2.636	0.6110	0.5155	0.7577
0.0466	2.032	1.686	2.535	0.5873	0.4900	0.7287
0.05	1.963	1.61	2.454	0.5673	0.4679	0.7054
0.0533	1.875	1.566	2.34	0.5419	0.4551	0.6726
0.0566	1.793	1.516	2.303	0.5182	0.4406	0.6620
0.06	1.755	1.447	2.183	0.5072	0.4205	0.6275
0.0633	1.655	1.371	2.171	0.4783	0.3984	0.6240
0.0666	1.592	1.327	2.045	0.4601	0.3856	0.5878
0.07	1.56	1.289	1.982	0.4509	0.3746	0.5697
0.0733	1.498	1.239	1.888	0.4329	0.3601	0.5427
0.0766	1.428	1.195	1.881	0.4127	0.3473	0.5407
0.08	1.378	1.138	1.793	0.3983	0.3307	0.5154
0.0833	1.334	1.107	1.737	0.3855	0.3217	0.4993
0.0866	1.277	1.063	1.623	0.3691	0.3089	0.4665
0.09	1.233	1.025	1.623	0.3564	0.2979	0.4665
0.0933	1.202	0.994	1.567	0.3474	0.2889	0.4504
0.0966	1.158	0.962	1.504	0.3347	0.2796	0.4323
0.1	1.108	0.925	1.453	0.3202	0.2688	0.4176
0.1033	1.076	0.899	1.384	0.3110	0.2613	0.3978
0.1066	1.038	0.868	1.403	0.3000	0.2523	0.4033
0.11	1.007	0.836	1.334	0.2910	0.2430	0.3834
0.1133	0.982	0.811	1.233	0.2838	0.2357	0.3544
0.1166	0.944	0.786	1.252	0.2728	0.2284	0.3599
0.12	0.919	0.767	1.221	0.2656	0.2229	0.3510
0.1233	0.894	0.742	1.17	0.2584	0.2156	0.3363
0.1266	0.868	0.723	1.12	0.2509	0.2101	0.3219
0.13	0.843	0.704	1.095	0.2436	0.2046	0.3147
0.1333	0.818	0.685	1.063	0.2364	0.1991	0.3055
0.1366	0.793	0.667	1.038	0.2292	0.1938	0.2984
0.14	0.774	0.648	1.007	0.2237	0.1883	0.2895
0.1433	0.755	0.635	0.975	0.2182	0.1845	0.2803
0.1466	0.736	0.623	0.95	0.2127	0.1811	0.2731
0.15	0.711	0.61	0.925	0.2055	0.1773	0.2659

TABLE D.2 (Cont.)

Elapsed Time (min)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.1533	0.699	0.591	0.913	0.2020	0.1718	0.2624
0.1566	0.68	0.579	0.875	0.1965	0.1683	0.2515
0.16	0.667	0.566	0.856	0.1928	0.1645	0.2460
0.1633	0.655	0.56	0.837	0.1893	0.1627	0.2406
0.1666	0.636	0.547	0.812	0.1838	0.1590	0.2334
0.17	0.623	0.535	0.793	0.1801	0.1555	0.2279
0.1733	0.611	0.528	0.774	0.1766	0.1534	0.2225
0.1766	0.598	0.516	0.755	0.1728	0.1500	0.2170
0.18	0.585	0.509	0.736	0.1691	0.1479	0.2116
0.1833	0.579	0.497	0.724	0.1673	0.1444	0.2081
0.1866	0.567	0.49	0.705	0.1639	0.1424	0.2026
0.19	0.56	0.484	0.692	0.1618	0.1407	0.1989
0.1933	0.548	0.478	0.68	0.1584	0.1389	0.1955
0.1966	0.541	0.472	0.667	0.1564	0.1372	0.1917
0.2	0.529	0.465	0.648	0.1529	0.1351	0.1863
0.2033	0.523	0.453	0.636	0.1512	0.1316	0.1828
0.2066	0.51	0.453	0.617	0.1474	0.1316	0.1773
0.21	0.504	0.44	0.604	0.1457	0.1279	0.1736
0.2133	0.497	0.44	0.592	0.1436	0.1279	0.1702
0.2166	0.491	0.428	0.585	0.1419	0.1244	0.1682
0.22	0.485	0.428	0.573	0.1402	0.1244	0.1647
0.2233	0.478	0.421	0.56	0.1382	0.1223	0.1610
0.2266	0.472	0.415	0.548	0.1364	0.1206	0.1575
0.23	0.466	0.409	0.541	0.1347	0.1189	0.1555
0.2333	0.453	0.402	0.529	0.1309	0.1168	0.1521
0.2366	0.447	0.402	0.523	0.1292	0.1168	0.1503
0.24	0.447	0.396	0.51	0.1292	0.1151	0.1466
0.2433	0.441	0.39	0.504	0.1275	0.1133	0.1449
0.2466	0.434	0.384	0.491	0.1254	0.1116	0.1411
0.25	0.428	0.377	0.485	0.1237	0.1096	0.1394
0.2533	0.422	0.377	0.478	0.1220	0.1096	0.1374
0.2566	0.422	0.371	0.472	0.1220	0.1078	0.1357
0.26	0.416	0.365	0.466	0.1202	0.1061	0.1339
0.2633	0.409	0.365	0.46	0.1182	0.1061	0.1322
0.2666	0.409	0.358	0.453	0.1182	0.1040	0.1302
0.27	0.403	0.358	0.447	0.1165	0.1040	0.1285
0.2733	0.397	0.352	0.441	0.1147	0.1023	0.1268
0.2766	0.39	0.346	0.434	0.1127	0.1006	0.1247
0.28	0.39	0.346	0.428	0.1127	0.1006	0.1230
0.2833	0.384	0.339	0.428	0.1110	0.0985	0.1230
0.2866	0.378	0.339	0.422	0.1092	0.0985	0.1213
0.29	0.378	0.333	0.416	0.1092	0.0968	0.1196
0.2933	0.372	0.333	0.409	0.1075	0.0968	0.1176
0.2966	0.365	0.327	0.403	0.1055	0.0950	0.1158

TABLE D.2 (Cont.)

Elapsed Time (min)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.3	0.365	0.327	0.403	0.1055	0.0950	0.1158
0.3033	0.365	0.327	0.397	0.1055	0.0950	0.1141
0.3066	0.359	0.321	0.39	0.1038	0.0933	0.1121
0.31	0.353	0.321	0.39	0.1020	0.0933	0.1121
0.3133	0.353	0.314	0.384	0.1020	0.0913	0.1104
0.3166	0.346	0.314	0.378	0.1000	0.0913	0.1087
0.32	0.346	0.308	0.372	0.1000	0.0895	0.1069
0.3233	0.34	0.308	0.372	0.0983	0.0895	0.1069
0.3266	0.34	0.302	0.365	0.0983	0.0878	0.1049
0.33	0.34	0.302	0.365	0.0983	0.0878	0.1049
0.3333	0.34	0.302	0.359	0.0983	0.0878	0.1032
0.35	0.321	0.289	0.346	0.0928	0.0840	0.0995
0.3666	0.309	0.277	0.327	0.0893	0.0805	0.0940
0.3833	0.296	0.27	0.321	0.0855	0.0785	0.0923
0.4	0.29	0.264	0.309	0.0838	0.0767	0.0888
0.4166	0.277	0.258	0.296	0.0801	0.0750	0.0851
0.4333	0.271	0.245	0.29	0.0783	0.0712	0.0834
0.45	0.265	0.239	0.277	0.0766	0.0695	0.0796
0.4666	0.258	0.233	0.271	0.0746	0.0677	0.0779
0.4833	0.246	0.226	0.265	0.0711	0.0657	0.0762
0.5	0.246	0.22	0.252	0.0711	0.0639	0.0724
0.5166	0.239	0.22	0.246	0.0691	0.0639	0.0707
0.5333	0.233	0.214	0.246	0.0673	0.0622	0.0707
0.55	0.227	0.214	0.239	0.0656	0.0622	0.0687
0.5666	0.227	0.207	0.233	0.0656	0.0602	0.0670
0.5833	0.221	0.207	0.227	0.0639	0.0602	0.0652
0.6	0.214	0.201	0.221	0.0618	0.0584	0.0635
0.6166	0.214	0.201	0.221	0.0618	0.0584	0.0635
0.6333	0.208	0.195	0.214	0.0601	0.0567	0.0615
0.65	0.208	0.195	0.208	0.0601	0.0567	0.0598
0.6666	0.202	0.189	0.208	0.0584	0.0549	0.0598
0.6833	0.202	0.189	0.202	0.0584	0.0549	0.0581
0.7	0.195	0.189	0.195	0.0564	0.0549	0.0561
0.7166	0.195	0.182	0.195	0.0564	0.0529	0.0561
0.7333	0.195	0.182	0.195	0.0564	0.0529	0.0561
0.75	0.189	0.182	0.189	0.0546	0.0529	0.0543
0.7666	0.189	0.182	0.189	0.0546	0.0529	0.0543
0.7833	0.189	0.182	0.183	0.0546	0.0529	0.0526
0.8	0.183	0.176	0.177	0.0529	0.0511	0.0509
0.8166	0.183	0.176	0.183	0.0529	0.0511	0.0526
0.8333	0.183	0.176	0.177	0.0529	0.0511	0.0509
0.85	0.183	0.176	0.177	0.0529	0.0511	0.0509
0.8666	0.183	0.176	0.17	0.0529	0.0511	0.0489
0.8833	0.177	0.17	0.17	0.0512	0.0494	0.0489
0.9	0.177	0.17	0.17	0.0512	0.0494	0.0489
0.9166	0.177	0.17	0.164	0.0512	0.0494	0.0471

TABLE D.2 (Cont.)

Elapsed Time (min)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.9333	0.177	0.17	0.164	0.0512	0.0494	0.0471
0.95	0.17	0.17	0.164	0.0491	0.0494	0.0471
0.9666	0.177	0.17	0.164	0.0512	0.0494	0.0471
0.9833	0.17	0.17	0.158	0.0491	0.0494	0.0454
1	0.17	0.17	0.158	0.0491	0.0494	0.0454
1.2	0.17	0.163	0.151	0.0491	0.0474	0.0434
1.4	0.164	0.145	0.145	0.0474	0.0421	0.0417
1.6	0.12	0.094	0.139	0.0347	0.0273	0.0400
1.8	0.082	0.069	0.139	0.0237	0.0201	0.0400
2	0.057	0.05	0.139	0.0165	0.0145	0.0400
2.2	0.044	0.044	0.139	0.0127	0.0128	0.0400
2.4	0.038	0.038	0.139	0.0110	0.0110	0.0400
2.6	0.032	0.031	0.133	0.0092	0.0090	0.0382
2.8	0.026	0.025	0.133	0.0075	0.0073	0.0382
3	0.019	0.019	0.107	0.0055	0.0055	0.0308
3.2	0.019	0.019	0.088	0.0055	0.0055	0.0253
3.4	0.019	0.019	0.07	0.0055	0.0055	0.0201
3.6	0.013	0.012	0.063	0.0038	0.0035	0.0181
3.8	0.013	0.012	0.051	0.0038	0.0035	0.0147
4	0.013	0.012	0.044	0.0038	0.0035	0.0126
4.2	0.013	0.012	0.038	0.0038	0.0035	0.0109
4.4	0.013	0.012	0.032	0.0038	0.0035	0.0092
4.6	0.013	0.006	0.032	0.0038	0.0017	0.0092
4.8	0.007	0.006	0.026	0.0020	0.0017	0.0075
5	0.007	0.006	0.026	0.0020	0.0017	0.0075

TABLE D.3 Slug Test Data for Agenda Monitoring Well MW 3D

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0	12.819	11.307	11.743	0.9903	0.9610	0.9624
0.0033	12.945	11.766	12.202	1.0000	1.0000	1.0000
0.0066	12.756	11.71	12.183	0.9854	0.9952	0.9984
0.01	12.498	11.559	12.063	0.9655	0.9824	0.9886
0.0133	12.272	11.42	11.887	0.9480	0.9706	0.9742
0.0166	12.07	11.257	11.724	0.9324	0.9567	0.9608
0.02	11.894	11.125	11.566	0.9188	0.9455	0.9479
0.0233	11.718	10.967	11.416	0.9052	0.9321	0.9356
0.0266	11.548	10.823	11.265	0.8921	0.9199	0.9232
0.03	11.379	10.672	11.12	0.8790	0.9070	0.9113
0.0333	11.221	10.533	10.975	0.8668	0.8952	0.8994
0.0366	11.07	10.395	10.83	0.8552	0.8835	0.8876
0.04	10.913	10.25	10.686	0.8430	0.8712	0.8758
0.0433	10.768	10.112	10.535	0.8318	0.8594	0.8634
0.0466	10.617	9.98	10.396	0.8202	0.8482	0.8520
0.05	10.473	9.841	10.258	0.8090	0.8364	0.8407
0.0533	10.334	9.709	10.12	0.7983	0.8252	0.8294
0.0566	10.183	9.577	9.981	0.7866	0.8140	0.8180
0.06	10.045	9.445	9.849	0.7760	0.8027	0.8072
0.0633	9.907	9.319	9.717	0.7653	0.7920	0.7963
0.0666	9.768	9.2	9.591	0.7546	0.7819	0.7860
0.07	9.636	9.068	9.459	0.7444	0.7707	0.7752
0.0733	9.504	8.948	9.327	0.7342	0.7605	0.7644
0.0766	9.372	8.828	9.201	0.7240	0.7503	0.7541
0.08	9.24	8.709	9.082	0.7138	0.7402	0.7443
0.0833	9.114	8.589	8.962	0.7041	0.7300	0.7345
0.0866	8.988	8.47	8.843	0.6943	0.7199	0.7247
0.09	8.862	8.363	8.723	0.6846	0.7108	0.7149
0.0933	8.743	8.243	8.61	0.6754	0.7006	0.7056
0.0966	8.617	8.13	8.497	0.6657	0.6910	0.6964
0.1	8.497	8.023	8.383	0.6564	0.6819	0.6870
0.1033	8.384	7.923	8.27	0.6477	0.6734	0.6778
0.1066	8.265	7.816	8.157	0.6385	0.6643	0.6685
0.11	8.151	7.715	8.05	0.6297	0.6557	0.6597
0.1133	8.038	7.608	7.943	0.6209	0.6466	0.6510
0.1166	7.931	7.501	7.836	0.6127	0.6375	0.6422
0.12	7.818	7.4	7.729	0.6039	0.6289	0.6334
0.1233	7.711	7.3	7.628	0.5957	0.6204	0.6251
0.1266	7.604	7.199	7.521	0.5874	0.6118	0.6164
0.13	7.497	7.098	7.421	0.5791	0.6033	0.6082
0.1333	7.396	7.004	7.32	0.5713	0.5953	0.5999
0.1366	7.289	6.91	7.226	0.5631	0.5873	0.5922
0.14	7.195	6.815	7.125	0.5558	0.5792	0.5839
0.1433	7.094	6.727	7.031	0.5480	0.5717	0.5762
0.1466	6.994	6.639	6.943	0.5403	0.5643	0.5690

TABLE D.3 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.15	6.899	6.551	6.848	0.5329	0.5568	0.5612
0.1533	6.805	6.469	6.754	0.5257	0.5498	0.5535
0.1566	6.711	6.375	6.666	0.5184	0.5418	0.5463
0.16	6.616	6.287	6.578	0.5111	0.5343	0.5391
0.1633	6.528	6.199	6.49	0.5043	0.5269	0.5319
0.1666	6.434	6.123	6.401	0.4970	0.5204	0.5246
0.17	6.352	6.041	6.32	0.4907	0.5134	0.5179
0.1733	6.264	5.96	6.232	0.4839	0.5065	0.5107
0.1766	6.176	5.878	6.156	0.4771	0.4996	0.5045
0.18	6.094	5.796	6.074	0.4708	0.4926	0.4978
0.1833	6.012	5.714	5.992	0.4644	0.4856	0.4911
0.1866	5.924	5.639	5.911	0.4576	0.4793	0.4844
0.19	5.842	5.569	5.835	0.4513	0.4733	0.4782
0.1933	5.76	5.494	5.753	0.4450	0.4669	0.4715
0.1966	5.685	5.418	5.678	0.4392	0.4605	0.4653
0.2	5.603	5.349	5.602	0.4328	0.4546	0.4591
0.2033	5.528	5.274	5.527	0.4270	0.4482	0.4530
0.2066	5.458	5.198	5.458	0.4216	0.4418	0.4473
0.21	5.377	5.129	5.382	0.4154	0.4359	0.4411
0.2133	5.307	5.06	5.313	0.4100	0.4301	0.4354
0.2166	5.226	5.003	5.237	0.4037	0.4252	0.4292
0.22	5.163	4.934	5.175	0.3988	0.4193	0.4241
0.2233	5.087	4.865	5.105	0.3930	0.4135	0.4184
0.2266	5.018	4.802	5.036	0.3876	0.4081	0.4127
0.23	4.949	4.745	4.967	0.3823	0.4033	0.4071
0.2333	4.88	4.676	4.904	0.3770	0.3974	0.4019
0.2366	4.817	4.607	4.835	0.3721	0.3916	0.3962
0.24	4.747	4.544	4.778	0.3667	0.3862	0.3916
0.2433	4.684	4.481	4.715	0.3618	0.3808	0.3864
0.2466	4.622	4.431	4.652	0.3570	0.3766	0.3812
0.25	4.559	4.374	4.589	0.3522	0.3717	0.3761
0.2533	4.496	4.311	4.526	0.3473	0.3664	0.3709
0.2566	4.439	4.254	4.47	0.3429	0.3616	0.3663
0.26	4.376	4.198	4.413	0.3380	0.3568	0.3617
0.2633	4.32	4.141	4.357	0.3337	0.3519	0.3571
0.2666	4.257	4.084	4.3	0.3289	0.3471	0.3524
0.27	4.206	4.028	4.237	0.3249	0.3423	0.3472
0.2733	4.15	3.978	4.18	0.3206	0.3381	0.3426
0.2766	4.087	3.927	4.13	0.3157	0.3338	0.3385
0.28	4.024	3.871	4.073	0.3109	0.3290	0.3338
0.2833	3.973	3.814	4.023	0.3069	0.3242	0.3297
0.2866	3.917	3.764	3.966	0.3026	0.3199	0.3250
0.29	3.873	3.72	3.916	0.2992	0.3162	0.3209
0.2933	3.816	3.669	3.859	0.2948	0.3118	0.3163
0.2966	3.76	3.619	3.809	0.2905	0.3076	0.3122

TABLE D.3 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.3	3.709	3.575	3.759	0.2865	0.3038	0.3081
0.3033	3.659	3.524	3.715	0.2827	0.2995	0.3045
0.3066	3.615	3.48	3.664	0.2793	0.2958	0.3003
0.31	3.564	3.436	3.614	0.2753	0.2920	0.2962
0.3133	3.514	3.392	3.57	0.2715	0.2883	0.2926
0.3166	3.47	3.348	3.52	0.2681	0.2845	0.2885
0.32	3.42	3.304	3.476	0.2642	0.2808	0.2849
0.3233	3.376	3.26	3.432	0.2608	0.2771	0.2813
0.3266	3.332	3.222	3.387	0.2574	0.2738	0.2776
0.33	3.288	3.178	3.343	0.2540	0.2701	0.2740
0.3333	3.244	3.134	3.299	0.2506	0.2664	0.2704
0.35	3.03	2.939	3.092	0.2341	0.2498	0.2534
0.3666	2.834	2.75	2.903	0.2189	0.2337	0.2379
0.3833	2.658	2.574	2.72	0.2053	0.2188	0.2229
0.4	2.488	2.411	2.557	0.1922	0.2049	0.2096
0.4166	2.325	2.26	2.393	0.1796	0.1921	0.1961
0.4333	2.18	2.121	2.248	0.1684	0.1803	0.1842
0.45	2.042	1.989	2.116	0.1577	0.1690	0.1734
0.4666	1.909	1.869	1.978	0.1475	0.1588	0.1621
0.4833	1.79	1.75	1.871	0.1383	0.1487	0.1533
0.5	1.677	1.643	1.751	0.1295	0.1396	0.1435
0.5166	1.576	1.548	1.651	0.1217	0.1316	0.1353
0.5333	1.475	1.448	1.556	0.1139	0.1231	0.1275
0.55	1.381	1.36	1.449	0.1067	0.1156	0.1188
0.5666	1.299	1.284	1.367	0.1003	0.1091	0.1120
0.5833	1.217	1.202	1.286	0.0940	0.1022	0.1054
0.6	1.148	1.133	1.21	0.0887	0.0963	0.0992
0.6166	1.079	1.064	1.141	0.0834	0.0904	0.0935
0.6333	1.009	1.001	1.072	0.0779	0.0851	0.0879
0.65	0.947	0.938	1.009	0.0732	0.0797	0.0827
0.6666	0.896	0.888	0.958	0.0692	0.0755	0.0785
0.6833	0.846	0.844	0.902	0.0654	0.0717	0.0739
0.7	0.789	0.793	0.858	0.0610	0.0674	0.0703
0.7166	0.745	0.743	0.801	0.0576	0.0631	0.0656
0.7333	0.707	0.699	0.757	0.0546	0.0594	0.0620
0.75	0.663	0.661	0.719	0.0512	0.0562	0.0589
0.7666	0.626	0.623	0.675	0.0484	0.0529	0.0553
0.7833	0.588	0.592	0.644	0.0454	0.0503	0.0528
0.8	0.556	0.56	0.606	0.0430	0.0476	0.0497
0.8166	0.537	0.529	0.581	0.0415	0.0450	0.0476
0.8333	0.5	0.497	0.543	0.0386	0.0422	0.0445
0.85	0.475	0.472	0.518	0.0367	0.0401	0.0425
0.8666	0.443	0.447	0.486	0.0342	0.0380	0.0398
0.8833	0.418	0.422	0.455	0.0323	0.0359	0.0373

TABLE D.3 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.9	0.399	0.403	0.442	0.0308	0.0343	0.0362
0.9166	0.374	0.384	0.417	0.0289	0.0326	0.0342
0.9333	0.355	0.359	0.392	0.0274	0.0305	0.0321
0.95	0.342	0.346	0.379	0.0264	0.0294	0.0311
0.9666	0.323	0.328	0.36	0.0250	0.0279	0.0295
0.9833	0.305	0.309	0.335	0.0236	0.0263	0.0275
1	0.292	0.296	0.323	0.0226	0.0252	0.0265
1.2	0.166	0.176	0.197	0.0128	0.0150	0.0161
1.4	0.11	0.114	0.128	0.0085	0.0097	0.0105
1.6	0.072	0.082	0.09	0.0056	0.0070	0.0074
1.8	0.059	0.057	0.071	0.0046	0.0048	0.0058
2	0.047	0.044	0.058	0.0036	0.0037	0.0048
2.2	0.04	0.038	0.052	0.0031	0.0032	0.0043
2.4	0.034	0.051	0.052	0.0026	0.0043	0.0043
2.6	0.034	0.025	0.046	0.0026	0.0021	0.0038
2.8	0.028	0.032	0.046	0.0022	0.0027	0.0038
3	0.028	0.025	0.033	0.0022	0.0021	0.0027
3.2	0.028	0.025	0.04	0.0022	0.0021	0.0033
3.4	0.015	0.025	0.033	0.0012	0.0021	0.0027
3.6	0.015	0.025	0.021	0.0012	0.0021	0.0017
3.8	0.021	0.025	0.033	0.0016	0.0021	0.0027
4	0.015	0.019	0.033	0.0012	0.0016	0.0027

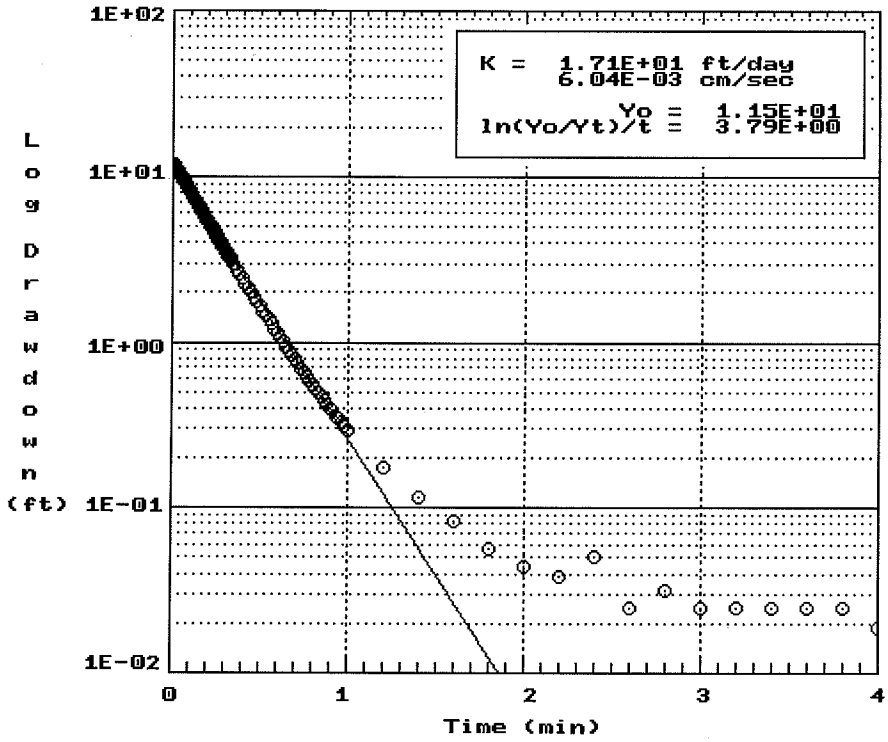

FIGURE D.3 Bouwer and Rice Slug Test Analysis for Agenda Monitoring Well MW 3D, Test 2

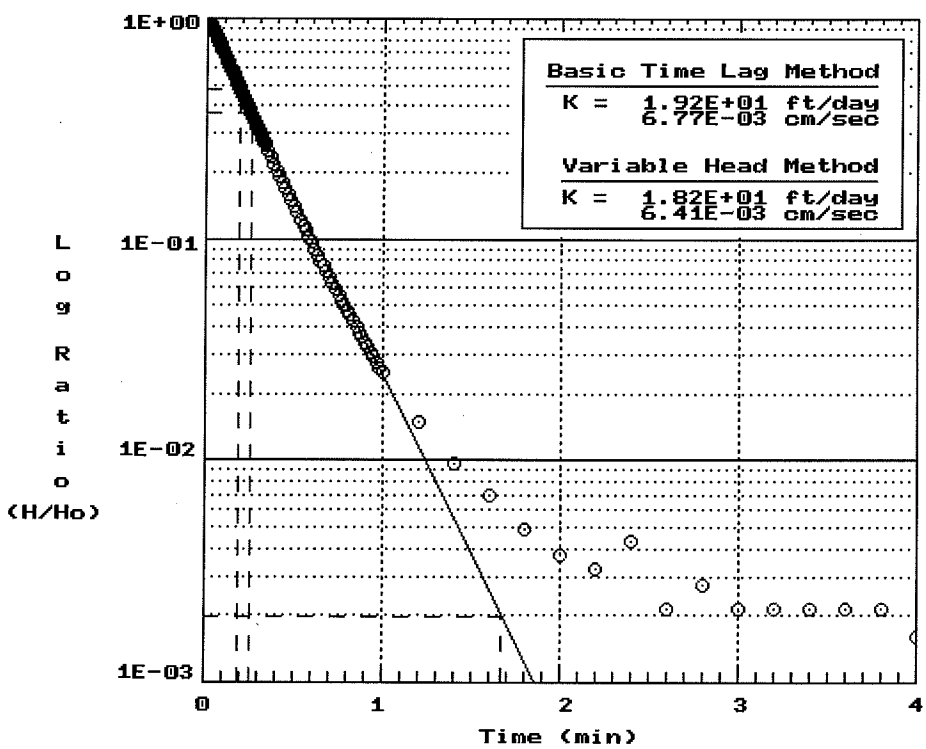

FIGURE D.4 Hvorslev Slug Test Analysis for Agenda Monitoring Well MW 3D, Test 2

TABLE D.4 Slug Test Data for Agenda Monitoring Well MW 3S

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0	10.659	8.923	8.929	1.0000	1.0000	0.8456
0.0033	6.802	8.312	10.559	0.6381	0.9315	1.0000
0.0066	7.721	8.577	9.47	0.7244	0.9612	0.8969
0.01	7.224	8.268	9.885	0.6777	0.9266	0.9362
0.0133	7.268	8.287	9.546	0.6819	0.9287	0.9041
0.0166	7.142	8.143	9.533	0.6700	0.9126	0.9028
0.02	7.048	8.099	9.439	0.6612	0.9077	0.8939
0.0233	6.985	7.998	9.344	0.6553	0.8963	0.8849
0.0266	6.897	7.935	9.288	0.6471	0.8893	0.8796
0.03	6.821	7.859	9.193	0.6399	0.8808	0.8706
0.0333	6.758	7.784	9.13	0.6340	0.8724	0.8647
0.0366	6.677	7.721	9.042	0.6264	0.8653	0.8563
0.04	6.614	7.646	8.973	0.6205	0.8569	0.8498
0.0433	6.544	7.583	8.91	0.6139	0.8498	0.8438
0.0466	6.475	7.52	8.835	0.6075	0.8428	0.8367
0.05	6.412	7.451	8.778	0.6016	0.8350	0.8313
0.0533	6.343	7.388	8.709	0.5951	0.8280	0.8248
0.0566	6.28	7.325	8.633	0.5892	0.8209	0.8176
0.06	6.217	7.262	8.583	0.5833	0.8139	0.8129
0.0633	6.154	7.199	8.514	0.5774	0.8068	0.8063
0.0666	6.091	7.142	8.451	0.5714	0.8004	0.8004
0.07	6.035	7.086	8.388	0.5662	0.7941	0.7944
0.0733	5.972	7.023	8.325	0.5603	0.7871	0.7884
0.0766	5.915	6.966	8.268	0.5549	0.7807	0.7830
0.08	5.852	6.909	8.206	0.5490	0.7743	0.7772
0.0833	5.802	6.853	8.143	0.5443	0.7680	0.7712
0.0866	5.745	6.796	8.08	0.5390	0.7616	0.7652
0.09	5.689	6.739	8.023	0.5337	0.7552	0.7598
0.0933	5.632	6.689	7.966	0.5284	0.7496	0.7544
0.0966	5.575	6.633	7.91	0.5230	0.7434	0.7491
0.1	5.525	6.582	7.853	0.5183	0.7376	0.7437
0.1033	5.468	6.526	7.797	0.5130	0.7314	0.7384
0.1066	5.418	6.475	7.74	0.5083	0.7257	0.7330
0.11	5.368	6.425	7.69	0.5036	0.7200	0.7283
0.1133	5.311	6.375	7.627	0.4983	0.7144	0.7223
0.1166	5.261	6.324	7.57	0.4936	0.7087	0.7169
0.12	5.21	6.274	7.513	0.4888	0.7031	0.7115
0.1233	5.16	6.23	7.463	0.4841	0.6982	0.7068
0.1266	5.11	6.173	7.406	0.4794	0.6918	0.7014
0.13	5.066	6.129	7.35	0.4753	0.6869	0.6961
0.1333	5.015	6.072	7.312	0.4705	0.6805	0.6925
0.1366	4.971	6.028	7.249	0.4664	0.6756	0.6865
0.14	4.921	5.978	7.199	0.4617	0.6700	0.6818
0.1433	4.877	5.934	7.148	0.4575	0.6650	0.6770
0.1466	4.827	5.884	7.092	0.4529	0.6594	0.6717

TABLE D.4 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.15	4.783	5.833	7.048	0.4487	0.6537	0.6675
0.1533	4.738	5.789	6.991	0.4445	0.6488	0.6621
0.1566	4.694	5.745	6.941	0.4404	0.6438	0.6574
0.16	4.65	5.695	6.897	0.4363	0.6382	0.6532
0.1633	4.606	5.651	6.846	0.4321	0.6333	0.6484
0.1666	4.562	5.607	6.796	0.4280	0.6284	0.6436
0.17	4.518	5.563	6.752	0.4239	0.6234	0.6395
0.1733	4.474	5.519	6.702	0.4197	0.6185	0.6347
0.1766	4.43	5.475	6.658	0.4156	0.6136	0.6306
0.18	4.386	5.431	6.614	0.4115	0.6087	0.6264
0.1833	4.348	5.387	6.563	0.4079	0.6037	0.6216
0.1866	4.304	5.343	6.519	0.4038	0.5988	0.6174
0.19	4.267	5.299	6.475	0.4003	0.5939	0.6132
0.1933	4.229	5.261	6.425	0.3968	0.5896	0.6085
0.1966	4.185	5.217	6.381	0.3926	0.5847	0.6043
0.2	4.147	5.179	6.33	0.3891	0.5804	0.5995
0.2033	4.109	5.135	6.286	0.3855	0.5755	0.5953
0.2066	4.071	5.091	6.242	0.3819	0.5705	0.5912
0.21	4.034	5.053	6.198	0.3785	0.5663	0.5870
0.2133	3.99	5.015	6.154	0.3743	0.5620	0.5828
0.2166	3.952	4.978	6.11	0.3708	0.5579	0.5787
0.22	3.914	4.94	6.066	0.3672	0.5536	0.5745
0.2233	3.883	4.896	6.022	0.3643	0.5487	0.5703
0.2266	3.845	4.858	5.978	0.3607	0.5444	0.5662
0.23	3.807	4.82	5.94	0.3572	0.5402	0.5626
0.2333	3.776	4.783	5.896	0.3543	0.5360	0.5584
0.2366	3.738	4.738	5.852	0.3507	0.5310	0.5542
0.24	3.7	4.707	5.815	0.3471	0.5275	0.5507
0.2433	3.669	4.669	5.777	0.3442	0.5233	0.5471
0.2466	3.631	4.632	5.733	0.3407	0.5191	0.5429
0.25	3.599	4.594	5.689	0.3376	0.5148	0.5388
0.2533	3.562	4.556	5.651	0.3342	0.5106	0.5352
0.2566	3.53	4.518	5.607	0.3312	0.5063	0.5310
0.26	3.499	4.487	5.569	0.3283	0.5029	0.5274
0.2633	3.461	4.449	5.531	0.3247	0.4986	0.5238
0.2666	3.43	4.418	5.487	0.3218	0.4951	0.5197
0.27	3.398	4.38	5.45	0.3188	0.4909	0.5161
0.2733	3.367	4.342	5.412	0.3159	0.4866	0.5125
0.2766	3.335	4.311	5.374	0.3129	0.4831	0.5089
0.28	3.304	4.279	5.336	0.3100	0.4795	0.5054
0.2833	3.266	4.248	5.299	0.3064	0.4761	0.5018
0.2866	3.241	4.21	5.261	0.3041	0.4718	0.4982
0.29	3.209	4.178	5.223	0.3011	0.4682	0.4946
0.2933	3.178	4.147	5.185	0.2982	0.4648	0.4911
0.2966	3.153	4.109	5.148	0.2958	0.4605	0.4875

TABLE D.4 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.3	3.121	4.078	5.11	0.2928	0.4570	0.4839
0.3033	3.09	4.046	5.072	0.2899	0.4534	0.4803
0.3066	3.065	4.009	5.034	0.2876	0.4493	0.4767
0.31	3.033	3.983	4.997	0.2845	0.4464	0.4732
0.3133	3.008	3.946	4.965	0.2822	0.4422	0.4702
0.3166	2.976	3.914	4.927	0.2792	0.4386	0.4666
0.32	2.951	3.883	4.896	0.2769	0.4352	0.4637
0.3233	2.92	3.851	4.858	0.2739	0.4316	0.4601
0.3266	2.895	3.826	4.827	0.2716	0.4288	0.4571
0.33	2.869	3.795	4.789	0.2692	0.4253	0.4535
0.3333	2.838	3.763	4.757	0.2663	0.4217	0.4505
0.35	2.706	3.612	4.587	0.2539	0.4048	0.4344
0.3666	2.586	3.474	4.436	0.2426	0.3893	0.4201
0.3833	2.46	3.335	4.273	0.2308	0.3738	0.4047
0.4	2.347	3.203	4.115	0.2202	0.3590	0.3897
0.4166	2.24	3.077	3.971	0.2102	0.3448	0.3761
0.4333	2.139	2.958	3.826	0.2007	0.3315	0.3623
0.45	2.045	2.838	3.688	0.1919	0.3181	0.3493
0.4666	1.951	2.725	3.555	0.1830	0.3054	0.3367
0.4833	1.863	2.618	3.423	0.1748	0.2934	0.3242
0.5	1.774	2.517	3.297	0.1664	0.2821	0.3122
0.5166	1.693	2.416	3.178	0.1588	0.2708	0.3010
0.5333	1.617	2.322	3.065	0.1517	0.2602	0.2903
0.55	1.548	2.221	2.951	0.1452	0.2489	0.2795
0.5666	1.472	2.133	2.844	0.1381	0.2390	0.2693
0.5833	1.409	2.051	2.737	0.1322	0.2299	0.2592
0.6	1.346	1.97	2.637	0.1263	0.2208	0.2497
0.6166	1.284	1.888	2.542	0.1205	0.2116	0.2407
0.6333	1.227	1.812	2.448	0.1151	0.2031	0.2318
0.65	1.17	1.743	2.353	0.1098	0.1953	0.2228
0.6666	1.12	1.667	2.272	0.1051	0.1868	0.2152
0.6833	1.07	1.605	2.183	0.1004	0.1799	0.2067
0.7	1.025	1.542	2.102	0.0962	0.1728	0.1991
0.7166	0.981	1.485	2.026	0.0920	0.1664	0.1919
0.7333	0.937	1.422	1.951	0.0879	0.1594	0.1848
0.75	0.893	1.359	1.881	0.0838	0.1523	0.1781
0.7666	0.856	1.309	1.806	0.0803	0.1467	0.1710
0.7833	0.818	1.252	1.73	0.0767	0.1403	0.1638
0.8	0.78	1.202	1.667	0.0732	0.1347	0.1579
0.8166	0.749	1.164	1.611	0.0703	0.1304	0.1526
0.8333	0.717	1.114	1.548	0.0673	0.1248	0.1466
0.85	0.686	1.063	1.485	0.0644	0.1191	0.1406
0.8666	0.66	1.025	1.435	0.0619	0.1149	0.1359
0.8833	0.629	0.988	1.378	0.0590	0.1107	0.1305

TABLE D.4 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.9	0.604	0.944	1.328	0.0567	0.1058	0.1258
0.9166	0.579	0.906	1.277	0.0543	0.1015	0.1209
0.9333	0.553	0.874	1.227	0.0519	0.0979	0.1162
0.95	0.528	0.837	1.183	0.0495	0.0938	0.1120
0.9666	0.509	0.805	1.139	0.0478	0.0902	0.1079
0.9833	0.484	0.774	1.095	0.0454	0.0867	0.1037
1	0.465	0.742	1.057	0.0436	0.0832	0.1001
1.2	0.295	0.459	0.673	0.0277	0.0514	0.0637
1.4	0.182	0.302	0.428	0.0171	0.0338	0.0405
1.6	0.125	0.188	0.283	0.0117	0.0211	0.0268
1.8	0.088	0.132	0.188	0.0083	0.0148	0.0178
2	0.063	0.094	0.132	0.0059	0.0105	0.0125
2.2	0.05	0.069	0.094	0.0047	0.0077	0.0089
2.4	0.031	0.05	0.069	0.0029	0.0056	0.0065
2.6	0.025	0.037	0.056	0.0023	0.0041	0.0053
2.8	0.018	0.031	0.037	0.0017	0.0035	0.0035
3	0.018	0.025	0.031	0.0017	0.0028	0.0029
3.2	0.012	0.018	0.025	0.0011	0.0020	0.0024
3.4	0.012	0.012	0.018	0.0011	0.0013	0.0017
3.6	0.012	0.012	0.025	0.0011	0.0013	0.0024
3.8	0.012	0.012	0.018	0.0011	0.0013	0.0017
4	0.006	0.018	0.018	0.0006	0.0020	0.0017
4.2	0.006	0.006	0.012	0.0006	0.0007	0.0011
4.4	0.006	0	0.012	0.0006	0.0000	0.0011
4.6	0.006	0.006	0.006	0.0006	0.0007	0.0006
4.8	0.006	0.006	0.006	0.0006	0.0007	0.0006
5	0	0	0.006	0.0000	0.0000	0.0006

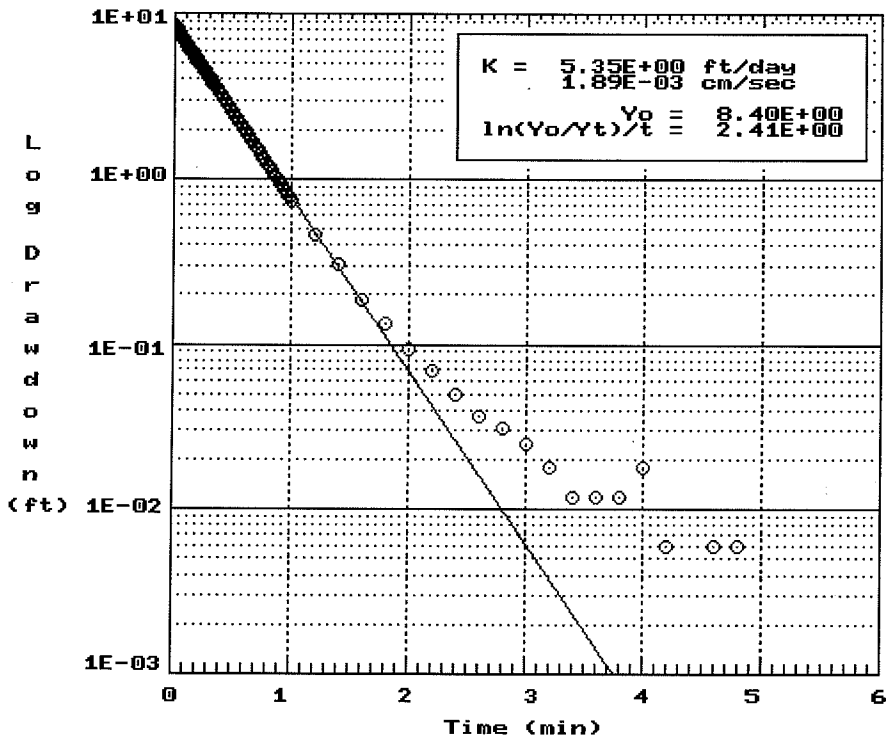

FIGURE D.5 Bouwer and Rice Slug Test Analysis for Agenda Monitoring Well MW 3S, Test 2

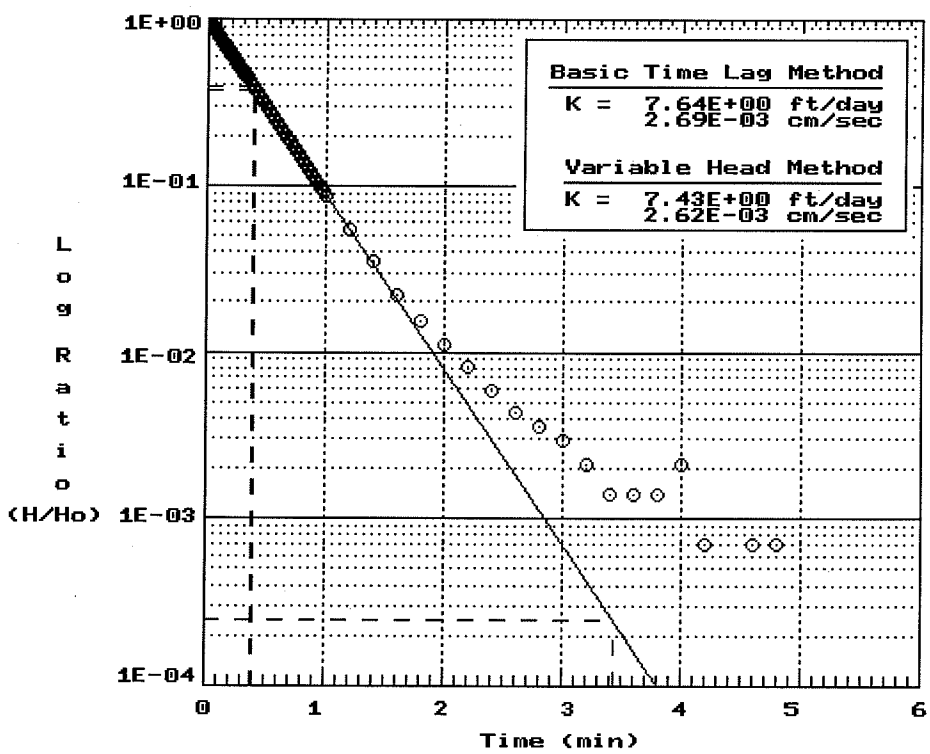

FIGURE D.6 Hvorslev Slug Test Analysis for Agenda Monitoring Well MW 3S, Test 2

TABLE D.5 Slug Test Data for Agenda Well SB01

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0	14.258	15.208	15.686	1.0000	1.0000	1.0000
0.0033	14.239	14.730	14.988	0.9987	0.9686	0.9555
0.0066	13.868	14.415	14.862	0.9726	0.9479	0.9475
0.01	13.673	14.308	15.006	0.9590	0.9408	0.9566
0.0133	13.824	14.390	14.944	0.9696	0.9462	0.9527
0.0166	13.736	14.308	14.755	0.9634	0.9408	0.9406
0.02	13.597	14.126	14.629	0.9536	0.9289	0.9326
0.0233	13.484	14.063	14.604	0.9457	0.9247	0.9310
0.0266	13.415	14.006	14.547	0.9409	0.9210	0.9274
0.03	13.390	13.943	14.428	0.9391	0.9168	0.9198
0.0333	13.295	13.849	14.327	0.9325	0.9106	0.9134
0.0366	13.207	13.748	14.264	0.9263	0.9040	0.9093
0.04	13.126	13.685	14.195	0.9206	0.8999	0.9049
0.0433	13.069	13.616	14.113	0.9166	0.8953	0.8997
0.0466	13.006	13.547	14.025	0.9122	0.8908	0.8941
0.05	12.918	13.465	13.950	0.9060	0.8854	0.8893
0.0533	12.849	13.383	13.880	0.9012	0.8800	0.8849
0.0566	12.780	13.321	13.805	0.8963	0.8759	0.8801
0.06	12.717	13.245	13.723	0.8919	0.8709	0.8749
0.0633	12.647	13.176	13.648	0.8870	0.8664	0.8701
0.0666	12.578	13.100	13.579	0.8822	0.8614	0.8657
0.07	12.509	13.031	13.509	0.8773	0.8569	0.8612
0.0733	12.440	12.962	13.434	0.8725	0.8523	0.8564
0.0766	12.377	12.893	13.365	0.8681	0.8478	0.8520
0.08	12.308	12.824	13.289	0.8632	0.8432	0.8472
0.0833	12.245	12.754	13.214	0.8588	0.8386	0.8424
0.0866	12.176	12.685	13.144	0.8540	0.8341	0.8379
0.09	12.113	12.622	13.075	0.8496	0.8300	0.8335
0.0933	12.050	12.553	13.006	0.8451	0.8254	0.8291
0.0966	11.987	12.484	12.937	0.8407	0.8209	0.8247
0.1	11.924	12.421	12.868	0.8363	0.8167	0.8203
0.1033	11.861	12.358	12.798	0.8319	0.8126	0.8159
0.1066	11.798	12.289	12.736	0.8275	0.8081	0.8119
0.11	11.735	12.226	12.666	0.8230	0.8039	0.8075
0.1133	11.672	12.163	12.597	0.8186	0.7998	0.8031
0.1166	11.609	12.100	12.528	0.8142	0.7956	0.7987
0.12	11.553	12.037	12.465	0.8103	0.7915	0.7947
0.1233	11.490	11.974	12.396	0.8059	0.7873	0.7903
0.1266	11.433	11.911	12.333	0.8019	0.7832	0.7862
0.13	11.370	11.842	12.270	0.7974	0.7787	0.7822
0.1333	11.314	11.786	12.201	0.7935	0.7750	0.7778
0.1366	11.251	11.723	12.138	0.7891	0.7708	0.7738
0.14	11.194	11.666	12.081	0.7851	0.7671	0.7702
0.1433	11.138	11.603	12.012	0.7812	0.7630	0.7658
0.1466	11.081	11.540	11.949	0.7772	0.7588	0.7618

TABLE D.5 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.15	11.024	11.484	11.886	0.7732	0.7551	0.7577
0.1533	10.961	11.421	11.830	0.7688	0.7510	0.7542
0.1566	10.905	11.364	11.767	0.7648	0.7472	0.7502
0.16	10.855	11.301	11.704	0.7613	0.7431	0.7461
0.1633	10.798	11.245	11.641	0.7573	0.7394	0.7421
0.1666	10.741	11.188	11.584	0.7533	0.7357	0.7385
0.17	10.685	11.131	11.521	0.7494	0.7319	0.7345
0.1733	10.628	11.068	11.465	0.7454	0.7278	0.7309
0.1766	10.571	11.012	11.408	0.7414	0.7241	0.7273
0.18	10.521	10.955	11.345	0.7379	0.7203	0.7233
0.1833	10.464	10.899	11.289	0.7339	0.7167	0.7197
0.1866	10.408	10.842	11.226	0.7300	0.7129	0.7157
0.19	10.358	10.785	11.169	0.7265	0.7092	0.7120
0.1933	10.307	10.735	11.113	0.7229	0.7059	0.7085
0.1966	10.251	10.678	11.056	0.7190	0.7021	0.7048
0.2	10.200	10.622	10.999	0.7154	0.6984	0.7012
0.2033	10.144	10.571	10.943	0.7115	0.6951	0.6976
0.2066	10.093	10.515	10.886	0.7079	0.6914	0.6940
0.21	10.043	10.458	10.823	0.7044	0.6877	0.6900
0.2133	9.993	10.408	10.773	0.7009	0.6844	0.6868
0.2166	9.942	10.351	10.716	0.6973	0.6806	0.6832
0.22	9.892	10.301	10.659	0.6938	0.6773	0.6795
0.2233	9.842	10.251	10.609	0.6903	0.6741	0.6763
0.2266	9.791	10.200	10.553	0.6867	0.6707	0.6728
0.23	9.741	10.144	10.502	0.6832	0.6670	0.6695
0.2333	9.691	10.093	10.446	0.6797	0.6637	0.6659
0.2366	9.640	10.043	10.389	0.6761	0.6604	0.6623
0.24	9.590	9.993	10.339	0.6726	0.6571	0.6591
0.2433	9.546	9.936	10.282	0.6695	0.6533	0.6555
0.2466	9.496	9.886	10.232	0.6660	0.6501	0.6523
0.25	9.445	9.842	10.181	0.6624	0.6472	0.6491
0.2533	9.401	9.791	10.131	0.6593	0.6438	0.6459
0.2566	9.351	9.741	10.074	0.6558	0.6405	0.6422
0.26	9.301	9.691	10.024	0.6523	0.6372	0.6390
0.2633	9.257	9.640	9.967	0.6492	0.6339	0.6354
0.2666	9.212	9.590	9.923	0.6461	0.6306	0.6326
0.27	9.162	9.546	9.873	0.6426	0.6277	0.6294
0.2733	9.118	9.496	9.823	0.6395	0.6244	0.6262
0.2766	9.068	9.445	9.772	0.6360	0.6211	0.6230
0.28	9.024	9.395	9.722	0.6329	0.6178	0.6198
0.2833	8.980	9.351	9.672	0.6298	0.6149	0.6166
0.2866	8.936	9.307	9.621	0.6267	0.6120	0.6133
0.29	8.892	9.257	9.571	0.6236	0.6087	0.6102
0.2933	8.841	9.212	9.527	0.6201	0.6057	0.6074
0.2966	8.797	9.162	9.477	0.6170	0.6024	0.6042

TABLE D.5 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.3	8.753	9.118	9.426	0.6139	0.5996	0.6009
0.3033	8.715	9.068	9.382	0.6112	0.5963	0.5981
0.3066	8.665	9.024	9.332	0.6077	0.5934	0.5949
0.31	8.621	8.980	9.288	0.6046	0.5905	0.5921
0.3133	8.577	8.936	9.238	0.6016	0.5876	0.5889
0.3166	8.533	8.892	9.194	0.5985	0.5847	0.5861
0.32	8.495	8.848	9.143	0.5958	0.5818	0.5829
0.3233	8.451	8.804	9.099	0.5927	0.5789	0.5801
0.3266	8.407	8.759	9.055	0.5896	0.5759	0.5773
0.33	8.363	8.715	9.011	0.5865	0.5731	0.5745
0.3333	8.325	8.671	8.961	0.5839	0.5702	0.5713
0.35	8.118	8.457	8.741	0.5694	0.5561	0.5572
0.3666	7.916	8.250	8.533	0.5552	0.5425	0.5440
0.3833	7.728	8.048	8.325	0.5420	0.5292	0.5307
0.4	7.539	7.853	8.118	0.5288	0.5164	0.5175
0.4166	7.356	7.658	7.923	0.5159	0.5036	0.5051
0.4333	7.180	7.476	7.721	0.5036	0.4916	0.4922
0.45	7.004	7.293	7.539	0.4912	0.4796	0.4806
0.4666	6.834	7.117	7.356	0.4793	0.4680	0.4690
0.4833	6.670	6.941	7.174	0.4678	0.4564	0.4574
0.5	6.507	6.777	7.004	0.4564	0.4456	0.4465
0.5166	6.350	6.614	6.834	0.4454	0.4349	0.4357
0.5333	6.199	6.457	6.664	0.4348	0.4246	0.4248
0.55	6.047	6.299	6.501	0.4241	0.4142	0.4144
0.5666	5.903	6.148	6.350	0.4140	0.4043	0.4048
0.5833	5.764	5.997	6.192	0.4043	0.3943	0.3947
0.6	5.620	5.859	6.041	0.3942	0.3853	0.3851
0.6166	5.487	5.714	5.896	0.3848	0.3757	0.3759
0.6333	5.355	5.576	5.758	0.3756	0.3666	0.3671
0.65	5.229	5.450	5.620	0.3667	0.3584	0.3583
0.6666	5.104	5.318	5.487	0.3580	0.3497	0.3498
0.6833	4.984	5.192	5.355	0.3496	0.3414	0.3414
0.7	4.864	5.066	5.229	0.3411	0.3331	0.3334
0.7166	4.745	4.946	5.104	0.3328	0.3252	0.3254
0.7333	4.632	4.827	4.978	0.3249	0.3174	0.3174
0.75	4.525	4.713	4.864	0.3174	0.3099	0.3101
0.7666	4.418	4.600	4.745	0.3099	0.3025	0.3025
0.7833	4.311	4.493	4.638	0.3024	0.2954	0.2957
0.8	4.210	4.386	4.518	0.2953	0.2884	0.2880
0.8166	4.116	4.286	4.418	0.2887	0.2818	0.2817
0.8333	4.015	4.185	4.311	0.2816	0.2752	0.2748
0.85	3.921	4.084	4.210	0.2750	0.2685	0.2684
0.8666	3.826	3.990	4.109	0.2683	0.2624	0.2620
0.8833	3.738	3.895	4.015	0.2622	0.2561	0.2560

TABLE D.5 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.9	3.650	3.801	3.921	0.2560	0.2499	0.2500
0.9166	3.568	3.713	3.832	0.2502	0.2441	0.2443
0.9333	3.480	3.625	3.738	0.2441	0.2384	0.2383
0.95	3.398	3.543	3.656	0.2383	0.2330	0.2331
0.9666	3.323	3.461	3.562	0.2331	0.2276	0.2271
0.9833	3.241	3.379	3.480	0.2273	0.2222	0.2219
1	3.165	3.298	3.398	0.2220	0.2169	0.2166
1.2	2.404	2.561	2.605	0.1686	0.1684	0.1661
1.4	1.819	1.932	1.970	0.1276	0.1270	0.1256
1.6	1.384	1.466	1.497	0.0971	0.0964	0.0954
1.8	1.051	1.120	1.151	0.0737	0.0736	0.0734
2	0.811	0.868	0.887	0.0569	0.0571	0.0565
2.2	0.629	0.673	0.692	0.0441	0.0443	0.0441
2.4	0.490	0.522	0.541	0.0344	0.0343	0.0345
2.6	0.383	0.415	0.428	0.0269	0.0273	0.0273
2.8	0.308	0.333	0.346	0.0216	0.0219	0.0221
3	0.245	0.264	0.277	0.0172	0.0174	0.0177
3.2	0.201	0.214	0.232	0.0141	0.0141	0.0148
3.4	0.163	0.176	0.188	0.0114	0.0116	0.0120
3.6	0.138	0.151	0.157	0.0097	0.0099	0.0100
3.8	0.113	0.125	0.132	0.0079	0.0082	0.0084
4	0.094	0.107	0.113	0.0066	0.0070	0.0072
4.2	0.081	0.094	0.100	0.0057	0.0062	0.0064
4.4	0.069	0.075	0.088	0.0048	0.0049	0.0056
4.6	0.056	0.069	0.075	0.0039	0.0045	0.0048
4.8	0.056	0.062	0.069	0.0039	0.0041	0.0044
5	0.050	0.056	0.062	0.0035	0.0037	0.0040
5.2	0.037	0.044	0.056	0.0026	0.0029	0.0036
5.4	0.037	0.044	0.050	0.0026	0.0029	0.0032
5.6	0.031	0.037	0.044	0.0022	0.0024	0.0028
5.8	0.031	0.031	0.044	0.0022	0.0020	0.0028
6	0.025	0.031	0.037	0.0018	0.0020	0.0024
6.2	0.025	0.031	0.037	0.0018	0.0020	0.0024
6.4	0.025	0.025	0.037	0.0018	0.0016	0.0024
6.6	0.018	0.025	0.031	0.0013	0.0016	0.0020
6.8	0.025	0.018	0.031	0.0018	0.0012	0.0020
7	0.018	0.025	0.031	0.0013	0.0016	0.0020
7.2	0.012	0.018	0.031	0.0008	0.0012	0.0020
7.4	0.018	0.018	0.025	0.0013	0.0012	0.0016
7.6	0.012	0.018	0.025	0.0008	0.0012	0.0016
7.8	0.012	0.012	0.025	0.0008	0.0008	0.0016
8	0.006	0.012	0.018	0.0004	0.0008	0.0011
8.2	0.006	0.012	0.018	0.0004	0.0008	0.0011
8.4	0.006	0.012	0.012	0.0004	0.0008	0.0008
8.6	0.006	0.012	0.012	0.0004	0.0008	0.0008
8.8	0.006	0.012	0.012	0.0004	0.0008	0.0008

TABLE D.5 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
9	0.000	0.006	0.012	0.0000	0.0004	0.0008
9.2	0.000	0.012	0.012	0.0000	0.0008	0.0008
9.4	0.000	0.006	0.012	0.0000	0.0004	0.0008
9.6	0.006	0.006	0.012	0.0004	0.0004	0.0008
9.8	0.000	0.006	0.012	0.0000	0.0004	0.0008
10	0.000	0.006	0.006	0.0000	0.0004	0.0004

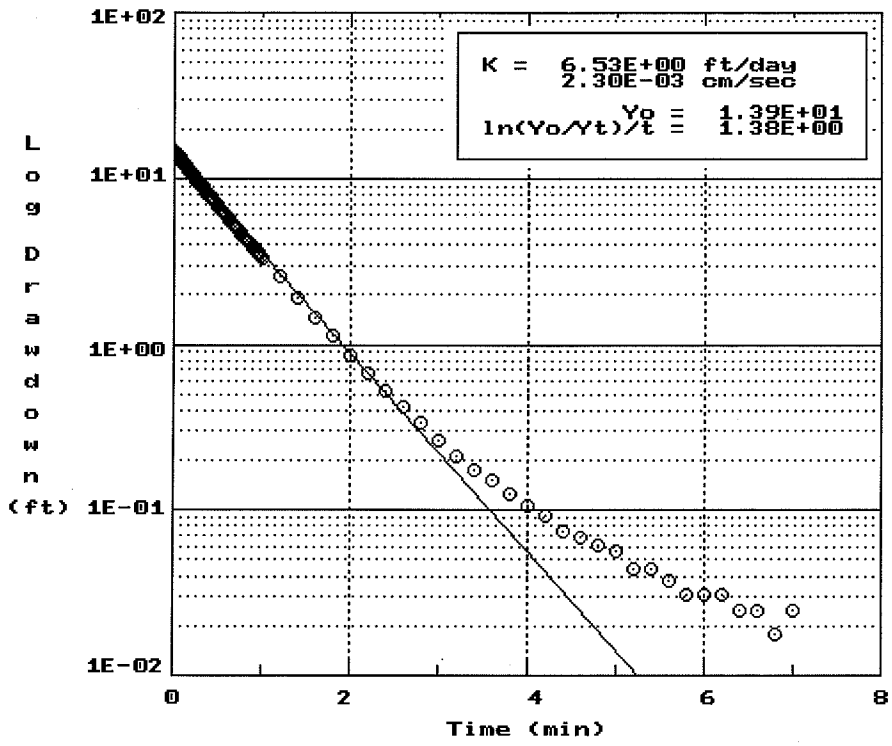

FIGURE D.7 Bouwer and Rice Slug Test Analysis for Agenda Well SB01, Test 2

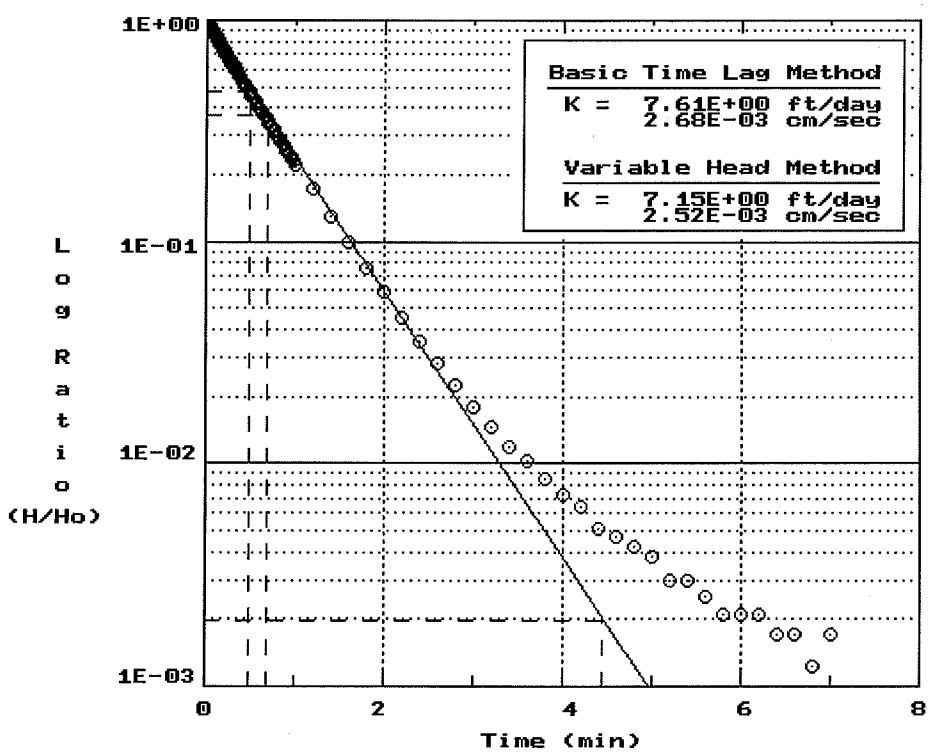

FIGURE D.8 Hvorslev Slug Test Analysis for Agenda Well SB01, Test 2

TABLE D.6 Slug Test Data for Agenda Well SB11

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0	10.387	12.96	12.287	1.0000	1.0000	1.0000
0.0033	10.834	13.343	12.677	1.0430	1.0296	1.0317
0.0066	10.922	13.306	12.727	1.0515	1.0267	1.0358
0.01	10.79	13.041	12.501	1.0388	1.0063	1.0174
0.0133	10.569	12.74	12.211	1.0175	0.9830	0.9938
0.0166	10.33	12.488	11.96	0.9945	0.9636	0.9734
0.02	10.129	12.268	11.746	0.9752	0.9466	0.9560
0.0233	9.947	12.073	11.557	0.9576	0.9316	0.9406
0.0266	9.783	11.897	11.387	0.9419	0.9180	0.9268
0.03	9.638	11.739	11.236	0.9279	0.9058	0.9145
0.0333	9.5	11.57	11.079	0.9146	0.8927	0.9017
0.0366	9.362	11.419	10.934	0.9013	0.8811	0.8899
0.04	9.236	11.274	10.79	0.8892	0.8699	0.8782
0.0433	9.116	11.136	10.651	0.8776	0.8593	0.8669
0.0466	8.984	10.985	10.513	0.8649	0.8476	0.8556
0.05	8.865	10.846	10.381	0.8535	0.8369	0.8449
0.0533	8.751	10.708	10.255	0.8425	0.8262	0.8346
0.0566	8.632	10.569	10.129	0.8310	0.8155	0.8244
0.06	8.525	10.437	10.003	0.8207	0.8053	0.8141
0.0633	8.412	10.305	9.877	0.8099	0.7951	0.8039
0.0666	8.305	10.179	9.758	0.7996	0.7854	0.7942
0.07	8.204	10.054	9.638	0.7898	0.7758	0.7844
0.0733	8.097	9.934	9.519	0.7795	0.7665	0.7747
0.0766	7.99	9.808	9.406	0.7692	0.7568	0.7655
0.08	7.896	9.689	9.292	0.7602	0.7476	0.7562
0.0833	7.795	9.569	9.179	0.7505	0.7383	0.7470
0.0866	7.695	9.456	9.072	0.7408	0.7296	0.7383
0.09	7.6	9.343	8.959	0.7317	0.7209	0.7291
0.0933	7.512	9.23	8.852	0.7232	0.7122	0.7204
0.0966	7.418	9.116	8.745	0.7142	0.7034	0.7117
0.1	7.323	9.009	8.638	0.7050	0.6951	0.7030
0.1033	7.235	8.896	8.538	0.6965	0.6864	0.6949
0.1066	7.147	8.789	8.437	0.6881	0.6782	0.6867
0.11	7.059	8.682	8.336	0.6796	0.6699	0.6784
0.1133	6.977	8.582	8.236	0.6717	0.6622	0.6703
0.1166	6.889	8.475	8.141	0.6632	0.6539	0.6626
0.12	6.808	8.374	8.041	0.6554	0.6461	0.6544
0.1233	6.726	8.273	7.946	0.6475	0.6383	0.6467
0.1266	6.644	8.179	7.852	0.6396	0.6311	0.6390
0.13	6.562	8.078	7.758	0.6318	0.6233	0.6314
0.1333	6.487	7.984	7.67	0.6245	0.6160	0.6242
0.1366	6.405	7.89	7.575	0.6166	0.6088	0.6165
0.14	6.329	7.795	7.487	0.6093	0.6015	0.6093
0.1433	6.254	7.701	7.399	0.6021	0.5942	0.6022
0.1466	6.178	7.613	7.311	0.5948	0.5874	0.5950

TABLE D.6 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.15	6.103	7.518	7.223	0.5876	0.5801	0.5879
0.1533	6.034	7.43	7.141	0.5809	0.5733	0.5812
0.1566	5.958	7.342	7.053	0.5736	0.5665	0.5740
0.16	5.889	7.254	6.971	0.5670	0.5597	0.5673
0.1633	5.82	7.166	6.889	0.5603	0.5529	0.5607
0.1666	5.751	7.084	6.814	0.5537	0.5466	0.5546
0.17	5.681	7.003	6.732	0.5469	0.5404	0.5479
0.1733	5.612	6.915	6.65	0.5403	0.5336	0.5412
0.1766	5.549	6.833	6.575	0.5342	0.5272	0.5351
0.18	5.48	6.757	6.499	0.5276	0.5214	0.5289
0.1833	5.417	6.675	6.418	0.5215	0.5150	0.5223
0.1866	5.354	6.594	6.342	0.5155	0.5088	0.5162
0.19	5.291	6.518	6.273	0.5094	0.5029	0.5105
0.1933	5.228	6.443	6.197	0.5033	0.4971	0.5044
0.1966	5.166	6.367	6.122	0.4974	0.4913	0.4983
0.2	5.103	6.292	6.053	0.4913	0.4855	0.4926
0.2033	5.046	6.216	5.983	0.4858	0.4796	0.4869
0.2066	4.983	6.141	5.914	0.4797	0.4738	0.4813
0.21	4.926	6.072	5.845	0.4742	0.4685	0.4757
0.2133	4.864	5.996	5.776	0.4683	0.4627	0.4701
0.2166	4.807	5.927	5.707	0.4628	0.4573	0.4645
0.22	4.75	5.858	5.637	0.4573	0.4520	0.4588
0.2233	4.694	5.788	5.575	0.4519	0.4466	0.4537
0.2266	4.643	5.719	5.505	0.4470	0.4413	0.4480
0.23	4.587	5.656	5.442	0.4416	0.4364	0.4429
0.2333	4.536	5.587	5.379	0.4367	0.4311	0.4378
0.2366	4.48	5.518	5.317	0.4313	0.4258	0.4327
0.24	4.429	5.455	5.254	0.4264	0.4209	0.4276
0.2433	4.373	5.392	5.197	0.4210	0.4160	0.4230
0.2466	4.322	5.329	5.134	0.4161	0.4112	0.4178
0.25	4.272	5.266	5.071	0.4113	0.4063	0.4127
0.2533	4.222	5.203	5.015	0.4065	0.4015	0.4082
0.2566	4.171	5.14	4.958	0.4016	0.3966	0.4035
0.26	4.121	5.077	4.901	0.3967	0.3917	0.3989
0.2633	4.077	5.021	4.838	0.3925	0.3874	0.3937
0.2666	4.027	4.964	4.788	0.3877	0.3830	0.3897
0.27	3.983	4.901	4.731	0.3835	0.3782	0.3850
0.2733	3.932	4.845	4.675	0.3786	0.3738	0.3805
0.2766	3.888	4.788	4.618	0.3743	0.3694	0.3758
0.28	3.844	4.731	4.568	0.3701	0.3650	0.3718
0.2833	3.8	4.675	4.511	0.3658	0.3607	0.3671
0.2866	3.75	4.624	4.461	0.3610	0.3568	0.3631
0.29	3.712	4.568	4.411	0.3574	0.3525	0.3590
0.2933	3.668	4.511	4.36	0.3531	0.3481	0.3548
0.2966	3.624	4.461	4.31	0.3489	0.3442	0.3508

TABLE D.6 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.3	3.58	4.411	4.26	0.3447	0.3404	0.3467
0.3033	3.536	4.354	4.209	0.3404	0.3360	0.3426
0.3066	3.498	4.304	4.159	0.3368	0.3321	0.3385
0.31	3.454	4.253	4.109	0.3325	0.3282	0.3344
0.3133	3.416	4.203	4.064	0.3289	0.3243	0.3308
0.3166	3.379	4.153	4.014	0.3253	0.3204	0.3267
0.32	3.335	4.109	3.97	0.3211	0.3171	0.3231
0.3233	3.297	4.058	3.92	0.3174	0.3131	0.3190
0.3266	3.259	4.014	3.876	0.3138	0.3097	0.3155
0.33	3.221	3.964	3.832	0.3101	0.3059	0.3119
0.3333	3.184	3.92	3.788	0.3065	0.3025	0.3083
0.35	3.001	3.693	3.574	0.2889	0.2850	0.2909
0.3666	2.831	3.486	3.372	0.2726	0.2690	0.2744
0.3833	2.674	3.291	3.184	0.2574	0.2539	0.2591
0.4	2.523	3.108	3.007	0.2429	0.2398	0.2447
0.4166	2.384	2.932	2.844	0.2295	0.2262	0.2315
0.4333	2.246	2.762	2.686	0.2162	0.2131	0.2186
0.45	2.12	2.611	2.535	0.2041	0.2015	0.2063
0.4666	2.007	2.466	2.391	0.1932	0.1903	0.1946
0.4833	1.894	2.328	2.259	0.1823	0.1796	0.1839
0.5	1.787	2.196	2.133	0.1720	0.1694	0.1736
0.5166	1.686	2.07	2.019	0.1623	0.1597	0.1643
0.5333	1.592	1.957	1.906	0.1533	0.1510	0.1551
0.55	1.504	1.843	1.799	0.1448	0.1422	0.1464
0.5666	1.422	1.743	1.699	0.1369	0.1345	0.1383
0.5833	1.34	1.648	1.611	0.1290	0.1272	0.1311
0.6	1.271	1.554	1.516	0.1224	0.1199	0.1234
0.6166	1.201	1.472	1.434	0.1156	0.1136	0.1167
0.6333	1.132	1.384	1.359	0.1090	0.1068	0.1106
0.65	1.069	1.315	1.283	0.1029	0.1015	0.1044
0.6666	1.013	1.239	1.214	0.0975	0.0956	0.0988
0.6833	0.956	1.176	1.145	0.0920	0.0907	0.0932
0.7	0.906	1.107	1.088	0.0872	0.0854	0.0885
0.7166	0.855	1.05	1.025	0.0823	0.0810	0.0834
0.7333	0.811	0.994	0.975	0.0781	0.0767	0.0794
0.75	0.767	0.937	0.918	0.0738	0.0723	0.0747
0.7666	0.723	0.887	0.874	0.0696	0.0684	0.0711
0.7833	0.685	0.843	0.824	0.0659	0.0650	0.0671
0.8	0.654	0.799	0.78	0.0630	0.0617	0.0635
0.8166	0.616	0.755	0.742	0.0593	0.0583	0.0604
0.8333	0.585	0.711	0.704	0.0563	0.0549	0.0573
0.85	0.553	0.679	0.667	0.0532	0.0524	0.0543
0.8666	0.528	0.641	0.629	0.0508	0.0495	0.0512
0.8833	0.503	0.61	0.597	0.0484	0.0471	0.0486

TABLE D.6 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.9	0.471	0.578	0.572	0.0453	0.0446	0.0466
0.9166	0.453	0.547	0.541	0.0436	0.0422	0.0440
0.9333	0.427	0.516	0.516	0.0411	0.0398	0.0420
0.95	0.409	0.497	0.484	0.0394	0.0383	0.0394
0.9666	0.39	0.471	0.465	0.0375	0.0363	0.0378
0.9833	0.364	0.446	0.44	0.0350	0.0344	0.0358
1	0.352	0.421	0.421	0.0339	0.0325	0.0343
1.2	0.207	0.245	0.251	0.0199	0.0189	0.0204
1.4	0.125	0.151	0.151	0.0120	0.0117	0.0123
1.6	0.075	0.1	0.1	0.0072	0.0077	0.0081
1.8	0.05	0.069	0.069	0.0048	0.0053	0.0056
2	0.037	0.05	0.05	0.0036	0.0039	0.0041
2.2	0.025	0.037	0.037	0.0024	0.0029	0.0030
2.4	0.018	0.031	0.031	0.0017	0.0024	0.0025
2.6	0.012	0.025	0.025	0.0012	0.0019	0.0020
2.8	0.012	0.025	0.025	0.0012	0.0019	0.0020
3	0.006	0.018	0.018	0.0006	0.0014	0.0015
3.2	0.006	0.018	0.018	0.0006	0.0014	0.0015
3.4	0.006	0.012	0.012	0.0006	0.0009	0.0010
3.6	0.006	0.012	0.012	0.0006	0.0009	0.0010
3.8	0	0.012	0.012	0.0000	0.0009	0.0010
4	0	0.006	0.012	0.0000	0.0005	0.0010
4.2	0	0.006	0.012	0.0000	0.0005	0.0010
4.4	0	0.006	0.006	0.0000	0.0005	0.0005
4.6	0	0.006	0.006	0.0000	0.0005	0.0005
4.8	0	0.006	0.006	0.0000	0.0005	0.0005
5	-0.006	0.006	0.006	-0.0006	0.0005	0.0005

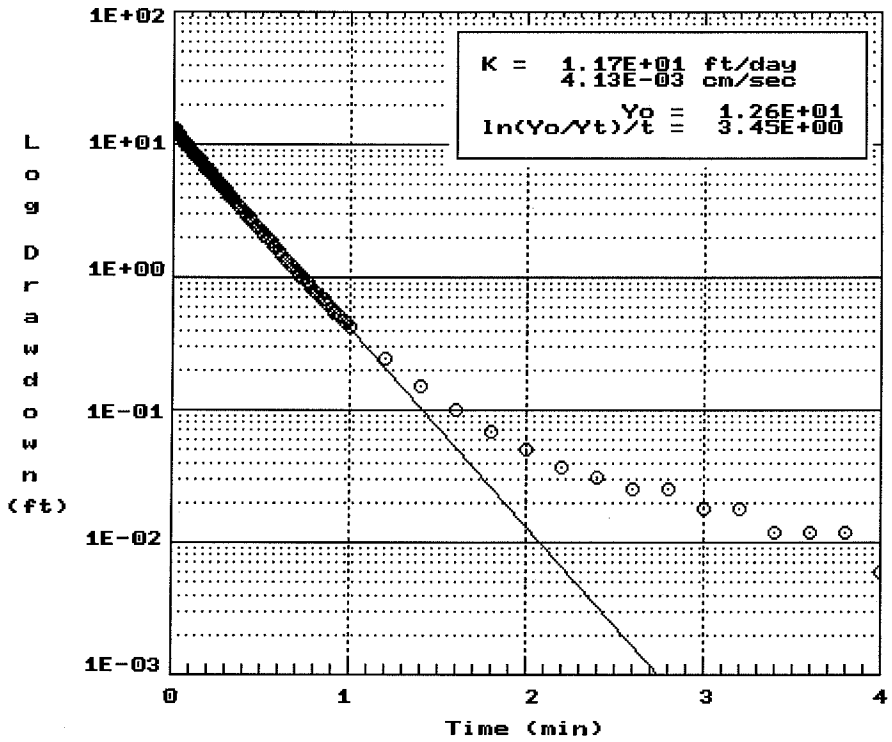

FIGURE D.9 Bouwer and Rice Slug Test Analysis for Agenda Well SB11, Test 2

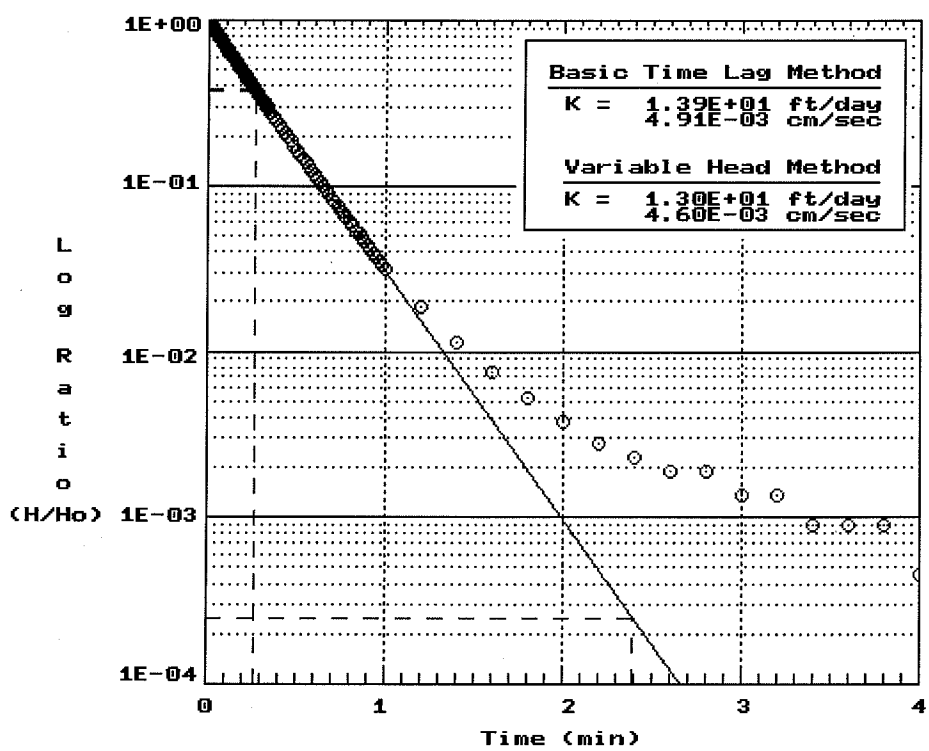

FIGURE D.10 Hvorslev Slug Test Analysis for Agenda Monitoring Well SB11, Test 2

TABLE D.7 Slug Test Data for Agenda Well SB12

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0	-0.459	14.884	14.708	-0.0319	1.0000	1.0000
0.0033	1.51	5.335	8.903	0.1049	0.3584	0.6053
0.0066	14.388	9.249	7.418	1.0000	0.6214	0.5044
0.01	8.06	11.092	11.803	0.5602	0.7452	0.8025
0.0133	5.191	6.481	7.217	0.3608	0.4354	0.4907
0.0166	11.211	9.909	9.84	0.7792	0.6657	0.6690
0.02	7.688	9.186	9.613	0.5343	0.6172	0.6536
0.0233	6.852	7.758	8.16	0.4762	0.5212	0.5548
0.0266	9.752	9.613	9.878	0.6778	0.6459	0.6716
0.03	7.695	8.506	8.745	0.5348	0.5715	0.5946
0.0333	7.55	8.462	8.947	0.5247	0.5685	0.6083
0.0366	8.959	9.173	9.381	0.6227	0.6163	0.6378
0.04	7.783	8.412	8.708	0.5409	0.5652	0.5921
0.0433	7.833	8.72	9.173	0.5444	0.5859	0.6237
0.0466	8.525	8.859	9.035	0.5925	0.5952	0.6143
0.05	7.858	8.487	8.871	0.5461	0.5702	0.6031
0.0533	7.94	8.758	9.11	0.5518	0.5884	0.6194
0.0566	8.274	8.689	8.909	0.5751	0.5838	0.6057
0.06	7.909	8.557	8.959	0.5497	0.5749	0.6091
0.0633	7.972	8.708	8.997	0.5541	0.5851	0.6117
0.0666	8.129	8.607	8.896	0.5650	0.5783	0.6048
0.07	7.921	8.588	8.966	0.5505	0.5770	0.6096
0.0733	7.965	8.651	8.928	0.5536	0.5812	0.6070
0.0766	8.041	8.576	8.896	0.5589	0.5762	0.6048
0.08	7.921	8.588	8.928	0.5505	0.5770	0.6070
0.0833	7.946	8.601	8.89	0.5523	0.5779	0.6044
0.0866	7.978	8.557	8.89	0.5545	0.5749	0.6044
0.09	7.909	8.569	8.89	0.5497	0.5757	0.6044
0.0933	7.921	8.563	8.865	0.5505	0.5753	0.6027
0.0966	7.934	8.538	8.871	0.5514	0.5736	0.6031
0.1	7.89	8.544	8.859	0.5484	0.5740	0.6023
0.1033	7.896	8.531	8.846	0.5488	0.5732	0.6014
0.1066	7.896	8.519	8.846	0.5488	0.5724	0.6014
0.11	7.871	8.519	8.833	0.5471	0.5724	0.6006
0.1133	7.871	8.506	8.827	0.5471	0.5715	0.6001
0.1166	7.871	8.5	8.821	0.5471	0.5711	0.5997
0.12	7.852	8.494	8.808	0.5457	0.5707	0.5989
0.1233	7.846	8.487	8.802	0.5453	0.5702	0.5984
0.1266	7.839	8.475	8.796	0.5448	0.5694	0.5980
0.13	7.827	8.469	8.789	0.5440	0.5690	0.5976
0.1333	7.821	8.462	8.783	0.5436	0.5685	0.5972
0.1366	7.814	8.456	8.777	0.5431	0.5681	0.5968
0.14	7.802	8.45	8.771	0.5423	0.5677	0.5963
0.1433	7.795	8.437	8.764	0.5418	0.5669	0.5959
0.1466	7.789	8.437	8.752	0.5414	0.5669	0.5951

TABLE D.7 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.15	7.783	8.425	8.745	0.5409	0.5660	0.5946
0.1533	7.77	8.418	8.739	0.5400	0.5656	0.5942
0.1566	7.764	8.412	8.733	0.5396	0.5652	0.5938
0.16	7.758	8.406	8.726	0.5392	0.5648	0.5933
0.1633	7.751	8.399	8.72	0.5387	0.5643	0.5929
0.1666	7.745	8.393	8.714	0.5383	0.5639	0.5925
0.17	7.739	8.387	8.708	0.5379	0.5635	0.5921
0.1733	7.726	8.38	8.701	0.5370	0.5630	0.5916
0.1766	7.72	8.374	8.695	0.5366	0.5626	0.5912
0.18	7.714	8.368	8.689	0.5361	0.5622	0.5908
0.1833	7.707	8.355	8.682	0.5357	0.5613	0.5903
0.1866	7.701	8.355	8.676	0.5352	0.5613	0.5899
0.19	7.695	8.343	8.67	0.5348	0.5605	0.5895
0.1933	7.682	8.336	8.664	0.5339	0.5601	0.5891
0.1966	7.682	8.33	8.657	0.5339	0.5597	0.5886
0.2	7.676	8.33	8.651	0.5335	0.5597	0.5882
0.2033	7.663	8.324	8.645	0.5326	0.5593	0.5878
0.2066	7.657	8.318	8.638	0.5322	0.5589	0.5873
0.21	7.651	8.311	8.632	0.5318	0.5584	0.5869
0.2133	7.644	8.305	8.626	0.5313	0.5580	0.5865
0.2166	7.638	8.299	8.62	0.5309	0.5576	0.5861
0.22	7.632	8.292	8.613	0.5304	0.5571	0.5856
0.2233	7.626	8.286	8.607	0.5300	0.5567	0.5852
0.2266	7.619	8.28	8.601	0.5295	0.5563	0.5848
0.23	7.613	8.274	8.601	0.5291	0.5559	0.5848
0.2333	7.607	8.267	8.594	0.5287	0.5554	0.5843
0.2366	7.6	8.261	8.588	0.5282	0.5550	0.5839
0.24	7.594	8.255	8.582	0.5278	0.5546	0.5835
0.2433	7.588	8.248	8.576	0.5274	0.5542	0.5831
0.2466	7.582	8.242	8.569	0.5270	0.5537	0.5826
0.25	7.575	8.236	8.563	0.5265	0.5533	0.5822
0.2533	7.569	8.23	8.557	0.5261	0.5529	0.5818
0.2566	7.563	8.223	8.55	0.5256	0.5525	0.5813
0.26	7.556	8.223	8.544	0.5252	0.5525	0.5809
0.2633	7.55	8.211	8.538	0.5247	0.5517	0.5805
0.2666	7.544	8.211	8.538	0.5243	0.5517	0.5805
0.27	7.537	8.204	8.531	0.5238	0.5512	0.5800
0.2733	7.537	8.198	8.525	0.5238	0.5508	0.5796
0.2766	7.531	8.192	8.519	0.5234	0.5504	0.5792
0.28	7.525	8.186	8.513	0.5230	0.5500	0.5788
0.2833	7.519	8.179	8.506	0.5226	0.5495	0.5783
0.2866	7.512	8.173	8.5	0.5221	0.5491	0.5779
0.29	7.506	8.167	8.494	0.5217	0.5487	0.5775
0.2933	7.5	8.16	8.487	0.5213	0.5482	0.5770
0.2966	7.493	8.16	8.481	0.5208	0.5482	0.5766

TABLE D.7 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.3	7.487	8.154	8.475	0.5204	0.5478	0.5762
0.3033	7.487	8.148	8.475	0.5204	0.5474	0.5762
0.3066	7.475	8.141	8.469	0.5195	0.5470	0.5758
0.31	7.468	8.135	8.462	0.5190	0.5466	0.5753
0.3133	7.468	8.129	8.456	0.5190	0.5462	0.5749
0.3166	7.462	8.123	8.45	0.5186	0.5458	0.5745
0.32	7.456	8.123	8.443	0.5182	0.5458	0.5740
0.3233	7.449	8.116	8.443	0.5177	0.5453	0.5740
0.3266	7.443	8.11	8.431	0.5173	0.5449	0.5732
0.33	7.437	8.104	8.431	0.5169	0.5445	0.5732
0.3333	7.431	8.097	8.425	0.5165	0.5440	0.5728
0.35	7.405	8.072	8.399	0.5147	0.5423	0.5710
0.3666	7.38	8.047	8.38	0.5129	0.5406	0.5698
0.3833	7.349	8.022	8.349	0.5108	0.5390	0.5677
0.4	7.324	7.997	8.324	0.5090	0.5373	0.5660
0.4166	7.298	7.972	8.299	0.5072	0.5356	0.5643
0.4333	7.273	7.946	8.274	0.5055	0.5339	0.5626
0.45	7.248	7.921	8.248	0.5038	0.5322	0.5608
0.4666	7.223	7.896	8.223	0.5020	0.5305	0.5591
0.4833	7.198	7.871	8.198	0.5003	0.5288	0.5574
0.5	7.173	7.852	8.179	0.4985	0.5275	0.5561
0.5166	7.154	7.827	8.154	0.4972	0.5259	0.5544
0.5333	7.129	7.808	8.129	0.4955	0.5246	0.5527
0.55	7.103	7.783	8.104	0.4937	0.5229	0.5510
0.5666	7.078	7.758	8.078	0.4919	0.5212	0.5492
0.5833	7.059	7.733	8.053	0.4906	0.5196	0.5475
0.6	7.034	7.707	8.034	0.4889	0.5178	0.5462
0.6166	7.009	7.688	8.009	0.4871	0.5165	0.5445
0.6333	6.99	7.663	7.99	0.4858	0.5148	0.5432
0.65	6.965	7.644	7.965	0.4841	0.5136	0.5415
0.6666	6.946	7.619	7.94	0.4828	0.5119	0.5398
0.6833	6.921	7.594	7.915	0.4810	0.5102	0.5381
0.7	6.902	7.575	7.89	0.4797	0.5089	0.5364
0.7166	6.877	7.55	7.871	0.4780	0.5073	0.5352
0.7333	6.858	7.531	7.846	0.4766	0.5060	0.5335
0.75	6.839	7.506	7.827	0.4753	0.5043	0.5322
0.7666	6.814	7.487	7.802	0.4736	0.5030	0.5305
0.7833	6.795	7.462	7.783	0.4723	0.5013	0.5292
0.8	6.77	7.443	7.758	0.4705	0.5001	0.5275
0.8166	6.751	7.418	7.733	0.4692	0.4984	0.5258
0.8333	6.726	7.399	7.714	0.4675	0.4971	0.5245
0.85	6.707	7.374	7.695	0.4662	0.4954	0.5232
0.8666	6.688	7.355	7.67	0.4648	0.4942	0.5215
0.8833	6.663	7.336	7.651	0.4631	0.4929	0.5202

TABLE D.7 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
0.9	6.644	7.311	7.626	0.4618	0.4912	0.5185
0.9166	6.625	7.292	7.607	0.4605	0.4899	0.5172
0.9333	6.606	7.267	7.582	0.4591	0.4882	0.5155
0.95	6.581	7.248	7.556	0.4574	0.4870	0.5137
0.9666	6.562	7.229	7.537	0.4561	0.4857	0.5124
0.9833	6.543	7.204	7.519	0.4548	0.4840	0.5112
1	6.518	7.185	7.493	0.4530	0.4827	0.5095
1.2	6.298	6.959	7.261	0.4377	0.4675	0.4937
1.4	6.072	6.72	7.015	0.4220	0.4515	0.4770
1.6	5.851	6.493	6.776	0.4067	0.4362	0.4607
1.8	5.637	6.273	6.556	0.3918	0.4215	0.4457
2	5.436	6.059	6.342	0.3778	0.4071	0.4312
2.2	5.241	5.858	6.135	0.3643	0.3936	0.4171
2.4	5.052	5.663	5.933	0.3511	0.3805	0.4034
2.6	4.87	5.474	5.744	0.3385	0.3678	0.3905
2.8	4.694	5.291	5.556	0.3262	0.3555	0.3778
3	4.524	5.115	5.373	0.3144	0.3437	0.3653
3.2	4.36	4.945	5.203	0.3030	0.3322	0.3538
3.4	4.209	4.782	5.033	0.2925	0.3213	0.3422
3.6	4.052	4.624	4.87	0.2816	0.3107	0.3311
3.8	3.907	4.473	4.713	0.2715	0.3005	0.3204
4	3.769	4.322	4.562	0.2620	0.2904	0.3102
4.2	3.63	4.178	4.417	0.2523	0.2807	0.3003
4.4	3.498	4.039	4.272	0.2431	0.2714	0.2905
4.6	3.372	3.907	4.134	0.2344	0.2625	0.2811
4.8	3.253	3.775	4.002	0.2261	0.2536	0.2721
5	3.133	3.649	3.869	0.2178	0.2452	0.2631
5.2	3.020	3.530	3.744	0.2099	0.2372	0.2546
5.4	2.913	3.410	3.618	0.2025	0.2291	0.2460
5.6	2.812	3.297	3.504	0.1954	0.2215	0.2382
5.8	2.705	3.184	3.391	0.1880	0.2139	0.2306
6	2.605	3.077	3.284	0.1811	0.2067	0.2233
6.2	2.517	2.970	3.171	0.1749	0.1995	0.2156
6.4	2.422	2.875	3.070	0.1683	0.1932	0.2087
6.6	2.334	2.775	2.970	0.1622	0.1864	0.2019
6.8	2.252	2.680	2.869	0.1565	0.1801	0.1951
7	2.171	2.586	2.781	0.1509	0.1737	0.1891
7.2	2.089	2.504	2.686	0.1452	0.1682	0.1826
7.4	2.013	2.416	2.598	0.1399	0.1623	0.1766
7.6	1.938	2.334	2.517	0.1347	0.1568	0.1711
7.8	1.868	2.252	2.428	0.1298	0.1513	0.1651
8	1.799	2.177	2.353	0.1250	0.1463	0.1600
8.2	1.730	2.101	2.271	0.1202	0.1412	0.1544
8.4	1.667	2.026	2.196	0.1159	0.1361	0.1493
8.6	1.610	1.957	2.126	0.1119	0.1315	0.1445
8.8	1.547	1.887	2.051	0.1075	0.1268	0.1394

TABLE D.7 (Cont.)

Elapsed Time (min.)	Residual Drawdown (ft)			H/H_o		
	Test 1	Test 2	Test 3	Test 1	Test 2	Test 3
9	1.485	1.824	1.982	0.1032	0.1225	0.1348
9.2	1.428	1.761	1.919	0.0992	0.1183	0.1305
9.4	1.378	1.699	1.850	0.0958	0.1141	0.1258
9.6	1.327	1.636	1.787	0.0922	0.1099	0.1215
9.8	1.277	1.579	1.730	0.0888	0.1061	0.1176
10	1.227	1.529	1.673	0.0853	0.1027	0.1137
12	0.830	1.057	1.176	0.0577	0.0710	0.0800
14	0.560	0.736	0.824	0.0389	0.0494	0.0560
16	0.372	0.510	0.578	0.0259	0.0343	0.0393
18	0.252	0.346	0.403	0.0175	0.0232	0.0274
20	0.170	0.233	0.277	0.0118	0.0157	0.0188
22		0.164	0.195		0.0110	0.0133
24		0.114	0.139		0.0077	0.0095
26		0.076	0.095		0.0051	0.0065
28			0.070			0.0048
30			0.051			0.0035
32			0.032			0.0022
34			0.025			0.0017
36			0.019			0.0013
38			0.013			0.0009
40			0.007			0.0005

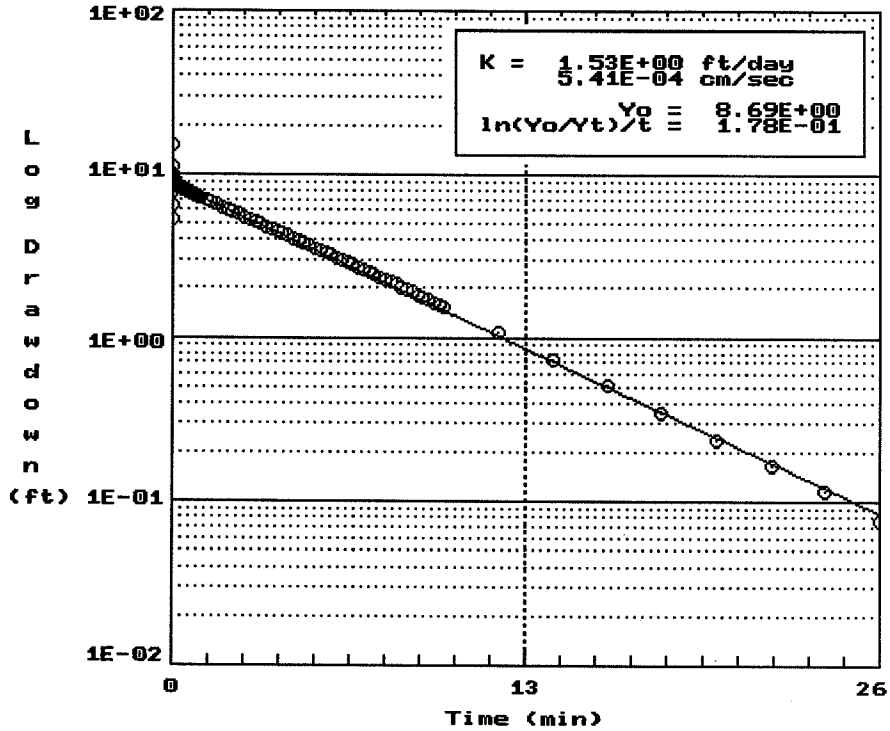

FIGURE D.11 Bouwer and Rice Slug Test Analysis for Agenda Well SB12, Test 2

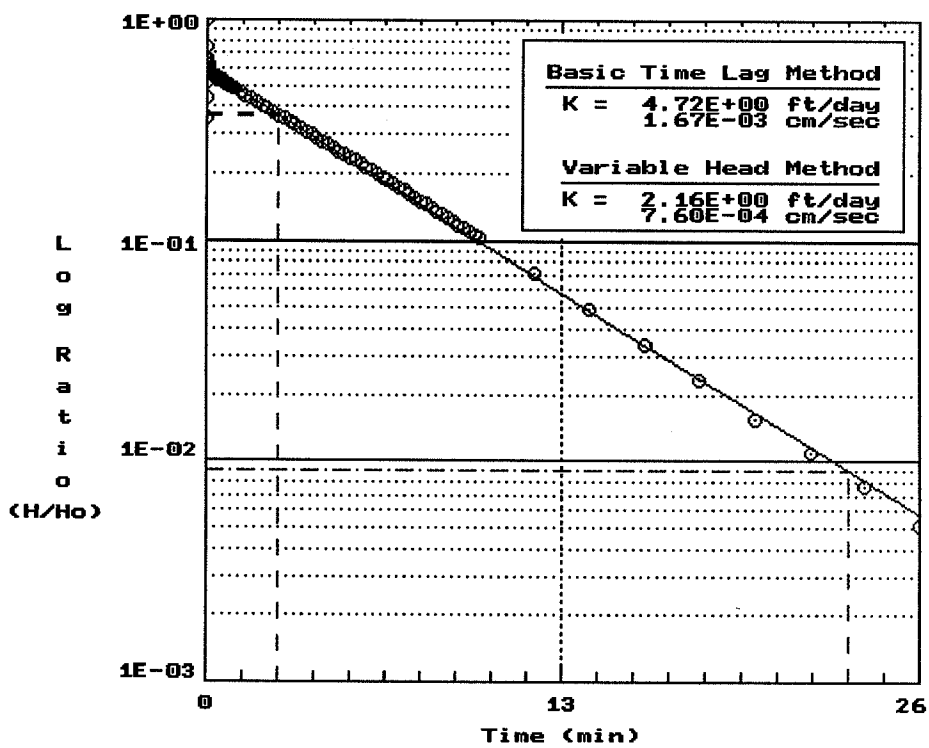

FIGURE D.12 Hvorslev Slug Test Analysis for Agenda Well SB12, Test 2

Appendix E:

Survey Data

TABLE E.1 Sampling Locations at Agenda, Kansas

Location	Horizontal Location[a]		Representative Ground Surface Elevation[b] (ft AMSL)	Reference Location (ft AMSL)	Description of Reference Elevation Location
	Northing	Easting			
Temporary Wells					
SB11	500247.17	2159353.89	1397.80	1400.83	Top of 4-in. well casing.
SB12	501029.28	2159198.31	1395.90	1398.49	Top of 4-in. well casing.
Soil Borings					
SB13	501017.66	2159197.93	1395.80	-	Average ground.
Cone Penetrometer Locations					
SB14	501084.57	2159693.03	1412.63	-	Average ground.
SB15	501332.52	2159677.73	1412.30	-	Average ground.
SB16	501448.04	2159681.75	1411.00	-	Average ground.

[a] Horizontal coordinates of target location centers are shown, not points selected to represent ground elevations or to provide reference elevations. Northings and Eastings are Kansas State Plane Coordinates shown in feet. Horizontal datum is converted North American Datum (NAD) 27.

[b] Vertical datum is National Geodetic Vertical Datum (NGVD) 29.

Appendix F:

Groundwater Sample Data

TABLE F.1 Groundwater Samples Collected during the Phase II Field Investigation at Agenda, Kansas

Location	Sample	Depth (ft)	Sample Date	Sample Description
Cone Penetrometer Locations				
SB14	ANSB14-W-04961	51-54	12/5/96	Water very slow entering rods. Waited 1.5 hr to collect sample. Water slightly colored.
SB15	ANSB15-W-04962	52-55	12/5/96	Water entered rods quickly.
SB16	ANSB16-W-04964	55-58	12/5/96	Water entered rods quickly.
Temporary Wells				
SB11	ANSB11-W-04965	107-127	12/11/96	Sample collected after purging well with Redi-Flow pump for 68 min at 3.5 gpm. (About 235 gal purged.) Depth to water from top of casing = 34 ft. Depth of well = 135 ft.
SB12	ANSB12-W-04966	31.5-41.5	12/11/96	Sample collected after purging well with Redi-Flow pump for 27 min at 2 gpm. (Purge volume = 54 gal.) Depth to water from top of casing = 23.96 ft. Depth of well = 45.79 ft.

TABLE F.2 Organic Analytical Results for Groundwater Samples Collected during the Phase II Field Investigation at Agenda, Kansas

Location	Sample	Depth (ft)	Carbon Tetrachloride (µg/L)	Chloroform (µg/L)
Cone Penetrometer Locations				
SB14	ANSB14-W-04961	51-54	< 5	< 5
SB15	ANSB15-W-04962	52-55	< 5	< 5
SB16	ANSB16-W-04964	55-58	< 5	< 5
Temporary Wells				
SB11	ANSB11-W-04965	107-127	< 5	< 5
SB12	ANSB12-W-04966	31.5-41.5	< 5	< 5

TABLE F.3 Inorganic Analytical Results for Groundwater Samples Collected during the Phase II Field Investigation at Agenda, Kansas

Location	Sample	Depth (ft)	Concentration (µg/L)						
			Aluminum	Calcium	Chloride	Iron	Magnesium	Manganese	Nitrate
Cone Penetrometer Locations									
SB14	ANSB14-W-04961	51-54	< 200	191,000	23,000	195	16,500	330	60,400
SB15	ANSB15-W-04962	52-55	< 200	139,000	31,000	96	11,000	117	10,800
SB16	ANSB16-W-04964	55-58	< 200	125,000	30,000	93	9,900	51	6,200
Temporary Wells									
SB11	ANSB11-W-04965	107-127	< 200	91,000	12,200	< 100	8,200	<15	600
SB12	ANSB12-W-04966	31.5-41.5	< 200	172,000	50,700	< 100	13,600	29	26,700

			Phosphate	Phosphorus	Potassium	Silicon	Sodium	Sulfate	Zinc
Cone Penetrometer Locations									
SB14	ANSB14-W-04961	51-54	< 100	< 250	< 5,000	14,300	48,000	50,600	51
SB15	ANSB15-W-04962	52-55	< 100	< 250	< 5,000	15,500	30,000	36,900	58
SB16	ANSB16-W-04964	55-58	< 100	< 250	< 5,000	14,400	29,000	32,800	39
Temporary Wells									
SB11	ANSB11-W-04965	107-127	< 100	< 250	< 5,000	13,600	27,000	25,100	< 20
SB12	ANSB12-W-04966	31.5-41.5	< 100	< 250	< 5,000	15,700	35,000	25,700	< 20

TABLE F.4 Analytical Results for Isotopes for Phase I and Phase II Groundwater Samples Collected at Agenda, Kansas

Location	Sample	Sample Depth (ft)	Sample Date	Deuterium δD (per mil)	Oxygen-18 $\delta^{18}O$ (per mil)	Tritium (TU ± error)	Tritium (enriched) (TU ± error)
Domestic Wells							
DW01	ANDW01-W-04850	110[a]	4/17/96	-52	-8.3	11 ± 3	7.93 ± 0.28
DW02	ANDW02-W-04851	60[a]	4/17/96	-48	-7.9	12 ± 3	NA[b]
DW03	ANDW03-W-04852	45[a]	4/17/96	-47	-7.9	8 ± 2	6.45 ± 0.29
DW04	ANDW04-W-04855	Unknown	4/18/96	-52	-8.3	11 ± 3	NA
DW05	ANDW05-W-04862	110[a]	4/19/96	-50	-8.1	9 ± 3	6.52 ± 0.25
DW06	ANDW06-W-04863	60[a]	4/19/96	-46	-7.8	12 ± 3	NA
DW08	ANDW08-W-04866	62[a]	4/20/96	-42	-7.3	14 ± 3	NA
DW09	ANDW09-W-04868	66[a]	4/22/96	-48	-7.6	10 ± 3	10.7 ± 0.9
DW10	ANDW10-W-04876	42[a]	4/23/96	-43.5	-7.7	26 ± 4	17.3 ± 0.6
Public Well							
PW01	ANPW01-W-04869	125[a]	4/22/96	-50	-8.2	2 ± 2	NA
Monitoring Wells							
MW01S	ANMW01S-W-04891	44-54	4/23/96	-42	-7.7	14 ± 3	NA
MW01D	ANMW01D-W-04890	130-140	4/23/96	-49	-7.7	0 ± 3	NA
MW02S	ANMW02S-W-04877	49-59	4/23/96	-43	-7.3	12 ± 3	NA
MW02D	ANMW02D-W-04878	129-139	4/23/96	-48	-7.9	16 ± 3	12.5 ± 0.4
MW03S	ANMW03S-W-04901	38-48	4/24/96	-52	-8.0	9 ± 3	7.9 ± 0.4
MW03D	ANMW03D-W-04902	104-114	4/24/96	-48	-8.1	5 ± 2	-0.13 ± 0.19
Cone Penetrometer Locations							
SB07	ANSB07-W-04881	46-49	4/24/96	-43	-7.4	16 ± 3	NA
SB09	ANSB09-W-04883	52-58	4/26/96	-52	-8.0	8 ± 3	6.8 ± 0.9
SB10	ABSB10-W-04885	53-56	4/26/96	-50	-7.8	6 ± 2	7.9 ± 0.9
SB14	ANSB14-W-04961	51-54	12/5/96	-50	-7.5	NA	10.2 ± 0.3
SB15	ANSB15-W-04962	52-55	12/5/96	-53	-7.6	NA	5.22 ± 0.17
SB16	ANSB16-W-04964	55-58	12/5/96	-54	-7.9	NA	5.72 ± 0.19
Cone Penetrometer Piezometers							
SB02	ANSB02-W-04880	64-70	4/23/96	-49	-8.1	7 ± 3	6.1 ± 0.9
SB08	ANSB08-W-04882	48.5-57.5	4/25/96	-49	-7.75	9 ± 2	7.4 ± 0.9
Temporary Wells							
SB01	ANSB01-W-04900	118.9-128.9	4/24/96	-51	-8.3	-1 ± 2	0.16 ± 0.18[c]
SB11	ANSB11-W-04965	107-127	12/11/96	-51	-7.9	NA	0.08 ± 0.09[c]
SB12	ANSB12-W-04966	31.5-41.5	12/11/96	-57	-8.1	NA	21.4 ± 0.7[c]

[a] Approximate depth of well.

[b] NA, sample not analyzed.

[c] Enriched tritium result is the average of duplicate measurements.

TABLE F.5 Field Measurements Made during Collection of Groundwater Samples in the Phase II Field Investigation at Agenda, Kansas

Location	Sample	Depth (ft)	Temperature (°C)	pH	Conductivity (µS/cm)	Alkalinity (mg/L)	Dissolved Oxygen (mg/L)	Nitrates (mg/L)
Cone Penetrometer Locations								
SB14	ANSB14-W-04961	51-54	14.6	7.18	835	300	6	87
SB15	ANSB15-W-04962	52-55	15.1	6.72	543	350	7	20
SB16	ANSB16-W-04964	55-58	17.4	7.08	514	350	8	5
Temporary Wells								
SB11	ANSB11-W-04965	107-127	12.5	6.99	435	300	4	2.5
SB12	ANSB12-W-04966	31.5-41.5	NR[a]	6.97	781	350	4	7.5

[a] NR, temperature not recorded.

Appendix G:

Quality Control and Waste Characterization Sample Data

TABLE G.1 Quality Control Samples Collected during the Phase II Field Investigation at Agenda, Kansas

Location	Sample	Depth (ft)	Sample Date	Sample Description
Equipment Rinsate				
QC	ANRI02-W-04959	-[a]	12/5/96	Equipment rinsate of ECPT sampling bailer prior to collection of sample ANSB14-W-04961.
Trip Blanks				
QC	ANTB12596-W-04960	-	12/5/96	Trip blank included in shipment of samples to Inchcape Laboratory on 12/5/96. See COC 964.
QC	ANTB-W-04971	-	12/11/96	Trip blank included in shipment of samples to Inchcape Laboratory on 12/11/96. See COC 327.
Field Replicate				
SB15	ANSB15-W-04963	52-55	12/5/96	Duplicate of sample ANSB15-W-04962.
Duplicate Laboratory Analyses				
SB11	ANSB11-W-04965RE	107-127	12/11/96	Duplicate laboratory analysis of sample ANSB11-W-04965 for the isotope deuterium.
SB12	ANSB12-W-04966RE	31.5-41.5	12/11/96	Duplicate laboratory analysis of sample ANSB12-W-04966 for the isotope oxygen-18.
SB16	ANSB16-W-04964RE	55-58	12/5/96	Duplicate laboratory analysis of sample ANSB16-W-04964 for deuterium and oxygen-18.
Waste Soil Samples				
SB11	ANSB11DR-S-04967	-	12/11/96	Sample of waste soil from SB11 roll-off container.
SB12	ANSB12DR-S-04969	-	12/11/96	Sample of waste soil from SB12 roll-off container.
Waste Water Samples				
SB11	ANSB11DR-W-04968	-	12/11/96	Sample of waste water/mud from drilling/purging of SB11 well.
SB12	ANSB12DR-W-04970	-	12/11/96	Sample of waste water/mud from drilling/purging of SB12 well.

[a] Depth not applicable.

TABLE G.2 Organic Analytical Results for Quality Control Samples Collected during the Phase II Field Investigation at Agenda, Kansas

			Concentration (µg/L for water, µg/kg for soil)	
Location	Sample	Depth (ft)	Carbon Tetrachloride	Chloroform
Equipment Rinsate				
QC	ANRI02-W-04959	-[a]	< 5	< 5
Trip Blanks				
QC	ANTB12596-W-04960	-	< 5	< 5
QC	ANTB-W-04971	-	< 5	< 5
Field Replicate				
SB15	ANSB15-W-04962	52-55	< 5	< 5
SB15	ANSB15-W-04963	52-55	< 5	< 5
Waste Soil Samples				
SB11	ANSB11DR-S-04967	-	< 5	< 5
SB12	ANSB12DR-S-04969	-	< 5	< 5
Waste Water Samples				
SB11	ANSB11DR-W-04968	-	< 5	< 5
SB12	ANSB12DR-W-04970	-	< 5	< 5

[a] Depth not applicable.

TABLE G.3 Recovery of System-Monitoring Compounds in Analyses for Volatile Organic Compounds

Sample	Analysis Date	Sample Delivery Group	Recovery[a] (%)		
			Toluene-d_8	Bromofluoro-benzene	1,2-Dichloro-ethane-d_4
ANRI02-W-04959	12/12/96	62977	90	86	85
AN12596-W-04960	12/12/96	62977	94	89	86
ANSB14-W-04961	12/12/96	62977	88	87	83
ANSB15-W-04962	12/12/96	62977	105	100	97
ANSB15-W-04963	12/12/96	62977	88	87	84
ANSB16-S-04964	12/12/96	62977	97	94	91
ANSB15-W-04962MS	12/12/96	62977	90	103	96
ANSB15-W-04962MSD	12/12/96	62977	96	102	96
ANSB11-W-04965	12/21/96	62977	95	106	97
ANSB12-W-04966	12/21/96	62977	94	106	96
ANTB-W-04971	12/21/96	62977	94	108	97
ANSB12DR-W-04970	12/19/96	63033	105	113	112
ANSB11DR-W-04968	12/21/96	63033	96	106	98
ANSB12DR-W-04970MS	12/21/96	63033	97	104	100
ANSB12DR-W-04970MSD	12/21/96	63033	95	105	97
ANSB11DR-S-04967[b]	12/18/96	63033	108	104	94
ANSB12DR-S-04969[b]	12/18/96	63033	112	91	96

[a] Contract-required quality control limits are as follows:

	Recovery (%) in Samples	
	Water	Soil
Toluene-d_8	88-110	84-138
Bromofluorobenzene	86-115	59-113
1,2-Dichloroethane-d_4	76-114	70-121

[b] Soil sample.

TABLE G.4 Matrix Spike/Matrix Spike (MS/MSD) Results in Analyses for Volatile Organic Compounds

Compound	Concentration (µg/L)				Recovery (%)			Relative Percent Difference	
	Sample	Sample Spike Added	MS Result	MSD Result	MS Result	MSD Result	QC Limit	RPD	QC Limit
MS/MSD Analysis of ANSB15-W-04962 for Sample Delivery Group 62977									
1,1-Dichloroethene	0	50	20	20	40[a]	40[a]	61-145	0	14
Trichloroethene	0	50	42	43	84	86	71-120	2	14
Benzene	0	50	42	43	84	86	76-127	2	11
Toluene	0	50	43	46	86	92	76-125	7	13
Chlorobenzene	0	50	45	46	90	92	75-130	2	13
Carbon Tetrachloride	< 5	50	38	38	76	76	60-140	0	40
Chloroform	< 5	50	40	41	80	82	60-140	5	40
MS Analysis of ANSB12DR-W-04970 for Sample Delivery Group 63033									
1,1-Dichloroethene	0	50	44	41	88	82	61-145	7	14
Trichloroethene	0	50	78	79	156[a]	158[a]	71-120	1	14
Benzene	0	50	50	46	100	92	76-127	8	11
Toluene	0	50	49	45	98	90	76-125	8	13
Chlorobenzene	0	50	49	44	98	88	75-130	11	13
Carbon Tetrachloride	< 5	50	46	42	92	84	60-140	9	40
Chloroform	< 5	50	45	38	90	76	60-140	17	40

[a] Value outside quality control limit.

TABLE G.5 Recovery of Inorganic Constituents during Analysis of Laboratory Control Samples

Analyte	Recovery[a] (%) in Sample Delivery Group	
	SDG 62975	SDG 63040
Aluminum	96.9	96.9
Calcium	95.4	95.4
Iron	96.1	96.1
Magnesium	95.3	95.3
Manganese	93.3	93.3
Potassium	98.8	98.8
Sodium	96.6	96.6
Zinc	94.9	94.9
Silicon	100.3	100.3
Phosphorus	-[b]	-
Chloride	100.4	99.6
Sulfate	101.1	101.4
Nitrate	94.0	96.0
Phosphate	95.0	104.1

[a] Laboratory control sample limit = 80-120%.

[b] Not analyzed.

TABLE G.6 Relative Percent Difference for Duplicate Isotope Analyses of Groundwater Samples Collected during the Phase II Field Investigation at Agenda, Kansas

Location	Sample	Depth (ft)	Sample Result (per mil)	Duplicate Result (per mil)	Relative Percent Difference
Duplicate Laboratory Analysis of Sample ANSB11-W-04965 for Deuterium					
SB11	ANSB11-W-04965	107-127	-51	-50	2.0
DuplIcate Laboratory Analysis of Sample ANSB12-W-04966 for Oxygen-18					
SB12	ANSB12-W-04966	31.5-41.5	-8.1	-8.3	2.4
Duplicate Laboratory Analysis of Sample ANSB16-04964 for Deuterium					
SB16	ANSB16-W-04964	55-58	-54	-55	1.8
Duplicate Laboratory Analysis of Sample ANSB16-04964 for Oxygen-18					
SB16	ANSB16-W-04964	55-58	-7.9	-7.7	2.6