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Investigation Plan to Define the Extent of Free Phase and Dissolved Phase Hydrocarbons in the Village of Hartford, Illinois

Volume I of III: Text, Figures, Tables and Appendices A through B

Clayton Project No. 15-03095.12.003
January 7, 2004

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GROUP SERVICES

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January 7, 2004

Prepared for:
THE HARTFORD WORKING GROUP
Hartford, Illinois

Prepared by:
CLAYTON GROUP SERVICES, INC.
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1.0 INTRODUCTION/PURPOSE

Clayton Group Services, Inc. (Clayton) was retained by The Hartford Working Group (Working Group) to prepare an Investigation Plan to Define the Extent of Free Phase and Dissolved Phase Hydrocarbons in the Village of Hartford, Illinois (Plan). Figure 1-1 shows the general location of the Village of Hartford, Illinois (Village). The Plan presents the known information and data available at the time of preparation of the document.

The purpose of the Plan is to:

- Present the known information regarding the hydrocarbon impacts in the Village.
- Present the known information regarding the physical setting, specifically, the geology and hydrogeology underlying Hartford.
- Present data obtained from work conducted in the Village in 2003 including the installation of five new monitoring wells to serve as sentinel wells regarding the Hartford Well Head Protection Area (WHPA).
- Conduct hydrogeologic testing, sampling, and groundwater analyses of the new sentinel wells.
- Conduct sampling and groundwater analyses of the known current monitoring wells in the Village that do not contain FPH.
- Collection of groundwater elevation data and apparent FPH thickness data from the known current and new monitoring wells to assist in delineating the FPH horizontal and apparent vertical extent in the Village and to develop groundwater flow maps.
- Present a conceptual site model regarding the hydrocarbon impacts to the Village based on available data.
- Identification of data gaps requiring additional investigative work in the Village and presenting an approach to address the data gaps.

The Village of Hartford site boundaries have been defined by the United States Environmental Protection Agency (USEPA) as being bounded by Rand Avenue to the north, the nearest railroad tracks to the east side of Olive Street to the east, Donna Drive and the south boundary of Hartford Park to the south, and Illinois State Highway 3 to the west. The Hartford site boundaries are presented in Figure 1-1. The Village site boundaries may differ from the Village corporate boundaries.

An ongoing task, which will continue as additional data is obtained, is the preparation of a Geographic Information System (GIS) database of the Village that will present information including the underground petroleum pipeline and other utility locations within Hartford, environmental incidents and data regarding the Village, such as boring logs and groundwater analytical results, and other pertinent information.

2.0 VILLAGE OF HARTFORD BACKGROUND INFORMATION

Background information regarding the vapor/free product issues in the northern portion of Hartford has been discussed in numerous reports by public and private entities. Figure 2-1 shows the northern portion of Hartford. It should be noted that Figure 2-1 is a work in progress; as new information is obtained, the figure will be updated accordingly.

Two of the most comprehensive reports presenting this background information are the March 1992 *History of Hydrocarbon Releases in the Village of Hartford, Illinois* prepared for Shell Oil Company by Engineering-Science (E-S Report) and the November 1990 *Hartford Underground Hydrocarbon Investigation* prepared by the Illinois Environmental Protection Agency (Illinois EPA Report). A Final Release by the Illinois Department of Public Health (Illinois DPH) titled *Public Health Assessment Response to Vapors in Hartford Homes, Hartford, Madison County, Illinois*, undated, was the most recent known document addressing vapor/free product issues in Hartford by others during 2002. Recently, Clayton, on behalf of The Premcor Refining Group, completed a *Current Conditions Report* (CC Report) for the Premcor Hartford Refinery and River Dock, dated April 28, 2003 and a Vapor Control System (VCS) Evaluation of the Village of Hartford, dated August 14, 2003 (Clayton VCS Evaluation). Information from these reports was used as the source of the following text in Section 2.0.

2.1 ODOR COMPLAINTS AND FIRES DOCUMENTED IN HARTFORD

In 1978, investigations were conducted in Hartford because of a series of residential house fires and documented odor complaints. According to the E-S Report, in 1978 the Hartford Police Department compiled a report summarizing complaints. Since 1978, the Hartford Police and Fire Departments have maintained detailed records of odor complaints. In general, the complaints have been located within an area bounded by

Hawthorne Street to the south, Olive Street to the east, Illinois State Highway 3 to the west, and Rand Avenue to the north.

Further research conducted as part of this Plan revealed 363 odor complaints/ observations and 26 fires. Seven odor complaints/observations were identified in the 1960s, 245 in the 1970s, 20 in the 1980s, 77 in the 1990s, and 14 to date in the 2000s. No odor complaints were recorded for 1967, 1971-72, 1976-77, 1980, 1984, 1989, 1992, 1996, 1998, or 2001. Tables 2-1 and 2-2 summarize the documented odor complaints and fires. These tables are subject to revision as new information becomes available.

This research revealed odor issues dating back to May 1966. No fires are known to have been reported in association with the identified FPH issue since May 1990, which is shortly before installation of the existing VCS in the Village in September 1992.

Twenty-five (25) odor complaints/observations, documented in 1974, were made with 14 occurring during the month of March within a seven-day period. These specific complaints were located at 108 and 110 East Watkins.

In 1978, 149 odor complaints/observations were made, all occurring during the months of March, April, and May. Ninety-one (91) of the complaints were located in the north end of Hartford, specifically, on West Birch, West Cherry, West Date, North Olive, and West Watkins Street, along with North Delmar Avenue. The remainder was located on East Maple, East Watkins, East Forest, East Date, and the 500 block of North Olive.

The April 1979 fires occurred during the second week of the month, with the majority on April 11, after a 5-inch rainfall. Other significant clustering of odor complaints/ observations occurred in 1979 with all 49 complaints again received in the months of March and April. The majority of the complaints, 34, were located on East Date, North

Delmar, East Watkins, and West Cherry. The remainder was located on North Olive, East Forest, and West Date, along with East Cherry.

A severe drought began in 1988 and ended in 1990, according to the E-S Report. As noted above, no documented complaints were recorded in 1989. However, in 1990, numerous complaints again were recorded. Twenty-seven (27) odor complaints were recorded in May 1990 along with five fires. All of the fires occurred within a four-day period after heavy rain on May 16, 1990. Evidence of a previous fire was noted at the 117 East Forest Street fire on May 19, 1990.

The Illinois DPH Report stated, after several weeks of heavy rain, residents of Hartford contacted the Illinois DPH on May 13, 2002. On this date, the Hartford Fire Department had six odor complaints from residences on East Watkins Street, specifically from addresses 116, 120, 122, 126, 130, and 134 East Watkins. The Illinois DPH concluded in an earlier health consultation that residential vapor intrusions during the week of May 13, 2002 were a public health hazard to persons in the affected homes.

2.2 REFINERIES AND UNDERGROUND LINES IN/NEAR HARTFORD

As part of the initial activities to identify the sources of the FPH plume beneath Hartford, the Illinois EPA Report identified three oil refineries in the immediate vicinity: the facility known as the Amoco Oil facility (currently the BP Amoco facility), the Clark Oil facility (currently the Premcor facility), and the Shell Oil facility (currently the ConocoPhillips facility). The locations of these facilities are presented in Figure 1-1. The Illinois EPA Report, the E-S Report, and the Clayton Reports also identified numerous underground and aboveground petroleum pipelines in Hartford and the immediate vicinity including:

- Ten Shell Oil (now ConocoPhillips) pipelines, along with sewer and waterlines, from the Shell (now ConocoPhillips) facility to the Shell (now ConocoPhillips) barge

facility on the Mississippi River. The ten product lines consist of one 12-inch line, one 10-inch line, six 8-inch underground lines, and two 6-inch aboveground lines. The lines generally trend westerly from the refinery parallel with Rand Avenue.

- Two, not-in-service, 10-inch Sinclair Oil/Atlantic-Richfield Company (ARCO) pipelines from the Premcor facility to the ARCO pump station north of the Hartford/Wood River Terminal. The line trends northwesterly from the refinery parallel with North Olive Street.

- Three abandoned 8-inch and one abandoned 3-inch pipelines from the Premcor facility to the Premcor river dock barge facility on the Mississippi River and one 14-inch out-of-service line to Olive Street. The lines generally trend west from the refinery parallel with Elm Street with the exception of the 14-inch line. These lines were installed in 1953 and are no longer in service.

- One 14-inch and two 10-inch pipelines from the Premcor facility to the Premcor river dock barge facility on the Mississippi River. The lines, installed in 1982, generally trend west from the refinery parallel with Elm Street.

The locations of these pipelines are presented in Figure 2-1 with one exception. The BP Amoco pipelines are not shown in Figure 2-1 since the pipelines are located approximately one-half mile north of Hartford. As noted above, this figure is a work in progress; as new information is obtained, the figure will be updated accordingly.

2.3 KNOWN RELEASES WITHIN HARTFORD

The E-S and Clayton CC Reports documented 22 known releases of petroleum hydrocarbons within or immediately adjacent to the Village of Hartford. Further research, completed as part of this Plan, has revealed 48 known spills within the Village. Table 2-3 presents the identified incidents along with the available information regarding the incident. These releases include eight in the 1970s, 17 in the 1980s, 18 in the 1990s, and five in the 2000s. No known documentation of releases has been found prior to 1973. These releases occurred throughout the northern portion of the Village of Hartford from a number of sources and identified responsible parties. The total quantity of

petroleum identified as released from those incidents with a listed amount (21 of the 48), irrespective of the nature of the product, is estimated at 324,000 gallons.

In addition to these documented releases, according to the E-S Report, there is evidence that some product lines had developed slow, continuous leaks. In a November 1990 report issued by the Illinois EPA, Mr. Mark Shrimpe, Vice President of the Hartford/Wood River Terminal, reported the 10-inch product line along Olive Street may have been leaking when it was in service. Inventory shortages averaged 360 barrels a week. According to the E-S Report, the 10-inch Sinclair line had been abandoned since 1985 and initially contained approximately 600 barrels of unleaded gasoline. Only 350 barrels were recovered, resulting in a shortage of approximately 250 barrels (10,500 gallons) of gasoline. Two pipeline pressure tests conducted in August and September of 1990 failed. This identified release of 250 barrels is also included in Table 2-3.

In addition, three leaking underground storage tank (LUST) sites have been identified in Illinois EPA records. These LUST issues within the Village of Hartford are presented in Table 2-4. Two of the LUST sites appear to be open according to the Illinois EPA website; the remaining one was granted a No Further Remediation (NFR) letter.

Eleven underground storage tank (UST) sites (representing 48 USTs) have also been identified within the Village of Hartford. These UST Sites within the Village of Hartford are presented in Table 2-5. The total capacity of the tanks identified at all 11 sites totals approximately 323,000 gallons of petroleum hydrocarbon. The contents of 12 of the USTs were either not identified or contained non-petroleum hydrocarbons and, thus, are not included in this total, although it is likely several of the 12 also contained petroleum.

2.4 PREVIOUS INVESTIGATIONS OF THE VAPOR/FREE PRODUCT ISSUES IN HARTFORD

2.4.1 Pre-1990s Investigations

According to the Illinois EPA Report, the vapor/free product issues were investigated over the years by various parties including the utility companies, adjacent oil refineries, and State of Illinois agencies. These investigations date back to 1966. The following information was excerpted from the 1978 Mathes Report, the 1990 Illinois EPA Report, and the 1992 E-S Report:

In 1966, air samples from a school basement located at Delmar and Rand Avenue revealed the major component was methane gas. In 1969, an air sample from 16 Hawthorne Place showed no natural gas, but the presence of sewer or marsh gas, liquid propane fuel, and gasoline. Soil gas samples were analyzed in 1966 and in 1970. The results showed carbon dioxide and hydrocarbons ranging from methane through pentane with the notable lack of ethane.

At the suggestion of the Illinois EPA, Hartford officials invited Amoco, Clark, and Shell to voluntarily cooperate in an investigation. John Mathes & Associates, Inc. (Mathes), an environmental consulting firm, was retained by Amoco, Clark, and Shell to investigate the cause of the presence of hydrocarbons beneath Hartford. The 1978 Mathes report included a summary of the data collected by the Illinois EPA and Shell Oil Company:

- In 1978, Illinois EPA installed ten monitoring wells (IEPA 1-10), and Shell installed two monitoring wells (Shell 1 and 2) in the Village of Hartford.
- On May 2, 1978, Shell inspected the 12 IEPA and Shell wells. The results, which are recorded in Mathes Table XI (Appendix B), indicate three wells contained product, three wells contained water with a product or other unidentified odor, and four wells contained water with no odor. Two wells were not tested. Hydrocarbon thicknesses

ranging from 3 feet 9.5 inches to 11 feet 6 inches were measured in Shell 2, IEPA 4, and IEPA 6.

The well construction details of these and subsequent piezometers/wells installed in the Village are presented in Table 2-6. Boring logs and well construction reports, if available, are provided in Appendix C.

In 1983, Shell conducted a geohydrological site assessment of the Shell Wood River Manufacturing Complex (WRMC) known as the Shepard Report. The Shepard Report estimated one million gallons of product underlies Hartford in an area 500 feet by 2,000 feet. The report indicated a northeast groundwater flow direction with a plume of hydrocarbons in the uppermost aquifer beneath Hartford between Arbor and Watkins Streets migrating northeast beneath Olive Street.

2.4.2 Early 1990s Investigations

The Mathes June 1990 soil-gas survey documented elevated vapor concentrations exist near the intersection of North Olive Street and Rand Avenue in Hartford. The Engineering Science October 1990 soil-gas survey identified separate-phase product in this area. E-S Figure 8 (Appendix A from the Mathes 1990 Soil-Gas Survey) illustrates the concentrations of Total Petroleum Hydrocarbon (TPH) vapors detected from depths of 7 to 10 feet below surface in Hartford. E-S Figure 9 (Appendix A) presents a TPH concentration map based on the data collected by Mathes in 1990 that E-S re-interpreted to incorporate the locations of documented pipeline breaks and product releases.

2.5 GROUNDWATER/SURFACE WATER ELEVATIONS AND HYDROCARBON COMPLAINTS

2.5.1 Historical Observations Relative to Groundwater

Previous opinions by other entities, as presented in this section, related the vapor issues to rises in the water table.

In 1973, Amoco observed that a direct relationship exists between the number of hydrocarbon odor complaints and a rise in the water table, specifically, when the water table rises, the number of hydrocarbon odor complaints increases.

The 1978 Mathes report states "experience has indicated that explosive mixtures are generally present only for a relatively short period of time in a particular area and that gas odor reports usually occur after periods of heavy rain or when the levels of the Mississippi River are rising." The Mathes report also summarized the relationship between water level elevations and seasonal rainfall patterns. The elevation of groundwater beneath Hartford decreases in late spring when groundwater withdrawal exceeds rainfall recharge. The groundwater starts to recover in the early winter months, and groundwater levels tend to rise during the wet spring months. Historically, groundwater level elevations are highest in May and lowest in December.

Mathes Figure VI (Appendix B) is a hydrograph prepared by Mathes in 1978. This hydrograph illustrates the correlation of fluctuations of groundwater and the number of hydrocarbon odor complaints documented by Hartford residents. The following conclusions drawn by Mathes are based on the data illustrated by this figure:

- Complaints of gas odors generally occurred when the groundwater level began to rise.
- Occasional complaints were received when the groundwater level was already high but was falling.

- Some complaints would occur immediately after heavy rainfall.
- The upward movement of the groundwater level appears to be closely related to reports of gas odors.

In addition, the following documentation supports the conclusion that rising water levels primarily noted during spring increase the potential for hydrocarbon vapor emissions and potential house fires in Hartford:

- House fires occurred during the second week of April 1979 after a 5-inch rain.
- A house fire occurred at the home of Mr. Doug Neal on May 16, 1990, after "extremely heavy rains." Within the next four days, three additional fires occurred in homes located in Hartford.

As presented on Table 2-2, all but two of the reported house fires in Hartford occurred during March, April, and May. The remaining two fires occurred during June and July.

E-S Figures 40 and 41 (Appendix A) are hydrographs compiled from gauging data provided by the Illinois State Water Survey (ISWS). The well gauged is approximately 0.75 miles northeast of Hartford and represents regional groundwater seasonal fluctuations. This groundwater pumping well is owned and operated by Marathon Oil Company and is completed to a depth of 107 feet. E-S Figure 40 (Appendix A) illustrates the number of documented hydrocarbon odor complaints and measured groundwater elevations from 1961 to 1990. It can be seen that the majority of hydrocarbon odor complaints occurred during periods of high groundwater elevations. E-S Figure 41 (Appendix A) is a hydrograph that illustrates the number of documented house fires. In every case documented, house fires occurred during periods of increasing or peak groundwater elevations.

Of significance, according to the E-S Report, is the fact that no house fires were reported during a period of severe drought that began in 1987 and continued until the end of 1989.

In addition, according to the E-S Report, only one hydrocarbon odor complaint was documented during 1987, and only two odor complaints were documented during 1988. The number of house fires and documented odor complaints once again increased with the advent of normal rainfall and subsequent aquifer recharge that has occurred since February 1990 (E-S Figure 40 and 41, Appendix A).

2.5.2 Historical Observations Relative to Surface Water

Clayton has created a hydrograph presenting Mississippi River stage data from 1960 to 2003. The stage data was obtained from the USGS 07010000 Mississippi River at St. Louis, Missouri gauging station located at Latitude 38°37'44", Longitude 90°10'47" NAD27, which is approximately 15 miles downstream from Hartford, Illinois. The gauge datum is 379.94 feet above sea level NGVD29. These data were downloaded from the USGS Water Resources (2003) website.

Documented odor complaints/observations (Table 2-1) and documented house fires (Table 2-2) were also plotted on these hydrographs to allow a qualitative comparison of the number of recorded vapor and fire issues with the historical stage heights of the Mississippi River. The historical USGS gauging data was generally provided on a weekly basis. Therefore, the documented odor complaints/observations and house fires from Tables 2-1 and 2-2, respectively, were totaled on a weekly basis. The corresponding total was applied to the closest available gauging date in order to allow a comparison of documented concerns with Mississippi River stage. The hydrographs with documented odor complaints/observations are presented in two figures: Figure 2-2 includes January 1960 to December 1979, and Figure 2-3 includes January 1980 to November 2003. The hydrographs with documented fires are also presented in two figures: Figure 2-4 includes January 1960 to December 1979, and Figure 2-5 includes January 1980 to November 2003.

As shown previously by other consultants, specifically Mathes and E-S, a general correlation appears to exist between times of higher Mississippi River stage and an elevated number of odor complaints/observations and fires. The number of odor complaints/observations and fires appear to cluster in the earlier portion of the years when groundwater elevations typically are rising. However, the documented odor complaints/observations were primarily reported by the public; thus, these reports contain varying degrees of subjectivity. Therefore, any application of these data is necessarily limited to a qualitative nature. In Clayton's opinion, the documented odor complaints/ observations are best viewed in an aggregate manner concerning location or time frame rather than on an individual basis.

However, the documented pattern of rising groundwater and surface water elevations and increased house fires and hydrocarbon odor complaints/observations described above indicates that fluctuation of groundwater and surface water elevations is one of the primary factors controlling hydrocarbon vapor emanation from the subsurface beneath Hartford.

2.6 PRODUCT RECOVERY

The following information was also obtained, in part, from the Burns & McDonnell Waste Consultants, Inc., *Groundwater Monitoring Plan for the Hartford Refinery*, dated December 2002 in addition to the previously mentioned sources.

On June 14, 1978, Clark Oil Company installed a recovery well (RW-1) east of Delmar Avenue at Forest Street. The recovery well, equipped with a skimmer pump, was installed to a depth of 45 feet. In 1979, Clark installed a second product-skimming recovery well (RW-2) west of Olive Street between Date and Cherry Streets. The locations of these recovery wells are shown in Figure 2-1. From 1978 to 1990, Clark/Premcor continued to operate the two recovery wells that removed floating product

and reported the monthly recovery amounts to the Illinois EPA, except for a period during 1983-1984 when reporting ceased. Odor complaints from village residents prompted an inquiry that resulted in reporting (and operations) being resumed.

By June 1982, Clark had reportedly recovered 639,022 gallons of gasoline from beneath the village. Monthly product recovery rates from both wells ranged from 1,091 gallons to 28,789 gallons. According to the Illinois EPA, Clark/Premcor had reportedly recovered a total of 1,161,981 gallons of product from the vicinity of Hartford by 1990.

Currently, there are three product recovery wells in Hartford as shown in Figure 2-1. From January 1994 through September 2002, over 82,700 gallons of product has been recovered.

As discussed in the *Vapor Control System Evaluation Report (*prepared by Clayton on behalf of the Hartford Working Group and dated December 10, 2003), pilot testing of several remedial technologies is proposed regarding the existing recovery wells, RW-1 through RW-3. Pending the evaluation of those test results, it is anticipated that these three recovery wells will be integrated into future remedial activities within the Village of Hartford.

3.0 PHYSICAL SETTING

The geology and hydrogeology of this area has been summarized in numerous reports previously submitted to the Illinois EPA. Available reports were reviewed and used as the basis for the geologic and hydrogeologic interpretation of the Village. Any additional information provided by Working Group members was incorporated into this interpretation as appropriate. The existing information, additional information from the Working Group, and data from the new sentinel wells were and are being used to create geologic cross sections of the area, groundwater contour maps, and apparent product thickness maps. Certain aspects of this work are still in progress, specifically regarding the December 2003 investigation, as Clayton is currently awaiting survey data prior to completing work, including cross-sections, involving the new sentinel wells. This information will be included in a future addendum.

The following information was excerpted from the 1978 Mathes Report, the 1991 Mathes Report, the 1992 E-S Report, the 1994 Burlington Environmental letter report, and the 2003 Clayton Report.

3.1 LOCATION

Hartford is located on the east bank of the Mississippi River, upstream from St. Louis, Missouri (Figure 1-1). The geographical region around Hartford and other nearby towns is collectively known as the American Bottoms, which encompasses an area of 175 square miles. The American Bottoms is a shallow valley 30 miles long and, at its widest point, 11 miles wide. The Mississippi and Missouri Rivers merge approximately one mile south of Hartford, and the enlarged Mississippi River flows south in an alluvial meander belt bordered on both sides by limestone bluffs.

Hartford lies 1,500 feet east of the Mississippi River. The Shell Tannery Property and the Premcor facility are located directly east of Hartford. The BP Amoco (fka Amoco) facility lies north-northeast of Hartford across Rand Avenue. The ConocoPhillips (fka Shell) manufacturing complex is located east of the Premcor facility. Figure 1-1 shows the respective property boundaries of these facilities and their geographical relationship to Hartford. Figure 2-1 is a map of the northern portion of Hartford.

Hartford is located in western Madison County, Illinois, in the Central Lowland Province of the Interior Plains of North America. The major physiographic features of the county are the upland till plains and bluffs and the Alluvial Mississippi River Valley. Wood River and Cahokia Creeks drain the western portion of the county. The Hartford area is located in the Springfield Tills Plain, which is an extensive, relatively flat area overlying till deposits laid down by glaciation. The major kinds of parent material in the area are loess, glacial till, glacial outwash, and alluvium.

3.2 GEOLOGY

The present landscape of the area and the upper 130 feet of the Hartford area were created by processes (alluvial and glaciation) active during the last 125,000 years. The dominant creator of the landscape locally is the Mississippi River. The Mississippi River changed its course frequently during the Pleistocene. The old meander loops are bordered by arcuate ridges and swales that were formed as slackwater bars in former channels. East of the meander loops are partially filled poorly drained swamps with silt and clay from floodwaters (QRI 1996).

During the Pleistocene period, the valley was filled with sandy glacial outwash known as the Mackinaw Member of the Henry Formation. The sands of the Mackinaw range from 60 to 150 feet in thickness and compose what is known as the Main Sand (Main Aquifer). The northeastern part of the Mississippi Alluvial Valley in Madison County contains

terraces of sand and gravel that stand above the present flood plain. These are outliers of former glacier valley fill sand and gravel. Wood River and Roxana are built on one of these terraces. The front of the terrace has a sharp rise of 12 to 15 feet, such as along Highway 111 between the Premcor Facility and the ConocoPhillips refinery. This is called the Roxana Terrace and is stratigraphically known as the Henry Formation Mackinaw Member (ISGS *Geology of East St. Louis Area* 1979).

The river- and glacial-laid sediments, developed in relatively recent geologic time, are underlain by consolidated sedimentary rocks over 3,800 feet thick. These bedrock formations dip gently northeastward from the Ozark Highlands toward the Illinois Basin and predominantly consist of limestone and dolomite with subordinate amounts of sandstone and shale. Mississippian rocks underlie the sediments in the western part of Madison County, and Pennsylvanian rocks underlie the eastern part. The Mississippian bedrock below the Premcor Facility is believed to be Renault Limestone. Renault Limestone consists of relatively pure limestone and an upper sandy limestone (ISGS *Geology Map of Illinois* 1956). Commonly, bedrock now occurs between 110 and 170 feet below land surface in the valley area.

The uppermost geologic unit is the Cahokia Alluvium of Holocene Age, which consists of sands, silts, and clays of floodplain, channel, and modern river origin. In recent times, the Mississippi River has reworked the upper part of the valley fill in migrating across the broad bottomlands, while spreading floodwaters deposited silt and clay along the sides of the channel and in backwater areas. The channel migration, cut-and-fill, and flooding have produced complex heterogeneous deposits.

Based on the investigations conducted to date by others, the hydrogeology of the Hartford vicinity consists of three aquifers or hydrostratigraphic units that vary from unconfined to confined conditions. The aquifers generally consist of coarse- to fine-grained permeable sands deposited within low permeability silty clays. These sand units have acquired local

names through recent investigations of the area over the years. The units, which are separated by clay and silty clay layers, are known as the Rand Sand, the EPA Sand, and the Main Sand (Mathes 1991). The Rand Sand is in the Cahokia Alluvium.

The deeper and thickest aquifer is known as the Main Sand. This aquifer underlies the entire area beginning at depths ranging from approximately 20 to 45 feet below land surface. Overlying the Main Sand, beneath the northeast section of Hartford, are two sand intervals (the EPA Sand and the Rand Sand) interbedded with low permeability clay and silty clays. The upper, seasonally saturated Rand Sand is encountered approximately 20 feet below ground surface (bgs). The EPA Sand underlies the Rand Sand and is separated from the Rand Sand by a clay layer that ranges in thickness from 3 to 11.5 feet.

The stratigraphy of the area under investigation, described above, is illustrated by the geologic cross-sections developed by Mathes shown in Mathes Cross Sections A-A', C-C', D-D', and E-E' (Appendix B). The cross-sections are designated as illustrated in Figure 3-1. Cross-sections of the borings/wells installed during the December 2003 investigation have not been completed as surveying is currently being conducted to establish horizontal and vertical control. These cross-sections will be included in a future addendum.

4.0 SITE WORK

4.1 JULY 2003 INVESTIGATION

In July 2003, as part of the Vapor Recovery System Evaluation, Clayton completed 24 soil Geoprobe® borings adjacent to three of the 12 existing vapor control borings (VCBs) in Hartford (Figure 3-2).

The borings were completed as vacuum monitoring probes at VCB-01 (located south of East Birch Street), VCB-06 (located on West Date Street), and VCB-12 (located on East Forest Street). The gauging results are discussed in Section 6.8 of the Clayton VCS Evaluation (dated August 14, 2003). The nested borings consisted of a shallow probe to a depth of 10 feet bgs and an adjacent deep probe to a depth of 28 feet bgs with one deep probe extending to 32 feet bgs. The borings were sampled continuously to termination. In general, the geology at these borings was consistent with the findings of the earlier investigations with a veneer of clays and silts overlying sand. Well construction details are provided in Table 2-6. Boring logs and well construction reports are contained in Appendix C. The well construction reports are presented in Draft form and the details in Table 2-6 are incomplete for these wells pending receipt of the December 2003 survey results.

Soil samples were initially scanned for organic vapors upon retrieval using a Photovac photoionization detector (PID) equipped with a 10.2 electron volt (eV) probe. The PID, calibrated to an isobutylene standard, measures total concentrations of organic vapors. The PID cannot identify or quantify specific components. Soil samples collected were placed in a sealed plastic bag for headspace analysis with the PID and geologic classification. The bagged samples were allowed to equilibrate for a minimum of 30 minutes at ambient temperature (approximately 70° F), and a headspace analysis was performed using the calibrated PID.

A series of five nested borings (MP-5 through MP-9 series) were conducted in an approximate line trending northwesterly of VCB-01 at differing spacing. The geology consisted of approximately 3 to 4 feet of silty clay fill overlying clayey silts and silty clays extending to approximately 17 to 18 feet bgs. Underlying this material is a silty sand that extends to the boring terminations of 28 to 32 feet bgs in all but the two northernmost borings. In these two borings, which approach East Birch Street, the borings terminate within clayey silts and silty clays encountered at approximately 26 to 28 feet bgs. Within the silty sand at several of the borings are lenses of clayey silt ranging from approximately 0.5- to 1-foot-thick at depths ranging from approximately 20 to 23 feet bgs. Three of the borings also contain approximately 2.5- to 3-foot-thick sand lenses within the silty sand with lesser amounts of silt. A petroleum-like odor was observed within the silty sand and overlying silts and clays; the odor was observed at shallower depths as the borings progressed from south to north. Black staining was noted at the water table and within the sand lenses with lesser amounts of silt. The water table was at approximately 18 feet bgs.

A series of three nested borings (MP-10 through MP-12 series) was conducted in an approximate line trending due north of VCB-06 at differing spacing. The geology consisted of less than 0.5 feet to approximately 4 feet of clayey silt fill overlying clayey silts and silty clays extending to boring terminations at 28 feet bgs; the exception was the northernmost boring, which encountered silty sand just before termination at 27.8 feet bgs. Silty sand lenses were identified within the upper 10 feet of the overlying silts and clays in all three borings. The southernmost boring contained silty sand from approximately 0.5 to 7 feet bgs. Similar silty sand was encountered at the two northernmost borings in lenses ranging from 2.5 to approximately 4.5 feet thick. The lenses were encountered at depths ranging from approximately 7 to 9.5 feet bgs in the central boring and 5 to 10 feet bgs in the northernmost boring. No petroleum odors or staining were identified in these borings. Water was encountered within the silts and clays at approximately 24 feet bgs.

A series of four nested borings (MP-13 through MP-16 series) was conducted in an approximate line trending due west of VCB-12 at differing spacing. The geology consisted of approximately 2.5 feet of silty clay fill overlying clayey silts and silty clays extending to approximately 14 feet bgs. Underlying this material is a silty sand that extends to the boring terminations at 28 feet bgs. Within the silty sand is an approximate 1-foot-thick clayey silt to silty clay lens extending from approximately 22.5 to 23.5 feet bgs, although it is approximately 3.5 feet thick and present at approximately 20 feet bgs in one of the borings. A petroleum-like odor was observed within the silty sand, and black staining was noted at the water table at approximately 24 feet bgs.

In general, PID results for the East Forest Street and East Birch Street probes were typically higher for samples within the unsaturated sand as compared to the overlying unsaturated silts and clays. In the East Forest Street and East Birch Street borings, this is likely due to proximity with apparent petroleum hydrocarbon; however, this is also typical of these geologic materials as effective porosity is typically greater within sands than within silts and clays. However, the relatively lower effective porosity of the silts and clays does not preclude effective application of a vapor control system in these materials. As was observed in the borings nearing East Birch Street, the petroleum odor was also noted in the overlying silts and clays. In two of the three West Date Street borings, notably higher PID readings were detected within the shallow silty sand lenses or the clayey silt fill than in the underlying soils. In regard to the West Date Street area, the presence of higher PID readings in the shallow sand lenses as compared to the deeper intervals indicates the detected readings may be due to sources other than the petroleum known to be present on the underlying water table. Further evaluation, as discussed in later sections, would be necessary to define the source, extent, and magnitude of these elevated PID readings.

4.2 DECEMBER 2003 INVESTIGATION

As part of the Plan, five new monitoring wells (HMW-25 through HMW-29) were installed to serve as sentinel wells concerning the Hartford Public Water Supply Five Year Recharge Area. As part of the Illinois EPA efforts to protect groundwater resources, a Well Head Protection Area (WHPA) was conducted for two Hartford, Illinois community water supply wells (McGuire et al. 2001). The WHPA is the surface area in the well vicinity that may provide recharge to the aquifer over a period of time (established as five years) for this program (Figure 2-1). This area is known as the Five-Year Recharge Area.

The new monitoring wells were installed to serve as a means to determine whether the identified FPH is encroaching upon the Illinois EPA Hartford WHPA (McGuire et al. 2001). The new sentinel wells are located outside the known extent of FPH identified within the Village. No relocation, due to the presence of FPH, was required from the proposed well locations. Figure 2-1 shows the location of the sentinel wells.

The wells were placed at a distance intended to provide an approximate "minimum of two years advance" notice of potential FPH or dissolved phase constituents encroachment upon the WHPA boundary. A review of the WHPA report (McGuire et al. 2001) indicated a northerly radius of approximately 1,200 feet from the northernmost active well (Well IEPA # 60105) to the perimeter of the five-year WHPA measured in the direction of the historic groundwater flow, which is discussed below. Dividing the distance (1,200 feet) by the time (5 years) yields a travel distance of approximately 240 feet per year. Thus, over a two-year period, travel distance is estimated at approximately 480 feet assuming groundwater flows in southerly or southwesterly direction toward the WHPA.

However, for the past 70 years, the natural movement of groundwater has been altered in the Hartford vicinity due to large-scale water pumpage. The net effect of this drawdown has been groundwater movement to the northeast as shown in Engineering-Science Figure 22 presented in Appendix A.

It should be noted, if potential indications of analyte impact upon these wells is discovered, it may have originated from the southern portion of the Village or even from within the WHPA. A review of the Illinois EPA's LUST database has revealed the following information. As shown in Figure 2-1, two identified LUST sites exist on or south of Hawthorne Avenue. While one of the LUST sites (IEMA#990742), located within the WHPA, has received a NFR letter (dated April 4, 2002 and recorded April 26, 2002), the second LUST site (IEMA#s 992395 and 992690), approximately 150 feet northeast of the WHPA, is the location of two open LUST incidents. This open LUST site is potentially upgradient of the proposed sentinel wells based on historic groundwater flow direction within the Village.

4.2.1 Soil Borings

Five soil borings for monitoring well installation were conducted from December 2 through December 6, 2003. The borings were completed in a partial arc beyond the northeastern portion of the WHPA. Soil borings (used for the installation of monitoring wells) were advanced using a conventional drill rig equipped with 4 ¼-inch hollow stem augers and operated by Philip Environmental Services Corporation (PSC) of Columbia, Illinois. The wells were sampled continuously to termination. The collection of soil samples for analysis was not deemed necessary during the new well installation activities based on PID scanning and field observations. Boring logs are contained in Appendix C.

Decontamination activities between borings were conducted at a designated location on the Premcor facility. Soil cuttings were temporarily containerized in a roll-off box on the Premcor facility prior to offsite disposal.

All soil borings were continuously sampled using a 5-foot split-spoon advanced before the auger. Soil samples were described and classified according to the Unified Soil Classification System. Visual, PID, and olfactory observations were noted. PID scanning was conducted in the same manner as discussed above in the July 2003 investigation. The borings were completed to depths of approximately 40 feet bgs.

In general, the geology at these borings was consistent with the findings of earlier investigations in the central portion of the Village. A veneer of silts and clays with apparent sand lenses overlying sand to the boring termination was found in all five borings. Sand with varying amounts of silt was present beginning at depths of approximately 12 feet bgs (HMW-25) to approximately 27.5 feet bgs (HMW-29) and extending to the boring terminations. During drilling, water was encountered at depths ranging from approximately 30 to 33 feet bgs.

No petroleum-like odors or staining was observed in any of the borings. In general, no significant PID readings were detected in any of the samples. A sweet, fruit-like odor was identified at HMW-29. No PID readings were detected at this boring location in the overlying soil. As stated above, this soil was not sampled since the odor identified above was interpreted to be in the groundwater and not in the overlying soil.

Additional drilling and sampling details are provided in the attached Standard Operating Procedures (SOPs) 120 contained in Appendix D. This SOP may have been modified based on field conditions that would be discussed in this section.

In addition, the flush-mount protective cover of existing well HMW-20 was replaced at this time, as Clayton had been unable to open the well at any previous well gauging events due to apparent damage to the cover.

As part of the December 2003 investigation, Clayton completed a Well Integrity Survey of Village wells (Table 3-1). The results of the survey reveal that all of the known existing wells require an upgrade/repair of the surface protection. Repair/replacement of these wells is discussed in Section 10.2.

4.2.2 Monitoring Well Installation and Development

The five new monitoring wells (HMW-25 through HMW-29) were installed to depths of approximately 40 feet bgs within an unconfined sand aquifer. A monitoring well installation SOP (SOP 210) is included in Appendix D.

Monitoring wells were constructed using 2-inch-inside-diameter (ID) PVC riser and 2-inch-ID 0.010-inch slotted PVC screen. Final screen length was determined by field conditions. Since unconfined (water table) conditions were encountered, the screen length was 15 feet. Monitoring well construction details are provided in Table 2-6. The monitoring well completion reports are found in Appendix C. The well construction reports are presented in Draft form; the details in Table 2-6 are incomplete for these wells pending receipt of the December 2003 survey results.

Prior to development, monitoring wells were allowed to set a minimum of 24 hours after installation. Development was performed using a submersible pump. Development was performed until pH, conductivity, and temperature stabilized. The wells recovered rapidly during development. A well development SOP (212) is provided in Appendix D. Summarized well development indicator parameters are provided in Table 3-2. Water

generated was and will continue to be containerized and managed at the Premcor facility's wastewater treatment plant.

The wells are also intended for use in obtaining groundwater samples and collecting hydrogeologic data. In-situ instantaneous hydraulic conductivity tests were conducted on four of the five sentinel wells to estimate the hydraulic conductivity of the formation materials near the wells. This is intended to provide a range of hydraulic conductivity values for the saturated lithology screened by the sentinel wells. The testing results will be presented in a future addendum.

Each new well and existing Village monitoring well (that could be found) was surveyed by an Illinois-licensed surveyor for horizontal control referenced to Illinois State Plane West Zone NAD 83 (feet) and vertical control referenced to mean sea level (feet). The survey was conducted by Crawford, Murphy and Tilly, Inc. (CMT) of Edwardsville, Illinois in mid-December 2003. The survey results will be presented and incorporated in a future addendum. This survey will provide a unified horizontal and vertical control database of existing wells within the Village.

Groundwater levels and apparent FPH thickness (if present) were measured in both new and existing Village wells in order to allow determination of horizontal hydraulic gradient and flow directions of groundwater, and delineate the current apparent horizontal and vertical extent of the FPH.

Additional monitoring well installation, development, and hydraulic conductivity testing details are provided in SOPs 210, 212, and 230 (Appendix D).

4.2.3 Indicator Monitoring Well Groundwater Sampling

One round of groundwater samples was collected in mid-December 2003 (using the low flow sampling technique) from the five new indicator monitoring wells and existing known wells (wells without FPH) within the Village. The samples were analyzed for those compounds on the Skinner list, specifically, volatile organic compounds (VOCs) (including methyl tertiary butyl ether [MTBE]), semi-volatile organic compounds (SVOCs) (including polynuclear aromatics [PNAs]) and metals. The analytes included on the Skinner list are presented in Table 3-3. Additional groundwater gauging, monitoring, sampling, and decontamination details are provided in SOPs 220, 415 and 500 (Appendix D). The results of this groundwater sampling event will be provided later once the results have been received from the laboratory and evaluated.

5.0 HYDROGEOLOGY OF THE PRIMARY HYDROSTRATIGRAPHIC UNITS IN THE VILLAGE OF HARTFORD

The main hydrostratigraphic units are discussed in more detail below incorporating results of the 2003 investigations. The Mississippi River, located approximately one mile west of the Village, is believed to be hydraulically connected to all three sand units (Mathes 1991). Water level fluctuations in all three sand units correspond to changes in the Mississippi River stage. Since the river stage varies up to 20 feet during a year, the sand units can vary from unconfined to confined conditions during the year.

5.1 THE MAIN SAND

The Main Sand is the primary source for large-quantity water production in the area. Natural groundwater movement beneath the American Bottoms is westerly, draining from the limestone bluffs (east wall of the valley) to the Mississippi River. However, for the past 70 years, the natural movement of groundwater has been altered in the Hartford vicinity due to large-scale water pumpage. Known cones of depression flank the village to the north (Amoco) and northeast (Shell). The net effect of this drawdown has groundwater movement to the northeast. Mathes Figures VII through XII (Appendix B) illustrate historical groundwater movement beneath Hartford.

The Main Sand, which underlies the EPA Sand, has been identified at an average depth of 39 feet bgs. The Main Sand is coarser than the overlying units and includes gravel. The potentiometric surface of the Main Aquifer corrected for product thickness as presented by E-S is shown in E-S Figure 22 (Appendix A). The groundwater elevation data used to construct this map were collected during the third quarter of 1990 and are summarized in E-S Table 3 (Appendix A). Product thicknesses were corrected using an accepted 80 percent density factor. Wells gauged and included on this potentiometric surface map were constructed so that only the Main Sand interval was monitored. The groundwater flows in a northeasterly direction at a gradient of 0.0018 feet per foot. The

1978 Mathes Phase I Investigation Report illustrates that the direction of groundwater flow near Hartford has been in a northeasterly direction since at least 1951.

In 1991, in the area of the Main property of Shell, the K values of the Main Sand ranged from 255.2 to 467.7 gpd/ft^2 according to Shell.

5.2 THE EPA SAND

The EPA Sand lies below the Rand Sand and above the Main Sand. The unit has been found at an average depth of 28 feet bgs (Mathes 1991). The EPA Sand is approximately 7 feet thick and is in apparent hydraulic communication with the Main Sand in the area where the separating clay pinches out. The unit is coarser than the overlying Rand Sand but also contains silt.

5.3 THE RAND SAND

The Rand Sand is the uppermost sand unit and has been found at an average depth of approximately 18 feet bgs.

The potentiometric surface of the Rand Sand, corrected for product thickness and based on the data collected during the third quarter of 1990, is shown in E-S Figure 30 (Appendix A). The groundwater flow direction, based on the data summarized in E-S Table 3 (Appendix A), is to the northeast. Groundwater flow in the Rand Sand mimics the direction of groundwater flow of the Main Sand. The groundwater flow is influenced by the cones-of-depression maintained by Shell (now ConocoPhillips) at the Main Plant property and at the Rand Avenue site.

The Rand Sand is unconfined during low river stages and becomes a confined unit during times of high river stage (Mathes 1991). An indication that the EPA and Main Sands are

hydraulically connected is indicated by the similar piezometric surface of both units. These units also vary with river stage from unconfined to locally confined conditions.

During May 1990, ES completed an aquifer performance test at the Rand Avenue site for the Shell Oil Company. According to the ES document prepared for this testing effort, ES stated it does appear a hydraulic connection exists between the Rand and EPA aquifers (ES 1990). However, according to ES (1992), a subsequent reevaluation of the test results stated the preponderance of evidence indicates the EPA and the Rand Sands do not appear to be in hydraulic communication. The average value of hydraulic conductivity (K) for the Rand Sand was determined to be 92.6 gpd/ft^2 (52 x 10^{-3} cm/sec). In addition, the average values of transmissivity (T) and storativity (S) were determined to be 280 gpd/ft and 0.0033, respectively. The value of storativity indicates semi-confined aquifer conditions.

Mathes (1991) originally identified the Rand as a discontinuous silty sand unit in the area of Hartford ranging from 0 to 7 feet thick. Subsequently, Burlington Environmental (Burlington fka Mathes) (1994) reinterpreted, based on subsequent CPT investigations conducted in 1991 and 1993 and previous boring logs, the areal extent of the Rand Sand within the Village. Burlington (1994) stated information gathered by both Burlington and E-S indicated the Rand Sand included clayey silts and silty clays with the Rand Sand being predominantly comprised of silt. Based on this understanding of the Rand Sand composition, the unit is present in northern Hartford and extends south to Elm Street where it appears to intersect the underlying EPA Sand. This document is provided in Appendix E. Burlington Figure 4 (Appendix E) presents the October 1993 interpreted extent of the Rand Sand in the Village. Burlington cross-sections J-J' and K-K' (Appendix E) present the October 1993 interpretation of the Rand Sand extents. Burlington cross-section K-K', though not part of the above document, also presents an October 1993 interpretation of the Rand Sand extents in the northern portion of the Village and is included in Appendix E.

It appears the monitoring probe series MP-5D through MP-9D (located between East Birch Street and East Cherry Street) and MP-10D through MP-12D (located adjacent to West Date Street) encountered only the Rand Sand. It appears the monitoring probe series MP-13D through MP-16D also encountered the Rand Sand and possibly the underlying EPA Sand. It should be noted these borings were installed only as part of an evaluation being conducted on the VCS within the Village and were not intended to provide extensive geologic information.

6.0 INTERPRETATIONS OF THE EXTENT AND DISTRIBUTION OF FREE PHASE HYDROCARBONS IN HARTFORD

6.1 HISTORICAL INTERPRETATIONS

Previous discussions by other consultants, as presented in this section, address the interpreted extent and migration of the known free-phase product on the water table. The sources of this information were identified in Section 2.0. Further research conducted as part of this Plan discovered additional data regarding the Village. This information is typically presented as figures contouring the interpreted FPH plume extents. However, FPH extent information by other consultants is presented for qualitative purposes only based on the belief that the FPH plume on the groundwater is actually likely to be irregular and discontinuous in configuration. This belief is based in part on the numerous known spills/releases that have occurred from multiple areas/sources within the Village. It is believed to be premature to conclude that the numerous spills/releases have combined into one areally contiguous FPH plume beneath the Village, although this may indeed be the case. Therefore, previous product thickness figures (which are contoured) prepared by other consultants are presented only for qualitative purposes.

A major factor controlling the migration of product beneath Hartford is the areal extent of the aquifers and the location of the less permeable clay lens (barriers) found separating the aquifers. E-S Figure 36 (Appendix A) is a map illustrating the interpreted extent of the Main, EPA, and Rand Aquifers beneath Hartford. The Main Sand underlies the entire area shown in the map. The crosshatched area represents the mapped extent of the clay lens that separates the EPA and the Main Sands. Therefore, this crosshatched area represents the E-S interpretation of the location of the EPA Sand. The map also illustrates the interpreted extent of the Rand Sand.

The potentiometric surface of the Main Aquifer as interpreted by E-S, not corrected for product thickness, is shown in E-S Figure 23 (Appendix A). The uncorrected

groundwater elevation data used to construct this map are also summarized in E-S Table 3 (Appendix A). Product accumulation, evident in well HB-32 (approximately 5 feet), is apparently caused by the intersection of the clay layer separating the EPA and Main Aquifers and the water table. The movement of product as it floats on the water table is restricted by the impermeable clay layer. Product migration is restricted, and hydrocarbons are trapped by the clay when the water table is below the top of this clay layer. This phenomenon was initially recognized in the 1978 Mathes investigation.

A 1982 Mathes (Appendix B) product thickness map illustrated the maximum accumulation of product occurs in the Main Aquifer beneath the intersection of Market and Elm Streets in Hartford. In addition, an isolated product accumulation area in the Main Sand is apparent beneath the intersections of Olive and Elm Streets.

The hydrocarbon thickness map, based on product thickness data collected during the third quarter of 1990 (E-S Table 3, Appendix A), is shown in E-S Figure 24 (Appendix A). The product plume located beneath Cherry and Market Streets is evident on both the 1982 and 1990 hydrocarbon product thickness maps. However, the primary hydrocarbon accumulation area evident in 1982 (in the Main Sand beneath the intersection of Elm and Market Streets) is not detected from the data collected in 1990. The plume in this area can therefore no longer be defined due to destroyed wells.

E-S Figure 28 (Appendix A) is an isopach map interpreting product thickness detected in the EPA Sand during gauging and monitoring activities conducted during the third quarter of 1990. The data illustrated by E-S Figure 28 (Appendix A) are summarized in E-S Table 3 (Appendix A); less than 2 feet of product was identified in wells P-81 and P-105.

Hydrocarbon thickness data collected from wells screened across the Rand Sand are illustrated in E-S Figures 31-33 (Appendix A). E-S Tables 3, 4, and 5 (Appendix A)

summarize the data collected. The thickness of the hydrocarbon layer measured on March 22, 1990 is illustrated by E-S Figure 31 (Appendix A); as measured on May 31, 1990 is illustrated by E-S Figure 32 (Appendix A); and as measured during the third quarter 1990 is illustrated by E-S Figure 33 (Appendix A).

As discussed in previous sections, numerous groundwater monitoring wells have been installed by various parties throughout the northern portion of the Village in an effort to address the identified contamination issue. The first of these wells was installed by the Illinois EPA and Shell Oil Company in the late-1970s. Additional wells have been installed over the intervening years with the most recent wells being installed in July and December 2003 by Clayton. However, it should be noted that the July 2003 wells are one-inch in diameter and were originally installed only to serve as part of an evaluation of the existing Village VCS system. As a result, these wells were not horizontally or vertically placed to be long-term groundwater gauging or sampling locations. In addition, these wells were not developed. Therefore, the use of these wells is necessarily limited in discussing the hydrogeology of the Village.

Various parties have completed well gauging events in the Village of Hartford dating back to 1978. Records of these events were discovered during a Clayton review of files available from sources including Premcor, the Illinois EPA, the Hartford Police and Fire Departments, and PSC (fka Burlington Environmental and John Mathes & Associates). Limited, if any, information was available regarding the events, including the methodology, beyond the actual measurements. It appears, at least in some of the historic measurements, that some of the wells were bailed the day prior to the well gauging event. In addition, as wells have been installed within the Village at different times since approximately 1978 by various parties, all wells may not have been measured at any particular gauging event for reasons ranging from a well not having been installed at that point in time to possible access issues. In addition, over the years, several wells have been "lost" for a variety of reasons including abandonment and road resurfacing.

Overall, therefore, the majority of these historical (prior to 2003) well gauging events is presented for qualitative purposes and should be viewed in that context. Table 5-1 provides the results of the historical (prior to 2003) monitoring well gauging. The specific gravity of hydrocarbon was assumed to be 0.74 for these historical measurements. In August 2003, Clayton determined the specific gravity of the FPH for nine samples from the Village. Based on the results presented in Table 5-2, the average specific gravity of all nine samples was calculated to be 0.77. This new FPH specific gravity determination was applied to well gauging events beginning in September 2003. Table 5-3 provides the results of the current (2003 to the present) monitoring well gauging.

6.2 2003 FPH EXTENTS

Clayton completed a limited apparent product thickness evaluation using monitoring wells that could be located within Hartford. Table 5-3 provides the results of the monitoring well gauging. All of the July 2003 measurements were made by the Illinois EPA, while the remaining data was obtained by Clayton. The apparent product thicknesses are presented in Figures 6-4 through 6-11. Current information regarding apparent product thickness has been presented in figures of the Village of Hartford simply as an identification of apparent FPH thicknesses at the remaining existing wells. This presentation reflects the limited information currently available regarding the FPH extents based on the small number of currently existing monitoring wells in the Village.

The apparent product thicknesses were also not contoured based on the belief that the FPH plume on the groundwater is likely to be irregular and potentially discontinuous or only semi-contiguous in configuration. Previous product thickness data, collected by other consultants (Mathes) in the early 1990s, are presented only for qualitative purposes. However, a limited comparison of the apparent FPH thicknesses from the early-1990s to

the apparent FPH thicknesses gauged in 2003 indicates the amount of apparent FPH appears to have diminished over the last decade.

7.0 GROUNDWATER FLOW

7.1 HISTORICAL REGIONAL GROUNDWATER FLOW

The following information was excerpted from the E-S Report (1992). In a joint effort to compile regional groundwater maps of the Hartford area, groundwater elevation data were collected from wells owned by Amoco, Clark, and Shell during the week of July 16, 1990. A portion of the data collected is summarized in E-S Table 3 (Appendix A). The groundwater elevation data collected were compiled by Amoco's consultants, Geraghty & Miller. One map illustrates groundwater data from the Main and EPA Aquifers (E-S Figure 34, Appendix A). The other map illustrates groundwater elevation data from intervals stratigraphically above the Main Aquifer (E-S Figure 35, Appendix A).

Inspection of E-S Figure 34 reveals the groundwater gradient slopes to the northeast with a "mounding" effect in two separate areas of the map. This effect occurs at the northeastern comer of Hartford and at the western end of the Premcor facility. Near the Rand Avenue release site, the groundwater gradient continues its downward slope toward the northeast corner of the map.

The data used to illustrate the groundwater gradient depicted on E-S Figure 34 in the area of the apparent mounding near the Rand Avenue release site were based on measurements of the groundwater elevations in the following wells:

- Hartford wells – HB-19, HB-32, HB-33, and RW-2
- EPA well – IEPA-7
- Shell wells – P-76, P-107, SP-12, SP-13, SP-14, and SP-18

With the exception of well RW-2, each well listed above is screened either in the EPA Sand; in both the EPA Sand and the underlying Main Sand; or in the Main, EPA, and Rand Sand intervals. Well RW-2 is screened only across the Main Sand interval.

Thus, the gauging data reflect water that has entered each well bore from several hydraulically separated, saturated intervals. Therefore, the data do not accurately reflect the groundwater elevation of the Main Aquifer. According to E-S, the mounding effects noted at the northeast corner of Hartford and the western edge of the Premcor facility are caused by groundwater data obtained from several hydraulically separate intervals that represent the composite of separate hydraulic head measurements. According to E-S, well data from wells screened exclusively in the Main Aquifer will produce a groundwater elevation contour map with a regular and consistent northeast groundwater gradient, as shown in E-S Figure 22 (Appendix A).

E-S Figure 35 (Appendix A) illustrates groundwater elevation data collected from monitoring wells screened across saturated sand intervals above the Main Sand. Near Rand Avenue, this interval has been designated as the Rand Sand. Based on data concerning well screen placement depth, at least two more shallow saturated intervals are present beneath both the Amoco and Premcor facilities. These shallow sand intervals screened in the monitoring wells shown in E-S Figure 34 (Appendix A) are both lithologically and hydraulically separated. The groundwater data as presented in E-S Figure 35 (Appendix A) are therefore misleading because the measurements represent "composite" effects from each separate interval screened. According to the E-S Report, an accurate representation of the groundwater gradient within the Rand Sand, for example, is illustrated by E-S Figure 30 (Appendix A).

7.2 2003 GROUNDWATER FLOW

Clayton has completed a series of well gauging events in the Village of Hartford during 2003. These events were conducted at all of the remaining accessible monitoring wells in the Village that could be located by Clayton at the time of the gauging event. Clayton also completed a limited apparent product thickness evaluation of these gauging events. Table 5-3 provides the results of the monitoring well gauging. All of the July 2003

measurements were made by the Illinois EPA; the remaining data was obtained by Clayton. Because of the measurements being conducted by different parties, the list of wells measured during these gauging events may vary slightly as Clayton did not have access to one or more locations available to the Illinois EPA.

Groundwater contour maps were constructed from the September, October, November, and December 2003 Clayton gauging events. These maps are presented as Figures 6-1 through 6-3A. The September through November events were chosen as concurrent well gauging was conducted on the Premcor facility at these times to enable the construction of a more comprehensive groundwater contour map of the area, especially as the number of remaining and accessible Village wells decreased over the years. The December 2003 groundwater contour map was constructed using only the wells located in the Village (including the newly installed sentinel wells HMW-25 through HMW-29). The installation of the sentinel wells required the surveying of top of casing elevations. The tops of casing elevation of the other monitoring wells located with in the Village were also re-surveyed at this time. In the process of this survey work, it was learned that the datum used for other monitoring wells on surrounding properties (Premcor, Shell Rand Avenue and Shell Tannery properties) differed. Therefore, this discrepancy needs to be rectified before an area groundwater contour map can be provided. Plans are to have this rectified and to conduct a round of depth to groundwater measurements (using appropriate monitoring wells in the Village and from the Premcor, Shell Rand Avenue and Shell Tannery properties) the end of January or first part of February. Once this has been completed, a groundwater contour map of the area will be provided. Table 5-4 provides the results of the monitoring well gauging on the Premcor facility.

Prior to construction of the groundwater contour maps, Clayton reviewed and evaluated the remaining Village wells and the accompanying groundwater elevation data as several of these wells had been installed at differing depths or within different aquifers for example. A similar review was also conducted of the remaining wells on the Premcor

facility. Selected Premcor facility boring logs and well construction reports (those used in the construction of the groundwater contour maps) are provided in Appendix C. The intent of the review was to ensure the integrity and representativeness of the data based on the available information. The evaluation considered factors potentially impacting accuracy of the data including screening different hydrostratigraphic units and errors in surveyed reference point elevations. The results of the well evaluations are presented in Tables 5-5 and 5-6.

The wells deemed satisfactory for groundwater map construction were those completed in the EPA/Main Aquifer. In addition, as of December 2003, access was received to the Shell Rand Avenue site and the Shell Tannery Property. Based on information provided by Shell, several of these wells are screened in the EPA/Main Sand. These wells, based on the provided information, will be included in future groundwater contour figures (once the top of casing elevations have been rectified). Those not included in the contour map were typically completed at significantly shallower depths or had limited, if any, information available regarding the screened formation.

Based on the above evaluation process, the September through November 2003 groundwater flow maps indicate the flow direction is generally westerly/northwesterly towards the Village from the area of the Premcor facility. An apparent mounding effect is indicated in the northwest corner of the Premcor facility. The small number of existing wells for September through November 2003 limits the extent of the evaluation of groundwater flow direction. The December 2003 groundwater flow map indicates the flow direction within the northern portion of the Village is north to northwesterly. This groundwater flow direction is generally consistent with historical interpretations provided by others.

8.0 CONCEPTUAL SITE MODEL OF HYDROCARBON IMPACT

Various parties have conducted investigations to understand the nature of the identified hydrocarbon contamination in the soil and groundwater underlying the Village of Hartford. As part of the development of a conceptual site model, Clayton has reviewed the available information and reports and conducted limited work in the Village during 2003. The following discussion presents our preliminary conceptual site model (CSM) of hydrocarbon impact to the Village of Hartford. As further investigations are conducted, this CSM will be enhanced and revised as necessary.

The immediate issue is continuing reported hydrocarbon odor complaints/observations from residences in the northern half of the Village (north of Hawthorne Avenue). The presence of an identified FPH plume resting on the groundwater surface with associated dissolved phase contamination is an interrelated issue that presents a concern to the groundwater of the Village of Hartford. These concerns remain despite the installation and operation of the Vapor Control System (VCS) in the northern half of the Village of Hartford. It appears the overall number of odor observations/complaints since startup of the VCS in September 1992, with the exception of 1993, have decreased significantly compared to the 1970s (Table 2-1). It is possible the VCS did not reach optimal operational conditions prior to the recorded complaints/observations in 1993.

However, it should also be noted that the number of complaints/observations (20) in the 1980s represent a fraction of the total number of known complaints/observations identified within the Village of Hartford since the 1960s. It is not currently known why this decrease occurred in the 1980s. It also should be noted that the documented odor complaints/observations were primarily reported by the public; thus, the reports contain varying degrees of subjectivity. In Clayton's opinion, the documented odor complaints/observations are best viewed in an aggregate manner in regard to location or time period rather than on an individual basis.

Regarding the odor complaints/observations, several conclusions originally drawn by Mathes in 1978 appear to be still valid today, specifically:

- Apparent hydrocarbon complaints/observations generally occur when the groundwater elevations begin to rise;
- Apparent hydrocarbon complaints/observations generally occur most frequently in the spring and early summer, which are times when precipitation is typically greater and groundwater elevations tend to rise or are at their highest level for the year.
- Apparent hydrocarbon complaints/observations appear to be associated with periods of heavy precipitation events in the form of rain.

Prior investigations have revealed that the Village of Hartford is situated on a veneer of low permeability alluvial silts and clays overlying three distinct higher permeability hydrostratigraphic units: the Rand Sand, the EPA Sand, and the Main Sand. The EPA Sand is in apparent hydraulic communication with the Main Sand in areas where the separating clay pinches out. Both underlie the northern portion of the Village of Hartford. As interpreted by Burlington (fka Mathes), the Rand Sand predominantly comprises silt and includes clayey silts and silty clays. According to Burlington, the Rand Sand is depicted (Appendix B) south to the majority of Elm Street and portions of E. Forest and E. Watkins Streets within the Village and appears to be in hydraulic communication with the underlying units. It is likely other higher permeability lens containing perched water exist within the veneer of silts and clay. FPH has been identified on the groundwater surface of the EPA/Main Sand since the late-1970s.

The Village of Hartford infrastructure, including utilities such as stormwater drainage systems and sanitary systems along with electrical, gas, water and other systems, is believed to be located primarily within the surficial silts and clays along with petroleum pipelines that traverse and ring the perimeters of the Village. As presented in Tables 2-3 and 2-4, spills and releases have been documented within the Village since the 1970s in association with these petroleum pipelines and from other sources such as leaking USTs.

Village records document that petroleum releases have impacted the Village infrastructure.

At present, the source of the identified hydrocarbon odor in the Village has not been determined. Further investigation will be necessary to identify the source of the odors and the mechanism(s) that may cause vapor intrusion into buildings and residences. It is possible that petroleum hydrocarbons that encounter the Village infrastructure (utility lines, etc.) may migrate within the more permeable backfill surrounding these utilities, many of which connect to the residential and commercial/public structures of the Village that in turn may have more permeable foundation fills. The stormwater drainage system is also believed to have served as a secondary means of distributing petroleum hydrocarbons through the Village. Little is known about the current condition of the Village infrastructure. However, past releases have been found to be leaking into the Village sewer system.

According to Jim Hickerson (Public Works Director for the Village), the area on the east side of the Village (north of Hawthorne Street) is served by a combined storm and sanitary sewer system. On the west side of the Village (north of Hawthorne Street) only West Maple, West Watkins, West Forrest, and West Elm Streets have separate storm and sanitary sewers. Delmar Avenue (north of Hawthorne Street) is primarily served by a combines storm and sanitary sewer system except at the north end where there are some storm sewer catch basins in the area of the school.

Because of the unknown source(s) of petroleum hydrocarbons within the Village and numerous potential migration routes throughout the Village, the behavior of the identified FPH within the Village must be viewed on a large-scale basis with scrutiny of existing conditions and infrastructure being a crucial element.

Petroleum hydrocarbon released on undisturbed ground will migrate down under the force of gravity with some concurrent lateral spreading (API undated). The downward movement is eventually stopped by one of three occurrences: the petroleum source is exhausted to immobility, the source will encounter a low permeability lithology, or it will reach groundwater. Secondary porosity features, such as fractures within clay soil, can enhance vertical migration of petroleum hydrocarbon through these lower permeability materials. The higher effective porosity of the more permeable sand units also serves to enhance vertical petroleum migration. Upon reaching groundwater, the petroleum hydrocarbon is then subject to further migration in differing directions beneath the Village based on varying groundwater controls in the area. It is believed the petroleum hydrocarbons are distributed in a highly irregular (both vertically and horizontally though potentially contiguous or at least semi-contiguous) plume of FPH on the groundwater surface throughout the northern portion of the Village. It is also possible this existing plume of FPH contributes to the identified hydrocarbon odor complaints/ observations within the Village. At times of heavy rainfall in areas such as the Village of Hartford, groundwater elevations may increase relatively rapidly in wells or piezometers. The increase is typically not due to recharge; rather, it is a result of pressurization on the hydrogeologic system due to an increase in the elevation of the discharge point (Saines 1981). During heavy rainfall, natural discharge areas of aquifers may be subject to relatively rapid increases in hydraulic head. This rise in the groundwater surface will naturally lead to a rise in the overlying FPH that will enhance the upward migration of vapors through the overlying soils, especially the more permeable sands. Again, secondary porosity features of clays, such as fractures, may enhance flows of vapors into overlying more permeable infrastructure and foundation fills that allows the vapors to enter the Village structures.

9.0 DATA GAPS

Based on the information gathered as part of this Plan, data gaps indicating the need for further investigation or research have been identified. These data gaps primarily reveal the need for additional research and/or field investigation to enhance the conceptual site model of the Village. Upon completion of the additional investigative or research activities, the conceptual site model may be revised as necessary to incorporate these new data. Currently identified data gaps are summarized below:

- Existing wells are limited in extent, both vertically and laterally, in regard to identifying the extent of the known FPH, resting on the groundwater surface and within the vadose zone, and associated dissolved phase hydrocarbons within the groundwater of the Village. Supplementation of the existing data through further investigation will enable a more accurate FPH plume delineation.

- Available historic geologic and hydrogeologic data interpretations have evolved over time based on continuing investigations throughout the years by different consultants. As a result, variable conclusions have been made regarding issues such as the extent of the Rand Sand and whether it is in communication with the underlying aquifers along with groundwater flow directions. To date, the investigations have been more limited in the southern end of the northern half of the Village. Several previously installed wells have been screened across one or more of the identified aquifers within the Village of Hartford with few of the total number of wells in the Village still functional. As a result, a limited number of wells are available to identify the current FPH plume and groundwater flow patterns within the identified hydrostratigraphic units. In addition, although cross-sections by other consultants have been found, many of the boring logs used to construct these cross-sections have not been found to date precluding accuracy and completeness evaluations of the existing cross-sections. Currently, the existing data, although substantial, is insufficient to provide the desired level of detail regarding the geology/hydrogeology of the Village of Hartford. Supplementation of the existing data through selected borings/well installations, accompanied by appropriate hydrogeologic testing, installed as part of the FPH delineation effort, will enable development of a more accurate CSM of the Village of Hartford.

- The identification of the locations of the Village infrastructure is generally considered not complete or well known. In addition, it is certainly possible that abandoned infrastructure, including possible petroleum pipelines, exists within the Village. Furthermore, the condition of the infrastructure is also generally considered unknown.

Of primary interest is the stormwater drainage system condition. Further research and investigation will enable a more accurate location of infrastructure and potentially source and extent of hydrocarbon odor observations.

10.0 APPROACH TO ADDRESS DATA GAPS

10.1 FPH PLUME DEFINITION

A determination of the current extent of the FPH plume within the Village of Hartford is a prerequisite to enhancing the CSM and designing an effective remedial approach. Clayton has reviewed various approaches ranging from remote sensing of the plume extents using thermal imagery to intrusive methods such as subsurface investigation using a geoprobe and/or drill rig.

An evaluation of the remote sensing methods indicated a variety of limitations that appear to make application of these technologies to the Village of Hartford problematic. In the case of thermal imagery, discussions with vendors/subcontractors indicate the presence of features including the buildings and infrastructure within the Village and the depth of the known FPH plume will provide innumerable potential interferences and difficulties in accurately interpreting the data and identifying the extent of the FPH plume. It is also believed that the application of an electromagnetic survey (E-M) would not be effective due to the numerous interferences created by the features of the Village. Other remote sensing applications such as ground penetrating radar (GPR) are not expected to be effective due to presence of extensive overlying silts and clays. Gravity and magnetic methods are not expected to be applicable based on their nature. Resistivity also is considered unlikely to be effective as the product thickness may not be sufficient to satisfactorily detect and identify the FPH plume extent. In addition, resistivity will only detect anomalies that may or may not be due to the presence of FPH, for example, it could indicate thickening of the sand and gravel.

Evaluations were also made of intrusive technologies including a Membrane Interface Probe (MIP) and a Rapid Optical Screening Tool (ROST). The MIP technology uses a down hole photoionization detector and was considered unlikely to be effective in

determining the extent of the FPH plume based on the inability of the method to discern between free phase product and dissolved phase product. In addition, the MIP technology had potential difficulties in fouling of the membrane from the free-phase product, which would cause a decrease in efficiency in the field.

The ROST technology was also evaluated. The ROST technology uses a down hole sensor deployed by Cone Penetration Testing (CPT) to characterize stratigraphy and to capture hydrocarbons and detect their relative concentration. Based on this evaluation, the ROST application appears to represent an efficient application that will provide in-situ geologic and real-time chemical data to help determine the extent of free-phase hydrocarbons beneath the Village of Hartford. A discussion of this technology is included as Appendix F.

Clayton is proposing to use the ROST assessment technology at multiple locations within the Village of Hartford to help collect data regarding the extent of the free-phase plume. Probe locations will be along existing streets and alleyways within the Village. The exact probe spacing will be based on observed conditions in the field in an attempt to delineate the plume. Given existing data regarding the extent of free product in the Village (Figures 6-4 through 6-11), probes will be spaced at approximately 250 feet. A diagram showing the anticipated sampling areas is presented as Figure 10-1.

Sampling will begin in areas of the Village where known free-phase hydrocarbons are present to develop a correlation of the ROST scan with actual measured free-phase hydrocarbons. Once a correlation is established, this information will be used to determine the expected presence of free-phase hydrocarbons. Once a perimeter of the interpreted free-phase hydrocarbons plume is identified by the ROST, additional ROST sampling may be required to further refine the edges of the free-phase hydrocarbon plume. Locations for these additional sample locations will be determined in the field

based on the ROST results. This will assist in locating the permanent monitoring wells near the edge of the free-phase hydrocarbon plume.

Upon completion of the ROST application, the data will be evaluated, and a subsurface investigation will be implemented to confirm the identified extent of the FPH. This subsurface investigation will consist of borings followed by the installation of monitoring wells at select locations as indicated by the results of the ROST evaluation. As such, the exact locations remain to be determined. Consequently, the subsurface investigation plan will be presented in a separate report addendum (Addendum) upon completion and evaluation of the ROST application.

However, the work to be conducted as part of the addendum will be conducted as discussed in the following sections.

10.2 ADDITIONAL FPH FIELD INVESTIGATION

The additional FPH field investigation to confirm and supplement the ROST investigation will be conducted as discussed in the following sections.

10.2.1 Soil Borings

Soil borings (used for the installation of monitoring wells) will be advanced using conventional drill rigs equipped with hollow stem augers. Although the collection of soil samples for laboratory analysis is not anticipated during monitoring well installation activities, soil samples may be collected dependent on field observations. Decontamination activities between borings are anticipated to be conducted at a designated location on the Premcor facility. Soil cuttings will be containerized and disposed offsite.

All soil borings will be continuously sampled using a split-spoon or similar continuous split-barrel sampling device advanced before the auger. Soil samples will be described and classified according to the Unified Soil Classification System. Visual, PID, and olfactory observations will be noted. Additional drilling and sampling details are provided in SOP 120 (Appendix D). This SOP may be modified based on field conditions.

At least three samples for grain size distribution and hydrometer will be collected from each type of subsurface material encountered during the drilling for the additional monitoring wells. Analysis of the samples will be in accordance with ASTM D 422. The analytical results will then be compared with the field soil classification.

10.2.2 Monitoring Well Installation and Hydrogeologic Testing

It is anticipated that approximately 15 new monitoring wells will be installed as part of post-ROST FPH plume delineation confirmation efforts. The final number of wells will be determined following the completion of the ROST investigation efforts. These wells will serve to bound the anticipated extent of FPH on the groundwater within the Village. In addition, these wells will serve as potential locations to collect hydrogeologic data and as monitoring points for dissolved phase constituents in the groundwater beneath the Village. Water generated will be containerized and managed at the Premcor facility's wastewater treatment plant.

All new wells are intended to be 2-inch ID PVC wells constructed with 0.010-inch screen. Final screen length will be determined by field conditions. If unconfined (water table) conditions are encountered, the screen length may be up to 15 feet to account for fluctuation of the water table. Available information indicates the water table may fluctuate up to 10 feet or more in some locations. If confined conditions are encountered, the screen length will be 5 feet. Boreholes for the monitoring wells will be drilled as

specified in Section 10.2.1. Figure 10-2 presents a representative monitoring well installation diagram.

In-situ instantaneous hydraulic conductivity (slug) tests will be conducted at selected wells that do not contain FPH to estimate the hydraulic conductivity of the formation materials near a well. This is intended to provide a range of hydraulic conductivity values for the saturated lithology screened by the monitoring wells.

Each new well and any additional existing Village monitoring wells that may be found in the future will be surveyed by an Illinois-licensed surveyor for horizontal control referenced to Illinois State Plane West Zone NAD 83 (feet) and vertical control referenced to mean sea level (feet), within the Village of Hartford (Madison County) Illinois. The survey is anticipated to be conducted by CMT. The survey results will be presented and incorporated in a future addendum. This survey will provide a unified horizontal and vertical control database of existing wells within the Village.

Groundwater levels and apparent FPH thickness (if present) will be measured in both new and existing Village wells in order to determine horizontal hydraulic gradient and flow directions of groundwater, and delineate the apparent horizontal and vertical extent of the FPH.

Additional monitoring well installation, development, and hydraulic conductivity testing details are provided in SOPs 210, 212, and 230 (Appendix D). These SOPs may be modified based on field conditions.

10.2.3 Repairs of Existing Monitoring Wells

Currently, Clayton has completed an integrity evaluation of the existing monitoring wells in the Village of Hartford. The results of the survey are presented in Table 3-1. Based on

the survey, all of existing monitoring wells, with the exception of those installed by Clayton in 2003, the RW-series and HMW-20, which was replaced in December 2003, require replacement (or installation) of the protective cover.

As part of this additional investigation, the known existing Village wells that require an upgrade/repair of the surface protection will be addressed. Repair/replacement of these wells will typically consist of removal of the existing cover by a qualified subcontractor. The new protective cover will be installed with a new concrete surface seal that extends to approximately 3 feet bgs, as conditions permit, to ensure a satisfactory surface seal. The existing interior expandable plugs will also be replaced, and new locks (keyed alike) will be installed. Based on the well integrity survey, no cutting of the PVC riser casing is envisioned; thus, the wells should not need to be resurveyed after completion of this work to enable continued accurate well gauging data. It is recognized that the ground surface elevation of the top of the protective cover will be changed after completion of the December 2003 survey; however, this is not anticipated to significantly impact any planned work in the Village.

10.2.4 Bail Down Test

Bail down recovery tests will be conducted to better understand the subsurface hydraulic controls as they relate to FPH flow into the existing monitoring/recovery wells. The bail down recovery tests will be conducted to estimate the actual thickness of FPH present in recovery/monitoring wells and surrounding formation materials within the known extent of the FPH plume.

The bail down recovery tests will be conducted using the methodology suggested by David Huntley, Professor of Geological Sciences from San Diego State University in a paper published in Ground Water (Vol. 38, No. 1, 2000). A copy of this paper is provided in

Appendix G. The results of the bail down recovery tests will be provided as part of a future report.

10.3 INFRASTRUCTURE ASSESSMENT

The investigation to assess the Village of Hartford infrastructure will initially consist of collecting available data, such as location, depth, and nature of the utility, from the various entities with systems located in the Village of Hartford. Upon collection and review of this data, an assessment of data gaps will be completed. The means to address these data gaps will be closely coordinated with the appropriate entity so that no damage results to the utility and to determine the best means to address any data gaps based on unique properties of the utility. In the case of some infrastructure such as the stormwater drainage system, visual surveys may be conducted.

In an effort to locate other utilities and abandoned pipelines, a combination of electrical resistivity and electro-magnetic remote sensing will be used to map the investigation area within the Village of Hartford. Based on the results of these surveys it will be necessary to conduct invasive investigation to locate potential utilities or abandoned pipelines. This would involve the careful excavation of the potential location and visual observation of any utility and/or abandoned pipeline.

Soil sampling will be conducted with a Geoprobe to investigate potential sources of hydrocarbons in the soil near the utilities and abandoned pipelines with the Village of Hartford. Information obtained regarding locations of the utilities will be compared with significant clustering of odor complaints/observations to determine if highly contaminated soil or pools of petroleum hydrocarbon are present in the backfill surrounding these utilities/pipelines. At these locations, a series of soil samples will be collected as close to the utilities as possible. Soil samples will be analyzed for the Skinner list of compounds (Table 3-3). This effort may be supplemented with additional investigative work such as

soil gas surveys or other techniques along suspected utilities/pipelines. The soil gas survey information collected by ENSR as part of the Interim Measures will be evaluated and incorporated into the investigation as appropriate.

10.4 DISSOLVED PHASE GROUNDWATER INVESTIGATION

Following the completion of the ROST investigation for the FPH and subsequent verification of the results with conventional well installation, the process of conducting additional groundwater investigations to define the extent of dissolved phase hydrocarbons will be initiated. The following sections describe the approach and techniques that will be employed to conduct this investigation. A number of wells and samples collected cannot be determined at this time since much of this work will be based on the FPH investigation.

10.4.1 Preliminary Groundwater Sample Collection

The initial phase of investigation for dissolved phase hydrocarbon contamination will be focused on rapidly identifying the areal extent. A Geoprobe unit will be used to install temporary monitoring wells at a number of locations outside to the previously determined free-product plume. Since this investigation is focused on the dissolved-phase groundwater contamination, this work cannot begin until the extent of the free-product plume is identified and verified with the permanent monitoring wells.

The data obtained from this investigation will be used to locate additional monitoring wells in an effort to confirm the dissolved-phase groundwater. The results of the recent groundwater sampling of the newly installed sentinel wells (HMW-25 through HMW-29) indicate that no dissolved-phase VOCs, SVOCs, or PNAs were detected above laboratory reporting levels (Appendix H). Therefore, this groundwater investigation would focus on the areas outside of the identified free-product plume and north of the sentinel wells within the Village of Hartford.

10.4.2 Permanent Monitoring Well Installation

If necessary, additional monitoring wells will be installed to confirm and monitor the dissolved-phase hydrocarbon contamination within the Village of Hartford. All new wells are intended to be 2-inch ID PVC wells constructed with 0.010-inch screen. Final screen length will be determined by field conditions. If unconfined (water table) conditions are encountered, the screen length may be up to 15 feet to account for fluctuation of the water table. Available information indicates the water table may fluctuate up to 10 feet or more in some locations. If confined conditions are encountered, the screen length will be 5 feet. Boreholes for the monitoring wells will be drilled as specified in Section 10.2.1. Figure 10-2 presents a representative monitoring well installation diagram.

In-situ instantaneous hydraulic conductivity (slug) tests will be conducted at selected wells to estimate the hydraulic conductivity of the formation materials near a well. This is intended to provide a range of hydraulic conductivity values for the saturated lithology screened by the monitoring wells.

Each new well will be surveyed by an Illinois-licensed surveyor for horizontal control referenced to Illinois State Plane West Zone NAD 83 (feet) and vertical control referenced to mean sea level (feet), within the Village of Hartford (Madison County) Illinois. The survey is anticipated to be conducted by CMT. The survey results will be presented and incorporated in a future addendum. This survey will provide a unified horizontal and vertical control database of existing wells within the Village.

Additional monitoring well installation, development, and hydraulic conductivity testing details are provided in SOPs 210, 212, and 230 (Appendix D). These SOPs may be modified based on field conditions.

10.4.3 Monitoring Well Groundwater Elevation Measurement

Groundwater elevation levels will be measured in the new wells in order to determine horizontal hydraulic gradient and flow directions of groundwater. This information will be combined with any other existing groundwater elevation information to define the groundwater flow direction for the dissolved-phase hydrocarbon contamination.

10.4.4 Monitoring Well Groundwater Sampling

One round of groundwater samples will be collected (using the low flow sampling technique) from selected monitoring wells (wells without FPH). The samples will be analyzed for the Skinner list of parameters presented in Table 3-3, specifically VOCs (including MTBE), PNAs, and metals.

Additional groundwater gauging, monitoring, sampling, and decontamination details are provided in SOPs 220 and 415 (Appendix D). These SOPs may be modified based on field conditions.

11.0 SCHEDULE

The investigation of the extent of the free phase hydrocarbon plume, using the ROST technology, is scheduled to begin the week of January 26, 2004. It is expected that the field portion of this work will take three (3) weeks. The actual start date of the work will be dependent on weather conditions and the actual length of time to complete the work will be dependent not only on weather conditions but also on the findings in the field. Figure 11-1 is a proposed investigation schedule.

Upon evaluation of the information obtained from the ROST investigation, this plan will be amended to propose locations for the completion of soil borings and installation of monitoring wells. These soil borings and monitoring wells will be used to confirm the ROST investigation and to address data gaps identified concerning groundwater flow patterns and the understanding of the hydrostratigraphic units underlying the northern portion of Hartford.

New monitoring wells along with existing monitoring wells will be sampled after the new well have been developed. Groundwater sampling will be conducted only at those monitoring wells without FPH. Bail down recovery tests will be conducted on new monitoring wells and existing monitoring wells that have FPH. Repairs of existing monitoring wells (needing repair) will be made in the spring, after the ground has thawed and weather permits.

The investigation of the dissolved-phase hydrocarbons within the Village of Hartford will begin once the FPH plume is verified through the installation of permanent monitoring wells. Additional monitoring wells may be installed if necessary to monitor the dissolved-phase hydrocarbon contamination.

The infrastructure assessment will be coordinated with the home needs assessments that are being conducted. Part of the interim measures to address the intrusion of vapors into homes includes a limited soil gas survey in select areas.

Figure 11-1 illustrates a detailed schedule for the investigation of the Village of Hartford to define the extent of free-product and dissolved-phase hydrocarbon contamination, as well as the identification of any soil source areas. Field investigation contingency tasks have been added throughout the schedule to allow for additional field investigation yet to be determined.

12.0 REPORTING

12.1 MONTHLY PROGRESS REPORTS

Throughout the investigation activities outlined in this plan, a monthly progress report will be developed and submitted to the agencies to provide an update on the progress and results of the investigations. The report will include the activities completed to date, results of these activities, proposed changes based on the results, and the anticipated the list of activities to be completed over the next month.

12.2 INVESTIGATION REPORTS

An investigation report will be prepared at the end of each investigation phase that will document all of the investigation procedures and results. Most of this information will be provided as data is obtained, this report will include all of the information and results.

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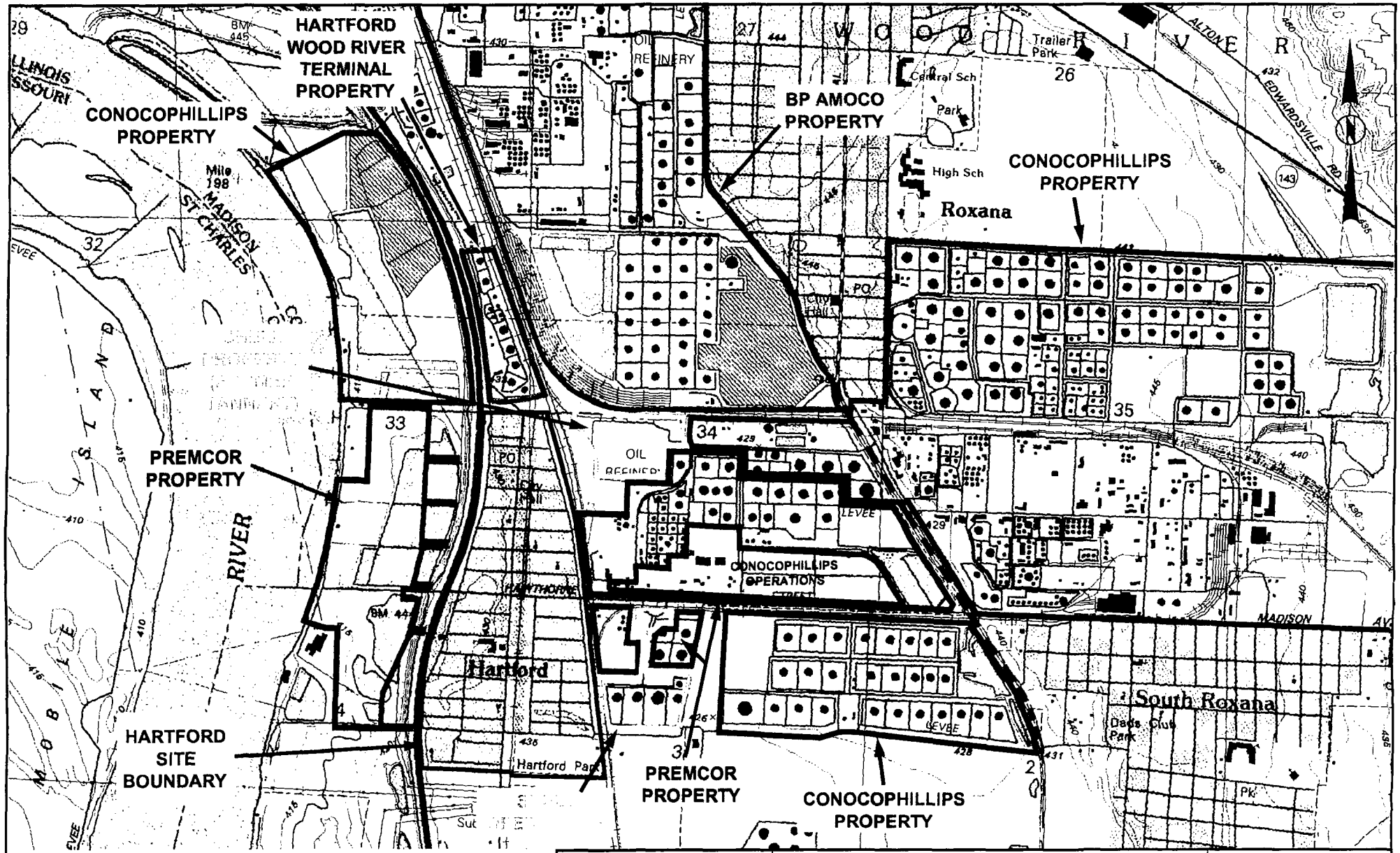
FIGURES



SCALE IN FEET

0 1000 2000 4000

SOURCE:
USGS 7.5 MINUTE SERIES TOPOGRAPHIC MAP
(WOOD RIVER, ILL.–MO. – rev.1994)

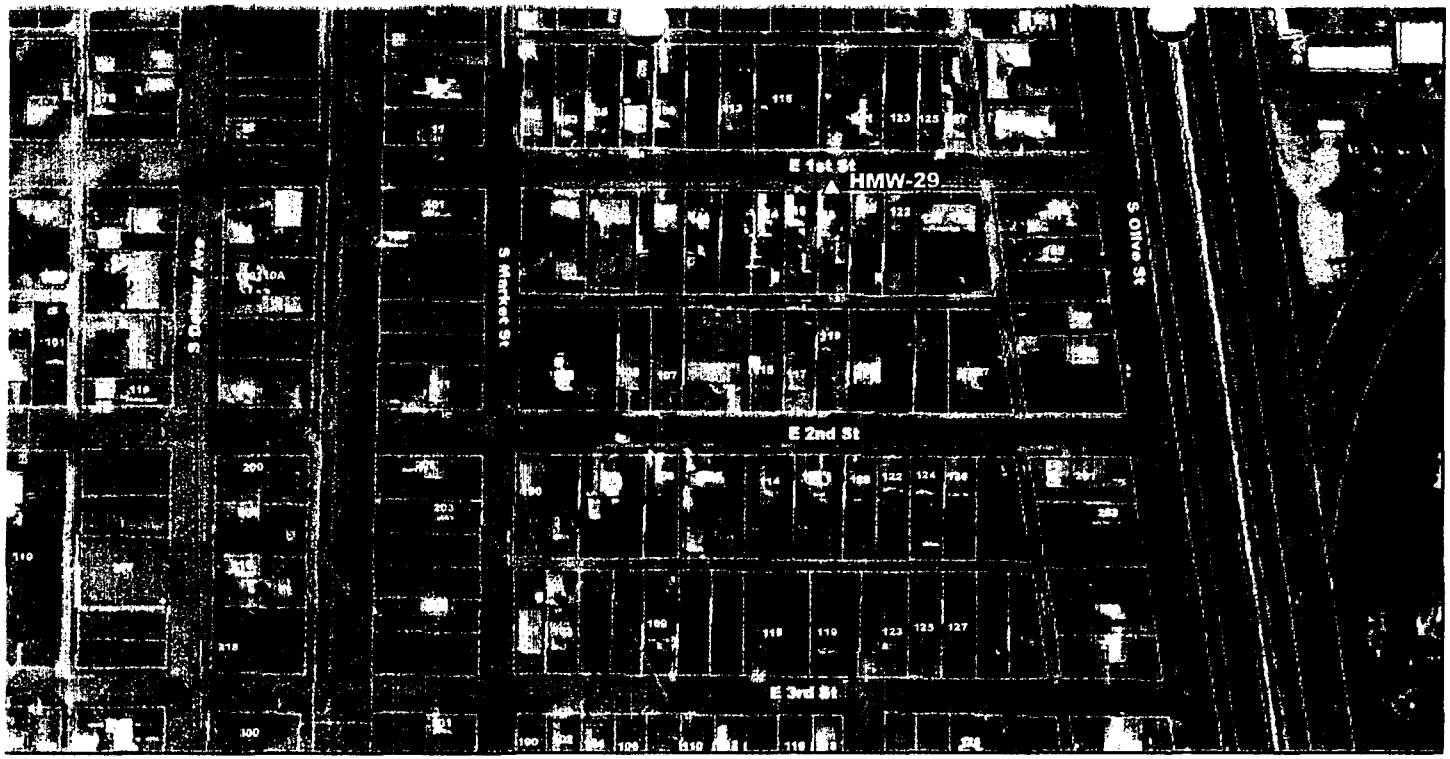
CHK BY	
DWN BY	BCP
DATE	12–15–03
SCALE	AS SHOWN
CAD NO.	0309512001B
PRJ NO.	15–03095.12

VILLAGE OF HARTFORD AND SURROUNDING AREA MAP

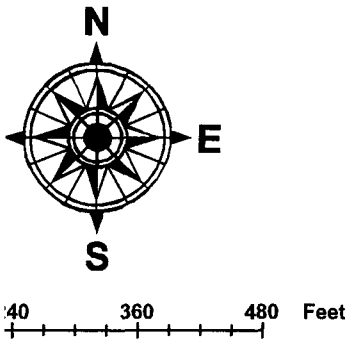
THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS

Clayton GROUP SERVICES

FIGURE
1–1



FORD, ILLINOIS



l data from Madison County, Illinois GIS Department

Map Notes: *DRAFT, this is a Work in Progess. (12/17/03)*

Accuracy of Data

Instrument Verified Features:
Feature's existence established through field investigation.
Coordinates established using various Survey and GPS grade instruments.

Field Verified Features:
Feature's existence has been verified through field investigation.
Location established through digitization of historic CAD drawings.
Accuracy of location is relative to surrounding features.

Unverified Features:
Feature's existence have not been verified through field investigation.
Location established through digitization of historic CAD drawings.
Accuracy of location is relative to surrounding features.

Figure 2-1

N:\Projermr\15-03095.10
**Hartford Working Group **
PDF_Output\Figure2-1_031217-01.pdf

VERSION: 031217-01

Clayton SM
GROUP SERVICES

Figure 2-2

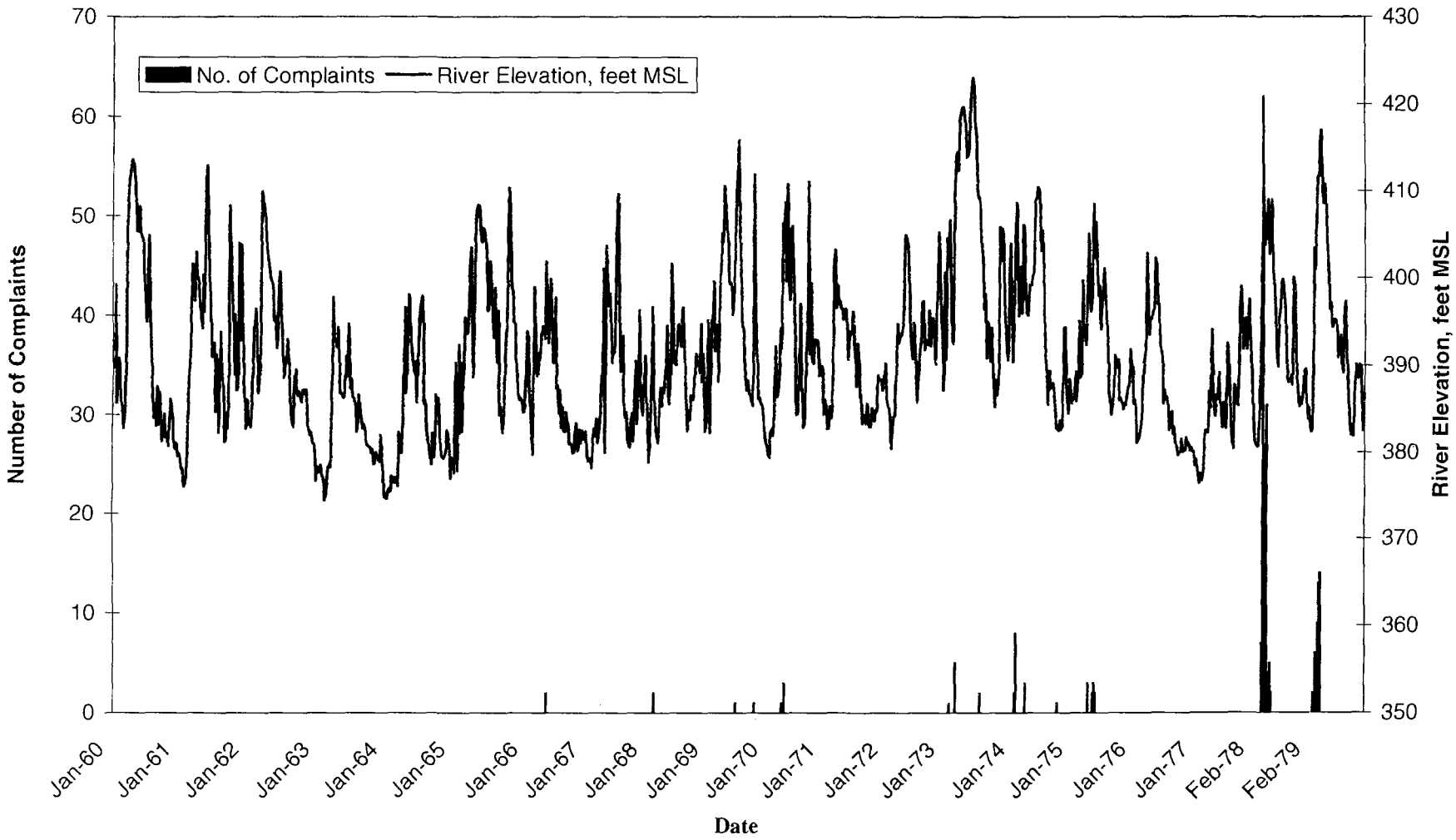

Number of Complaints and Mississippi River Elevation - 1960 to 1979
No. of Complaints
River Elevation, feet MSL
Number of Complaints
River Elevation, feet MSL
Date
0
10
20
30
40
50
60
70
350
360
370
380
390
400
410
420
430
Jan-60
Jan-61
Jan-62
Jan-63
Jan-64
Jan-65
Jan-66
Jan-67
Jan-68
Jan-69
Jan-70
Jan-71
Jan-72
Jan-73
Jan-74
Jan-75
Jan-76
Jan-77
Feb-78
Feb-79

Figure 2-3

Number of Complaints and Mississippi River Elevation - 1980 to 2003

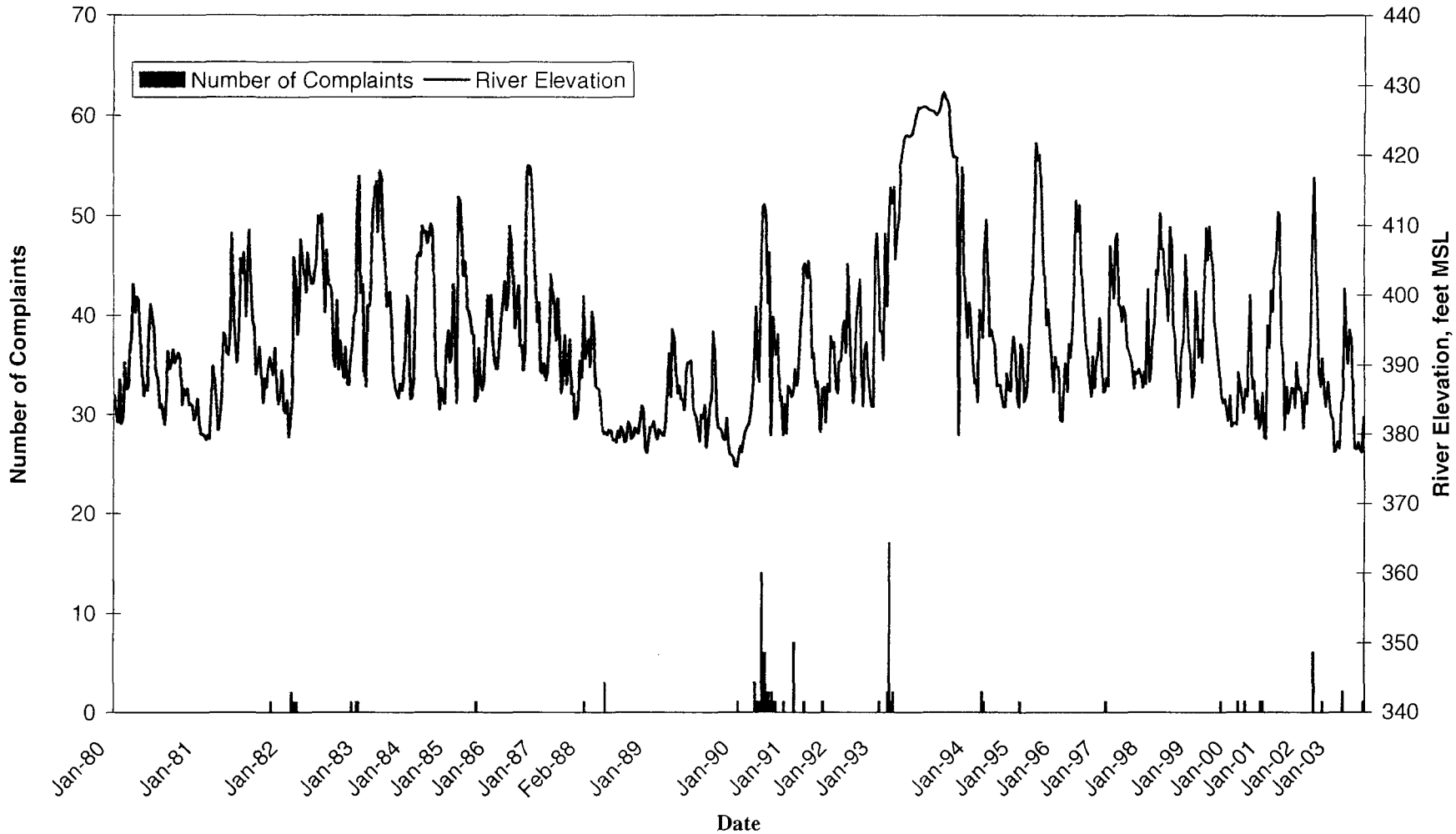


Figure 2-4

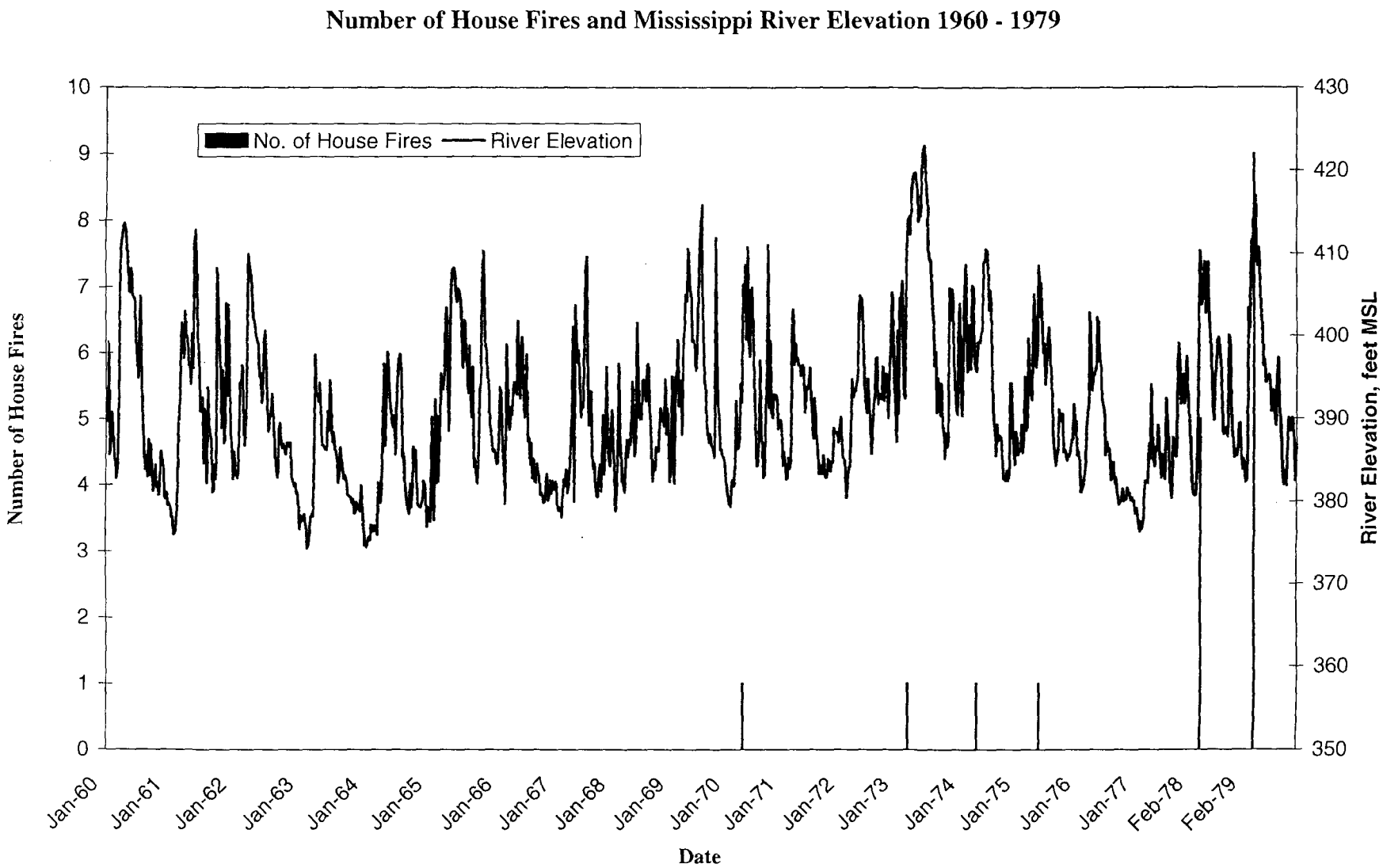
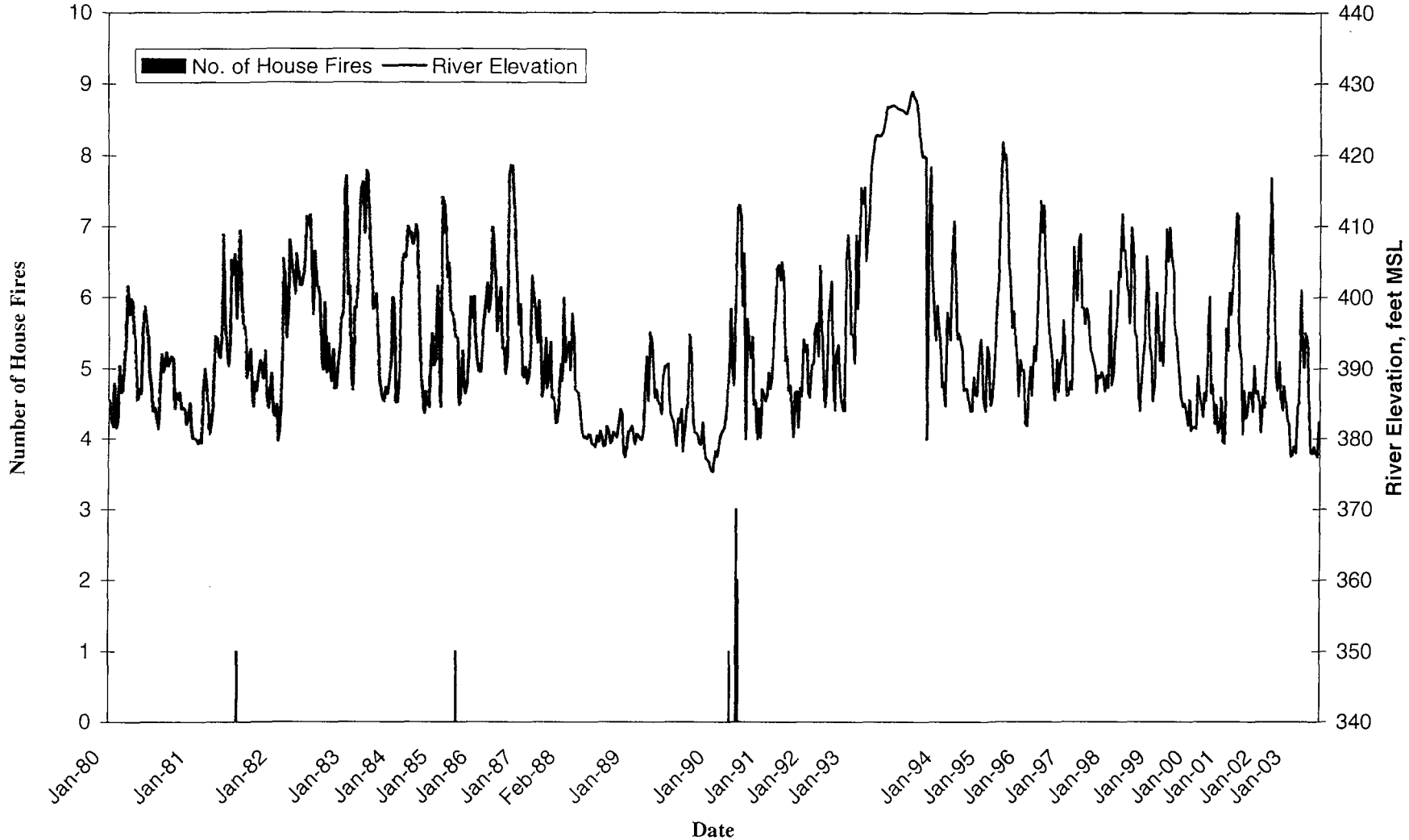
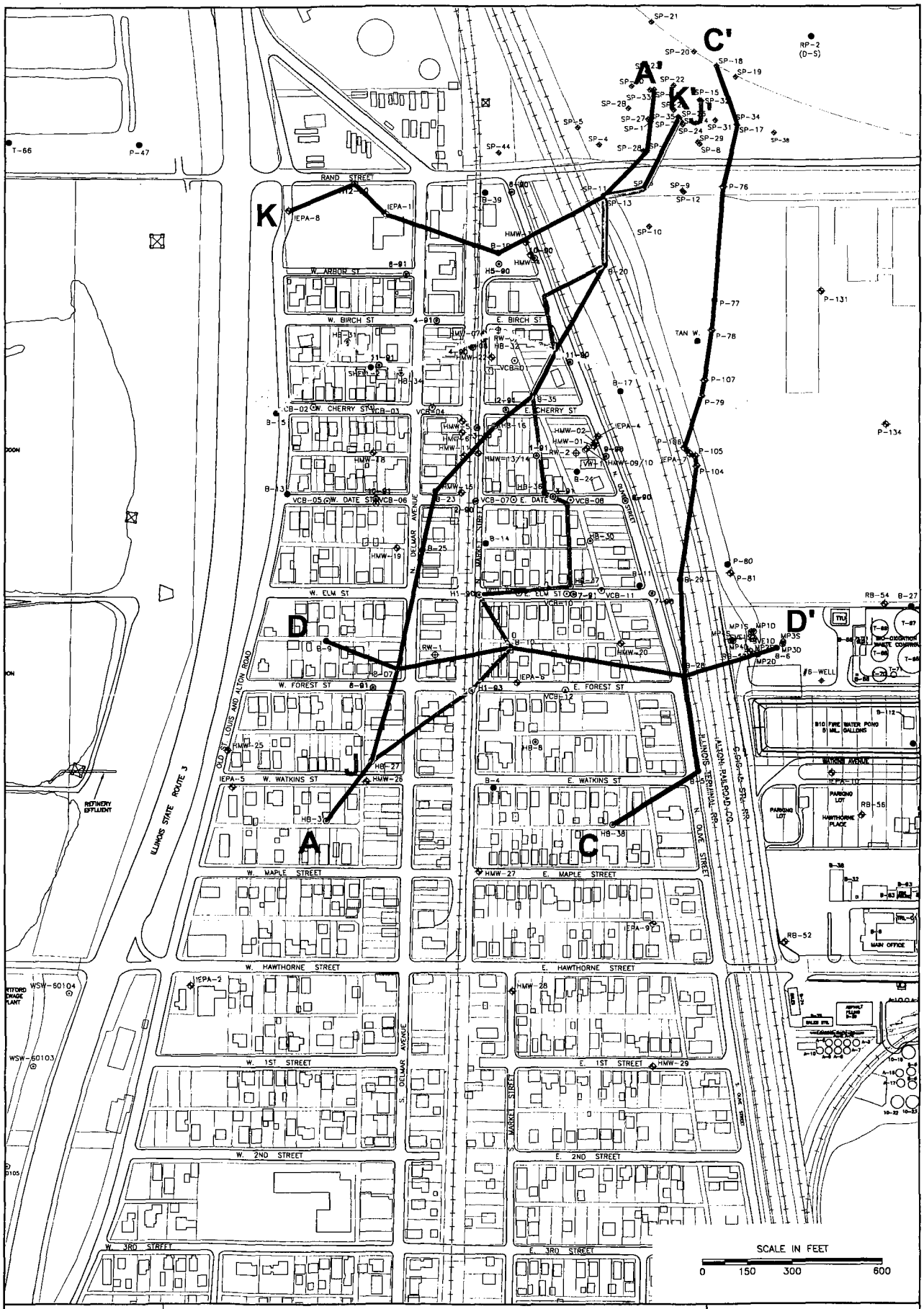

Number of House Fires and Mississippi River Elevation 1960 - 1979
No. of House Fires
River Elevation
Number of House Fires
River Elevation, feet MSL
Date
0
1
2
3
4
5
6
7
8
9
10
350
360
370
380
390
400
410
420
430
Jan-60
Jan-61
Jan-62
Jan-63
Jan-64
Jan-65
Jan-66
Jan-67
Jan-68
Jan-69
Jan-70
Jan-71
Jan-72
Jan-73
Jan-74
Jan-75
Jan-76
Jan-77
Feb-78
Feb-79

Figure 2-5

Number of House Fires and Mississippi River Elevation, 1980 - 2003





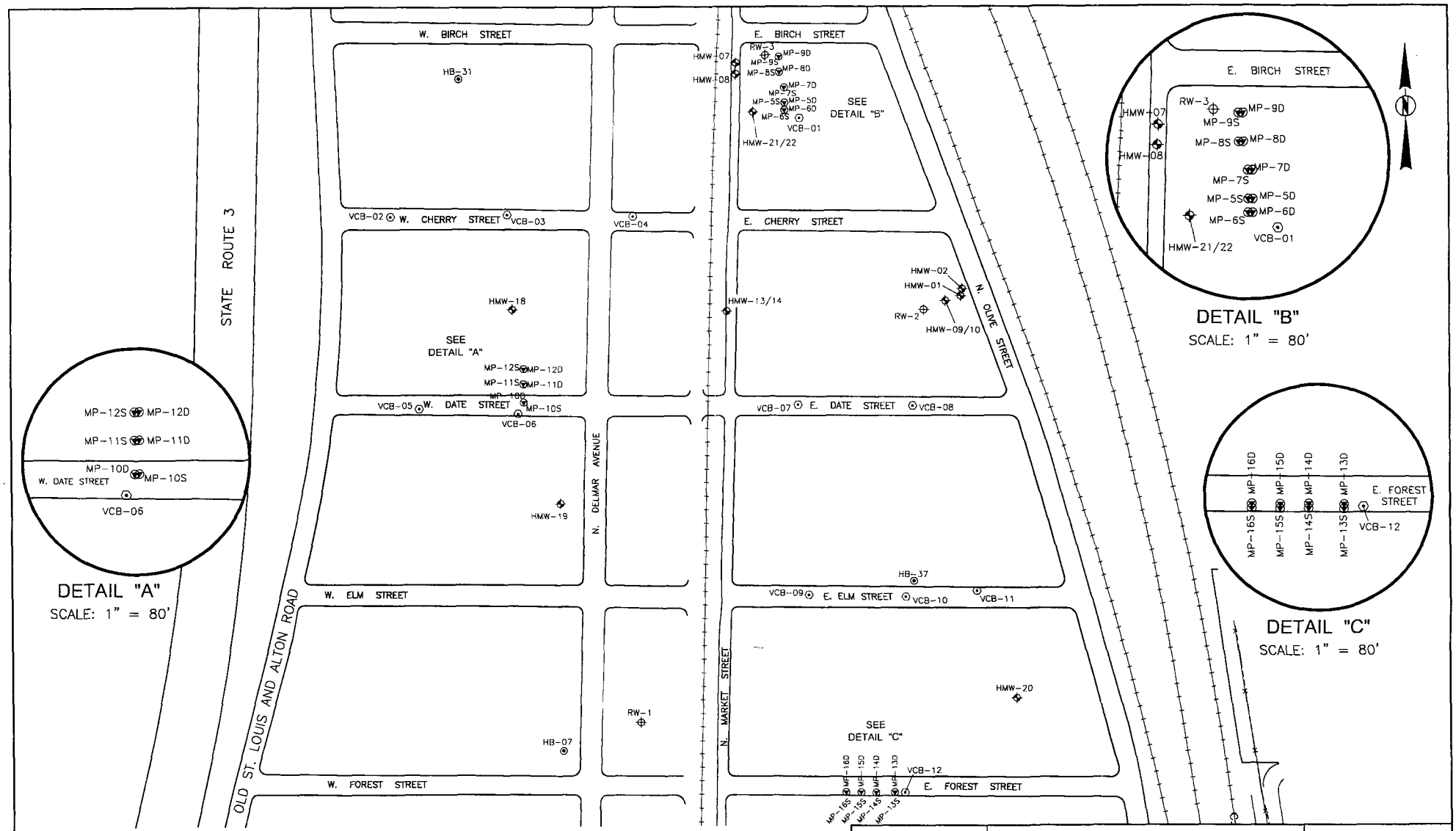
CHECK BY	KDC
DRAWN BY	BCP
DATE	12-18-03
SCALE	AS SHOWN
CAD NO.	0309507D
PRJ NO.	15-03095

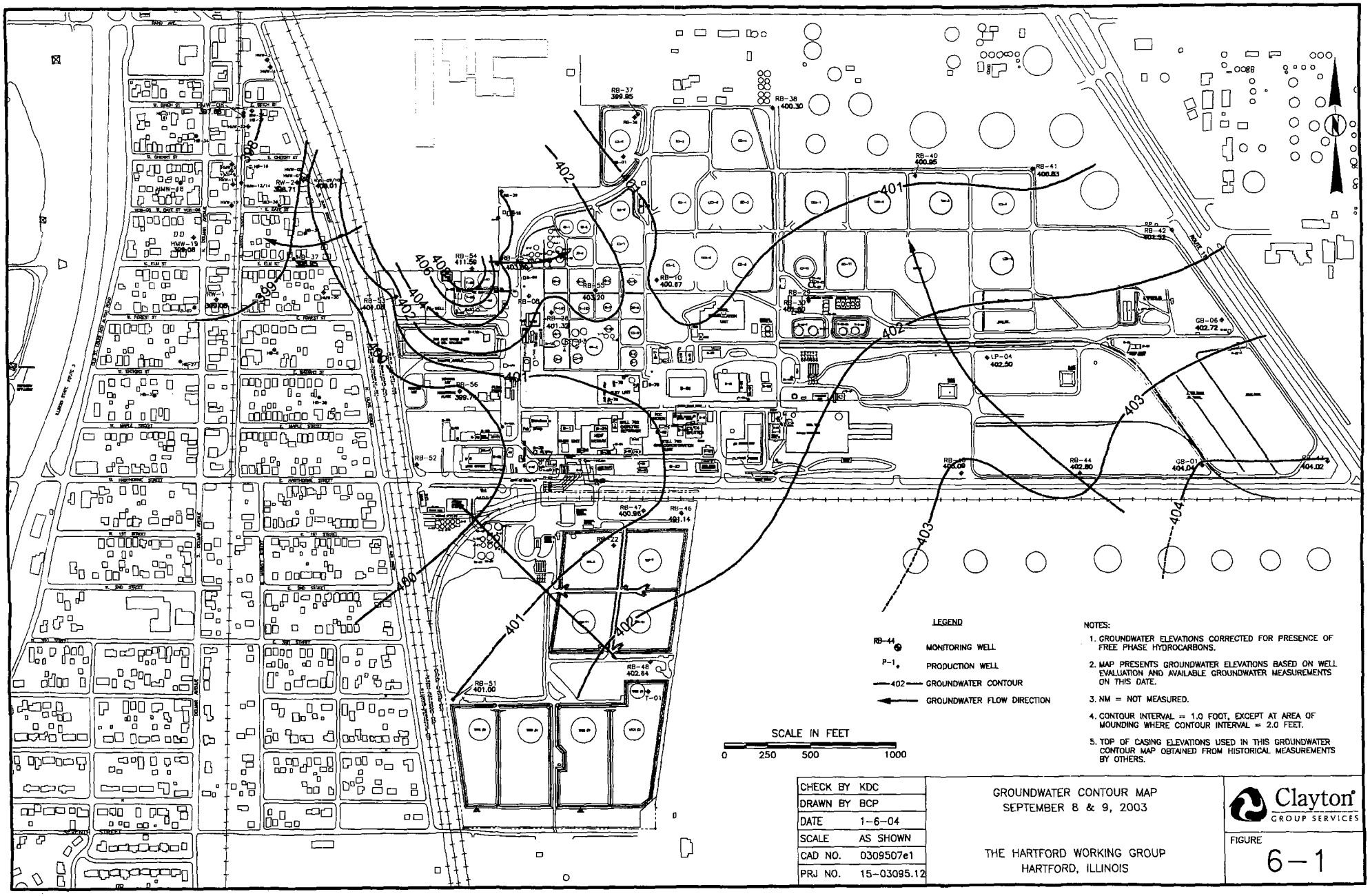
CROSS SECTION REFERENCE MAP
VILLAGE OF HARTFORD

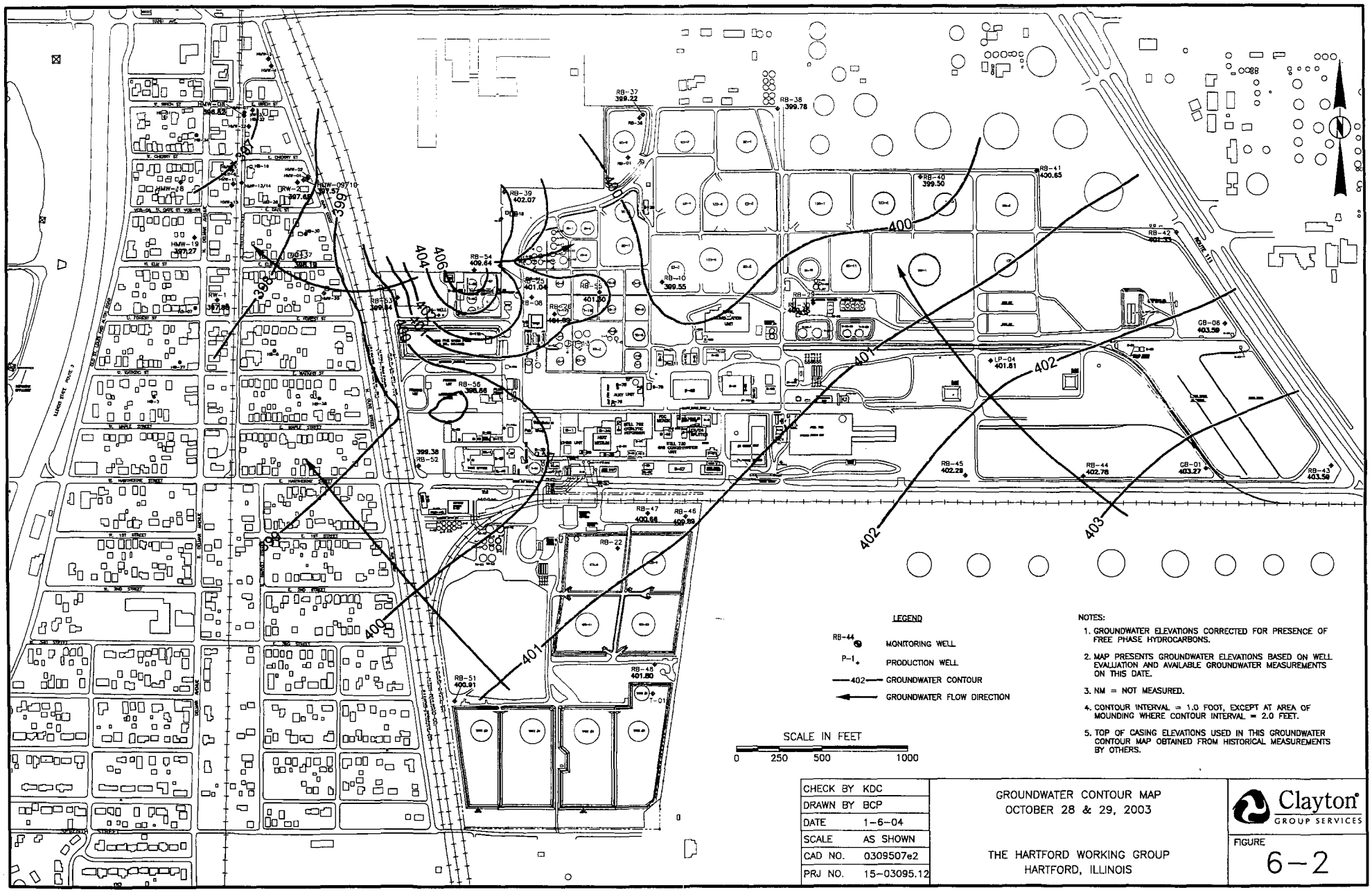
HARTFORD WORKING GROUP
HARTFORD, ILLINOIS

Clayton®
GROUP SERVICES

FIGURE 3-1


W. BIRCH STREET
E. BIRCH STREET
HB-31
HMW-07
HMW-08
RW-3
MP-9D
MP-9S
MP-8S
MP-8D
MP-7D
MP-7S
MP-5S
MP-5D
MP-6D
MP-6S
VCB-01
HMW-21/22
SEE DETAIL "B"
VCB-02
W. CHERRY STREET
VCB-03
VCB-04
E. CHERRY STREET
HMW-18
SEE DETAIL "A"
MP-12S
MP-12D
MP-11S
MP-11D
MP-10D
MP-10S
VCB-05
W. DATE STREET
VCB-06
VCB-07
E. DATE STREET
VCB-08
HMW-13/14
HMW-02
HMW-01
RW-2
HMW-09/10
N. OLIVE STREET
STATE ROUTE 3
N. DELMAR AVENUE
HMW-19
W. ELM STREET
VCB-09
E. ELM STREET
VCB-10
VCB-11
HB-37
OLD ST. LOUIS AND ALTON ROAD
N. MARKET STREET
HMW-20
SEE DETAIL "C"
RW-1
HB-07
W. FOREST STREET
E. FOREST STREET
MP-16S
MP-16D
MP-15S
MP-15D
MP-14S
MP-14D
MP-13S
MP-13D
VCB-12
DETAIL "A"
SCALE: 1" = 80'
DETAIL "B"
SCALE: 1" = 80'
DETAIL "C"
SCALE: 1" = 80'
LEGEND
SOIL VAPOR MONITORING PROBE (MP)
MONITORING WELL (HMW)
MONITORING WELL (HB)
VAPOR CONTROL BORING (VCB)
RECOVERY WELL (RW)
NOTE:
SOIL VAPOR MONITORING PROBES (MP) INSTALLED BY CLAYTON ON JULY 23-25, 2003. REMAINING WELLS AND BORINGS INSTALLED BY OTHERS.
SCALE IN FEET
0 75 150 300
CHECK BY
DRAWN BY BCP
DATE 12-18-03
SCALE AS SHOWN
CAD NO. 0309506B
PRJ NO. 15-03095
SOIL VAPOR MONITORING PROBE LOCATIONS
JULY 2003
THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS
Clayton GROUP SERVICES
FIGURE
3-2


LEGEND
RB-44 MONITORING WELL
P-1 PRODUCTION WELL
402 GROUNDWATER CONTOUR
GROUNDWATER FLOW DIRECTION
SCALE IN FEET
0 250 500 1000
NOTES:
1. GROUNDWATER ELEVATIONS CORRECTED FOR PRESENCE OF FREE PHASE HYDROCARBONS.
2. MAP PRESENTS GROUNDWATER ELEVATIONS BASED ON WELL EVALUATION AND AVAILABLE GROUNDWATER MEASUREMENTS ON THIS DATE.
3. NM = NOT MEASURED.
4. CONTOUR INTERVAL = 1.0 FOOT, EXCEPT AT AREA OF MOUNDING WHERE CONTOUR INTERVAL = 2.0 FEET.
5. TOP OF CASING ELEVATIONS USED IN THIS GROUNDWATER CONTOUR MAP OBTAINED FROM HISTORICAL MEASUREMENTS BY OTHERS.
CHECK BY KDC
DRAWN BY BCP
DATE 1-6-04
SCALE AS SHOWN
CAD NO. 0309507e1
PRJ NO. 15-03095.12
GROUNDWATER CONTOUR MAP
SEPTEMBER 8 & 9, 2003
THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS
Clayton GROUP SERVICES
FIGURE
6-1



NOTES:

1. GROUNDWATER ELEVATIONS CORRECTED FOR PRESENCE OF FREE PHASE HYDROCARBONS.
2. MAP PRESENTS GROUNDWATER ELEVATIONS BASED ON WELL EVALUATION AND AVAILABLE GROUNDWATER MEASUREMENTS ON THIS DATE.
3. NM = NOT MEASURED.
4. CONTOUR INTERVAL = 1.0 FOOT, EXCEPT AT AREA OF MOUNDING WHERE CONTOUR INTERVAL = 2.0 FEET.
5. TOP OF CASING ELEVATIONS USED IN THIS GROUNDWATER CONTOUR MAP OBTAINED FROM HISTORICAL MEASUREMENTS BY OTHERS.

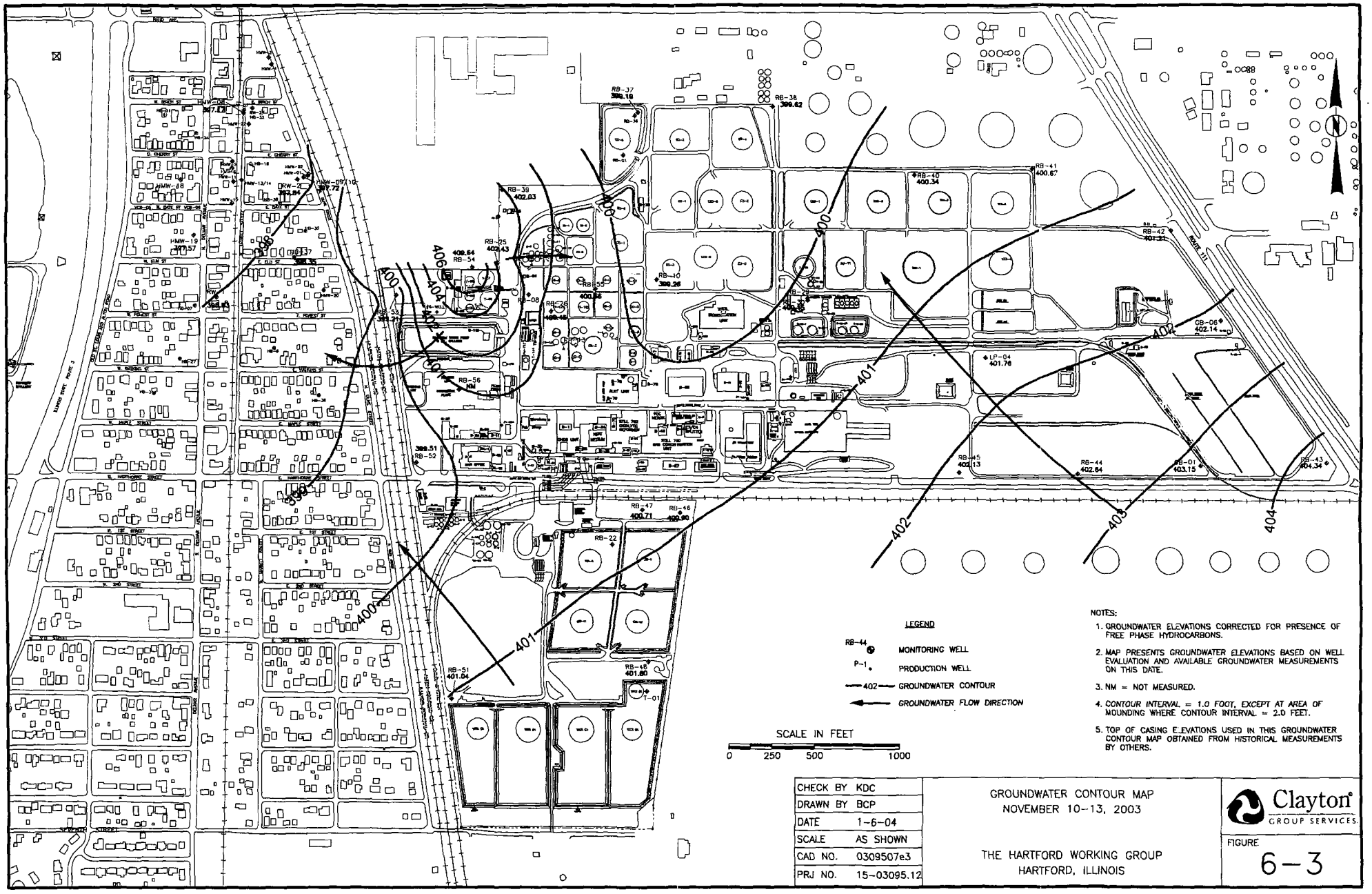
CHECK BY	KDC
DRAWN BY	BCP
DATE	1-6-04
SCALE	AS SHOWN
CAD NO.	0309507e2
PRJ NO.	15-03095.12

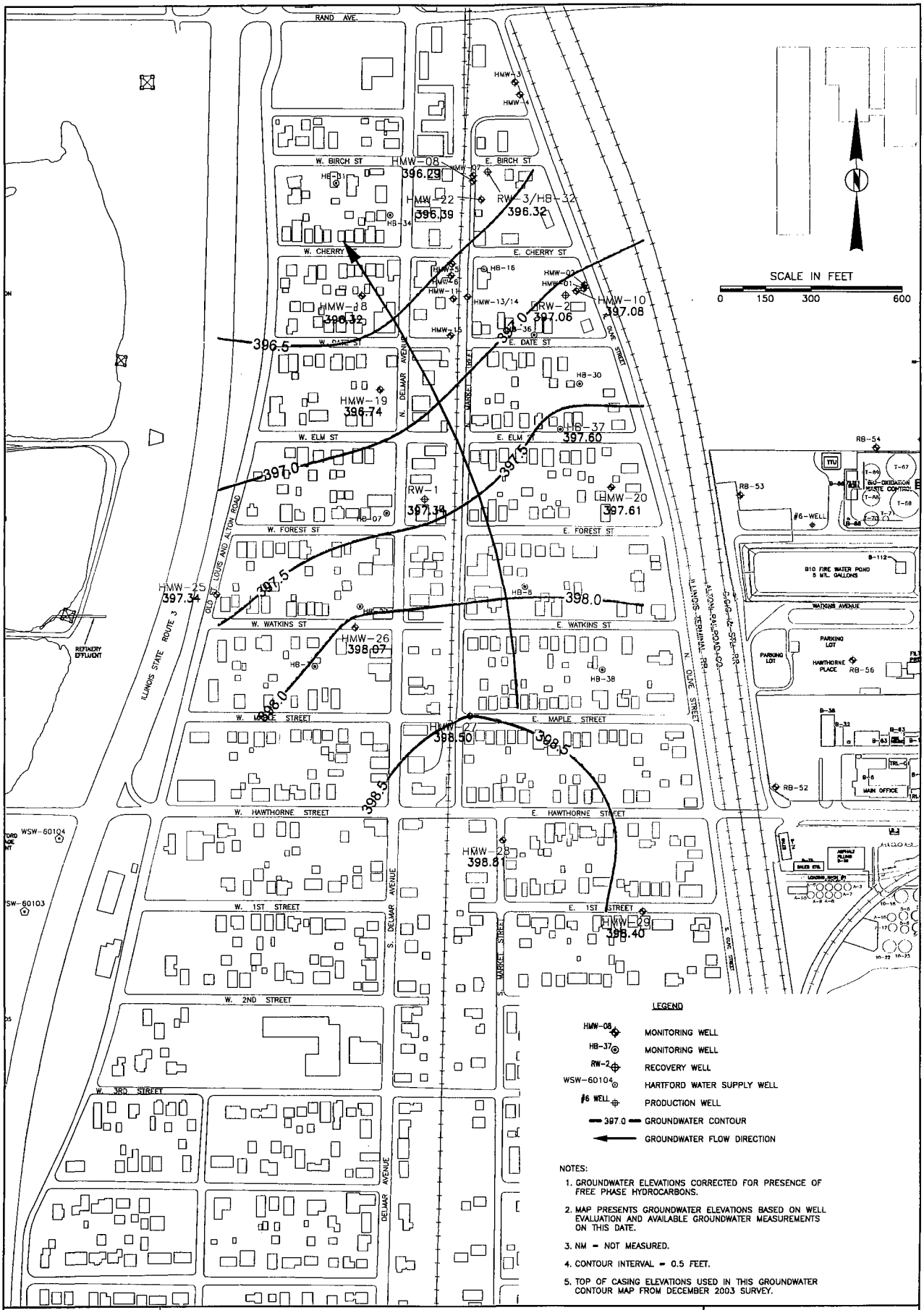
GROUNDWATER CONTOUR MAP
OCTOBER 28 & 29, 2003

THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS

Clayton® GROUP SERVICES

FIGURE
6-2


LEGEND
RB-44 MONITORING WELL
P-1 PRODUCTION WELL
402 GROUNDWATER CONTOUR
GROUNDWATER FLOW DIRECTION
SCALE IN FEET
0 250 500 1000
NOTES:
1. GROUNDWATER ELEVATIONS CORRECTED FOR PRESENCE OF FREE PHASE HYDROCARBONS.
2. MAP PRESENTS GROUNDWATER ELEVATIONS BASED ON WELL EVALUATION AND AVAILABLE GROUNDWATER MEASUREMENTS ON THIS DATE.
3. NM = NOT MEASURED.
4. CONTOUR INTERVAL = 1.0 FOOT, EXCEPT AT AREA OF MOUNDING WHERE CONTOUR INTERVAL = 2.0 FEET.
5. TOP OF CASING ELEVATIONS USED IN THIS GROUNDWATER CONTOUR MAP OBTAINED FROM HISTORICAL MEASUREMENTS BY OTHERS.
CHECK BY KDC
DRAWN BY BCP
DATE 1-6-04
SCALE AS SHOWN
CAD NO. 0309507e3
PRJ NO. 15-03095.12
GROUNDWATER CONTOUR MAP
NOVEMBER 10-13, 2003
THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS
Clayton GROUP SERVICES
FIGURE
6-3



NOTES:

1. GROUNDWATER ELEVATIONS CORRECTED FOR PRESENCE OF FREE PHASE HYDROCARBONS.
2. MAP PRESENTS GROUNDWATER ELEVATIONS BASED ON WELL EVALUATION AND AVAILABLE GROUNDWATER MEASUREMENTS ON THIS DATE.
3. NM = NOT MEASURED.
4. CONTOUR INTERVAL = 0.5 FEET.
5. TOP OF CASING ELEVATIONS USED IN THIS GROUNDWATER CONTOUR MAP FROM DECEMBER 2003 SURVEY.

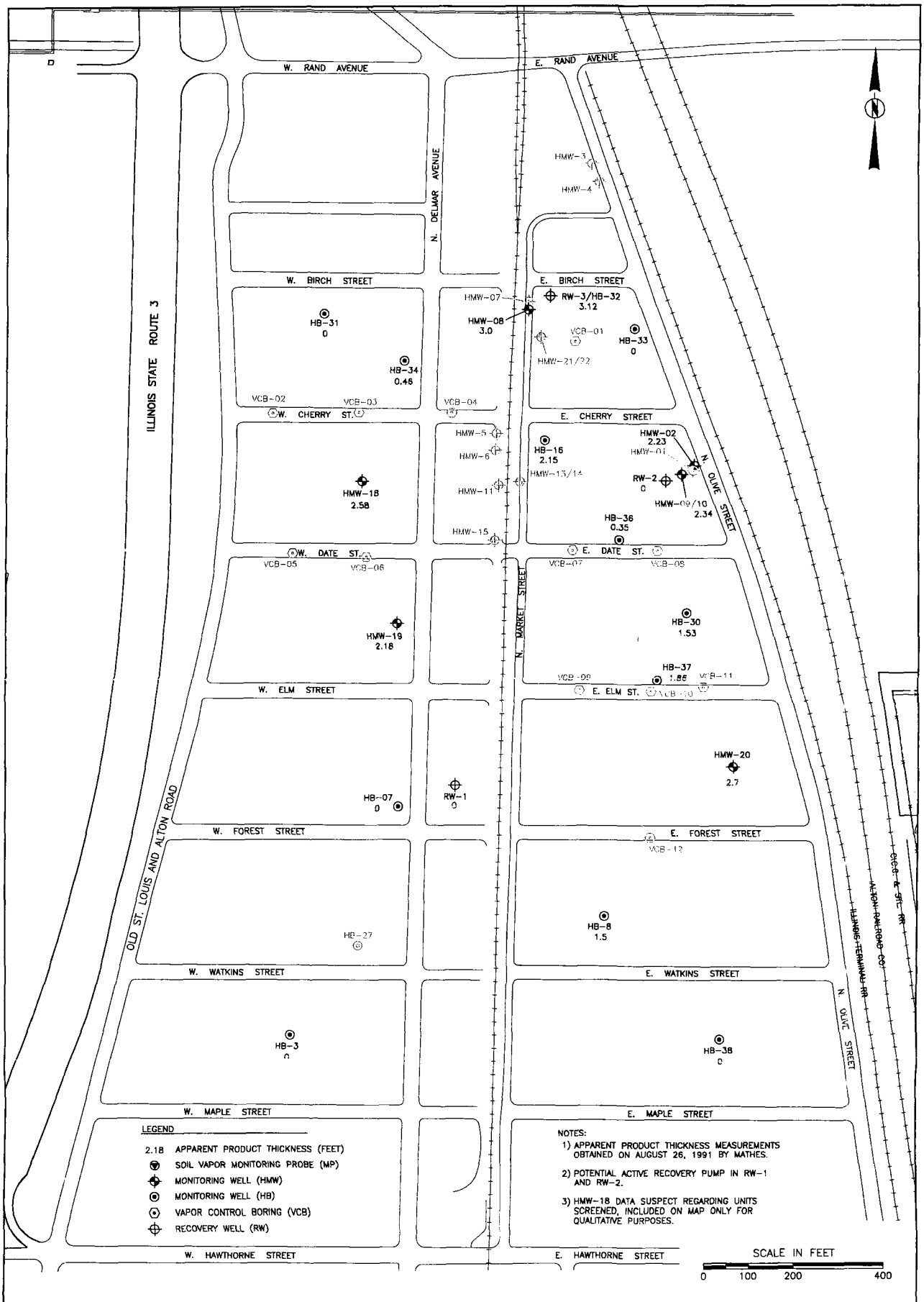
CHECK BY	KDC
DRAWN BY	BCP
DATE	1-6-04
SCALE	AS SHOWN
CAD NO.	0309507e4
PRJ NO.	15-03095

GROUNDWATER CONTOUR MAP
DECEMBER 10, 2003

HARTFORD WORKING GROUP
VILLAGE OF HARTFORD
HARTFORD, ILLINOIS

Clayton® GROUP SERVICES

FIGURE 6-3A

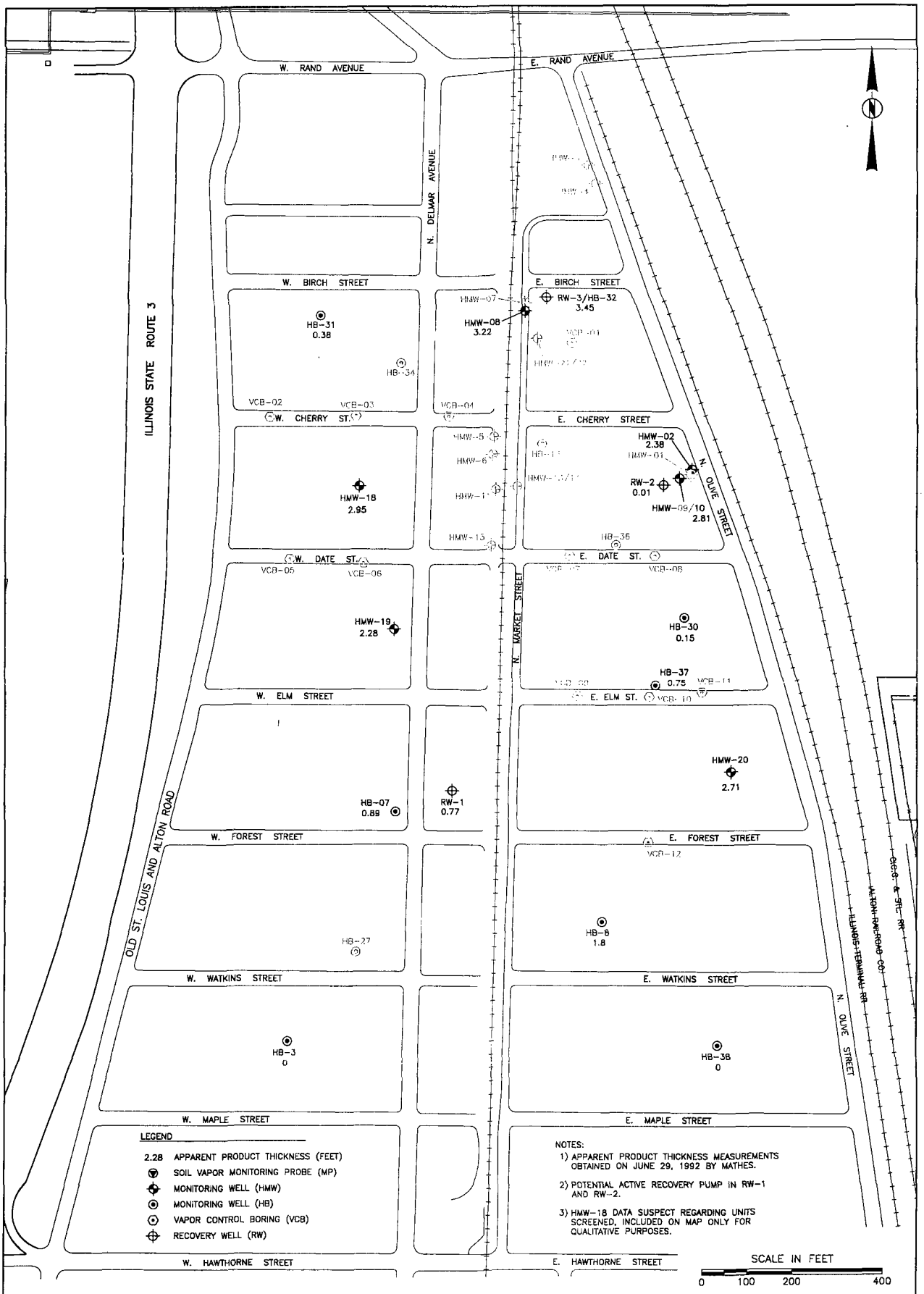


CHECK BY	KDC
DRAWN BY	BCP
DATE	12-18-03
SCALE	AS SHOWN
CAD NO.	0309506J
PRJ NO.	15-03095

APPARENT FPH PRODUCT THICKNESS MAP
AUGUST 26, 1991
EPA/MAIN SAND
VILLAGE OF HARTFORD
THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS

Clayton® GROUP SERVICES

FIGURE 6-4

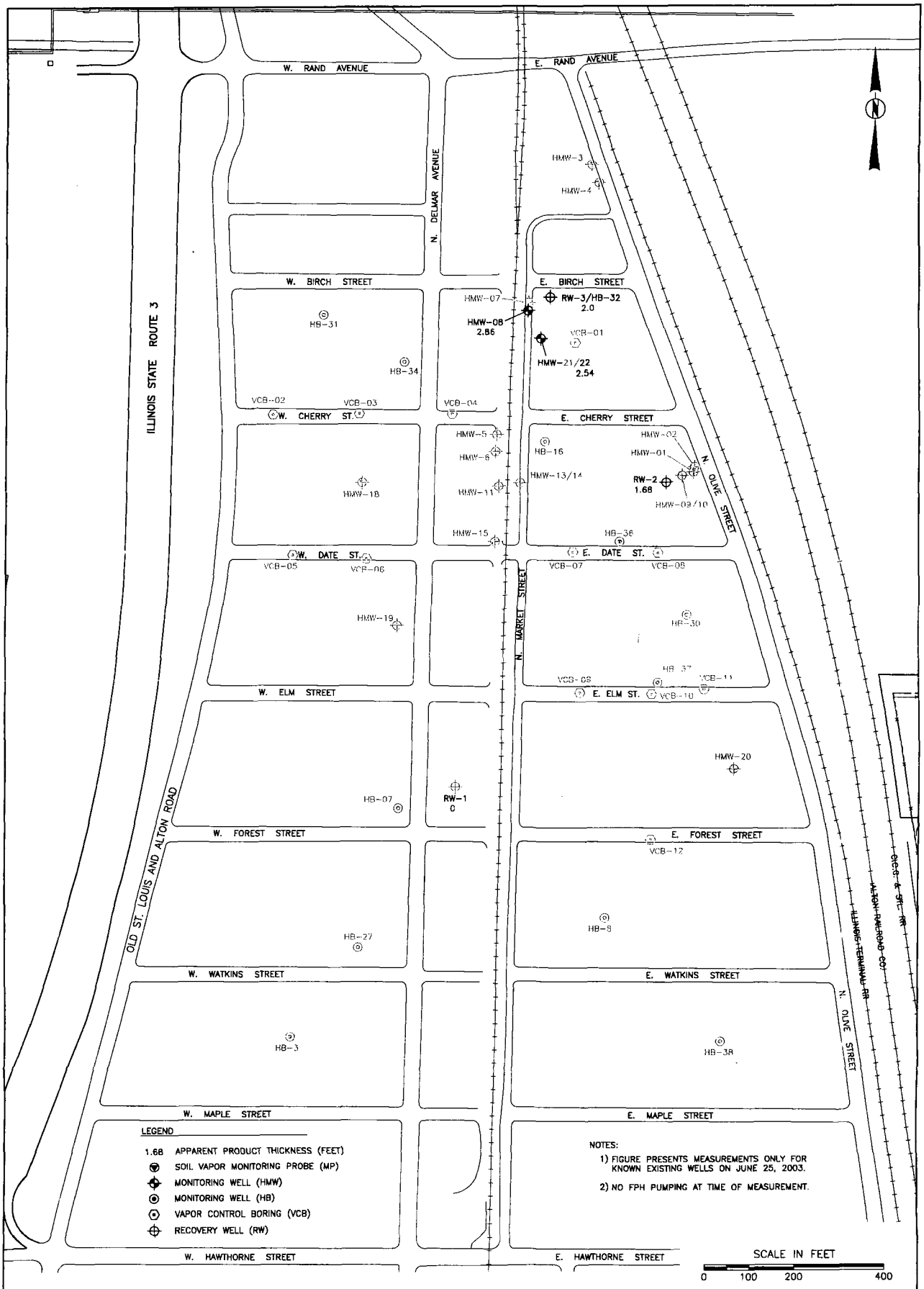


CHECK BY	KDC
DRAWN BY	BCP
DATE	12-18-03
SCALE	AS SHOWN
CAD NO.	0309506i
PRJ NO.	15-03095

APPARENT FPH PRODUCT THICKNESS MAP
JUNE 29, 1992
EPA/MAIN SAND
VILLAGE OF HARTFORD
THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS

Clayton GROUP SERVICES

FIGURE 6-5

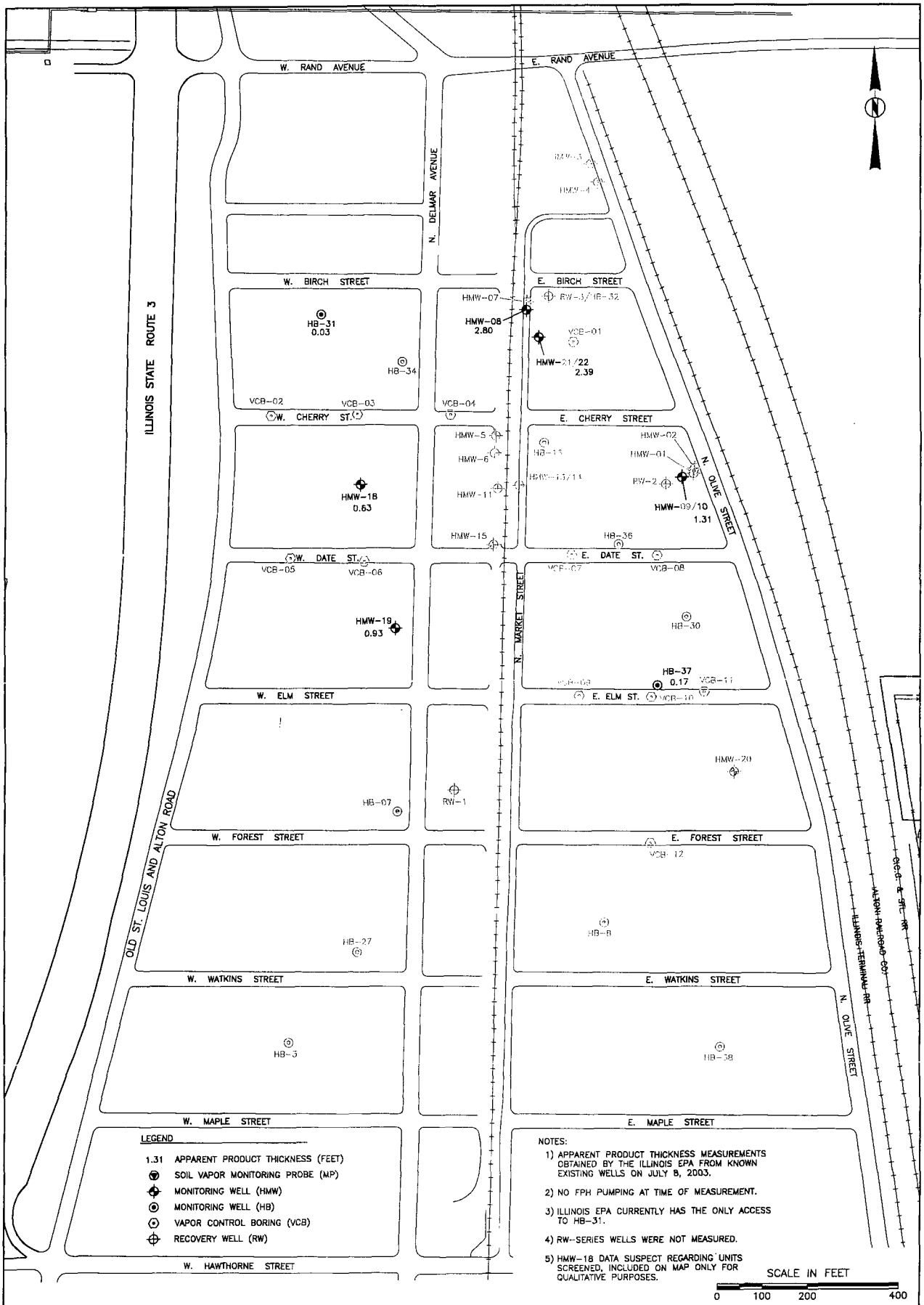


CHECK BY	KDC
DRAWN BY	BCP
DATE	12-18-03
SCALE	AS SHOWN
CAD NO.	0309506H
PRJ NO.	15-03095

APPARENT FPH PRODUCT THICKNESS MAP
JUNE 25, 2003
EPA/MAIN SAND
VILLAGE OF HARTFORD
THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS

Clayton GROUP SERVICES

FIGURE 6-6

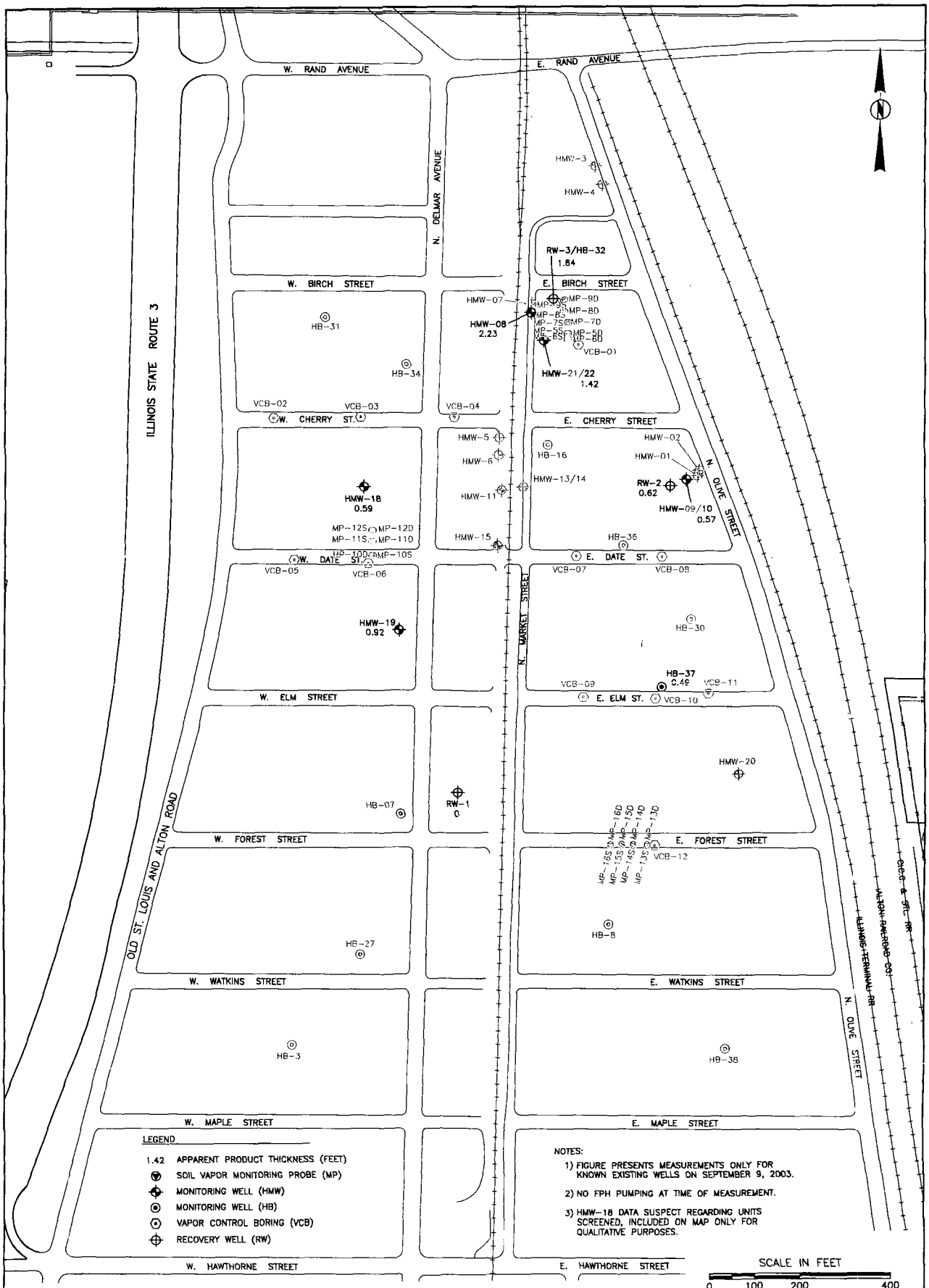


CHECK BY	KDC
DRAWN BY	BCP
DATE	12-18-03
SCALE	AS SHOWN
CAD NO.	0309506G
PRJ NO.	15-03095

APPARENT FPH PRODUCT THICKNESS MAP
JULY 8, 2003
EPA/MAIN SAND
VILLAGE OF HARTFORD
THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS

Clayton GROUP SERVICES

FIGURE 6-7

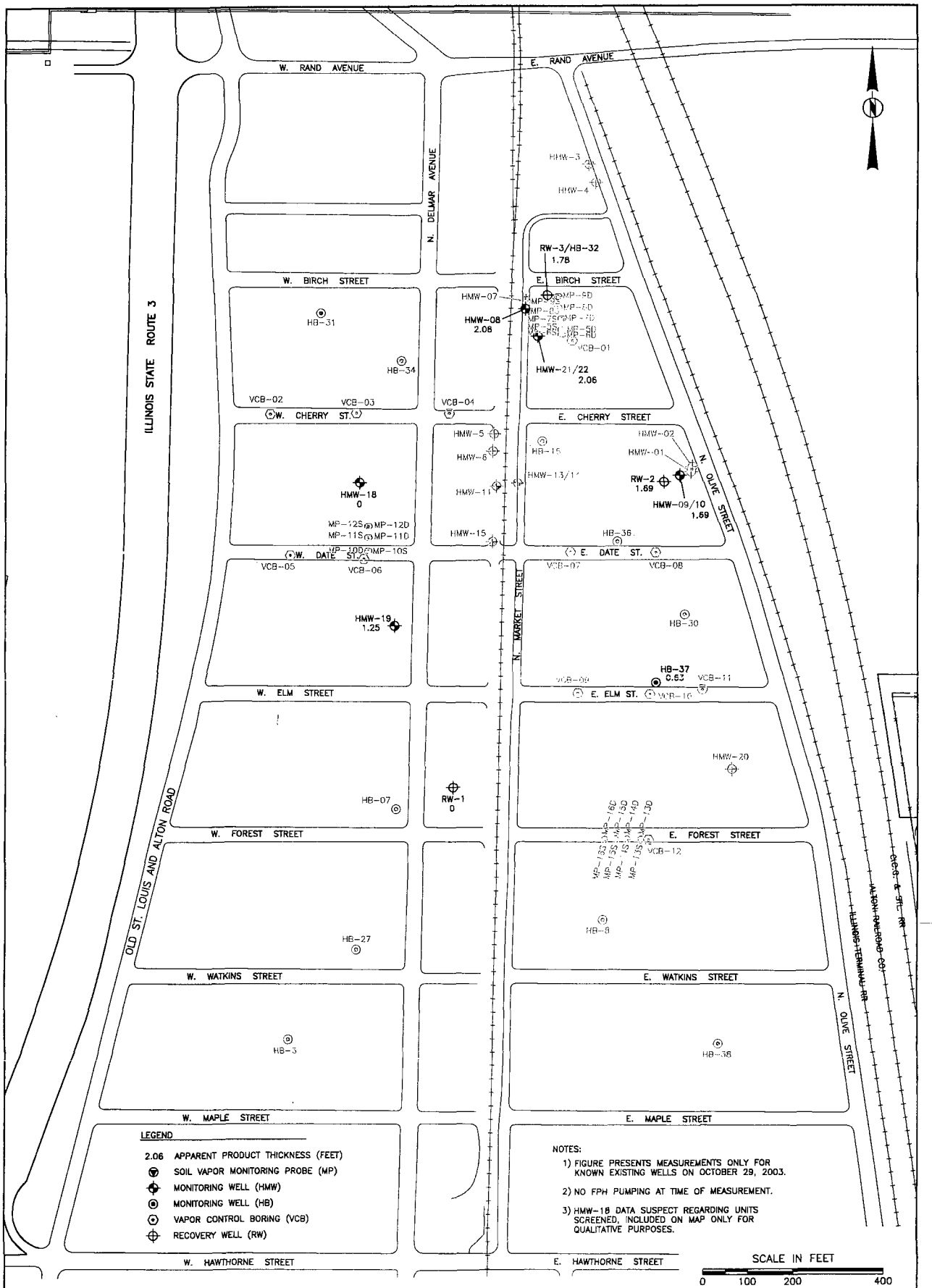


CHECK BY	KDC
DRAWN BY	BCP
DATE	12-18-03
SCALE	AS SHOWN
CAD NO.	0309506F
PRJ NO.	15-03095

APPARENT FPH PRODUCT THICKNESS MAP
SEPTEMBER 9, 2003
EPA/MAIN SAND
VILLAGE OF HARTFORD
THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS

Clayton® GROUP SERVICES

FIGURE 6-8

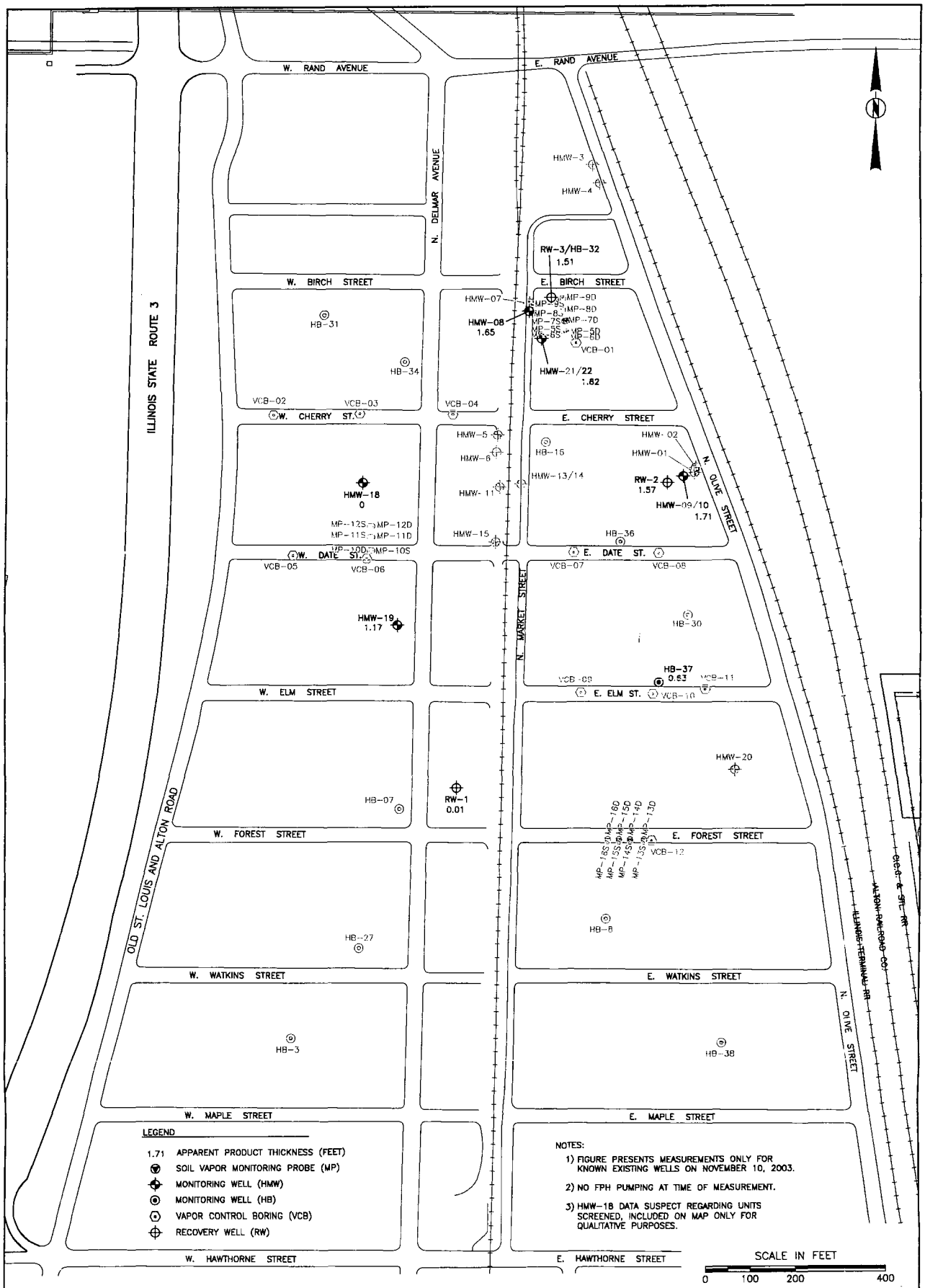


CHECK BY	KDC
DRAWN BY	BCP
DATE	12-18-03
SCALE	AS SHOWN
CAD NO.	0309506E
PRJ NO.	15-03095

APPARENT FPH PRODUCT THICKNESS MAP
OCTOBER 29, 2003
EPA/MAIN SAND
VILLAGE OF HARTFORD
THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS

Clayton® GROUP SERVICES

FIGURE 6-9

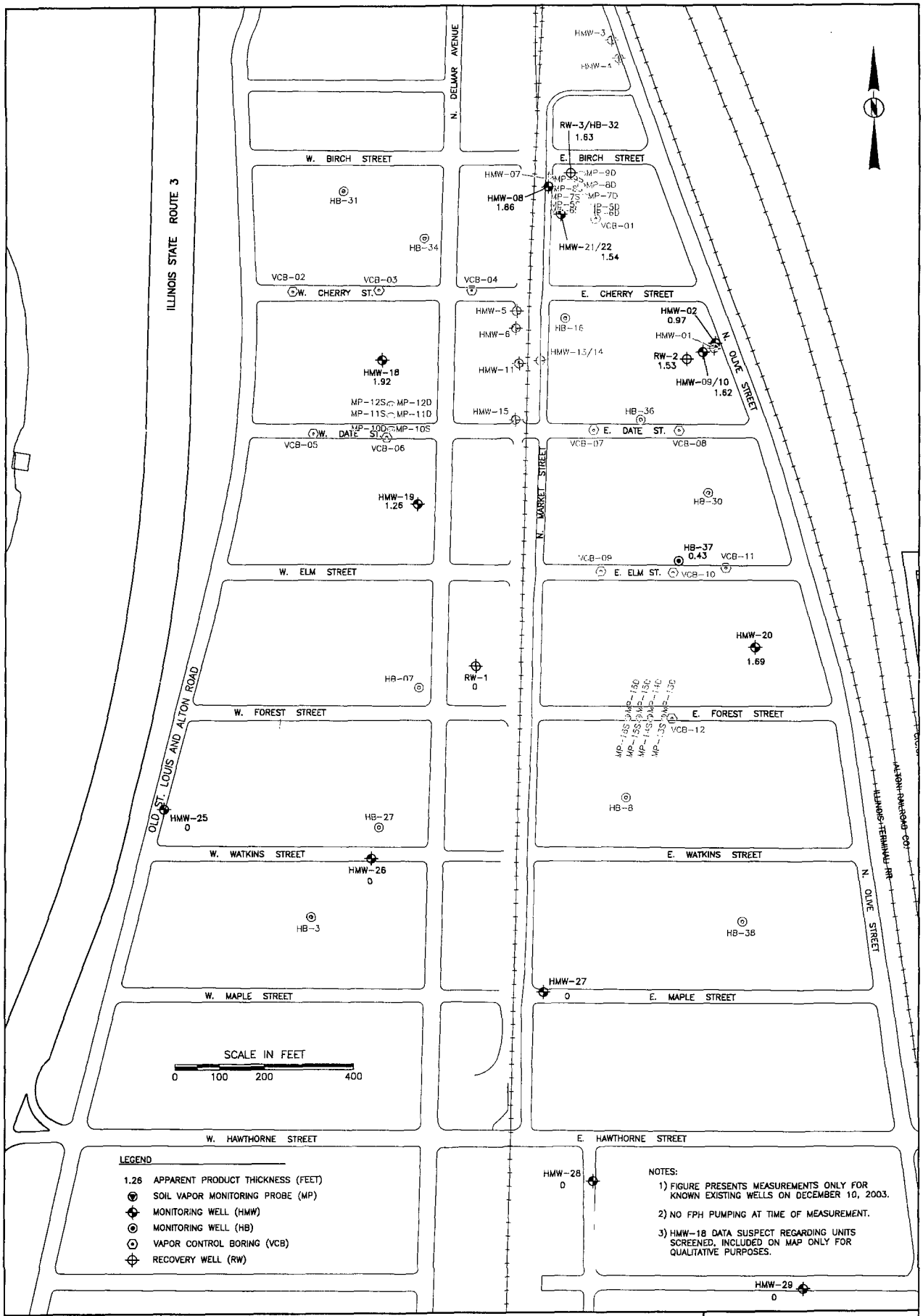


CHECK BY	KDC
DRAWN BY	BCP
DATE	12-18-03
SCALE	AS SHOWN
CAD NO.	0309506D
PRJ NO.	15-03095

APPARENT FPH PRODUCT THICKNESS MAP
NOVEMBER 10, 2003
EPA/MAIN SAND
VILLAGE OF HARTFORD
THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS

Clayton® GROUP SERVICES

FIGURE 6-10

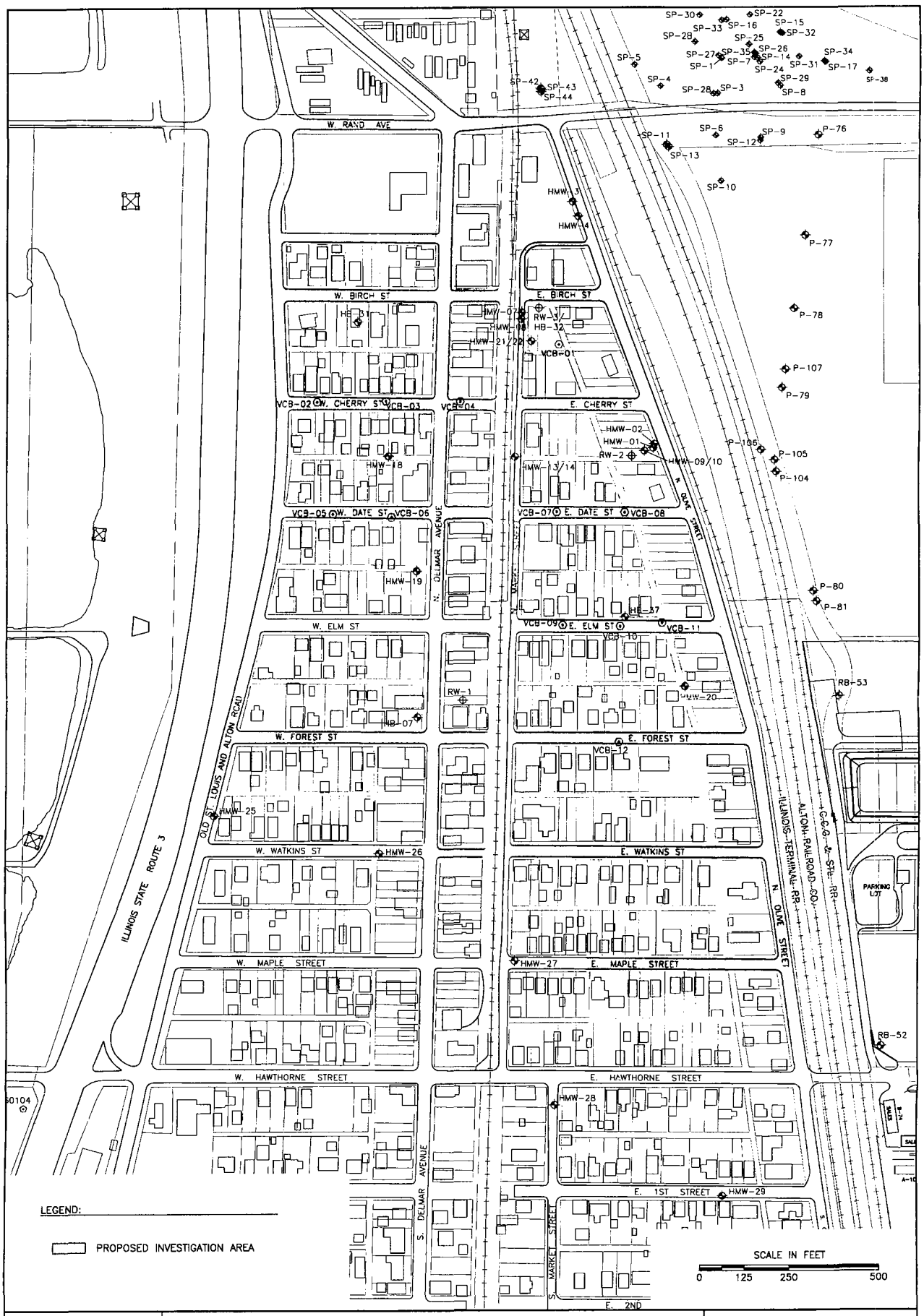


CHECK BY	KDC
DRAWN BY	BCP
DATE	12-18-03
SCALE	AS SHOWN
CAD NO.	0309506K
PRJ NO.	15-03095

APPARENT FPH PRODUCT THICKNESS MAP
DECEMBER 10, 2003
EPA/MAIN SAND
VILLAGE OF HARTFORD
THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS

Clayton GROUP SERVICES

FIGURE 6-11



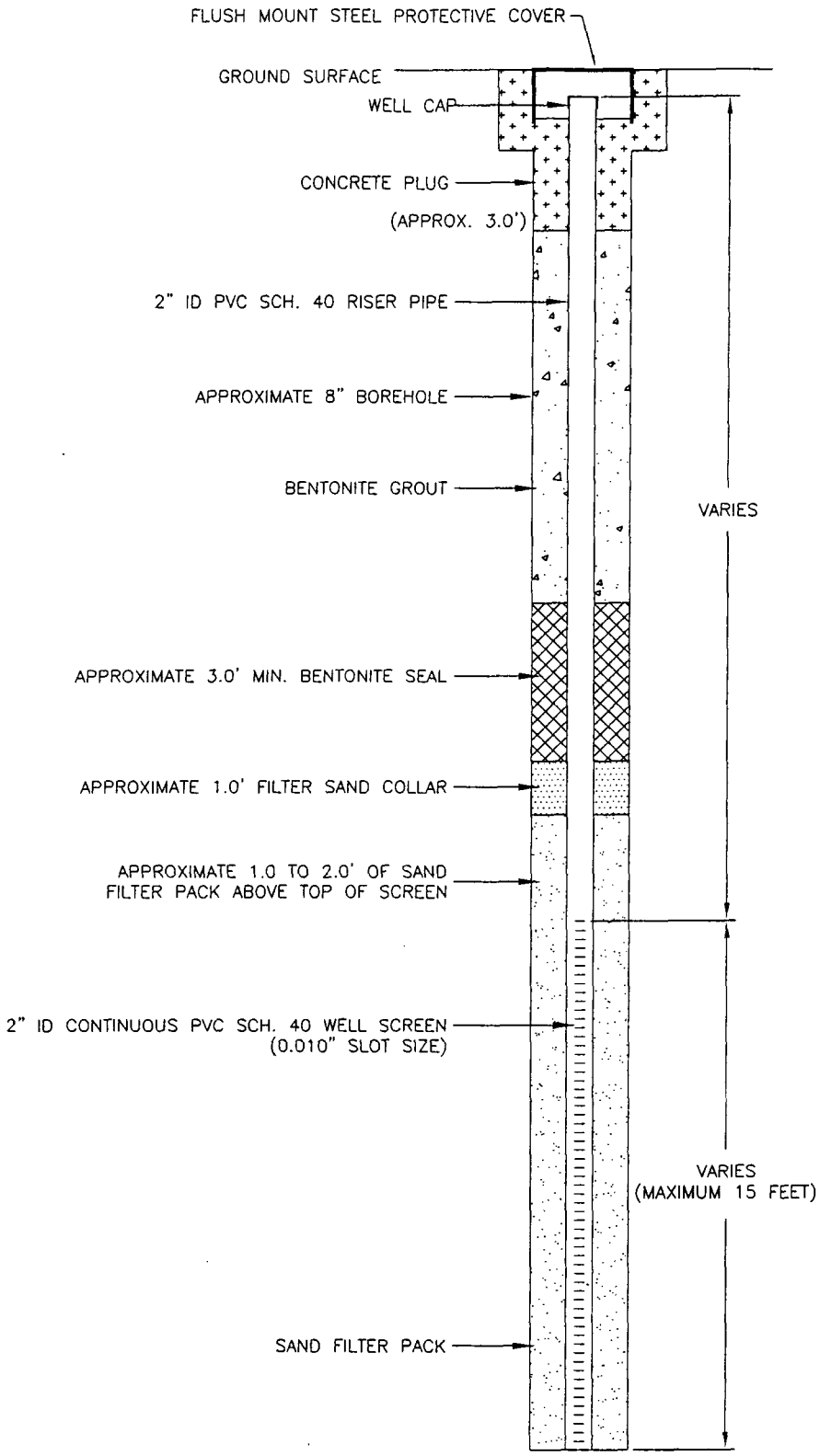
CHECK BY	KDC
DRAWN BY	BCP
DATE	12-18-03
SCALE	AS SHOWN
CAD NO.	0309507F
PRJ NO.	15-03095

PROPOSED ROST™ SAMPLING AREAS
VILLAGE OF HARTFORD

THE HARTFORD WORKING GROUP
HARTFORD, ILLINOIS

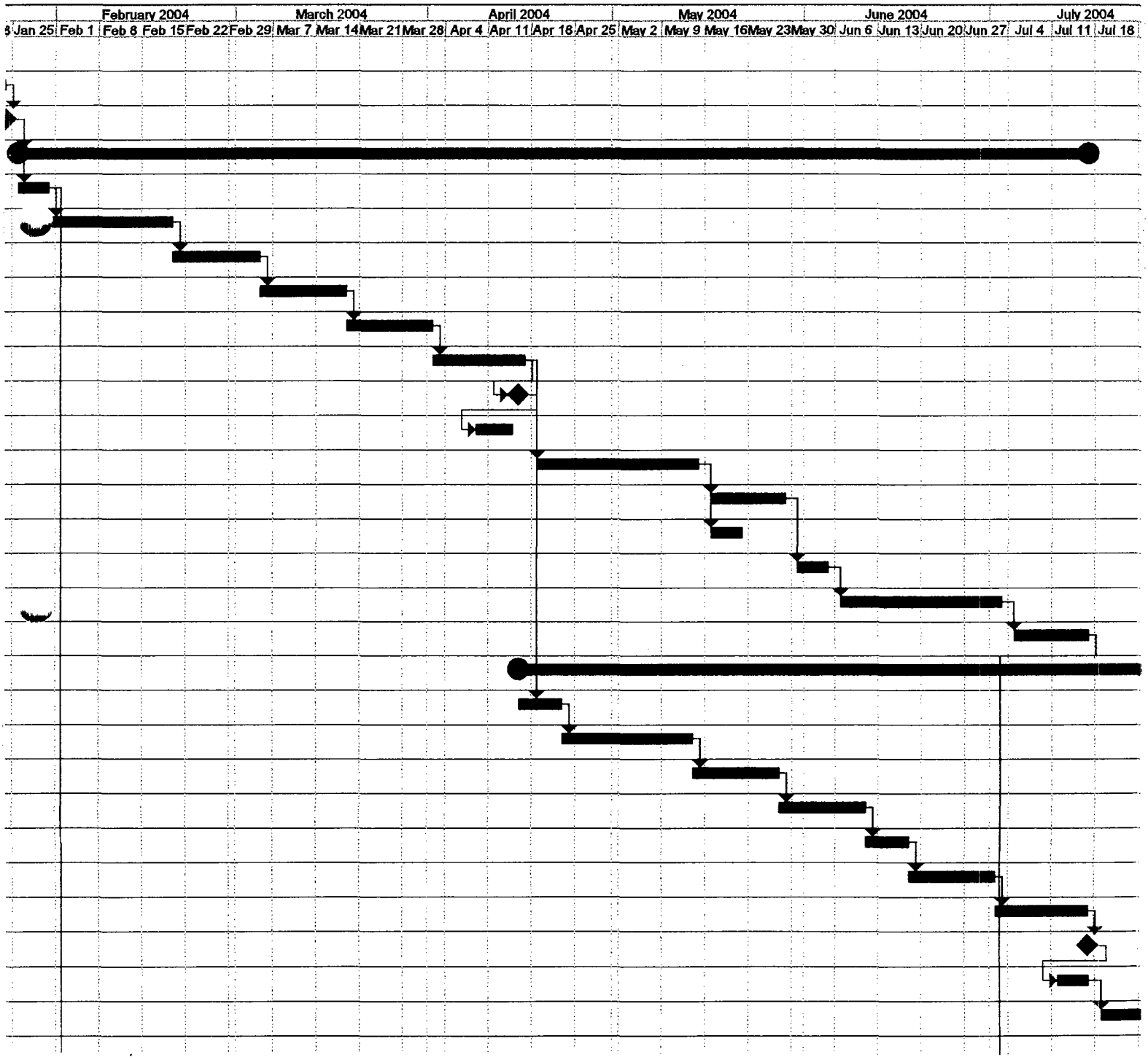
Clayton® GROUP SERVICES

FIGURE 10-1



CHECK BY KDC	REPRESENTATIVE MONITORING WELL INSTALLATION DIAGRAM	Clayton® GROUP SERVICES
DRAWN BY BCP		
DATE 10-10-03		FIGURE
SCALE AS SHOWN		10-2
CAD NO. 0309512001C	THE HARTFORD WORKING GROUP HARTFORD, ILLINOIS	
PRJ NO. 15-03095.12		

Figure 11-1
Free-Product and Dissolved Groundwater Investigation Schedule
Hartford, Illinois



TABLES

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois
Notes

Work in Progress
January 7, 2004

The Hartford Working Group / Hartford, Illinois

This table does not include gas odors observed at monitoring well or public supply wells located in the Village of Hartford.

No Village records of gas odors for 1967, 1971, 1972, 1976 and 1977 according to Hartford Police Department files.

Locations identified as unknown likely include detailed listings that occurred during same month.

The notes identifying unknowns were obtained from Phillips Service Corporation (PSC) files.

Report numbers are Village of Hartford identifications.

NA = None or not available

(1) Occurrence identified as gas explosion.

(2) Field notes indicate Dobby home on N. Olive was checked for gas. None found on their property. The source of these notes is not identified. Notes were obtained from PSC files.

(3) Field notes indicate Dobby home on N. Olive was checked for gas based on resident's report of gas odor in home for past week. None found in house, but at NE corner of house apparent gas odor was observed. The source of these notes is not identified. Notes were obtained from PSC files.

(4) Field notes indicate gas odor observed in Campbell's store. The source of these notes is not identified. Notes were obtained from PSC files.

(5) Lab # D010920 identified gas odor in Woodrow Wilson gym alley off Delmar manhole.

(6) ISGS report identified Woodrow Wilson gym with an indicated gas odor.

(7) 4/24/78 - Typed notes indicate gas odor in Mays and Stanton houses.
The source of these notes, believed to be from the Hartford Police Dept, is not identified. Notes were obtained from PSC files. Later notes indicate Mays house at 119 E. Watkins. Other documentation identifies Mays house at 119 E. Watkins (A19). Later notes indicate Stanton house at 112 E. Watkins. Other documentation identifies Stanton house at 112 E. Watkins (A16).

(8) Field notes indicate gas odor observed in church basement. The source of these notes is not identified. Notes were obtained from PSC files. Later notes indicate Assembly of God at 105 E. Watkins.

(9) Field notes indicate gas odor observed in church. The source of these notes is not identified. The notes were obtained from PSC files.

(10) Field notes indicate gas odor observed in church. The source of these notes is not identified. The notes were obtained from PSC files.

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois
Notes

Work in Progress
January 7, 2004

The Hartford Working Group / Hartford, Illinois

(11) Field notes indicate swamp gas odor observed in church and nearby homes. The source of these notes is not identified. The notes were obtained from PSC files.

(12) Field notes indicate gas odor observed in church. The source of these notes is not identified. The notes were obtained from PSC files.

(13) Field notes indicate gas odor observed in church. The source of these notes is not identified. The notes were obtained from PSC files.

(14) Field notes indicate gas odor observed in church. The source of these notes is not identified. The notes were obtained from PSC files.

(15) Field notes indicate gas odor observed in church. The source of these notes is not identified. The notes were obtained from PSC files.

(16) Field notes indicate gas odor observed in church. The source of these notes is not identified. The notes were obtained from PSC files.

(17) Typed notes indicate gas odor detected at 117 W. Birch and 105 W. Cherry. The source of these notes, believed to be from Hartford Police Dept, is not identified. The notes were obtained from PSC files.

(18) Typed notes indicate gas odor at W. Birch and Woodrow Wilson School. The source of these notes, believed to be Hartford Police Dept, is not identified. The notes were obtained from PSC files.

(19) Typed notes indicate gas odor at 119 W. Cherry. The source of these notes, believed to be from Hartford Police Dept, is not identified. Notes were obtained from PSC files.

(20) Determined to be natural gas leak

(21) Source is Illinois EPA e-mail from Chris Cahnovsky dated 11/19/03

(22) From Premcor's facility complaint folder. Detected small amount of hydrocarbon in basement sump. Mothball odor. Junkyard located a few doors down from this home.

(23) From Premcor's facility complaint folder. Oily water noted in excavation on Elm Street.

(24) From Premcor's facility complaint folder. Report from Jim Hickerson of diesel fuel in sewers.

May 1970 (estimated).
Field notes indicate multiple locations identified with evidence of gas found along the majority of the north and south sides of W. Date, scattered locations along E. Date, scattered locations along N. Market between E. Date and E. Cherry and along E. Cherry. The source of these notes is not identified. The notes were obtained from PSC files.

A 3/13/73 Amoco letter to B.F. Sadowski, State Fire Marshal, presented gas sample results indicating gas odor at the following locations: 207 N. Olive St (2/2/73), an unknown location (4/29/70), basement W. of F.D. and 112 E. Cherry (5/6/70) and Olive St. (5/9/70)

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois
Notes

Work in Progress
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The Hartford Working Group / Hartford, Illinois

3/25/73 - Field notes indicate gas checking conducted on this date. No address/location provided. The source of these notes is not identified. The notes were obtained from PSC files.

10/27/74 - Field notes indicate sewer gas odor observed in an unidentified house, the Stanton's house, and the Glass house. The source of these notes is not identified. The notes were obtained from PSC files.

3/31/78 - Field notes indicate gas odor observed in test pit dug at school. The source of these notes is not identified. The notes were obtained from PSC files.

4/4/78 - Shell gas sample analyses indicate presence of hydrocarbon at 123 Birch, schoolyard, and school basement.

4/10/78 - Typed notes indicate gas odor along N. Olive between Date to Forest and on the south side of Watkins.
A separate map of Village (BEI 025578), believed to be associated with the above notes, shows the odor locations as along the east side of N. Olive, the south side of E. Watkins, at intersection of E. Maple and N. Olive. The source of these notes, believed to be Hartford Police Dept, is not identified. The notes were obtained from PSC files.

117 & 119 W. Birch St. is a duplex

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois

Work in Progress
January 7, 2004

The Hartford Working Group / Hartford, Illinois

DATE	ADDRESS	REPORT #
05/66	Unknown locations	NA
05/05/66	800 N. Delmar (Woodrow Wilson Jr. High Gym) (believed to be this location)	NA
02/22/68	800 N. Delmar (Woodrow Wilson Jr. High Gym) (believed to be this location)	NA
02/68	Unknown locations	NA
07/69	Unknown locations	NA
07/69	16 Hawthorne Place	23-7-64
10/22/69	800 N. Delmar (Woodrow Wilson Jr. High Gym)[6]	NA
04/23/70	112 E. Cherry[1]	NA
05/70	Unknown locations	NA
05/06/70	119 W. Date	NA
05/06/70	112 E. Cherry	NA
02/02/73	207 N. Olive St.	
03/73	Unknown locations	NA
03/13/73	507 N. Olive	NA
03/14/73	507 N. Olive	NA
03/14/73	119 W. Date	NA
03/15/73	119 W. Date	NA
06/73	Unknown locations	NA
06/13/73	507 N. Olive[2]	NA
01/74	Unknown locations	NA
01/26/74	105 E. Watkins[8]	NA
01/30/74	105 E. Watkins[8]	NA
02/01/74	105 E. Watkins[9]	NA
02/01/74	108 E. Watkins	NA
02/01/74	110 E. Watkins	NA
02/02/74	105 E. Watkins[10]	NA
02/02/74	108 E. Watkins	NA
02/02/74	110 E. Watkins	NA
02/04/74	123 E. Maple	NA
3/18-24 /74	108 E. Watkins	NA
3/18-24 /74	110 E. Watkins	NA
03/25/74	507 N. Olive[3]	NA
10/74	Unknown locations	NA
04/75	Unknown locations	NA
04/01/75	105 E. Watkins[11]	NA
04/02/75	105 E. Watkins[11]	NA

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois

Work in Progress
January 7, 2004

The Hartford Working Group / Hartford, Illinois

DATE	ADDRESS	REPORT #
04/26/75	105 E. Watkins[11]	NA
04/29/75	119 E. Watkins	NA
05/75	Unknown locations	NA
05/03/75	105 E. Watkins[12]	NA
05/04/75	105 E. Watkins[12]	NA
05/10/75	105 E. Watkins[12]	NA
05/11/75	105 E. Watkins[12]	NA
03/78 (est.)	134 E. Watkins	NA
03/78 (est.)	129 W. Date	NA
03/78 (est.)	207 W. Fourth	NA
03/78 (est.)	122 W. Hawthorne	NA
03/20/78	117 W. Birch	78-193(27F)
03/20/78	119 W. Birch	78-193(27F)
03/20/78	125 W. Birch	78-197(27F)
03/24/78	119 W. Birch	78-206(27F)
03/24/78	105 E. Watkins[13] (Assembly of God Church)	NA
03/24/78	119 E. Watkins	NA
03/25/78	118 E. Date	78-210 (9D)
03/25/78	105 E. Watkins[14]	NA
03/25/78	516 N. Delmar[4]	NA
03/27/78	117/119 W. Birch	78-215(9D)
03/27/78	121 W. Birch	78-215(9D)
03/27/78	123 W. Birch	78-215(9D)
03/27/78	125 W. Birch	78-215(9D)
03/27/78	127 W. Birch	78-215(9D)
03/27/78	105 E. Watkins[15]	NA
03/28/78	101 E. Date	78-223(27F)
03/28/78	119 E. Date	78-224(27F)
03/28/78	121 W. Birch	78-225(27F)
03/28/78	123 W. Birch	78-226(27F)
03/28/78	125 W. Birch	78-227(27F)
03/28/78	126 E. Watkins	78-228(27F)
03/28/78	105 W. Elm	78-229(27F)
03/28/78	900 N. Delmar	78-230(27F)
03/28/78	107 W. Cherry	78-231(27F)
03/29/78	117 W. Date	78-232(27F)

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois

Work in Progress
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The Hartford Working Group / Hartford, Illinois

DATE	ADDRESS	REPORT #
03/29/78	119 W. Date	78-233(27F)
03/29/78	110 W. Cherry	78-234(27F)
03/29/78	118 E. Date	78-235(27F)
03/30/78	117 W. Date	78-232(27F)
03/30/78	107 E. Date	78-236(27F)
03/30/78	119 W. Cherry	78-237(27F)
03/30/78	105 W. Cherry	78-238(9D)
03/30/78	800 N. Delmar (Gym)	78-239(27F)
03/30/78	121 W. Cherry	78-240(27F)
03/30/78	123 W. Cherry	78-241(27F)
03/30/78	118 W. Elm	78-242(27F)
03/30/78	121 W. Watkins	78-243(27F)
03/30/78	116 E. Date	78-244(27F)
03/30/78	130 W. Forest	78-245(27F)
03/30/78	125 W. Cherry	78-246(27F)
03/30/78	122 E. Watkins	78-247(27F)
03/30/78	134 E. Watkins	78-248(27F)
03/30/78	111 N. Olive	78-249(27F)
03/30/78	130 E. Watkins	78-250(27F)
03/30/78	514-516 N. Delmar	78-251(27F)
03/30/78	301 N. Delmar Ave. (First Baptist Church)	78-252(27F)
03/30/78	117 W. Cherry	78-253(27F)
03/30/78	405 N. Olive	78-254(27F)
03/30/78	401 N. Olive	78-255(27F)
03/30/78	106 E. Elm	78-256(27F)
03/30/78	111 E. Forest	78-257(27F)
03/30/78	100 E. Maple	78-258(27F)
03/30/78	142 E. Maple	78-259(27F)
03/30/78	117 E. Date	78-260(27F)
03/30/78	107 W. Cherry	
03/31/78	112 W. Cherry	78-261(27F)
03/31/78	115 W. Cherry	78-262(27F)
03/31/78	111 W. Date	78-264(27F)
03/31/78	501 N. Olive	78-263(27F)
03/31/78	112 E. Date	78-265(27F)
03/31/78	140 E. Maple	78-266(27F)
03/31/78	139 E. Watkins	78-267(27F)

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois

Work in Progress
January 7, 2004

The Hartford Working Group / Hartford, Illinois

DATE	ADDRESS	REPORT #
03/31/78	104 W. Cherry	78-268(27F)
03/31/78	123 Birch St.	
03/31/78	800 N. Delmar (Woodrow Wilson Jr. High Gym) (believed to be this location)	
04/78 (est.)	507 N. Olive	NA
04/78 (est.)	111 E. Watkins	NA
04/01/78	114 E. Date	78-269(27F)
04/01/78	111 W. Cherry	78-276(27F)
04/01/78	105 W. Watkins	78-273(27F)
04/01/78	118 W. Watkins	78-274(27F)
04/01/78	139 W. Watkins	78-275(27F)
04/03/78	119 W. Cherry	78-237(27F)
04/03/78	142 E. Maple	78-259(27F)
04/03/78	129 W. Date	78-270(27F)
04/03/78	107 W. 4th	78-271(27F)
04/03/78	102 W. Date	78-272(27F)
04/03/78	111 W. Cherry	78-276(27F)
04/05/78	107 W. Cherry	78-231(27F)
04/05/78	119 W. Date	78-233(27F)
04/05/78	130 E. Watkins	78-250(27F)
04/05/78	301 N. Delmar	78-252(27F)
04/05/78	104 W. Cherry	78-268(27F)
04/05/78	105 E. Watkins[16]	NA
04/05/78	108 E. Watkins	NA
04/05/78	117 W. Birch[17]	NA
04/05/78	105 W. Cherry[17]	Lab # DO10919
04/05/78	133 W. Watkins[20]	78-279(27F)
04/05/78	800 N. Delmar (Woodrow Wilson Jr. High Gym)[5]	Lab #DO10920
04/05/78	Rand Avenue IL Terminal Tracks Union Electric Substation	Lab #DO10925
04/06/78	105 E. Elm	78-277(27F)
04/06/78	W. Birch[18]	NA
04/06/78	800 N. Delmar (Woodrow Wilson Jr. High Gym)[18]	NA
04/07/78	119 W. Date	78-233(27F)
04/08/78	119 W. Cherry[19]	NA
04/08/78	130 E. Watkins	78-250(27F)
04/08/78	301 N. Delmar	78-252(27F)
04/11/78	112 Watkins	Lab # DO10974 & DO10975 / 78-310(27 F)

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois

Work in Progress
January 7, 2004

The Hartford Working Group / Hartford, Illinois

DATE	ADDRESS	REPORT #
04/11/78	115 N. Delmar	78-312(27F)
04/11/78	130 E. Maple	78-313(27F)
04/12/78	201 N. Olive	78-314(27F)
04/16/78	107 W. Cherry	NA
04/16/78	123 W. Birch	78-226(27F)
04/16/78	107 W. Cherry	78-231(27F)
04/17/78	118 E. Date	78-235(27F)
04/17/78	121 W. Cherry	78-240(27F)
04/17/78	516 N. Delmar	78-251(27F)
04/17/78	117 W. Cherry	78-253(27F)
04/17/78	501 N. Olive	78-263(27F)
04/17/78	104 W. Cherry	78-268(27F)
04/17/78	111 W. Cherry	78-276(27F)
04/17/78	122 W. Hawthorne	78-303(27F)
04/17/78	200 N. Delmar (General Baptist Church)	78-306(27F)
04/17/78	516 N. Delmar (IGA Grocery Store)	78-307(27F)
04/17/78	800 N. Delmar (Woodrow Wilson Jr. High Gym)	NA
04/17/78	108 E. Watkins	78-308(27F)
04/17/78	104 E. Watkins	78-309(27F)
04/17/78	112 E. Watkins	78-310(27F)
04/17/78	105 E. Watkins (Assembly of God Church)	78-311(27F)
04/18/78	125 W. Birch	78-227(27F)
04/18/78	800 N. Delmar (Gym)	78-239(27F)
04/18/78	112 E. Date	78-265(27F)
04/18/78	104 W. Cherry	78-268(27F)
04/18/78	128 W. Cherry	78-315(27F)
04/18/78	122 W. Watkins	78-316(27F)
04/18/78	116 E. Watkins	78-317(27F)
04/19/78	114 W. Watkins	NA
04/19/78	108 E. Watkins	78-308(27F)
04/19/78	115 W. Watkins	78-318(27F)
04/19/78	133 W. Watkins	NA
04/20/78	129 E. Maple	NA
04/20/78	104 W. Cherry	78-268(27F)
04/24/78	119 E. Watkins[7]	NA
04/24/78	112 E. Watkins[7]	NA
04/25/78	107 W. Cherry	NA

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois

Work in Progress
January 7, 2004

The Hartford Working Group / Hartford, Illinois

DATE	ADDRESS	REPORT #
04/28/78	112 E. Watkins	78-310(27F)
05/78	Unknown locations	NA
05/04/78	142 E. Maple	NA
05/07/78	119 E. Second	78-355(29H)
05/08/78	501 N. Olive	NA
05/09/78	800 N. Delmar (Woodrow Wilson Jr. High Gym)	NA
05/10/78	800 N. Delmar (Woodrow Wilson Jr. High Gym)	NA
05/13/78	800 N. Delmar (Woodrow Wilson Jr. High Gym)	NA
05/15/78	800 N. Delmar (Woodrow Wilson Jr. High Gym)[6]	NA
05/16/78	104 E. Watkins	NA
03/03/79	501 N. Olive	NA
03/06/79	501 N. Olive	NA
03/13/79	501 N. Olive	NA
03/22/79	123 W. Cherry	NA
03/22/79	117 E. Date	NA
03/22/79	112 E. Date	NA
03/23/79	106 W. Cherry	NA
03/23/79	105 W. Cherry	NA
03/23/79	107 W. Cherry	NA
03/28/79	501 N. Olive	NA
03/28/79	107 W. Cherry	NA
03/28/79	105 E. Watkins (Assembly of God Church)	NA
03/28/79	604 N. Delmar	NA
04/02/79	130 E. Watkins	NA
04/03/79	105 E. Watkins (Assembly of God Church)	NA
04/03/79	130 E. Watkins	NA
04/03/79	108 E. Watkins	NA
04/03/79	112 E. Watkins	NA
04/03/79	119 W. Date	NA
04/05/79	117 W. Date	NA
04/07/79	119 E. Watkins	NA
04/08/79	104 W. Cherry	NA
04/11/79	104 E. Date	NA
04/11/79	117 E. Date	NA
04/11/79	118 E. Date	NA
04/11/79	401 N. Olive	NA
04/12/79	107 W. Cherry	

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois

Work in Progress
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The Hartford Working Group / Hartford, Illinois

DATE	ADDRESS	REPORT #
04/12/79	117 E. Date	
04/12/79	118 E. Date	
04/14/79	116 E. Date	
04/14/79	109 E. Date	
04/14/79	103 E. Date	
04/14/79	101 E. Cherry	
04/14/79	617 N. Olive	
04/14/79	606 N. Delmar	
04/18/79	101 E. Watkins	
04/18/79	122 E. Forest St.	
04/18/79	121 E. Forest St.	
04/18/79	117 E. Forest St.	
04/18/79	111 E. Forest St.	
04/18/79	114 E. Forest St.	
04/18/79	125 E. Forest St.	
04/19/79	300 N. Delmar	
04/19/79	215 N. Delmar	
04/19/79	214 N. Delmar	
04/19/79	212 N. Delmar	
04/19/79	210 N. Delmar	
04/19/79	206 N. Delmar	
04/19/79	114 N. Delmar	
07/81	800 N. Delmar (Woodrow Wilson Jr. High Gym)	
10/27/81	7th St. at S. Olive[25]	81-1846
02/10/82	105 E. Watkins	NA
02/16/82	103 E. Date	NA
02/23/82	501 N. Olive	NA
03/08/82	114 E. Date	NA
11/05/82	2 S. Delmar	82-1754
12/04/82	Hawthorne & Delmar (Gymnasium)	82-1886(29)
12/10/82	105 E. Watkins (Assembly of God Church)	
04/83		
05/83		
05/84		
02/85		
02/85		
08/13/85	Olive St. & Cherry St.	85-1012

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois

Work in Progress
January 7, 2004

The Hartford Working Group / Hartford, Illinois

DATE	ADDRESS	REPORT #
02/86		
07/87		
01/24/88	S. Olive from 3rd to 6th	29H-88-0152
06/30/88	105 E. First	29H-88-1217
06/30/88	107 E. First	29H-88-1217
06/30/88	116 E. Hawthorne	29H-88-1217
01/06/90	Rand Avenue / 70 yds west of double track (North of roadway/pipeline area)	28F-90-0037
03/21/90	107 W. Cherry Street	29G-90-0498
03/25/90	117 East Forest Street	NA
03/29/90	518 N. Delmar	NA
04/04/90	118 W. Birch	NA
04/27/90	117 E. Forest Street	29G-90-0740
05/16/90	401 N. Olive	NA
05/16/90	409 N. Olive	NA
05/16/90	117 E. Date	NA
05/16/90	136 W. Forest	NA
05/16/90	127 E. Elm	NA
05/16/90	105 W. Cherry	NA
05/16/90	800 N. Delmar (Woodrow Wilson Jr. High Gym)	
05/17/90	111 W. Forest	
05/17/90	123 W. Birch	NA
05/17/90	118 W. Birch	NA
05/17/90	125 W. Birch	NA
05/17/90	136 W. Forest	
05/18/90	507 N. Delmar Avenue	29G-90-0860
05/18/90	800 N. Delmar (Woodrow Wilson Jr. High Gym)	
05/19/90	301 N. Delmar Ave. (First Baptist Church)	29G-90-0864
05/19/90	507 N. Delmar	29G-90-0865
05/20/90	104 W. Cherry St.	29G-90-0872
05/20/90	105 E. First	29G-90-0875
05/20/90	119 W. Cherry	29G-90-0877
05/20/90	119 W. Date Street	29G-90-0876
05/21/90	507 N. Delmar (Village Hall / Jail)	29G-90-0885
05/21/90	319 N. Olive	NA
05/22/90	119 W. Date	NA
05/23/90	100 E. Maple	NA
05/23/90	119 W. Date	

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois

Work in Progress
January 7, 2004

The Hartford Working Group / Hartford, Illinois

DATE	ADDRESS	REPORT #
05/26/90	119 W. Date Street	29G-90-0908
05/31/90	117 W. Date	NA
06/19/90	201 N. Olive	900092
06/23/90	119 W. Date	29G-90-1074
06/28/90	130 E. Watkins	NA
07/13/90	305 S. Delmar	29H-90-2108
07/13/90	507 N. Delmar	29H-90-2108
08/13/90	305 S. Delmar	900117
11/05/90	113 E. Sixth St.[26]	29H-90-2952
02/12/91	117 E. Forest St.	29H-91-0216
02/13/91	119 E. Watkins	910018
02/13/91	120 E. Watkins	29H-91-0215/910012
02/13/91	123 E. Watkins	910013
02/13/91	117 E. Forest St.	910015
02/13/91	101 E. Birch	910017
02/13/91	123 E. Watkins	NA
05/03/91	301 N. Delmar Ave. (First Baptist Church)	NA
10/11/91	107 E. Birch	91-2401
01/14/93	105 E. First	93-0054
04/11/93	119 E. Watkins	NA
04/12/93	119 E. Watkins	
04/13/93	301 N. Delmar Ave. (First Baptist Church)	NA
04/14/93	116 E. Watkins	NA
04/14/93	119 E. Watkins	NA
04/14/93	301 N. Delmar Ave. (First Baptist Church)	NA
04/15/93	301 N. Delmar Ave. (First Baptist Church)	NA
04/17/93	125 E. Watkins	NA
04/18/93	119 E. Watkins	NA
04/18/93	125 E. Watkins	NA
04/18/93	100 E. Maple	NA
04/19/93	119 E. Watkins	NA
04/19/93	120 E. Watkins	NA
04/19/93	125 E. Watkins	NA
04/22/93	116 E. Watkins	NA
04/22/93	142 E. Watkins	NA
04/22/93	316 N. Delmar Ave.	NA
04/22/93	318 N. Delmar	NA

TABLE 2-1
Documented Odor Complaints/Observations Within the Village of Hartford, Illinois

Work in Progress
January 7, 2004

The Hartford Working Group / Hartford, Illinois

DATE	ADDRESS	REPORT #
04/28/93	134 E. Watkins	NA
05/12/93	101 E. Watkins	NA
05/13/93	301 N. Delmar Ave. (First Baptist Church)	NA
04/12/94	316 N. Delmar	NA
04/12/94	129 W. Birch	NA
04/21/94	130 E. Watkins	NA
01/12/95	715 N. Delmar	95-0058
01/31/97	110 W. 1st	NA
09/21/99	111 East 2nd Street [22]	NA
03/10/00	129 E. Hawthorne	NA
04/28/00	Elm Street[23]	NA
10/19/00	117 E. Date	000127
11/08/00	E. Elm at alley[24]	000134
05/13/02	116 E. Watkins	20040
05/13/02	120 E. Watkins	20040
05/13/02	122 E. Watkins	20040
05/13/02	126 E. Watkins	20040
05/13/02	130 E. Watkins	20040
05/13/02	134 E. Watkins	20040
08/19/02	115 E. 4th	20087
04/08/03	112 E. Watkins	30047
04/08/03	109 E. Hawthorne	30048
11/18/03	N. Delmar and Elm[21]	NA

TABLE 2-2
Documented Fires/Observations Within the Village of Hartford, Illinois

Work in Progress
January 7, 2004

The Hartford Working Group / Hartford, Illinois

DATE	ADDRESS	REPORT #
April 23, 1970	113 East Cherry Street	NA
March 13, 1973	119 West Date Street	NA
April 11, 1974	119 E. Date	NA
April 28, 1975	119 East Watkins Street	NA
March 24, 1978	119 West Birch Street / 117 West Birch Street	NA
March 25, 1978	118 East Date Street	78-210(9D)
March 27, 1978	117 West Birch Street / 119 West Birch Street	78-215(9D)
March 30, 1978	105 West Cherry Street	78-238(9D)
March 31, 1978	118 East Date Street	78-235(27F)
April 11, 1979	130 E. Watkins	NA
April 11, 1979	123 E. Watkins	NA
April 11, 1979	116 E. Watkins	NA
April 11, 1979	119 E. Date	NA
April 11, 1979	409 N. Olive	NA
July 21, 1981	102 East Cherry Street	NA
June 11, 1985	501 North Olive Street	NA
March 21, 1990	102 East Cherry Street	28B-90-0499
May 16, 1990	117 East Forest Street	28B-90-0842
May 16, 1990	119 West Birch Street	28B-90-0843
May 16, 1990	117 West Birch Street	NA
May 19, 1990	101 East Birch Street	28B-90-0861
May 19, 1990	117 East Forest Street	29G-90-0863

NOTES:
NA = None or not available
Report numbers are Village of Hartford identifications
117 & 119 W. Birch Street are part of a duplex.

TABLE 2-3
Past Spill Release Summary to Land/Groundwater Within the Village of Hartford

Hartford Working Group / Hartford, Illinois

Work in Progress
January 7, 2004

Clayton #	Source of Information	Spill Date	NRC Report #	IEMA Incident #	Material	Quantity	Location	Response
1	Shell Oil Company Report prepared by Engineering-Science	1973			Benzene	Unknown	River Line North of Rand Ave	R.P. Shell Oil
2	Shell Oil Company Report prepared by Engineering-Science	02/22/77			Gasoline	Unknown	Along N Olive (10-inch line owned by Sinclair/ operated by ARCO)	
3	Shell Oil Company Report prepared by Engineering-Science	04/20/77			Unknown	Unknown	Intersection of Olive & Rand	
4	1978 Hartford Police Report	03/10/78			Gasoline	Unknown	Rand Ave between Delmar & Olive	R.P. Clark
5	Shell Oil Company Report prepared by Engineering-Science/IEPA/ERU	04/28/78			Gasoline	Unknown	Elm St near Delmar Ave	R.P. Clark
6	1978 Mathes Report (Phase I Gas Odors & Fires)	prior to 5/2/78			Not identified	Not identified	Olive & Rand Sts	Prior leak also identified at this location. R.P. Clark
7	1978 Mathes Report (Phase I Gas Odors & Fires)	05/02/78			Not identified	Not identified	South of Elm St on Olive St	R.P. Clark
8	IEPA/ERU/Hartford Police Report 780814 (29H)	10/16/78			Gasoline/Butane	Unknown	Corner of N Olive & E Elm	Recovery truck vacuumed product. R.P. Clark
9		01/08/81		810008	#6 Fuel Oil	400 gals	Delmar & Elm	Hired Environmental Emergency Services to clean up.
10	Shell Oil Company Report prepared by Engineering-Science/1990 IEPA Report	01/08/81			Gasoline	Approx. 5 bbls	Along N Olive St	R.P. Sinclair
11	Hartford Police Report 81-0610(2	04/10/81			Oil	Unknown	N Olive at E Forest	Clark to barricade area. R.P. Clark
12	Shell Oil Company Report prepared by Engineering-Science/1990 IEPA Report	07/12/81			Gasoline	Approx. 24 bbls	Along N Olive St	R.P. Sinclair
13	Shell Oil Company Report prepared by Engineering-Science/1990 IEPA Report	06/07/82			#2 Fuel Oil	Approx. 9 bbls	Along N Olive St	R.P. Sinclair
14	Hartford Police Report 82-1752 (2	11/05/82			Diesel Fuel	Unknown	700 Block of N Olive	Fire Dept appeared to have flushed material into storm sewer.
15	Hartford Police Report 82-1775 (2	11/10/82			#6 Diesel Oil	Unknown	N Olive & E Forest	Clark Oil dispatched crew to clean up and repair leak. R.P. Clark
16	Shell Oil Company Report prepared by Engineering-Science	12/31/82			Oil	Unknown	Vicinity of N Olive & E Forest	R.P. Clark
17	1981-1990 Hartford Police Records	04/16/83			Unknown	Unknown	Date at Olive St	R.P. Clark
18	1990 IEPA Report	11/20/84	10508/ 10529		#2 Fuel Oil (light cycle oil)	Several hundred gals	100 Block E Elm	Fire Dept. flushed to storm sewer to Mississippi River. R.P. Apex Oil
19	IEMA	05/21/87		870863	PCB	15 gals	East of Route 3	Excavated soil and gravel. R.P. Union Electric
20	IEMA	05/26/87		870868	99% sulphuric acid	5 gals	Rand Ave	Soda ash, excavate, dispose. R.P. Shell
21	1981-1990 Hartford Police Records	09/26/87			Unknown	Unknown	N Olive at E Cherry	R.P. Clark
22	IEMA	06/05/89		890937	Gasoline	500 gals	Not listed	Applied absorbent pads. R.P. Marathon Pipeline
23	NRC Database/IEMA	07/21/89	12008	891305	Diesel Fuel	2,800 gals	1/2 mile N of Hawthorne Blvd on IL Rte 3	Vacuum truck on scene recovering the fuel, surface been sanded, tank truck/hole punched into the bottom of the tank. R.P. Commercial Cartage
24	IEMA	10/16/89		892041	Jet Fuel	Est. 10 gals	E of Rte 3, S of Hartford Township	R.P. Shell
25	Shell Oil Company Report prepared by Engineering-Science/IEMA	12/16/89		892661	Unleaded Gasoline	Est. 294,000 gals	NE of intersection of Rand & Olive	Product recovery. R.P. Shell
26	1990 IEPA Report	08/30/90			Gasoline	Approx. 250 bbls	Along N Olive	Pipeline estimated to contain approx. 600 bbls. Upon draining, only approx. 350 bbls recovered. R.P. Sinclair
27	IEMA	12/10/90		903663	Virgin Lube Oil	Unknown	S Delmar	R.P. Conoco
28	IEMA	12/20/90		903786	Unleaded Gasoline	10 bbls	S Delmar	R.P. Conoco
29	IEMA	01/11/91		910099	Slopwater and Oil	Unknown	Unknown	R.P. Shell
30	IEMA	11/22/91		913413	Lubricant Oil	Unknown	S Delmar	R.P. Conoco
31	IEMA	12/06/91	98677	913533	Asphalt Oil	30 gals	Underground pipeline on E side of Rte 3/ W Elm St	Excavated and replaced 400 ft of piping up to Rte 3 crossing. R.P. Clark
32	IEMA	01/24/92		920221	Crude Oil Sludge	N/A	Unknown	R.P. Koch Pipelines
33	IEMA	04/30/92		921154	Petroleum Product	Not listed	Hwy 203 S. Delmar Avenue	R.P. Marathon Oil
34	NRC Database	06/28/93	198981	931734	Diesel Fuel	7,200 gals	Hawthorne Ave & Southern Pacific RR	Train struck truck. Removing soil. R.P. Hartog Oil
35	NRC Database	12/05/93	211014		Gasoline	Unknown		
36	NRC Database	02/13/94	221572		Fuel Oil #2	30 gals		
37	IEMA	10/28/94		942432	#2 Fuel Oil	6,000 gals	#2 Fuel; piling driven through line at Rte 3	Contaminated soil removed and spill area bioremediated

TABLE 2-3
Past Spill Release Summary to Land/Groundwater Within the Village of Hartford

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

Clayton #	Source of Information	Spill Date	NRC Report #	IEMA Incident #	Material	Quantity	Location	Response
38	NRC Database	01/31/95	278209		Gasoline (unleaded)	5 gals	Section 4, Township 4N, Range 9W	Release being secured, isolating line, applied absorbents, contaminated soil to be removed. Suspected R.P.: Marathon Pipeline
39	Misc Document	07/17/97			Water & Diesel Fuel	<50 gals	Amoco Bridge over Rand Ave	Material/dryagent/absorbent pads/dirt/gravel, debris removed and area cleaned
40	IEMA	06/19/98		981477	#2 Diesel Fuel	>50 gals	S Delmar Ave	R.P. Ameren U.E.
41	1998 Environmental Incidents/ Excursions	11/28/98			Gasoline	3-4 gals	Leaking valve released into sump; oil movement (west of #2 pit)	Called for VOC truck
42	NRC Database	12/27/98	468873		Gas, Diesel, Water	15 gals	Unknown	
43	IEMA	09/26/99		992199	14" Black Oil Line Leak	5 bbls	112 E Elm	Line repair
44	IEMA	11/08/00	547675	20002148	14" Diesel River Line Leak		City storm sewer along Market & E Elm	Soil was excavated approximately 10-12 ft bgs to repair the diesel line
45	IEMA	10/16/01		20011741	Diesel fuel	Unknown	Under roadway at Market & Elm	Contractor hired for cleanup
46	Facility Files	11/2001			Black Oil	Unknown	Leak on 14" black oil line on W Elm	
47	IEMA	05/03/02		20020695	Gasoline	Unknown	E Watkin St	Premcor Refinery has crews on scene. R.P. Premcor
48	IEMA	07/30/03		20031128	Unknown	Unknown	Between railroad tracks and Olive at Elm	07/31 area excavated to determine exactly what has occurred and where. R.P. Premcor

NOTES:

IEMA = Illinois Emergency Management Agency
IEPA = Illinois Environmental Protection Agency
ERU = Illinois Emergency Response Unit
NRC = National Response Center
R.P. = Identified Responsible Party
Table based on review of available information in IL EPA Bureau of Land & Emergency Response Unit files, IL Emergency Management Agency files & the NRC Database Website. Search of NRC database for items identified in Hartford (no other keyword searches conducted).

TABLE 2-4
LUST Sites Within the Village of Hartford

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

Clayton #	Source of Information	IEMA #	IEMA Date	LPC #	Name	Location	Products	Status
1	Illinois EPA Bureau of Land Leaking Underground Storage Tank Incident Tracking	990742	3/27/1999	1190505010	Hartford, Village of	103 South Old St. Louis Road	Gasoline, diesel	NFR Date 4/4/02 Recorded 4/26/02
2	Illinois EPA Bureau of Land Leaking Underground Storage Tank Incident Tracking	992395	10/22/1999	1190505032	Piasa Motor Fuels	2 North Delmar	Gasoline, fuel oil, used oil	Open
3	Illinois EPA Bureau of Land Leaking Underground Storage Tank Incident Tracking	992690	12/7/1999	1190505032	Piasa Motor Fuels	2 North Delmar	Gasoline, fuel oil, used oil	Open

NOTES: Search of LUST database conducted for items identified in the Village of Hartford (no other keyword searches were conducted).

TABLE 2-5
USTs Within the Village of Hartford

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

Clayton #	Source of Information	Facility ID	Name	Location	Products	Number of Tanks-Capacity (gals)	Age (yrs)	Last Use/Status
1	EDR Radius Map/ OSFM	6003824	Schiber Truck Co	Rand and Olive	Gasoline	1-99	32	Last use not reported; removed
					Diesel	1-99	21	Last use not reported; removed
2	OSFM	6005710	Hartford Lubricants Complex	S Delmar	NR	1-600	15	Exempt from registration
					NR	1-500	15	Exempt from registration
					NR	1-400	15	Exempt from registration
					NR	1-600	15	Exempt from registration
					NR	1-500	15	Exempt from registration
3	OSFM	6014140	Piasa Motor Fuels Bulkplant	1 Piasa Lane	Diesel	1-30,000	26	Currently in use
					Gasoline	1-30,000	26	Currently in use
					Gasoline	1-20,000	26	Currently in use
					Diesel	1-20,000	26	Currently in use
					Solvent	1-10,000	25	Last used 1/1/98; removed
					Lube Oil	1-10,000	25	Last used 1/1/98; removed
					Solvent	1-10,000	20	Last used 1/1/98; removed
					Anti-Freeze	1-10,000	27	Last used 1/1/98; removed
					Diesel	1-20,000	26	Currently in use
					Diesel	1-30,000	26	Currently in use
					Kerosene	1-30,000	28	Currently in use
					Lube Oil	1-6,000	20	Last used 1/1/98; removed
					Lube Oil	1-6,000	20	Last used 1/1/98; removed
					Lube Oil	1-6,000	20	Last used 1/1/98; removed
4	EDR Radius Map/ OSFM	6014142	Hartford Wood River Terminal	900 N Delmar	Gasoline	1-20,000	14	Last use not reported; currently in use
5	OSFM	6014944	Hartford School Bldg	W 3rd St	Heating Oil	1-0	37	Exempt from registration
6	OSFM	6014945	Hartford Elem School	W 2nd St	Kerosene	1-6,000	96	Last used 1/1/75; removed
7	OSFM	6016296	Village Garage	103 Old St Louis Rd	Gasoline	1-1,000	19	Last used 12/15/98; removed
					Diesel	1-1,000	19	Last used 12/15/98; removed
					Diesel	1-1,000	19	Last used 1/1/91; removed
					Diesel	1-300	21	Last used 1/1/91; removed
					Diesel	1-560	10	Last used 12/15/98; removed

TABLE 2-5
USTs Within the Village of Hartford

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

Clayton #	Source of Information	Facility ID	Name	Location	Products	Number of Tanks-Capacity (gals)	Age (yrs)	Last Use/Status
8	EDR Radius Map/ OSFM	6016534	Village Store	2 N Delmar Avenue	Gasoline	1-4,000	33	Last used 12-1-98; removed
					Gasoline	1-4,000	33	Last used 12-1-98; removed
					Gasoline	1-2,000	33	Last used 12-1-98; removed
					Used Oil	1-560	33	Last used 12-1-98; removed
					Heating Oil	1-560	33	Last used 1-1-87; removed
					Gasoline	1-2,000	NR	Last used 12/1/73; exempt from registration
					Unknown	1-560	NR	Last used 12/1/73; exempt from registration
					Unknown	1-560	NR	Last used 12/1/73; exempt from registration
					Unknown	1-1,000	NR	Last used 12/1/73; exempt from registration
					Unknown	1-1,000	NR	Last used 12/1/73; exempt from registration
9	OSFM	6016541	Piasa Pantry 1	101 Piasa Lane	Kerosene	1-2,000	15	Currently in use
					Diesel	1-10,000	8	Currently in use
					Gasoline	1-10,000	26	Currently in use
					Gasoline	1-10,000	26	Currently in use
					Gasoline	1-10,000	26	Currently in use
					Diesel	1-10,000	26	Currently in use
10	EDR Radius Map	6028428	Ray Eihausen	115 N Delmar	Gasoline	1-0	NR	Last use 12-1-73; exempt from registration
11	OSFM	6039655	Casey's General Store	900 N Old St Louis Rd	Gasoline	1-10,000	4	Currently in use
					Gasoline	1-10,000	4	Currently in use

NOTES: Capacities listed are those listed on the UST Notification Forms that are to be completed by owner/operator.
OSFM = Office of the State Fire Marshal.
NR = Not Reported

TABLE 2-6
Well Construction Summary-Village of Hartford

The Hartford Working Group / Hartford, Illinois

Work in Progress
January 7, 2004

Well Number	Installation Date	Abandon-ment Date	Ground Elevation	Location (1)		Depth of Boring from GS	Total Well Depth from GS	Stickup	Top of Well Casing Elevation	Bottom of Well Elevation (Sump)	Well ID	Well Material		Riser Length	Screen Length 1st slot to last slot	Bottom of Screen to End Cap	Screen Depth				Hydrostratigraphic Information	Soil Boring Log	Well Completion Report
				Northing	Easting							Riser	Screen				Top Slot from GS	Top Slot Elevation	Bottom Slot from GS	Bottom Slot Elevation	Unit Screened		
			(ft)			(ft)	(ft)	(ft)		(ft)	(in)			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)			
HMW-1	11/19/90		430.97	790776.09	2317419.02	23.10	23.10	-0.32	430.65	407.87	2	PVC	PVC.010	17.80	4.73	0.25	18.12	412.85	22.85	408.12		No	Yes
HMW-2	11/19/90		430.71	790784.87	2317417.77	36.44	36.44	-0.52	430.19	394.27	2	PVC	PVC.010	25.85	9.82	0.25	26.34	404.37	36.16	394.55	Silty sand	Yes	Yes
HMW-3	11/19/90		429.93	791444.11	2317205.64	35.00	34.92	-0.61	429.32	395.01	2	PVC	PVC.010	29.33	4.73	0.25	29.94	399.99	34.67	395.26	Silty sand	Yes	Yes
HMW-4	11/20/90		430.09	791433.95	2317208.28	26.00	26.00	-0.54	429.55	404.09	2	PVC	PVC .010	20.38	4.98	0.25	21.02	409.07	25.75	404.34		Yes	Yes
HMW-5	11/20/90		433.22			22.25	22.25	-0.48	432.74	410.97	2	PVC	PVC.010	16.79	4.73	0.25	17.27	415.95	22.00	411.22	Upper: Silty clay; Lower: Silty sand	Yes	Yes
HMW-6	11/20/90		432.83			38.24	38.24	-0.44	432.39	394.59	2	PVC	PVC.010	27.73	9.82	0.25	28.17	404.66	37.99	394.84	Silty sand	Yes	Yes
HMW-7	11/20/90		430.51	791159.27	2317045.11	27.03	27.03	-0.34	430.17	403.48	2	PVC	PVC.010	16.62	9.82	0.25	15.96	414.55	25.78	404.73	Upper: Silty clay; Lower: Silty sand	Yes	Yes
HMW-8	11/21/90		430.81	791142.11	2317044.40	43.00	42.65	-0.50	430.31	388.16	2	PVC	PVC.010	32.08	9.82	0.25	32.58	398.23	42.40	388.41	Upper: Fine sand; Lower: Sand with gravel	Yes	Yes
HMW-9	03/22/91		431.00	790773.14	2317391.09	23.00	23.00	-0.33	430.85	408.00	2	PVC	PVC.010	12.47	10.20	NA	12.80	418.20	23.00	408.00		No	Yes
HMW-10	03/22/91		431.00	790773.14	2317391.09	43.00	43.00	-0.37	430.81	388.00	2	PVC	PVC.010	27.33	15.30	NA	27.70	403.30	43.00	388.00		No	Yes
HMW-11	03/20/91					21.00	21.00	-0.62			2	PVC	PVC.010	10.38	10.00	NA	11.00		21.00			No	Yes
HMW-12	03/20/91					39.50	39.50	-0.68			2	PVC	PVC.010	23.32	15.00	NA	24.00		39.00			No	Yes
HMW-13	03/20/91		432.04	790757.93	2317033.88	19.50	19.50	-0.54	431.59	412.54	2	PVC	PVC.010	8.86	10.10	NA	9.40	422.64	19.50	412.54		No	Yes
HMW-14	03/20/91		432.04	790757.93	2317033.88	39.50	39.50	-0.60	431.54	392.54	2	PVC	PVC.010	23.50	15.30	NA	22.90	409.14	38.20	393.84		No	Yes
HMW-15	03/21/91		433.40			21.00	21.00	-0.38	433.12	412.40	2	PVC	PVC.010	11.16	10.20	NA	10.80	422.60	21.00	412.40		No	Yes
HMW-16	03/21/91		433.40			43.50	43.50	-0.37	433.12	389.90	2	PVC	PVC.010	27.07	15.30	NA	26.70	406.70	42.00	391.40		No	Yes
HMW-17	03/26/91		431.81			44.00	44.00	-0.35	431.47	387.81	2	PVC	PVC.010	28.70	15.30	NA	28.35	403.46	43.65	388.16		No	Yes
HMW-18	03/26/91		432.67	790758.42	2316674.26	43.00	43.00	-0.45	432.25	389.67	2	PVC	PVC.010	28.15	15.30	NA	27.70	404.97	43.00	389.67		No	Yes
HMW-19	03/25/91		432.69	790445.62	2316740.23	43.00	43.00	-0.29	432.41	389.69	2	PVC	PVC.010	27.09	15.60	NA	26.80	405.89	42.40	390.29		No	Yes
HMW-20	03/25/91		431.93	790117.35	2317498.63	43.00	43.00	-0.40	431.35	388.93	2	PVC	PVC.010	27.55	15.30	NA	27.15	404.78	42.45	389.48		No	Yes
HMW-21	09/04/91		430.38	791078.13	2317075.23	24.40	24.40	0.52	430.05	405.98	2	PVC	PVC.010	14.35	10.00	0.2	14.20	416.18	24.20	406.18	Upper: Silty clay; Lower: Sandy silt	Yes	Yes
HMW-22	09/04/91		430.38	791078.13	2317075.23	40.00	40.00	0.28	430.15	390.38	2	PVC	PVC.010	30.47	10.00	0.2	29.80	400.58	39.80	390.58	Sandy silt	Yes	Yes
HMW-23	09/04/91					24.70	24.70	0.52			2	PVC	PVC.020	14.52	10.00	0.2	14.50		24.50		Sandy silt	Yes	Yes
HMW-24	09/04/91					40.00	40.00	0.52			2	PVC	PVC.020	29.55	10.00	0.2	29.40		39.40		Upper: Silty sand; Lower: fine sand	Yes	Yes
HMW-25	12/02/03		427.78	789758.95	2316192.37	39.00	38.70	-0.50	427.45	389.08	2	PVC	PVC .010	23.50	14.70	0.3	24.00	403.78	38.70	389.08	Upper: Fine sand: Lower: Silty sand	Yes	Yes
HMW-26	12/03/03		425.59	789647.92	2316656.71	40.00	39.70	-0.50	425.20	385.89	2	PVC	PVC .010	24.50	14.70	0.3	25.00	400.59	39.70	385.89	Silty fine sand	Yes	Yes
HMW-27	12/04/03		431.05	789349.95	2317042.45	40.00	39.70	-0.50	430.75	391.35	2	PVC	PVC .010	24.50	14.70	0.3	25.00	406.05	39.70	391.35	Upper: Fine sand: Lower: Silty sand	Yes	Yes
HMW-28	12/05/03		431.30	788928.80	2317153.14	40.00	39.70	-0.50	430.97	391.60	2	PVC	PVC .010	24.50	14.70	0.3	25.00	406.30	39.70	391.60	Fine grained sand	Yes	Yes
HMW-29	12/06/03		430.42	788688.12	2317621.08	40.00	39.70	-0.50	430.07	390.72	2	PVC	PVC .010	24.50	14.70	0.3	25.00	405.42	39.70	390.72	Upper: Silty sand; Lower: fine sand	Yes	Yes
HB-3	06/01/78		429.77			40.50	38.50	1.50	431.27	391.27	2	PVC	PVC.020	28.50	14.00	NA	24.50	405.27	38.50	391.27	Upper: Silty sand; Lower: fine sand	Yes	Yes
HB-4	06/02/78	3/15/90[2]				40.50	39.00	1.50			2	PVC	PVC.020	28.00	14.00	NA	25.00		39.00		Upper: Fine Sand; Lower: Fine-medium silty sand	Yes	Yes
HB-5	06/05/78	3/15/90[2]	429.50			40.50	39.00	1.50		390.50	2	PVC	PVC	32.00	10.00	NA	29.00	400.50	39.00	390.50	Upper: Silty clay; Lower: fine-medium sand	Yes	Yes
HB-7	05/26/78		430.98	790025.87	2316756.36	42.50	41.50	2.00	432.98	389.48	2	PVC	PVC	22.50	21.00	NA	20.00	410.98	41.50	389.48	Fine sand	Yes	Yes
HB-8	05/30/78	3/15/90[2]	430.15			40.50	39.00	2.20	432.31	391.15	2	PVC	PVC	29.00	14.00	NA	25.00	405.15	39.00	391.15	Fine sand	Yes	Yes
HB-9	05/30/78	3/15/90[2]	430.50			40.50	39.00	1.00		391.50	2	PVC	PVC.020	27.50	14.00	NA	25.00	405.50	39.00	391.50	Fine sand	Yes	Yes
HB-10	05/26/78	3/15/90[2]	429.00			43.00	41.50	1.50		387.50	2	PVC	PVC.020	23.50	21.00	NA	20.50	408.50	41.50	387.50	Fine sand	Yes	Yes

TABLE 2-6
Well Construction Summary-Village of Hartford

The Hartford Working Group / Hartford, Illinois

Work in Progress
January 7, 2004

Well Number	Installation Date	Abandon-ment Date	Ground Elevation	Location (1)		Depth of Boring from GS	Total Well Depth from GS	Stickup	Top of Well Casing Elevation	Bottom of Well Elevation (Sump)	Well ID	Well Material		Riser Length	Screen Length 1st slot to last slot	Bottom of Screen to End Cap	Screen Depth				Hydrostratigraphic Information	Soil Boring Log	Well Completion Report
				Northing	Easting							Riser	Screen				Top Slot from GS	Top Slot Elevation	Bottom Slot from GS	Bottom Slot Elevation	Unit Screened		
			(ft)			(ft)	(ft)	(ft)		(ft)	(in)			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)			
HB-11	05/31/78	3/15/90[2]				40.50	37.50	1.50			2	PVC	PVC	28.00	14.00	NA	23.50		37.50		Upper: Silty clay; Lower: fine-medium sand	Yes	Yes
HB-13	05/30/78					40.50	37.00	0.67			2	PVC	PVC.020	27.17	14.00	NA	23.00		37.00		Fine sand	Yes	Yes
HB-14	05/25/78					45.50	44.00	1.90			2	PVC	PVC	33.40	14.00	NA	30.00		44.00		Fine sand	Yes	Yes
HB-15	06/01/78		431.00			40.50	38.00	1.00		393.00	2	PVC	PVC.020	20.50	21.00	NA	17.00	414.00	38.00	393.00	Fine sand	Yes	Yes
HB-16	05/25/78		431.09			40.50	39.00	1.00	432.09	392.09	2	PVC	PVC.020	30.50	11.00	NA	28.00	403.09	39.00	392.09	Upper: Silty clay; Lower: fine sand	Yes	Yes
HB-17	06/02/78					50.50	46.75	2.00			2	PVC	PVC	25.50	27.00	NA	19.75		46.75		Upper: Silty clay; Lower; fine-coarse sand	Yes	Yes
HB-19	06/05/78		429.48			50.50	49.00	1.50	430.98	380.48	2	PVC	PVC.020	33.50	17.00	NA	32.00	397.48	49.00	380.48	Upper: Clay; Lower: fine-coarse sand	Yes	Yes
HB-19A	06/13/78		429.48			50.50	27.00	1.50		402.48	2	PVC	PVC	21.50	7.00	NA	20.00	409.48	27.00	402.48	Upper: Silty clay; Lower fine to medium sand	Yes	Yes
HB-19B	09/13/78		429.48			50.50	20.00	1.00		409.48	2	PVC	PVC	9.00	12.00	NA	8.00	421.48	20.00	409.48	Silty clay	Yes	Yes
HB-20	06/12/78		429.00			50.50	48.00	1.00		381.00	2	PVC	PVC	31.50	20.00	NA	28.00	401.00	48.00	381.00	Upper: Silty clay; Lower: fine-coarse sand	Yes	Yes
HB-23	05/24/78	3/15/90[2]	430.00			47.50	46.00	1.50		384.00	2	PVC	PVC	35.00	14.00	NA	32.00	398.00	46.00	384.00	Upper: Silty clay; Lower: fine-coarse sand	Yes	Yes
HB-24	05/24/78		431.55			48.00	44.00	0.67	432.21	387.55	2	PVC	PVC	27.67	21.00	NA	23.00	408.55	44.00	387.55	Upper: Silty clay; Lower: fine-coarse sand	Yes	Yes
HB-25	05/31/78		431.00			40.50	39.00	2.00		392.00	2	PVC	PVC	28.50	14.00	NA	25.00	406.00	39.00	392.00	Silty sand	Yes	Yes
HB-26	05/31/78	3/15/90[2]				40.50	39.00	1.17			2	PVC	PVC.020	27.67	14.00	NA	25.00		39.00		Upper: Clayey silt; Lower: fine sand	Yes	Yes
HB-27	06/09/78		425.35			40.50	39.00	1.16	426.51	386.35	2	PVC	PVC	21.67	20.00	NA	19.00	406.35	39.00	386.35	Fine sand	Yes	Yes
HB-28	06/08/78	3/15/90[2]	430.00			48.00	41.50	2.00		388.50	2	PVC	PVC	33.50	10.00	NA	31.50	398.50	41.50	388.50	Upper: Silty clay; Lower: fine sand	Yes	Yes
HB-29	06/09/78		430.00			50.50	48.00	2.00		382.00	2	PVC	PVC	26.00	24.00	NA	24.00	406.00	48.00	382.00	Upper: Silty clay; Lower: fine-coarse sand	Yes	Yes
HB-30	06/08/78		430.75			40.50	39.00	1.00	431.75	391.75	2	PVC	PVC	28.00	12.00	NA	27.00	403.75	39.00	391.75	Fine sand	Yes	Yes
HB-31	06/08/78		431.28	791156.00	2316599.65	45.50	44.00	1.50	432.78	387.28	2	PVC	PVC	35.50	10.00	NA	34.00	397.28	44.00	387.28	Fine-coarse sand	Yes	Yes
HB-33	06/06/78	3/15/90[2]	428.86			48.00	43.00	2.00	430.86	385.86	2	PVC	PVC	28.00	17.00	NA	26.00	402.86	43.00	385.86	Upper: Silty clay; Lower: fine-medium sand	Yes	Yes
HB-34	06/12/78		430.63			40.50	39.00	2.00	432.63	391.63	2	PVC	PVC	31.00	10.00	NA	29.00	401.63	39.00	391.63	Fine sand	Yes	Yes
HB-35	06/13/78	3/15/90[2]	430.08			40.50	39.00	2.33	432.41	391.08	2	PVC	PVC	30.00	10.00	NA	27.67	402.41	37.67	392.41	Upper: Clay; Lower: fine silty sand	Yes	Yes
HB-36	06/13/78		429.68			40.50	39.00	1.50	431.18	390.68	2	PVC	PVC	27.50	13.00	NA	26.00	403.68	39.00	390.68	Fine sand	Yes	Yes
HB-37	06/14/78		428.68	790308.41	2317342.26	40.50	37.70	2.00	432.41	390.98	2	PVC	PVC	31.00	10.00	NA	29.00	399.68	38.50	390.18	Upper: Silty clay; Lower: fine-medium sand	Yes	Yes
HB-38	06/15/78		428.94			40.50	38.50	1.67	430.60	390.44	2	PVC	PVC	25.17	15.00	NA	23.50	405.44	38.50	390.44	Fine sand	Yes	Yes
HB-39	06/15/78					50.50	48.00	1.00			2	PVC	PVC	39.00	10.00	NA	38.00		48.00		Upper: Silty clay; Lower: fine-coarse sand	Yes	Yes
HB-39A	06/16/78					50.50	24.50	0.50			2	PVC	PVC	11.00	14.00	NA	10.50		24.50		Silty clay	Yes	Yes
IEPA 1	04/18/78		430.50			45.00	45.00	0.40	430.90	385.50	2	PVC	PVC	25.00	20.00	NA	25.00	405.50	45.00	385.50	Upper: Silty clay; Lower: medium sand	Yes	No
IEPA 2	04/11/78	3/15/90[2]	429.60			39.50	39.50	3.60	433.20	390.10	2	PVC	PVC	23.00	20.00	NA	19.50	410.10	39.50	390.10	Medium sand	Yes	No
IEPA 3	04/12/78					51.50	51.50	1.70			2	PVC	PVC	23.20	30.00	NA	21.50		51.50		Medium sand	Yes	No
IEPA 4	04/12/78		430.00			44.50	44.50	1.00	431.00	385.50	2	PVC	PVC	25.50	20.00	NA	24.50	405.50	44.50	385.50	Upper: Silty clay; Lower: medium sand	Yes	No
IEPA 5	04/19/78	3/15/90[2]	429.46			40.00	40.00	1.90	431.30	389.46	2	PVC	PVC	21.90	20.00	NA	20.00	409.46	40.00	389.46	Fine sand	Yes	No

TABLE 2-6
Well Construction Summary-Village of Hartford

The Hartford Working Group / Hartford, Illinois

Work in Progress
January 7, 2004

Well Number	Installation Date	Abandon-ment Date	Ground Elevation	Location (1)		Depth of Boring from GS	Total Well Depth from GS	Stickup	Top of Well Casing Elevation	Bottom of Well Elevation (Sump)	Well ID	Well Material		Riser Length	Screen Length 1st slot to last slot	Bottom of Screen to End Cap	Screen Depth				Hydrostratigraphic Information	Soil Boring Log	Well Completion Report
				Northing	Easting							Riser	Screen				Top Slot from GS	Top Slot Elevation	Bottom Slot from GS	Bottom Slot Elevation	Unit Screened		
			(ft)			(ft)	(ft)	(ft)		(ft)	(in)			(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)			
IEPA 6	04/19/78	3/15/90[2]	430.80			45.00	45.00	2.10	432.90	385.80	2	PVC	PVC	27.10	20.00	NA	25.00	405.80	45.00	385.80	Upper: Silt; Lower: fine sand	Yes	No
IEPA 7	04/20/78		430.20			55.00	53.00	0.70	430.90	377.20	2	PVC	PVC	20.70	35.00	NA	18.00	412.20	53.00	377.20	Upper: Silty loam; Lower: sand and gravel	Yes	No
IEPA 8	04/20/78		429.60			45.00	42.00	2.20	431.80	387.60	2	PVC	PVC	24.20	20.00	NA	22.00	407.60	42.00	387.60	Upper: Silt; Lower: medium sand	Yes	No
IEPA 9	04/21/78		430.10			45.00	45.00	1.00	431.10	385.10	2	PVC	PVC	16.00	30.00	NA	15.00	415.10	45.00	385.10	Upper: Loam; Lower: medium sand	Yes	No
IEPA 10	04/21/78		429.20			45.00	45.00	0.00	429.20	384.20	2	PVC	PVC	25.00	20.00	NA	25.00	404.20	45.00	384.20	Upper: Clay; Lower: Coarse sand	Yes	No
RW-1			431.83	790073.09	2316878.24				433.78													No	No
RW-2			431.22	790762.59	2317351.36				431.99													No	No
RW-3/HB-32	06/06/78	3/15/90[2]	429.50	791178.41	2317083.89	45.50	43.00	1.25	430.75	386.50	4	PVC	PVC	29.25	15.00	NA	28.00	401.50	43.00	386.50	Upper: Silty clay; Lower: fine-coarse sand	No	No
SHELL-1	04/05/78		431.90			45.00	45.00	0.00	431.90	386.90	2	PVC	PVC	20.00	20.00	NA	25.00	406.90	45.00	386.90	Upper: Silt; Lower: fine-medium sand	Yes	No
SHELL-2	04/05/78		432.10			45.00	45.00	0.00	432.62	387.10	2	PVC	PVC	20.00	20.00	NA	25.00	407.10	45.00	387.10	Upper: Clay; Lower: fine-medium sand	Yes	No
VW-1	03/18/91					38.00	38.00	-1.00			6	PVC	SS; PVC.020	7.15	29.85	NA	8.15		38.00			No	Yes
VCB-1	09/06/91					35.00	35.00	0.00														Yes	No
VCB-2	12/04/91					33.50	32.00	0.00	430.96[3]		8	Steel	SS 0.02	12.00	20.00	NA	12.00		32.00		Upper: Silty clay; Lower: clayey sand	Yes	Yes
VCB-3	11/27/91					33.40	32.00	0.00	433.14[3]		8	Steel	SS 0.02	12.00	20.00	NA	12.00		32.00		Upper: Clayey silt; Lower: sandy clay	Yes	Yes
VCB-4	12/02/91					33.60	32.00	0.00	433.55[3]		8	Steel	SS 0.02	12.00	20.00	NA	12.00		32.00		Upper: Clayey silt; Lower: Sandy silt	Yes	Yes
VCB-5	12/03/91					33.40	32.00	0.00	428.10[3]		8	Steel	SS 0.02	12.00	20.00	NA	12.00		32.00		Upper: Clayey silt; Lower: sand	Yes	Yes
VCB-6	12/09/91					33.60	32.00	0.00	432.67[3]		8	Steel	SS 0.02	12.00	20.00	NA	12.00		32.00		Upper: Clayey silt; Lower: sand	Yes	Yes
VCB-7	12/09/91					33.60	32.00	0.00	432.96[3]		8	Steel	SS 0.02	12.00	20.00	NA	12.00		32.00		Upper: Clayey silt; Lower: silty sand	Yes	Yes
VCB-8	12/06/91					33.30	32.00	0.00	423.09[3]		8	Steel	SS 0.02	12.00	20.00	NA	12.00		32.00		Upper: Silty clay; Lower: Silty sand	Yes	Yes
VCB-9	12/10/91					32.60	31.00	0.00	432.66[3]		8		SS 0.02	11.00	20.00	NA	11.00		31.00		Upper: Clay with sand; Lower: silt	Yes	No
VCB-10	12/11/91					32.00	31.00	0.00	432.88[3]		8	Steel	SS 0.02	11.00	20.00	NA	11.00		31.00		Silty clay	Yes	Yes
VCB-11	12/03/91					32.00	32.00	0.00	432.33[3]													Yes	No
VCB-12	12/05/91					32.30	31.00	0.00	429.08[3]		8	Steel	SS 0.02	11.00	20.00	NA	11.00		31.00		Upper: Silty sand; Lower: fine sand	Yes	Yes
HVW-3	09/06/91					35.00	35.00	0.00			8	Carbon Steel	SS304 0.2	9.80	25.00	0.2	9.80		34.80		Upper: Silty clay; Lower: Silty sand	Yes	Yes
HVW-4	09/09/91					35.00	35.00	0.00			8	Carbon Steel	SS304 0.2	9.80	25.00	0.2	9.80		34.80		Upper: Silty clay; Lower: Silty sand	Yes	Yes
MP-5S	07/23/03		430.34	791100.10	2317147.05	10.00	10.00	0.00	429.83	420.34	1	PVC	PVC 0.010	5.00	5.00		5.00	425.34	10.00	420.34	Silty clay	Yes	Yes
MP-5D	07/23/03		430.34	791100.42	2317144.96	32.00	32.00	0.00	430.09	398.34	1	PVC	PVC 0.010	17.35	10.00		17.35	412.99	27.35	402.99	Silty sand	Yes	Yes
MP-6S	07/23/03		430.26	791089.23	2317146.81	10.00	10.00	0.00	430.15	420.26	1	PVC	PVC 0.010	5.00	5.00		5.00	425.26	10.00	420.26	Silty clay	Yes	Yes
MP-6D	07/23/03		430.26	791088.92	2317148.61	28.00	28.00	0.00	430.13	402.26	1	PVC	PVC 0.010	17.35	10.00		17.35	412.91	27.35	402.91	Silty sand	Yes	Yes
MP-7S	07/23/03		430.38	791125.20	2317138.83	10.00	10.00	0.00	430.17	420.38	1	PVC	PVC 0.010	5.00	5.00		5.00	425.38	10.00	420.38	Silty clay	Yes	Yes

TABLE 2-6
Well Construction Summary-Village of Hartford

The Hartford Working Group / Hartford, Illinois

Work in Progress
January 7, 2004

Well Number	Installation Date	Abandon-ment Date	Ground Elevation (ft)	Location (1) Northing	Location (1) Easting	Depth of Boring from GS (ft)	Total Well Depth from GS (ft)	Stickup (ft)	Top of Well Casing Elevation	Bottom of Well Elevation (Sump) (ft)	Well ID (in)	Well Material Riser	Well Material Screen	Riser Length (ft)	Screen Length 1st slot to last slot (ft)	Bottom of Screen to End Cap (ft)	Screen Depth Top Slot from GS (ft)	Screen Depth Top Slot Elevation (ft)	Screen Depth Bottom Slot from GS (ft)	Screen Depth Bottom Slot Elevation (ft)	Hydrostratigraphic Information Unit Screened	Soil Boring Log	Well Completion Report
MP-7D	07/23/03		430.38	791125.49	2317140.61	28.00	28.00	0.00	430.16	402.38	1	PVC	PVC 0.010	16.65	10.00		16.65	413.73	26.65	403.73	Upper: Silty clay: Lower: silty sand	Yes	Yes
MP-8S	07/23/03		430.37	791147.46	2317125.98	10.00	10.00	0.00	430.20	420.37	1	PVC	PVC 0.010	5.00	5.00		5.00	425.37	10.00	420.37	Silty clay	Yes	Yes
MP-8D	07/23/03		430.37	791148.25	2317127.74	28.00	28.00	0.00	430.14	402.37	1	PVC	PVC 0.010	17.35	10.00		17.35	413.02	27.35	403.02	Silty clay	Yes	Yes
MP-9S	07/24/03		430.22	791170.97	2317119.01	10.00	10.00	0.00	430.05	420.22	1	PVC	PVC 0.010	5.00	5.00		5.00	425.22	10.00	420.22	Silty clay	Yes	Yes
MP-9D	07/24/03		430.22	791171.77	2317120.70	28.00	28.00	0.00	430.00	402.22	1	PVC	PVC 0.010	17.60	10.00		17.60	412.62	27.60	402.62	Silty clay, with silty sand towards the middle of the screen	Yes	Yes
MP-10S	07/24/03		430.84	790612.78	2316701.47	10.00	10.00	0.00	430.53	420.84	1	PVC	PVC 0.010	5.00	5.00		5.00	425.84	10.00	420.84	Clayey silt	Yes	Yes
MP-10D	07/24/03		430.71	790614.66	2316701.73	28.00	28.00	0.00	430.37	402.71	1	PVC	PVC 0.010	17.85	10.00		17.85	412.86	27.85	402.86	Clayey silt	Yes	Yes
MP-11S	07/24/03		431.56	790643.47	2316700.18	10.00	10.00	0.00	431.19	421.56	1	PVC	PVC 0.010	5.00	5.00		5.00	426.56	10.00	421.56	Silty sand and clay	Yes	Yes
MP-11D	07/24/03		431.56	790643.26	2316701.90	28.00	28.00	0.00	431.19	403.56	1	PVC	PVC 0.010	17.85	10.00		17.85	413.71	27.85	403.71	Clayey silt	Yes	Yes
MP-12S	07/24/03		431.95	790667.72	2316700.00	10.00	10.00	0.00	431.70	421.95	1	PVC	PVC 0.010	5.00	5.00		5.00	426.95	10.00	421.95	Silty sand	Yes	Yes
MP-12D	07/24/03		431.95	790667.72	2316701.91	28.00	28.00	0.00	431.63	403.95	1	PVC	PVC 0.010	17.85	10.00		17.85	414.10	27.85	404.10	Clayey silt	Yes	Yes
MP-13S	07/25/03		429.44	789962.08	2317299.17	10.00	10.00	0.00	429.20	419.44	1	PVC	PVC 0.010	5.00	5.00		5.00	424.44	10.00	419.44	Silty clay	Yes	Yes
MP-13D	07/25/03		429.44	789963.84	2317299.28	28.00	28.00	0.00	429.30	401.44	1	PVC	PVC 0.010	17.85	10.00		17.85	411.59	27.85	401.59	Silty sand	Yes	Yes
MP-14S	07/25/03		429.74	789961.61	2317267.68	10.00	10.00	0.00	429.51	419.74	1	PVC	PVC 0.010	5.00	5.00		5.00	424.74	10.00	419.74	Clayey silt	Yes	Yes
MP-14D	07/25/03		429.74	789963.46	2317267.85	28.00	28.00	0.00	429.51	401.74	1	PVC	PVC 0.010	17.35	10.00		17.35	412.39	27.35	402.39	Silty sand	Yes	Yes
MP-15S	07/25/03		429.90	789961.14	2317243.41	10.00	10.00	0.00	429.63	419.90	1	PVC	PVC 0.010	5.00	5.00		5.00	424.90	10.00	419.90	Silty clay	Yes	Yes
MP-15D	07/25/03		429.90	789963.00	2317243.37	28.00	28.00	0.00	429.58	401.90	1	PVC	PVC 0.010	17.35	10.00		17.35	412.55	27.35	402.55	Silty sand	Yes	Yes
MP-16S	07/25/03		430.02	789961.22	2317219.23	10.00	10.00	0.00	429.75	420.02	1	PVC	PVC 0.010	5.00	5.00		5.00	425.02	10.00	420.02	Clayey silt	Yes	Yes
MP-16D	07/25/03		430.02	789963.11	2317219.17	28.00	28.00	0.00	429.77	402.02	1	PVC	PVC 0.010	17.85	10.00		17.85	412.17	27.85	402.17	Silty sand	Yes	Yes

MP = Measuring Point
GS = Ground Surface
NA = Not Applicable
ID = Inside Diameter
(1) = Local Plane Coordinates
(2) = According to March 23, 1990 Clark Oil & Refining Corporation survey, these wells were found to have been destroyed, paved over or plugged.
(3) = Top of casing for the VCB wells is generally 3-4 feet below ground surface
* = Well Abandonment Date Unkown
Fields left blank indicate that no data was found.

TABLE 3-1
Well Integrity Survey - Village of Hartford

The Hartford Working Group / Hartford, Illinois

PROJECT INFORMATION			
Project Name:	Village of Hartford	Survey Date:	12/17 - 18/03
Project No.:	15-03095.12-002	Field Personnel:	H. Mendygral and N. Bolivar

WELL INTEGRITY INFORMATION

Well ID	Well ID Label Present	Protective Casing				Surface Seal Present	Well Casing			Comments	Repair Needed
		Present	Diameter	Material	Lock		Diameter	Material	Lock		
HB-07	No	Yes	4"	Iron	No	No	2"	PVC	No	No cover on protective casing	Yes
HB-37	No	No	N/A	N/A	N/A	N/A	2"	PVC	No	No protective casing	Yes
HMW-1	No	Yes	6"	Aluminum	No	Yes	2"	PVC	Yes	Flushmount	Yes
HMW-2	No	Yes	6"	Aluminum	No	No	2"	PVC	Yes	Protective casing broken - Flushmount	Yes
HMW-3	No	Yes	6"	Aluminum	No	No	2"	PVC	Yes	Water in protective casing - Flushmount	Yes
HMW-4	No	Yes	6"	Aluminum	No	Yes	2"	PVC	Yes	Flushmount	Yes
HMW-7	No	Yes	6"	Aluminum	No	Yes	2"	PVC	Yes	Flushmount	Yes
HMW-8	No	Yes	6"	Aluminum	No	No	2"	PVC	Yes	Protective casing broken- Flushmount	Yes
HMW-9	Yes	Yes	8"	Iron	No	Yes	2"	PVC	Yes	HMW-9/10 in same protective casing - flushmount	Yes
HMW-10	Yes	Yes	8"	Iron	No	Yes	2"	PVC	Yes	HMW-9/10 in same protective casing - flushmount	Yes
HMW-13	Yes	Yes	8"	Iron	No	Yes	2"	PVC	Yes	HMW-13/14 in same protective casing - flushmount	Yes
HMW-14	Yes	Yes	8"	Iron	No	Yes	2"	PVC	Yes	HMW-13/14 in same protective casing - flushmount	Yes
HMW-18	No	Yes	6"	Aluminum	No	Yes	2"	PVC	Yes	Flushmount	Yes
HMW-19	No	Yes	6"	Aluminum	No	Yes	2"	PVC	Yes	Flushmount	Yes
HMW-20	No	Yes	8"	Iron	No	Yes	2"	PVC	Yes	New protective casing installed December 2003 - flushmount	No
HMW-21	No	Yes	8"	Iron	No	Yes	2"	PVC	Yes	HMW-21/22 in same protective casing, needs bolts - flushmount	Yes
HMW-22	No	Yes	8"	Iron	No	Yes	2"	PVC	Yes	HMW-21/22 in same protective casing, needs bolts - flushmount	Yes
RW-01	No	No	N/A	N/A	N/A	No	2.8'	Iron	No	Well in secure (gated/locked) area - stickup	No
RW-02	No	No	N/A	N/A	N/A	No	2.8'	Iron	No	Well in secure (gated/locked) area - stickup	No
RW-03	No	Yes	8"	Iron	No	Yes	6"	PVC	No	Well in secure (gated/locked) area - stickup	No

TABLE 3-2
Well Development Indicator Parameters
Village of Hartford

The Hartford Working Group / Hartford, Illinois

Well Number	Date	Time	Total Volume of Water Removed (gallons)	Temperature (°C)	pH (std. units)	Conductivity (uS/cm)	Turbidity (ntu)	Dissolved Oxygen (ug/L)	Visual Clarity
HMW-25	12/9/03	12:44:00	30	15.6	6.57	861	2486	1788.00	Cloudy
		12:45:00	32	15.6	6.61	844	2486	4062.00	Cloudy
		12:47:00	35	15.7	6.60	863	2486	7689.00	Cloudy
		12:50:00	50	15.8	6.66	868	2486	4902.00	Cloudy
		12:54:00	60	15.6	6.64	845	2199	2119.00	Cloudy
		13:00:00	70	15.7	6.60	852	1250	661.00	Slightly Cloudy
		13:04:00	80	15.6	6.59	862	945	5712.00	Slightly Cloudy
		13:08:00	90	15.7	6.55	848	1407	4923.00	Slightly Cloudy
		13:09:44		15.7	6.55	848	1407	4923.30	Slightly Cloudy
		13:10:25	95	15.6	6.56	849	1235	4889.52	Slightly Cloudy
		13:11:03		15.8	6.57	860	1182	4717.82	Slightly Cloudy
		13:11:43		15.7	6.55	861	1156	4625.64	Slightly Cloudy
		13:12:23	97	15.7	6.53	3	67	4514.82	Slightly Cloudy
HMW-26	12/9/03	16:30:00	25	16.5	6.44	1395	1764	553.00	Cloudy
		16:35:00	35	16.6	6.44	1420	2049	382.00	Slightly Cloudy
		16:40:00	40	16.5	6.44	1429	1810	861.00	Slightly Cloudy
		16:41:29		16.5	6.41	1426	1863	278.20	Slightly Cloudy
		16:42:08		16.5	6.41	1436	1787	241.25	Slightly Cloudy
		16:42:48		16.6	6.42	1431	1811	217.42	Slightly Cloudy
		16:43:28		16.6	6.45	1423	1999	143.88	Slightly Cloudy
		16:44:07		16.5	6.49	1421	2233	185.95	Slightly Cloudy
		16:45:00	45	16.5	6.41	1436	1787	241.00	Slightly Cloudy
HMW-27	12/9/03	17:23:00	21	16.5	6.51	1099	934	848.00	Slightly Cloudy
		17:25:00	25	16.5	6.43	1102	514	631.00	Clear
		17:26:27		16.5	6.47	1106	447	459.75	Clear
		17:27:07	30	16.5	6.44	1108	386	758.78	Clear
		17:27:46		16.4	6.45	1121	322	546.78	Clear
		17:28:26		16.5	6.48	1121	410	482.63	Clear
		17:29:06	35	16.5	6.43	1121	367	358.24	Clear

TABLE 3-2
Well Development Indicator Parameters
Village of Hartford

The Hartford Working Group / Hartford, Illinois

Well Number	Date	Time	Total Volume of Water Removed (gallons)	Temperature (°C)	pH (std. units)	Conductivity (uS/cm)	Turbidity (ntu)	Dissolved Oxygen (ug/L)	Visual Clarity
HMW-28	12/10/03	11:02:00	20	15.4	6.45	968	1755	390.00	Cloudy
		11:04:00	22	15.3	6.40	965	1740	298.00	Slightly Cloudy
		11:07:29	27	15.3	6.47	970	908	644.99	Slightly Cloudy
		11:08:09		15.3	6.48	972	772	397.32	Slightly Cloudy
		11:08:49		15.4	6.48	970	1430	285.88	Slightly Cloudy
		11:09:27		15.3	6.49	970	881	279.23	Slightly Cloudy
		11:10:08	33	15.4	6.48	971	1145	217.80	Slightly Cloudy
HMW-29	12/10/03	11:54:00	20	15.4	6.53	856	2001	*	Slightly Cloudy
		11:56:00	27	15.4	6.59	866	1285	*	Slightly Cloudy
		11:59:57	40	15.5	6.62	845	233	*	Slightly Cloudy
		12:00:36		15.4	6.62	868	686	*	Slightly Cloudy
		12:01:16		15.4	6.59	870	1307	*	Slightly Cloudy
		12:01:55		15.4	6.57	879	1418	*	Slightly Cloudy
		12:02:35	55	15.3	6.56	889	1475	*	Slightly Cloudy

NOTES:

* Electronic data corrupted

°C = degrees Centigrade

mV = millivolts

ntu = nephelometric turbidity units

µg/L = micrograms per liter

uS/cm = microsiemens per centimeter

TABLE 3-3
Groundwater Compound/Analyte List with Quantitation Limit
Village of Hartford Sampling

The Hartford Working Group / Hartford, Illinois

PARAMETER	PREPARATION METHOD	ANALYTICAL METHOD	COMPOUND	METHOD DETECTION LIMIT (µg/L)	PRACTICAL QUANTITATION LIMIT (µg/L)
VOCs					
	-	8260B	Benzene	0.5	2
	-	8260B	Carbon disulfide	1	5
	-	8260B	Chlorobenzene	1	5
	-	8260B	Chloroform	1	5
	-	8260B	1,2-Dichlorobenzene	1	5
	-	8260B	1,3-Dichlorobenzene	1	5
	-	8260B	1,4-Dichlorobenzene	1	5
	-	8260B	1,1-Dichloroethane	1	5
	-	8260B	1,2-Dichloroethane	1	5
	SW 8015	8260B	1,4-Dioxane	BD	BD
	-	8260B	Ethylbenzene	1	5
	-	8260B	Ethylene dibromide (EDB)	1	5
	-	8260B	Methyl ethyl ketone (MEK)	5	25
	-	8260B	Methyl tertiary butyl ether (MTBE)	0.5	2
	-	8260B	Styrene	1	5
	-	8260B	Toluene	1	5
	-	8260B	1,1,1-Trichloroethane	1	5
	-	8260B	Trichloroethene	1	5
	-	8260B	Tetrachloroethylene	1	5
	-	8260B	Xylenes (total)	1	5
SVOCs					
	3510C	8310	Acenaphthene	2	5
	3510C	8310	Anthracene	0.1	5
	3510C	8310	Benzo(a)anthracene	0.05	0.1
	3510C	8310	Benzo(b)fluoranthene	0.1	0.18
	3510C	8310	Benzo(k)fluoranthene	0.1	0.17
	3510C	8310	Benzo(a)pyrene	0.1	0.2
	3510C	8270C	Bis(2-ethylhexyl)phthalate	4	6
	3510C	8310	Chrysene	0.3	0.8
	3510C	8270C	o-Cresol	1	10
	3510C	8270C	m-Cresol	1	10
	3510C	8270C	p-Cresol	1	10
	3510C	8310	Dibenz(a,h)anthracene	0.2	0.3
	3510C	8270C	Di-n-butyl phthalate	3	10
	3510C	8270C	Diethyl phthalate	2	10
	3510C	8270C	2,4-Dimethylphenol	1	10
	3510C	8270C	Dimethyl phthalate	1	10
	3510C	8270C	2,4 Dinitrophenol		
	3510C	8310	Fluoranthene	0.5	2
	3510C	8310	Fluorene	0.4	1
	3510C	8310	Indeno(1,2,3-cd)pyrene	0.1	0.4
	3510C	8310	Napthalene	2	5
	3510C	8270C	4-Nitrophenol	1	10
	3510C	8310	Phenanthrene	0.5	5
	3510C	8270C	Phenol	1	5
	3510C	8310	Pyrene	0.1	2
	3510C	8270C	Pyridine	5	20
	3510C	8270C	Quinoline	BD	BD

TABLE 3-3
Groundwater Compound/Analyte List with Quantitation Limit
Village of Hartford Sampling

The Hartford Working Group / Hartford, Illinois

PARAMETER	PREPARATION METHOD	ANALYTICAL METHOD	COMPOUND	METHOD DETECTION LIMIT (µg/L)	PRACTICAL QUANTITATION LIMIT (µg/L)
Metals					
	SW 3020B	SW 7000G	Antimony	1.7	5
	SW 3020B	SW 7000G	Arsenic	0.7	3
	SW 3020B	SW 6010B	Barium	0.9	5
	SW 3020B	SW 6010B	Beryllium	0.2	1
	SW 3020B	SW 6010B	Cadmium	0.3	2
	SW 3020B	SW 6010B	Chromium-Total	4	10
	SW 3010A	SW 6010B	Cobalt	2	10
	-	9014	Cyanide Total	3	7
	SW 3020B	SW 7000G	Lead	0.4	2
	-	SW 7470A	Mercury	0.05	0.2
	SW 3020B	SW 6010B	Nickel	3	10
	SW 3020B	SW 7000G	Selenium	3.5	6
	SW 3020B	SW 6010B	Silver	3.2	10
	SW 3020B	SW 6010B	Vanadium	3	10
	SW 3020B	SW 6010B	Zinc	2	10

NOTES:
VOC, SVOC, and Metal Groundwater compound/analytes based on USEPA Region 5 Waste Management Branch "Skinner List" Constituents of Concern for Wastes from Petroleum Processes.
BD = Being Developed
"--" = The practical quantitation limit is the laboratory capable lower detection limit.
µg/L = Micrograms per liter

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
IEPA-1	05/09/78	NM	20.62	20.80		--	0.18	--
	Summer 78	NM	NA	23.33		--	0.00	--
	3rd Q. 1990	430.50	NA	--		--	0.00	--
IEPA-2	05/09/78	NM	24.58	24.65		--	0.07	--
	Summer 78	NM	NA	27.33		--	0.00	--
	3rd Q. 1990	429.60	NA	--		--	0.00	--
IEPA-3	05/09/78	NM	41.17	41.40		--	0.23	--
IEPA-4	05/09/78	NM	31.25	33.86		--	2.61	--
	Summer 78	NM	32.38	35.63		--	3.25	--
	3rd Q. 1990	430.00	NA	--		--	0.00	--
IEPA-5	05/09/78	NM	26.83	27.00		--	0.17	--
	Summer 78	NM	NA	29.17		--	0.00	--
	3rd Q. 1990	429.40	NA	--		--	0.00	--
IEPA-6	05/09/78	NM	31.29	35.56		--	4.27	--
	Summer 78	NM	32.58	37.29		--	4.71	--
	3rd Q. 1990	430.80	NA	--		--	0.00	--
IEPA-7	05/09/78	NM	32.42	32.58		--	0.16	--
	Summer 78	NM	NA	32.75		--	0.00	--
	3rd Q. 1990	431.39	NA	30.33		401.06	0.00	401.06
IEPA-8	05/09/78	NM	33.08	33.16		--	0.08	--
	Summer 78	NM	NA	34.92		--	0.00	--
	3rd Q. 1990	429.66	NA	--		--	0.00	--
IEPA-9	05/09/78	NM	30.29	30.50		--	0.21	--
	Summer 78	NM	NA	31.21		--	0.00	--
	3rd Q. 1990	430.10	NA	--		--	0.00	--
IEPA-10	05/09/78	NM	30.46	30.70		--	0.24	--
	Summer 78	NM	NA	31.50		--	0.00	--
	3rd Q. 1990	429.20	NA	--		--	0.00	--
HB-03	Summer 78	NM	NA	30.17		--	0.00	--
	04/18/90	431.27	NA	32.90		398.37	0.00	398.37
	05/18/90	431.27	NA	30.60		400.67	0.00	400.67

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-03	07/18/90	431.27	NA	27.05		404.22	0.00	404.22
	10/18/90	431.27	NA	33.20		398.07	0.00	398.07
	01/23/91	431.27	NA	33.65		397.62	0.00	397.62
	03/22/91	431.27	NA	32.43		398.84	0.00	398.84
	05/09/91	431.27	NA	26.95		404.32	0.00	404.32
	06/28/91	431.27	NA	27.32		403.95	0.00	403.95
	08/26/91	431.27	NA	30.15		401.12	0.00	401.12
	10/15/91	431.27	NA	31.20		400.07	0.00	400.07
	01/21/92	431.27	NA	33.05		398.22	0.00	398.22
	06/29/92	431.27	NA	33.20		398.07	0.00	398.07
	07/27/92	431.27	NA	31.55		399.72	0.00	399.72
	04/21/93	431.27	NA	29.00		402.27	0.00	402.27
	06/23/93	431.27	NA	22.00		409.27	0.00	409.27
	07/15/93	431.27	NA	13.44		417.83	0.00	417.83
	08/20/93	431.27	NA	13.27		418.00	0.00	418.00
	09/17/93	431.27	NA	16.78		414.49	0.00	414.49
	10/15/93	431.27	NA	20.37		410.90	0.00	410.90
	11/10/93	431.27	NA	24.86		406.41	0.00	406.41
	12/07/93	431.27	NA	25.75		405.52	0.00	405.52
	01/11/94	431.27	NA	28.98		402.29	0.00	402.29
	02/24/94	431.27	NA	29.74		401.53	0.00	401.53
	03/16/94	431.27	NA	27.52		403.75	0.00	403.75
	04/27/94	431.27	NA	25.38		405.89	0.00	405.89
	05/24/94	431.27	NA	24.60		406.67	0.00	406.67
	06/28/94	431.27	NA	27.50		403.77	0.00	403.77
	07/21/94	431.27	NA	28.20		403.07	0.00	403.07
	08/17/94	431.27	NA	30.30		400.97	0.00	400.97
	09/28/94	431.27	NA	31.00		400.27	0.00	400.27
	10/27/94	431.27	NA	31.55		399.72	0.00	399.72
	11/21/94	431.27	NA	31.15		400.12	0.00	400.12
	12/14/94	431.27	NA	30.72		400.55	0.00	400.55

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-03	01/30/95	431.27	NA	33.18		398.09	0.00	398.09
	02/22/95	431.27	NA	31.90		399.37	0.00	399.37
	03/28/95	431.27	NA	30.45		400.82	0.00	400.82
	04/25/95	431.27	NA	27.40		403.87	0.00	403.87
	05/26/95	431.27	NA	17.25		414.02	0.00	414.02
	06/20/95	431.27	NA	18.98		412.29	0.00	412.29
	07/12/95	431.27	NA	22.10		409.17	0.00	409.17
	08/23/95	431.27	NA	26.36		404.91	0.00	404.91
	09/25/95	431.27	NA	29.18		402.09	0.00	402.09
	10/26/95	431.27	NA	29.82		401.45	0.00	401.45
	11/27/95	431.27	NA	28.87		402.40	0.00	402.40
	05/31/96	431.27				410.24		
HB-04	3rd Q. 1990	430.00	NA	--		--	0.00	--
	Summer 78	NM	NA	30.79		--	0.00	--
HB-05	Summer 78	NM	NA	32.50		--	0.00	--
HB-07	Summer 78	NM	32.33	35.75		--	3.42	--
	03/15-16/90	NM	37.20	37.60		--	0.40	--
	04/18/90	432.98	35.70	36.50		396.48	0.80	397.07
	05/18/90	432.98	NA	34.10		398.88	0.00	398.88
	07/18/90	432.98	NA	30.33		402.65	0.00	402.65
	10/18/90	432.98	35.40	36.45		396.53	1.05	397.31
	01/23/91	432.98	36.00	36.50		396.48	0.50	396.85
	03/22/91	432.98	35.20	35.30		397.68	0.10	397.75
	06/28/91	432.98	NA	30.41		402.57	0.00	402.57
	08/26/91	432.98	NA	33.27		399.71	0.00	399.71
	10/15/91	432.98	NA	35.78		397.20	0.00	397.20
	01/21/92	432.98	35.44	36.30		396.68	0.86	397.32
	06/29/92	432.98	35.68	36.57		396.41	0.89	397.07
	07/27/92	432.98	34.66	34.67		398.31	0.01	398.32
	04/21/93	432.98	NA	22.90		410.08	0.00	410.08
	06/23/93	432.98	24.38	28.10		404.88	3.72	407.63

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-07	07/15/93	432.98	NA	17.68		415.30	0.00	415.30
	08/20/93	432.98	NA	16.72		416.26	0.00	416.26
	09/17/93	432.98	20.07	20.40		412.58	0.33	412.82
	10/15/93	432.98	22.77	24.14		408.84	1.37	409.85
	11/10/93	432.98	26.86	28.83		404.15	1.97	405.61
	12/07/93	432.98	28.30	28.59		404.39	0.29	404.60
	01/11/94	432.98	31.35	31.46		401.52	0.11	401.60
	02/24/94	432.98	NA	32.48		400.50	0.00	400.50
	03/16/94	432.98	NA	30.50		402.48	0.00	402.48
	04/27/94	432.98	NA	28.45		404.53	0.00	404.53
	05/24/94	432.98	NA	27.55		405.43	0.00	405.43
	06/28/94	432.98	NA	31.20		401.78	0.00	401.78
	07/21/94	432.98	NA	30.90		402.08	0.00	402.08
	08/17/94	432.98	NA	32.60		400.38	0.00	400.38
	09/28/94	432.98	33.30	33.65		399.33	0.35	399.59
	10/27/94	432.98	33.90	34.70		398.28	0.80	398.87
	11/21/94	432.98	33.70	33.73		399.25	0.03	399.27
	12/14/94	432.98	NA	33.30		399.68	0.00	399.68
	01/30/95	432.98	33.87	33.97		399.01	0.10	399.08
	02/22/95	432.98	34.10	34.70		398.28	0.60	398.72
	03/28/95	432.98	NA	33.18		399.80	0.00	399.80
	04/25/95	432.98	NA	30.60		402.38	0.00	402.38
	05/26/95	432.98	NA	21.30		411.68	0.00	411.68
	06/20/95	432.98	21.05	25.50		407.48	4.45	410.77
	07/12/95	432.98	24.20	27.40		405.58	3.20	407.95
	08/23/95	432.98	28.82	29.25		403.73	0.43	404.05
	09/25/95	432.98	31.40	31.70		401.28	0.30	401.50
	10/26/95	432.98	32.10	32.45		400.53	0.35	400.79
	11/27/95	432.98	32.12	32.83		400.15	0.71	400.68
	05/31/96	432.98				407.81		

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-08	Summer 78	NM	32.17	34.63		--	2.46	--
	04/18/90	432.31	35.30	36.35		395.96	1.05	396.74
	05/18/90	432.31	34.30	35.00		397.31	0.70	397.83
	07/18/90	432.31	29.84	31.50		400.81	1.66	402.04
	10/18/90	432.31	34.20	36.00		396.31	1.80	397.64
	01/23/91	432.31	35.25	36.00		396.31	0.75	396.87
	03/22/91	432.31	34.48	35.15		397.16	0.67	397.66
	05/09/91	432.31	30.40	30.90		401.41	0.50	401.78
	06/28/91	432.31	29.78	31.94		400.37	2.16	401.97
	08/26/91	432.31	33.30	34.80		397.51	1.50	398.62
	10/15/91	432.31	34.71	36.35		395.96	1.64	397.17
	01/21/92	432.31	34.64	35.96		396.35	1.32	397.33
	06/29/92	432.31	34.90	36.70		395.61	1.80	396.94
	07/27/92	432.31	34.28	34.50		397.81	0.22	397.97
	04/21/93	432.31	NA	26.90		405.41	0.00	405.41
	06/23/93	432.31	24.95	27.10		405.21	2.15	406.80
	07/15/93	432.31	18.77	20.93		411.38	2.16	412.98
	08/20/93	432.31	17.15	17.71		414.60	0.56	415.01
	09/17/93	432.31	20.28	22.02		410.29	1.74	411.58
	10/15/93	432.31	21.35	26.44		405.87	5.09	409.64
	11/10/93	432.31	26.24	27.77		404.54	1.53	405.67
	12/07/93	432.31	27.35	28.51		403.80	1.16	404.66
	01/11/94	432.31	30.22	31.18		401.13	0.96	401.84
	02/24/94	432.31	31.83	32.43		399.88	0.60	400.32
	03/16/94	432.31	NA	30.27		402.04	0.00	402.04
	04/27/94	432.31	28.20	28.55		403.76	0.35	404.02
	05/24/94	432.31	27.00	27.80		404.51	0.80	405.10
	06/28/94	432.31	29.70	30.20		402.11	0.50	402.48
	07/21/94	432.31	30.30	30.60		401.71	0.30	401.93
	08/17/94	432.31	32.70	33.50		398.81	0.80	399.40
	09/28/94	432.31	32.60	33.35		398.96	0.75	399.52

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-08	10/27/94	432.31	33.25	33.30		399.01	0.05	399.05
	11/21/94	432.31	33.00	33.50		398.81	0.50	399.18
	12/14/94	432.31	32.65	32.75		399.56	0.10	399.63
	01/30/95	432.31	33.33	33.75		398.56	0.42	398.87
	02/22/95	432.31	33.45	34.25		398.06	0.80	398.65
	03/28/95	432.31	32.80	32.83		399.48	0.03	399.50
	04/25/95	432.31	NA	33.80		398.51	0.00	398.51
	05/26/95	432.31	NA	22.43		409.88	0.00	409.88
	06/20/95	432.31	20.70	26.90		405.41	6.20	410.00
	07/12/95	432.31	24.20	27.00		405.31	2.80	407.38
	08/23/95	432.31	28.08	28.83		403.48	0.75	404.04
	09/25/95	432.31	30.46	31.05		401.26	0.59	401.70
	10/26/95	432.31	31.30	32.25		400.06	0.95	400.76
	11/27/95	432.31	31.55	32.50		399.81	0.95	400.51
	05/31/96	432.31				432.31		
HB-09	Summer 78	NM	NA	31.75		--	0.00	--
HB-10	Summer 78	NM	31.50	36.67		--	5.17	--
	3rd Q. 1990	432.00	NA	--		--	0.00	--
HB-11	Summer 78	NM	33.06	33.13		--	0.07	--
HB-13	Summer 78	NM	NA	24.46		--	0.00	--
HB-14	Summer 78	NM	31.88	36.08		--	4.20	--
	3rd Q. 1990	432.00	NA	--		--	0.00	--
HB-15	Summer 78	NM	NA	25.25		--	0.00	--
HB-16	Summer 78	NM	33.75	33.83		--	0.08	--
	03/15-16/90	NM	36.10	38.00		--	1.90	--
	04/18/90	432.09	35.70	37.95		394.14	2.25	395.81
	05/18/90	432.09	34.05	35.75		396.34	1.70	397.60
	07/18/90	432.09	30.22	33.70		398.39	3.48	400.97
	10/18/90	432.09	34.90	37.50		394.59	2.60	396.51
	01/23/91	432.09	Found- Not Accessible					
	03/22/91	432.09	Found- Not Accessible					

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-16	05/09/91	432.09	Found- Not Accessible					
	06/28/91	432.09	Found- Not Accessible					
	08/26/91	432.09	34.30	36.45		395.64	2.15	397.23
	10/15/91	432.09	Found- Not Accessible					
	01/21/92	432.09	Found- Not Accessible					
	06/29/92	432.09	Found- Not Accessible					
	07/27/92	432.09	Found- Not Accessible					
HB-17	Summer 78	NM	NA	20.63		--	0.00	--
	3rd Q. 1990	430.00	NA	--		--	0.00	--
HB-19	Summer 78	NM	33.13	33.17		--	0.05	--
	03/15-16/90	NM	NA	21.00		--	0.00	--
	3rd Q. 1990	430.98	NA	14.60		416.38	0.00	416.38
	04/18/90	430.98	NA	18.20		412.78	0.00	412.78
	05/18/90	430.98	NA	15.80		415.18	0.00	415.18
	07/18/90	430.98	NA	14.60		416.38	0.00	416.38
	10/18/90	430.98	NA	17.90		413.08	0.00	413.08
	01/23/91	430.98	ınd- Not Accessible					
	03/22/91	NM	NA	33.90		--	0.00	--
	05/09/91	NM	NA	29.45		--	0.00	--
HB-19A	Summer 78	NM	18.38	23.75		--	5.37	--
	03/22/91	NM	NA	13.50		--	0.00	--
	05/09/91	NM	NA	13.95		--	0.00	--
HB-19B	Summer 78	NM	18.67	20.54		--	1.87	--
	03/22/91	430.98	NA	13.60		417.38	0.00	417.38
	05/09/91	430.98	NA	14.42		416.56	0.00	416.56
HB-20	Summer 78	NM	NA	21.83		--	0.00	--
HB-23	Summer 78	NM	33.83	34.17		--	0.34	--
HB-24	Summer 78	NM	32.63	35.75		--	3.12	--
	3rd Q. 1990	432.21	NA	--		--	0.00	--
	04/18/90	432.21						
	05/18/90	432.21						

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-24	07/18/90	432.21						
	10/18/90	432.21						
	01/23/91	432.21						
	03/22/91	432.21						
HB-25	Summer 78	NM	32.83	36.42		--	3.59	--
HB-26	Summer 78	NM	33.29	33.38		--	0.09	--
HB-27	Summer 78	NM	NA	25.46		--	0.00	--
	03/15-16/90	NM	NA	DRY[5]			0.00	
	04/18/90	426.51	NA	29.00		397.51	0.00	397.51
HB-27	05/18/90	426.51	NA	28.40		398.11	0.00	398.11
	07/18/90	426.51	NA	22.68		403.83	0.00	403.83
	10/18/90	426.51	NA	27.40		399.11	0.00	399.11
	01/23/91	426.51	NA	28.50		398.01	0.00	398.01
	03/22/91	426.51						
	05/09/91	426.51						
	06/28/91	426.51						
	08/26/91	426.51						
	10/15/91	426.51						
	01/21/92	426.51						
	06/29/92	426.51						
	07/27/92	426.51						
HB-28	Summer 78	NM	32.67	32.71		--	0.04	--
HB-29	Summer 78	NM	31.33	35.29		--	3.96	--
	3rd Q. 1990	429.00	NA	--		--	0.00	--
HB-30	Summer 78	NM	32.48	32.50		--	0.02	--
	03/15-16/90	NM	NA	DRY[5]				
	04/18/90	431.75	NA	DRY				
	05/18/90	431.75	34.60	35.10		396.65	0.50	397.02
	07/18/90	431.75	30.30	32.15		399.60	1.85	400.97
	10/18/90	431.75	34.11	35.35		396.40	1.24	397.32
	01/23/91	431.75	NA	35.70		396.05	0.00	396.05

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-30	03/22/91	431.75	34.45	35.10		396.65	0.65	397.13
	05/09/91	431.75	30.70	32.25		399.50	1.55	400.65
	06/28/91	431.75	30.10	31.85		399.90	1.75	401.20
	08/26/91	431.75	33.12	34.65		397.10	1.53	398.23
	10/15/91	431.75	34.65	35.03		396.72	0.38	397.00
	01/21/92	431.75	34.60	35.05		396.70	0.45	397.03
	06/29/92	431.75	34.94	35.09		396.66	0.15	396.77
	07/27/92	431.75	34.34	34.98		396.77	0.64	397.24
	04/21/93	431.75	26.87	32.90		398.85	6.03	403.31
	06/23/93	431.75	24.48	30.85		400.90	6.37	405.61
	07/15/93	431.75	16.84	28.82		402.93	11.98	411.80
	08/20/93	431.75	17.70	19.43		412.32	1.73	413.60
	09/17/93	431.75	21.04	21.67		410.08	0.63	410.55
	10/15/93	431.75	22.05	27.00		404.75	4.95	408.41
	11/10/93	431.75	26.08	29.94		401.81	3.86	404.67
	12/07/93	431.75	27.57	29.14		402.61	1.57	403.77
	01/11/94	431.75	30.59	31.03		400.72	0.44	401.05
	02/24/94	431.75	32.02	32.23		399.52	0.21	399.68
	03/16/94	431.75	30.22	30.89		400.86	0.67	401.36
	04/27/94	431.75	28.00	30.46		401.29	2.46	403.11
	05/24/94	431.75	26.70	30.40		401.35	3.70	404.09
	06/28/94	431.75	29.95	31.00		400.75	1.05	401.53
	07/21/94	431.75	30.10	31.70		400.05	1.60	401.23
	08/17/94	431.75	31.50	33.30		398.45	1.80	399.78
	09/28/94	431.75	32.40	33.40		398.35	1.00	399.09
	10/27/94	431.75	33.55	33.65		398.10	0.10	398.17
	11/21/94	431.75	32.80	33.15		398.60	0.35	398.86
	12/14/94	431.75	32.50	33.00		398.75	0.50	399.12
	01/30/95	431.75	33.10	34.05		397.70	0.95	398.40
	02/22/95	431.75	33.18	34.15		397.60	0.97	398.32
	03/28/95	431.75	32.45	33.80		397.95	1.35	398.95

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-30	04/25/95	431.75	30.44	31.20		400.55	0.76	401.11
	05/26/95	431.75	19.70	30.10		401.65	10.40	409.35
	06/20/95	431.75	20.00	29.50		402.25	9.50	409.28
	07/12/95	431.75	23.42	29.95		401.80	6.53	406.63
	08/23/95	431.75	27.62	30.40		401.35	2.78	403.41
	09/25/95	431.75	30.25	31.40		400.35	1.15	401.20
	10/26/95	431.75	31.20	32.25		399.50	1.05	400.28
	11/27/95	431.75	31.25	32.30		399.45	1.05	400.23
	05/31/96	431.75				401.17		
HB-31[3]	Summer 78	NM	34.58	34.67		--	0.09	--
	03/15-16/90	NM	NA	37.90		--	0.00	--
	04/18/90	432.78	36.90	37.00		395.78	0.10	395.85
	05/18/90	432.78	33.70	33.85		398.93	0.15	399.04
	07/18/90	432.78	31.75	31.85		400.93	0.10	401.00
	10/18/90	432.78	36.40	36.65		396.13	0.25	396.32
	01/23/91	432.78	36.85	37.85		394.93	1.00	395.67
	03/22/91	432.78	36.00	37.18		395.60	1.18	396.47
	05/09/91	432.78	30.35	30.69		402.09	0.34	402.34
	06/28/91	432.78	31.63	32.05		400.73	0.42	401.04
	08/26/91	432.78	NA	34.85		397.93	0.00	397.93
	10/15/91	432.78	36.79	36.98		395.80	0.19	395.94
	01/21/92	432.78	36.68	36.95		395.83	0.27	396.03
	06/29/92	432.78	36.80	37.18		395.60	0.38	395.88
	07/27/92	432.78	35.50	35.70		397.08	0.20	397.23
	04/21/93	432.78	26.78	26.85		405.93	0.07	405.98
	06/23/93	432.78	28.67	28.82		403.96	0.15	404.07
	07/15/93	432.78	16.69	16.81		415.97	0.12	416.06
	08/20/93	432.78	16.46	16.56		416.22	0.10	416.29
	09/17/93	432.78	19.37	19.40		413.38	0.03	413.40
	10/15/93	432.78	23.68	23.70		409.08	0.02	409.09
	11/10/93	432.78	27.60	27.62		405.16	0.02	405.17

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-31 [3]	12/07/93	432.78	29.38	29.58		403.20	0.20	403.35
	01/11/94	432.78	32.55	32.80		399.98	0.25	400.17
	02/24/94	432.78	32.86	33.12		399.66	0.26	399.85
	03/16/94	432.78	30.99	31.10		401.68	0.11	401.76
	04/27/94	432.78	28.70	28.80		403.98	0.10	404.05
	05/24/94	432.78	28.05	28.10		404.68	0.05	404.72
	06/28/94	432.78	30.20	30.30		402.48	0.10	402.55
	07/21/94	432.78	NA	30.70		402.08	0.00	402.08
	08/17/94	432.78	32.90	33.00		399.78	0.10	399.85
	09/28/94	432.78	NA	33.44		399.34	0.00	399.34
	10/27/94	432.78	NA	33.80		398.98	0.00	398.98
	11/21/94	432.78	33.45	33.50		399.28	0.05	399.32
	12/14/94	432.78	NA	33.10		399.68	0.00	399.68
	01/30/95	432.78	33.95	34.00		398.78	0.05	398.82
	02/22/95	432.78	34.50	34.60		398.18	0.10	398.25
	03/28/95	432.78	32.90	33.00		399.78	0.10	399.85
	04/25/95	432.78	30.10	30.20		402.58	0.10	402.65
	05/26/95	432.78	19.65	19.80		412.98	0.15	413.09
	06/20/95	432.78	22.50	22.65		410.13	0.15	410.24
	07/12/95	432.78	25.15	25.20		407.58	0.05	407.62
	08/23/95	432.78	29.33	29.46		403.32	0.13	403.42
	09/25/95	432.78	31.98	32.04		400.74	0.06	400.78
	10/26/95	432.78	32.30	32.40		400.38	0.10	400.45
	11/27/95	432.78	32.20	32.30		400.48	0.10	400.55
	05/31/96	432.78						
HB-32	Summer 78	NM	32.08	36.00		--	3.92	--
	04/18/90	430.75	34.60	36.45		394.30	1.85	395.67
	05/18/90	430.75	32.90	33.45		397.30	0.55	397.71
	07/18/90	430.75	28.75	34.55		396.20	5.80	400.49
	10/18/90	430.75	33.40	36.90		393.85	3.50	396.44
	01/23/91	430.75	34.25	37.25		393.50	3.00	395.72

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
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Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-32	03/22/91	430.75	33.65	36.20		394.55	2.55	396.44
	05/09/91	430.75	28.10	33.67		397.08	5.57	401.20
	06/28/91	430.75	28.58	34.45		396.30	5.87	400.64
	08/26/91	430.75	32.72	35.84		394.91	3.12	397.22
	10/15/91	430.75	33.92	37.23		393.52	3.31	395.97
	01/21/92	430.75	Found- Not Accessible					
	06/29/92	430.75	33.91	37.36		393.39	3.45	395.94
	07/27/92	430.75	33.29	35.31		395.44	2.02	396.93
	04/21/93	430.75	22.49	32.90		397.85	10.41	405.55
	06/23/93	430.75	22.24	33.82		396.93	11.58	405.50
	07/15/93	430.75	12.79	32.42		398.33	19.63	412.86
	08/20/93	430.75	11.45	33.41		397.34	21.96	413.59
	09/17/93	430.75	Found- Not Accessible					
	10/15/93	430.75	Found- Not Accessible					
	11/10/93	430.75	Found- Not Accessible					
	12/07/93	430.75	Found- Not Accessible					
	01/11/94	430.75	NA	Dry				
	02/24/94	430.75	Found- Not Accessible					
	03/16/94	430.75	Found- Not Accessible					
	04/27/94	430.75	25.40	32.20		398.55	6.80	403.58
	05/24/94	430.75	24.60	32.20		398.55	7.60	404.17
	06/28/94	430.75	27.20	32.40		398.35	5.20	402.20
	07/21/94	430.75	28.30	32.20		398.55	3.90	401.44
	08/17/94	430.75	31.40	33.50		397.25	2.10	398.80
	09/28/94	430.75	31.00	32.60		398.15	1.60	399.33
	10/27/94	430.75	31.90	32.90		397.85	1.00	398.59
	11/21/94	430.75	31.20	33.10		397.65	1.90	399.06
	12/14/94	430.75	Found- Not Accessible					
	01/30/95	430.75	35.45	36.68		394.07	1.23	394.98
	02/22/95	430.75	36.20	36.30		394.45	0.10	394.52
	03/28/95	430.75	34.90	35.25		395.50	0.35	395.76

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-32	04/25/95	430.75	NA	32.58		398.17	0.00	398.17
	05/26/95	430.75	23.30	23.55		407.20	0.25	407.39
	06/20/95	430.75	24.90	25.60		405.15	0.70	405.67
	07/12/95	430.75	25.75	32.90		397.85	7.15	403.14
	08/23/95	430.75	30.95	31.15		399.60	0.20	399.75
	09/25/95	430.75	33.10	34.30		396.45	1.20	397.34
	10/26/95	430.75	33.35	35.21		395.54	1.86	396.92
	11/27/95	430.75	33.80	33.90		396.85	0.10	396.92
	05/31/96	430.75				400.23		
HB-33	Summer 78	NM	31.83	34.42		--	2.59	--
	04/18/90	430.86	NA	34.50		396.36	0.00	396.36
	05/18/90	430.86	NA	33.75		397.11	0.00	397.11
	07/18/90	430.86	NA	28.65		402.21	0.00	402.21
	10/18/90	430.86	NA	32.95		397.91	0.00	397.91
	01/23/91	430.86	NA	33.65		397.21	0.00	397.21
	03/22/91	430.86	NA	33.67		397.19	0.00	397.19
	05/09/91	430.86	NA	29.60		401.26	0.00	401.26
	06/28/91	430.86	NA	28.74		402.12	0.00	402.12
	08/26/91	430.86	NA	32.02		398.84	0.00	398.84
	10/15/91	430.86	NA	33.80		397.06	0.00	397.06
	01/21/92	430.86	NA	33.18		397.68	0.00	397.68
	06/29/92	430.86	NA	33.41		397.45	0.00	397.45
	07/27/92	430.86	NA	33.20		397.66	0.00	397.66
	04/21/93	430.86	NA	25.05		405.81	0.00	405.81
	06/23/93	430.86	NA	24.20		406.66	0.00	406.66
	07/15/93	430.86	NA	17.81		413.05	0.00	413.05
	08/20/93	430.86	NA	17.05		413.81	0.00	413.81
	09/17/93	430.86	NA	19.90		410.96	0.00	410.96
	10/15/93	430.86	NA	22.28		408.58	0.00	408.58
	11/10/93	430.86	NA	25.96		404.90	0.00	404.90
	12/07/93	430.86	NA	26.83		404.03	0.00	404.03

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-33	01/11/94	430.86	NA	29.20		401.66	0.00	401.66
	02/24/94	430.86	NA	29.72		401.14	0.00	401.14
	03/16/94	430.86	NA	28.10		402.76	0.00	402.76
	04/27/94	430.86	NA	26.96		403.90	0.00	403.90
	05/24/94	430.86	NA	26.20		404.66	0.00	404.66
	06/28/94	430.86	NA	27.50		403.36	0.00	403.36
	07/21/94	430.86	NA	28.20		402.66	0.00	402.66
	08/17/94	430.86	NA	29.81		401.05	0.00	401.05
	09/28/94	430.86	NA	30.70		400.16	0.00	400.16
	10/27/94	430.86	NA	31.45		399.41	0.00	399.41
	11/21/94	430.86	NA	30.50		400.36	0.00	400.36
	12/14/94	430.86	NA	30.50		400.36	0.00	400.36
	01/30/95	430.86	NA	30.68		400.18	0.00	400.18
	02/22/95	430.86	NA	31.05		399.81	0.00	399.81
	03/28/95	430.86	NA	30.68		400.18	0.00	400.18
	04/25/95	430.86	NA	29.80		401.06	0.00	401.06
	05/26/95	430.86	NA	18.21		412.65	0.00	412.65
	06/20/95	430.86	NA	20.41		410.45	0.00	410.45
	07/12/95	430.86	NA	22.40		408.46	0.00	408.46
	08/23/95	430.86	NA	25.60		405.26	0.00	405.26
	09/25/95	430.86	NA	27.48		403.38	0.00	403.38
	10/26/95	430.86	NA	28.05		402.81	0.00	402.81
	11/27/95	430.86	NA	28.61		402.25		
	05/31/96	430.86				407.26		
HB-34 [2]	Summer 78	NM	34.50	34.58		--	0.08	--
	03/15-16/90	NM	37.30	38.20		--	0.90	--
	04/18/90	432.63	36.45	36.80		395.83	0.35	396.09
	05/18/90	432.63	33.40	34.70		397.93	1.30	398.89
	07/18/90	432.63	30.85	31.75		400.88	0.90	401.55
	10/18/90	432.63	35.35	35.38		397.25	0.03	397.27
	01/23/91	432.63	NA	34.70		397.93	0.00	397.93

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-34 [2]	03/22/91	432.63	NA	34.00		398.63	0.00	398.63
	05/09/91	432.63	NA	29.41		403.22	0.00	403.22
	06/28/91	432.63	NA	30.40		402.23	0.00	402.23
	08/26/91	432.63	34.28	34.74		397.89	0.46	398.23
	10/15/91	432.63	NA	35.88		396.75	0.00	396.75
	01/21/92	432.63	35.52	36.50		396.13	0.98	396.86
	06/29/92	432.63	NA	36.10		396.53	0.00	396.53
	07/27/92	432.63	34.96	35.75		396.88	0.79	397.46
	04/21/93	432.63	NA	32.40		400.23	0.00	400.23
	06/23/93	432.63	NA	24.85		407.78	0.00	407.78
	07/15/93	432.63	NA	18.66		413.97	0.00	413.97
	08/20/93	432.63	15.87	15.89		416.74	0.02	416.75
	09/17/93	432.63	19.25	19.27		413.36	0.02	413.37
	10/15/93	432.63	21.76	21.77		410.86	0.01	410.87
	11/10/93	432.63	26.02	28.32		404.31	2.30	406.01
	12/07/93	432.63	26.32	26.72		405.91	0.40	406.21
	01/11/94	432.63	30.37	32.15		400.48	1.78	401.80
	02/24/94	432.63	31.50	32.06		400.57	0.56	400.98
	03/16/94	432.63	29.53	29.76		402.87	0.23	403.04
	04/27/94	432.63	26.98	27.00		405.63	0.02	405.64
	05/24/94	432.63	26.40	26.50		406.13	0.10	406.20
	06/28/94	432.63	NA	29.20		403.43	0.00	403.43
	07/21/94	432.63	29.70	29.90		402.73	0.20	402.88
	08/17/94	432.63	32.55	32.60		400.03	0.05	400.07
	09/28/94	432.63	33.50	33.55		399.08	0.05	399.12
	10/27/94	432.63	34.05	34.10		398.53	0.05	398.57
	11/21/94	432.63	33.50	34.25		398.38	0.75	398.94
	12/14/94	432.63	33.15	33.95		398.68	0.80	399.27
	01/30/95	432.63	33.65	34.05		398.58	0.40	398.88
	02/22/95	432.63	31.60	31.70		400.93	0.10	401.00
	03/28/95	432.63	30.90	30.93		401.70	0.03	401.72

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-34 [2]	04/25/95	432.63	29.20	29.25		403.38	0.05	403.42
	05/26/95	432.63	19.60	19.70		412.93	0.10	413.00
	06/20/95	432.63	20.67	20.70		411.93	0.03	411.95
	07/12/95	432.63	24.10	24.13		408.50	0.03	408.52
	08/23/95	432.63	27.42	27.46		405.17	0.04	405.20
	09/25/95	432.63	30.65	31.40		401.23	0.75	401.79
	10/26/95	432.63	32.00	32.95		399.68	0.95	400.38
	11/27/95	432.63	32.00	32.78		399.85	0.78	400.43
	05/31/96	432.63				409.23		
HB-35	Summer 78	NM	28.54	30.29		--	1.75	--
	3rd Q. 1990	430.68	NA	--		--	0.00	--
	04/18/90	430.68	Found-Well Plugged					
	05/18/90	430.68	Found-Well Plugged					
	07/18/90	430.68	Found-Well Plugged					
	10/15/90	430.68	Found- Well Plugged					
	01/23/91	430.68	Found- Well Plugged					
	03/22/91	430.68	Found- Well Plugged					
HB-36	Summer 78	NM	32.08	35.00		--	2.92	--
	03/15-16/90	NM	NA	DRY[5]				
	04/18/90	431.18	34.70	35.50		395.68	0.80	396.27
	05/18/90	431.18	NA	34.25		396.93	0.00	396.93
	07/18/90	431.18	30.08	30.40		400.78	0.32	401.02
	10/18/90	431.18	NA	32.10		399.08	0.00	399.08
	01/23/91	431.18	NA	34.00		397.18	0.00	397.18
	03/22/91	431.18	29.28	29.80		401.38	0.52	401.76
	05/09/91	431.18	NA	29.90		401.28	0.00	401.28
	06/28/91	431.18	NA	23.93		407.25	0.00	407.25
	08/26/91	431.18	32.75	33.10		398.08	0.35	398.34
	10/15/91	431.18	NA	33.15		398.03	0.00	398.03
	01/21/92	431.18	NA	DRY		--	0.00	--
	06/29/92	431.18	NA	DRY		--	0.00	--

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-36	07/27/92	431.18	NA	DRY		--	0.00	--
	04/21/93	431.18	NA	DRY		--	0.00	--
	06/23/93	431.18	23.95	25.42		405.76	1.47	406.85
	07/15/93	431.18	NA	17.61		413.57	0.00	413.57
	08/20/93	431.18	NA	4.12		427.06	0.00	427.06
	09/17/93	431.18	NA	2.10		429.08	0.00	429.08
	10/15/93	431.18	NA	2.85		428.33	0.00	428.33
	11/10/93	431.18	NA	3.63		427.55	0.00	427.55
	12/07/93	431.18	NA	4.19		426.99	0.00	426.99
	01/11/94	431.18	NA	4.77		426.41	0.00	426.41
HB-36	02/24/94	431.18	NA	5.30		425.88	0.00	425.88
	03/16/94	431.18	NA	5.54		425.64	0.00	425.64
	04/27/94	431.18	NA	5.90		425.28	0.00	425.28
	05/24/94	431.18	NA	6.20		424.98	0.00	424.98
	06/28/94	431.18	NA	6.45		424.73	0.00	424.73
	07/21/94	431.18	NA	6.90		424.28	0.00	424.28
	08/17/94	431.18	Found- Not Accessible					
	09/28/94	431.18	Found- Not Accessible					
	10/27/94	431.18	Found- Not Accessible					
	11/21/94	431.18	Found- Not Accessible					
	12/14/94	431.18	Found- Not Accessible					
	01/30/95	431.18	Found- Not Accessible					
	02/22/95	431.18	Found- Not Accessible					
	03/28/95	431.18	Found- Not Accessible					
	04/25/95	431.18	Found- Not Accessible					
	05/26/95	431.18	Found- Not Accessible					
	06/20/95	431.18	Found- Not Accessible					
	07/12/95	431.18	Found- Not Accessible					
	08/23/95	431.18	Found- Not Accessible					
	09/25/95	431.18	Found- Not Accessible					
	10/26/95	431.18	Found- Not Accessible					

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-36	11/27/95	431.18	Found- Not Accessible					
	05/31/96	431.18				NA		
HB-37	Summer 78	NM	NA	33.67		--	0.00	--
	03/15-16/90	NM	NA	DRY[5]				
	04/18/90	432.41	NA	Dry				
	05/18/90	432.41	35.30	35.60		396.81	0.30	397.03
	07/18/90	432.41	30.93	32.20		400.21	1.27	401.15
	10/18/90	432.41	34.45	35.50		396.91	1.05	397.69
	01/23/91	432.41	35.49	35.90		396.51	0.41	396.81
	03/22/91	432.41	34.74	35.85		396.56	1.11	397.38
	05/09/91	432.41	31.02	32.34		400.07	1.32	401.05
	06/28/91	432.41	29.94	33.75		398.66	3.81	401.48
	08/26/91	432.41	33.82	35.68		396.73	1.86	398.11
	10/15/91	432.41	34.08	35.85		396.56	1.77	397.87
	01/21/92	432.41	35.20	35.52		396.89	0.32	397.13
	06/29/92	432.41	35.15	35.90		396.51	0.75	397.07
	07/27/92	432.41	34.91	35.88		396.53	0.97	397.25
	04/21/93	432.41	24.89	33.18		399.23	8.29	405.36
	06/23/93	432.41	25.61	32.30		400.11	6.69	405.06
	07/15/93	432.41	19.25	28.90		403.51	9.65	410.65
	08/20/93	432.41	18.17	18.54		413.87	0.37	414.14
	09/17/93	432.41	21.49	21.53		410.88	0.04	410.91
	10/15/93	432.41	23.31	23.39		409.02	0.08	409.08
	11/10/93	432.41	27.12	27.32		405.09	0.20	405.24
	12/07/93	432.41	28.06	28.29		404.12	0.23	404.29
	01/11/94	432.41	31.05	31.16		401.25	0.11	401.33
	02/24/94	432.41	32.58	32.86		399.55	0.28	399.76
	03/16/94	432.41	30.85	31.07		401.34	0.22	401.50
	04/27/94	432.41	28.47	28.65		403.76	0.18	403.89
	05/24/94	432.41	27.60	27.80		404.61	0.20	404.76
	06/28/94	432.41	30.20	30.65		401.76	0.45	402.09

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

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January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-37	07/21/94	432.41	30.90	31.60		400.81	0.70	401.33
	08/17/94	432.41	32.25	33.20		399.21	0.95	399.91
	09/28/94	432.41	33.10	33.65		398.76	0.55	399.17
	10/27/94	432.41	33.70	34.70		397.71	1.00	398.45
	11/21/94	432.41	33.40	34.00		398.41	0.60	398.85
	12/14/94	432.41	33.10	33.60		398.81	0.50	399.18
	01/30/95	432.41	33.75	34.55		397.86	0.80	398.45
	02/22/95	432.41	33.83	34.40		398.01	0.57	398.43
	03/28/95	432.41	33.30	33.90		398.51	0.60	398.95
	04/25/95	432.41	31.05	31.70		400.71	0.65	401.19
	05/26/95	432.41	22.60	23.45		408.96	0.85	409.59
	06/20/95	432.41	22.70	23.80		408.61	1.10	409.42
	07/12/95	432.41	24.90	25.97		406.44	1.07	407.23
	08/23/95	432.41	28.54	29.42		402.99	0.88	403.64
	09/25/95	432.41	30.92	31.35		401.06	0.43	401.38
	10/26/95	432.41	31.91	32.30		400.11	0.39	400.40
	11/27/95	432.41	32.00	32.40		400.01	0.40	400.31
	05/31/96	432.41				406.16		
HB-38	Summer 78	NM	NA	30.79		--	0.00	--
	03/15-16/90	NM	NA	DRY[5]				
	04/18/90	430.60	NA	33.80		396.80	0.00	396.80
	05/18/03	430.60	NA	32.85		397.75	0.00	397.75
	07/18/90	430.60	NA	28.55		402.05	0.00	402.05
	10/18/90	430.60	NA	32.60		398.00	0.00	398.00
	01/23/91	430.60	NA	33.20		397.40	0.00	397.40
	03/22/91	430.60	NA	33.10		397.50	0.00	397.50
	05/09/91	430.60	NA	28.76		401.84	0.00	401.84
	06/28/91	430.60	NA	28.18		402.42	0.00	402.42
	08/26/91	430.60	NA	31.50		399.10	0.00	399.10
	10/15/91	430.60	NA	33.04		397.56	0.00	397.56
	01/21/92	430.60	NA	32.90		397.70	0.00	397.70

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-38	06/29/92	430.60	NA	33.26		397.34	0.00	397.34
	07/27/92	430.60	NA	32.68		397.92	0.00	397.92
	04/21/93	430.60	NA	25.60		405.00	0.00	405.00
	06/23/93	430.60	NA	25.14		405.46	0.00	405.46
	07/15/93	430.60	NA	18.16		412.44	0.00	412.44
	08/20/93	430.60	NA	15.73		414.87	0.00	414.87
	09/17/93	430.60	NA	19.09		411.51	0.00	411.51
	10/15/93	430.60	NA	20.69		409.91	0.00	409.91
	11/10/93	430.60	NA	24.52		406.08	0.00	406.08
	12/07/93	430.60	NA	25.60		405.00	0.00	405.00
	01/11/94	430.60	NA	28.29		402.31	0.00	402.31
	02/24/94	430.60	NA	30.04		400.56	0.00	400.56
	03/16/94	430.60	NA	28.42		402.18	0.00	402.18
	04/27/94	430.60	NA	26.45		404.15	0.00	404.15
	05/24/94	430.60	NA	25.40		405.20	0.00	405.20
	06/28/94	430.60	NA	28.00		402.60	0.00	402.60
	07/21/94	430.60	NA	28.55		402.05	0.00	402.05
	08/17/94	430.60	NA	30.00		400.60	0.00	400.60
	09/28/94	430.60	NA	30.90		399.70	0.00	399.70
	10/27/94	430.60	NA	31.60		399.00	0.00	399.00
	11/21/94	430.60	NA	31.25		399.35	0.00	399.35
	12/14/94	430.60	NA	30.85		399.75	0.00	399.75
	01/30/95	430.60	NA	31.57		399.03	0.00	399.03
	02/22/95	430.60	NA	31.75		398.85	0.00	398.85
	03/28/95	430.60	NA	31.18		399.42	0.00	399.42
	04/25/95	430.60	NA	29.00		401.60	0.00	401.60
	05/26/95	430.60	NA	21.28		409.32	0.00	409.32
	06/20/95	430.60	NA	20.30		410.30	0.00	410.30
	07/12/95	430.60	NA	23.08		407.52	0.00	407.52
	08/23/95	430.60	NA	26.38		404.22	0.00	404.22
	09/25/95	430.60	NA	28.63		401.97	0.00	401.97

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-38	10/26/95	430.60	NA	29.07		401.53	0.00	401.53
	11/27/95	430.60	NA	29.83		400.77	0.00	400.77
	05/31/96	430.60				405.85		
HB-39	Summer 78		34.63	34.92		-34.92	0.29	-34.71
	3rd Q. 1990	433.00	NA	--		--	0.00	--
HB-39A	Summer 78	NM	20.38	23.50		--	3.12	--
HMW-01	12/14/90	430.65	NA	22.88		407.77	0.00	407.77
	01/23/91	430.65	NA	19.70		410.95	0.00	410.95
	03/22/91	430.65	NA	20.40		410.25	0.00	410.25
	05/09/91	430.65	NA	22.70		407.95	0.00	407.95
	06/28/91	430.65	NA	22.07		408.58	0.00	408.58
	08/26/91	430.65	NA	22.74		407.91	0.00	407.91
	10/15/91	430.65	NA	22.79		407.86	0.00	407.86
	01/21/92	430.65	NA	22.35		408.30	0.00	408.30
	06/29/92	430.65	NA	22.61		408.04	0.00	408.04
	07/27/92	430.65	NA	22.61		408.04	0.00	408.04
	04/21/93	430.65	NA	18.23		412.42	0.00	412.42
	06/23/93	430.65	NA	20.76		409.89	0.00	409.89
	07/15/93	430.65	NA	16.90		413.75	0.00	413.75
	08/20/93	430.65	13.17	18.69		411.96	5.52	416.04
	09/17/93	430.65	15.27	18.86		411.79	3.59	414.45
	10/15/93	430.65	17.35	18.76		411.89	1.41	412.93
	11/10/93	430.65	20.68	21.36		409.29	0.68	409.79
	12/07/93	430.65	18.88	19.20		411.45	0.32	411.69
	01/11/94	430.65	22.18	22.61		408.04	0.43	408.36
	02/24/94	430.65	NA	22.62		408.03	0.00	408.03
	03/16/94	430.65	22.45	22.78		407.87	0.33	408.11
	04/27/94	430.65	NA	20.27		410.38	0.00	410.38
	05/24/94	430.65	NA	22.80		407.85	0.00	407.85
	06/28/94	430.65	NA	22.70		407.95	0.00	407.95
	07/21/94	430.65	NA	22.90		407.75	0.00	407.75

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-01	08/17/94	430.65	NA	22.90		407.75	0.00	407.75
	09/28/94	430.65	NA	22.85		407.80	0.00	407.80
	10/27/94	430.65	NA	22.85		407.80	0.00	407.80
	11/21/94	430.65	NA	22.80		407.85	0.00	407.85
	12/14/94	430.65	NA	22.80		407.85	0.00	407.85
	01/30/95	430.65	NA	21.80		408.85	0.00	408.85
	02/22/95	430.65	NA	22.00		408.65	0.00	408.65
	03/28/95	430.65	NA	21.60		409.05	0.00	409.05
	04/25/95	430.65	NA	21.85		408.80	0.00	408.80
	05/26/95	430.65	NA	13.80		416.85	0.00	416.85
	06/20/95	430.65	NA	16.95		413.70	0.00	413.70
	07/12/95	430.65	NA	19.42		411.23	0.00	411.23
	08/23/95	430.65	NA	20.45		410.20	0.00	410.20
	09/25/95	430.65	NA	21.73		408.92	0.00	408.92
	10/26/95	430.65	NA	22.35		408.30	0.00	408.30
	11/27/95	430.65	NA	22.60		408.05	0.00	408.05
	05/31/96	430.65				430.65		
HMW-02	12/14/90	430.19	33.65	35.95		394.24	2.30	395.94
	01/23/91	430.19	33.40	35.15		395.04	1.75	396.34
	03/22/91	430.19	32.93	33.82		396.37	0.89	397.03
	05/09/91	430.19	29.00	30.42		399.77	1.42	400.82
	06/28/91	430.19	28.64	31.18		399.01	2.54	400.89
	08/26/91	430.19	31.94	34.17		396.02	2.23	397.67
	10/15/91	430.19	33.29	35.47		394.72	2.18	396.33
	01/21/92	430.19	33.28	35.38		394.81	2.10	396.36
	06/29/92	430.19	33.55	35.93		394.26	2.38	396.02
	07/27/92	430.19	33.10	34.53		395.66	1.43	396.72
	04/21/93	430.19	24.80	27.40		402.79	2.60	404.71
	06/23/93	430.19	23.60	31.02		399.17	7.42	404.66
	07/15/93	430.19	14.55	29.73		400.46	15.18	411.69
	08/20/93	430.19	12.87	28.23		401.96	15.36	413.33

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-02	09/17/93	430.19	15.96	30.07		400.12	14.11	410.56
	10/15/93	430.19	18.75	31.13		399.06	12.38	408.22
	11/10/93	430.19	24.18	29.98		400.21	5.80	404.50
	12/07/93	430.19	25.63	28.83		401.36	3.20	403.73
	01/11/94	430.19	29.03	30.39		399.80	1.36	400.81
	02/24/94	430.19	30.30	31.46		398.73	1.16	399.59
	03/16/94	430.19	28.85	29.48		400.71	0.63	401.18
	04/27/94	430.19	26.85	27.91		402.28	1.06	403.06
	05/24/94	430.19	25.80	27.40		402.79	1.60	403.97
	06/28/94	430.19	27.90	30.15		400.04	2.25	401.71
	07/21/94	430.19	28.50	30.70		399.49	2.20	401.12
	08/17/94	430.19	30.20	31.60		398.59	1.40	399.63
	09/28/94	430.19	30.80	32.65		397.54	1.85	398.91
	10/27/94	430.19	31.35	33.60		396.59	2.25	398.26
	11/21/94	430.19	31.25	32.75		397.44	1.50	398.55
	12/14/94	430.19	30.90	32.05		398.14	1.15	398.99
	01/30/95	430.19	31.56	33.00		397.19	1.44	398.26
	02/22/95	430.19	31.60	33.30		396.89	1.70	398.15
	03/28/95	430.19	31.05	31.75		398.44	0.70	398.96
	04/25/95	430.19	28.85	29.95		400.24	1.10	401.05
	05/26/95	430.19	17.22	30.05		400.14	12.83	409.63
	06/20/95	430.19	18.63	30.93		399.26	12.30	408.36
	07/12/95	430.19	21.20	30.80		399.39	9.60	406.49
	08/23/95	430.19	26.65	30.60		399.59	3.95	402.51
	09/25/95	430.19	28.60	30.65		399.54	2.05	401.06
	10/26/95	430.19	29.55	30.95		399.24	1.40	400.28
	11/27/95	430.19	29.75	31.35		398.84	1.60	400.02
	05/31/96					399.69		
HMW-03	12/14/90	429.32	NA	31.78		397.54	0.00	397.54
	01/23/91	Found - Not Accessible						
	03/22/91	429.32	NA	31.7		397.62	0.00	397.62

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-03	05/09/91	429.32	NA	28.5		400.82	0.00	400.82
	06/28/91	429.32	NA	26.8		402.52	0.00	402.52
	08/26/91	429.32	NA	31.65		397.67	0.00	397.67
	10/15/91	429.32	NA	33.58		395.74	0.00	395.74
	01/21/92	429.32	NA	31.89		397.43	0.00	397.43
	06/29/92	429.32	NA	32.45		396.87	0.00	396.87
	07/27/92	429.32	NA	32.01		397.31	0.00	397.31
	04/21/93	429.32	NA	28.4		400.92	0.00	400.92
	06/23/93	Found - Not Accessible						
	07/15/93	429.32	NA	17.64		411.68	0.00	411.68
	08/20/93	429.32	NA	14.4		414.92	0.00	414.92
	09/17/93	429.32	NA	17.59		411.73	0.00	411.73
	10/15/93	429.32	NA	17.7		411.62	0.00	411.62
	11/10/93	Found - Not Accessible						
	12/07/93	Found - Not Accessible						
	01/11/94	Found - Not Accessible						
	02/24/94	Found - Not Accessible						
	03/16/94	Found - Not Accessible						
	04/27/94	Found - Not Accessible						
	05/24/94	Found - Not Accessible						
	06/28/94	Found - Not Accessible						
	07/21/94	Found - Not Accessible						
	08/17/94	Found - Not Accessible						
	09/28/94	429.32	NA	29.2		400.12	0.00	400.12
	10/27/94	429.32	NA	29.65		399.67	0.00	399.67
	11/21/94	429.32	NA	28.4		400.92	0.00	400.92
	12/14/94	429.32	NA	28.8		400.52	0.00	400.52
	01/30/95	Found - Not Accessible						
	02/22/95	429.32	NA	28.3		401.02	0.00	401.02
	03/28/95	429.32	NA	27.9		401.42	0.00	401.42
	04/25/95	429.32	NA	26.35		402.97	0.00	402.97

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-03	05/26/95	429.32	NA	18.42		410.90	0.00	410.90
	06/20/95	429.32	NA	18.03		411.29	0.00	411.29
	07/12/95	429.32	NA	20.7		408.62	0.00	408.62
	08/23/95	429.32	NA	23.52		405.80	0.00	405.80
	09/25/95	429.32	NA	26.2		403.12	0.00	403.12
	10/26/95	429.32	NA	27.45		401.87	0.00	401.87
	11/27/95	429.32	NA	27.17		402.15	0.00	402.15
	05/31/96					0.00		
HMW-04	12/14/90	429.55	NA	14.95		414.60	0.00	414.60
	01/23/91	429.55	NA	9.6		419.95	0.00	419.95
	03/22/91	429.55	NA	11.17		418.38	0.00	418.38
	05/09/91	429.55	11.41	11.43		418.12	0.02	418.13
	06/28/91				Found - Not Accessible			
	08/26/91				Found - Not Accessible			
	10/15/91	429.55	34.54	36.85		392.70	2.31	394.41
	01/21/92	429.55	34.62	35.23		394.32	0.61	394.77
	06/29/92	429.55	NA	13.52		416.03	0.00	416.03
	07/27/92	429.55	19.2	19.32		410.23	0.12	410.32
	04/21/93	429.55	8.56	8.73		420.82	0.17	420.95
	06/23/93	429.55	9.85	10.05		419.50	0.20	419.65
	07/15/93	429.55	9.61	9.71		419.84	0.10	419.91
	08/20/93	429.55	7.89	7.91		421.64	0.02	421.65
	09/17/93	429.55	NA	7.85		421.70	0.00	421.70
	10/15/93	429.55	NA	6.55		423.00	0.00	423.00
	11/10/93	429.55	NA	9.8		419.75	0.00	419.75
	12/07/93	429.55	NA	6.1		423.45	0.00	423.45
	01/11/94	429.55	NA	11.78		417.77	0.00	417.77
	02/24/94	429.55	NA	12.87		416.68	0.00	416.68
	03/16/94	429.55	NA	12.93		416.62	0.00	416.62
	04/27/94	429.55	NA	8.52		421.03	0.00	421.03
	05/24/94	429.55	NA	8.35		421.20	0.00	421.20

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-04	06/28/94	429.55	NA	13.6		415.95	0.00	415.95
	07/21/94	429.55	NA	14.1		415.45	0.00	415.45
	08/17/94	429.55	NA	16.85		412.70	0.00	412.70
	09/28/94	429.55	NA	18.55		411.00	0.00	411.00
	10/27/94	429.55	NA	18.9		410.65	0.00	410.65
	11/21/94	429.55	NA	15.1		414.45	0.00	414.45
	12/14/94	429.55	NA	14.15		415.40	0.00	415.40
	01/30/95	429.55	NA	11.8		417.75	0.00	417.75
	02/22/95	429.55	NA	11.62		417.93	0.00	417.93
	03/28/95	429.55	NA	11.13		418.42	0.00	418.42
	04/25/95	429.55	NA	12.4		417.15	0.00	417.15
	05/26/95	429.55	NA	6.28		423.27	0.00	423.27
	06/20/95	429.55	NA	7.4		422.15	0.00	422.15
	07/12/95	429.55	NA	9.9		419.65	0.00	419.65
	08/23/95	429.55	NA	10.72		418.83	0.00	418.83
	09/25/95	429.55	NA	14.65		414.90	0.00	414.90
	10/26/95	429.55	NA	17.5		412.05	0.00	412.05
	11/27/95	429.55	NA	18.65		410.90	0.00	410.90
	05/31/96	429.55				421.68		
HMW-05	12/14/90				Found - Not Accessible			
	01/23/91				Found - Not Accessible			
	03/22/91	432.74	NA	23.93		408.81	0.00	408.81
	05/09/91				Found - Not Accessible			
	06/28/91				Found - Not Accessible			
	08/26/91	432.74	34.15	37		395.74	2.85	397.85
	10/15/91				Found - Not Accessible			
	01/21/92				Found - Not Accessible			
	06/29/92				Found - Not Accessible			
	07/27/92				Found - Not Accessible			
HMW-06	12/14/90				Found - Not Accessible			
	01/23/91				Found - Not Accessible			

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

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January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-06	03/22/91	432.39	35.05	36.63		395.76	1.58	396.93
	05/09/91	432.39	NA	30.9		401.49	0.00	401.49
	06/28/91	Found - Not Accessible						
	08/26/91	432.39	NA	21.93		410.46	0.00	410.46
	10/15/91	Found - Not Accessible						
	01/21/92	Found - Not Accessible						
	06/29/92	Found - Not Accessible						
	07/27/92	Found - Not Accessible						
HMW-07	12/14/90	430.17	NA	25.35		404.82	0.00	404.82
	01/23/91	Found - Not Accessible						
	03/22/91	430.17	NA	24.85		405.32	0.00	405.32
	05/09/91	430.17	NA	24.34		405.83	0.00	405.83
	06/28/91	430.17	NA	24.22		405.95	0.00	405.95
	08/26/91	430.17	NA	25.13		405.04	0.00	405.04
	10/15/91	430.17	NA	25.53		404.64	0.00	404.64
	01/21/92	430.17	NA	25.38		404.79	0.00	404.79
	06/29/92	430.17	NA	25.53		404.64	0.00	404.64
	07/27/92	430.17	NA	25.54		404.63	0.00	404.63
	04/21/93	430.17	NA	22.3		407.87	0.00	407.87
	06/23/93	430.17	NA	20.69		409.48	0.00	409.48
	07/15/93	430.17	16.71	18.79		411.38	2.08	412.92
	08/20/93	430.17	9.72	21.58		408.59	11.86	417.37
	09/17/93	430.17	12.54	22.57		407.60	10.03	415.02
	10/15/93	430.17	14.46	21.2		408.97	6.74	413.96
	11/10/93	430.17	19.36	22.69		407.48	3.33	409.94
	12/07/93	430.17	18.23	20.38		409.79	2.15	411.38
	01/11/94	430.17	22.12	23.21		406.96	1.09	407.77
	02/24/94	430.17	23.29	23.68		406.49	0.39	406.78
	03/16/94	430.17	23.35	23.61		406.56	0.26	406.75
	04/27/94	430.17	21.92	22.18		407.99	0.26	408.18
	05/24/94	430.17	21.4	21.7		408.47	0.30	408.69

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-07	06/28/94	430.17	23.4	23.8		406.37	0.40	406.67
	07/21/94	430.17	23.7	24.1		406.07	0.40	406.37
	08/17/94	430.17	24.3	24.75		405.42	0.45	405.75
	09/28/94	430.17	24.55	25.05		405.12	0.50	405.49
	10/27/94	430.17	24.75	25.2		404.97	0.45	405.30
	11/21/94	430.17	24.65	25.1		405.07	0.45	405.40
	12/14/94	430.17	24.65	25.15		405.02	0.50	405.39
	01/30/95	430.17	24.52	24.9		405.27	0.38	405.55
	02/22/95	430.17	24.45	24.8		405.37	0.35	405.63
	03/28/95	430.17	24.3	24.75		405.42	0.45	405.75
	04/25/95	430.17	24.1	24.53		405.64	0.43	405.96
	05/26/95	430.17	NA	17.15		413.02	0.00	413.02
	06/20/95	430.17	17.05	17.15		413.02	0.10	413.09
	07/12/95	430.17	20.2	20.4		409.77	0.20	409.92
	08/23/95	430.17	22.45	22.7		407.47	0.25	407.66
	09/25/95	430.17	24.02	24.3		405.87	0.28	406.08
	10/26/95	430.17	24.26	24.5		405.67	0.24	405.85
	11/27/95	430.17	24.4	24.75		405.42	0.35	405.68
	05/31/96	430.17				409.74		
HMW-08	12/14/90	430.31	33.9	37.95		392.36	4.05	395.36
	01/23/91	Found - Not Accessible						
	03/22/91	430.31	33.1	35.18		395.13	2.08	396.67
	05/09/91	430.31	27.4	33.38		396.93	5.98	401.36
	06/28/91	430.31	28.22	33.9		396.41	5.68	400.61
	08/26/91	430.31	32.4	35.4		394.91	3.00	397.13
	10/15/91	430.31	33.56	36.77		393.54	3.21	395.92
	01/21/92	430.31	33.58	36.76		393.55	3.18	395.90
	06/29/92	430.31	33.76	36.98		393.33	3.22	395.71
	07/27/92	430.31	32.93	34.8		395.51	1.87	396.89
	04/21/93	430.31	21.81	32.7		397.61	10.89	405.67
	06/23/93	430.31	21.85	33.05		397.26	11.20	405.55

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-08	07/15/93	430.31	17.03	17.38		412.93	0.35	413.19
	08/20/93	430.31	16.35	16.49		413.82	0.14	413.92
	09/17/93	430.31	19.13	19.48		410.83	0.35	411.09
	10/15/93	430.31	18.4	33.8		396.51	15.40	407.91
	11/10/93	430.31	23.8	33.25		397.06	9.45	404.05
	12/07/93	430.31	24.56	34.3		396.01	9.74	403.22
	01/11/94	430.31	28.64	34.18		396.13	5.54	400.23
	02/24/94	430.31	29.84	33.44		396.87	3.60	399.53
	03/16/94	430.31	28.86	29.65		400.66	0.79	401.24
	04/27/94	430.31	25.41	32.66		397.65	7.25	403.02
	05/24/94	430.31	24.5	32.65		397.66	8.15	403.69
	06/28/94	430.31	27.5	32.4		397.91	4.90	401.54
	07/21/94	430.31	29.35	32.7		397.61	3.35	400.09
	08/17/94	430.31	30.2	33.3		397.01	3.10	399.30
	09/28/94	430.31	31	33.5		396.81	2.50	398.66
	10/27/94	430.31	31.8	34		396.31	2.20	397.94
	11/21/94	430.31	31.2	33.9		396.41	2.70	398.41
	12/14/94	430.31	31	33.15		397.16	2.15	398.75
	01/30/95	430.31	31.6	33.65		396.66	2.05	398.18
	02/22/95	430.31	31.9	34.3		396.01	2.40	397.79
	03/28/95	430.31	30.72	32.95		397.36	2.23	399.01
	04/25/95	430.31	28.66	29.7		400.61	1.04	401.38
	05/26/95	430.31	19.52	19.8		410.51	0.28	410.72
	06/20/95	430.31	20.91	21.2		409.11	0.29	409.32
	07/12/95	430.31	23.7	23.9		406.41	0.20	406.56
	08/23/95	430.31	25.64	32.7		397.61	7.06	402.83
	09/25/95	430.31	28.62	33.3		397.01	4.68	400.47
	10/26/95	430.31	29.35	33.1		397.21	3.75	399.99
	11/27/95	430.31	29.35	33.15		397.16	3.80	399.97
	05/31/96	430.31				405.75		

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-09	05/09/91	NM	NA	23.04		--	0.00	--
	06/28/91	430.85	NA	23.05		407.80	0.00	407.80
	08/26/91	430.85	NA	23.15		407.70	0.00	407.70
	10/15/91	430.85	NA	23.07		407.78	0.00	407.78
	01/21/92	430.85	NA	23.1		407.75	0.00	407.75
	06/29/92	430.85	NA	23.03		407.82	0.00	407.82
	07/27/92	430.85	NA	23.08		407.77	0.00	407.77
	04/21/93	430.85	NA	23.05		407.80	0.00	407.80
	06/23/93	430.85	NA	22.9		407.95	0.00	407.95
	07/15/93	430.85	18.05	20.73		410.12	2.68	412.10
	08/20/93	430.85	13.61	17.77		413.08	4.16	416.16
	09/17/93	430.85	17.22	20.97		409.88	3.75	412.66
	10/15/93	430.85	19.2	21.48		409.37	2.28	411.06
	11/10/93	430.85	22.22	23.16		407.69	0.94	408.39
	12/07/93	430.85	22.69	23.16		407.69	0.47	408.04
	01/11/94	430.85	23.13	23.15		407.70	0.02	407.71
	02/24/94	430.85	23.13	23.19		407.66	0.06	407.70
	03/16/94	430.85	NA	Dry		--	0.00	--
	04/27/94	430.85	NA	Dry		--	0.00	--
	05/24/94	Found - Not Accessible						
	06/28/94	430.85	NA	23.3		407.55	0.00	407.55
	07/21/94	430.85	NA	23.2		407.65	0.00	407.65
	08/17/94	430.85	NA	23.2		407.65	0.00	407.65
	09/28/94	430.85	NA	23.2		407.65	0.00	407.65
	10/27/94	430.85	NA	23.2		407.65	0.00	407.65
	11/21/94	430.85	NA	23.15		407.70	0.00	407.70
	12/14/94	430.85	NA	23.15		407.70	0.00	407.70
	01/30/95	430.85	NA	23.2		407.65	0.00	407.65
	02/22/95	430.85	NA	23.2		407.65	0.00	407.65
	03/28/95	430.85	NA	23.18		407.67	0.00	407.67
	04/25/95	430.85	NA	23.18		407.67	0.00	407.67

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-09	05/26/95	430.85	NA	19.93		410.92	0.00	410.92
	06/20/95	430.85	NA	19.22		411.63	0.00	411.63
	07/12/95	430.85	NA	22		408.85	0.00	408.85
	08/23/95	430.85	NA	23.1		407.75	0.00	407.75
	09/25/95	430.85	22.9	23.18		407.67	0.28	407.88
	10/26/95	430.85	NA	23.1		407.75	0.00	407.75
	11/27/95	430.85	NA	23.14		407.71	0.00	407.71
	05/31/96	430.85				406.29		
HMW-10	05/09/91	NM	29.95	31.55		--	1.60	--
	06/28/91	430.81	30	31.25		399.56	1.25	400.49
	08/26/91	430.81	32.63	34.97		395.84	2.34	397.57
	10/15/91	430.81	33.85	36.54		394.27	2.69	396.26
	01/21/92	430.81	33.86	36.53		394.28	2.67	396.26
	06/29/92	430.81	34.19	37		393.81	2.81	395.89
	07/27/92	430.81	33.68	35.09		395.72	1.41	396.76
	04/21/93	430.81	24.25	31.7		399.11	7.45	404.62
	06/23/93	430.81	23.16	31.75		399.06	8.59	405.42
	07/15/93	430.81	14.65	31.14		399.67	16.49	411.87
	08/20/93	430.81	12.5	31.6		399.21	19.10	413.34
	09/17/93	430.81	16.28	31.73		399.08	15.45	410.51
	10/15/93	430.81	19.4	32.11		398.70	12.71	408.11
	11/10/93	430.81	24.31	32.32		398.49	8.01	404.42
	12/07/93	430.81	25.35	32.6		398.21	7.25	403.58
	01/11/94	430.81	29.23	32.45		398.36	3.22	400.74
	02/24/94	430.81	30.7	32.66		398.15	1.96	399.60
	03/16/94	430.81	28.92	31.6		399.21	2.68	401.19
	04/27/94	430.81	26.47	31.66		399.15	5.19	402.99
	05/24/94	430.81	25.25	31.7		399.11	6.45	403.88
	06/28/94	430.81	28.3	31.5		399.31	3.20	401.68
	07/21/94	430.81	29.1	31.5		399.31	2.40	401.09
	08/17/94	430.81	30.7	32.55		398.26	1.85	399.63

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-10	09/28/94	430.81	31.35	32.35		398.46	1.00	399.20
	10/27/94	430.81	31.9	34.35		396.46	2.45	398.27
	11/21/94	430.81	31.85	33.45		397.36	1.60	398.54
	12/14/94	430.81	31.55	32.85		397.96	1.30	398.92
	01/30/95	430.81	32.18	33.78		397.03	1.60	398.21
	02/22/95	430.81	32.2	34.2		396.61	2.00	398.09
	03/28/95	430.81	31.58	32.6		398.21	1.02	398.96
	04/25/95	430.81	29.2	31.2		399.61	2.00	401.09
	05/26/95	430.81	17.6	31.45		399.36	13.85	409.61
	06/20/95	430.81	18.3	31.55		399.26	13.25	409.07
	07/12/95	430.81	21.78	31.3		399.51	9.52	406.55
	08/23/95	430.81	26.3	31.25		399.56	4.95	403.22
	09/25/95	430.81	29.19	31.4		399.41	2.21	401.05
	10/26/95	430.81	30.14	31.67		399.14	1.53	400.27
	11/27/95	430.81	30.32	32.08		398.73	1.76	400.03
	05/31/96	430.81				399.71		
HMW-11	06/28/91	Found - Not Accessible						
	08/26/91		NA	20.50		-20.50	0.00	-20.50
	10/15/91	Found - Not Accessible						
	01/21/92	Found - Not Accessible						
	06/29/92	Found - Not Accessible						
	07/27/92	Found - Not Accessible						
HMW-12	05/09/91		NM	NM				
	06/28/91	Found - Not Accessible						
	08/26/91		33.82	34.10		-34.10	0.28	-33.89
	10/15/91	Found - Not Accessible						
	01/21/92	Found - Not Accessible						
	06/29/92	Found - Not Accessible						
	07/27/92	Found - Not Accessible						
HMW-13	05/09/91	NM	NA	18.66		--	0.00	--
	06/28/91	431.46	NA	18.78		412.68	0.00	412.68

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-13	08/26/91	431.46	NA	18.85		412.61	0.00	412.61
	10/15/91	431.46	NA	18.83		412.63	0.00	412.63
	01/21/92	431.46	NA	18.68		412.78	0.00	412.78
	06/29/92				Found - Not Accessible			
	07/27/92				Found - Not Accessible			
	04/21/93				Found - Not Accessible			
	06/23/93				Found - Not Accessible			
	07/15/93				Found - Not Accessible			
	08/20/93				Found - Not Accessible			
	09/17/93	431.59	17.8	18.95		412.64	1.15	413.49
	10/15/93	431.59	18.09	18.95		412.64	0.86	413.28
	11/10/93	431.59	18.87	18.95		412.64	0.08	412.70
	12/07/93	431.59	18.9	18.95		412.64	0.05	412.68
	01/11/94	431.59	18.9	18.95		412.64	0.05	412.68
	02/24/94	431.59	18.9	18.94		412.65	0.04	412.68
	03/16/94	431.59	18.89	18.94		412.65	0.05	412.69
	04/27/94	431.59	18.88	18.92		412.67	0.04	412.70
	05/24/94	431.59	NA	18.95		412.64	0.00	412.64
	06/28/94	431.59	NA	18.95		412.64	0.00	412.64
	07/21/94	431.59	NA	18.95		412.64	0.00	412.64
	08/17/94	431.59	NA	18.95		412.64	0.00	412.64
	09/28/94	431.59	NA	18.95		412.64	0.00	412.64
	10/27/94	431.59	NA	18.95		412.64	0.00	412.64
	11/21/94	431.59	NA	18.65		412.94	0.00	412.94
	12/14/94	431.59	NA	18.68		412.91	0.00	412.91
	01/30/95	431.59	NA	18.69		412.90	0.00	412.90
	02/22/95	431.59	NA	18.7		412.89	0.00	412.89
	03/28/95	431.59	NA	18.7		412.89	0.00	412.89
	04/25/95	431.59	NA	18.7		412.89	0.00	412.89
	05/26/95	431.59	NA	18.18		413.41	0.00	413.41
	06/20/95	431.59	18.35	18.6		412.99	0.25	413.18

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-13	07/12/95	431.59	NA	18.7		412.89	0.00	412.89
	08/23/95	431.59	NA	18.68		412.91	0.00	412.91
	09/25/95	431.59	NA	18.7		412.89	0.00	412.89
	10/26/95	431.59	NA	18.72		412.87	0.00	412.87
	11/27/95	431.59	NA	18.65		412.94	0.00	412.94
	05/31/96	431.59				412.91		
HMW-14	05/09/91	NM	29.30	31.38			2.08	
	06/28/91	431.51	29.60	32.02		399.49	2.42	401.28
	08/26/91	431.51	32.18	35.75		395.76	3.57	398.40
	10/15/91	431.51	34.54	36.85		394.66	2.31	396.37
	01/21/92	431.51	34.55	36.54		394.97	1.99	396.44
	06/29/92				Found - Not Accessible			
	07/27/92				Found - Not Accessible			
	04/21/93				Found - Not Accessible			
	06/23/93				Found - Not Accessible			
	07/15/93				Found - Not Accessible			
	08/20/93				Found - Not Accessible			
	09/17/93	431.54	17.44	27.48		404.06	10.04	411.49
	10/15/93	431.54	20.6	30.2		401.34	9.60	408.44
	11/10/93	431.54	25.78	30.42		401.12	4.64	404.55
	12/07/93	431.54	26.95	30.49		401.05	3.54	403.67
	01/11/94	431.54	30.35	32.13		399.41	1.78	400.73
	02/24/94	431.54	31.39	32.7		398.84	1.31	399.81
	03/16/94	431.54	29.55	31.06		400.48	1.51	401.60
	04/27/94	431.54	27.48	29.76		401.78	2.28	403.47
	05/24/94	431.54	26.35	29.95		401.59	3.60	404.25
	06/28/94	431.54	29.05	31.15		400.39	2.10	401.94
	07/21/94	431.54	29.8	31.6		399.94	1.80	401.27
	08/17/94	431.54	31.35	33.55		397.99	2.20	399.62
	09/28/94	431.54	31.95	34		397.54	2.05	399.06
	10/27/94	431.54	32.6	34		397.54	1.40	398.58

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-14	11/21/94	431.54	32.25	34.15		397.39	1.90	398.80
	12/14/94	431.54	32	33.55		397.99	1.55	399.14
	01/30/95	431.54	32.65	34.1		397.44	1.45	398.51
	02/22/95	431.54	32.88	34.88		396.66	2.00	398.14
	03/28/95	431.54	32	33.15		398.39	1.15	399.24
	04/25/95	431.54	29.5	31.15		400.39	1.65	401.61
	05/26/95	431.54	17.95	28.81		402.73	10.86	410.77
	06/20/95	431.54	19.1	29.31		402.23	10.21	409.79
	07/12/95	431.54	22.83	28.4		403.14	5.57	407.26
	08/23/95	431.54	27.55	30.15		401.39	2.60	403.31
	09/25/95	431.54	30.12	32.05		399.49	1.93	400.92
	10/26/95	431.54	30.68	32.69		398.85	2.01	400.34
	11/27/95	431.54	30.78	33.35		398.19	2.57	400.09
	05/31/96					402.22		
HMW-15	05/09/91	NM	NA	20.98		--	0.00	--
	06/28/91	433.12	NA	21		412.12	0.00	412.12
	08/26/91	433.12	NA	21		412.12	0.00	412.12
	10/15/91	433.12	NA	20.95		412.17	0.00	412.17
	01/21/92	433.12	NA	20.97		412.15	0.00	412.15
	06/29/92	433.12	NA	21		412.12	0.00	412.12
	07/27/92	433.12	NA	19.78		413.34	0.00	413.34
	04/21/93	433.12	NA	19.05		414.07	0.00	414.07
	06/23/93	433.12	NA	Dry		--	0.00	--
	07/15/93	433.12	NA	18.99		414.13	0.00	414.13
	08/20/93	433.12	14	19.94		413.18	5.94	417.58
	09/17/93	433.12	17.41	18.55		414.57	1.14	415.41
	10/15/93	433.12	19.4	20.82		412.30	1.42	413.35
	11/10/93	Found - Not Accessible						
	12/07/93	Found - Not Accessible						
	01/11/94	433.12	NA	Dry		--	0.00	--
	02/24/94	433.12	NA	Dry		--	0.00	--

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-15	03/16/94	433.12	NA	Dry		--	0.00	--
	04/27/94	433.12	NA	Dry		--	0.00	--
	05/24/94	433.12	NA	Dry		--	0.00	--
	06/28/94	433.12	NA	Dry		--	0.00	--
	07/21/94	433.12	NA	Dry		--	0.00	--
	08/17/94	433.12	NA	Dry		--	0.00	--
	09/28/94	433.12	NA	Dry		--	0.00	--
	10/27/94	433.12	NA	Dry		--	0.00	--
	11/21/94	433.12	NA	Dry		--	0.00	--
	12/14/94	433.12	NA	Dry		--	0.00	--
	01/30/95	433.12	NA	Dry		--	0.00	--
	02/22/95	433.12	NA	Dry		--	0.00	--
	03/28/95	433.12	NA	Dry		--	0.00	--
	04/25/95	433.12	NA	Dry		--	0.00	--
	05/26/95	433.12	NA	Dry		--	0.00	--
	06/20/95	433.12	18.85	19.55		413.57	0.70	414.09
	07/12/95	433.12	NA	Dry		--	0.00	--
	08/23/95	433.12	NA	Dry		--	0.00	--
	09/25/95	433.12	NA	Dry		--	0.00	--
	10/26/95	433.12	NA	Dry		--	0.00	--
	11/27/95	433.12	NA	Dry		--	0.00	--
	05/31/96	433.12				413.07		
HMW-16	05/09/91	NM	30.30	34.22		--	3.92	--
	06/28/91	433.12	30.76	34.35		398.77	3.59	401.43
	08/26/91	433.12	34.82	37.02		396.10	2.20	397.73
	10/15/91	433.12	36.08	38.50		394.62	2.42	396.41
	01/21/92	433.12	36.02	38.24		394.88	2.22	396.52
	06/29/92	433.12	36.27	38.68		394.44	2.41	396.22
	07/27/92	433.12	35.48	36.50		396.62	1.02	397.37
	04/21/93	433.12	24.38	33.82		399.30	9.44	406.29
	06/23/93	433.12	24.20	33.65		399.47	9.45	406.46

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-16	07/15/93	433.12	16.13	27.71		405.41	11.58	413.98
	08/20/93	433.12	13.12	32.82		400.30	19.70	414.88
	09/17/93	433.12	17.35	32.77		400.35	15.42	411.76
	10/15/93	433.12	21.32	33.48		399.64	12.16	408.64
	11/10/93	433.12	26.59	33.80		399.32	7.21	404.66
	12/07/93	433.12	27.84	33.71		399.41	5.87	403.75
	01/11/94	433.12	31.88	33.75		399.37	1.87	400.75
	02/24/94	433.12	NA	33.27		399.85	0.00	399.85
	03/16/94	433.12	30.85	33.21		399.91	2.36	401.66
	04/27/94	433.12	28.18	33.48		399.64	5.30	403.56
	05/24/94	433.12	27.05	33.60		399.52	6.55	404.37
	06/28/94	433.12	30.30	33.50		399.62	3.20	401.99
	07/21/94	433.12	31.15	33.66		399.46	2.51	401.32
	08/17/94	433.12	33.25	33.90		399.22	0.65	399.70
	09/28/94	433.12	33.95	34.55		398.57	0.60	399.01
	10/27/94	433.12	34.50	35.70		397.42	1.20	398.31
	11/21/94	433.12	34.30	34.55		398.57	0.25	398.76
	12/14/94	433.12	34.00	34.10		399.02	0.10	399.09
	01/30/95	433.12	34.60	34.95		398.17	0.35	398.43
	02/22/95	433.12	34.89	35.50		397.62	0.61	398.07
	03/28/95	433.12	33.82	34.00		399.12	0.18	399.25
	04/25/95	433.12	30.82	33.15		399.97	2.33	401.69
	05/26/95	433.12	18.10	33.00		400.12	14.90	411.15
	06/20/95	433.12	19.58	33.36		399.76	13.78	409.96
	07/12/95	433.12	23.52	33.40		399.72	9.88	407.03
	08/23/95	433.12	28.50	33.45		399.67	4.95	403.33
	09/25/95	433.12	31.70	33.58		399.54	1.88	400.93
	10/26/95	433.12	32.55	33.59		399.53	1.04	400.30
	11/27/95	433.12	31.45	33.11		400.01	1.66	401.24
	05/31/96	433.12				399.81		

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-17	05/09/91	NM	NA	29.64		--	0.00	--
	06/28/91	431.47	30.75	30.94		400.53	0.19	400.67
	08/26/91	431.47	NA	33.20		398.27	0.00	398.27
	10/15/91	431.47	35.20	37.90		393.57	2.70	395.57
	01/21/92	431.47	35.54	36.44		395.03	0.90	395.70
	06/29/92	431.47	35.61	36.70		394.77	1.09	395.58
	07/27/92	431.47	NA	34.31		397.16	0.00	397.16
	04/21/93				Found - Not Accessible			
	06/23/93				Found - Not Accessible			
	07/15/93				Found - Not Accessible			
	08/20/93				Found - Not Accessible			
	09/17/93				Found - Not Accessible			
	10/15/93				Found - Not Accessible			
	11/10/93	431.47	27.25	30.11		401.36	2.86	403.48
	12/07/93	431.47	28.22	29.99		401.48	1.77	402.79
	01/11/94	431.47	31.37	32.72		398.75	1.35	399.75
	02/24/94	431.47	31.67	32.55		398.92	0.88	399.57
	03/16/94	431.47	29.97	30.77		400.70	0.80	401.29
	04/27/94	431.47	28.03	29.35		402.12	1.32	403.10
	05/24/94	431.47	27.30	29.20		402.27	1.90	403.68
	06/28/94	431.47	NA	29.40		402.07	0.00	402.07
	07/21/94	431.47	30.70	NA		--	--	--
	08/17/94	431.47	32.10	NA		--	--	--
	09/28/94	431.47	32.00	33.30		398.17	1.30	399.13
	10/27/94	431.47	33.70	NA		--	--	--
	11/21/94	431.47	32.90	34.30		397.17	1.40	398.21
	12/14/94	431.47	32.60	33.50		397.97	0.90	398.64
	01/30/95	431.47	33.15	34.00		397.47	0.85	398.10
	02/22/95	431.47	33.40	35.40		396.07	2.00	397.55
	03/28/95	431.47	32.27	32.60		398.87	0.33	399.11
	04/25/95	431.47	29.65	30.25		401.22	0.60	401.66

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-17	05/26/95	431.47	19.60	19.90		411.57	0.30	411.79
	06/20/95	431.47	21.70	22.30		409.17	0.60	409.61
	07/12/95	431.47	24.50	26.00		405.47	1.50	406.58
	08/23/95	431.47	28.10	31.35		400.12	3.25	402.53
	09/25/95	431.47	30.80	31.20		400.27	0.40	400.57
	10/26/95	431.47	31.30	32.90		398.57	1.60	399.75
	11/27/95	431.47	31.45	33.11		398.36	1.66	399.59
	05/31/96	431.47				406.35		
HMW-18	05/09/91	NM	29.7	32.1		--	2.40	--
	06/28/91	432.25	30.1	31.85		400.40	1.75	401.70
	08/26/91	432.25	33.3	35.88		396.37	2.58	398.28
	10/15/91	432.25	35.08	37.85		394.40	2.77	396.45
	01/21/92	432.25	34.9	37.56		394.69	2.66	396.66
	06/29/92	432.25	35.1	38.05		394.20	2.95	396.38
	07/27/92	432.25	34.2	35.93		396.32	1.73	397.60
	04/21/93	432.25	22.5	31.41		400.84	8.91	407.43
	06/23/93	432.25	23.28	31.15		401.10	7.87	406.92
	07/15/93	432.25	11.92	30.82		401.43	18.90	415.42
	08/20/93	432.25	11.6	30.72		401.53	19.12	415.68
	09/17/93	432.25	15.78	30.78		401.47	15.00	412.57
	10/15/93	432.25	30.9	31		401.25	0.10	401.32
	11/10/93	432.25	26.5	31.08		401.17	4.58	404.56
	12/07/93	432.25	27.71	31.06		401.19	3.35	403.67
	01/11/94	432.25	31.05	33.03		399.22	1.98	400.69
	02/24/94	432.25	31.94	34.1		398.15	2.16	399.75
	03/16/94	432.25	30.1	31.69		400.56	1.59	401.74
	04/27/94	432.25	27.49	31.3		400.95	3.81	403.77
	05/24/94	432.25	26.6	31		401.25	4.40	404.51
	06/28/94	432.25	29.8	31.5		400.75	1.70	402.01
	07/21/94	432.25	30.45	32		400.25	1.55	401.40

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-18	08/17/94	432.25	32.8	34		398.25	1.20	399.14
	09/28/94	432.25	32.6	34.05		398.20	1.45	399.27
	10/27/94	432.25	33.2	35.45		396.80	2.25	398.47
	11/21/94	432.25	32.95	34.8		397.45	1.85	398.82
	12/14/94	432.25	32.65	34.15		398.10	1.50	399.21
	01/30/95	432.25	33.38	34.9		397.35	1.52	398.47
	02/22/95	432.25	33.52	35.4		396.85	1.88	398.24
	03/28/95	432.25	32.55	33.87		398.38	1.32	399.36
	04/25/95	432.25	29.85	31.65		400.60	1.80	401.93
	05/26/95	432.25	16.15	30.8		401.45	14.65	412.29
	06/20/95	432.25	18.7	30.75		401.50	12.05	410.42
	07/12/95	432.25	22.93	30.9		401.35	7.97	407.25
	08/23/95	432.25	28.35	30.9		401.35	2.55	403.24
	09/25/95	432.25	31.18	32.3		399.95	1.12	400.78
	10/26/95	432.25	31.55	33.27		398.98	1.72	400.25
	11/27/95	432.25	31.73	33.8		398.45	2.07	399.98
	05/31/96	432.25				401.25		
HMW-19	05/09/91	NM	29.45	32.15		--	2.70	--
	06/28/91	432.41	29.93	32.13		400.28	2.20	401.91
	08/26/91	432.41	33.87	36.05		396.36	2.18	397.97
	10/15/91	432.41	35.23	37.58		394.83	2.35	396.57
	01/21/92	432.41	35.12	37.13		395.28	2.01	396.77
	06/29/92	432.41	35.3	37.58		394.83	2.28	396.52
	07/27/92	432.41	34.3	35.44		396.97	1.14	397.81
	04/21/93	432.41	25.02	25.68		406.73	0.66	407.22
	06/23/93	432.41	23.95	29.54		402.87	5.59	407.01
	07/15/93	432.41	17.16	17.55		414.86	0.39	415.15
	08/20/93	432.41	16.72	16.86		415.55	0.14	415.65
	09/17/93	432.41	19.91	19.92		412.49	0.01	412.50
	10/15/93	432.41	22.59	25.86		406.55	3.27	408.97
	11/10/93	432.41	26.89	29.43		402.98	2.54	404.86

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-19	12/07/93	432.41	27.89	30.14		402.27	2.25	403.94
	01/11/94	432.41	31.42	31.69		400.72	0.27	400.92
	02/24/94	432.41	NA	32.37		400.04	0.00	400.04
	03/16/94	432.41	30.2	31.02		401.39	0.82	402.00
	04/27/94	432.41	28	29.59		402.82	1.59	404.00
	05/24/94	432.41	27	29.65		402.76	2.65	404.72
	06/28/94	432.41	29.8	31.2		401.21	1.40	402.25
	07/21/94	432.41	30.65	31.35		401.06	0.70	401.58
	08/17/94	432.41	32.45	32.85		399.56	0.40	399.86
	09/28/94	432.41	33	33.8		398.61	0.80	399.20
	10/27/94	432.41	33.5	34.7		397.71	1.20	398.60
	11/21/94	432.41	33.2	34.1		398.31	0.90	398.98
	12/14/94	432.41	33	33.2		399.21	0.20	399.36
	01/30/95	432.41	33.62	34		398.41	0.38	398.69
	02/22/95	432.41	33.9	34.67		397.74	0.77	398.31
	03/28/95	432.41	NA	32.89		399.52	0.00	399.52
	04/25/95	432.41	30	31.2		401.21	1.20	402.10
	05/26/95	432.41	NA	20.6		411.81	0.00	411.81
	06/20/95	432.41	21.4	25.9		406.51	4.50	409.84
	07/12/95	432.41	23.55	29.1		403.31	5.55	407.42
	08/23/95	432.41	28.19	30.89		401.52	2.70	403.52
	09/25/95	432.41	31.4	31.6		400.81	0.20	400.96
	10/26/95	432.41	31.84	32.6		399.81	0.76	400.37
	11/27/95	432.41	31.93	32.93		399.48	1.00	400.22
	05/31/96	432.41				407.69		
HMW-20	05/09/91	NM	29.46	33		--	3.54	--
	06/28/91	431.35	28.9	33.1		398.25	4.20	401.36
	08/26/91	431.35	32.15	34.85		396.50	2.70	398.50
	10/15/91	431.35	34.11	36.18		395.17	2.07	396.70
	01/21/92	431.35	34	36.32		395.03	2.32	396.75
	06/29/92	431.35	34.33	37.04		394.31	2.71	396.32

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-20	07/27/92	431.35	34.01	34.95		396.40	0.94	397.10
	04/21/93	431.35	24.7	32.93		398.42	8.23	404.51
	06/23/93	431.35	23.05	32.7		398.65	9.65	405.79
	07/15/93	431.35	19.6	20.18		411.17	0.58	411.60
	08/20/93	431.35	17.46	18.55		412.80	1.09	413.61
	09/17/93	431.35	20.78	20.92		410.43	0.14	410.53
	10/15/93	431.35	22.62	23.14		408.21	0.52	408.59
	11/10/93	431.35	26.03	27.61		403.74	1.58	404.91
	12/07/93	431.35	26.54	29.75		401.60	3.21	403.98
	01/11/94	431.35	29.54	31.74		399.61	2.20	401.24
	02/24/94	431.35	31.39	32.1		399.25	0.71	399.78
	03/16/94	431.35	29.84	30.39		400.96	0.55	401.37
	04/27/94	431.35	28.06	28.53		402.82	0.47	403.17
	05/24/94	431.35	26.9	27.9		403.45	1.00	404.19
	06/28/94	431.35	29.3	30.7		400.65	1.40	401.69
	07/21/94	431.35	29.8	30.7		400.65	0.90	401.32
	08/17/94	431.35	31.25	32.2		399.15	0.95	399.85
	09/28/94	431.35	32.15	32.6		398.75	0.45	399.08
	10/27/94	431.35	32.9	NA		--	--	--
	11/21/94	431.35	32	32.6		398.75	0.60	399.19
	12/14/94	431.35	32.2	32.5		398.85	0.30	399.07
	01/30/95	431.35	NA	33		398.35	0.00	398.35
	02/22/95	431.35	NA	33.2		398.15	0.00	398.15
	03/28/95	431.35	32.32	32.38		398.97	0.06	399.01
	04/25/95	431.35	30.3	30.45		400.90	0.15	401.01
	05/26/95	431.35	20.2	23.2		408.15	3.00	410.37
	06/20/95	431.35	22.21	23.3		408.05	1.09	408.86
	07/12/95	431.35	24.5	25.6		405.75	1.10	406.56
	08/23/95	431.35	27.46	28.82		402.53	1.36	403.54
	09/25/95	431.35	29.56	31.03		400.32	1.47	401.41
	10/26/95	431.35	31.6	32.05		399.30	0.45	399.63

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-20	11/27/95	431.35	30.94	32.4		398.95	1.46	400.03
	05/31/96					NA		
HMW-21	10/15/91	NM	NA	23.42		--	0.00	--
	01/21/92				Found - Not Accessible			
	06/29/92		Unable To Find					
	07/27/92	NM	NA	23.70		--	0.00	--
	04/21/93	434.40	NA	20.03		414.37	0.00	414.37
	06/23/93	434.40	NA	18.02		416.38	0.00	416.38
	07/15/93	434.40	NA	17.64		416.76	0.00	416.76
	08/20/93	434.40	12.26	12.64		421.76	0.38	422.04
	09/17/93	434.40	14.03	14.09		420.31	0.06	420.35
	10/15/93	434.40	15.34	15.44		418.96	0.10	419.03
	11/10/93	434.40	NA	18.57		415.83	0.00	415.83
	12/07/93	434.40	NA	16.27		418.13	0.00	418.13
	01/11/94	434.40	NA	19.89		414.51	0.00	414.51
	02/24/94	434.40	NA	20.86		413.54	0.00	413.54
	03/16/94	434.40	NA	21.02		413.38	0.00	413.38
	04/27/94	434.40	NA	19.26		415.14	0.00	415.14
	05/24/94	434.40	NA	18.65		415.75	0.00	415.75
	06/28/94	434.40	NA	20.65		413.75	0.00	413.75
	07/21/94	434.40	NA	21.20		413.20	0.00	413.20
	08/17/94	434.40	NA	21.85		412.55	0.00	412.55
	09/28/94	434.40	NA	22.55		411.85	0.00	411.85
	10/27/94	434.40	NA	22.95		411.45	0.00	411.45
	11/21/94	434.40	NA	22.85		411.55	0.00	411.55
	12/14/94	434.40	NA	22.80		411.60	0.00	411.60
	01/30/95	434.40	NA	22.45		411.95	0.00	411.95
	02/22/95	434.40	NA	22.00		412.40	0.00	412.40
	03/28/95	434.40	NA	21.71		412.69	0.00	412.69
	04/25/95	434.40	NA	21.90		412.50	0.00	412.50
	05/26/95	434.40	NA	14.43		419.97	0.00	419.97

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-21	06/20/95	434.40	NA	15.21		419.19	0.00	419.19
	07/12/95	434.40	NA	18.00		416.40	0.00	416.40
	08/23/95	434.40	NA	19.03		415.37	0.00	415.37
	09/25/95	434.40	NA	20.79		413.61	0.00	413.61
	10/26/95	434.40	NA	21.70		412.70	0.00	412.70
	11/27/95	434.40	NA	22.30		412.10	0.00	412.10
	05/31/96					417.24		
HMW-22	10/15/91	NM	33.91	37.02		--	3.11	--
	01/21/92	Found - Not Accessible						
	06/29/92	NM	34.13	37.25		--	3.12	--
	07/27/92	NM	33.31	35.23		--	1.92	--
	04/21/93	434.40	22.3	32.96		401.44	10.66	409.33
	06/23/93	434.40	22.23	33.28		401.12	11.05	409.30
	07/15/93	434.40	12.5	32.64		401.76	20.14	416.66
	08/20/93	434.40	11.82	31.1		403.30	19.28	417.57
	09/17/93	434.40	15.17	32.62		401.78	17.45	414.69
	10/15/93	434.40	19.17	33.45		400.95	14.28	411.52
	11/10/93	434.40	24.17	33.68		400.72	9.51	407.76
	12/07/93	434.40	25.27	34.01		400.39	8.74	406.86
	01/11/94	434.40	29.15	34.11		400.29	4.96	403.96
	02/24/94	434.40	30.34	33.68		400.72	3.34	403.19
	03/16/94	434.40	28.28	32.84		401.56	4.56	404.93
	04/27/94	434.40	25.9	32.75		401.65	6.85	406.72
	05/24/94	434.40	25.2	32.1		402.30	6.90	407.41
	06/28/94	434.40	27.95	32.6		401.80	4.65	405.24
	07/21/94	434.40	29.3	31.4		403.00	2.10	404.55
	08/17/94	434.40	31	32.7		401.70	1.70	402.96
	09/28/94	434.40	31.55	33.2		401.20	1.65	402.42
	10/27/94	434.40	32.2	34.1		400.30	1.90	401.71
	11/21/94	434.40	31.75	33.65		400.75	1.90	402.16
	12/14/94	434.40	31.45	33.25		401.15	1.80	402.48

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-22	01/30/95	434.40	32.03	34.1		400.30	2.07	401.83
	02/22/95	434.40	32.3	34.75		399.65	2.45	401.46
	03/28/95	434.40	31.33	32.83		401.57	1.50	402.68
	04/25/95	434.40	29.1	30.1		404.30	1.00	405.04
	05/26/95	434.40	19.78	21.2		413.20	1.42	414.25
	06/20/95	434.40	21.2	23.9		410.50	2.70	412.50
	07/12/95	434.40	24.13	24.15		410.25	0.02	410.26
	08/23/95	434.40	26.55	31.33		403.07	4.78	406.61
	09/25/95	434.40	29.93	30.73		403.67	0.80	404.26
	10/26/95	434.40	30.55	31.55		402.85	1.00	403.59
	11/27/95	434.40	31.6	31.65		402.75	0.05	402.79
	05/31/96	434.40				404.26		
HMW-23	10/15/91	NM	33.39	36.58		--	3.19	--
	01/21/92	Found - Not Accessible						
	06/29/92	NM	NA	23.56		--	0.00	--
	07/27/92	Unable To Find						
	05/31/96					UNKNOWN		
HMW-24	10/15/91	NM	NA	23.9		--	0.00	--
	01/21/92	Found - Not Accessible						
	06/29/92	Unable To Find						
	07/27/92	Unable To Find						
RW-1	04/18/90	434.44	37.40	37.55		396.89	0.15	397.00
	05/18/90	434.44	NA	35.85		398.59	0.00	398.59
	07/18/90	434.44	NA	32.05		402.39	0.00	402.39
	10/18/90	434.44	NA	37.20		397.24	0.00	397.24
	01/23/91	434.44	NA	37.70		396.74	0.00	396.74
	03/22/91	434.44	NA	36.83		397.61	0.00	397.61
	05/09/91	434.44	NA	32.88		401.56	0.00	401.56
	06/28/91	434.44	31.86	32.60		401.84	0.74	402.39
	08/26/91	434.44	NA	34.46		399.98	0.00	399.98
	10/15/91	434.44	NA	30.16		404.28	0.00	404.28

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
RW-1	01/21/92	434.44	NA	30.67		403.77	0.00	403.77
	06/29/92	434.44	37.28	38.05		396.39	0.77	396.96
	07/27/92	434.44	36.20	36.40		398.04	0.20	398.19
	04/21/93	434.44	NA	27.75		406.69	0.00	406.69
	06/23/93	434.44	NA	27.10		407.34	0.00	407.34
	07/15/93				Found - Not Accessible			
	08/20/93	434.44	NA	18.52		415.92	0.00	415.92
	09/17/93	434.44	22.04	22.05		412.39	0.01	412.40
	10/15/93				Found - Not Accessible			
	11/10/93				Found - Not Accessible			
	12/07/93				Found - Not Accessible			
	01/11/94				Found - Not Accessible			
	02/24/94				Found - Not Accessible			
	03/16/94				Found - Not Accessible			
	04/27/94	434.44	NA	30.10		404.34	0.00	404.34
	05/24/94				Found - Not Accessible			
	06/28/94	434.44	NA	31.85		402.59	0.00	402.59
	07/21/94	434.44	NA	32.50		401.94	0.00	401.94
	08/17/94	434.44	NA	34.15		400.29	0.00	400.29
	09/28/94	434.44	NA	34.90		399.54	0.00	399.54
	10/27/94	434.44	NA	35.60		398.84	0.00	398.84
	11/21/94	434.44	NA	35.05		399.39	0.00	399.39
	12/14/94	434.44	NA	34.80		399.64	0.00	399.64
	01/30/95	434.44	NA	35.25		399.19	0.00	399.19
	02/22/95	434.44	NA	35.80		398.64	0.00	398.64
	03/28/95	434.44	34.72	34.75		399.69	0.03	399.71
	04/25/95	434.44	NA	32.20		402.24	0.00	402.24
	05/26/95	434.44	NA	23.10		411.34	0.00	411.34
	06/20/95	434.44	NA	23.08		411.36	0.00	411.36
	07/12/95	434.44	26.50	26.85		407.59	0.35	407.85
	08/23/95	434.44	30.40	30.56		403.88	0.16	404.00

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
RW-1	09/25/95	434.44	32.90	33.00		401.44	0.10	401.51
	10/26/95	434.44	34.70	34.80		399.64	0.10	399.71
	11/27/95	434.44	NA	33.75		400.69	0.00	400.69
	05/31/96	434.44				407.52		
RW-2	04/18/90	432.66	36.35	36.95		395.71	0.60	396.15
	05/18/90	432.66	34.95	35.50		397.16	0.55	397.57
	07/18/90	432.66	NA	31.95		400.71	0.00	400.71
	10/18/90	432.66	35.80	36.80		395.86	1.00	396.60
	01/23/91	432.66	NA	36.70		395.96	0.00	395.96
	03/22/91	432.66	NA	35.61		397.05	0.00	397.05
	05/09/91	432.66	NA	31.52		401.14	0.00	401.14
	06/28/91	432.66	NA	31.58		401.08	0.00	401.08
	08/26/91	432.66	NA	31.58		401.08	0.00	401.08
	10/15/91	432.66	35.83	37.88		394.78	2.05	396.30
	01/21/92	432.66	35.66	38.04		394.62	2.38	396.38
	06/29/92	432.66	36.67	36.68		395.98	0.01	395.99
	07/27/92	432.66	NA	35.65		397.01	0.00	397.01
	04/21/93	432.66	26.95	32.71		399.95	5.76	404.21
	06/23/93	432.66	NA	Dry		--	0.00	--
	07/15/93				Found - Not Accessible			
	08/20/93	432.66	14.70	31.52		401.14	16.82	413.59
	09/17/93	432.66	18.41	32.21		400.45	13.80	410.66
	10/15/93	432.66	23.97	25.89		406.77	1.92	408.19
	11/10/93	432.66	26.11	33.88		398.78	7.77	404.53
	12/07/93	432.66	27.18	34.18		398.48	7.00	403.66
	01/11/94	432.66	30.96	34.33		398.33	3.37	400.82
	02/24/94	432.66	32.52	34.47		398.19	1.95	399.63
	03/16/94	432.66	30.73	33.00		399.66	2.27	401.34
	04/27/94	432.66	29.43	29.77		402.89	0.34	403.14
	05/24/94	432.66	27.45	32.00		400.66	4.55	404.03
	06/28/94	432.66	30.20	32.80		399.86	2.60	401.78

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
RW-2	07/21/94	432.66	31.10	32.70		399.96	1.60	401.14
	08/17/94	432.66	32.50	34.20		398.46	1.70	399.72
	09/28/94	432.66	33.15	34.95		397.71	1.80	399.04
	10/27/94	432.66	33.80	35.90		396.76	2.10	398.31
	11/21/94	432.66	33.90	34.00		398.66	0.10	398.73
	12/14/94	432.66	33.30	34.55		398.11	1.25	399.04
	01/30/95	432.66	34.30	35.00		397.66	0.70	398.18
	02/22/95	432.66	34.00	34.40		398.26	0.40	398.56
	03/28/95	432.66	33.45	34.20		398.46	0.75	399.02
	04/25/95	432.66	31.40	31.50		401.16	0.10	401.23
	05/26/95	432.66	22.85	22.95		409.71	0.10	409.78
	06/20/95	432.66	22.70	27.20		405.46	4.50	408.79
	07/12/95	432.66	25.95	26.30		406.36	0.35	406.62
	08/23/95	432.66	28.95	30.45		402.21	1.50	403.32
	09/25/95	432.66	31.35	32.05		400.61	0.70	401.13
	10/26/95	432.66	32.20	33.60		399.06	1.40	400.10
	11/27/95	432.66	32.48	33.35		399.31	0.87	399.95
	05/31/96	432.66				406.46		
SHELL-01	5/9/1978[6]		35.79	35.48		-35.48	-0.31	-35.71
	Summer 78		NA	36.92		-36.92	0.00	-36.92
	3rd Q. 1990	431.18	NA	--		--	0.00	--
SHELL-02[2]	05/09/78	NM	33.46	37.37		--	3.91	--
	Summer 78	NM	35.25	38.00		--	2.75	--
	04/18/90	432.62	NA	Dry				
	05/18/90	432.62	NA	34.30		398.32	0.00	398.32
	07/18/90	432.62	30.50	34.10		398.52	3.60	401.18
	10/18/90	432.62	NA	34.05				
	01/23/91	432.62	NA	34.20		398.42	0.00	398.42
	03/22/91	432.62	NA	Dry		--	0.00	--
	05/09/91	432.62	29.41	34.05		398.57	4.64	402.00
	06/28/91	432.62	30.54	34.05		398.57	3.51	401.17

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
SHELL-02 [2]	08/26/91	432.62	NA	Dry				
	10/15/91	432.62	NA	Dry				
	01/21/92	432.62	NA	Dry				
	06/29/92	432.62	NA	Dry				
	07/27/92	432.62	NA	Dry				
	04/21/93	Found - Not Accessible						
	06/23/93	432.62	23.85	33.3		399.32	9.45	406.31
	07/15/93	432.62	13.87	30.07		402.55	16.20	414.54
	08/20/93	432.62	16.55	21.29		411.33	4.74	414.84
	09/17/93	432.62	17.02	30.98		401.64	13.96	411.97
	10/15/93	432.62	21.63	31.84		400.78	10.21	408.34
	11/10/93	432.62	26.96	33.28		399.34	6.32	404.02
	12/07/93	432.62	5.54	11.05		421.57	5.51	425.65
	01/11/94	432.62	31.95	33.5		399.12	1.55	400.27
	02/24/94	432.62	32.84	33.53		399.09	0.69	399.60
	03/16/94	432.62	30.93	31.98		400.64	1.05	401.42
	04/27/94	432.62	28.18	32.3		400.32	4.12	403.37
	05/24/94	432.62	28.1	32.1		400.52	4.00	403.48
	06/28/94	432.62	30.4	32.5		400.12	2.10	401.67
	07/21/94	432.62	31.2	33.1		399.52	1.90	400.93
	08/17/94	432.62	33	33.8		398.82	0.80	399.41
	09/28/94	432.62	NA	33.55		399.07	0.00	399.07
	10/27/94	432.62	NA	Dry		--	0.00	--
	11/21/94	432.62	NA	Dry		--	0.00	--
	12/14/94	432.62	NA	Dry		--	0.00	--
	01/30/95	432.62	NA	Dry		--	0.00	--
	02/22/95	432.62	NA	Dry		--	0.00	--
	03/28/95	432.62	33.2	33.3		399.32	0.10	399.39
	04/25/95	432.62	30.5	32.4		400.22	1.90	401.63
	05/26/95	432.62	17.1	32.3		400.32	15.20	411.57
	06/20/95	432.62	19.3	32.9		399.72	13.60	409.78

TABLE 5-1
Groundwater Elevations/Apparent Product Thickness - Village of Hartford, Illinois
1978 to 2002

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
SHELL-02 [2]	07/12/95	432.62	23.45	32.8		399.82	9.35	406.74
	08/23/95	432.62	28.72	32.75		399.87	4.03	402.85
	09/25/95	432.62	31.83	33.1		399.52	1.27	400.46
	10/26/95	432.62	32.8	33.82		398.80	1.02	399.55
	11/27/95	432.62	32.48	33.35		399.27	0.87	399.91
	05/31/96	432.62				432.62		

NOTES: SG = Specific gravity of hydrocarbon, assumed to be 0.74
NA = Not Applicable
[2] Wells Shell #2 and HB-34 plugged and abandoned 1/29/97.
[3] Located on private property - Illinois EPA accessible only.

TABLE 5-2
FPH Specific Gravity Analyses

The Hartford Working Group / Hartford, Illinois

Battelle Sample ID	Client Sample ID	Initial Weight (g)	Final Weight (g)	Volume (ml)	Density (g/ml)
T6441	HMW19	2.5441	3.3174	1	0.7733
T6442	HMW18	2.5234	3.3027	1	0.7793
T6444	HMW08	2.4922	3.2675	1	0.7753
T6445	RW2	2.5568	3.3232	1	0.7664
T6446	HMW22	2.5379	3.3150	1	0.7771
T6447	RW3	2.5198	3.3082	1	0.7884
T6448	HMW14	2.5352	3.3054	1	0.7702
T6370	HB-37	2.5589	3.3264	1	0.7675
T6371	HMW10	2.5520	3.3093	1	0.7573
				Average =	**0.7728**

NOTES:
Density = (Final Weight - Initial Weight) / Volume

TABLE 5-3
Groundwater Elevations/Apparent Product Thickness - Village of Hartford
2003 to the Present

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HB-07	07/08/03	432.98	DRY	DRY		DRY	DRY	DRY
	09/09/03	432.98	DRY	DRY		DRY	DRY	DRY
	10/29/03	432.98	DRY	DRY		DRY	DRY	DRY
	11/10/03	432.98	DRY	DRY		DRY	DRY	DRY
	12/10/03	432.32	DRY	DRY		DRY	DRY	DRY
HB-31	07/08/03	432.78	32.59	32.62		400.16	0.03	400.18
	09/09/03	432.78	NM	NM		NM	NM	NM
HB-37	07/08/03	432.41	31.45	31.62		400.79	0.17	400.92
	09/09/03	432.41	33.35	33.84		398.57	0.49	398.95
	10/29/03	432.41	34.08	34.71		397.70	0.63	398.19
	11/10/03	432.41	33.92	34.55		397.86	0.63	398.35
	12/10/03	431.77	34.07	34.50		397.27	0.43	397.60
HMW-01	07/08/03	430.65	NA	18.85		411.80	0.00	411.80
	09/09/03	430.65	NA	21.22		409.43	0.00	409.43
	10/29/03	430.65	NA	22.00		408.65	0.00	408.65
	11/10/03	430.65	NA	22.14		408.51	0.00	408.51
	12/10/03	429.97	NA	19.97		410.00	0.00	410.00
HMW-02	07/08/03				Found - Not Accessible			
	09/09/03				Found - Not Accessible			
	10/29/03				Found - Not Accessible			
	11/10/03				Found - Not Accessible			
	12/10/03	429.65	33.25	33.28		396.37	0.03	396.39
HMW-03	12/10/03	428.72	NA	28.65		400.07	0.00	400.07
HMW-04	12/10/03	428.96	13.76	13.77		415.19	0.01	415.20
HMW-07	06/25/03	430.17	NA	24.18		405.99	0.00	405.99
	07/08/03	430.17	NA	23.90		406.27	0.00	406.27
	09/09/03	430.17	NA	24.06		406.11	0.00	406.11
	10/29/03	430.17	NA	25.12		405.05	0.00	405.05
	11/10/03	430.17	NA	25.13		405.04	0.00	405.04
	12/10/03	429.12	NA	25.03		404.09	0.00	404.09
HMW-08	06/25/03	430.31	29.92	32.78		397.53	2.86	399.65
	07/08/03	430.31	29.86	32.66		397.65	2.80	399.72
	09/09/03	430.31	32.12	34.35		395.96	2.23	397.68
	10/29/03	430.31	33.01	35.09		395.22	2.08	396.82
	11/10/03	430.31	32.76	34.41		395.90	1.65	397.17
	12/10/03	429.74	33.02	34.88		394.86	1.86	396.29

TABLE 5-3
Groundwater Elevations/Apparent Product Thickness - Village of Hartford
2003 to the Present

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-09	07/08/03	430.85	NA	23.15		407.70	0.00	407.70
	09/09/03	430.85	NA	23.92		406.93	0.00	406.93
	10/29/03	430.85	DRY	DRY		DRY	DRY	DRY
	11/10/03	430.85	DRY	DRY		DRY	DRY	DRY
	12/10/03	430.23	DRY	DRY		DRY	DRY	DRY
HMW-10	07/08/03	430.81	30.05	31.36		399.45	1.31	400.42
	09/09/03	430.81	30.67	31.24		399.57	0.57	400.01
	10/29/03	430.81	32.85	34.54		396.27	1.69	397.57
	11/10/03	430.81	32.70	34.41		396.40	1.71	397.72
	12/10/03	430.20	32.75	34.37		395.83	1.62	397.08
HMW-13	06/09/03	431.59	NA	18.62		412.97	0.00	412.97
	07/08/03	431.59	NA	18.63		412.96	0.00	412.96
	09/09/03	431.59	NA	18.74		412.85	0.00	412.85
	10/29/03	431.59	NA	18.80		412.79	0.00	412.79
	11/10/03	431.59	NA	18.77		412.82	0.00	412.82
	12/10/03	430.81	NA	18.67		412.14	0.00	412.14
HMW-14	06/09/03	431.54	30.65	31.79		399.75	1.14	400.59
	07/08/03	431.54	30.93	32.05		399.49	1.12	400.32
	09/09/03	431.44	32.97	34.45		396.99	1.48	398.13
	10/29/03	431.44	33.83	35.42		396.02	1.59	397.24
	11/10/03	431.44	33.61	35.19		396.25	1.58	397.47
	12/10/03	430.86	33.80	35.23		395.63	1.43	396.73
HMW-18	07/08/03	432.25	32.04	32.67		399.58	0.63	400.05
	09/09/03	432.25	33.44	34.03		398.22	0.59	398.67
	10/29/03	432.25	34.84	37.00		395.25	2.16	396.91
	11/10/03	432.25	34.49	36.52		395.73	2.03	397.29
	12/10/03	431.58	34.82	36.74		394.84	1.92	396.32
HMW-19	07/08/03	432.41	31.80	32.73		399.68	0.93	400.37
	09/09/03	432.41	33.12	34.04		398.37	0.92	399.08
	10/29/03	432.41	34.85	36.10		396.31	1.25	397.27
	11/10/03	432.41	34.57	35.74		396.67	1.17	397.57
	12/10/03	431.80	34.77	36.03		395.77	1.26	396.74
HMW-20	07/08/03	Found - Not Accessible						
	12/10/03	430.65	32.65	34.34		396.31	1.69	397.61

TABLE 5-3
Groundwater Elevations/Apparent Product Thickness - Village of Hartford
2003 to the Present

Work In Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
HMW-21	07/08/03	434.40	NA	20.30		414.10	0.00	414.10
	09/09/03	434.40	NA	21.94		412.46	0.00	412.46
	10/29/03	434.40	NA	22.80		411.60	0.00	411.60
	11/10/03	434.40	NA	22.78		411.62	0.00	411.62
	12/10/03	430.05	NA	22.65		407.40	0.00	407.40
HMW-22	06/25/03	434.40	30.32	32.86		401.54	2.54	403.42
	07/08/03	434.40	30.35	32.74		401.66	2.39	403.43
	09/09/03	434.40	32.71	34.13		400.27	1.42	401.36
	10/29/03	434.40	33.37	35.43		398.97	2.06	400.56
	11/10/03	434.40	33.10	34.92		399.48	1.82	400.88
	12/10/03	430.15	33.41	34.95		395.20	1.54	396.39
HMW-25	12/10/03	427.45	NA	30.11		397.34	0.00	397.34
HMW-26	12/10/03	425.20	NA	27.13		398.07	0.00	398.07
HMW-27	12/10/03	430.75	NA	32.25		398.50	0.00	398.50
HMW-28	12/10/03	430.97	NA	32.16		398.81	0.00	398.81
HMW-29	12/10/03	430.07	NA	31.67		398.40	0.00	398.40
RW-1	06/24/03	434.44	NA	33.36		401.08	0.00	401.08
	09/09/03	434.44	NA	35.36		399.08	0.00	399.08
	10/29/03	434.44	NA	36.58		397.86	0.00	397.86
	11/10/03	434.44	36.41	36.42		398.02	0.01	398.03
	12/10/03	433.78	NA	36.44		397.34	0.00	397.34
RW-2	06/09/03	432.66	31.50	33.18		399.48	1.68	400.72
	09/09/03	432.66	33.81	34.43		398.23	0.62	398.71
	10/29/03	432.66	34.62	36.31		396.35	1.69	397.65
	11/10/03	432.66	34.46	36.03		396.63	1.57	397.84
	12/10/03	431.99	34.58	36.11		395.88	1.53	397.06
RW-3/HB-32	06/09/03		33.32	35.32			2.00	
	09/09/03		35.81	37.65			1.84	
	10/29/03		36.70	38.48			1.78	
	11/10/03		36.38	37.89			1.51	
	12/10/03	433.35	36.66	38.29		395.06	1.63	396.32

NOTES:

SG = Specific gravity of hydrocarbon, assumed to be 0.74 by others for data recorded before 09/03.
SG = Specific gravity of hydrocarbon, determined to be an average of 0.77 for data recorded during and after 09/03.
NA = Not Applicable
[1] Located on private property - Illinois EPA accessible only.
Top of casing elevations prior to December 2003 obtained from historical measurements by others.
Top of casing elevations for December 2003 obtained by survey completed by CMT in December 2003.
HMW-21 and HMW-22 top of casing elevations prior to 12/10 determined to be suspect based on 12/10 survey.

TABLE 5-4
Groundwater Elevations/Apparent Product Thickness - Wells outside of Hartford
2003 to Present

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
Premcor Refinery Wells								
RB-10	04/30/03	430.76	27.68	41.19	403.08	389.57	13.51	399.57
	09/08/03	430.76	30.02	30.36	400.74	400.40	0.34	400.67
	10/29/03	430.76	31.16	31.38	399.60	399.38	0.22	399.55
	11/13/03	430.76	31.41	31.82	399.35	398.94	0.41	399.26
	12/10/03	430.76	30.93	31.14	399.83	399.62	0.21	399.78
RB-25	04/09/03	432.84	NA	30.59	NA	402.25	0	402.25
	05/01/03	432.84	NA	29.42	NA	403.42	0	403.42
	09/08/03	432.84	NA	29.24	NA	403.60	0	403.60
	10/28/03	432.84	NA	31.80	NA	401.04	0	401.04
	11/12/03	432.84	NA	30.41	NA	402.43	0	402.43
	12/10/03	432.84	NA	29.25	NA	403.59	0	403.59
RB-26	04/09/03	430.76	NA	30.21	NA	400.55	0	400.55
	04/30/03	430.76	NA	29.81	NA	400.95	0	400.95
	09/08/03	430.76	NA	29.44	NA	401.32	0	401.32
	10/29/03	430.76	NA	29.67	NA	401.09	0	401.09
	11/13/03	430.76	NA	30.31	NA	400.45	0	400.45
	12/10/03	430.76	NA	31.36	NA	399.40	0	399.40
RB-30	04/09/03	432.62	NA	32.36	NA	400.26	0	400.26
	04/30/03	432.62	32.00	32.01	400.62	400.61	0.01	400.62
	09/08/03	432.62	NA	31.02	NA	401.60	0	401.60
	10/29/03	432.62	NA	32.17	NA	400.45	0	400.45
	11/13/03	432.62	NA	32.47	NA	400.15	0	400.15
	12/10/03	432.62	NA	31.99	NA	400.63	0	400.63
RB-37	04/09/03	429.11	29.44	32.33	NA	396.78	2.89	398.92
	05/01/03	429.11	29.06	32.32	400.05	396.79	3.26	399.20
	09/08/03	429.11	28.68	30.85	400.43	398.26	2.17	399.95
	10/28/03	429.11	29.79	30.24	399.32	398.87	0.45	399.22
	11/12/03	429.11	29.84	30.19	399.27	398.92	0.35	399.19
	12/10/03	429.11	28.95	32.64	400.16	396.47	3.69	399.35

TABLE 5-4
Groundwater Elevations/Apparent Product Thickness - Wells outside of Hartford
2003 to Present

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
RB-38	04/09/03	434.42	NA	34.89	NA	399.53	0	399.53
	04/30/03	434.42	NA	34.58	NA	399.84	0	399.84
	09/08/03	434.42	NA	34.12	NA	400.30	0	400.30
	10/28/03	434.42	NA	34.64	NA	399.78	0	399.78
	11/12/03	434.42	NA	34.80	NA	399.62	0	399.62
	12/10/03	434.42	NA	34.74	NA	399.68	0	399.68
RB-39	04/09/03	432.21	NA	29.86	NA	402.35	0	402.35
	04/30/03	432.21	NA	28.54	NA	403.67	0	403.67
	09/08/03	432.21	NM	NM	NM	NM	NM	NM
	10/29/03	432.21	NA	30.14	NA	402.07	0	402.07
	11/12/03	432.21	NA	30.18	NA	402.03	0	402.03
	12/10/03	432.21	NA	28.01	NA	404.20	0	404.20
RB-40	04/09/03	434.23	NA	34.03	NA	400.20	0	400.20
	04/30/03	434.23	NA	33.79	NA	400.44	0	400.44
	09/08/03	434.23	NA	33.28	NA	400.95	0	400.95
	10/28/03	434.23	NA	34.73	NA	399.50	0	399.50
	11/11/03	434.23	NA	33.89	NA	400.34	0	400.34
	12/10/03	434.23	NA	33.92	NA	400.31	0	400.31
RB-41	04/09/03	433.97	NA	33.55	NA	400.42	0	400.42
	04/30/03	433.97	NA	33.41	NA	400.56	0	400.56
	09/08/03	433.97	NA	33.14	NA	400.83	0	400.83
	10/28/03	433.97	NA	33.32	NA	400.65		400.65
	11/11/03	433.97	NA	33.30	NA	400.67	0	400.67
	12/10/03	433.97	NA	33.51	NA	400.46	0	400.46
RB-42	04/09/03	429.18	NA	28.08	NA	401.10	0	401.10
	04/30/03	429.18	NA	27.99	NA	401.19	0	401.19
	09/08/03	429.18	NA	27.66	NA	401.52	0	401.52
	10/28/03	429.18	NA	27.85	NA	401.33	0	401.33
	11/11/03	429.18	NA	27.97	NA	401.21	0	401.21
	12/10/03	429.18	NA	28.05	NA	401.13	0	401.13

TABLE 5-4
Groundwater Elevations/Apparent Product Thickness - Wells outside of Hartford
2003 to Present

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
RB-43	04/09/03	428.68	NA	25.24	NA	403.44	0	403.44
	04/30/03	428.68	NA	25.13	NA	403.55	0	403.55
	09/08/03	428.68	NA	24.66	NA	404.02	0	404.02
	10/28/03	428.68	NA	25.09	NA	403.59	0	403.59
	11/11/03	428.68	NA	24.34	NA	404.34	0	404.34
	12/10/03	428.68	NA	25.30	NA	403.38	0	403.38
RB-44	04/09/03	433.68	NA	31.16	NA	402.52	0	402.52
	04/30/03	433.68	NA	31.01	NA	402.67	0	402.67
	09/08/03	433.68	NA	30.88	NA	402.80	0	402.80
	10/28/03	433.68	NA	30.90	NA	402.78	0	402.78
	11/11/03	433.68	NA	31.04	NA	402.64	0	402.64
	12/10/03	433.68	NA	30.83	NA	402.85	0	402.85
RB-45	04/09/03	432.65	NA	30.65	NA	402.00	0	402.00
	04/30/03	432.65	NA	30.44	NA	402.21	0	402.21
	09/08/03	432.65	NA	29.56	NA	403.09	0	403.09
	10/28/03	432.65	NA	30.36	NA	402.29	0	402.29
	11/11/03	432.65	NA	30.52	NA	402.13	0	402.13
	12/10/03	432.65	NA	30.34	NA	402.31	0	402.31
RB-46	05/01/03	431.35	NA	30.43	NA	400.92	0	400.92
	09/08/03	431.35	NA	30.21	NA	401.14	0	401.14
	10/29/03	431.35	NA	30.46	NA	400.89	0	400.89
	11/11/03	431.35	NA	30.45	NA	400.90	0	400.90
	12/10/03	431.35	NA	30.49	NA	400.86	0	400.86
RB-47	05/01/03	431.85	NA	31.13	NA	400.72	0	400.72
	09/08/03	431.85	NA	30.89	NA	400.96	0	400.96
	10/29/03	431.85	NA	31.19	NA	400.66	0	400.66
	11/10/03	431.85	NA	31.14	NA	400.71	0	400.71
	12/10/03	431.85	NA	31.25	NA	400.60	0	400.60
RB-48	05/01/03	431.99	29.50	32.90	402.49	399.09	3.4	401.61
	09/08/03	431.99	28.63	31.91	403.36	400.08	3.28	402.64
	10/29//03	431.99	29.84	31.44	402.15	400.55	1.6	401.80
	11/12/03	431.99	29.74	32.70	402.25	399.29	2.96	401.60
	12/10/03	431.99	29.65	32.85	402.34	399.14	3.2	401.64

TABLE 5-4
Groundwater Elevations/Apparent Product Thickness - Wells outside of Hartford
2003 to Present

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
RB-51	05/01/03	432.31	NA	30.95	NA	401.36	0	401.36
	09/08/03	432.31	NA	31.31	NA	401.00	0	401.00
	10/29/03	432.31	NA	31.40	NA	400.91	0	400.91
	11/11/03	432.31	NA	31.27	NA	401.04	0	401.04
	12/10/03	432.31	NA	31.24	NA	401.07	0	401.07
RB-52	04/09/03	432.75	33.10	35.38	399.65	397.37	2.28	399.06
	05/01/03	432.75	32.67	34.25	400.08	398.50	1.58	399.67
	09/08/03	432.75	NM	NM	NM	NM	NM	NM
	10/29/03	432.75	NA	33.37	NA	399.38	0	399.38
	11/12/03	432.75	NA	33.24	NA	399.51	0	399.51
	12/10/03	432.75	NA	33.20	NA	399.55	0	399.55
RB-53	04/30/03	434.57	34.67	34.83	399.9	399.74	0.16	399.86
	09/08/03	434.57	33.50	33.68	401.07	400.89	0.18	401.03
	10/28/03	434.57	34.69	34.88	399.88	399.69	0.19	399.84
	11/13/03	434.57	35.32	35.48	399.25	399.09	0.16	399.21
	12/10/03	434.57	34.57	34.65	400	399.92	0.08	399.98
RB-54	04/09/03	432.61	NA	22.70	NA	409.91	0	409.91
	04/30/03	432.61	NA	21.26	NA	411.35	0	411.35
	09/08/03	432.61	NA	21.02	NA	411.59	0	411.59
	10/28/03	432.61	NA	22.97	NA	409.64	0	409.64
	11/12/03	432.61	NA	22.97	NA	409.64	0	409.64
	12/10/03	432.61	NA	21.61	NA	411.00	0	411.00
RB-55	04/30/03	434.94	32.47	36.84	402.47	398.10	4.37	401.33
	09/08/03	434.94	31.74	31.76	403.2	403.18	0.02	403.20
	10/29/03	434.94	33.64	33.66	401.3	401.28	0.02	401.30
	11/13/03	434.94	34.06	35.05	400.88	399.89	0.99	400.66
	12/10/03	434.94	31.50	36.85	403.44	398.09	5.35	402.26
RB-56	05/01/03	432.64	33.06	35.04	399.58	397.60	1.98	399.07
	09/08/03	432.64	32.86	33.02	399.78	399.62	0.16	399.74
	10/29/03	432.64	33.74	33.92	398.9	398.72	0.18	398.86
	11/12/03	432.64	NM	NM	NM	NM	NM	NM
	12/10/03	432.64	33.72	33.92	398.92	398.72	0.2	398.88

TABLE 5-4
Groundwater Elevations/Apparent Product Thickness - Wells outside of Hartford
2003 to Present

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
GB-1	04/09/03	432.28	NA	29.23	NA	403.05	0	403.05
	04/30/03	432.28	NA	29.19	NA	403.09	0	403.09
	09/08/03	432.28	NA	28.24	NA	404.04	0	404.04
	10/28/03	432.28	NA	29.01	NA	403.27	0	403.27
	11/10/03	432.28	NA	29.13	NA	403.15	0	403.15
	12/10/03	432.28	NA	28.99	NA	403.29	0	403.29
GB-6	04/09/03	431.26	NA	29.20	NA	402.06	0	402.06
	04/30/03	431.26	NA	29.21	NA	402.05	0	402.05
	09/08/03	431.26	NA	28.54	NA	402.72	0	402.72
	10/28/03	431.26	NA	29.05	NA	402.21	0	402.21
	11/11/03	431.26	NA	29.12	NA	402.14	0	402.14
	12/10/03	431.26	NA	29.19	NA	402.07	0	402.07
LP-4	04/09/03	433.26	NA	31.75	NA	401.51	0	401.51
	04/30/03	433.26	NA	31.49	NA	401.77	0	401.77
	09/08/03	433.26	NA	30.76	NA	402.50	0	402.50
	10/28/03	433.26	NA	31.45	NA	401.81	0	401.81
	11/11/03	433.26	NA	31.50	NA	401.76	0	401.76
	12/10/03	433.26	NA	31.55	NA	401.71	0	401.71
Tannery Property Wells								
P-77	12/10/03	435.30	NA	37.65		397.65	0.00	397.65
P-78	12/10/03	434.02	NA	36.20		397.82	0.00	397.82
P-79	12/10/03	433.38	NA	35.54		397.84	0.00	397.84
P-105	12/10/03	433.27	NA	32.61		400.66	0.00	400.66
P-106	12/10/03	433.37	NA	35.46		397.91	0.00	397.91
P-107	12/10/03	432.56	NA	30.14		402.42	0.00	402.42
SP-12	11/11/03		NA	32.05			0.00	
	12/10/03		NA	30.61			0.00	
SP-13	11/11/03		NA	34.63			0.00	
	12/10/03		NA	34.38			0.00	

TABLE 5-4
Groundwater Elevations/Apparent Product Thickness - Wells outside of Hartford
2003 to Present

Work in Progress
January 7, 2004

Hartford Working Group / Hartford, Illinois

WELL	DATE	(A) Casing Rim Elevation (ft)	(B) Depth to Hydrocarbon (ft)	(C) Depth to Water (ft)	(A)-(B) Hydrocarbon Surf. Elevation (ft)	(A)-(C) Water Surface Elevation (ft)	(C)-(B) Hydrocarbon Thickness (ft)	Piezometric Surface Elevation[1] (ft)
Rand Avenue Property Wells								
SP-14	11/11/03		NA	29.46			0.00	
	12/10/03		NA	28.74			0.00	
SP-18	11/12/03		NA	32.46			0.00	
	12/10/03		NA	31.92			0.00	
SP-28	11/13/03		NA	18.21			0.00	
	12/10/03		NA	13.75			0.00	
SP-37	11/12/03		NA	29.85			0.00	
	12/10/03		NA	25.70			0.00	
SP-40	11/12/03		NA	31.91			0.00	
	12/10/03		NA	30.53			0.00	
SP-43	11/12/03		NA	31.78			0.00	
	12/10/03		NA	27.76			0.00	

TABLE 5-5
Evaluation of Existing Wells/Piezometers For Contouring Main/EPA Sand Aquifer - Village of Hartford

The Hartford Working Group / Hartford, Illinois

Work in Progress January 7, 2004

Existing Wells	Satisfactory	Not Satisfactory	Rationale	Notes
HB-03	X			Not found in 2003 - believed abandoned or destroyed
HB-07		X	Appears plugged at 9' bgs	If it can be restored the well is appropriate to use in contouring the Main Sand (20' screen)
HB-08	X			Not found in 2003 - believed abandoned or destroyed
HB-30	X			Not found in 2003 - believed abandoned or destroyed
HB-31	X			Not found in 2003 - believed abandoned or destroyed
HB-37	X			Upper 3.5' of screen set in clay (10' screen)
HB-38	X			Not found in 2003 - believed abandoned or destroyed
HMW-01		X	Shallow	(5' screen)
HMW-02		X	Potentially screening two hydrostratigraphic units/ Geology more complex than apparent from available information	Unable to gauge in 2003 prior to December (10' screen)
HMW-03		X	Potentially screening two hydrostratigraphic units/ Geology more complex than apparent from available information	(5' screen)
HMW-04		X	Shallow	(5' screen)
HMW-07		X	Shallow	Set in clay (10' screen)
HMW-08	X			TSE: 398.33 (10' screen)
HMW-09		X	Shallow	(10' screen)
HMW-10	X			Upper portion of screen believed set in clay (No Log-15' screen). Evaluated based on cross-section (J-J') in vicinity.
HMW-13		X	Shallow	(10' screen)
HMW-14		X	Potentially screening two hydrostratigraphic units/ Geology more complex than apparent from available information	Believed to screen Rand, EPA and Main Sand (No Log-15' screen). Evaluation based on cross-section (A-A') in vicinity.
HMW-18	X			No Log (15' screen).
HMW-19	X			No Log-15' screen
HMW-20	X			(15' screen)
HMW-21		X	Shallow	(10' screen)
HMW-22	X			(10' screen)
HMW-25	X			(15' screen)
HMW-26	X			(15' screen)
HMW-27	X			(15' screen)
HMW-28	X			(15' screen)
HMW-29	X			(15' screen)
RW-01	X			No Log/Well Construction Report
RW-02	X			No Log/Well Construction Report
RW-03/HB-32	X			Upper 3.5' of screen set in clay (15' screen)

NOTES: TSE = Top of screen TOC = Top of casing

TABLE 5-6
Wells Used for Contouring Main/EPA Sand Aquifer
Located Outside of Hartford

The Hartford Working Group / Hartford, Illinois

Work in Progress
January 7, 2004

Existing Wells
Premcor Property Wells
GB-1
GB-6
LP-4
RB-10
RB-25
RB-26
RB-30
RB-37
RB-38
RB-39
RB-40
RB-41
RB-42
RB-43
RB-44
RB-45
RB-46
RB-47
RB-48
RB-51
RB-52
RB-53
RB-54
RB-55
RB-56
Tannery Property Wells
P-77
P-78
P-79
P-105
P-106
P-107
SP-12
SP-13
Rand Avenue Property Wells
SP-14
SP-18
SP-28
SP-37
SP-40
SP-43

APPENDIX A

FIGURE AND TABLES
1992 ENGINEERING-SCIENCE REPORT FOR SHELL

HISTORY OF HYDROCARBON RELEASES IN THE VILLAGE OF HARTFORD, ILLINOIS

Prepared for

SHELL OIL COMPANY

MARCH 1992

H0095

Prepared by

ENGINEERING-SCIENCE

DESIGN • RESEARCH • PLANNING

9906 GULF FREEWAY, HOUSTON, TEXAS 77034 • 713/943-5432

ES ENGINEERING-SCIENCE

Figure 8

Mathes 1990 Vapor Plume Map

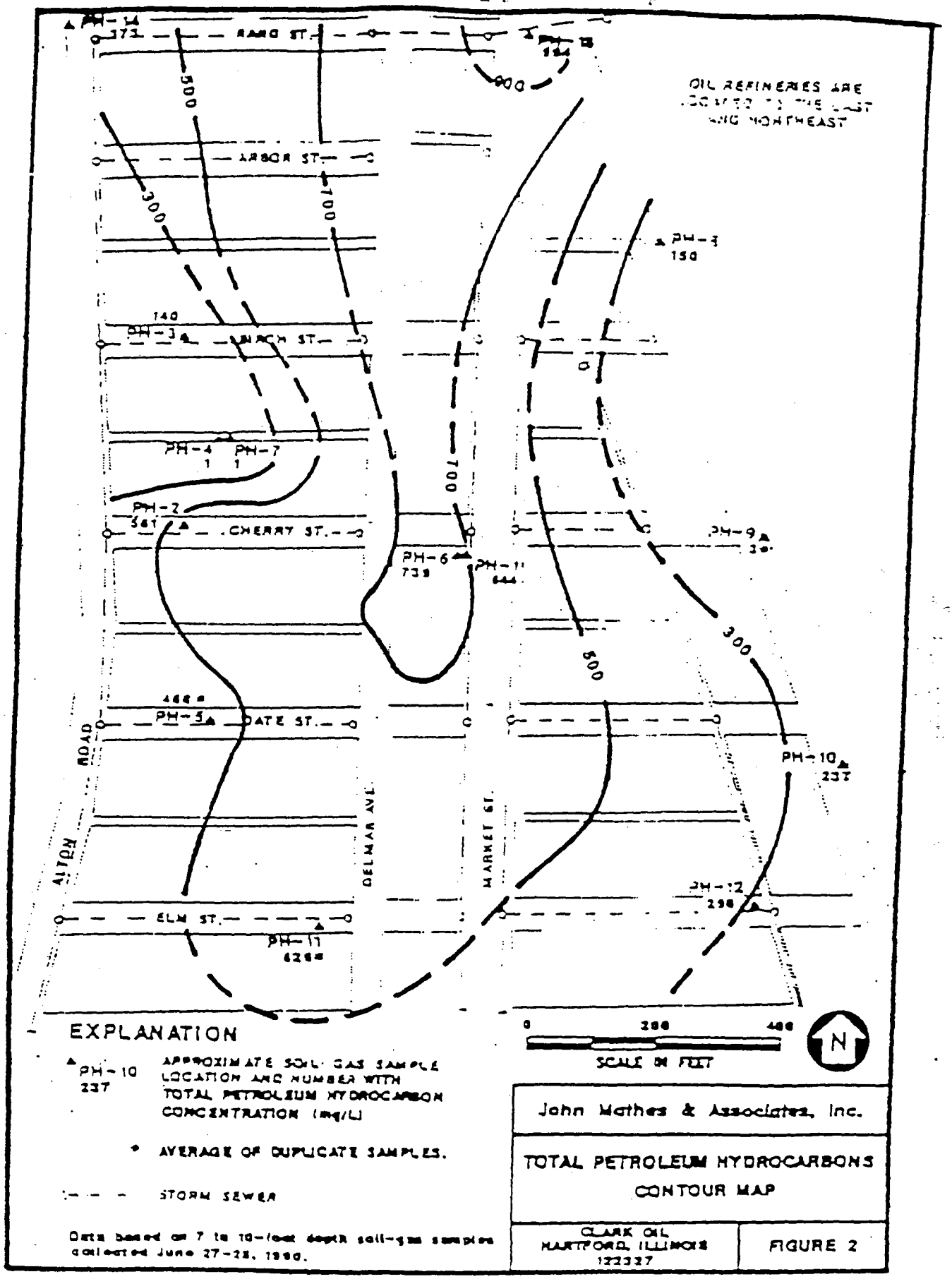
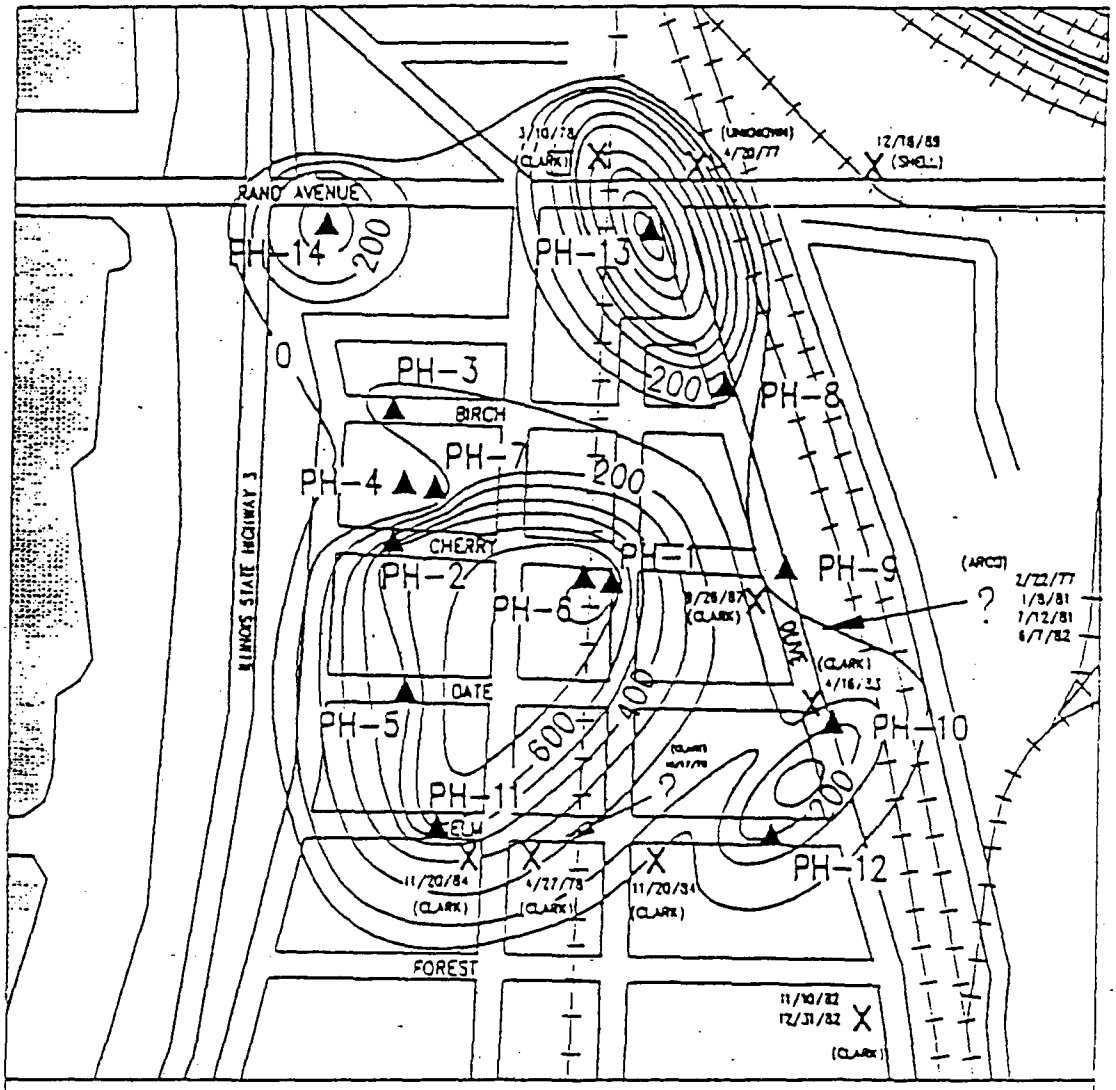


Figure 9

Mathes 1990 Vapor Plume Map (Re-contoured)



SAMPLE LOCATION	DEPTH (feet)	TPH CONCENTRATION (ppmv)
PH-1	8	664
PH-2	7	561
PH-3	7	140
PH-4	7	0.942
PH-5	7	484
PH-6	7	739.2
PH-7	7	0.717
PH-8	9	150
PH-9	9	3.01
PH-10	9	237
PH-11	9	634
PH-12	9	298
PH-13	10	994
PH-14	10	373

0 SCALE 1000

FEET

X – DOCUMENTED RELEASE AND LOCATION

? – DOCUMENTED RELEASE AT UNKNOWN LOCATION

FIGURE 11

Rand Avenue Cone-of-Depression Map

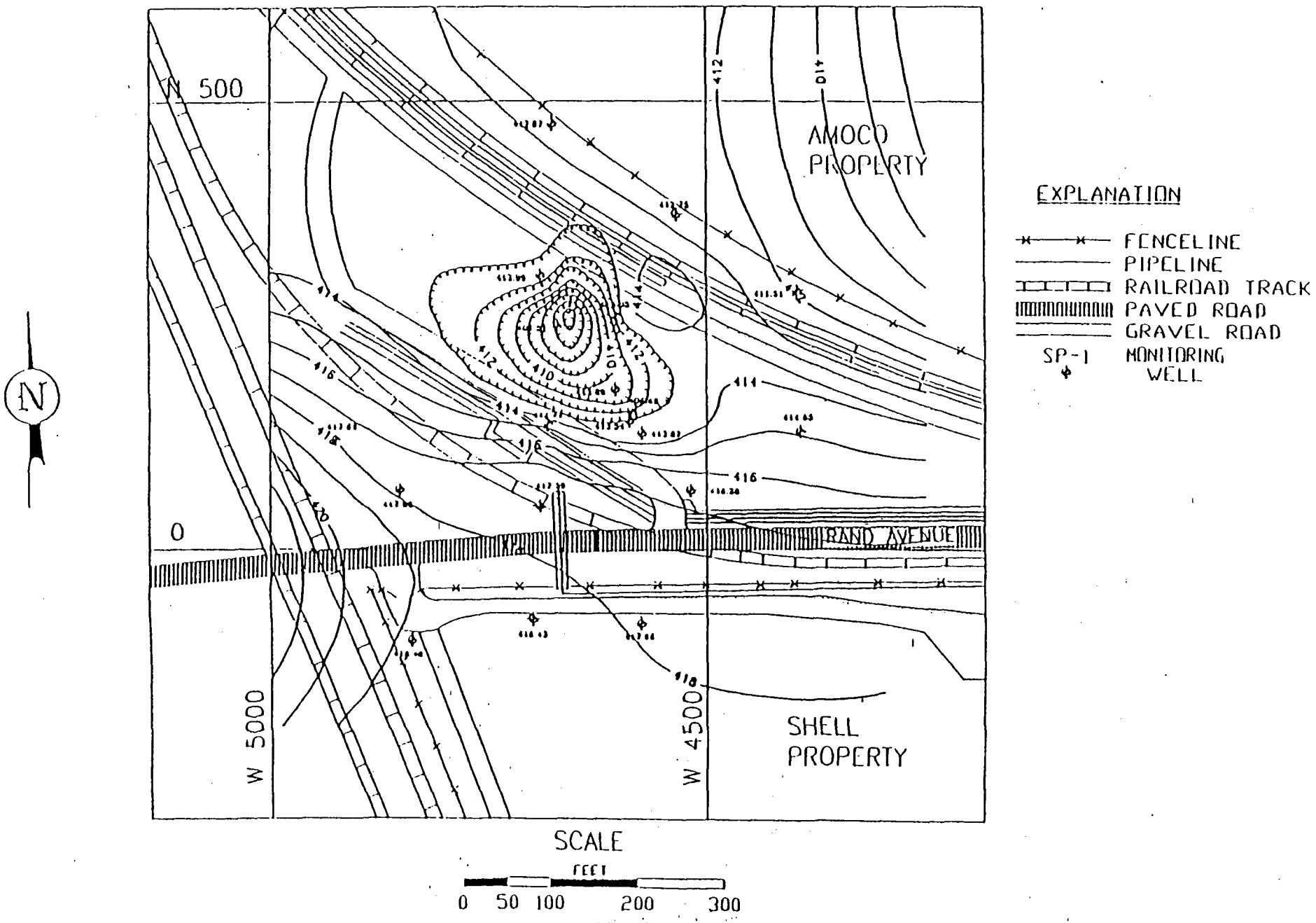
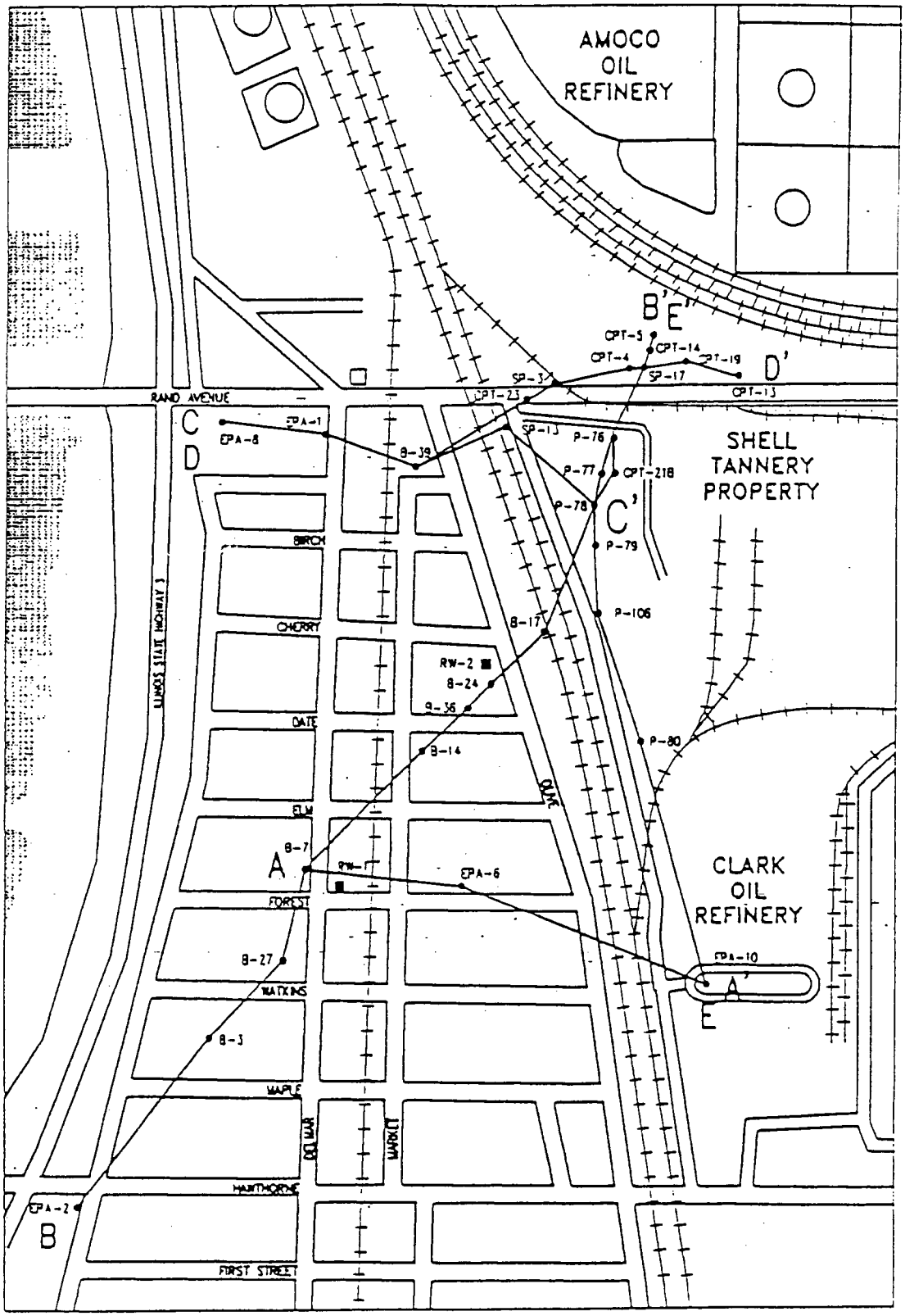


FIGURE 12

Cross-Sections Through Hartford



0 SCALE 1000

FEET

FIGURE 13
CROSS-SECTION A-A'

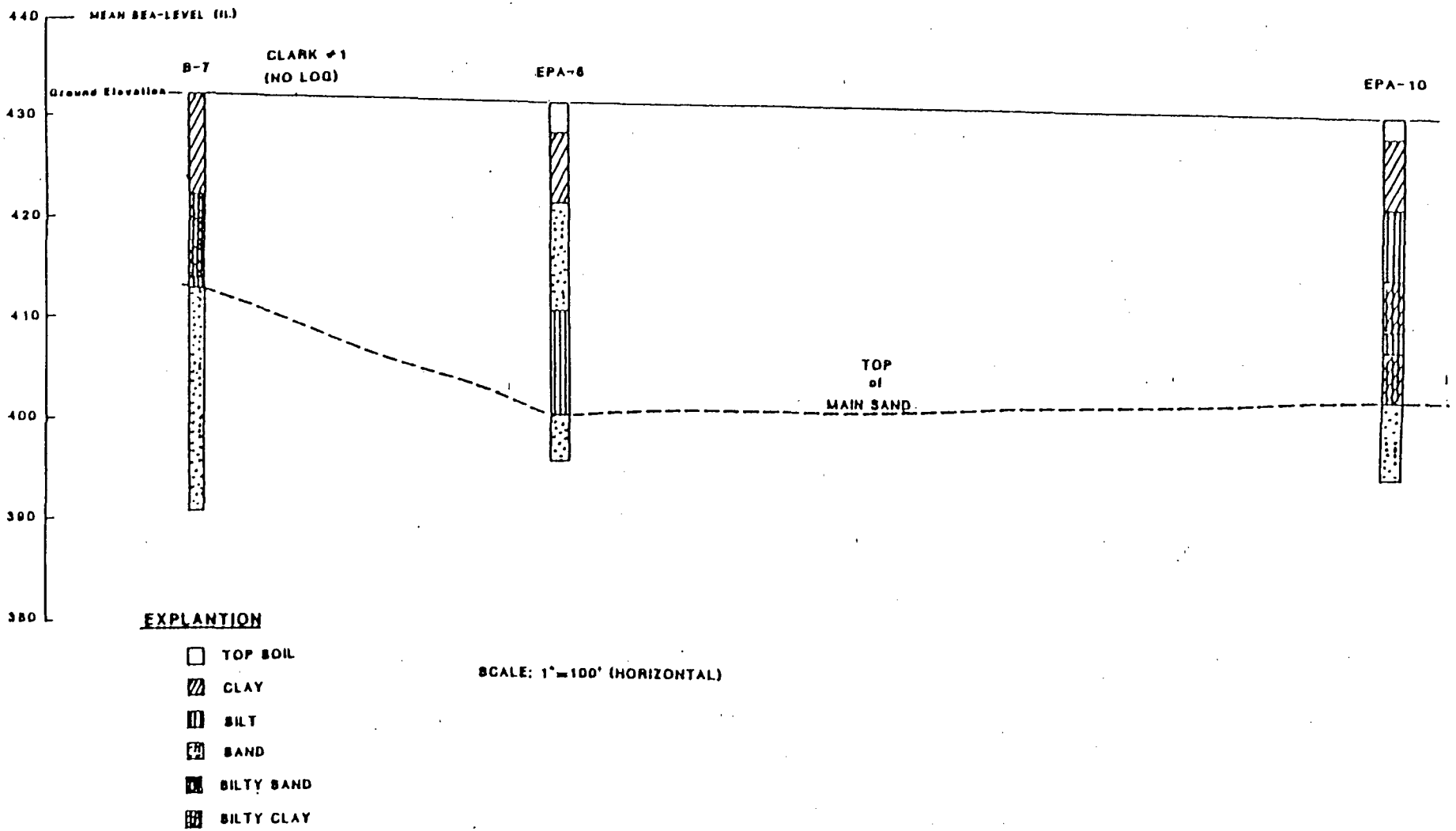


FIGURE 14

CROSS-SECTION B-B'

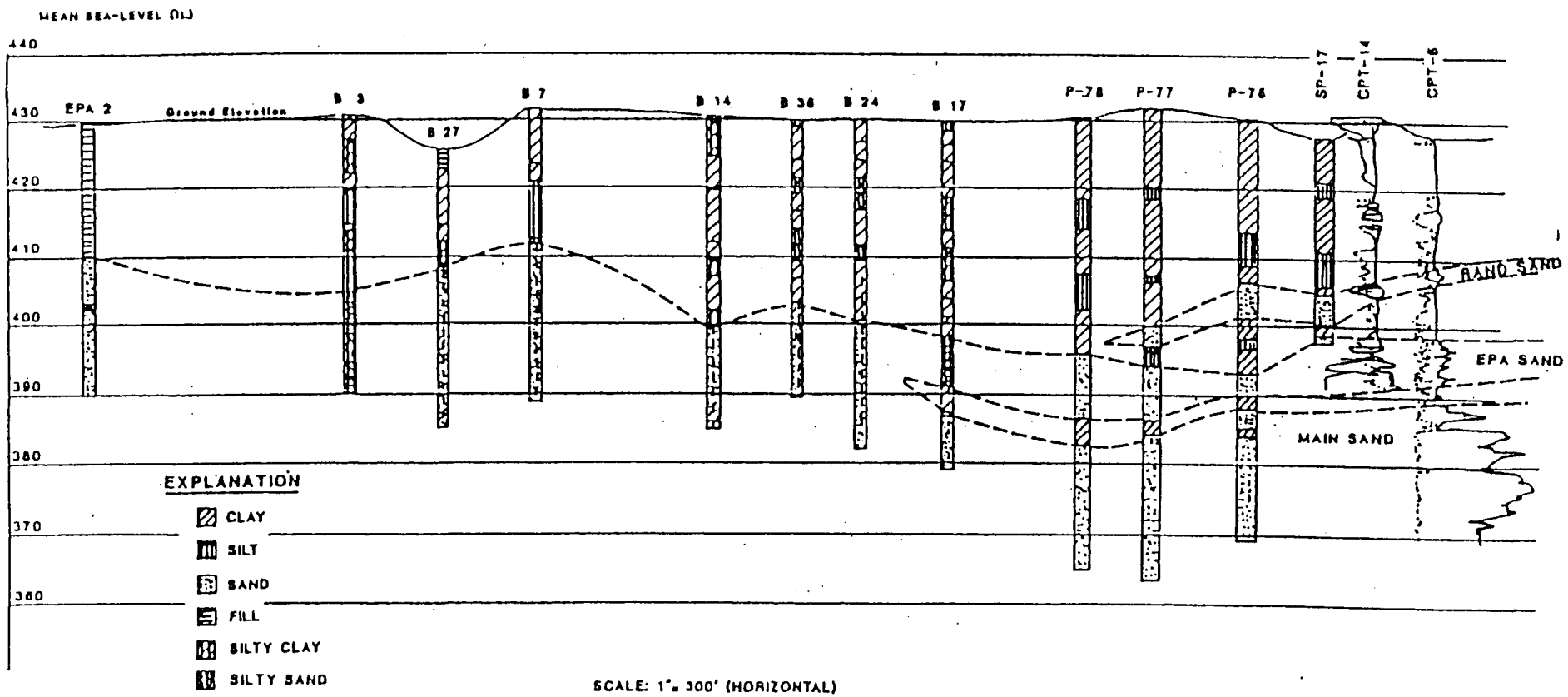
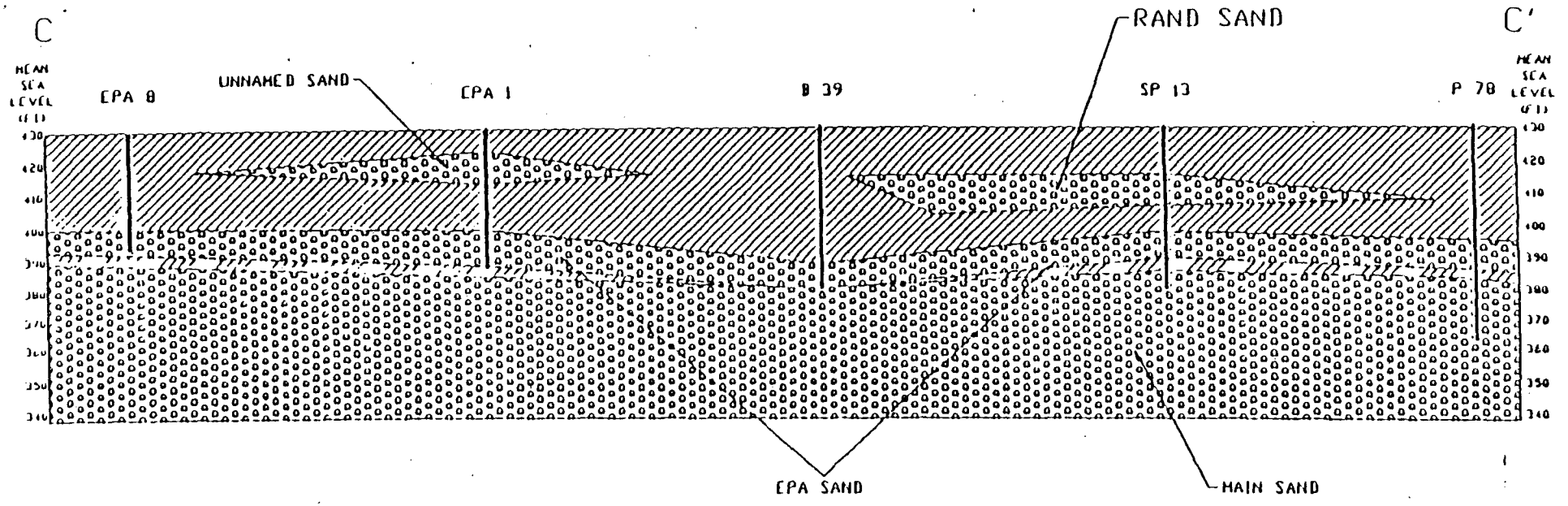


FIGURE 15

CROSS-SECTION C-C'



EXPLANATION

- SAND
- CLAY
- SILTS, CLAYS, STRINGER SANDS

FEET
0 100 200

VERTICAL EXXAGGERATION = 3x

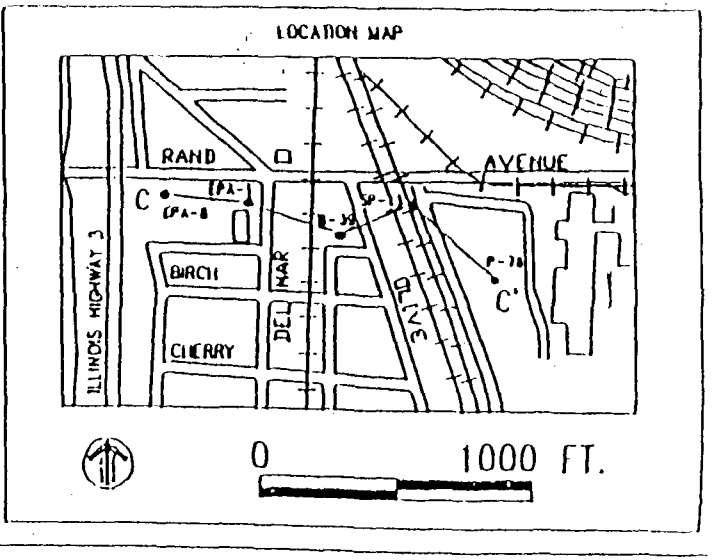
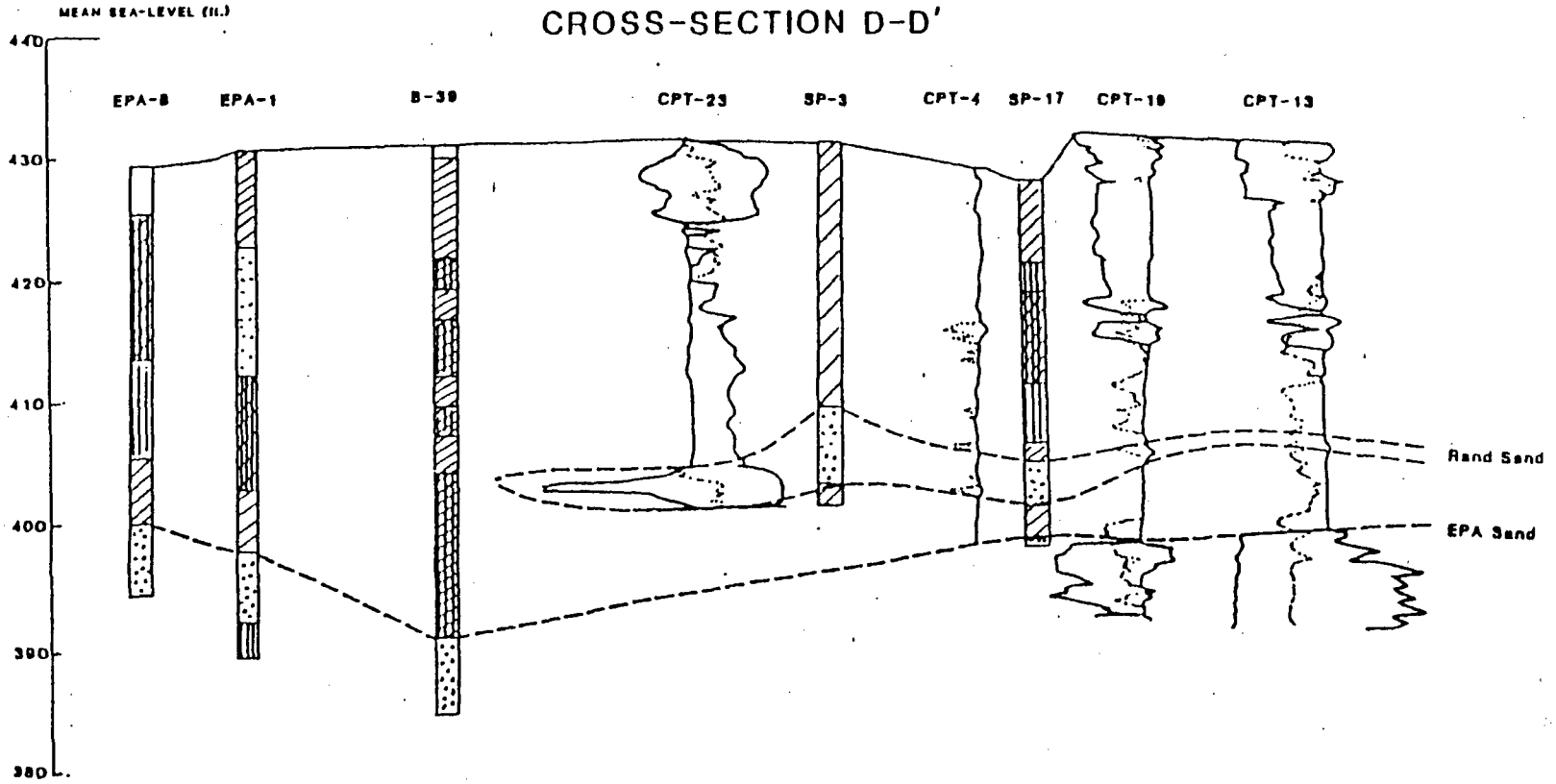


FIGURE 16
CROSS-SECTION D-D'

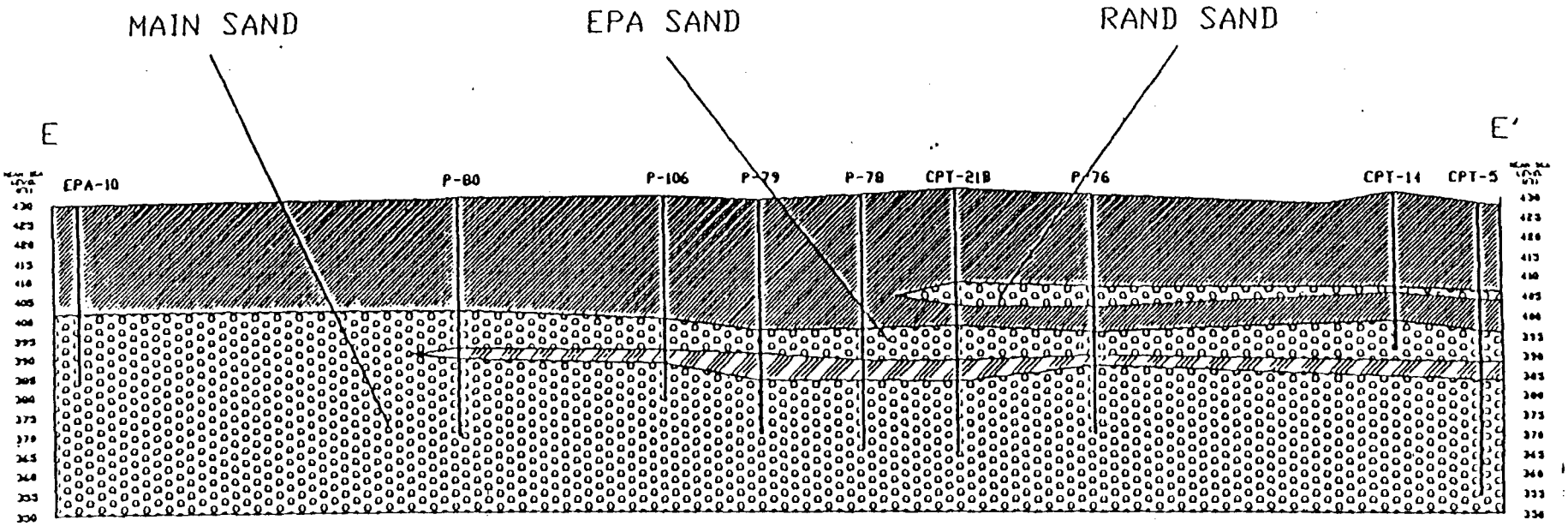


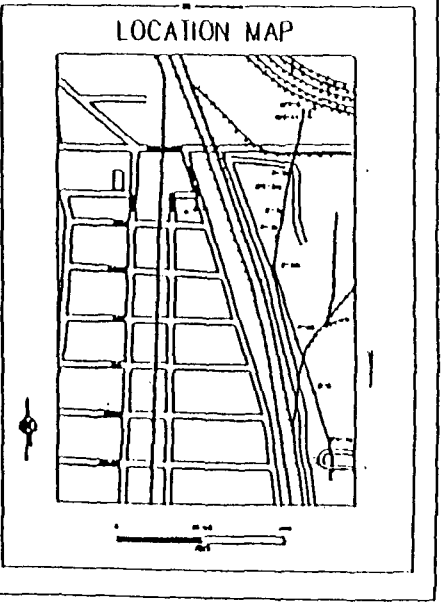
EXPLANATION

- CLAY
- SILT
- SAND
- TOP SOIL
- SILTY CLAY

SCALE: 1" 200' (HORIZONTAL)

FIGURE 17
CROSS-SECTION E-E'





EXPLANATION

- SAND
- CLAY
- SILTS, CLAYS AND STRINGER SANDS

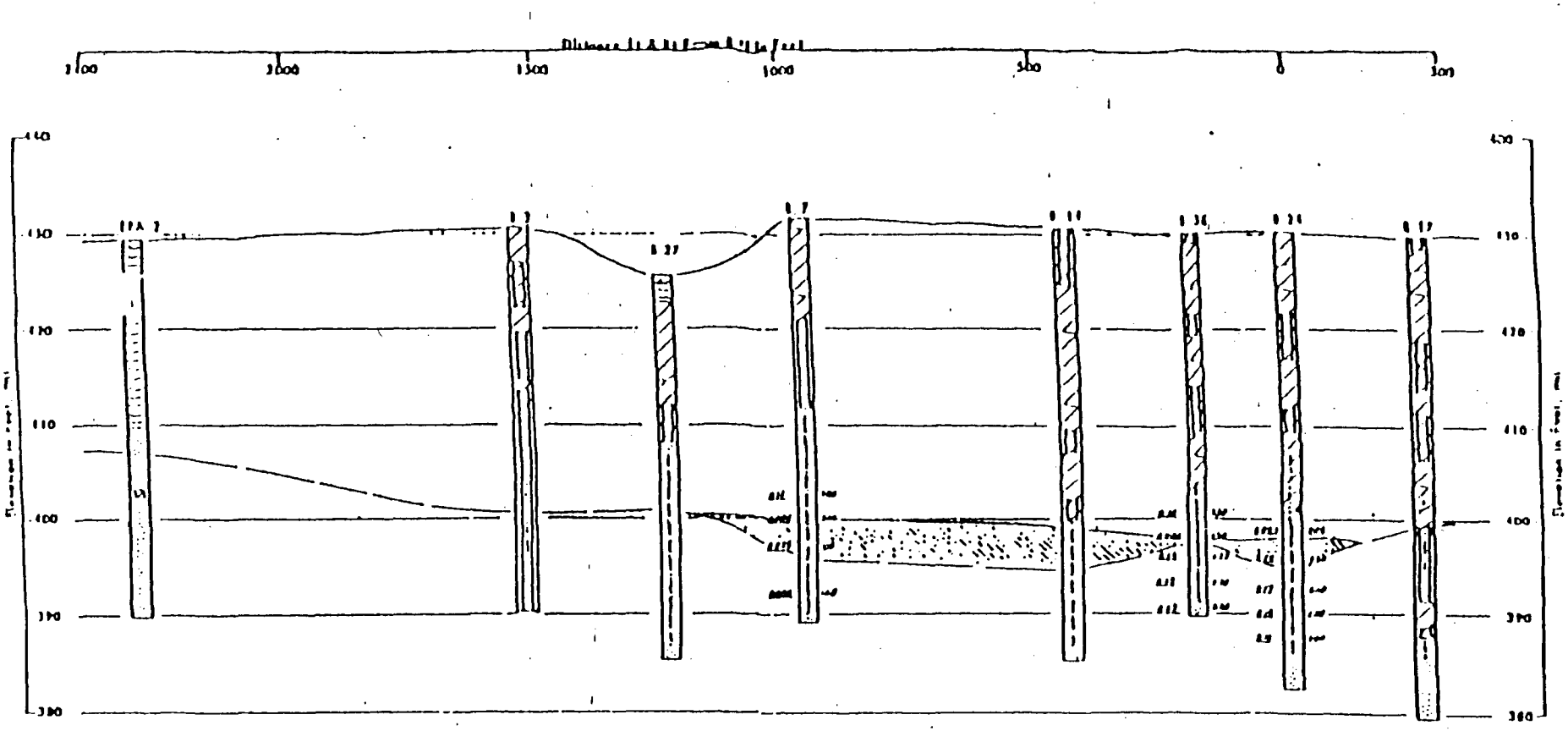
FEET

0 250 500

Vertical Exaggeration 8x

FIGURE 18

Mathes Subsurface Profile, EPA-2 to B-17

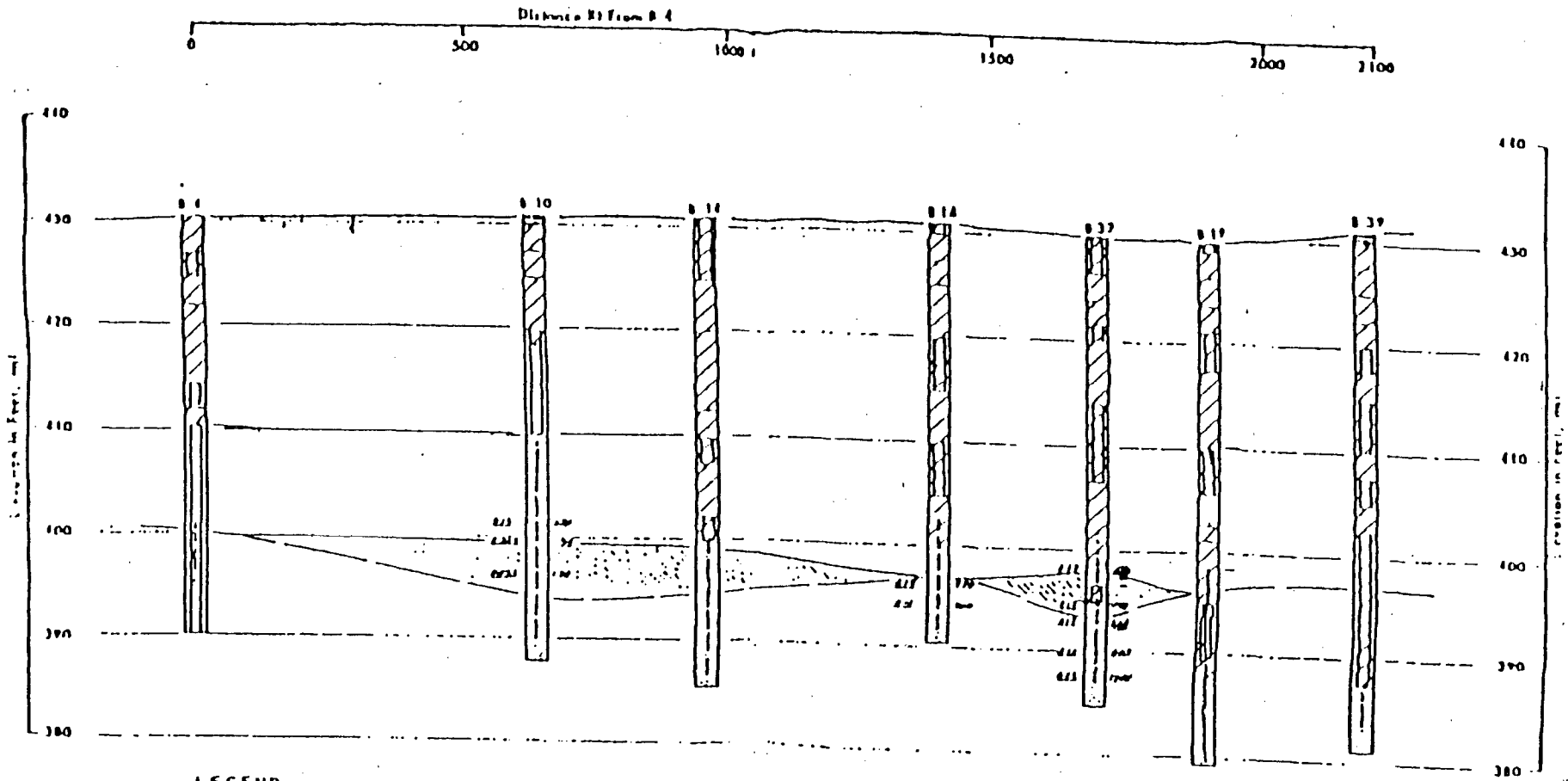


SOIL PROFILE

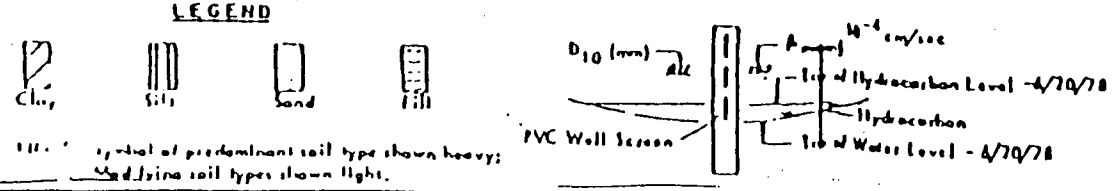
Section CC

Figure 19

Mathes Subsurface Profile, B-4 to B-39



LEGEND

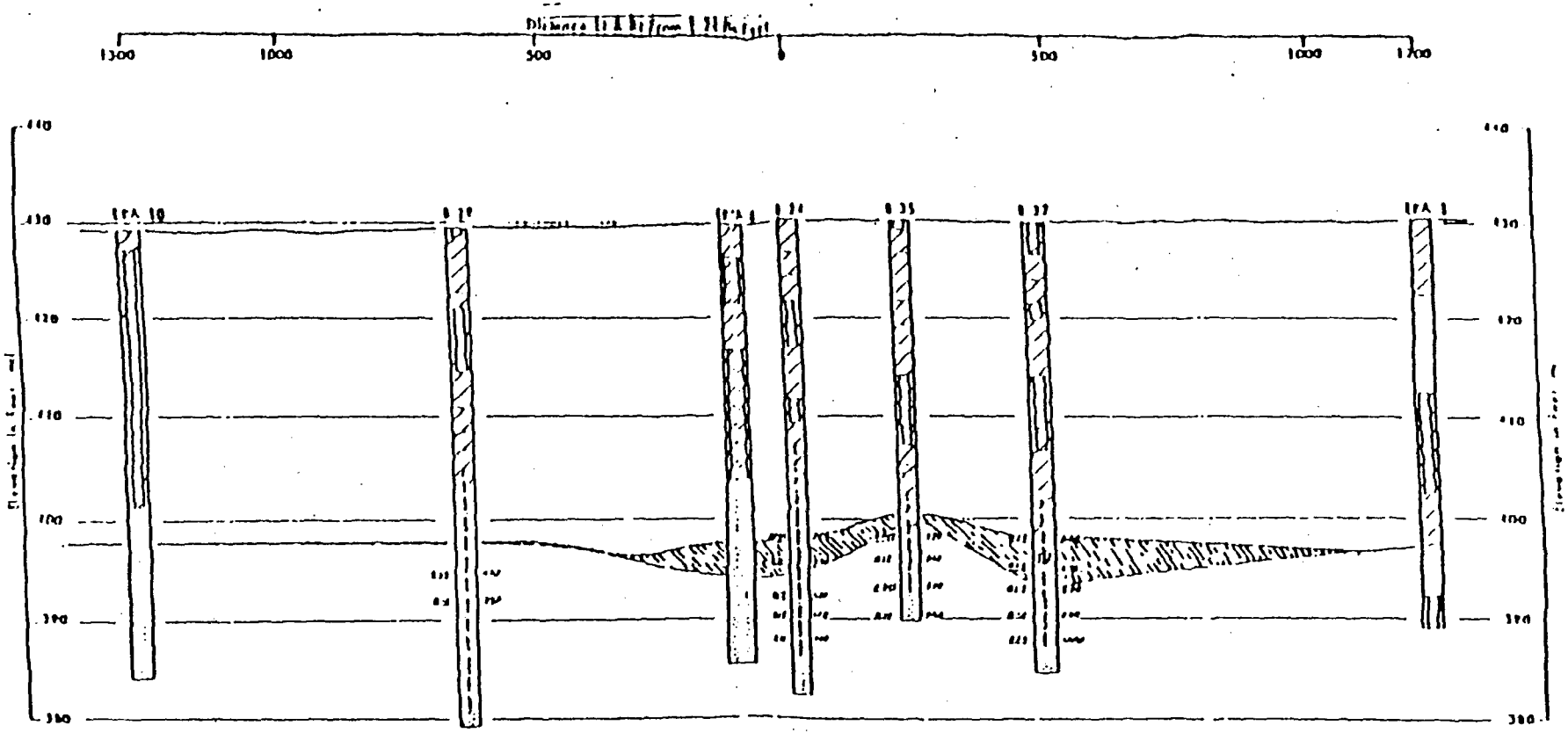


SOIL PROFILE

Section AA

Figure 20

Mathes Subsurface Profile, EPA-10 to EPA-1

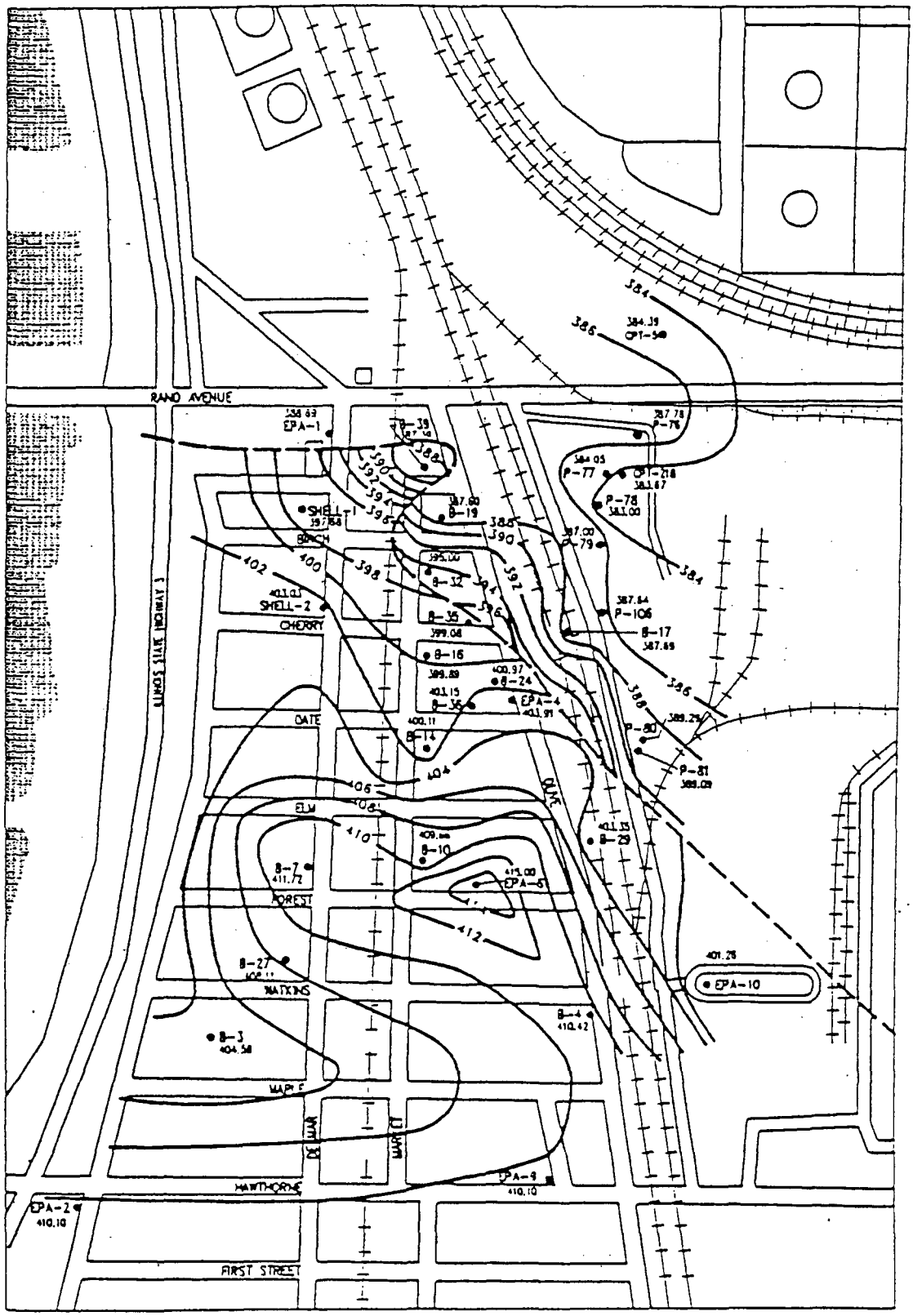


SOIL PROFILE

Section 88

FIGURE 21

TOP OF THE MAIN SAND



0 SCALE 1000

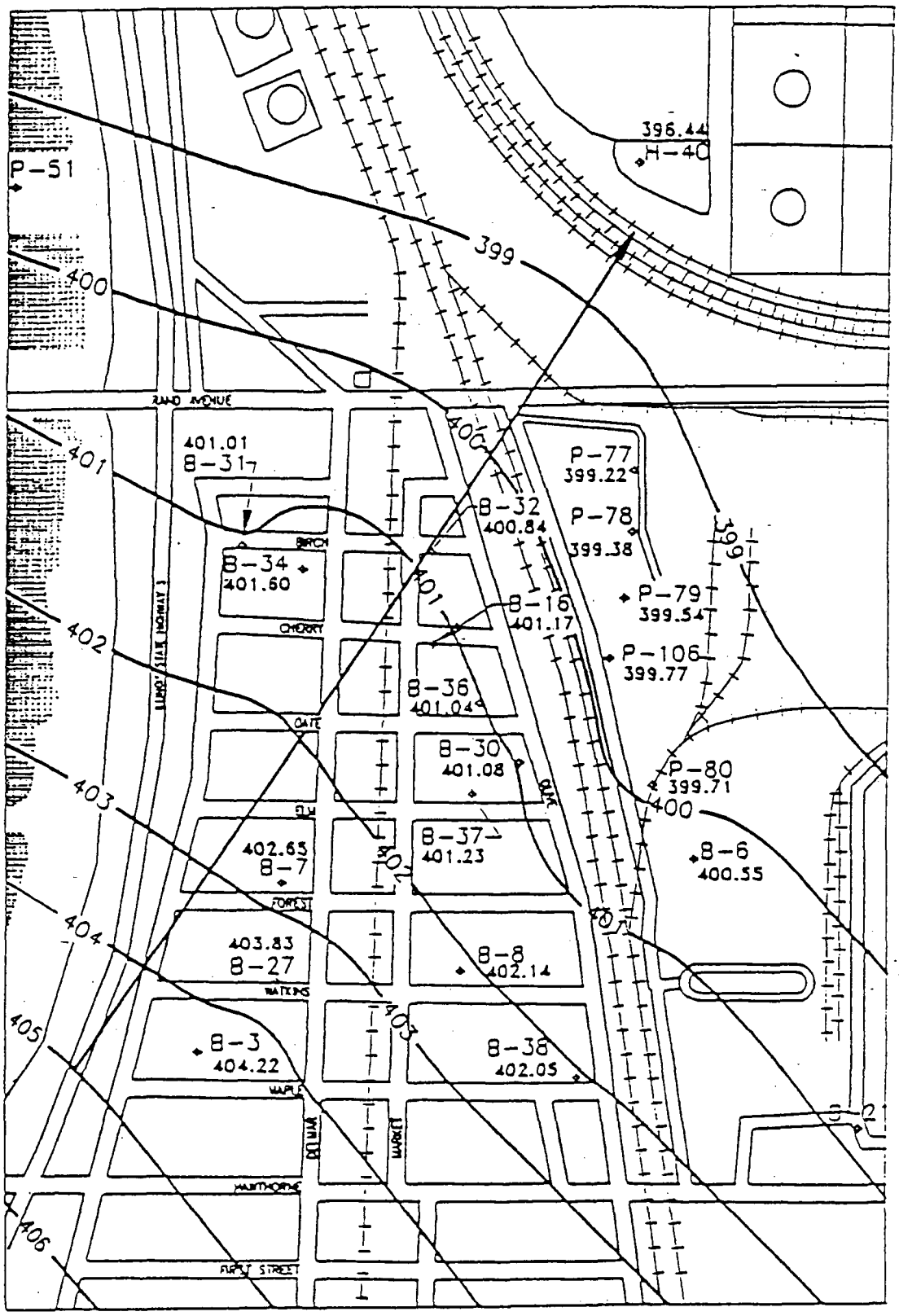
FEET

EXTENT OF CLAY DELINEATING THE MAIN AND EPA SANDS

CONTOUR INTERVAL = 2 FEET

FIGURE 22

Corrected Groundwater Surface of the Main Aquifer-
Third Quarter 1990



GROUNDWATER FLOW DIRECTION

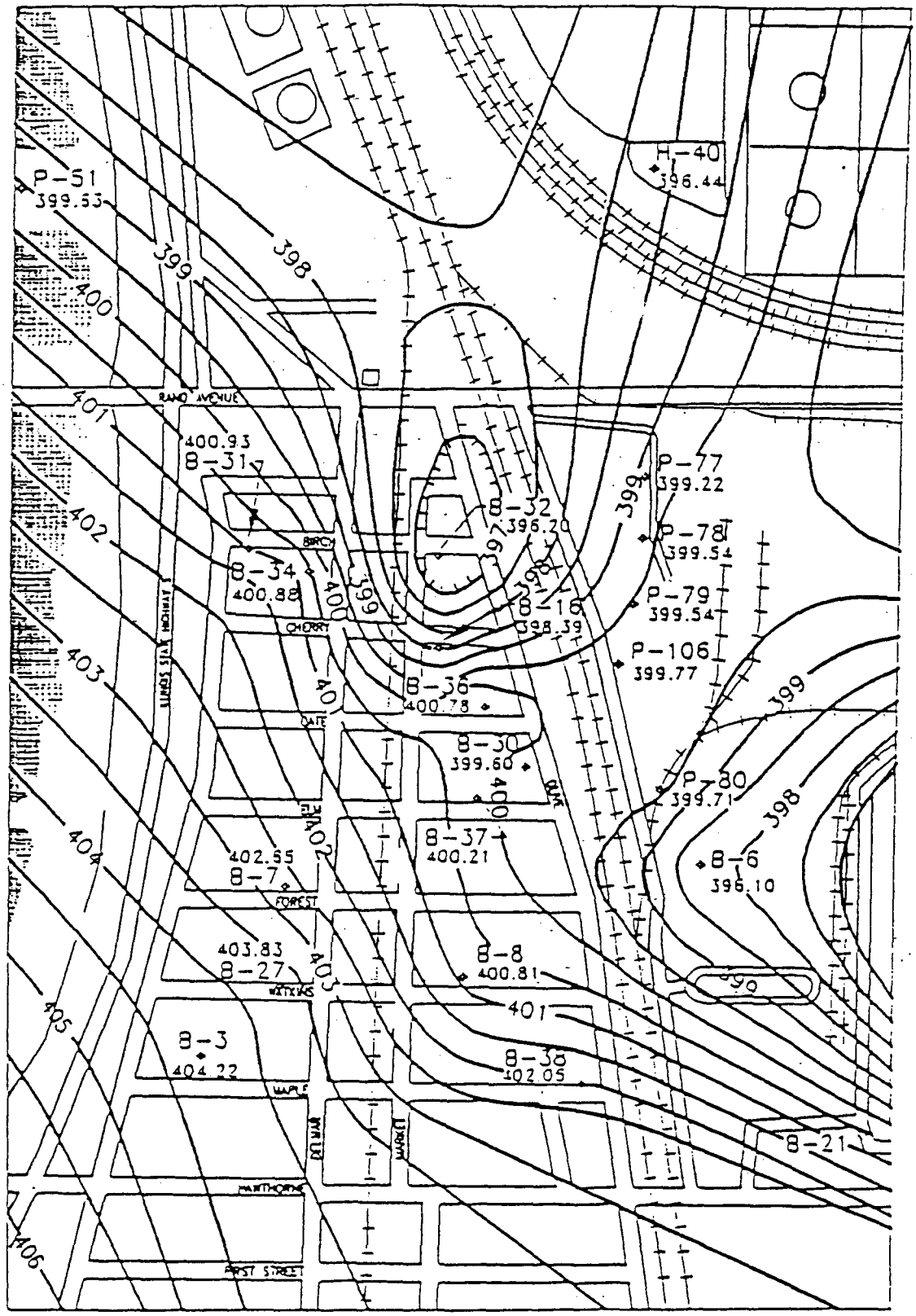
0 SCALE 1000

FEET

CONTOUR INTERVAL = 1 FOOT

FIGURE 23

Uncorrected Groundwater Surface of the Main Aquifer-Third Quarter 1990



SCALE

0 1000

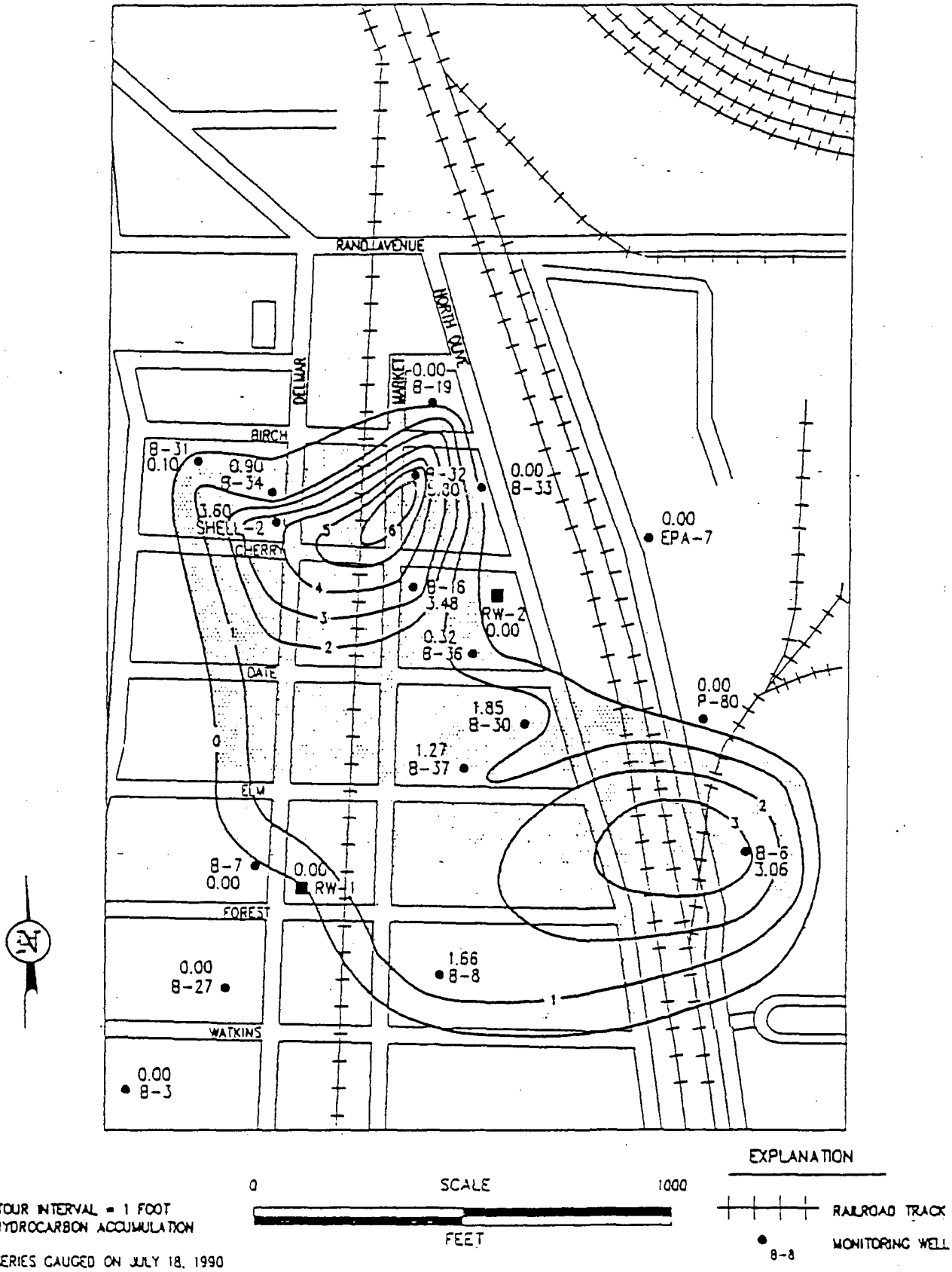
FEET

CONTOUR INTERVAL = 0.5 FEET

FIGURE 24

Product Thickness in the Main Aquifer

THIRD QUARTER 1990

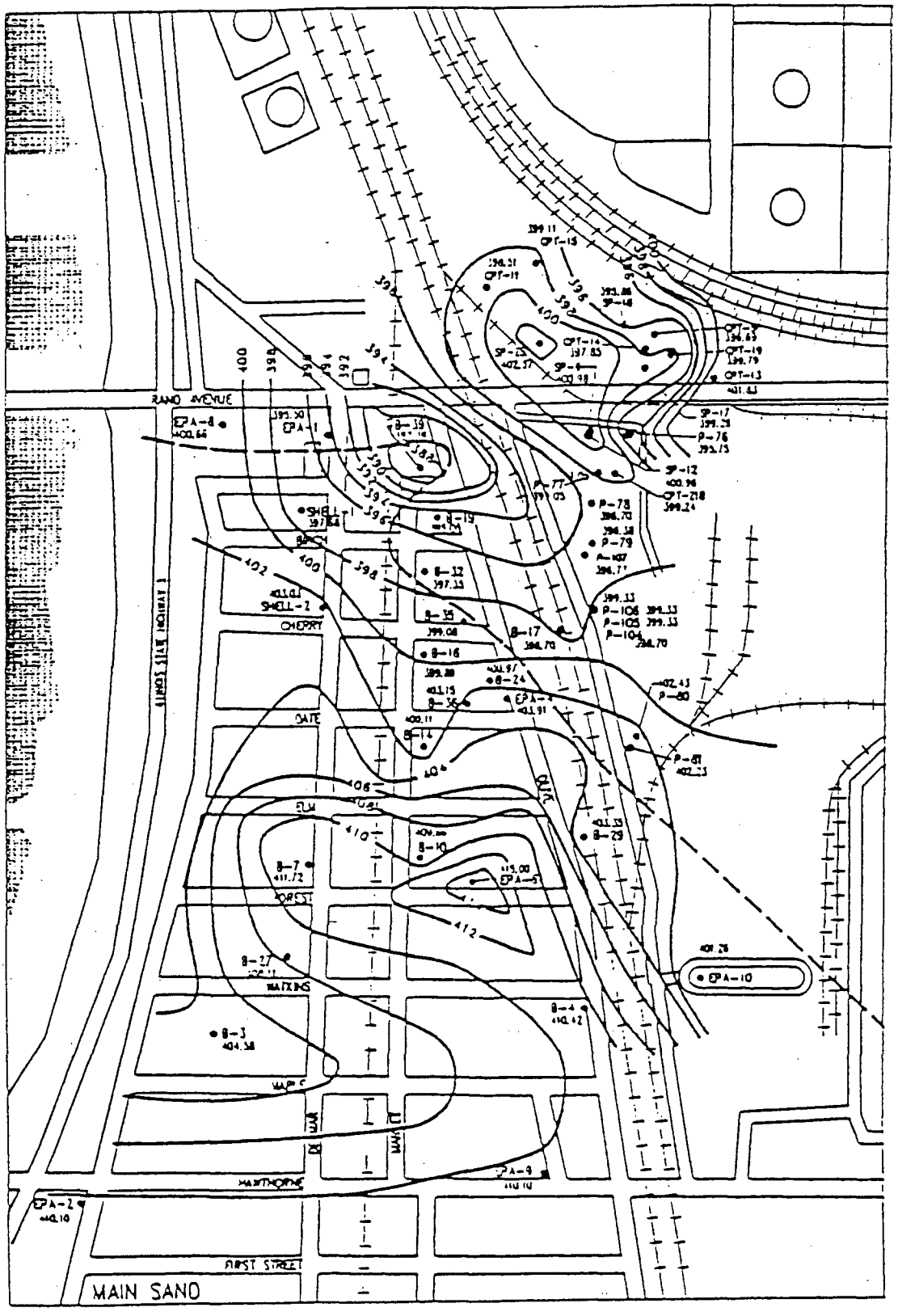


CONTOUR INTERVAL = 1 FOOT
OF HYDROCARBON ACCUMULATION

B-SERIES GAUGED ON JULY 18, 1990

FIGURE 25

Top of the Main and EPA Sands



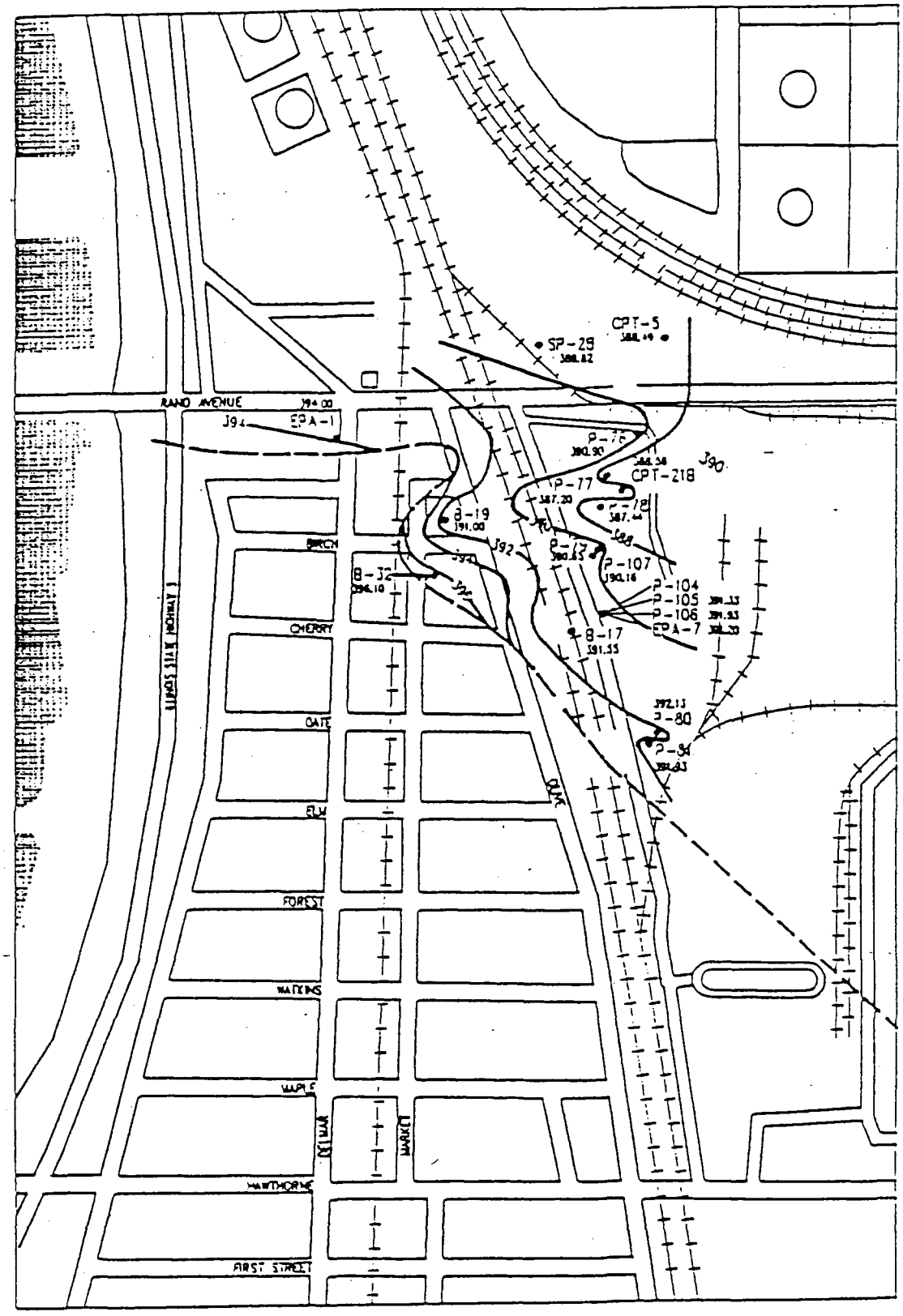
SCALE 0 1000 FEET

EXTENT OF CLAY DELINEATING THE MAIN AND EPA SANDS

CONTOUR INTERVAL = 2 FEET

FIGURE 26

Base of the EPA Sand



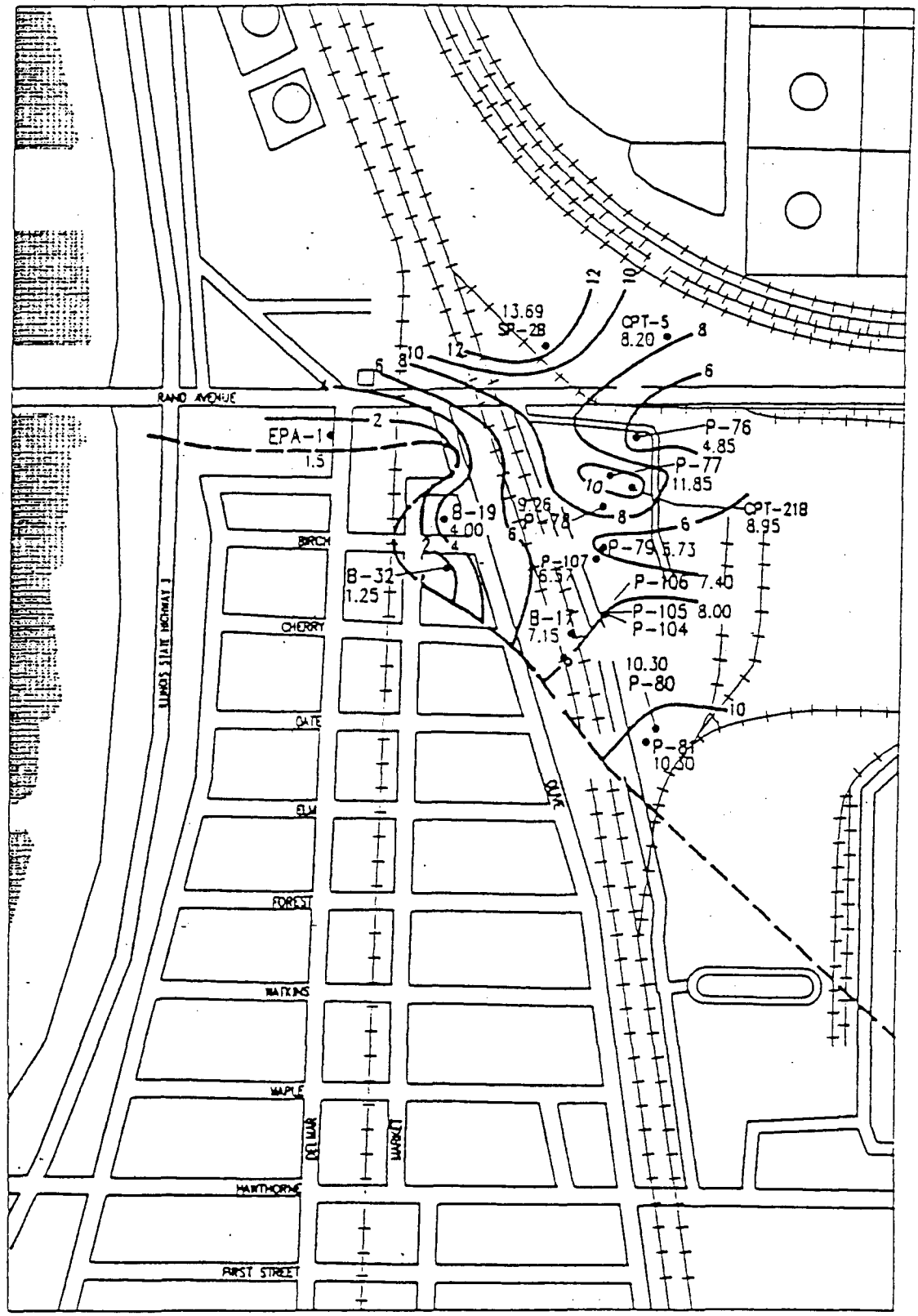
SCALE 0 1000 FEET

EXTENT OF CLAY DELINEATING THE MAIN AND EPA SANDS

CONTOUR INTERVAL = 2 FEET

FIGURE 27

ISOPACH THICKNESS OF THE EPA SAND



0 SCALE 1000

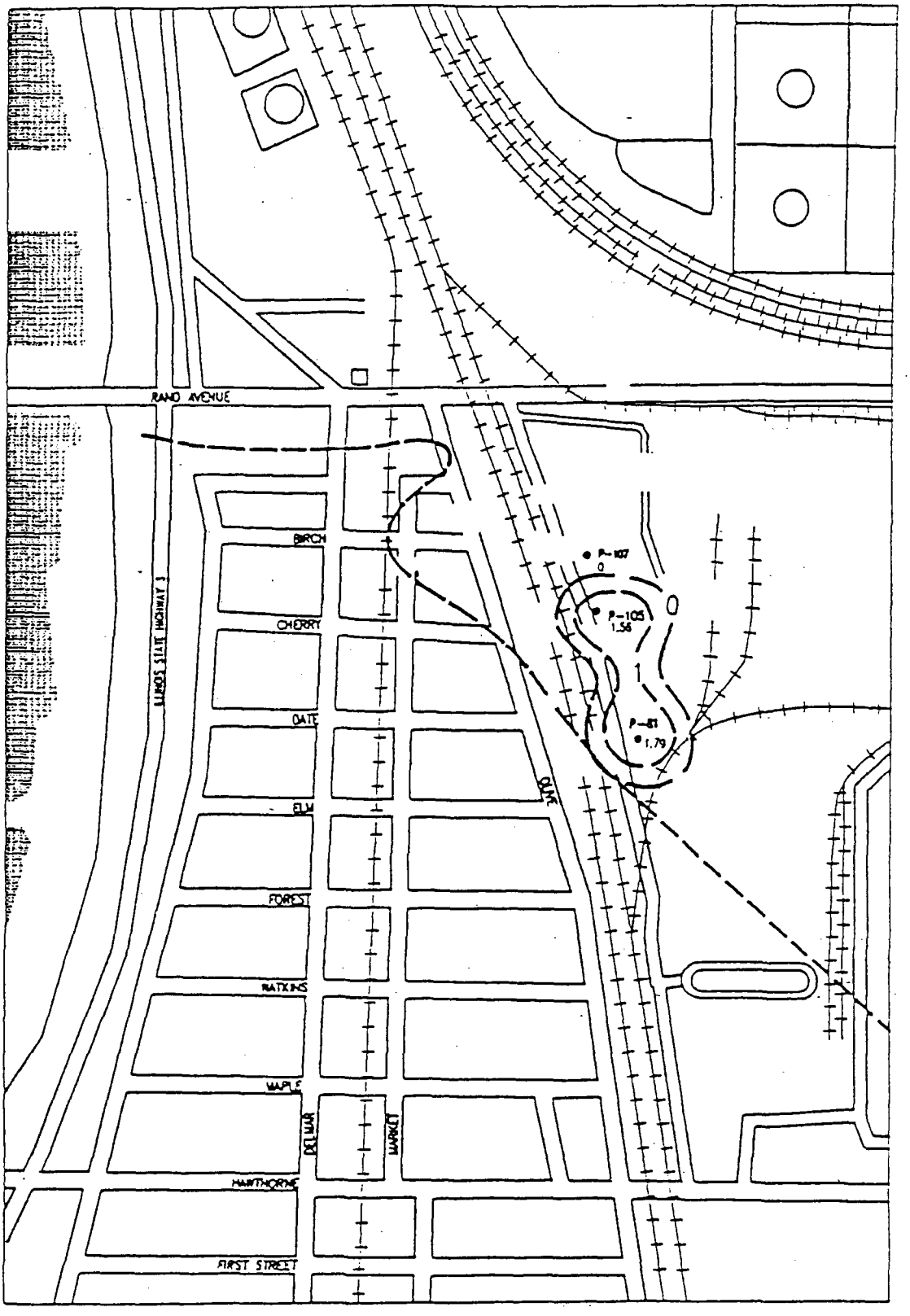
FEET

EXTENT OF CLAY DELINEATING THE MAIN AND EPA SANDS

CONTOUR INTERVAL = 2 FEET

FIGURE 28

Isopach Product Thickness, EPA Aquifer



SCALE

0 1000

FEET

EXTENT OF CLAY DELINEATING THE MAIN AND EPA SANDS

CONTOUR INTERVAL = 1 FOOT

FIGURE 29

Isopach Thickness of the Rand Sand

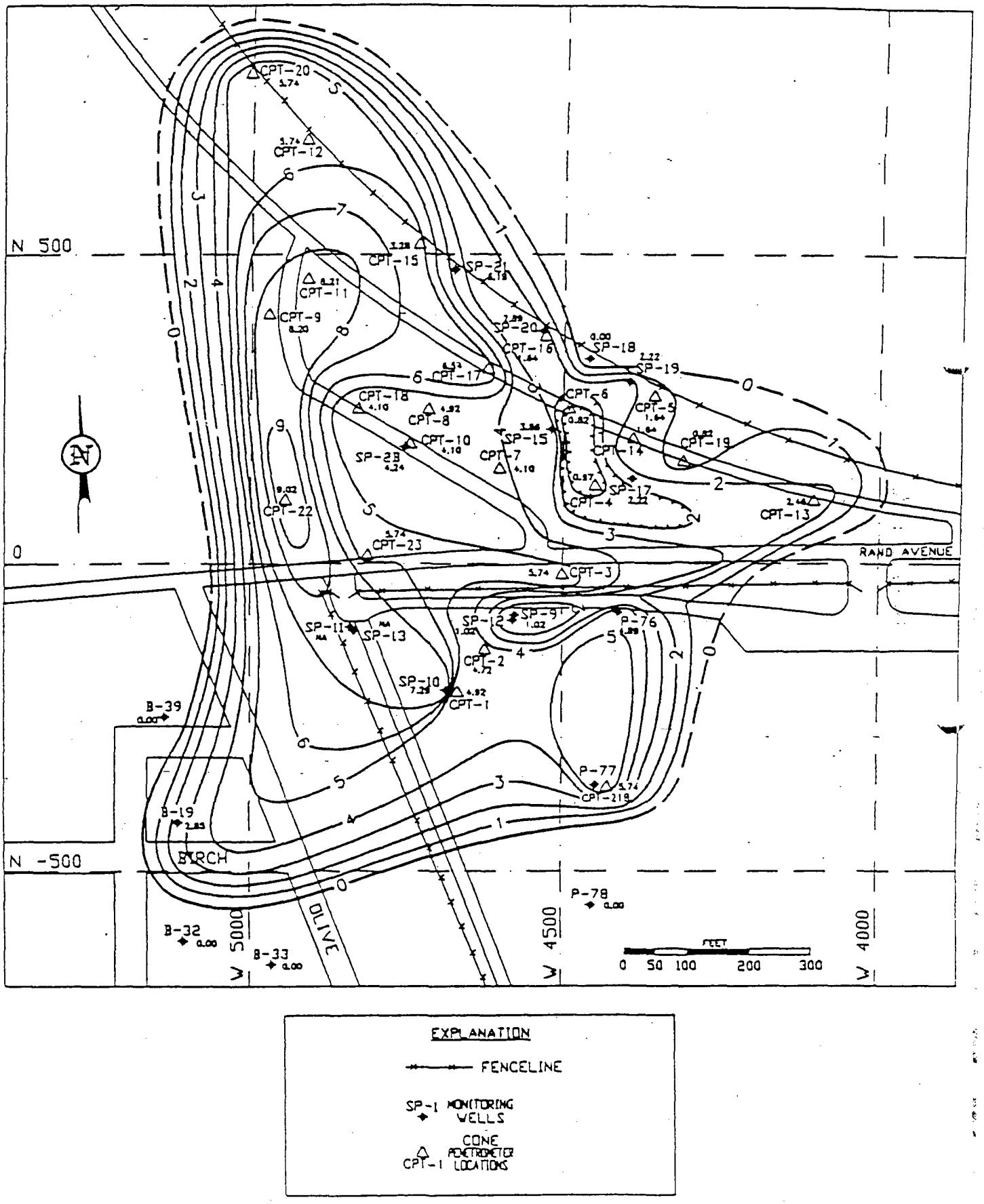


FIGURE 30

Corrected Groundwater Surface of the Rand Aquifer
Third Quarter 1990

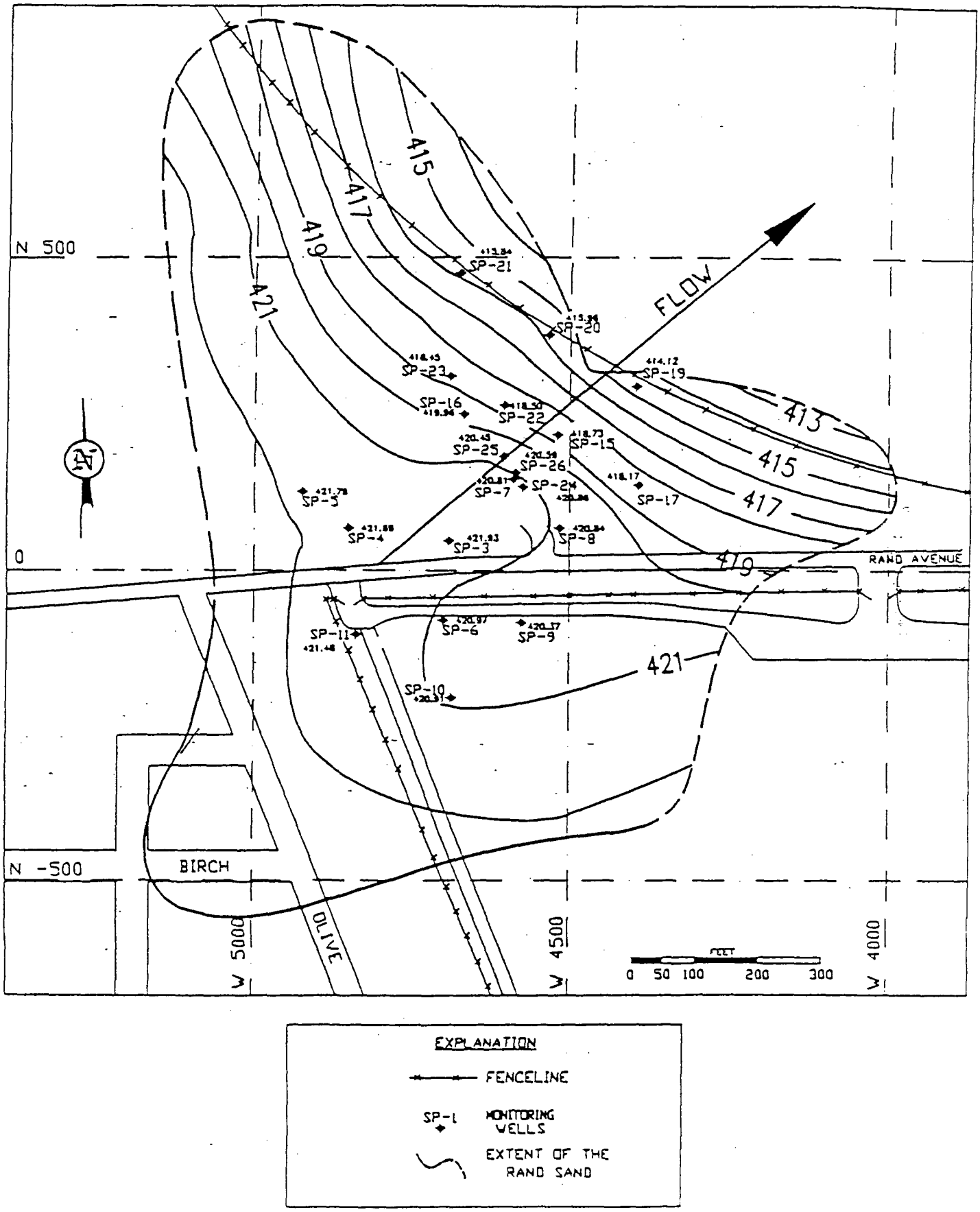
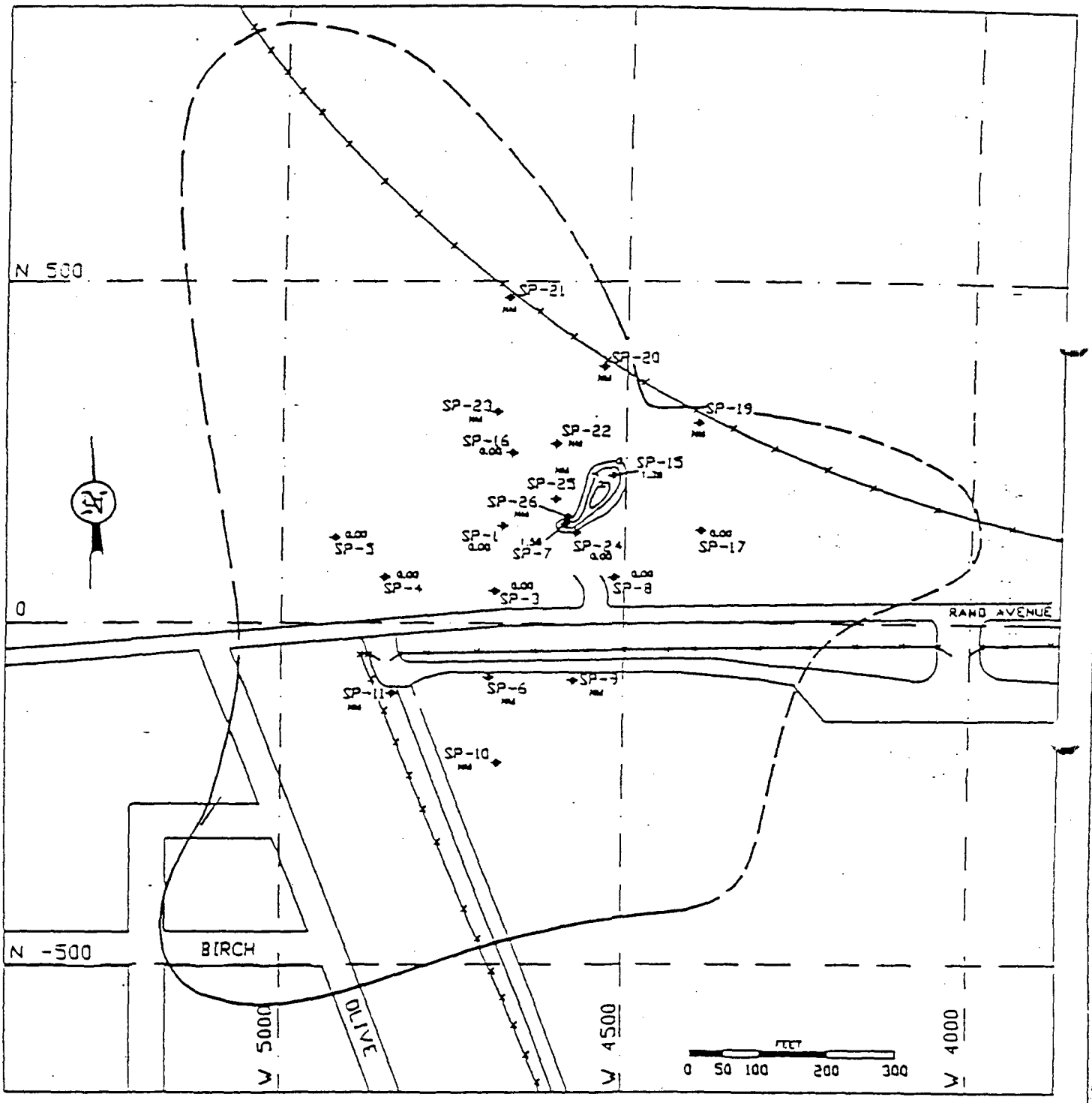


FIG29-32.DWG

FIGURE 31

Hydrocarbon Thickness in the Rand Aquifer-
March 22, 1990



EXPLANATION

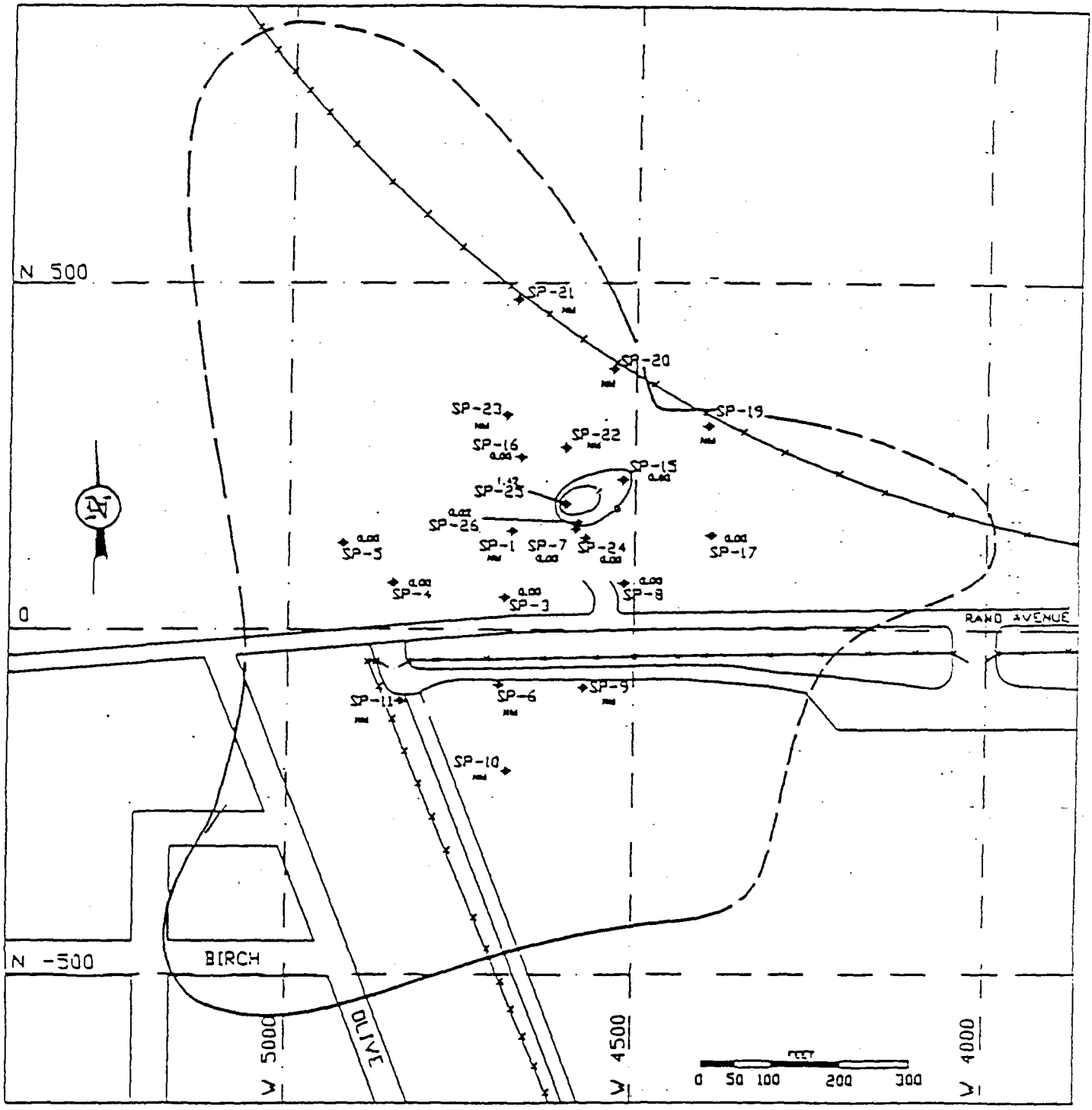
FENCELINE

SP-1 MONITORING WELLS

EXTENT OF THE RAND SAND

FIGURE 32

Hydrocarbon Thickness in the Rand Aquifer-
May 31, 1990



EXPLANATION

FENCELINE

SP-1 MONITORING WELLS

EXTENT OF THE RAND SAND

FIGURE 33

Hydrocarbon Thickness in the Rand Aquifer-
Third Quarter 1990

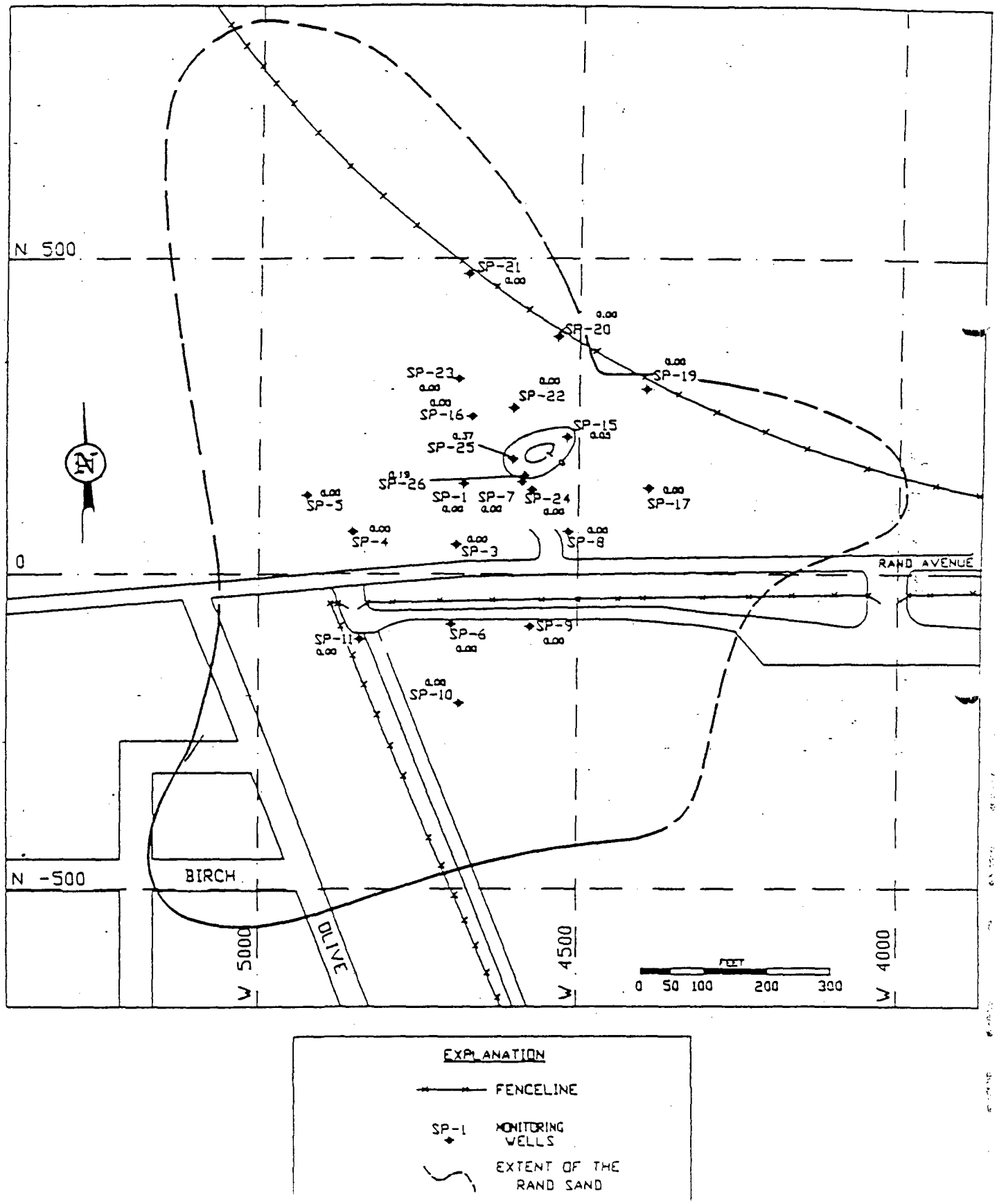
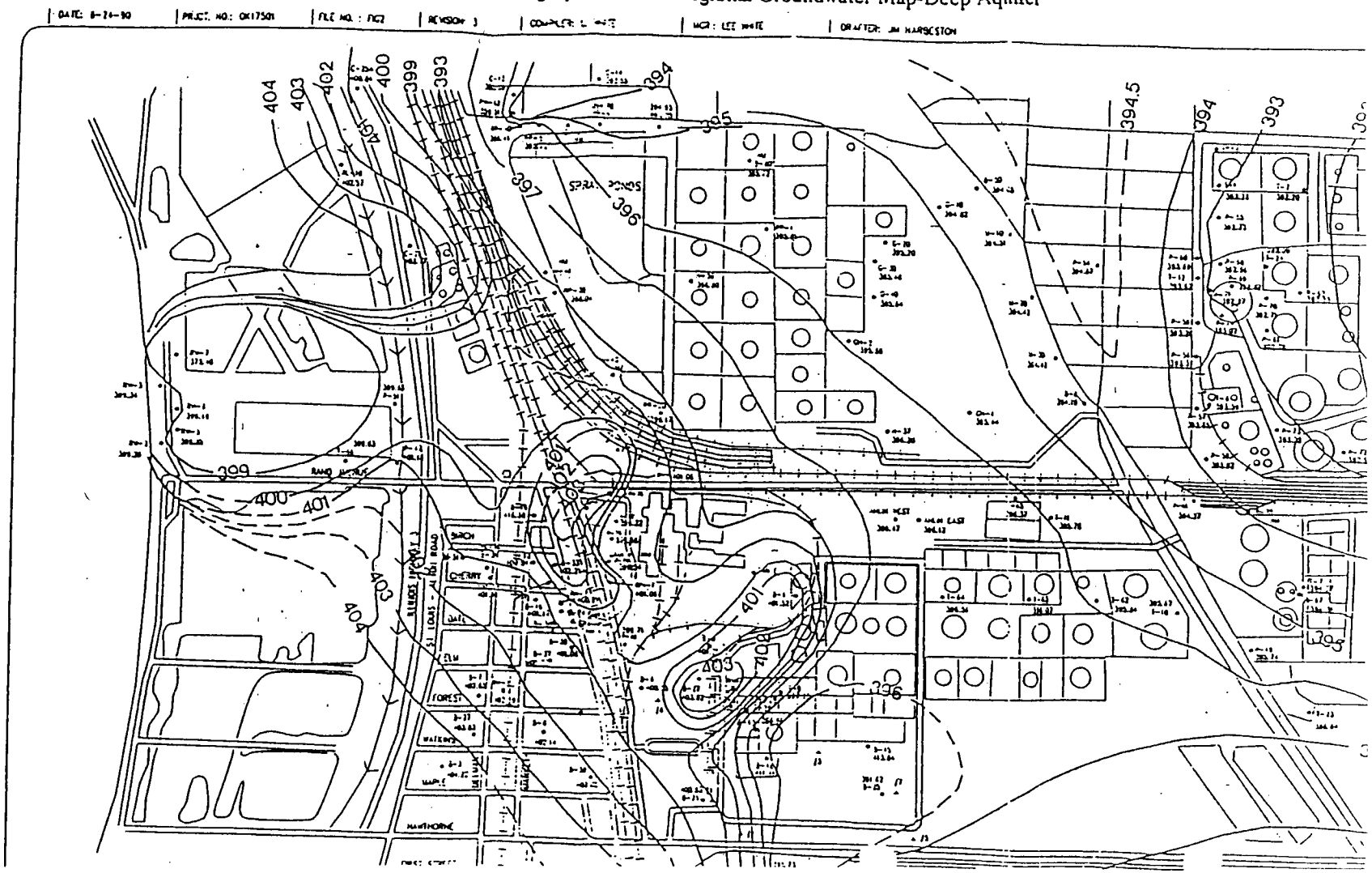


Figure 34

Geraghty and Miller Regional Groundwater Map-Deep Aquifer



ES ENGINEERING-SCIENCE

FIGURE 35

Geraghty and Miller Regional Groundwater Map-Shallow Aquifer

DATE: 8-23-90 | PROJ. NO.: OK17504 | FILE NO.: FIG2 | REVISION 1 | COMPILED: L. WHITE | MGR: LEE WHITE | DRAFTER: JM HARBESTON

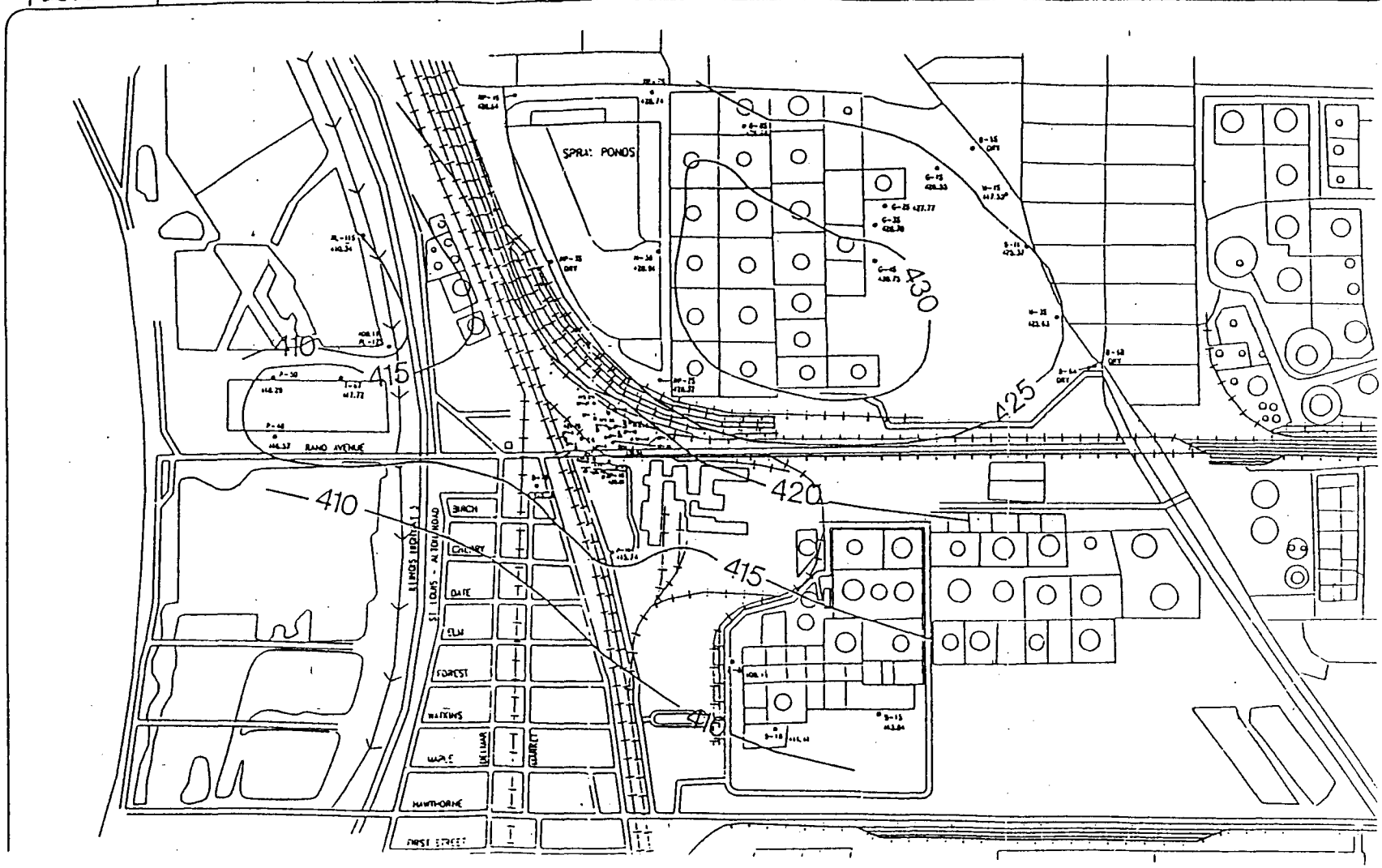
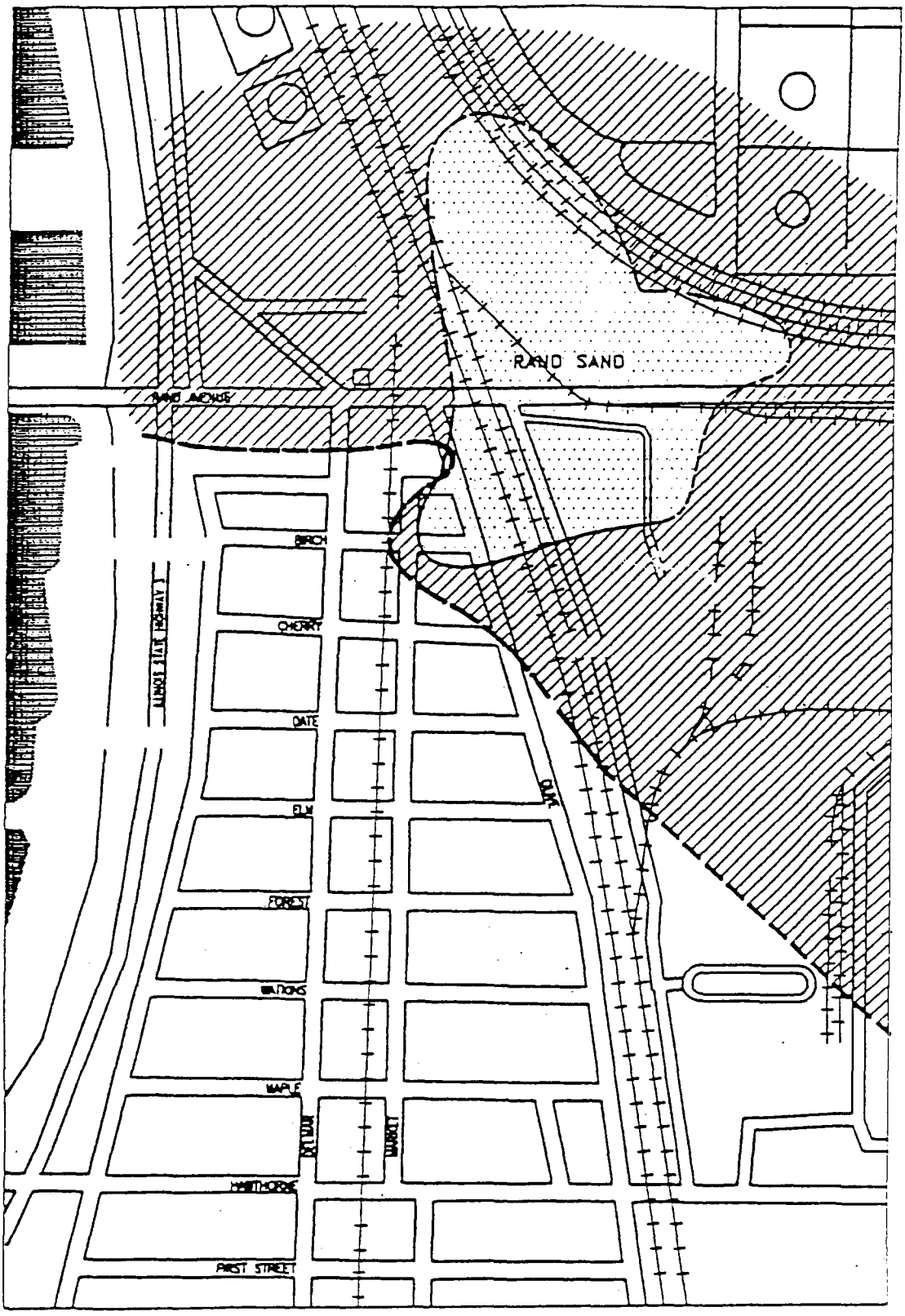


FIGURE 36

Areal Extents



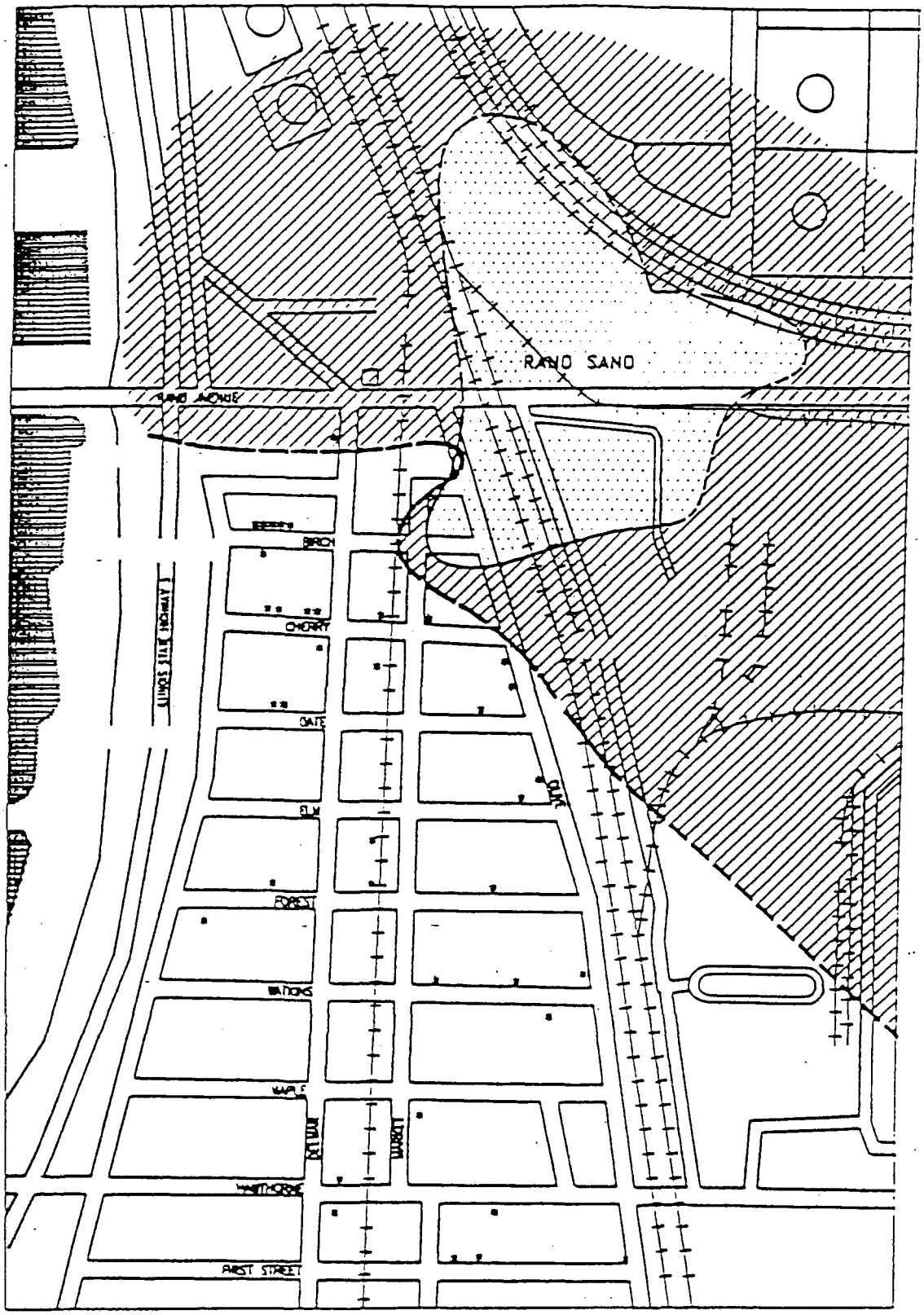
SCALE 0 1000 FEET

EXTENT OF CLAY DELINEATING THE MAIN AND EPA SANDS

EXTENT OF THE RAND SAND

FIGURE 37

LOCATION OF HOMES WITH ODOR COMPLAINTS
1981–1990
WITH RESPECT TO AREAL EXTENTS



* HOMES WITH ODOR COMPLAINTS

SCALE 0 1000 FEET

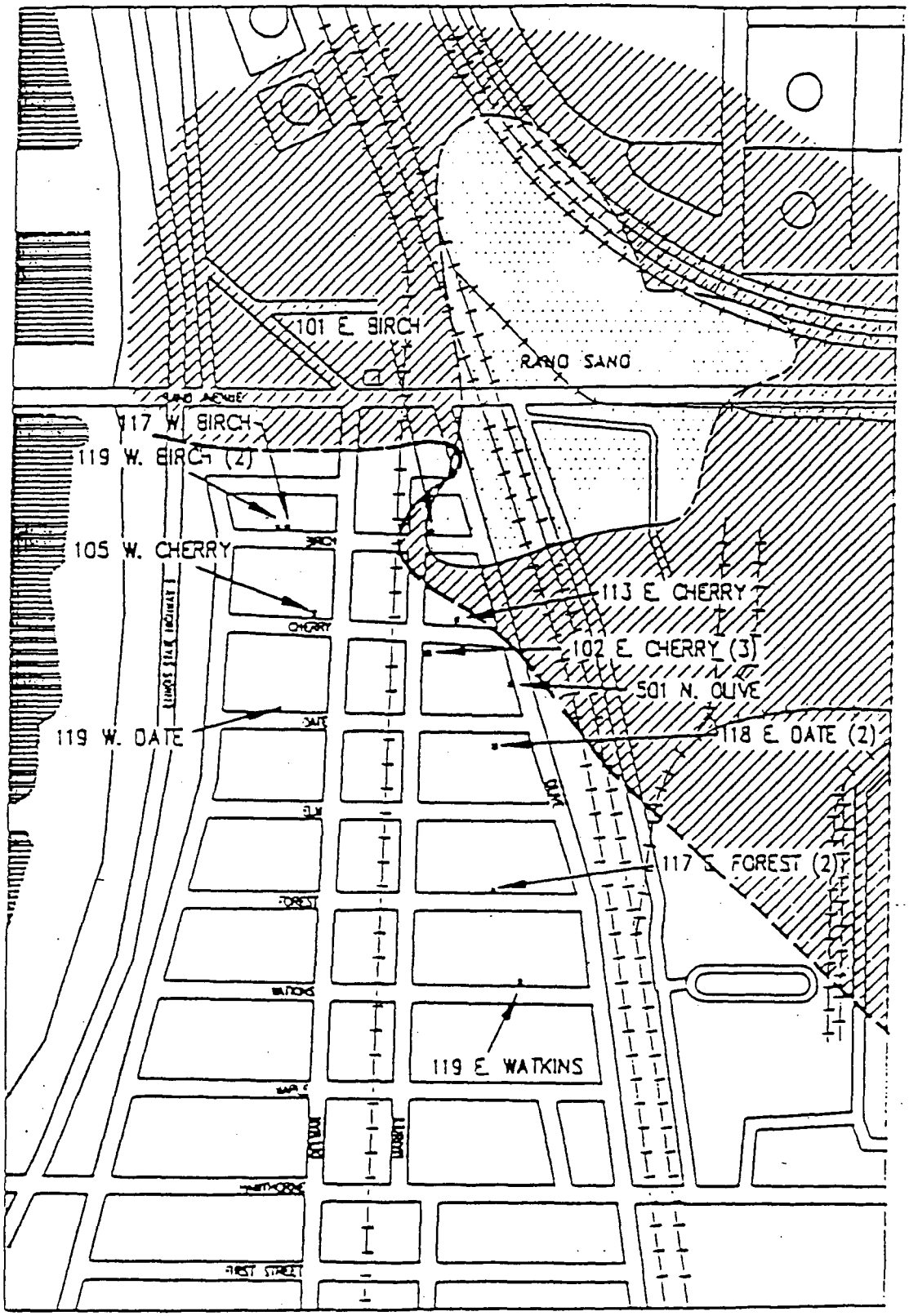
EXTENT OF CLAY DELINEATING THE MAIN AND EPA SANDS

EXTENT OF THE RANO SAND

FIG36

FIGURE 38

LOCATION OF HOMES WITH FIRES
1970–1990
WITH RESPECT TO AREAL EXTENTS



* HOME WITH FIRE COMPLAINT

FOUR FIRES OCCURRED IN APRIL 1979 AT UNKOWN ADDRESSES (SHEPARD, 1983)

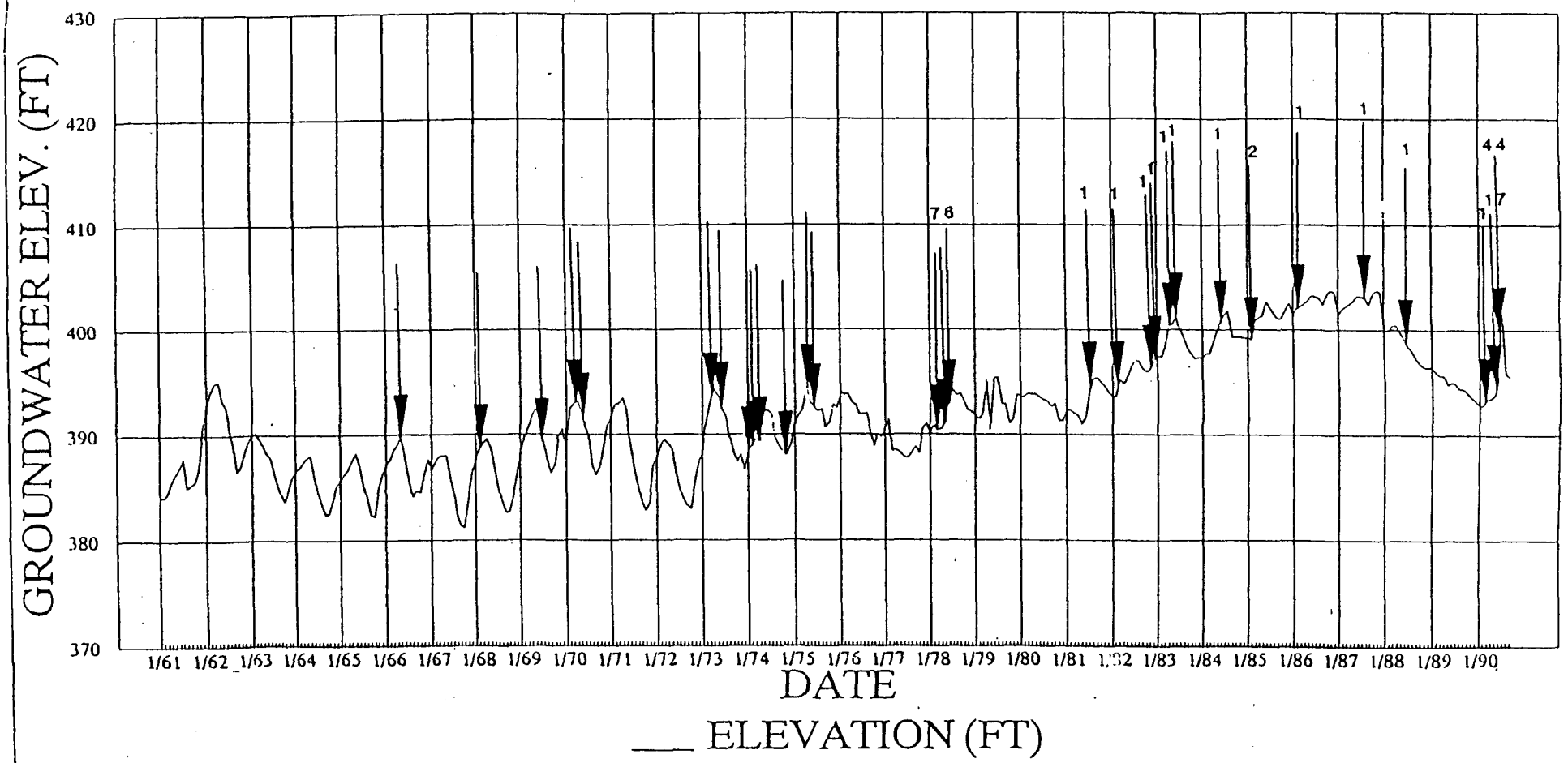
SCALE 0 1000 FEET

EXTENT OF CLAY DELINEATING THE MAIN AND EPA SANDS

EXTENT OF THE RANO SAND

Figure 40

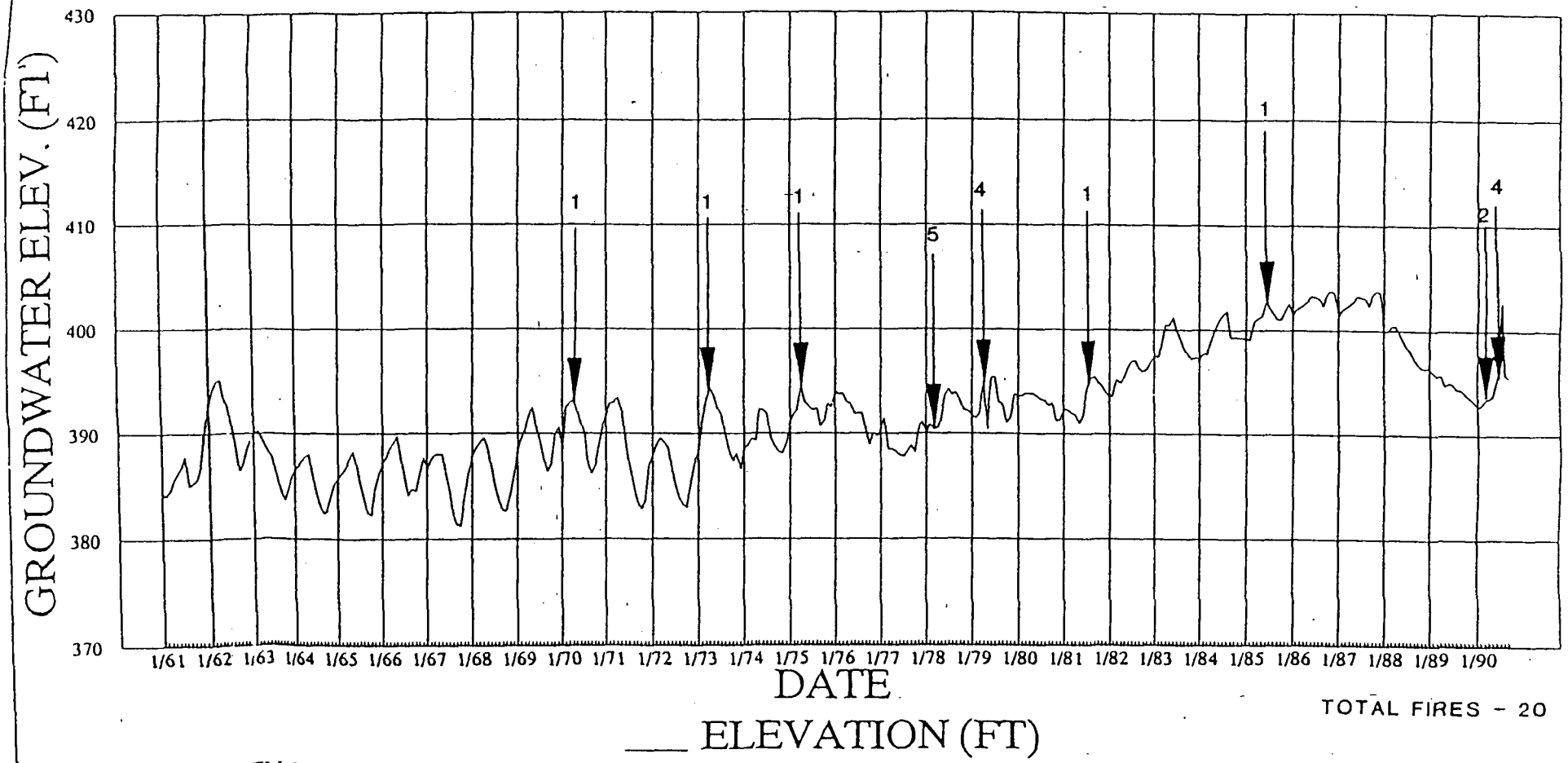
HYDROGRAPH FOR THE AMERICAN BOTTOMS: JANUARY 1961 TO SEPTEMBER 1990
HYDROCARBON ODOR COMPLAINTS IN HARTFORD HOMES



MARATHON OIL: WELL I.D. – 01081
LOCATION – MAD 5N9W–27.5 al

Figure 41

HYDROGRAPH FOR THE AMERICAN BOTTOMS: JANUARY 1961 TO SEPTEMBER 1990
FIRE COMPLAINTS IN HARTFORD HOMES



TOTAL FIRES - 20

MARATHON OIL: WELL I.D. - 01081
LOCATION - MAD 5N9W-27.5 al

TABLE 3
MONITOR WELLS OF THE HARTFORD VICINITY
3rd QUARTER 1990 GAUGING DATA AND AQUIFER ELEVATIONS

WELL ID	TOP OF WELL MSL ft	DEPTH TO PRODUCT ft	DEPTH TO WATER (Static)* ft	UNCORR. WT ELEV ft	PRODUCT ELEV. ft	PRODUCT THICKNESS ft	WT ELEV CORRECTED FOR PRODUCT ft	TOP OF RAND SAND ft	BASE OF RAND SAND ft	TOP OF EPA SAND ft	BASE OF EPA SAND ft	TOP OF MAIN SAND ft	SCREENED AQUIFER
SHELL WELLS – TANNERY PROPERTY													
P-76	433.88		34.67	399.21			399.21	407.03	402.14	395.75	390.90	387.75	EPA-MAIN
P-77	435.17		35.95	399.22			399.22	406.00	403.57	399.05	387.20	384.05	MAIN
P-78	433.88		34.50	399.38			399.38	–	–	396.70	387.44	383.00	MAIN
P-79	433.26		33.72	399.54			399.54	–	–	396.38	390.65	387.00	MAIN
P-80	433.64		33.93	399.71			399.71	–	–	402.43	392.13	389.29	MAIN
P-81	433.80	32.42	34.21	399.59	401.38	1.79	401.02	–	–	402.23	391.93	389.09	EPA
P-104	433.28		17.54	415.74			415.74	–	–				UNNAMED
P-105	433.13	31.39	32.95	400.18	401.74	1.56	401.43	–	–	399.33	391.33		EPA
P-106	433.24		33.47	399.77			399.77	–	–	399.33	391.93	387.64	MAIN
P-107	432.46		27.70	404.76			404.76	–	–	396.73	390.16		EPA
EPA-7**	431.39		30.33	401.06			401.06	–	–	394.70	391.20	385.20	EPA-MAIN
SHELL WELLS AND CPTs – RAND AVENUE													
SP-1	429.63		8.76	420.87			420.87	*	*				RAND
SP-2(D)**	429.84		NM	NM			NM	*	*	*	*		RAND-EPA
SP-2B(D)	429.69		NM	NM			NM	409.69	405.45	402.51	388.82		EPA
SP-3	432.26		10.33	421.93			421.93	*	*				RAND
SP-4	430.91		9.22	421.69			421.69	*	*				RAND
SP-5	431.46		9.68	421.78			421.78	*	*				RAND
SP-6	433.63		12.66	420.97			420.97	*	*				RAND
SP-7	429.48		8.67	420.81			420.81	*	*				RAND
SP-8	429.53		8.69	420.84			420.84	*	*				RAND
SP-9	433.15		12.78	420.37			420.37	407.01	405.99	400.98			RAND
SP-10	433.19		12.28	420.91			420.91	414.50	407.21				RAND
SP-11	433.00		11.52	421.48			421.48	*	406.10				RAND
SP-12 (D)	432.92		28.34	404.58			404.58	407.01	405.99	400.98	*	*	EPA-MAIN
SP-13 (D)	433.27		30.32	402.95			402.95	*	406.10	*	*	*	EPA-MAIN
SP-14 (D)	429.33		27.73	401.60			401.60	*	*	*	*	*	EPA-MAIN
SP-15	428.96	10.22	10.27	418.69	418.74	0.05	418.73	409.49	405.63				RAND
SP-16	428.77		8.81	419.96			419.96	*	*				RAND
SP-17	428.68		10.51	418.17			418.17	404.16	401.94	399.26			RAND
SP-18 (D)	429.01		27.74	401.27			401.27	–	–	395.86	*	*	EPA-MAIN
SP-19	431.61		17.49	414.12			414.12	407.61	405.39				RAND
SP-20	431.88		15.92	415.96			415.96	409.41	406.52				RAND
SP-21	432.42		16.58	415.84			415.84	410.60	404.41				RAND
SP-22	430.91		12.41	418.50			418.50	*	*				RAND
SP-23	431.27		12.82	418.45			418.45	*	*				RAND
SP-24	429.46		8.60	420.86			420.86	*	*				RAND
SP-25	429.00	8.48	8.85	420.15	420.52	0.37	420.45	*	*				RAND
SP-26	428.99	8.36	8.55	420.44	420.63	0.19	420.59	*	*				RAND
CPT-1	430.50			NM			NM	409.99	405.07				
CPT-2	430.28			NM			NM	408.75	404.03				
CPT-3	431.88			NM			NM	406.45	400.71				
CPT-4	429.08			NM			NM	403.62	402.65				
CPT-5	428.68			NM			NM	406.53	404.89	396.69	388.49	384.39	
CPT-6	431.58			NM			NM	407.79	406.97				

TABLE 3
MONITOR WELLS OF THE HARTFORD VICINITY
3rd QUARTER 1990 GAUGING DATA AND AQUIFER ELEVATIONS

WELL ID	TOP OF WELL MSL ft	DEPTH TO PRODUCT ft	DEPTH TO WATER (Static)* ft	UNCORR. WT ELEV ft	PRODUCT ELEV. ft	PRODUCT THICKNESS ft	WT ELEV CORRECTED FOR PRODUCT ft	TOP OF RAND SAND ft	BASE OF RAND SAND ft	TOP OF EPA SAND ft	BASE OF EPA SAND ft	TOP OF MAIN SAND ft	SCREENED AQUIFER
CPT-7	429.98			NM			NM	407.83	403.73				
CPT-8	429.38			NM			NM	409.69	404.77				
CPT-9	430.08			NM			NM	409.57	401.37				
CPT-10	429.88			NM			NM	410.19	406.09				
CPT-11	430.50			NM			NM	412.46	404.25	398.51			
CPT-12	430.58			NM			NM	410.07	404.33				
CPT-13	432.18			NM			NM	407.57	405.11	401.83			
CPT-14	431.48			NM			NM	406.87	405.23	397.85			
CPT-15	430.28			NM			NM	408.95	405.87	399.11			
CPT-16	428.98			NM			NM	407.65	406.01				
CPT-17	431.38			NM			NM	404.31	403.49				
CPT-18	430.08			NM			NM	409.57	405.47				
CPT-19	431.78			NM			NM	406.35	405.53	399.79			
CPT-20	430.28			NM			NM	407.31	401.57				
CPT-21B	432.05			NM			NM	408.26	402.52	399.24	388.58	383.67	
CPT-22	431.68			NM			NM	411.99	402.97				
CPT-23	431.78			NM			NM	410.45	404.71				
AMOCO WELLS													
H-40	435.14		36.70	398.44			398.44	–	–	UNK.	UNK.	UNK.	MAIN
WELLS – VILLAGE OF HARTFORD													
B-3	431.27		27.05	404.22			404.22	–	–	–	–	404.58	MAIN
B-4	430.00			NM			NM	–	–	–	–	410.42	MAIN
B-7	432.98		30.33	402.65			402.65	–	–	–	–	411.72	MAIN
B-8	432.31	29.84	31.50	400.81	402.47	1.66	402.14	–	–	–	–	UNK.	MAIN
B-10	432.00			NM			NM	–	–	–	–	409.86	MAIN
B-14	432.00			NM			NM	–	–	–	–	400.11	MAIN
B-16	432.09	30.22	33.70	398.39	401.87	3.48	401.17	–	–	–	–	399.89	MAIN
B-17	430.00			NM			NM	–	–	398.70	391.55	387.69	MAIN
B-19	430.98		14.60	416.38			416.38	405.50	402.65	395.00	391.00	387.60	EPA-MAIN
B-24	432.21			432.21			432.21	–	–	–	–	400.97	MAIN
B-27	426.51		22.68	403.83			403.83	–	–	–	–	408.11	MAIN
B-29	429.00			NM			NM	–	–	–	–	403.35	MAIN
B-30	431.75	30.30	32.15	399.60	401.45	1.85	401.08	–	–	–	–	UNK.	MAIN
B-31	432.78	31.75	31.85	400.93	401.03	0.10	401.01	–	–	–	–	UNK.	MAIN
B-32	430.75	28.75	34.55	396.20	402.00	5.80	400.84	–	–	397.35	396.10	395.17	EPA-MAIN
B-33	430.86		28.65	402.21			402.21	–	–	–	–	UNK.	EPA-MAIN
B-34	432.63	30.85	31.75	400.88	401.78	0.90	401.60	–	–	–	–	UNK.	MAIN
B-35	430.68			NM			NM	–	–	–	–	399.08	MAIN
B-36	431.18	30.08	30.40	400.78	401.10	0.32	401.04	–	–	–	–	403.15	MAIN
B-37	432.41	30.93	32.20	400.21	401.48	1.27	401.23	–	–	–	–	UNK.	MAIN
B-38	430.60		28.55	402.05			402.05	–	–	–	–	UNK.	MAIN
B-39	433.00			NM			NM	–	–	–	–	387.39	MAIN
SHELL-1	431.18			NM			NM	–	–	–	–	403.15	MAIN
SHELL-2	432.62	30.50	34.10	398.52	402.12	3.60	401.40	–	–	–	–	UNK.	MAIN
RW-1	434.44		32.05	402.39			402.39	–	–	–	–	UNK.	MAIN
RW-2	432.66		31.95	400.71			400.71	–	–	–	–	387.39	MAIN

TABLE 3
MONITOR WELLS OF THE HARTFORD VICINITY
3rd QUARTER 1990 GAUGING DATA AND AQUIFER ELEVATIONS

WELL ID	TOP OF WELL MSL ft	DEPTH TO PRODUCT ft	DEPTH TO WATER (Static)* ft	UNCORR. WT ELEV ft	PRODUCT ELEV. ft	PRODUCT THICKNESS ft	WT ELEV CORRECTED FOR PRODUCT ft	TOP OF RAND SAND ft	BASE OF RAND SAND ft	TOP OF EPA SAND ft	BASE OF EPA SAND ft	TOP OF MAIN SAND ft	SCREENED AQUIFER
EPA WELLS – VILLAGE OF HARTFORD													
EPA-1	430.50			NM			NM	–	–	395.50	394.00	388.69	EPA
EPA-2	429.60			NM			NM	–	–	–	–	410.10	MAIN
EPA-4	430.00			NM			NM	–	–	–	–	403.91	MAIN
EPA-5	429.40			NM			NM	–	–	–	–		MAIN
EPA-6	430.80			NM			NM	–	–	–	–	415.00	MAIN
EPA-7**	LOCATED AND LISTED AS A SHELL TANNERY PROPERTY WELL							–	–	394.70	391.20	385.20	EPA-MAIN
EPA-8	429.66			NM			NM	–	–	400.66			EPA
EPA-9	430.10			NM			NM	–	–	–	–	410.10	MAIN
EPA-10	429.20			NM			NM	–	–	–	–	401.26	MAIN
CLARK REFINERY WELLS													
B-3	431.56		30.35	401.21			401.21	–	–	UNK.	UNK.	UNK.	MAIN
B-6	432.69	31.53	34.59	398.10	401.16	3.06	400.55	–	–	UNK.	UNK.	UNK.	MAIN
B-27	430.91		26.99	403.92			403.92	–	–	UNK.	UNK.	UNK.	MAIN
B-21	431.46	30.61	30.71	400.75	400.85	0.10	400.83	–	–	UNK.	UNK.	UNK.	MAIN

	ELEVATION WAS ESTIMATED FROM BORING LOG OR CROSS-SECTION
	SAND UNIT WAS NOT PENETRATED. ELEVATION UNKNOWN.
–	SAND UNIT IS NOT PRESENT AT THIS WELL LOCATION
*	SAND UNIT SURFACE FELL BETWEEN SAMPLES. CPT DATA USED FOR DELINEATING RAND SAND
**	WELL SP-2 AND EPA-7 PLUGGED AND ABANDONED 10/21/91
NM	WELL WAS NOT GAUGED
UNK.	ELEVATION UNKNOWN. BORING LOGS NOT AVAILABLE.

TABLE 3
MONITOR WELLS OF THE HARTFORD VICINITY
3rd QUARTER 1990 GAUGING DATA AND AQUIFER ELEVATIONS

WELL ID	TOP OF WELL MSL ft	DEPTH TO PRODUCT ft	DEPTH TO WATER (Static)* ft	UNCORR. WT ELEV ft	PRODUCT ELEV. ft	PRODUCT THICKNESS ft	WT ELEV CORRECTED FOR PRODUCT ft	TOP OF RAND SAND ft	BASE OF RAND SAND ft	TOP OF EPA SAND ft	BASE OF EPA SAND ft	TOP OF MAIN SAND ft	SCREENED AQUIFER
IEPA WELLS – VILLAGE OF HARTFORD													
EPA-1	430.50			NM			NM	–	–	395.50	394.00	388.69	EPA
EPA-2	429.60			NM			NM	–	–	–	–	410.10	MAIN
EPA-4	430.00			NM			NM	–	–	–	–	403.91	MAIN
EPA-5	429.40			NM			NM	–	–	–	–		MAIN
EPA-6	430.80			NM			NM	–	–	–	–	415.00	MAIN
EPA-7**	LOCATED AND LISTED AS A SHELL TANNERY PROPERTY WELL							–	–	394.70	391.20	385.20	EPA-MAIN
EPA-8	429.66			NM			NM	–	–	400.66			EPA
EPA-9	430.10			NM			NM	–	–	–	–	410.10	MAIN
EPA-10	429.20			NM			NM	–	–	–	–	401.26	MAIN
CLARK REFINERY WELLS													
B-3	431.56		30.35	401.21			401.21	–	–	UNK.	UNK.	UNK.	MAIN
B-6	432.69	31.53	34.59	398.10	401.16	3.06	400.55	–	–	UNK.	UNK.	UNK.	MAIN
B-27	430.91		26.99	403.92			403.92	–	–	UNK.	UNK.	UNK.	MAIN
B-21	431.46	30.61	30.71	400.75	400.85	0.10	400.83	–	–	UNK.	UNK.	UNK.	MAIN

	ELEVATION WAS ESTIMATED FROM BORING LOG OR CROSS-SECTION
	SAND UNIT WAS NOT PENETRATED. ELEVATION UNKNOWN.
–	SAND UNIT IS NOT PRESENT AT THIS WELL LOCATION
*	SAND UNIT SURFACE FELL BETWEEN SAMPLES. CPT DATA USED FOR DELINEATING RAND SAND
**	WELL SP-2 AND EPA-7 PLUGGED AND ABANDONED 10/21/91
NM	WELL WAS NOT GAUGED
UNK.	ELEVATION UNKNOWN. BORING LOGS NOT AVAILABLE.

Table 4
Site Monitoring Data

Well No.	Depth to Fluid (ft)	Depth to Water (ft)	Product Thickness (ft)
SP-1	-	15.85	-
SP-3	-	16.36	-
SP-7	15.13	16.69	1.56
SP-16	-	15.48	-
SP-8	-	16.36	-
SP-15	15.16	16.55	1.39
SP-17	-	16.04	-
SP-4	-	16.85	-
SP-5	-	17.33	-

Table 5
Site Monitoring Data

Well No.	Depth to Fluid	Depth to Water	Product Thickness
SP-3	-	7.51	-
SP-7	-	6.64	-
SP-16	-	7.61	-
SP-8	-	6.53	-
SP-15	7.49	8.09	0.60
SP-17	-	8.50	-
SP-4	-	6.14	-
SP-5	-	5.56	-
SP-14	-	27.05	-
SP-24	-	-	-
SP-25	6.19	7.61	1.42
SP-26	6.04	6.06	0.02

APPENDIX B

EXCERTED INFORMATION FROM JOHN MATHES & ASSOCIATES

APPENDIX B-1	FIGURES VI –XII AND TABLE XI FROM MATHES, ENGINEERING INVESTIGATION REPORT (JULY 17, 1978)
APPENDIX B-2	SELECTED CROSS SECTIONS COMPLETED BY MATHES (A.K.A. BURLINGTON ENVIRONMENTAL, INC.) AND AVAILABLE SOIL BORING LOGS USED BY MATHES TO CONSTRUCT THE CROSS SECTIONS A-A' B-B' C-C' D-D' E-E' J-J' K-K'
APPENDIX B-3	FIGURE 5 – THICKNESS OF PETROLEUM PRODUCTS OCCURRING ON THE TOP OF THE PIEZOMETRIC SURFACE IN HARTFORD, ILLINOIS (1982)
APPENDIX B-4	FIGURE 4 – APPROXIMATE AERIAL EXTENT OF THE RAND SAND FROM A 1993 BURLINGTON ENVIRONMENTAL INC. REPORT (F.K.A MATHES)

Clayton GROUP SERVICES

APPENDIX B-1

FIGURES VI – XII AND TABLE XI
FROM MATHES, ENGINEERING INVESTIGATION REPORT (JULY 17, 1978)

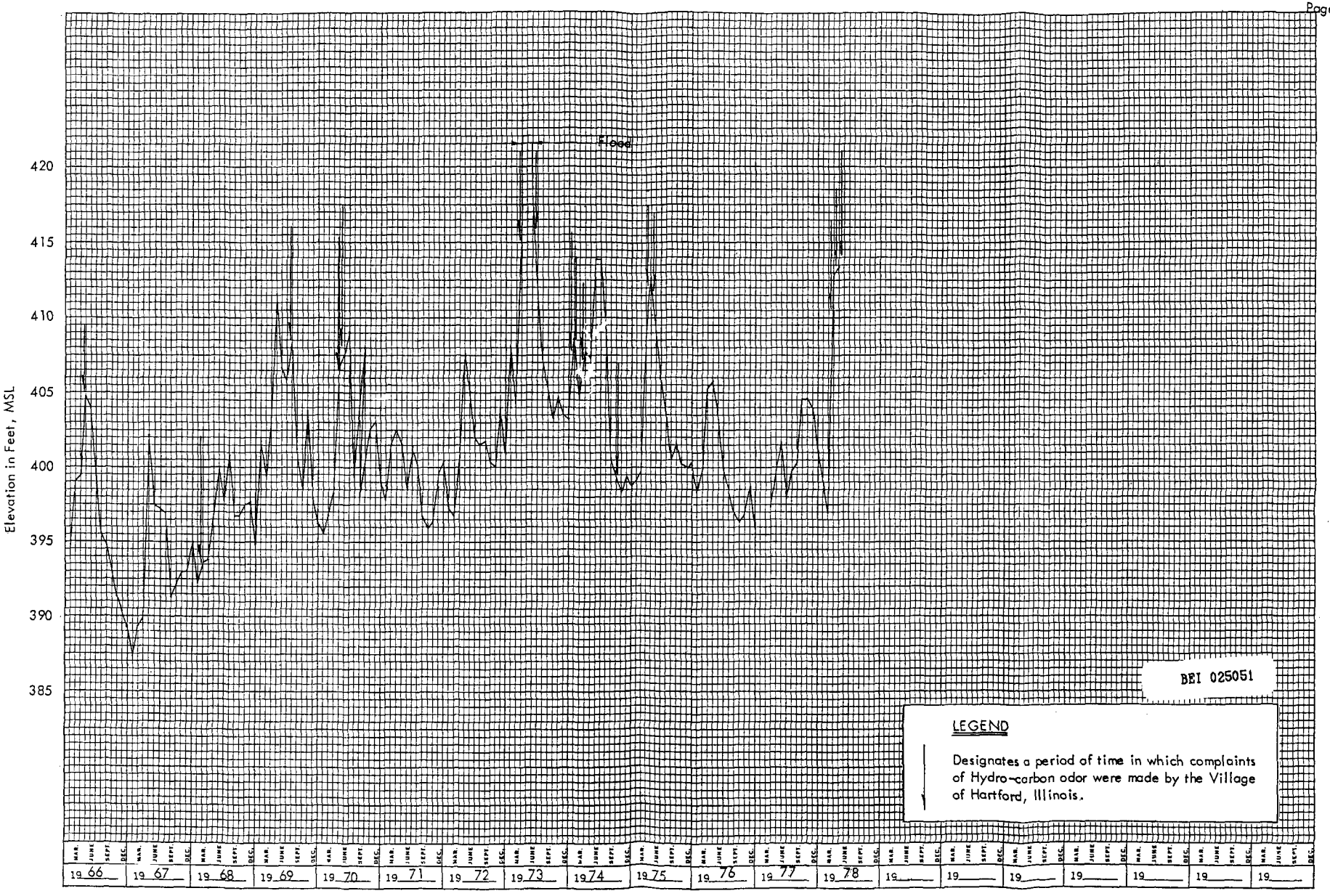
Engineering Investigation Report

PHASE I
GAS ODORS & FIRES
HARTFORD, ILLINOIS

July 17, 1978

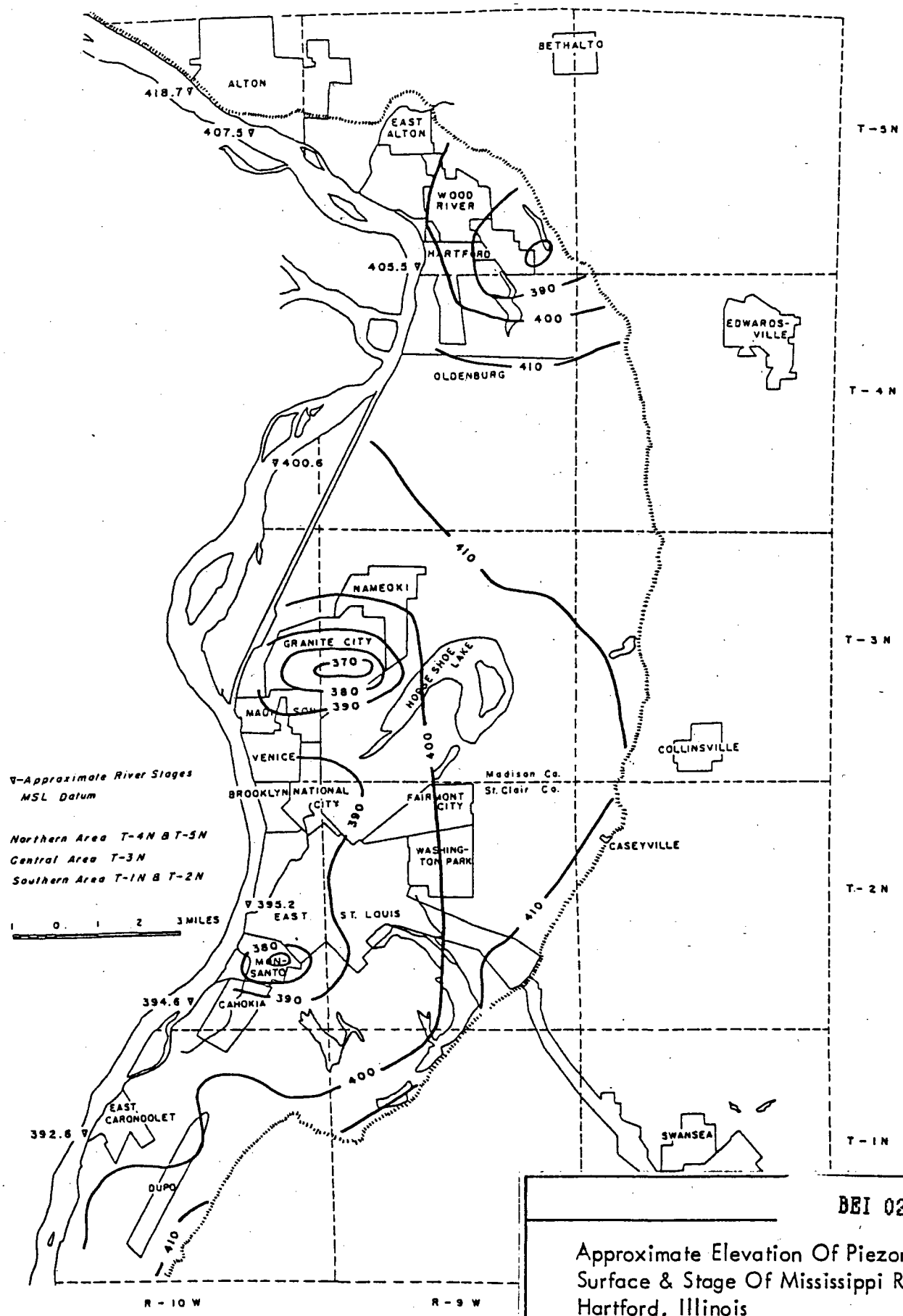
RECEIVED
JUN 1 1990
IEPA-DLPC

JOHN MATHES & ASSOCIATES, INC.
ENGINEERING CONSULTANTS IN THE APPLIED EARTH SCIENCES



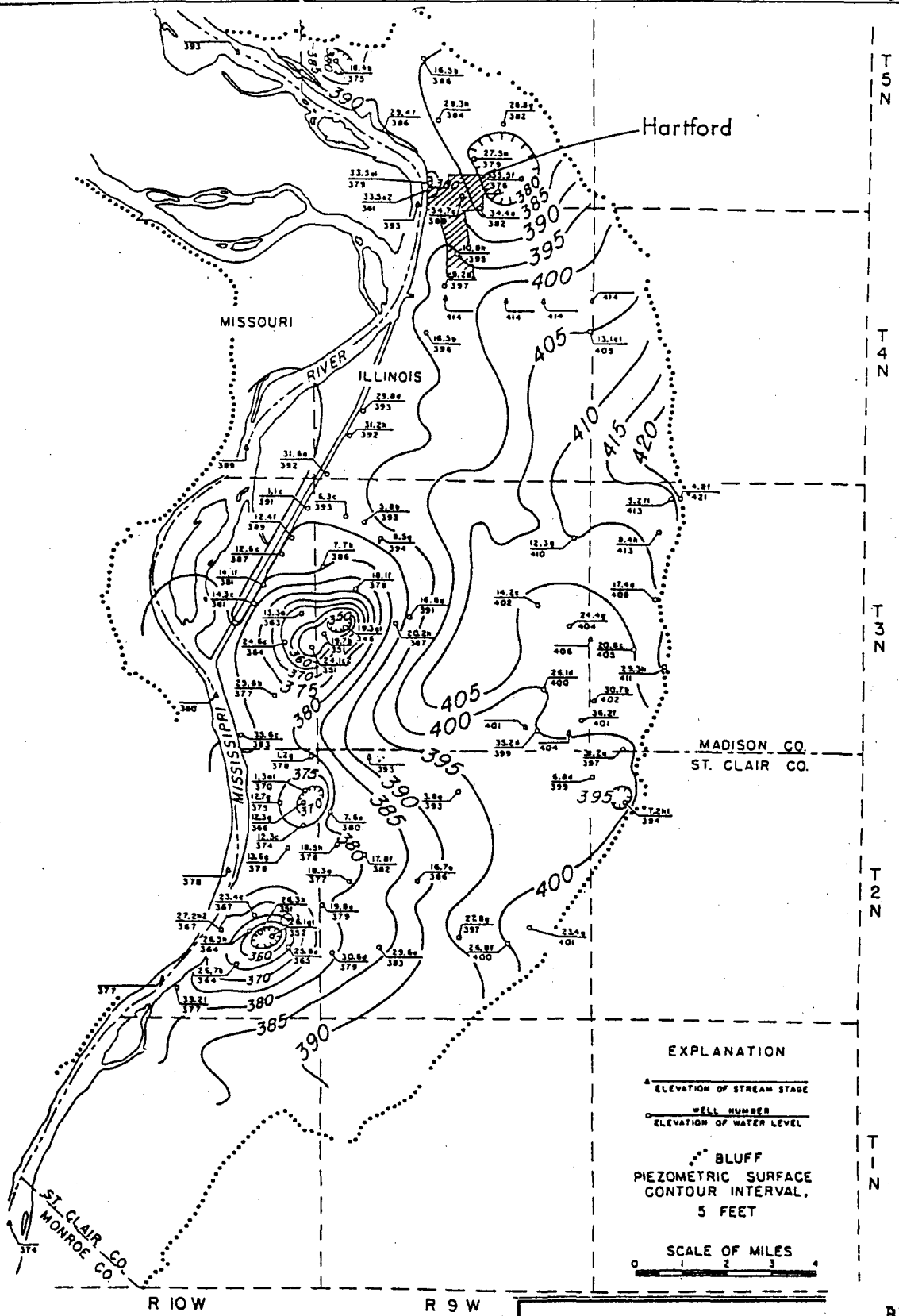
Fluctuations Of Ground Water Level & Gas Odor Complaints - 1966-1968

K&E 20 YEARS BY MONTHS X 110 DIVISIONS KEUFFEL & ESSER CO. 47 3853 MADE IN U.S.A.



BEI 024992

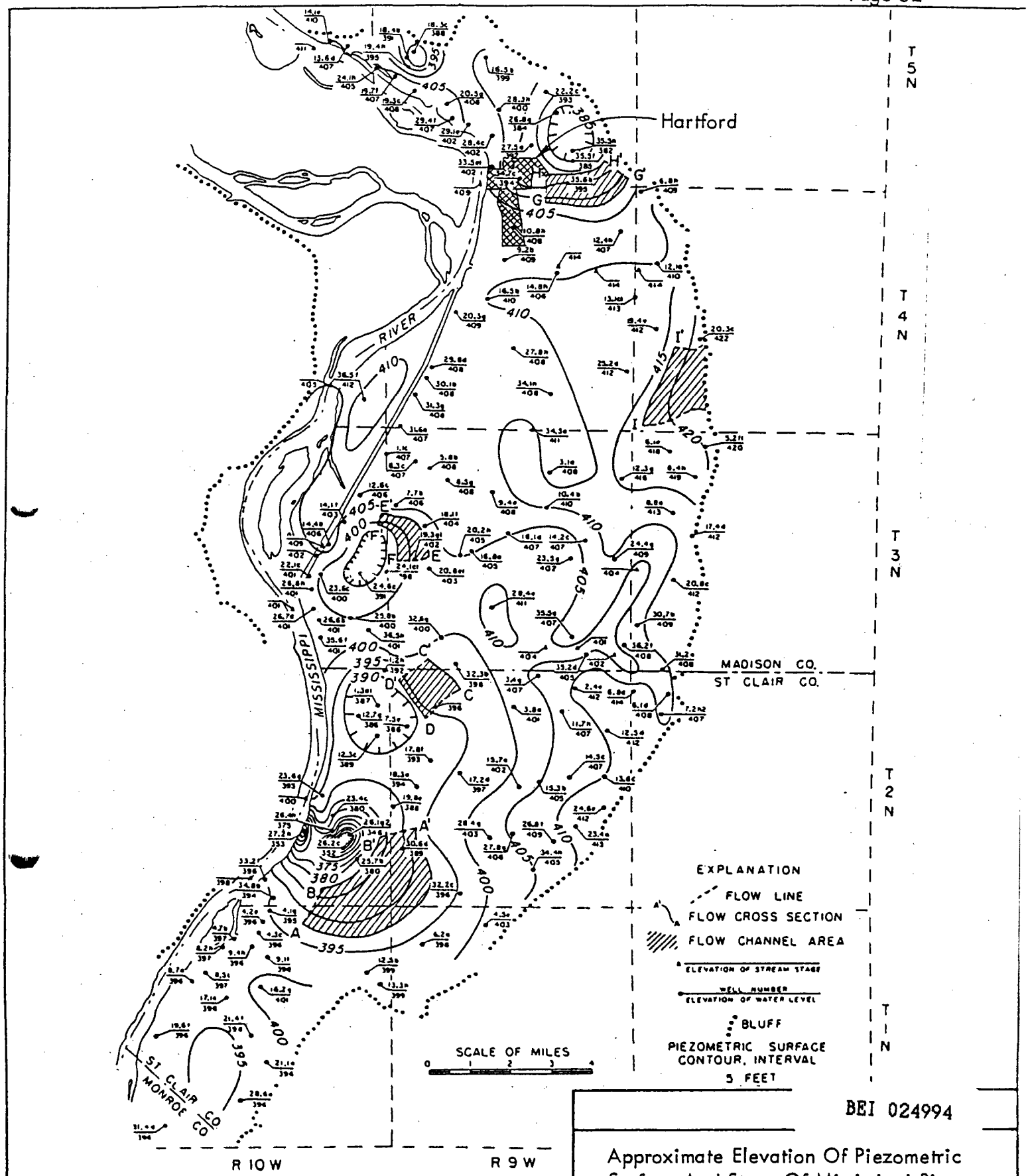
Approximate Elevation Of Piezometric Surface & Stage Of Mississippi River Hartford, Illinois November, 1951 (After Bruin & Smith, 1953) Figure VII



BEI 024993

Approximate Elevation Of Piezometric Surface & Stage Of Mississippi River at Hartford, Illinois
December, 1956
(After Schicht & Jones, 1962)

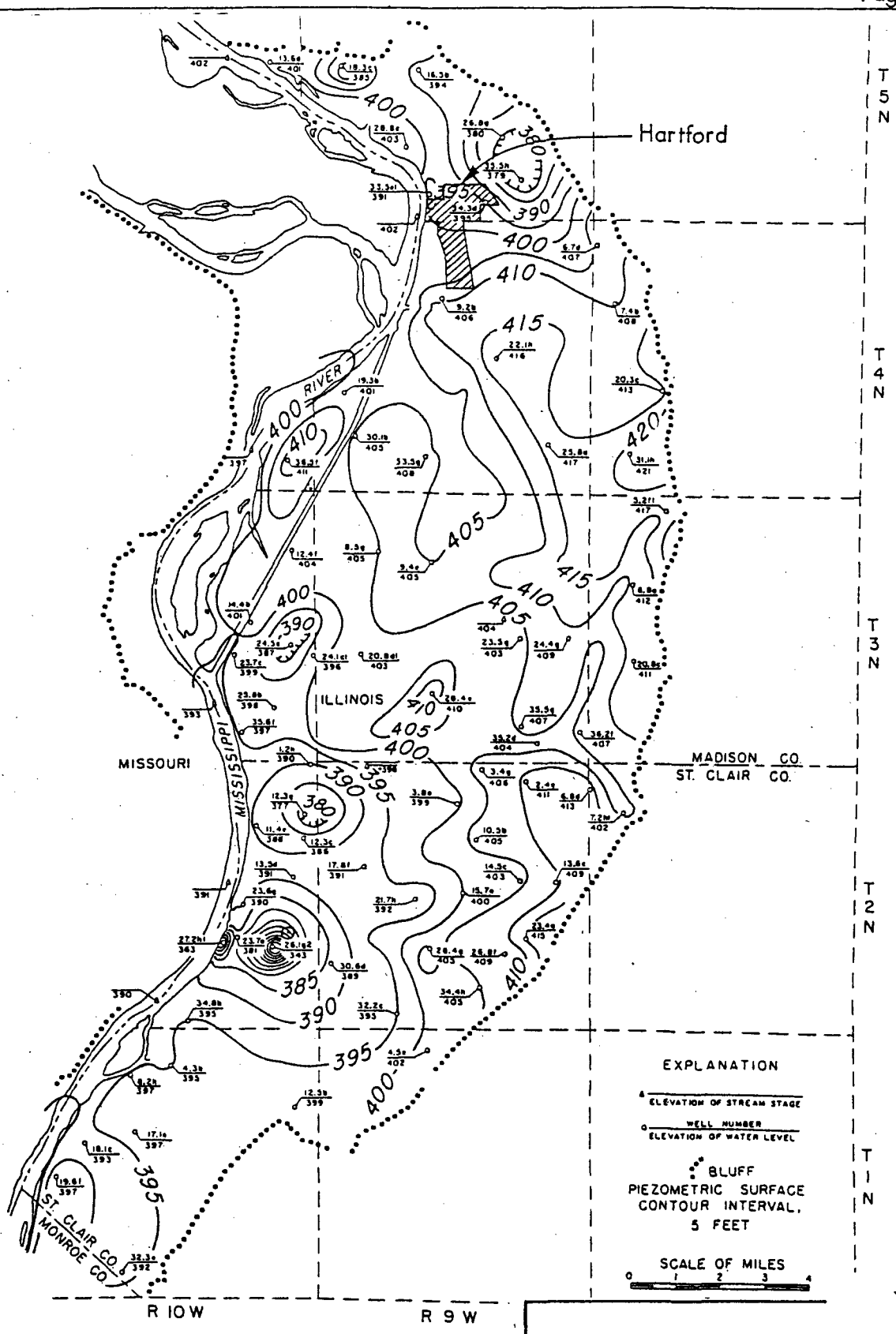
Figure VIII



BEI 024994

Approximate Elevation Of Piezometric Surface And Stage Of Mississippi River at Hartford, Illinois
June, 1961
(After Schicht & Jones, 1962)

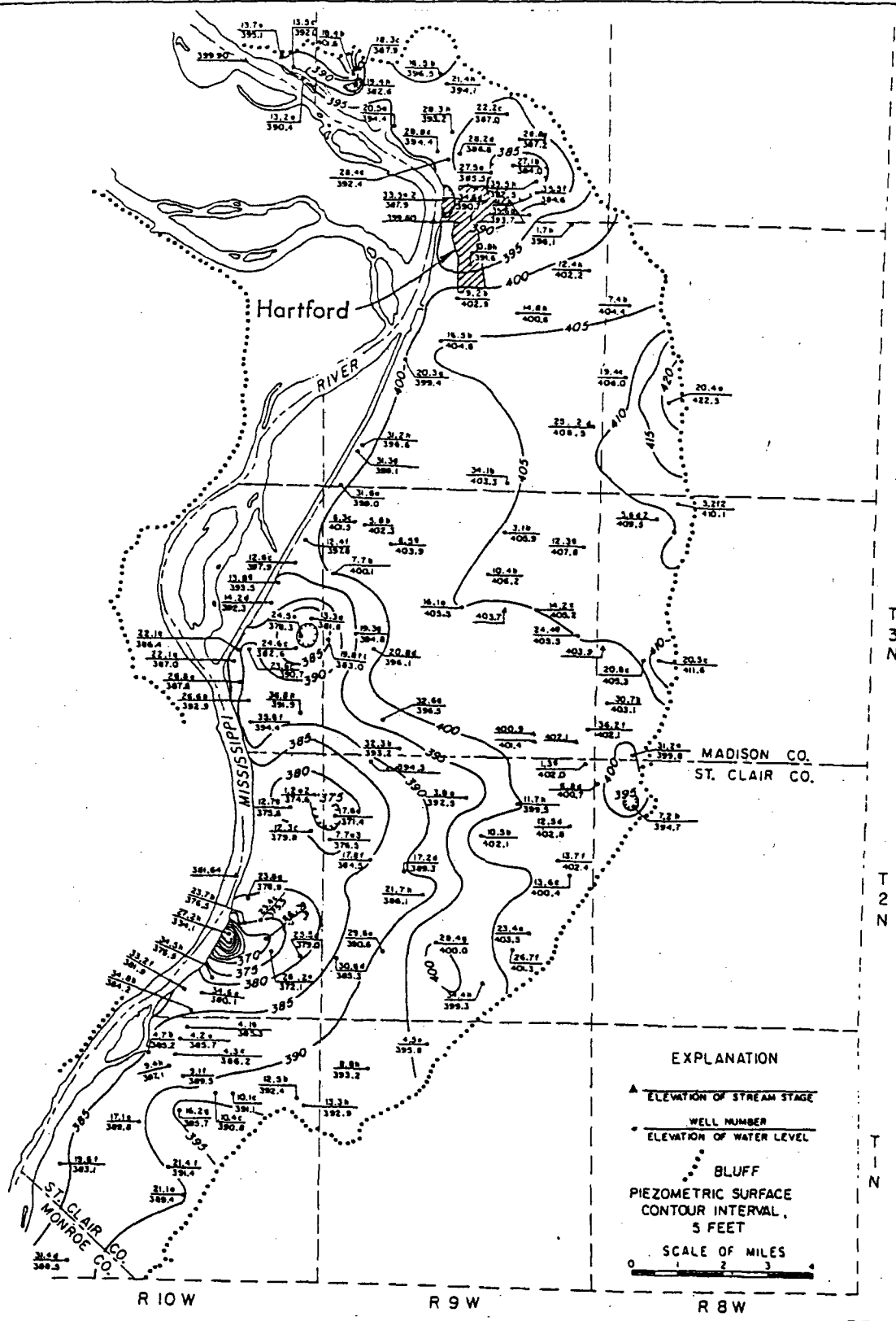
Figure IX



BEI 024995

Approximate Elevation Of Piezometric Surface & Stage Of Mississippi River at Hartford, Illinois
June, 1962
(After R.J. Schicht, 1965)

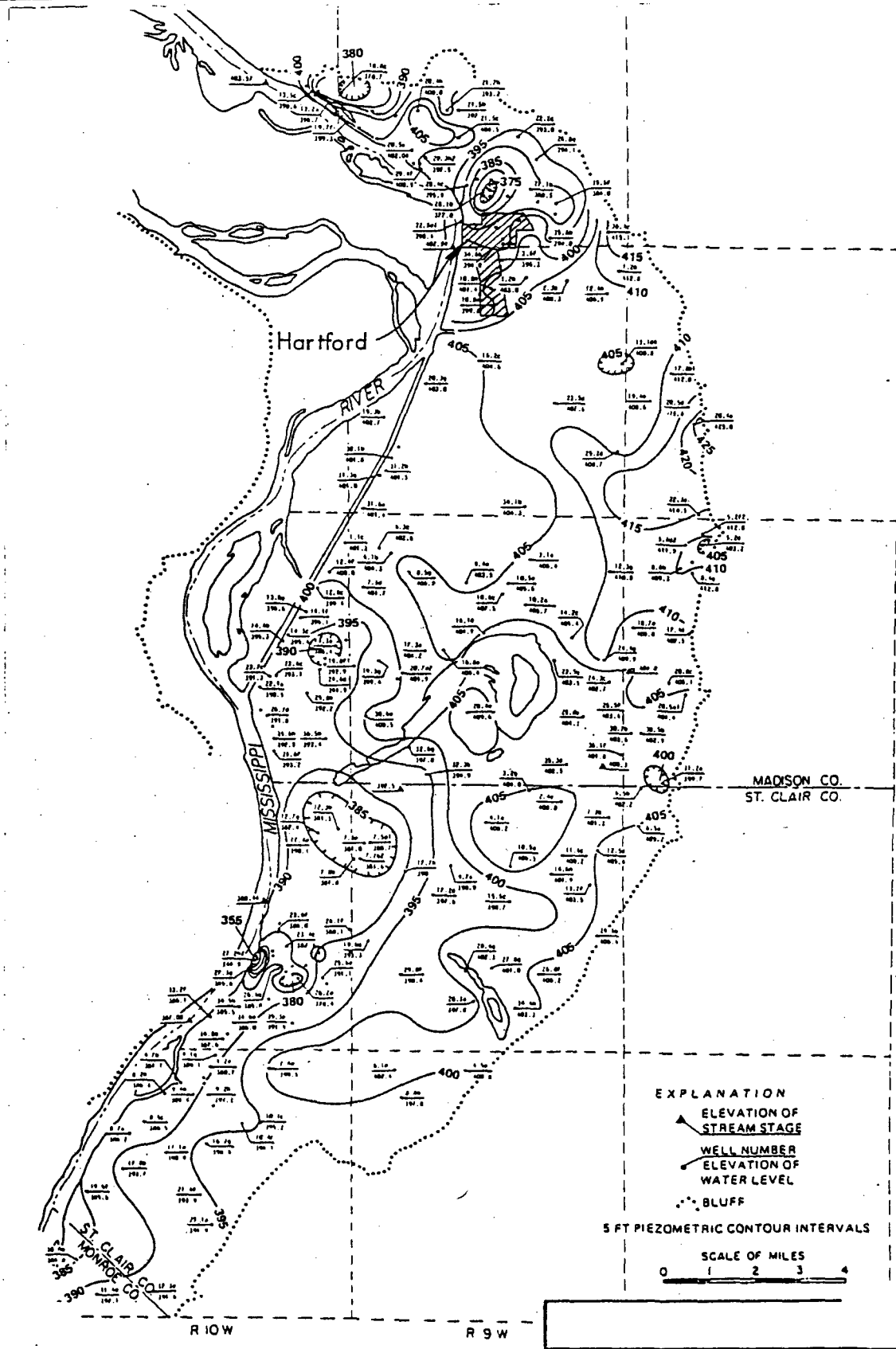
Figure X



BEI 024996

Approximate Elevation Of Piezometric Surface And Stage of Mississippi River at Hartford, Illinois November, 1966 (After Reitz, 1968)

Figure XI



BEI 024997

Approximate Elevation Of Piezometric Surface And Stage Of Mississippi River at Hartford, Illinois November, 1971 (After Baker, 1972)

Figure XII

Table XI

Bert Schneider } Shell Oil Co.
Bill Shepherd

5-2-78

Chief Anderson

1:30 P.M.

5-2-78 MEASUREMENTS

Hole	Top Pipe to TD	Top Pipe to Grade	Top Pipe to Liquid	Inches Product
Shell				
1	40'1"	2'9"	34'5"	0 - Odor
2	38'1½"	2'1"	32'3½" (63")	- 7" Water
EPA				
1B	43'2"	5"	20'9½"	0 - Stale Odor
2	35'2"	4"	23'8"	0
3	No tests were taken			
4	44'7"	11"	30'11" (11'6")	2'2" Water
5	38'8"	18"	25'11"	0
6	41'4½"	24"	31'½"	(45½")
7	Tannery Property - No tests were taken			
8	43'2"	2'6"	31'11½"	No Odor
9	41'2"	12"	31'3½"	0
10	43'0"	0	30'3½"	0

Clark Sewer Leak in Watkins St.

Clark Line leak Olive and Rand Streets (again) (Sampled)

Clark, Line leaks Noon 5-2-78 20' South of Elm Street on Olive.

Water Level And Product Observations
In Monitoring Wells
Shell Oil Co.
Hartford, Illinois

May 2, 1978 (Shell Oil Co.)

The following compounds were found in the locations listed.

	METHANE	CO_2	GASOLINE	BUTANE
EPA Well #1	X	X	*	X
EPA Well #5	ND	X	ND	ND
EPA Well #6			**	
EPA Well #7	X	X	ND	X
EPA Well #8	X	X	ND	X
EPA Well #9	ND	X	X	X
EPA Well #10	X	X	X	X
EPA Well #4			**	
EPA Well #1			*	
EPA Well #2			*	
EPA Well #3	ND		ND	ND
SHELL WELL #1			X	
SHELL WELL #2			X larger layer	
SHELL WELL #2			X**	

* - Hydrocarbons in a higher boiling range than gasoline.
** - pure gasoline
X - Present
ND - Not detected

Chromatographic And Mass Spectographic Analyses
Water Samples From Monitoring Wells
Hartford, Illinois

I E P A

PUBLIC WATER SUPPLY

	METHANE	CO_2	GASOLINE	BUTANE
HARTFORD PWS				
Finished	ND	ND	ND	ND
Raw Well #3	X	X	ND	ND
Raw Well #2	ND	X	ND	ND
BETHALTO				
Raw at Well	ND	X	ND	ND
ROXANA				
Raw at Well	ND	ND	ND	ND
WOODRIVER				
Raw at Well	X	X	ND	ND

X --- Present

ND --- Not Detected

Chromagraphic And Mass Spectographic Analyses
Water Samples From Public Water Supplies
Hartford, Illinois Area

May, 1978 I. E. P. A.

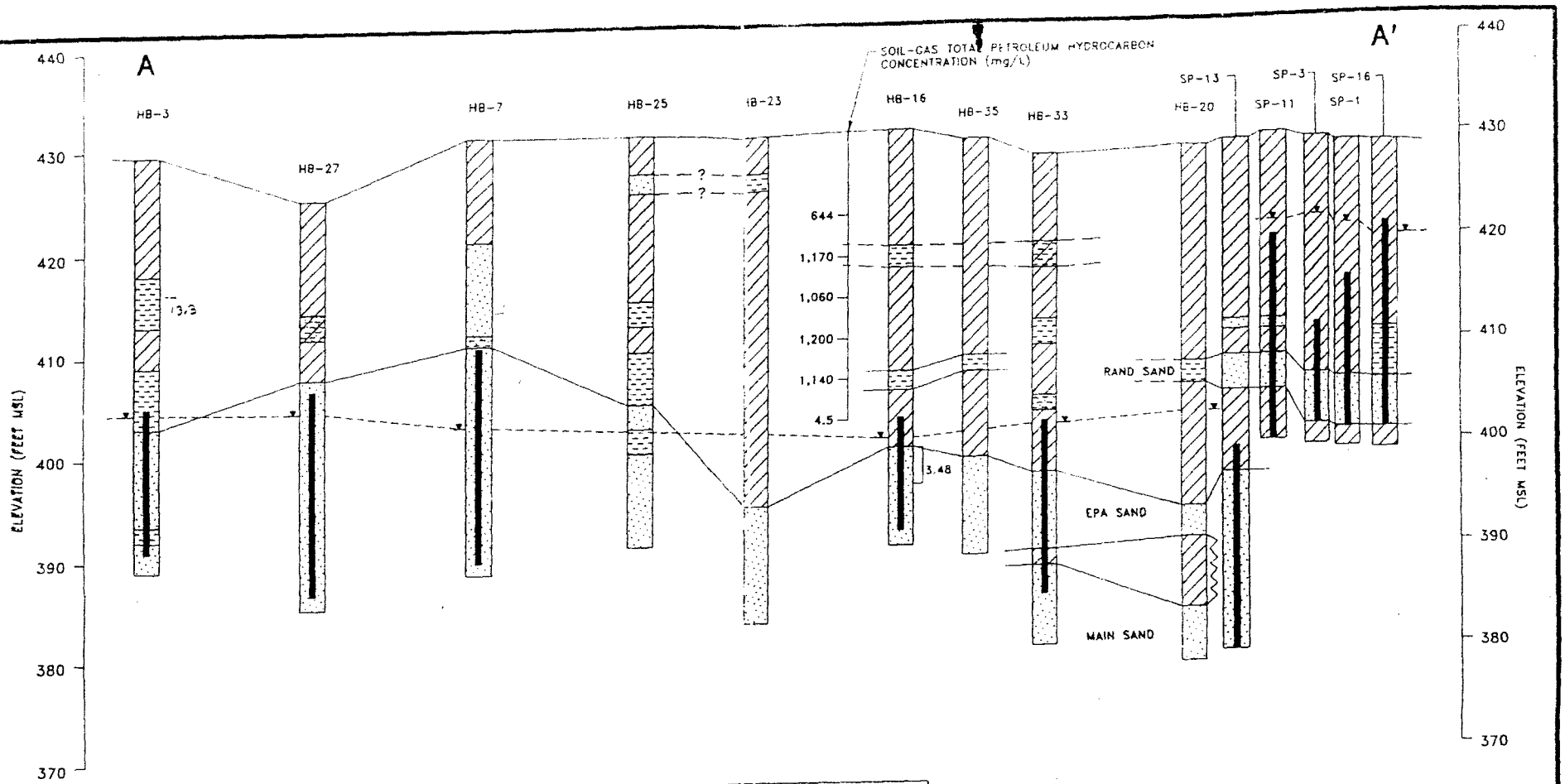
APPENDIX B-2

SELECTED CROSS SECTIONS COMPLETED BY MATHES (A.K.A. BURLINGTON ENVIRONMENTAL, INC.) AND AVAILABLE SOIL BORING LOGS USED BY MATHES TO CONSTRUCT THE CROSS SECTIONS

A-A'
C-C'
D-D'
E-E'
J-J'
K-K'

THE FOLLOWING BORING LOGS ARE UNAVAILABLE AND THEREFORE NOT INCLUDED:

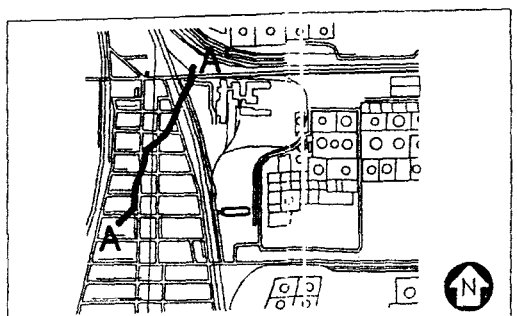
- **CPT H1-90**
- **CPT H1-93**
- **CPT H3-91**
- **CPT H5-90**
- **CPT H10-90**
- **CPT H12-90**
- **HB-6**
- **P-76**
- **P-77**
- **P-78**
- **P-79**
- **P-105**
- **P-107**



EXPLANATION

- CLAY
- SILT
- SAND
- GRAVEL
- SCREENED INTERVAL
- STATIC WATER LEVEL (CORRECTED FOR HYDROCARBON THICKNESS)
- 3.48 HYDROCARBON THICKNESS IN FEET

NOTE:
1. Monitoring wells or boreholes located in Hartford have been relabeled with a "H" prefix on cross section.
2. Fluid measurements were made in July 1990.
3. Soil-gas results from sample location PH-1 on June 27, 1990. (Mathes, 1990)



LOCATOR MAP

HORIZONTAL SCALE IN FEET
0 200 400
0 10 20
VERTICAL SCALE IN FEET

General Note:
This profile was developed by interpolation between widely spaced boreholes. Only at the borehole locations should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.

John Mathes & Associates, Inc.

CROSS SECTION A – A'

CLARK OIL COMPANY
HARTFORD, ILLINOIS
122327

DWG NO. 1

DRAWN BY	CHECKED BY	DOCUMENT MANAGER	PROJECT MANAGER
PTS 10/5/90	BB 10/5/90	KAM 10/15/90	LSB 10/15/90

B REV. DATE 9/6/90

EXHIBIT 412 1/17/94 BSW

Drilled for 1978 Phase II Study

RECORD OF SUBSURFACE EXPLORATION

JOHN MATHES & ASSOCIATES

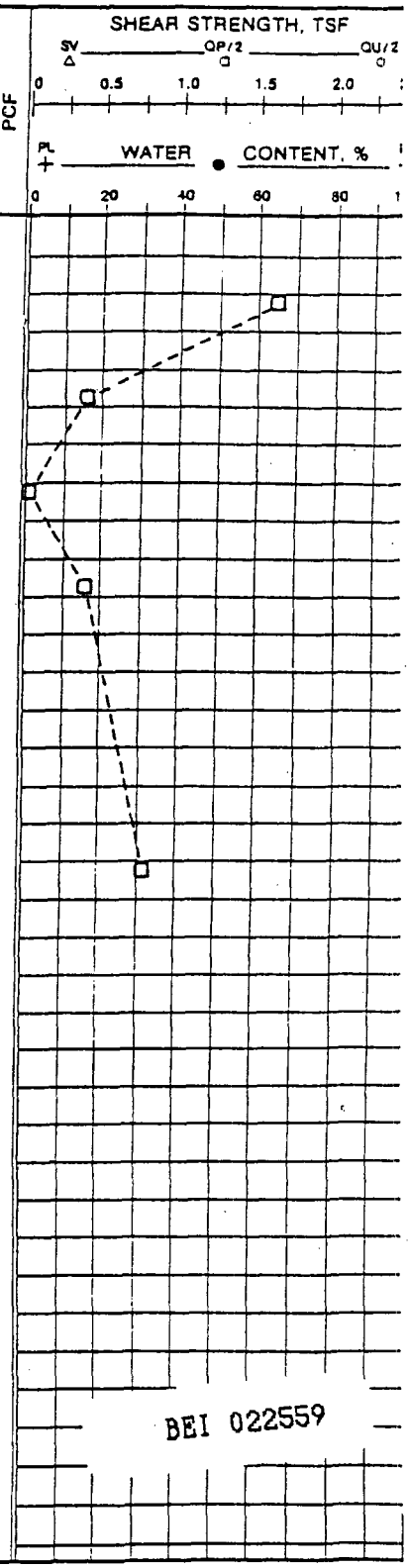
BORING 3 (HB-3) CONTRACT 465-78

DRILLED BY Gotsch DATE DRILLED 6/1/78 LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION)	BLOWS	DRY UNIT WEIGHT PCF
				Grayish-Brown CLAY w/Silt		
	1	SS			3-4	
5	2	SS		Grayish-Brown Silty CLAY -w/Fine Sandy Seams @4.0'	1-2	
	3	SS		-w/Traces Of Fine Sand @7.5'	1/18"	
10	4	SS		Interbedded Brown CLAY & Silty CLAY Seams w/Oxi. Spots ~~& Stains & Traces Of Sand~~	1-2	
	5	SS		Brownish-Gray Fine Sandy SILT	3-5	
15	6	SS			3-3	
				Gray CLAY w/Oxi. Spots & Stains		
	7	SS		Gray Silty CLAY Interbedded w/Fine Sandy Seams	2-3	
20	8	SS			3-4	
				Gray Fine Sandy SILT		
	9	SS			7-8	
25	10	SS			4-5	
	11	SS		Grayish-Brown Silty Fine SAND	8-7	
30	12	SS	Encountered Water @ 29.5'		4-4	
	13	SS			8-8	
35	14	SS		-w/Dk.Gr.Fi.Sandy Silt Seam @34.0'	7-11	

Cont'd



BEI 022559

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 3 Cont'd (HB-3) CONTRACT 465-78

DRILLED BY Gotsch DATE DRILLED 6/1/78 LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		Br. Silty Fine SAND		
				Gray Fine Sandy SILT		
	15	SS			10-13	
				Gray Silty Fine SAND		
40	16	SS		T. O. B.	12-12	
45						

SHEAR STRENGTH, TSF: SV △ — QP/2 □ — QU/2 ○ (0, 0.5, 1.0, 1.5, 2.0, 2)

WATER CONTENT, % (0, 20, 40, 60, 80, 10)

BEI 022560

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

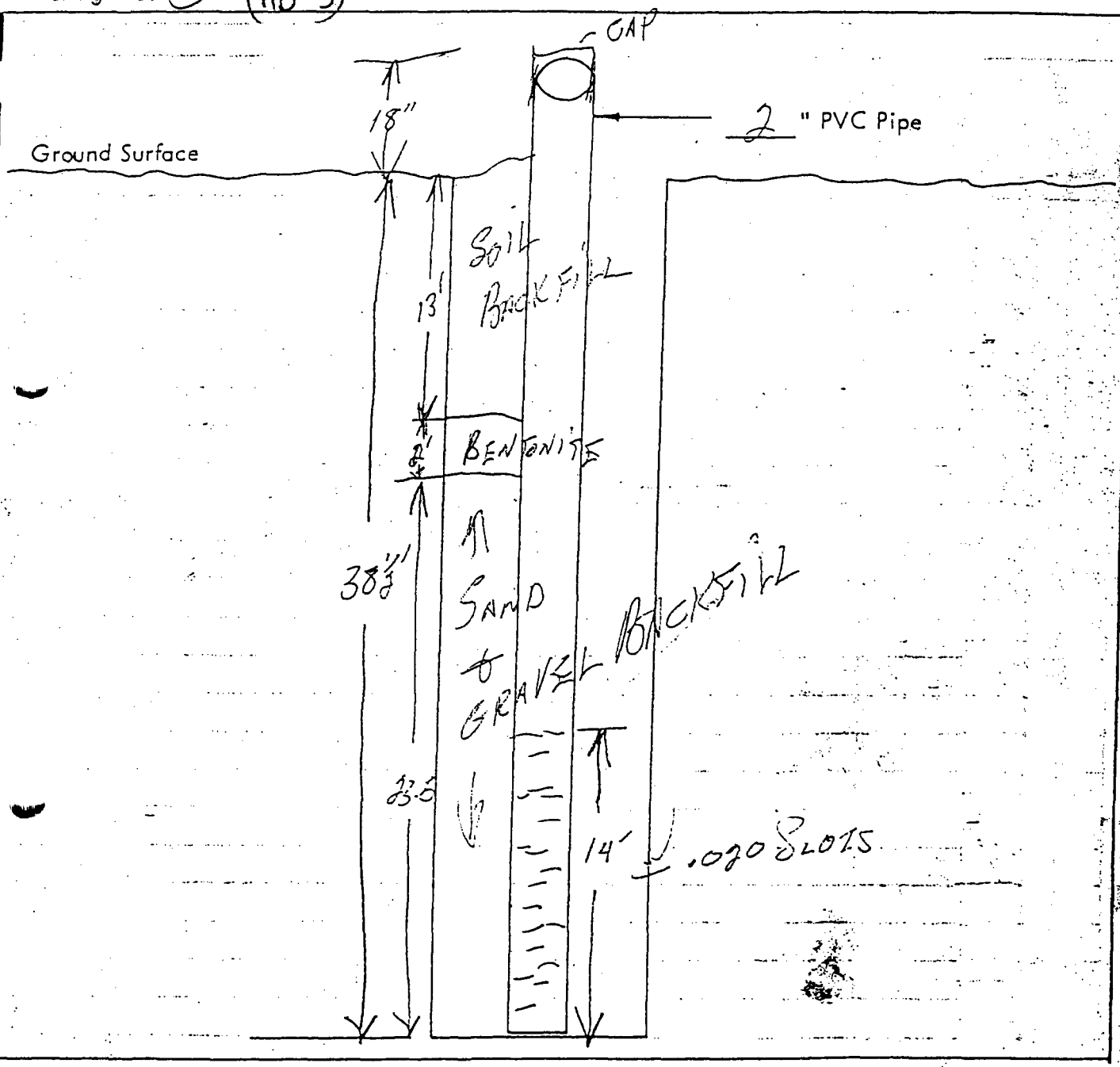
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 3 (HB-3) Contract No. Date Installed



NOTES:

BEI 023423

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

BORING 27 (HB-27) CONTRACT 465-78

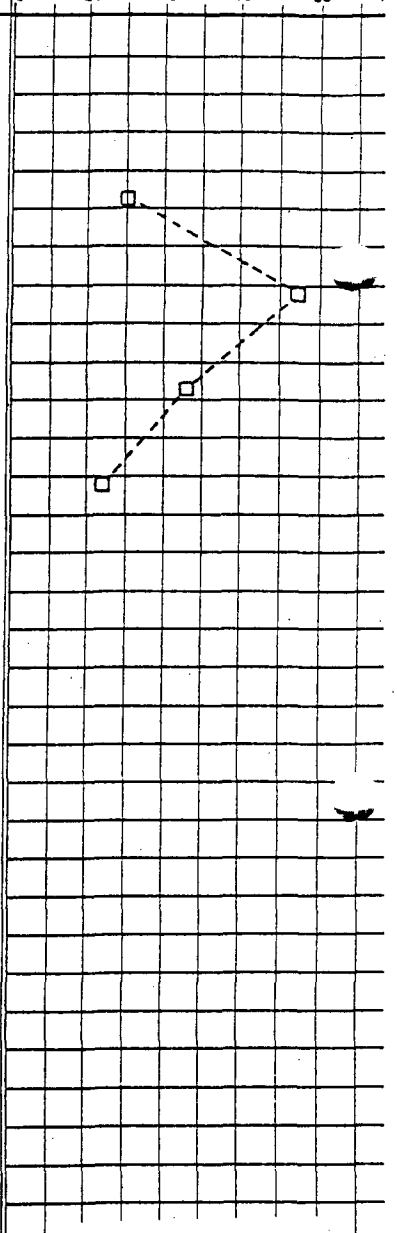
DRILLED BY Gatsch DATE DRILLED 6/9/78 LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				CINDERS & SOIL		
	1	SS		Black CLAY & CINDERS	2-3	
5	2	SS		Brownish-Gray CLAY w/Oxi. Spots, Stains & Silty Pockets	3-3	
	3	SS			4-5	
10	4	SS			2-2	
	5	SS		Interbedded Gray CLAY Silty CLAY & Fine Sandy SILT Seams	2-3	
15	6	SS		Gray Silty CLAY w/Sandy & Silt Seams	3-2	
	7	SS			4-3	
20	8	SS		Brown Fine SAND -Silty To 28.0' -w/Clayey Pockets @ 19.0'	5-8	
	9	SS			4-6	
25	10	SS		-w/Traces Of Clay @ 24.0'	4-6	
	11	SS		-Gray From 26.5' To 33.0'	5-5	
30	12	SS		-w/Silt @ 29.0'	10-12	
	13	SS		-Silty From 31.5' To 38.0' -w/Traces Of Clay @ 31.5'	5-7	
35	14	SS		-Brown @ 34.0' Cont'd	4-5	

SHEAR STRENGTH, TSF — SV △ — QP/2 □ — QU/2 ○ — 0 0.5 1.0 1.5 2.0

PL + — WATER ● CONTENT, % — 0 20 40 60 80 1



BEI 022597

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 27 Cont'd (HB-27) CONTRACT 465-78

JOHN MATHES & ASSOCIATES

DRILLED BY Gotsch
PROJECT Phase II, Hydrocarbon Recovery Investigation
DATE DRILLED 6/9/78
DRILLING METHOD Hollow Auger
LOGGED BY Schweigert
PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		Brown Silty Fine SAND		
				-Brownish-Gray @ 36.5'		
	15	SS			17-19	
				-Gray w/Silt @ 39.0'		
40	16	SS			7-9	
				T. O. B.		
45						

SHEAR STRENGTH, TSF — SV △ — QP/2 □ — QU/2 ○ — 0 0.5 1.0 1.5 2.0 2.5

PL + — WATER ● CONTENT, % — + LL — 0 20 40 60 80 100

BEI 022598

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

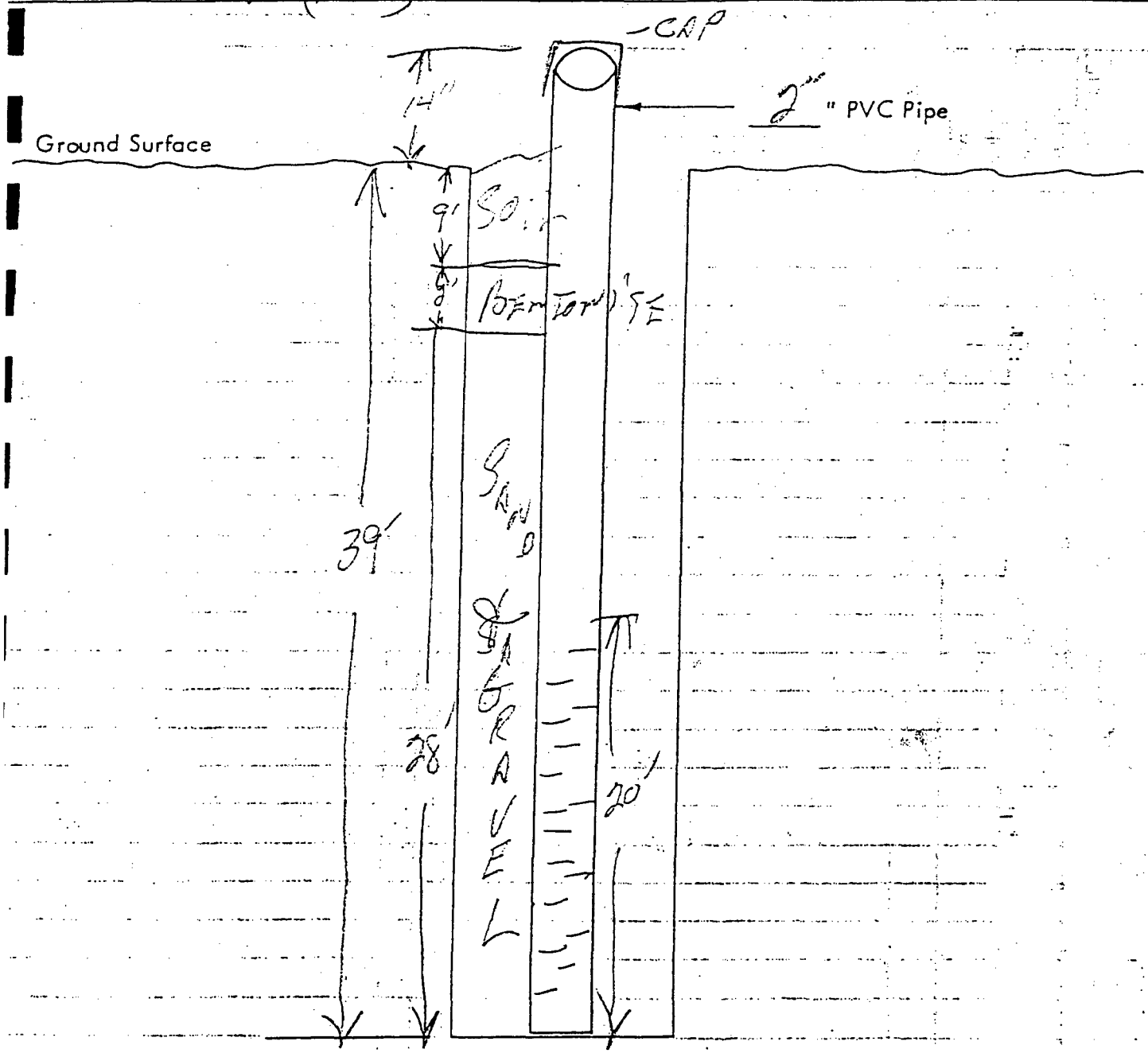
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 27 (HB-27) Contract No. Date Installed



NOTES:

BEI 023444

nformation Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

BORING 7 (HB-7) CONTRACT 465-78

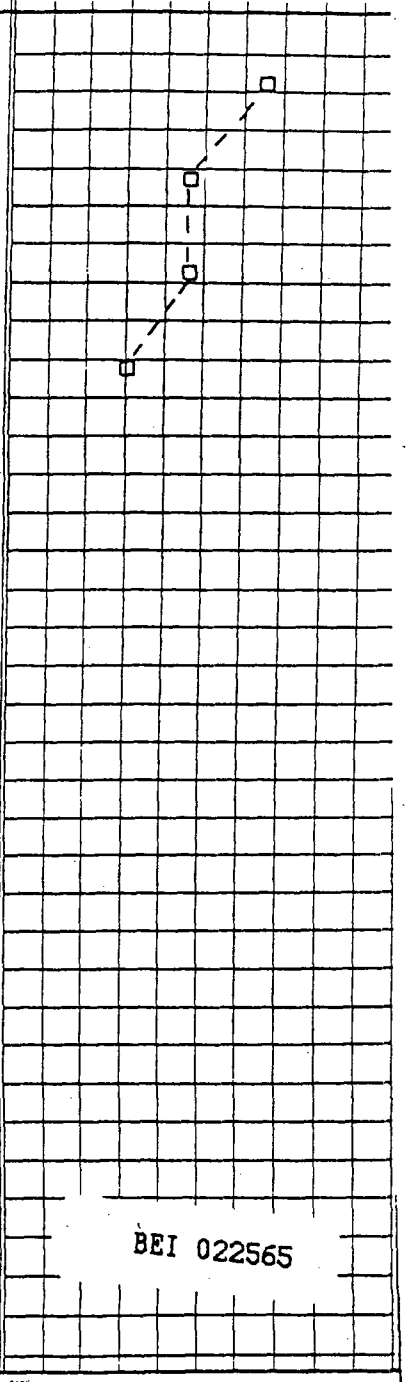
JOHN MATHES & ASSOCIATES

LOGGED BY Schweigert
PIEZOMETER Yes
DATE DRILLED 5/26/78
DRILLING METHOD Hollow Auger
DRILLED BY Roberts
PROJECT Phase II, Hydrocarbon Recovery

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Br. CLAY w/Roots		
	1	SS		Grayish-Brown CLAY w/Silt To Dark Brown Silty CLAY w/ Fine Sand, Fill	6-5	
5	2	SS			2-2	
	3	SS		-w/Rock & Brick Fragments @ 6'	4-4	
10	4	SS		Gray CLAY w/Silt, Oxidized Spots, Stains, & Fi. Sandy Pockets	2-4	
	5	SS		Gray Silty Fine SAND -w/CLAY from 11' To 15'	3-5	
15	6	SS			3-5	
	7	SS			4-5	
20	8	SS		Gray Fine Sandy Silt	4-5	
	9	SS		Gray Fine SAND -Silty From 21' To 27.5' -w/A Faint Fuel Odor From 23' To 27.5'	5-6	
25	10	SS			6-6	
	11	SS		-w/A Fuel Odor From 28.5' To 40'	6-7	
30	12	SS		-Medium To Fine w/Traces Of Silt @ 28.5'	14-17	
	13	SS		-Gray & Brown Fine To Medium w/Silt From 31' To 35'	14-21	
35	14	SS		Cont'd	14-19	

SHEAR STRENGTH, TSF: SV △ — QP/2 □ — QU/2 □ (0, 0.5, 1.0, 1.5, 2.0)

WATER CONTENT, % (0, 20, 40, 60, 80)



BEI 022565

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 7 Cont'd (HB-7) CONTRACT 465-78

DRILLED BY Roberts DATE DRILLED 5/26/78 LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				-Fine To Medium w/Coarse Sand @ 36'		
	15	SS			11-18	
				-Brown Fine To Medium w/ Silt@ 38.5'		
	16	SS		-Silty w/Clay @41'	13-13	
40						
	17	SS			13-15	
				T. O. B.		
45						

SHEAR STRENGTH, TSF — SV △ QP/2 □ QU/2 ○ — 0 0.5 1.0 1.5 2.0 2

WATER CONTENT, % — PL + ● + LL — 0 20 40 60 80 10

BEI 022566

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

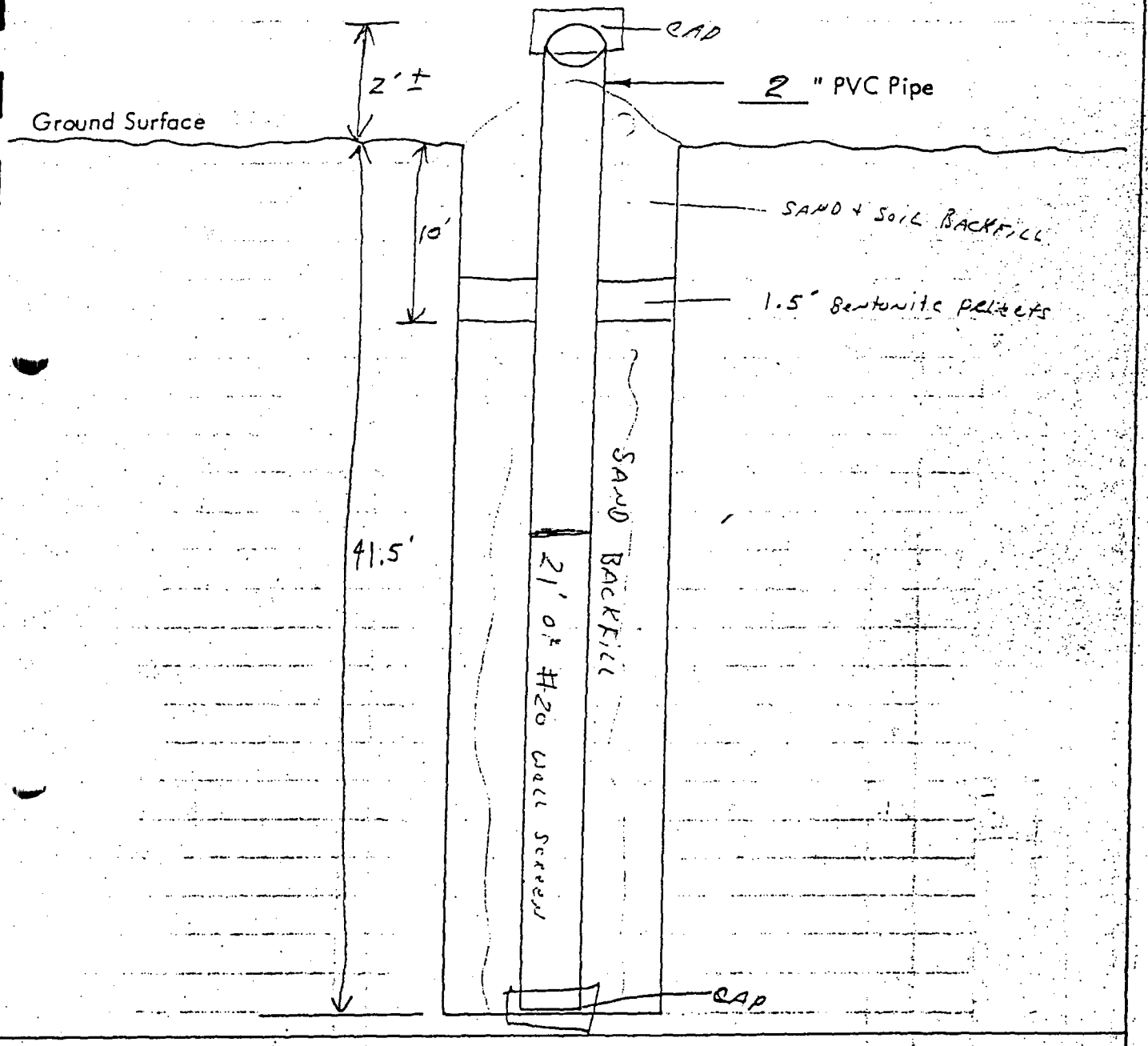
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. B-7 (HB-7) Contract No. 465 Date Installed 5-26-78



NOTES:

BEI 023426

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

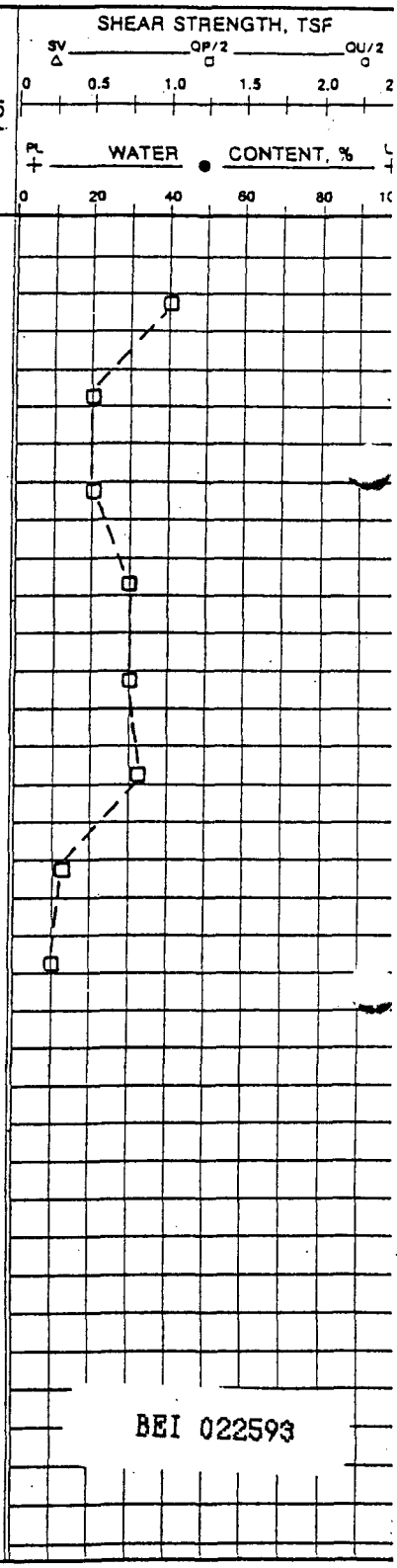
RECORD OF SUBSURFACE EXPLORATION

BORING 25 (HB-25) CONTRACT 465-78

JOHN MATHES & ASSOCIATES

DRILLED BY Roberts LOGGED BY Schweigert
PROJECT Phase II, Hydrocarbon Recovery DATE DRILLED 5/31/78
DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Brown Silty CLAY w/Roots & Traces Of Fine Sand		
	1	SS		Brown CLAY w/Silt & Traces Of Fine Sand	1-2	
5	2	SS		Brown Silty, Clayey Fine SAND	1-1	
	3	SS		Gray Silty CLAY w/Oxidized Stains & Traces Of Fine Sand	1-1	
10	4	SS		Gray CLAY w/Oxidized Spots & Stains	1-3	
	5	SS		-Mottled Dark Gray & Gray w/Slickensides @ 11.5'	3-4	
15	6	SS		-Mottled Gray & Brown @ 14'	3-3	
	7	SS		Gray Clayey SILT w/Oxidized Stains, Sand Lenses, & Traces Of Fine Sand	2-4	
20	8	SS		Brown Silty CLAY w/Root holes & Oxidized Stains	2-2	
	9	SS		Brown & Gray CLAY Brown To Gray SILT w/A Fuel Odor	2-3	
25	10	SS		-Clayey w/Oxidized Stains @ 21.5' -Fine Sandy w/Clay @ 24'	2-3	
	11	SS		Grayish-Brown Fine Silty SAND w/A Fuel Odor	3-6	
30	12	SS		Brown Fine Sandy SILT w/A Fuel Odor & Traces Of Clay	3-6	
	13	SS		Gray To Dark Gray Silty Fine SAND w/A Fuel Odor	13-17	
35				Cont'd		



BEI 022593

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 25 Cont'd (HB-25) CONTRACT 465-78

DRILLED BY Roberts LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery DATE DRILLED 5/31/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		-w/Traces Of Clay Below 34'	3-7	
	15	SS			9-11	
40	16	SS		T. O. B.	8-12	
45						

SHEAR STRENGTH, TSF — SV △ QP/2 □ QU/2 ○ — 0 0.5 1.0 1.5 2.0 2.

WATER CONTENT, % — PL + ● + LL — 0 20 40 60 80 10

BEI 022594

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

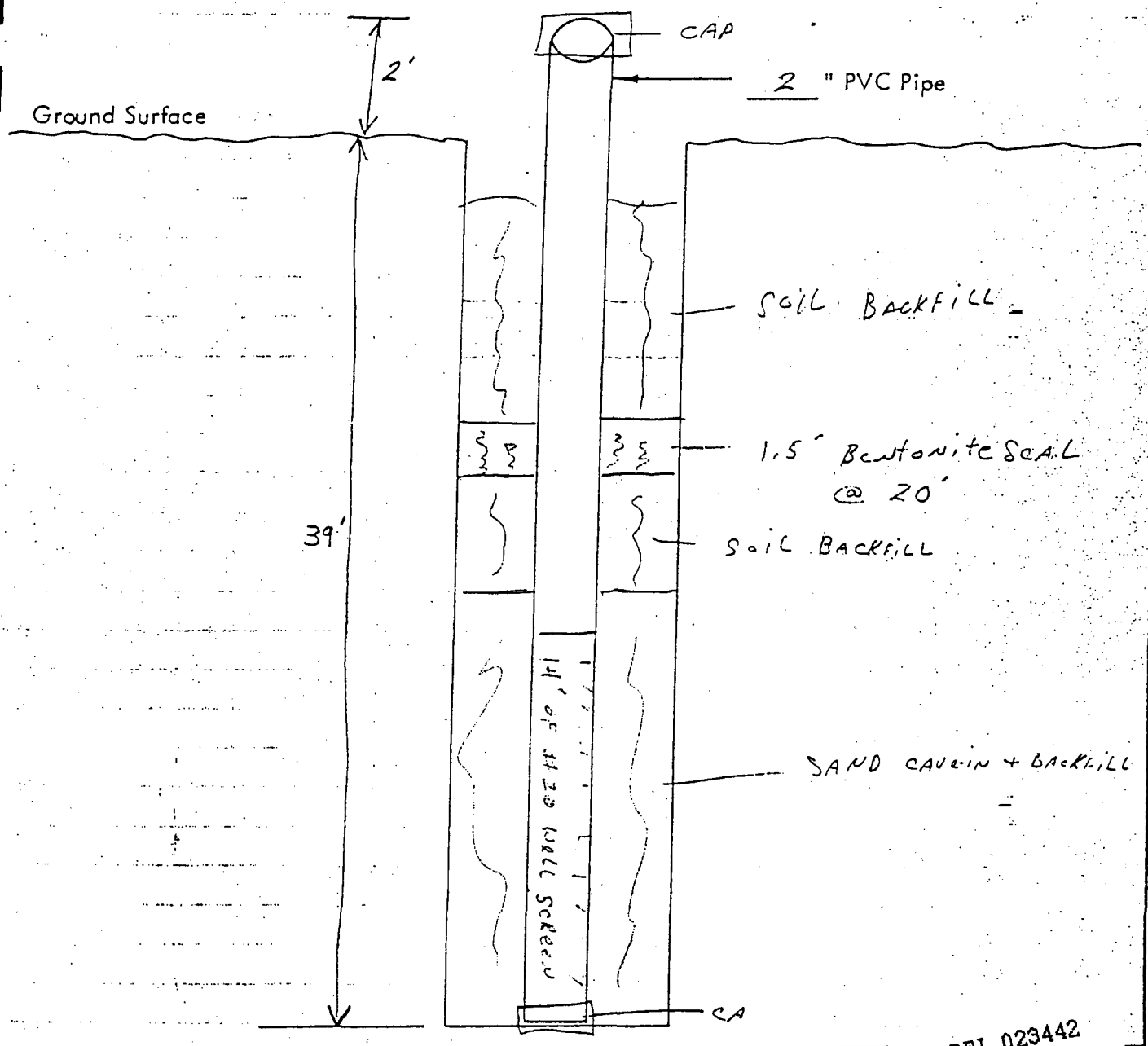
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. B-25 (HB-25) Contract No. 465 Date Installed 5-31-78



BEI 023442

NOTES:

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

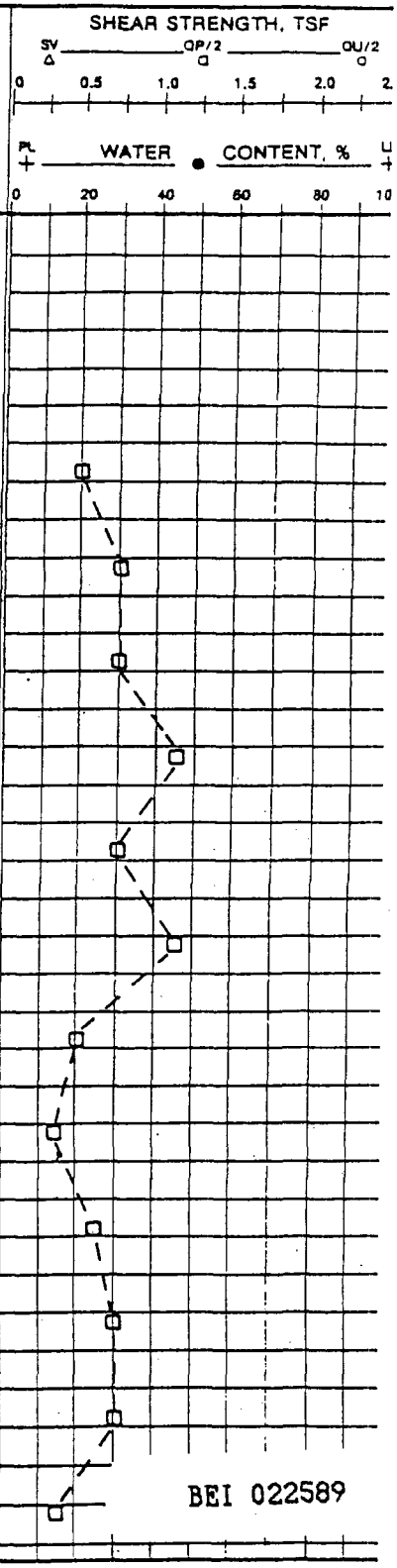
RECORD OF SUBSURFACE EXPLORATION

BORING 23 (HB-23) CONTRACT 465-78

JOHN MATHES & ASSOCIATES

DRILLED BY Roberts LOGGED BY Schweigert
PROJECT Phase II Hydrocarbon Recovery PIEZOMETER None
DATE DRILLED 5/24/78
DRILLING METHOD Hollow Auger

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	1	SS		Dk. Br. Si. CLAY w/Traces Of Fine Sand & Roots	1-2	
5	2	SS		Brown Clayey Fine Sandy SILT	2-1	
	3	SS		Grayish-Br. CLAY w/Silt & Fine Sandy Pockets	2-2	
10	4	SS		Grayish-Brown CLAY w/Oxi. Spots & Stains	2-3	
	5	SS		Brownish-Gray Silty CLAY	4-4	
15	6	SS		Dk. Gr. To Br. CLAY w/Oxi. Spots -w/Silty Pockets @ 13.5'	5-6	
	7	SS		-w/Oxidized Stains @ 18.5'	5-6	
20	8	SS			3-5	
	9	SS		Gray CLAY w/Silt & Traces Of Fine Sand -w/Clay & Silt Pockets @ 23.5'	2-1	
25	10	SS			2-2	
	11	SS		Dk. Gr. Silty CLAY w/Traces Of Fine Sand	3-5	
30	12	SS		Grayish-Brown CLAY w/Si., Si. Fi. Sandy Pockets & A Faint Fuel Odor	3-5	
	13	SS		Reddish Br. CLAY w/Traces Of Sand & A Faint Fuel Odor	3-6	
35	14	SS		Gr.-Br. Si. CLAY w/Traces Of Fi. Sa. & A Fuel Odor Cont'd	2-6	



BEI 022589

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 23 Cont'd (HB-23) CONTRACT 465-78

DRILLED BY Roberts DATE DRILLED 5/24/78 LOGGED BY Schweigert

PROJECT Phase II Hydrocarbon Recovery DRILLING METHOD Hollow Auger PIEZOMETER None

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	15	SS		Br. Med. To Fine SAND -w/Gravel @ 36'	19-27	
40	16	SS		-w/A Fuel Odor From 36' To 45' -Silty Coarse To Fine @ 38.5'	16-21	
	17	SS		-Fine To Medium @ 41'	27-34	
45	18	SS		-Fine To Coarse w/Si. & Grav @ 43.5'	19-21	
	19	SS		-Fine To Coarse w/Traces Of Gravel @ 46'	16-18	
50				T. O. B.		

SHEAR STRENGTH, TSF — SV △ — QP/2 □ — QU/2 ○ — 0 0.5 1.0 1.5 2.0

WATER CONTENT, % — 0 20 40 60 80

BEI 022590

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

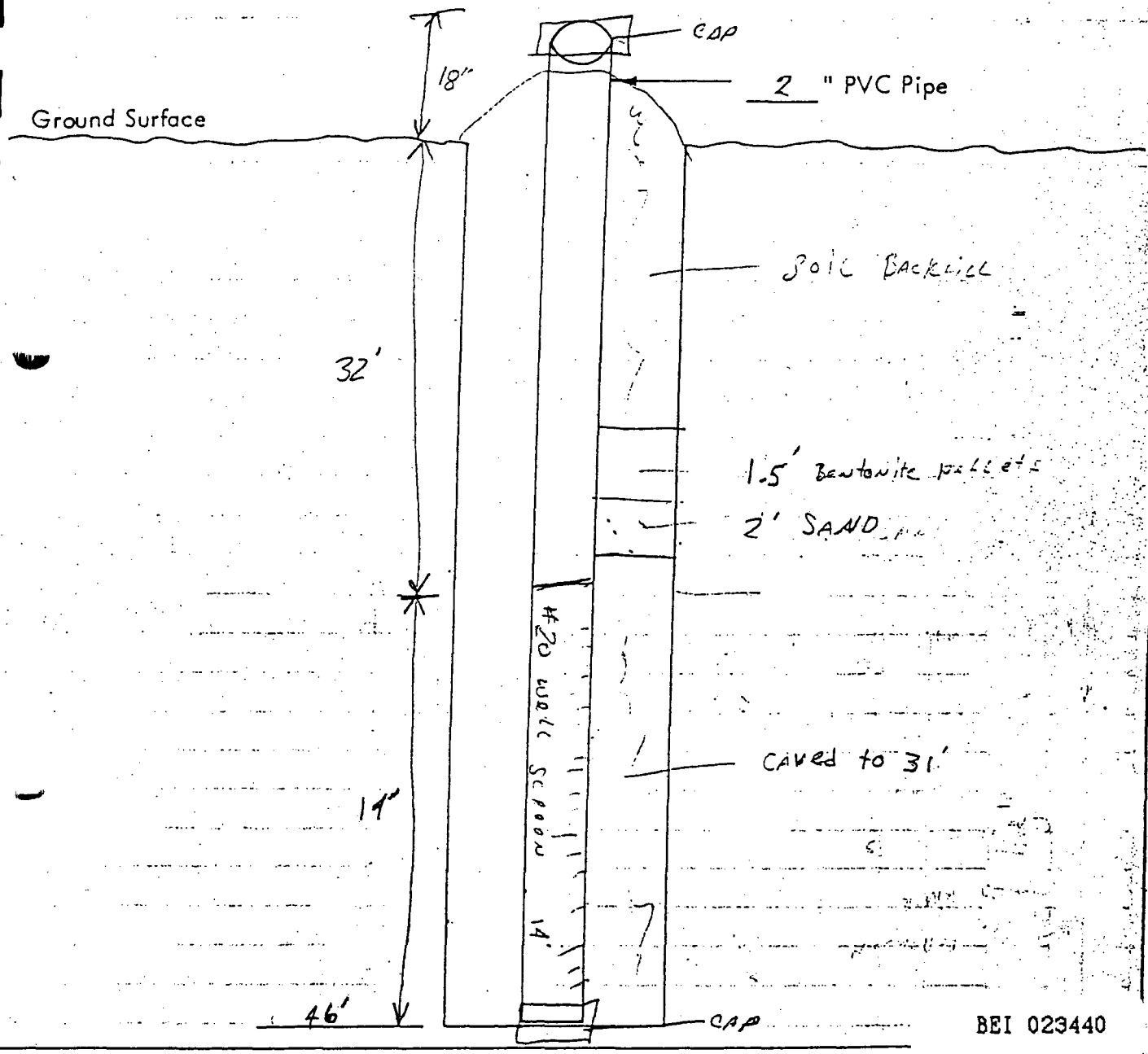
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. B-23 (HB-23) Contract No. 465 Date Installed 5-24-78



BEI 023440

NOTES:

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

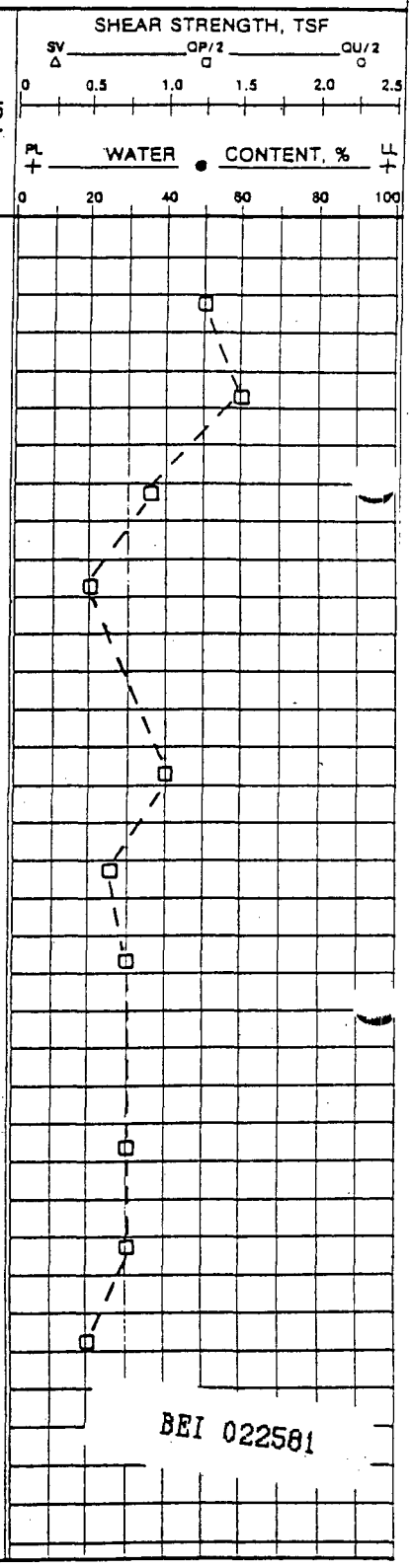
Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

BORING 16 (HB-16) CONTRACT 465-78

DRILLED BY Gotsch LOGGED BY Schweigert
PROJECT Phase II Hydrocarbon Recovery DATE DRILLED 5/25/78
PIEZOMETER Yes DRILLING METHOD Hollow Auger

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Br. & Gr. Si. CLAY w/Roots		
	1	SS		Brown CLAY w/Silt, Roots, Glass & Rock Fragments, Fill	2-3	
5	2	SS		Brown & Dk. Gray CLAY w/ Oxidized Spots	2-4	
	3	SS		Brownish-Gray To Gray CLAY w/Silt & Oxidized Spots & Stains	2-4	
10	4	SS		-w/Sandy Pockets @ 6.5' -w/Silty Pockets @ 9'	1-2	
	5	SS		Gray Clayey SILT w/Fine Sand	2-3	
15	6	SS		Brown & Gray Silty CLAY	1-1	
	7	SS		Gray CLAY w/Silt & A Faint Fuel Odor	1-2	
20	8	SS			1-2	
	9	SS		Brown Silty CLAY w/Fine Sand	2-2	
25	10	SS		Dark Gray Clayey SILT w/ Fine Sand	2-2	
	11	SS		Gray CLAY w/Silt & A Faint Fuel Odor -w/Sand Lenses @ 26.5'	2-2	
30	12	SS			2-2	
	13	SS		Brownish-Gray Fine Sand w/A Fuel Odor -Silty @ 31.5' -Fine To Med. w/Si. Below 34'	7-11	
35				Cont'd		



BEI 022581

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 16 (HB-16) CONTRACT 465-78

JOHN MATHES & ASSOCIATES

DRILLED BY Gotsch LOGGED BY Schweigert

PROJECT Phase II Hydrocarbon Recovery DATE DRILLED 5/25/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL SURFACE ELEVATION	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV △, QP/2 ○, QU/2 ○; 0, 0.5, 1.0, 1.5, 2.0) / WATER CONTENT, % (+ PL, ●; 0, 20, 40, 60, 80)
	14	SS			10-14		
				-w/Traces Of Coarse Sand @ 36.5'			
	15	SS			13-13		
				-w/Clay Pockets @ 39'			
40	16	SS			12-14		
				T. O. B.			

BEI 022582

GROUND WATER DEPTH AT COMPLETION _____ AFTER 24 HRS. 31.0' AFTER _____ HRS. _____

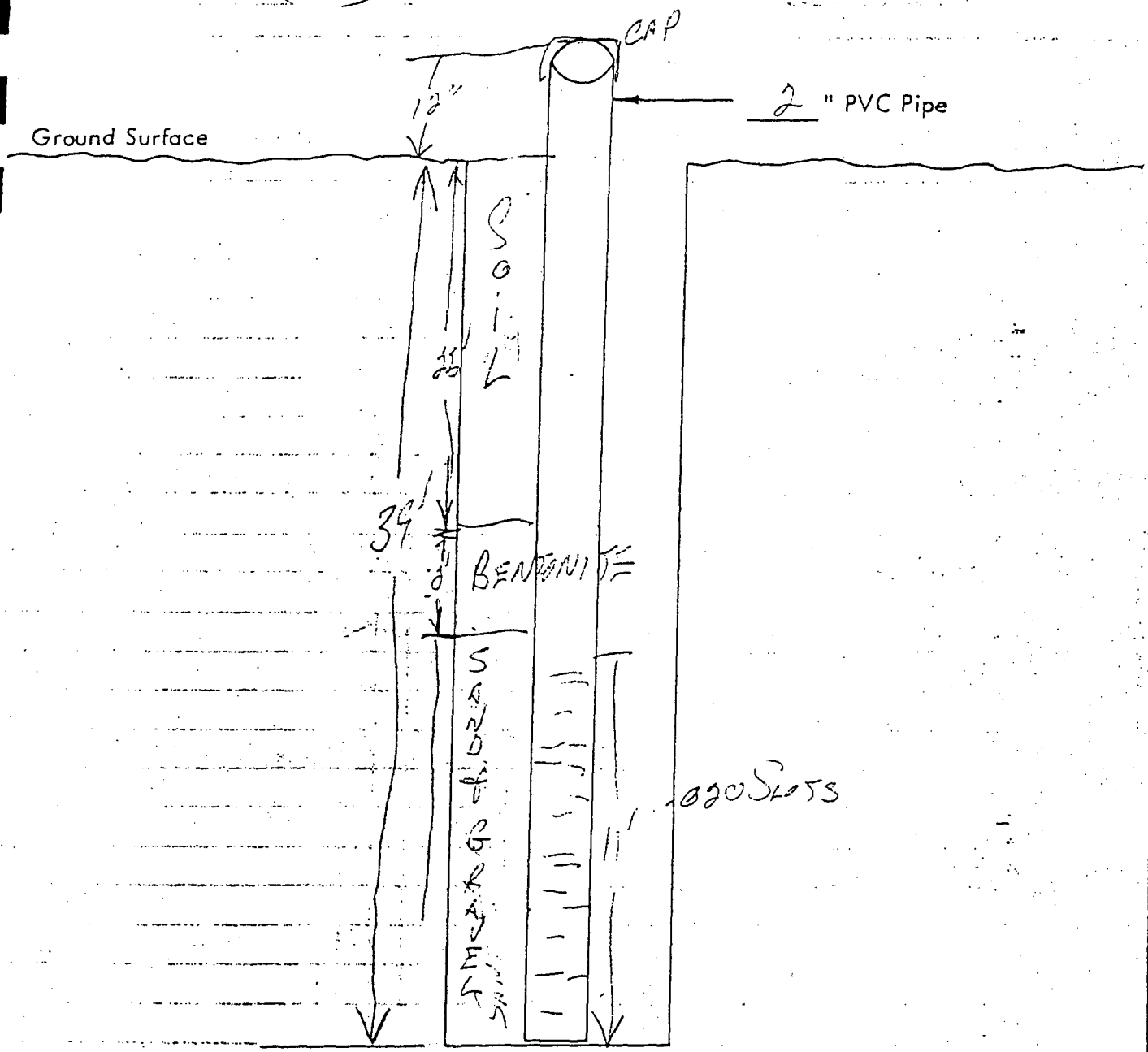
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 16 (HB-16) Contract No. Date Installed



NOTES:

BEI 023434

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

BORING 35 (HB-35) CONTRACT 465-78

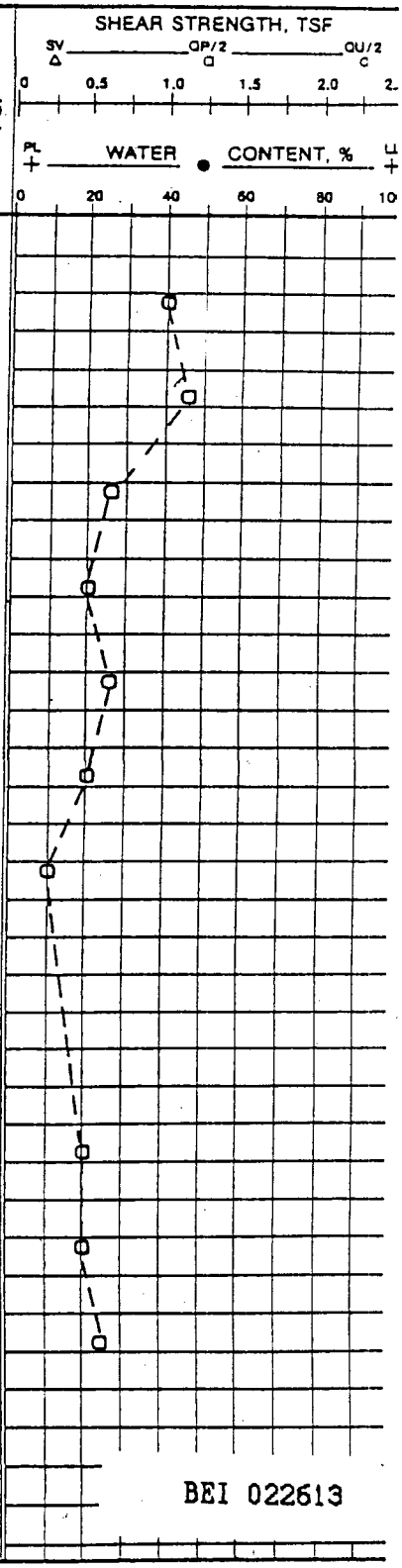
DRILLED BY Roberts LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery Investigation DATE DRILLED 6/13/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

SURFACE ELEVATION

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL	BLOWS	DRY UNIT WEIGHT PCF
				Dk. Br. Silty CLAY w/ Traces Of Roots		
	1	SS		Dk. Br. & Dk. Gr. CLAY w/ Silt & Traces Of Fine Sand	2-2	
5	2	SS		Dk. Gr. & Br. To Grayish-Brown CLAY w/Oxidized Spots & Stains	4-6	
	3	SS			2-3	
10	4	SS		Gray CLAY w/Silt, Silty & Clayey Pockets, & Oxidized Spots & Stains	4-3	
	5	SS		Gray & Brown To Gray CLAY -w/Oxidized Spots & Stains @ 14'	2-2	
15	6	SS			2-1	
	7	SS		Dk. Gr. Silty CLAY w/Traces Of Fine Sand	1-1	
20	8	SS			1-2	
	9	SS		Dk. Gr. Clayey SILT w/ Traces Of Fine Sand	1-2	
				Gray CLAY		
25	10	SS			3-4	
				Dk. Gr. CLAY w/Silt		
	11	SS		Gray CLAY	1-2	
30	12	SS			2-3	
	13	SS		Br. To Gr. Fine SAND -w/Clayey Pockets @ 31.5' -w/Silt & A Fuel Odor From 31.5' To 38'	7-11	
35	14	SS		Cont'd	4-7	



BEI 022613

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 35 Cont'd (HB-35) CONTRACT 465-78

DRILLED BY Roberts DATE DRILLED 6/13/78 LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV △, QP/2 □, QU/2 ○; 0, 0.5, 1.0, 1.5, 2.0) / WATER CONTENT, % (PL +, ● ; 0, 20, 40, 60, 80)
	14	SS		Gr. Fine SAND w/Silt & A Fuel Odor			
	15	SS			9-16		
				-Silty @ 39'			
40	16	SS		T. O. B.	8-15		
45							

BEI 022614

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

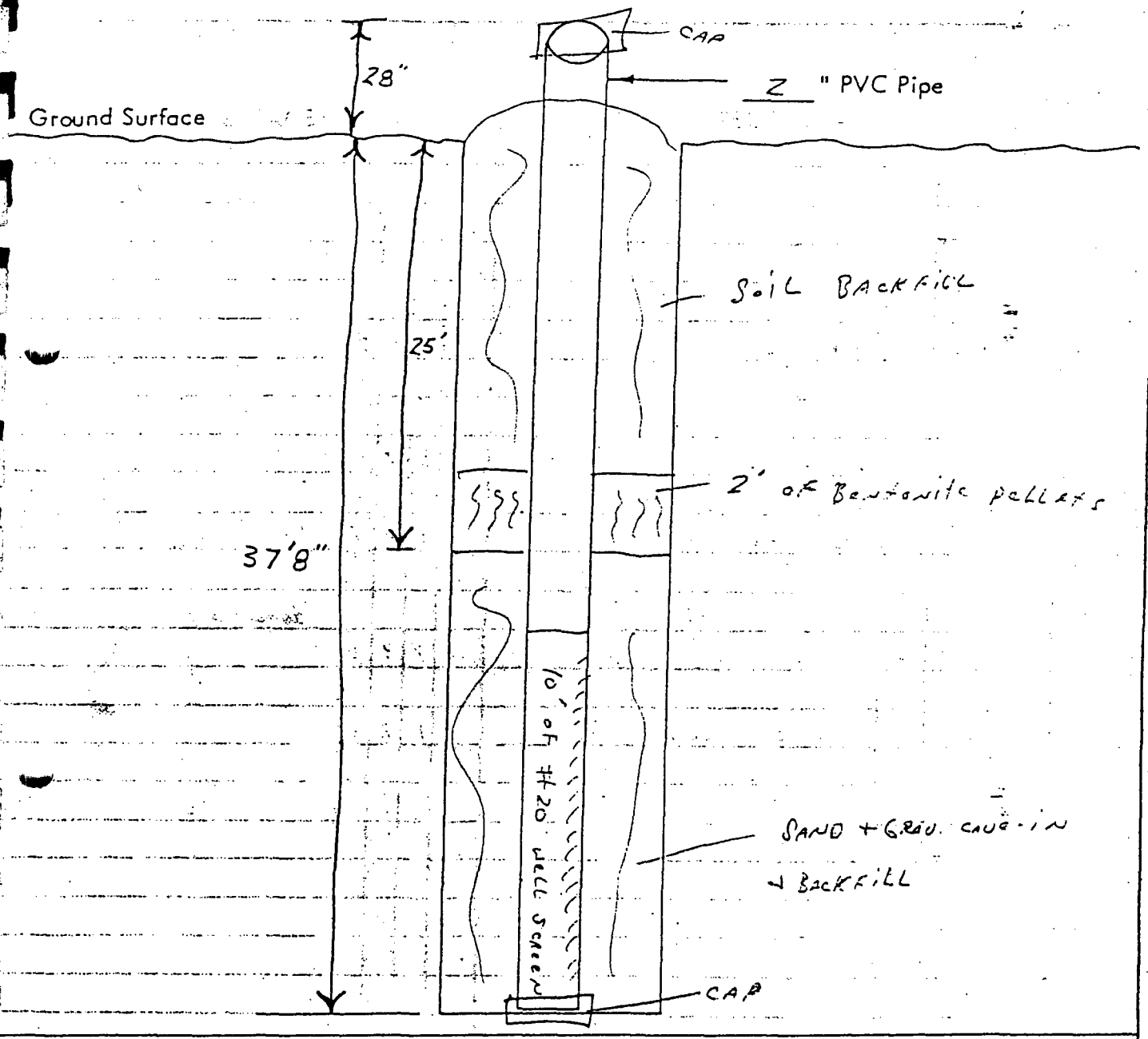
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. B-35 (HB-35) Contract No. 465 Date Installed 6-14-78



NOTES:

BEI 023452

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

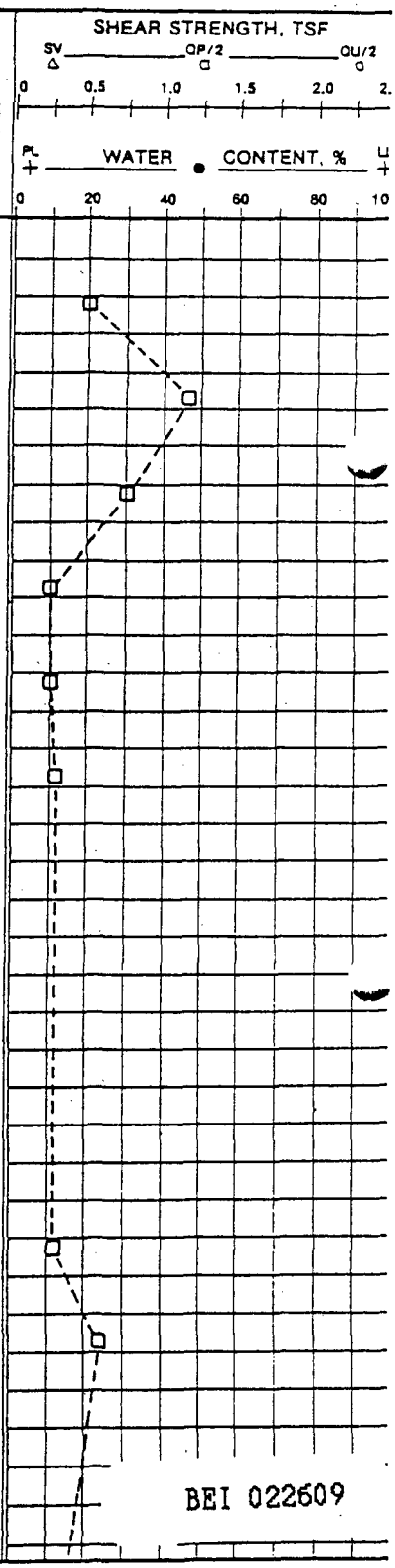
RECORD OF SUBSURFACE EXPLORATION

BORING 33 (HB-33) CONTRACT 465-78

DRILLED BY Roberts DATE DRILLED 6/6/78 LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	1	SS		Dk. Br. CLAY w/Si. & Traces Of Sand	4-3	
5	2	SS		Dk. Gr. CLAY w/Oxidized Spots -Gray w/Oxidized Spots & Stains & Traces Of Sand From 6.0'	4-7	
	3	SS			2-3	
10	4	SS		Gray & Brown Sandy Clayey SILT	2-3	
	5	SS		Gray & Brown Silty CLAY w/ Fine Sand -w/Calcareous Matter @ 14.0'	2-1	
15	6	SS			1-2	
	7	SS		Gray & Brown Clayey SILT w/ Fine Sand	1-1	
20	8	SS		Gr. & Br. Fine Sandy Silty CLAY -Brown From 21.5'	1-1	
	9	SS			3-4	
25	10	SS		Gr. Fine Sandy SILT	1-2	
	11	SS		Dk. Gr. Silty CLAY	1-2	
30	12	SS		Dk. Gr. CLAY w/Silt	2-3	
	13	SS		Gr. Fine SAND w/Silt & Fuel Odor	10-14	
35	14	SS		Cont'd	11-14	



BEI 022609

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 33 Cont'd (HB-33) CONTRACT 465-78

JOHN MATHES & ASSOCIATES

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		Gr. Fine SAND w/Silt & Fuel Odor		
	15	SS			10-7	
				Dk. Gr. Silty CLAY		
40	16	SS		Gr. Fine To Coarse SAND w/Silt & Fuel Odor	2-25	
	17	SS		-Gravelly From 40.3' To 43.0'	23-22	
45	18	SS		-w/Gravel @ 44.0'	12-20	
				-Fine To Medium @ 46.5'		
	19	SS		T. O. B.	20-26	
50						

SHEAR STRENGTH, TSF: SV △ QP/2 □ QU/2 ○ — 0, 0.5, 1.0, 1.5, 2.0

PL + WATER ● CONTENT, % — 0, 20, 40, 60, 80

DRILLED BY Roberts DATE DRILLED 6/6/78 LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

BEI 022610

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

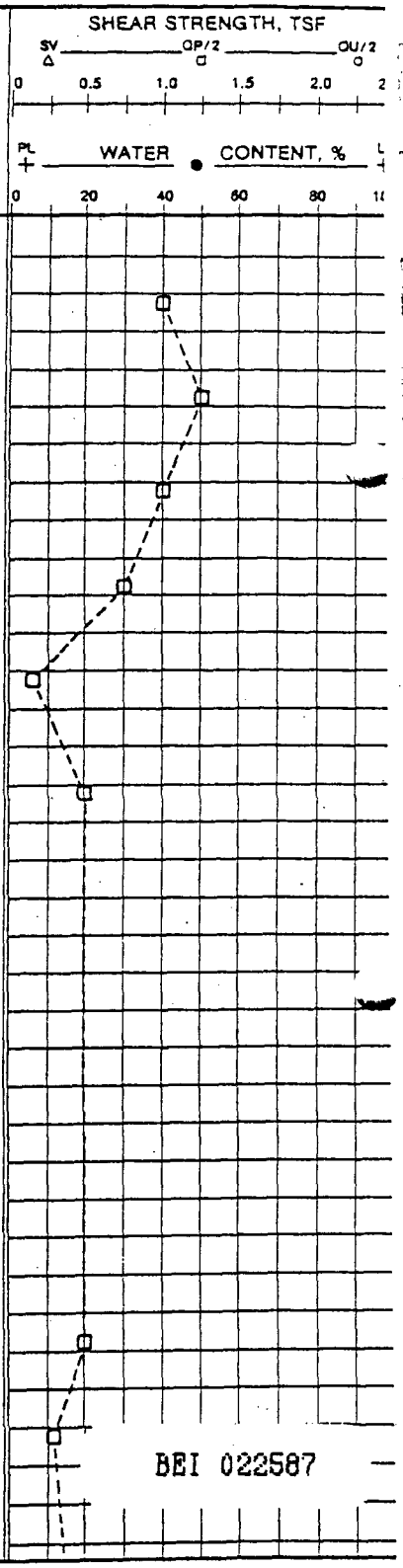
BORING 20 (HB-20) CONTRACT 465-78

DRILLED BY Roberts LOGGED BY Black

PROJECT Phase II, Hydrocarbon Rec. DATE DRILLED 6/12/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Black Silty CINDERS		
	1	SS		Black CLAY w/Silt	2-3	
5	2	SS		Dark Gray CLAY	2-5	
	3	SS		Gr.CLAY w/Silt, Oxidized Spots & Stains & Traces of Fine Sand	2-3	
10	4	SS		Gray CLAY w/Oxidized Spots & Stains	2-3	
	5	SS		Brownish-Gray Fine Sandy Silty CLAY	1-1	
15	6	SS		Gr.CLAY w/Silt Seams	1-2	
	7	SS		Gray Silty CLAY w/Traces of Fine Sand	1-1	
20	8	SS			1-1	
	9	SS		Gray Fine Sandy SILT w/1" Clay Seams @ 23.0'	1-2	
25	10	SS		Gray Silty CLAY w/Fine Sand & 3" Clay Seam @ 25.5'	3-2	
	11	SS		Dark Gray Fine Sandy Silty CLAY w/Clay Seams	2-2	
30	12	SS		Dark Gray CLAY w/Silt	1-2	
	13	SS		-Dark Brown & Gray w/ Traces of Fine Sand @ 31.5'	2-3	
35	14	SS		Cont'd	8-12	



BEI 022587

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 20 Cont'd (HB-20) CONTRACT 465-78

DRILLED BY Gotsch LOGGED BY Black

PROJECT Phase II, Hydrocarbon Rec. PIEZOMETER Yes

DATE DRILLED 4/12/78

DRILLING METHOD Hollow Auger

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		Dk. Gray Silty Fine SAND -Gray Fine to Medium w/ Silt @ 36.5'		
	15	SS			5-7	
40	16	SS		Dark Gray Silty CLAY w/ Fine Sand -Interbedded w/Fine Sand Seams & Partings @ 41.5'	W/H-4	
	17	SS			2-4	
45	18	SS		Dark Gray CLAY w/Silt	8-17	
	19	SS		Gray Coarse to Fine SAND w/Silt & Fuel Odor -Fine to Medium @ 46.5' -Fine to Coarse @ 49.0'	21-25	
50	20	SS			12-14	
				T.O.B.		
55						

SHEAR STRENGTH, TSF

SV △ QP/2 □ QU/2 ○

0 0.5 1.0 1.5 2.0 2.

PL + WATER ● CONTENT, % + LL

0 20 40 60 80 10

BEI 022588

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

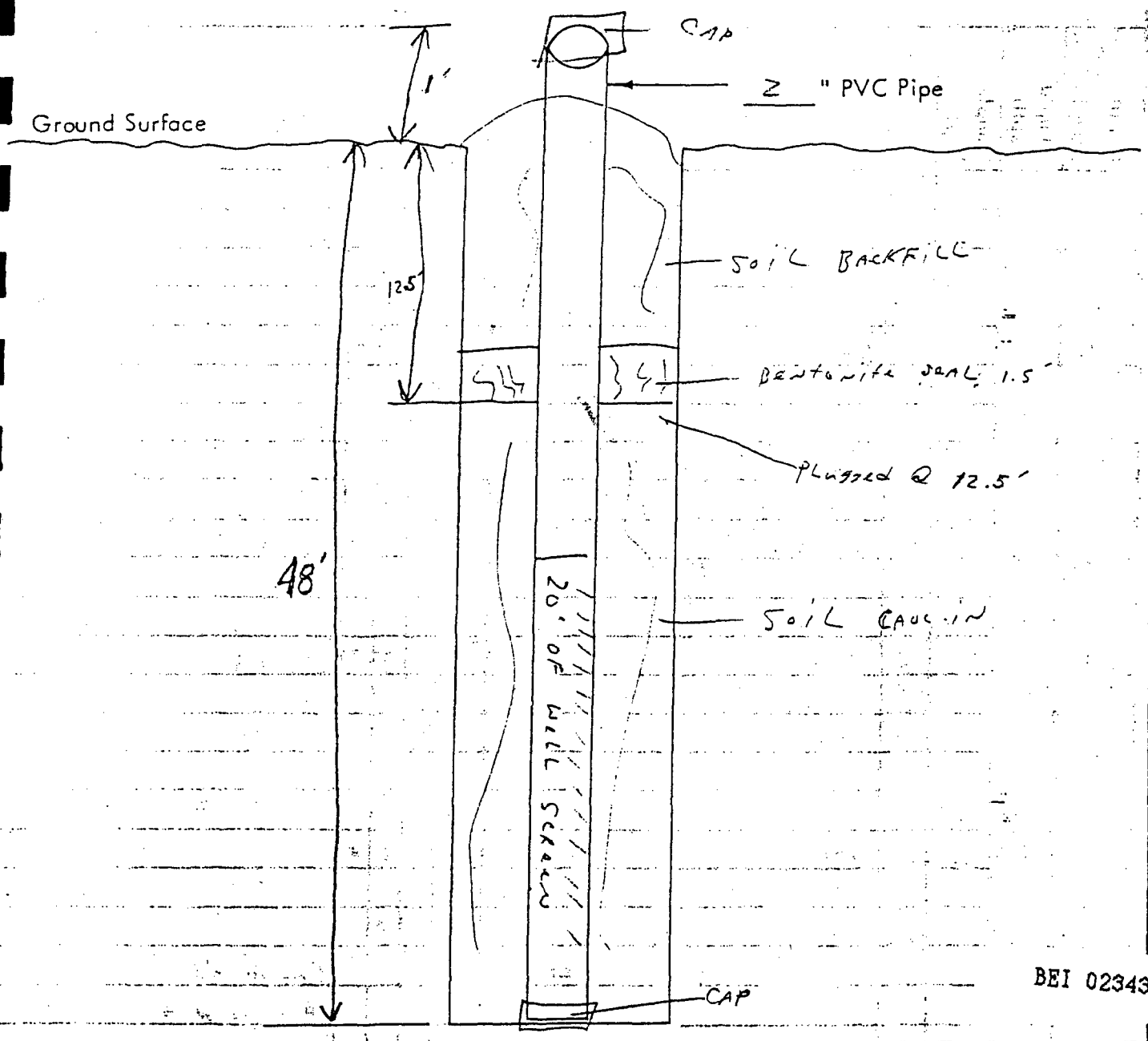
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. B-20 (HB-20) Contract No. 465 Date Installed 6-12-78



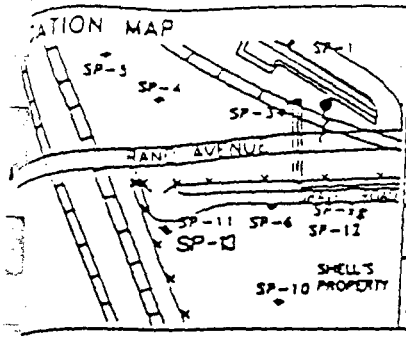
BEI 023439

NOTES: Hole plugged @ 13' - Re-drilled 25' plugged again @ 12.5'

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface



SHELL OIL COMPANY - WELL LOG

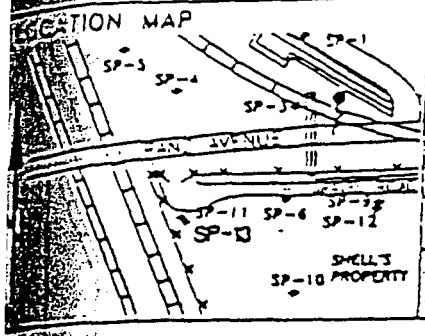
WELL NUMBER	SP-13	LOCATION	WRMC SPILL AREA
DATE	1-13-90	WEATHER	SUNNY MID 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	8.25 HOLLOW-STEM AUGER 5.875" MUD ROTARY	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	50'-29' WB-40 SAND	SEAL	0'-27' GROUT 27'-29' BENTONITE

CASING	TYPE SCHEDULE 40 PVC		DIAMETER 6" 4"		LENGTH 28' 30'	HOLE DIA. 10" 6"	
SCREEN	TYPE S.40 PVC	SLOT 0.01"	DIAMETER 4"		LENGTH 20'	TOTAL DEPTH 50'	

SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0				FLUSH MOUNT
					1			6" CASING	
					2			4" CASING	
					3				
					4			Description of the shallow section of this well is on SP-11 well log. Well SP-11 is 6' NNW to well SP-13.	
					5				
					6				
					7				
					8				
					9				
					10				
					11				
					12				
					13				
					14				
					15				
					16				
					17				
					18				
					19				
					20				

BEI 022442

LANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL



SHELL OIL COMPANY - WELL LOG

WELL NUMBER	SP-13	LOCATION	WRMC SPILL AREA
DATE	1-13-90	WEATHER	SUNNY MID 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	8.25" HOLLOW-STEM AUGER 5.875" MUD ROTARY	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	50'-29' WB-40 SAND	SEAL	0'-27' GROUT 27'-29' BENTONITE

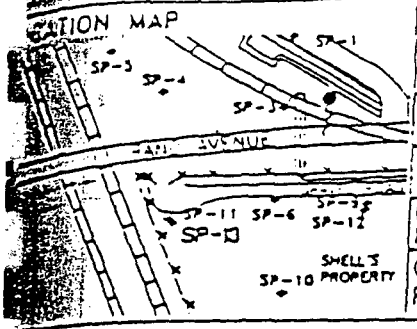
CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 6" 4" LENGTH 28' 30' HOLE DIA. 10" 6"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 20' TOTAL DEPTH 50'

COMPACTNESS SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					20				
					21				
					22				
					23			6" CASING	
					24				
					25				
					26				
					27				
					28			4" CASING	
					29				
					30				
					31				
					32				
loose					33		6	0.00'-0.63' SAND, gray, fine-to medium-grained, subrounded.	
		1	23.7		34	0.63	13		
							18		
							34		
					35				
loose					36			0.00'-0.31' SAND, gray, fine-to medium-grained, some coarse-grained, subrounded.	
					37				
hard								0.31'-0.38' COAL, black, anthracite.	
loose					38		12	0.38'-0.72' SAND, medium-to coarse-grained, some fine-and very coarse-grained with some small pebbles, subrounded to rounded.	
		2	4.7		39	0.72	19		
							7		
					40		9		

EXPLANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022443



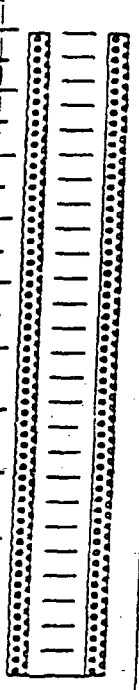
SHELL OIL COMPANY - WELL LOG

WELL NUMBER	SP-13	LOCATION	WRMC SPILL AREA
DATE	1-13-90	WEATHER	SUNNY MID 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	8.25" HOLLOW-STEM AUGER 5.875" MUD ROTARY	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	50'-29' W8-40 SAND	SEAL	0'-27' GROUT 27'-29' BENTONITE

CASING	TYPE SCHEDULE 40 PVC	DIAMETER 6" 4"	LENGTH 28' 30'	HOLE DIA. 10" 6"	
SCREEN	TYPE S.40 PVC SLOT 0.01"	DIAMETER 4"	LENGTH 20'	TOTAL DEPTH 50'	

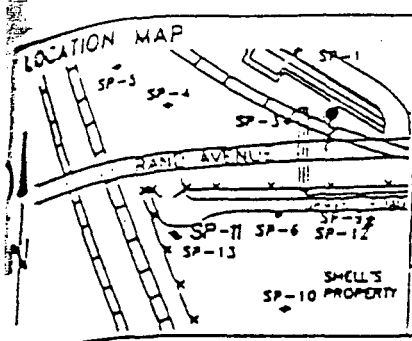
SOIL CONDITIONS	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
					40			
					41			
					42			
soft		plas			43			0.00'-0.34' SILT, gray, clayey.
soft		plas						0.31'-0.49' CLAY, gray, silty.
poor	loose		3	3.2	44	1.47	3, 3, 5, 5	0.49'-0.53' SAND, gray, very fine-to fine-grained, subrounded.
	soft	plas						0.53'-0.83' CLAY, gray, silty.
poor	vloose				45			0.83'-0.96' SAND, gray, very fine- to fine-grained, subrounded.
	soft	plas			46			0.96'-1.21' CLAY, gray, silty.
poor	vloose							1.21'-1.47' SAND, gray, very fine-to fine-grained, subrounded.
					47			
					48			
poor	loose		4	117.2	49	1.21	20, 31, 24, 19	0.00'-1.21' SAND, gray, medium-to coarse-grained, some small pebbles, subrounded to well-rounded, different product odor.
					50			
					51			
					52			
					53			
					54			
					55			
					56			
					57			
					58			
					59			
					60			

WELL COMPLETION



EXPLANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022444



SHELL OIL COMPANY - WELL LOG

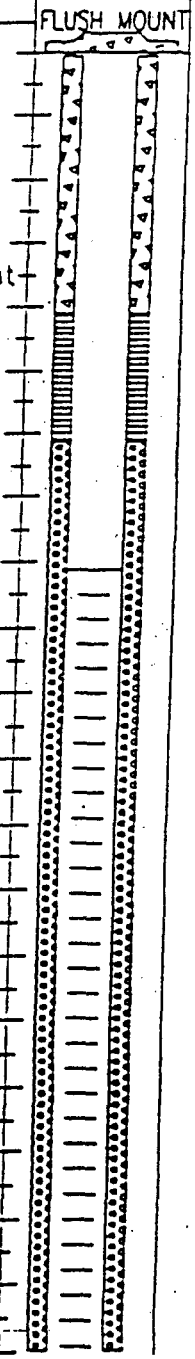
WELL NUMBER	SP-11	LOCATION	TANNERY
DATE	1-9-90	WEATHER	WINDY LOW 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	28'-6' W8-40 SAND	SEAL	0'-4' GROUT 4'-6' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 10' HOLE DIA. 10"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 20' TOTAL DEPTH 28'

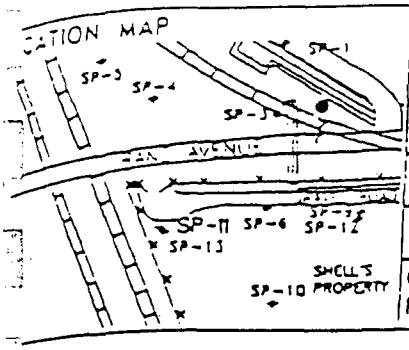
CONSIST.	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
		soft	plastic	1	2.6	0.98		1, 3, 3, 4	0.00'-0.98' CLAY, mottled gray and light tan.
		soft	plastic	2	11.6	1.24		1, 2, 2, 3	0.00'-1.24' CLAY, mottled light tan and light gray, silty.
		v soft	v plas	3	2.3	2.00		pushed, 1, 2, 3	0.00'-2.00' CLAY, light gray, mottled light tan.
			loose						0.00'-0.54' SAND, gray, fine-grained, slight product odor.
		soft	plastic	4	125.3	1.67		pushed	0.54'-0.92' SILT, gray, sandy.
			loose					pushed	0.92'-1.32' SAND, gray, fine-grained, product odor.
		soft	plastic					pushed, 1	1.32'-1.67' CLAY, gray, sandy, product odor.

WELL COMPLETION



LEGEND: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022497



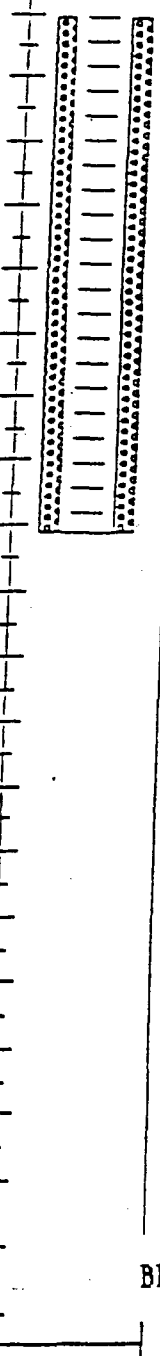
SHELL OIL COMPANY - WELL LOG

WELL NUMBER	SP-11	LOCATION	TANNERY
DATE	1-9-90	WEATHER	WINDY LOW 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	28'-6' WB-40 SAND	SEAL	0'-4' GROUT 4'-6' BENTONITE

ING	TYPE SCHEDULE 40 PVC	DIAMETER 4"	LENGTH 10'	HOLE DIA. 10"	
REEN	TYPE S.40 PVC	SLOT 0.01"	DIAMETER 4"	LENGTH 20'	TOTAL DEPTH 28'

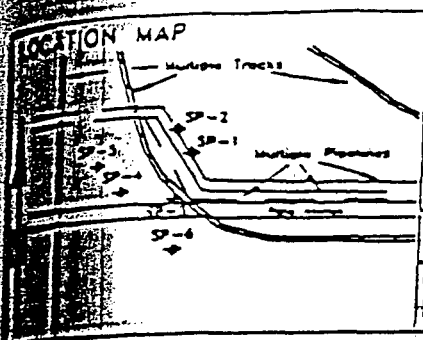
SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
					20			
					21			
					22			
					23			
od							pushed	0.00'-1.11' SAND, light brown, very fine-grained.
			5	3.1	24	2.00	pushed	
mod	vloose						pushed	1.11'-1.70' SAND, gray, very fine-grained.
					25		2	
	v soft	v plas						1.70'-2.00' CLAY, gray, sandy.
					26			
					27			
					28			
	v soft	v plas					pushed	0.00'-2.00' CLAY, gray, very sticky.
			6	5.2	29	2.00	pushed	
							pushed	
							1	
					30			
					31			
					32			
					33			
					34			
					35			
					36			
					37			
					38			
					39			
					40			

WELL COMPLETION



BEI 022438

TION GROUT SAND SCREEN
BENTONITE CASING WATER LEVEL



SHELL OIL COMPANY-WELL LOG

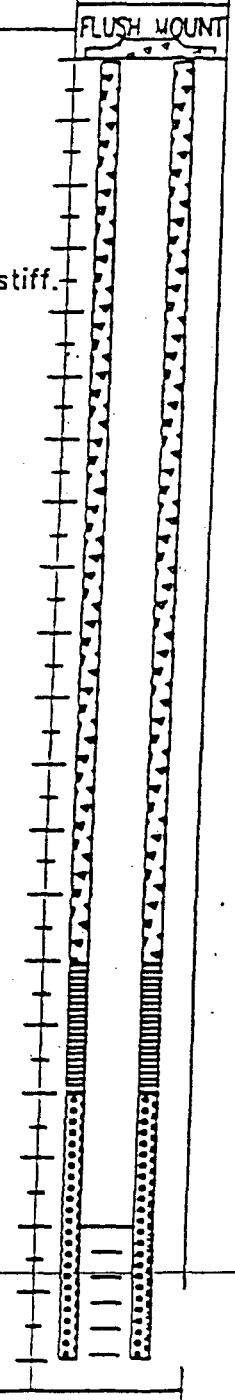
WELL NUMBER	SP-3	LOCATION	WRMC SPILL AREA
DATE	12-27-89	WEATHER	OVERCAST COLD
LOGGED BY	HENRY WISE	DRILLED BY	JOHN MATHIS, INC
DRILLING METHOD	10.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	30'-16'=14'	SEAL	14'-0' GROUT 16'-14' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 18' HOLE DIA. 12"

SCREEN ▶ TYPE S.40 PVC SLOT 0.020" DIAMETER 4" LENGTH 10' TOTAL DEPTH 30'

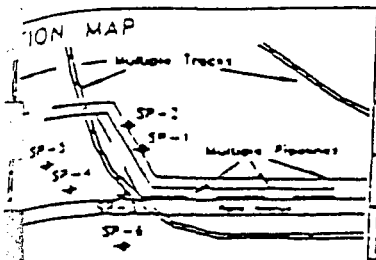
CONSISTENCY	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
					0			
					1			
					2			
					3			
		slight	1	29.4	4	1.16	2, 2, 3, 5	0.00'-1.16' CLAY, black, moderately stiff.
					5			
					6			
					7			
					8			
		plastic	2	1335	9	1.70	2, 2, 3, 4	0.00'-1.70' CLAY, olive-grey, slightly stiff.
					10			
					11			
					12			
					13			
		plastic	3	1028	14	2.00	1, 1, 1, 2	0.00'-2.00' CLAY, brown, slightly stiff.
					15			
					16			
					17			
					18		0	NO RECOVERY
			4		19	0.00	0, 0, 1	
					20			

WELL COMPLETION



GROUT SAND SCREEN

BEI 022421



SHELL OIL COMPANY-WELL LOG

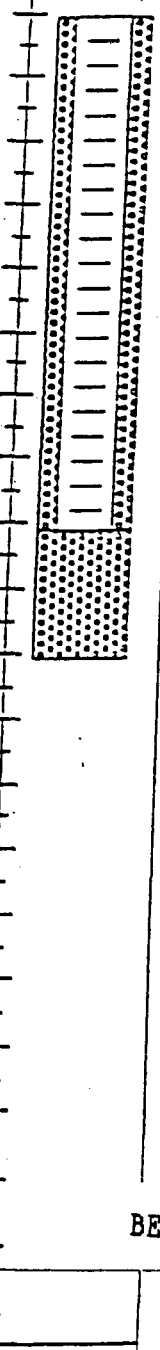
WELL NUMBER	SP-3	LOCATION	WRMC SPILL AREA
DATE	12-27-89	WEATHER	OVERCAST COLD
LOGGED BY	HENRY WISE	DRILLED BY	JOHN MATHIS, INC
DRILLING METHOD	10.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	30'-16'=14'	SEAL	14'-0' GROUT 16'-14' BENTONITE

▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 18" HOLE DIA. 12"

▶ TYPE S.40 PVC SLOT 0.020" DIAMETER 4" LENGTH 10' TOTAL DEPTH 30'

DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
				20			
				21			
				22			
				23			
loose		5	1689	24	1.50	1 2 2 3	0.00'-1.50' SAND, brown, very-fine-grained, product odor.
				25			
				26			
				27			
				28			
	plastic	6	499	29	1.60	0 1 2 3	0.00'-1.60' CLAY, grey, slightly stiff.
				30			
				31			
				32			
				33			
				34			
				35			
				36			
				37			
				38			
				39			
				40			

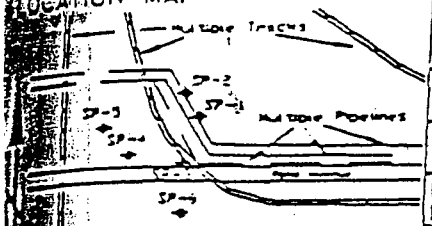
WELL COMPLETION



BEI 022422

GROUT SAND SCREEN
BENTONITE CASING WATER LEVEL

LOCATION MAP



SHELL OIL COMPANY-WELL LOG

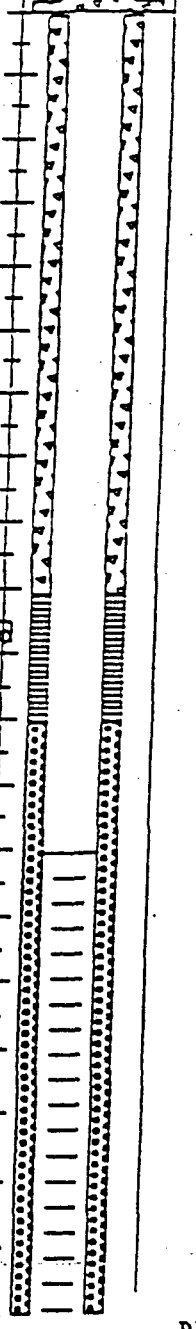
WELL NUMBER	SP-1	LOCATION	WRMC SPILL AREA
DATE	12-21-89	WEATHER	-3 F CLEAR WINDY
LOGGED BY	J.PAWLIK	DRILLED BY	JOHN MATHIS, INC.
DRILLING METHOD	10.25' HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	28'-11'=17'	SEAL	9'-0' ENVIROPLUG 11'-9' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 13' HOLE DIA. 12"

SCREEN ▶ TYPE S.40 PVC SLOT 0.02" DIAMETER 4" LENGTH 15' TOTAL DEPTH 28'

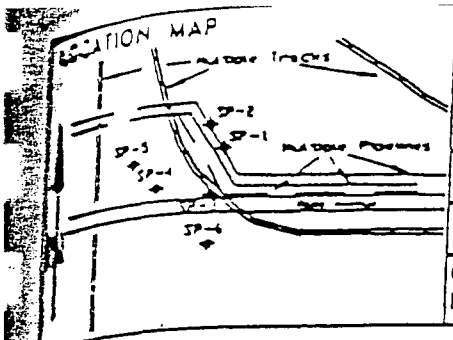
CONSISTENCY	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
						0			
						1			
						2			
						3			
stiff	slight			1	537	4	1.75'	1	0.00'-0.57' CLAY, dark brown, some limestone rock.
stiff	slight							1	0.57'-0.75' CLAY, black, hydrocarbon odor.
						5			
						6			
						7			
						8		2	0.00'-0.19' CAVINGS, dark brown clay and limestone rock.
stiff	slight			2	1280	9	1.25'	2	0.19'-0.69' CLAY, black, slightly silty.
stiff	slight							2	
						10		1	0.69'-1.25' CLAY, gray, orange mottled, slightly silty.
						11			
						12			
						13		2	0.00'-0.43' CAVINGS, black clay and limestone rock.
stiff	plastic			3	2000+	14	0.70'	1	
								1	0.43'-0.70' CLAY, tan, orange mottled.
						15			
						16			
						17			
						18		1	0.00'-0.42' CLAY, tan, orange mottled, moderately silty, hydrocarbon odor.
stiff	plastic			4	2000+	19	0.42'	1	
						20		1	

WELL COMPLETION



LEGEND: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022413



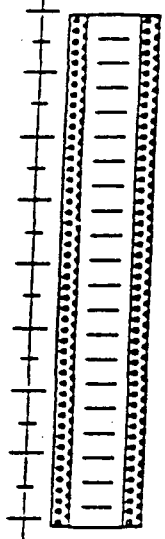
SHELL OIL COMPANY-WELL LOG

WELL NUMBER	SP-1	LOCATION	WRMC SPILL AREA
DATE	12-21-89	WEATHER	-3 F CLEAR WINDY
LOGGED BY	J.PAWLIK	DRILLED BY	JOHN MATHIS, INC.
DRILLING METHOD	10.25' HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	28'-11'=17'	SEAL	9'-0' ENVIROPLUG 11'-9' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 13' HOLE DIA. 12"

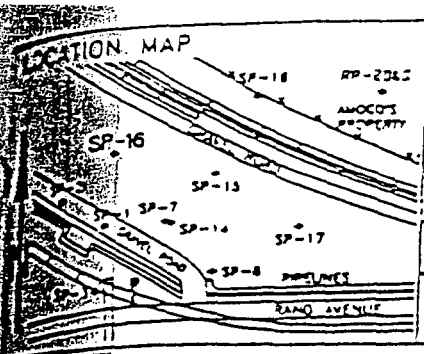
SCREEN ▶ TYPE S.40 PVC SLOT 0.02" DIAMETER 4" LENGTH 15' TOTAL DEPTH 28'

CONSISTANCE	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					20			WATER ON A.W. RODS AT 20.5'	
					21				
					22				
					23				
	loose						1	0.00'-0.10' SILT, tan, some clay.	
	soft	slight	5	697	24	1.0'	1	0.10'-0.20' CLAY, green, very silty.	
wet	loose						1	0.20'-1.0' SAND, very fine-grained, green to dark gray.	
					25		1		
					26				
					27				
					28				
	stiff	slight	6	423	29	1.46'	0	0.00'-1.46' CLAY, gray to green.	
							0		
							0	* clay may have been wet in spoon, sample frozen when spoon was opened.	
							0		
					30				
					31				
					32				
					33				
					34				
					35				
					36				
					37				
					38				
					39				
					40				



LEGEND: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022414



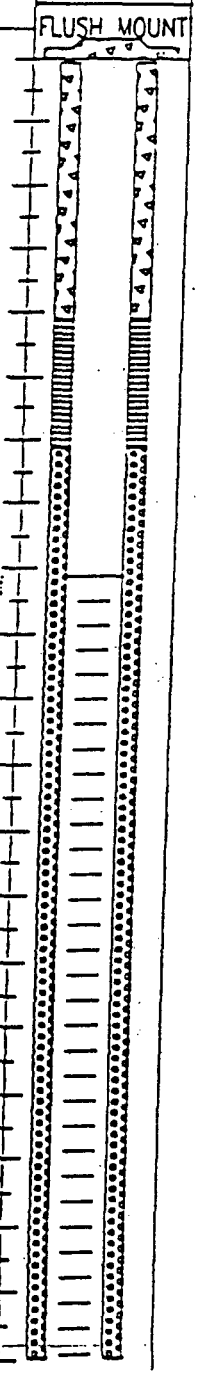
SHELL OIL COMPANY - WELL LOG

WELL NUMBER	SP-16	LOCATION	WRMC SPILL AREA
DATE	1-12-90	WEATHER	SUNNY, WINDY HIGH 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	28'-6' WB-40 SAND	SEAL	0'-4' GROUT 4'-6' BENTONITE

CASING	TYPE SCHEDULE 40 PVC	DIAMETER 4"	LENGTH 8'	HOLE DIA. 10"
SCREEN	TYPE S.40 PVC SLOT 0.01"	DIAMETER 4"	LENGTH 20'	TOTAL DEPTH 28'

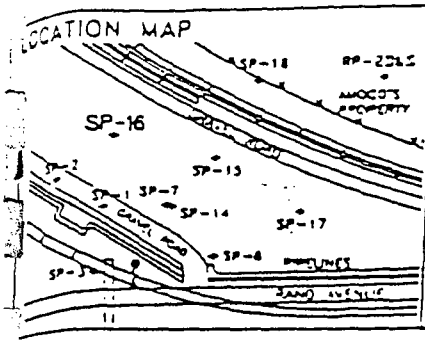
SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
	m. stiff	plas	1	1581	3–4	0.36	3, 4, 5, 4	0.00'–0.36' CLAY, dark gray.
	soft	plas	2	865	8–9	.072	4, 3, 3, 3	0.00'–0.72' CLAY, mottled light gray and tan, slight product odor.
	soft	plas	3	>2000	13–14	7.00	3, 3, 3, 3	0.00'–2.00' CLAY, mottled light gray and tan, very fine-grained sand filled burrows from 0.18'–0.32', slight product odor.
	soft	plas	4	1987	18–19	1.13	2, 2, 2, 2	0.00'–1.13' SILT, light gray, some tan clay increasing with depth, product odor.

WELL COMPLETION



EXPLANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022450



SHELL OIL COMPANY - WELL LOG

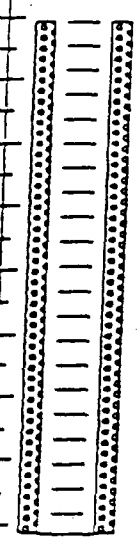
WELL NUMBER	SP-16	LOCATION	WRMC SPILL AREA
DATE	1-12-90	WEATHER	SUNNY, WINDY HIGH 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	28'-6' WB-40 SAND	SEAL	0'-4' GROUT 4'-6' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 8' HOLE DIA. 10"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 20' TOTAL DEPTH 28'

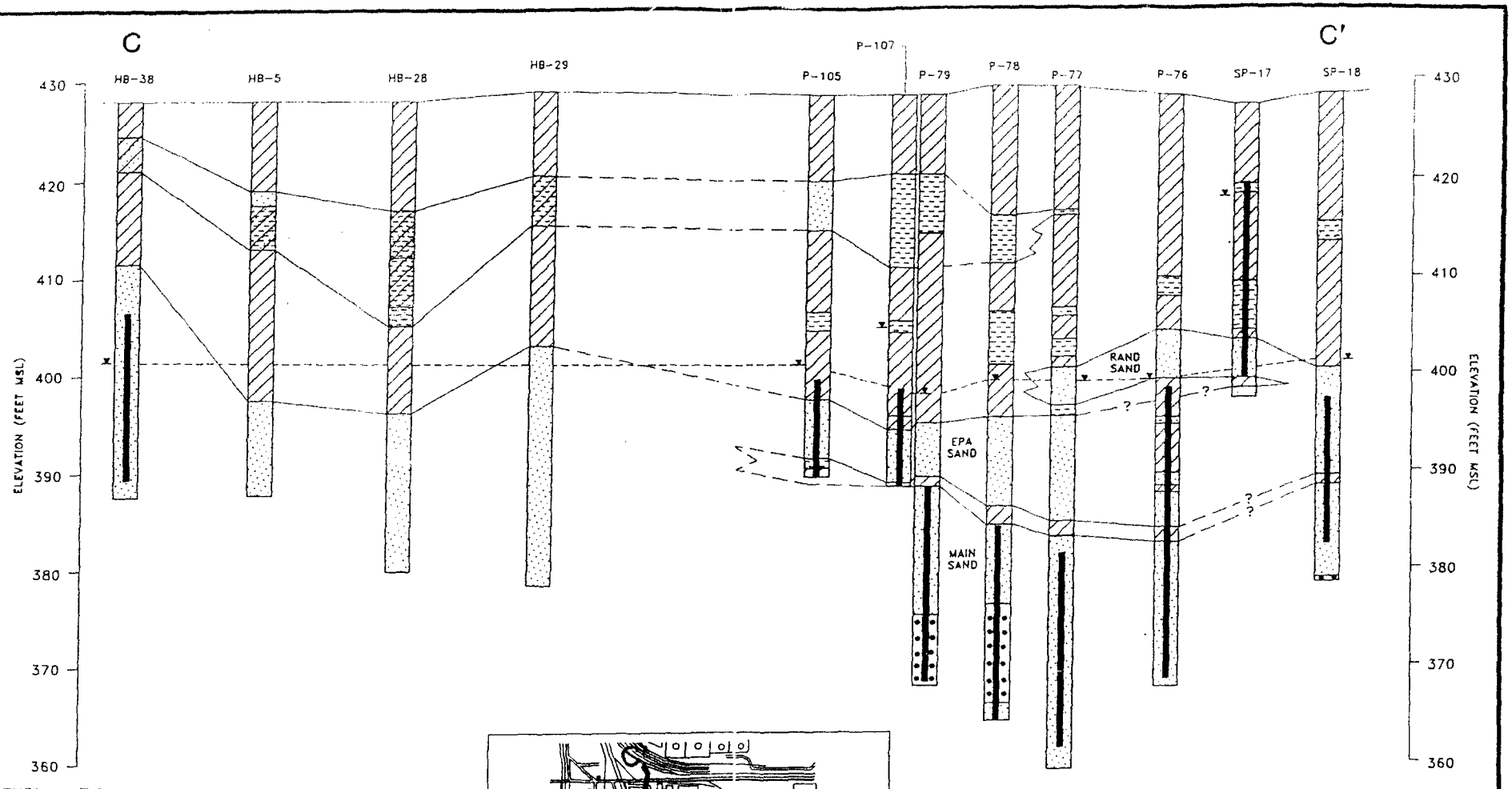
SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
poor	vloose				20			
					21			
					22			
					23			
			5	>2000	24	1.87	1, 1, 3, 4	0.00'-1.87' SAND, dark gray, fine-to very fine-grained, sub-rounded, clayey, very slight product odor, sheen on spoon.
					25			
					26			
					27			
					28			
	soft	v plas	6	32.3	29	1.63	1, 3, 4, 4	0.00'-1.63' CLAY, dark gray, sticky.
					30			
					31			
					32			
					33			
					34			
					35			
					36			
					37			
					38			
					39			
					40			

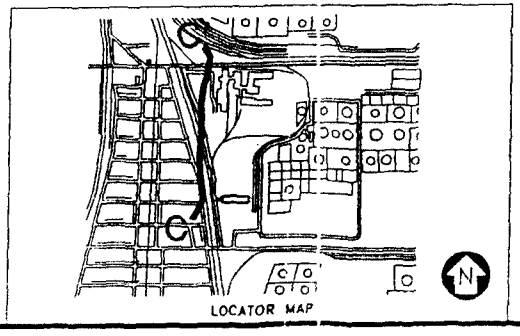
WELL COMPLETION



EXPLANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022451





LOCATOR MAP

HORIZONTAL SCALE IN FEET
0 200 400
0 10 20
VERTICAL SCALE IN FEET

EXPLANATION

- CLAY
- SILT
- SAND
- GRAVEL
- SCREENED INTERVAL
- STATIC WATER LEVEL (CORRECTED FOR HYDROCARBON THICKNESS)

NOTE: 1. Monitoring wells or boreholes located in Hartford have been relabeled with a "H" prefix on cross section.
2. Fluid measurements were made in July 1990.

General Note:
This profile was developed by interpolation between widely spaced boreholes. Only at the borehole locations should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.

John Mathes & Associates, Inc.

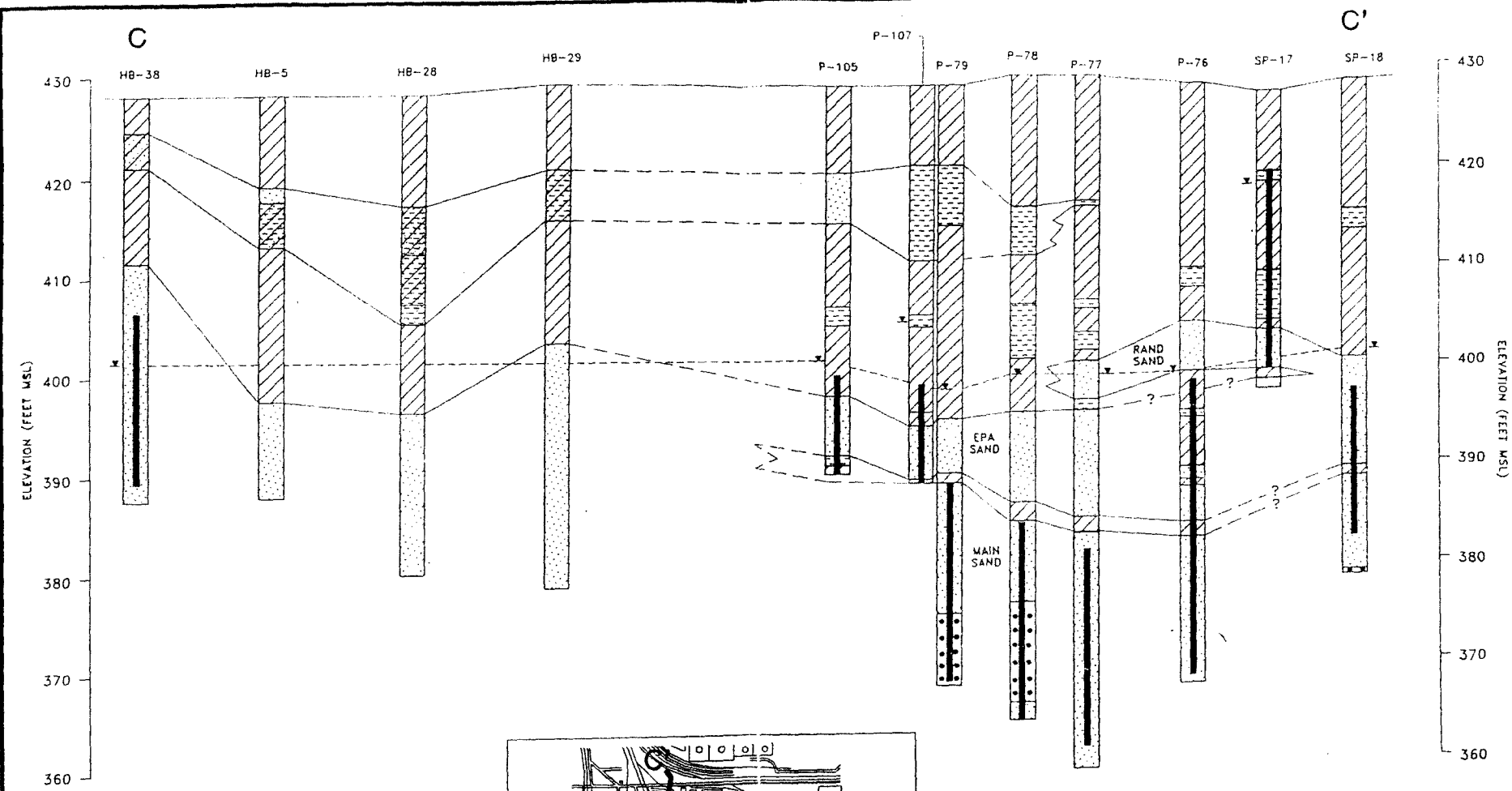
CROSS SECTION C – C'

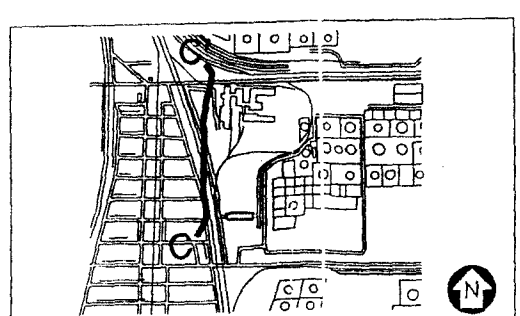
CLARK OIL COMPANY
HARTFORD, ILLINOIS
122327

DWG NO. 3

DRAWN BY	CHECKED BY	DOCUMENT MANAGER	PROJECT MANAGER
PTS 10/5/90	BTS 10/5/90	KJM 10/5/90	[illegible] 10/15/90

B
REV. DATE 9/7/90





LOCATOR MAP

HORIZONTAL SCALE IN FEET
0 200 400
0 10 20
VERTICAL SCALE IN FEET

EXPLANATION

- CLAY
- SILT
- SAND
- GRAVEL
- SCREENED INTERVAL
- STATIC WATER LEVEL (CORRECTED FOR HYDROCARBON THICKNESS)

NOTE: 1. Monitoring wells or boreholes located in Hartford have been relabeled with a "H" prefix on cross section.
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General Note:
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John Mathes & Associates, Inc.

CROSS SECTION C – C'

CLARK OIL COMPANY
HARTFORD, ILLINOIS
122327

DWG NO. 3

DRAWN BY	CHECKED BY	DOCUMENT MANAGER	PROJECT MANAGER
PTS 10/5/90	BTS 10/5/90	KJM 10/8/90	[illegible] 10/15/90

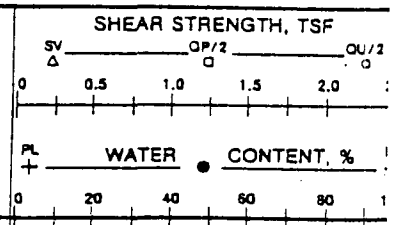
B
REV. DATE 9/7/90

RECORD OF SUBSURFACE EXPLORATION

BORING 38 (HB-38) CONTRACT 465-78

DRILLED BY Roberts LOGGED BY Schweigert
PROJECT Phase II, Hydrocarbon Recovery PIEZOMETER Yes
DATE DRILLED 6/15/78 DRILLING METHOD Hollow Auger

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	1	SS		Dark Brown Silty CLAY -w/Traces Of Fine Sand@1.5'	1-1	
5	2	SS		Brown Silty Fine SAND w/ Clay	1-1	
	3	SS		Brownish-Gray To Gray CLAY w/Oxidized Spots	2-2	
10	4	SS			2-4	
	5	SS			3-4	
15	6	SS		Gr. Si. CLAY w/Oxidized Stains	2-2	
	7	SS		Brown Fine SAND -Silty From 16.5' To 23'	5-7	
20	8	SS			5-7	
	9	SS			9-14	
25	10	SS		-Gray From 24' To 28' -w/Silt @ 24'	9-14	
	11	SS			6-6	
30	12	SS		-w/Silt From 29' To 38' -w/Black Spots From 29' To 33'	3-9	
	13	SS		-Fine To Medium Lens @ 32.5'	9-10	
35	14	SS		Cont'd	13-13	



BEI 022619

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 38 Cont'd (HB-38) CONTRACT 465-78

DRILLED BY Roberts DATE DRILLED 6/15/78 LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV △, QP/2 □, QU/2 ○; 0, 0.5, 1.0, 1.5, 2.0) / WATER CONTENT, % (PL +, ●; 0, 20, 40, 60, 80)
	14	SS		Brown Fine SAND w/Silt			
	15	SS			5-7		
				-Silty w/Clay @ 39'			
40	16	SS		T. O. B.	6-7		
45							

BEI 022620

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

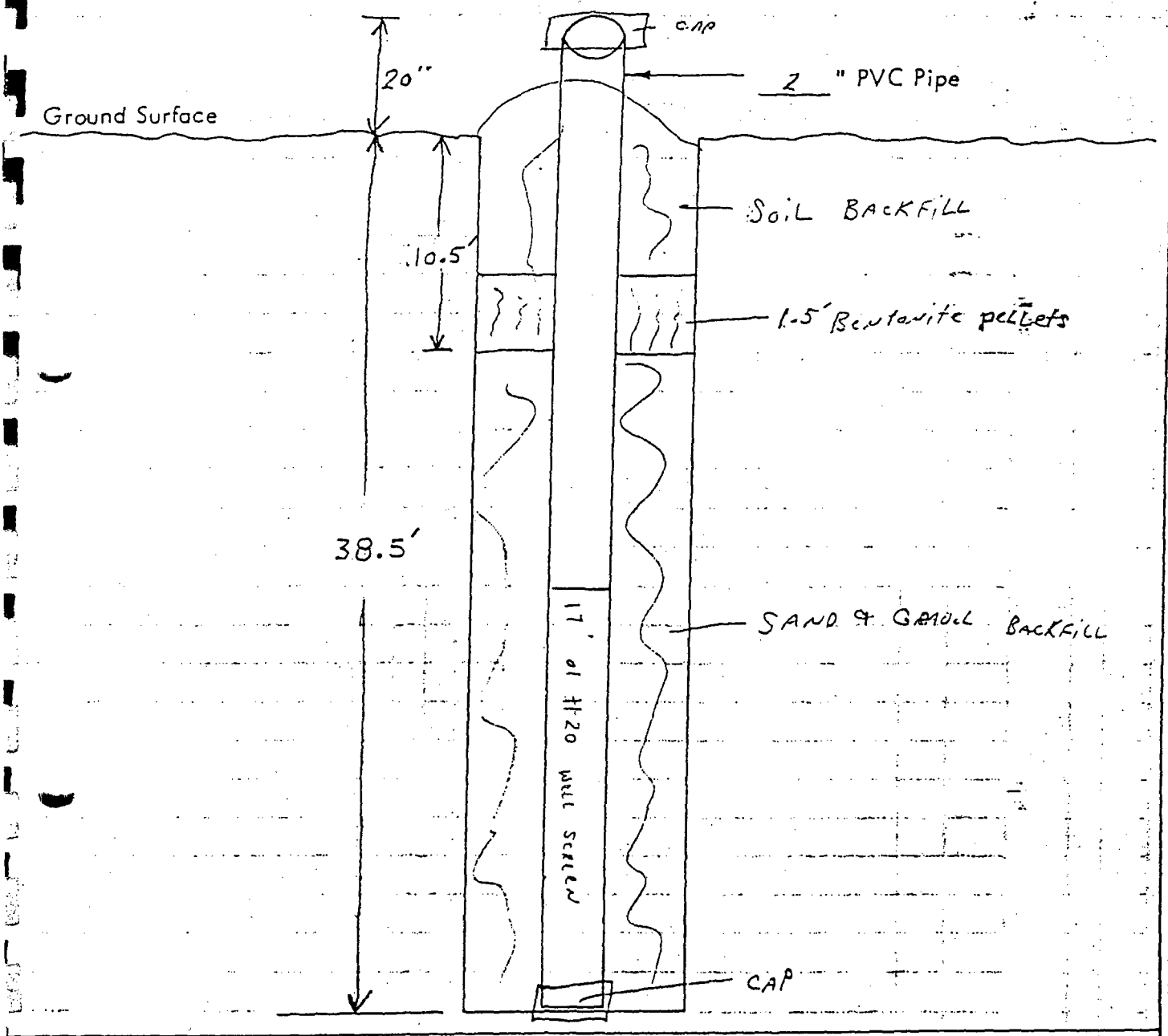
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. B-38 (HB-38) Contract No. 465 Date Installed 6-15-78



NOTES:

BEI 023455

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

BORING 5 (HB-5) CONTRACT 465-78

DRILLED BY Roberts LOGGED BY Black

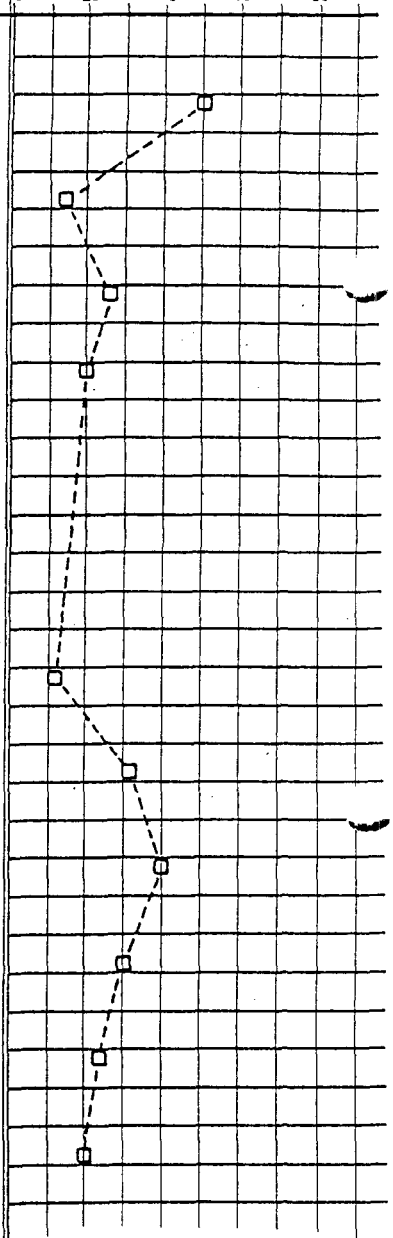
DATE DRILLED 6/5/78 PIEZOMETER Yes

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	1	SS		Dark Gray & Brown CLAY w/Fine Roots	5-5	
5	2	SS		Brown Silty CLAY w/Traces Of Fine Sand	1-2	
	3	SS		Gray CLAY w/Oxidized Spots & Stains	2-4	
10	4	SS		Gray Fine Sandy Silty CLAY Grayish-Brown Silty Fine SAND	4-5	
	5	SS		Brownish-Gray Fine Sandy SILT w/Oxi. Stains	3-6	
15	6	SS		Gray Fine Sandy Clayey SILT w/Oxidized Stains	4-4	
	7	SS		Gray Silty CLAY w/Oxidized Spots & Stains & Traces Of Sand	4-4	
20	8	SS		Interbedded Gray CLAY, Si. Clay & Clayey SILT Seams	3-4	
	9	SS		Dark Gray CLAY w/Oxidized Spots & Silty Pockets	4-5	
25	10	SS		Gray CLAY w/Silt, Fine Sand & Oxidized Spots	2-3	
	11	SS		Gray CLAY w/Oxidized Spots Silty Clay Lenses & Sand Partings	2-3	
30	12	SS		Dark Brownish-Gray CLAY w/Silt	3-3	
	13	SS		Brown Silty Fine To Medium SAND -w/Clay @ 29.0'	10-10	
35	14	SS		Cont'd	9-13	

SHEAR STRENGTH, TSF — SV △ OP/2 □ QU/2 ○ — 0 0.5 1.0 1.5 2.0

PL + WATER ● CONTENT, % — 0 20 40 60 80



BEI 022569

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 5 Cont'd (HB-5) CONTRACT 465-78

DRILLED BY Roberts LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation DATE DRILLED 6/5/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV △, QP/2 □, QU/2 ○; 0, 0.5, 1.0, 1.5, 2.0) / WATER CONTENT, % (PL +, ●; 0, 20, 40, 60, 80)
	14	SS		Brown Silty Fine To Medium SAND			
	15	SS			6-10		
				-w/Silt & 2" Clay Seam @ 39.0'			
40	16	SS		T. O. B.	13-14		
45							

BEI 022564

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

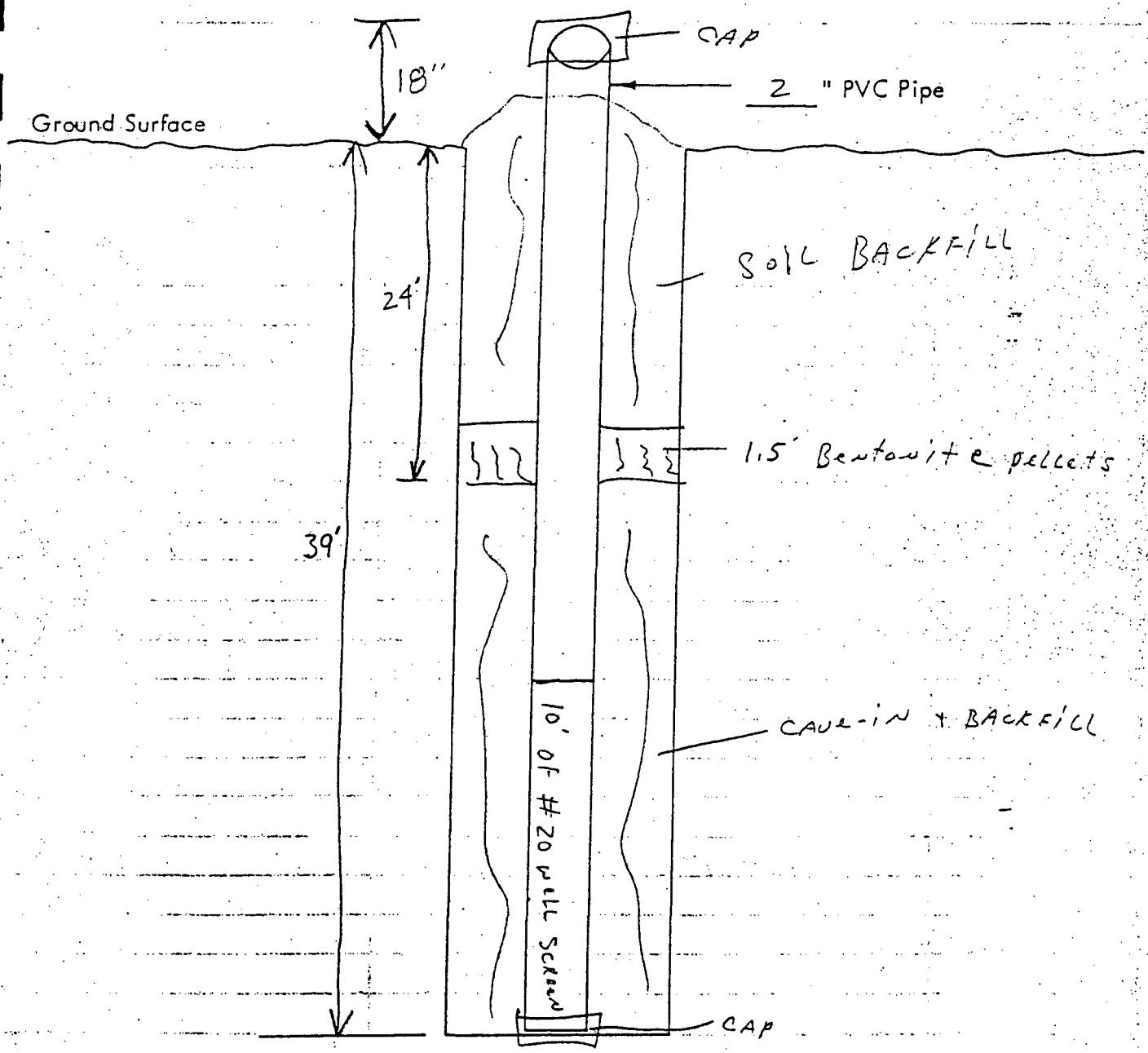
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. B-5 (HB-5) Contract No. 465 Date Installed 6-5-78



NOTES:

BEI 023425

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

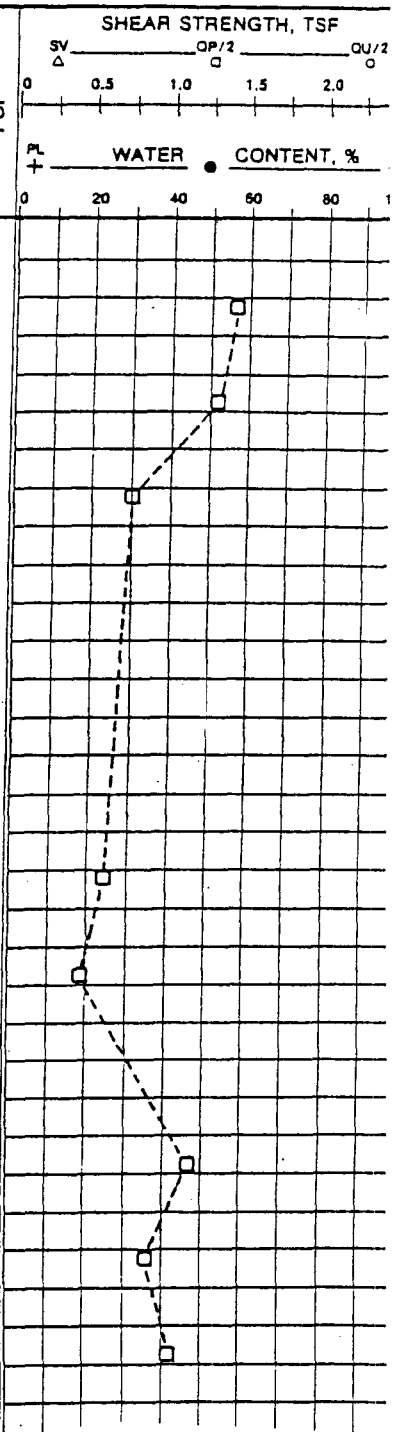
RECORD OF SUBSURFACE EXPLORATION

BORING 28 (HB-28) CONTRACT 465-78

DRILLED BY Gotsch DATE DRILLED 6/8/78 LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Brown & Dk. Gr. Silty CLAY		
	1	SS		Dk. Br. CLAY w/Silt & Traces Of Fine Sand	6-7	
5	2	SS		Brown & Dark Gray CLAY w/ Oxidized Spots	3-5	
	3	SS		Brownish-Gray CLAY w/Silt Oxidized Stains & Traces Of Sand	2-2	
10	4	SS		Gray Silty CLAY w/Traces Of Fine Sand	2-4	
	5	SS		Brown Fine Sandy SILT	1-2	
15	6	SS		Gray Fine Sandy Clayey SILT	1/12"-1	
	7	SS		Gray CLAY w/Silt	2-3	
20	8	SS		Dk. Gr. & Gr. CLAY w/Silt & Traces Of Fine Sand	1-2	
	9	SS		Gray Clayey Fine Sandy SILT	1-2	
25	10	SS		Gray Silty CLAY & CLAY w/Si. & Traces Of Fine Sand	2-3	
	11	SS		Mottled Gray & Brown CLAY	2-3	
30	12	SS		-Gray @ 29.0'	2-3	
	13	SS		Gray Silty CLAY Brown Fine SAND w/Fuel Odor	7-8	
35	14	SS		-Fine To Medium @ 34.0' Cont'd	7-10	



BEI 022599

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 28 Cont'd (HB-28) CONTRACT 465-78

JOHN MATHES & ASSOCIATES

DRILLED BY Gotsch DATE DRILLED 6/8/78 LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		Brown Fine Fine To Medium SAND w/Fuel Odor		
	15	SS		-Brownish-Gray Fine @ 36.5'	13-15	
45	16	SS		-Gray Fine To Medium Below 44.0'	17-19	
	17	SS		T. O. B.	13-16	
50						

SHEAR STRENGTH, TSF — SV △ QP/2 □ QU/2 ○ — 0 0.5 1.0 1.5 2.0

PL + WATER ● CONTENT, % — 0 20 40 60 80 1

BEI 022600

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

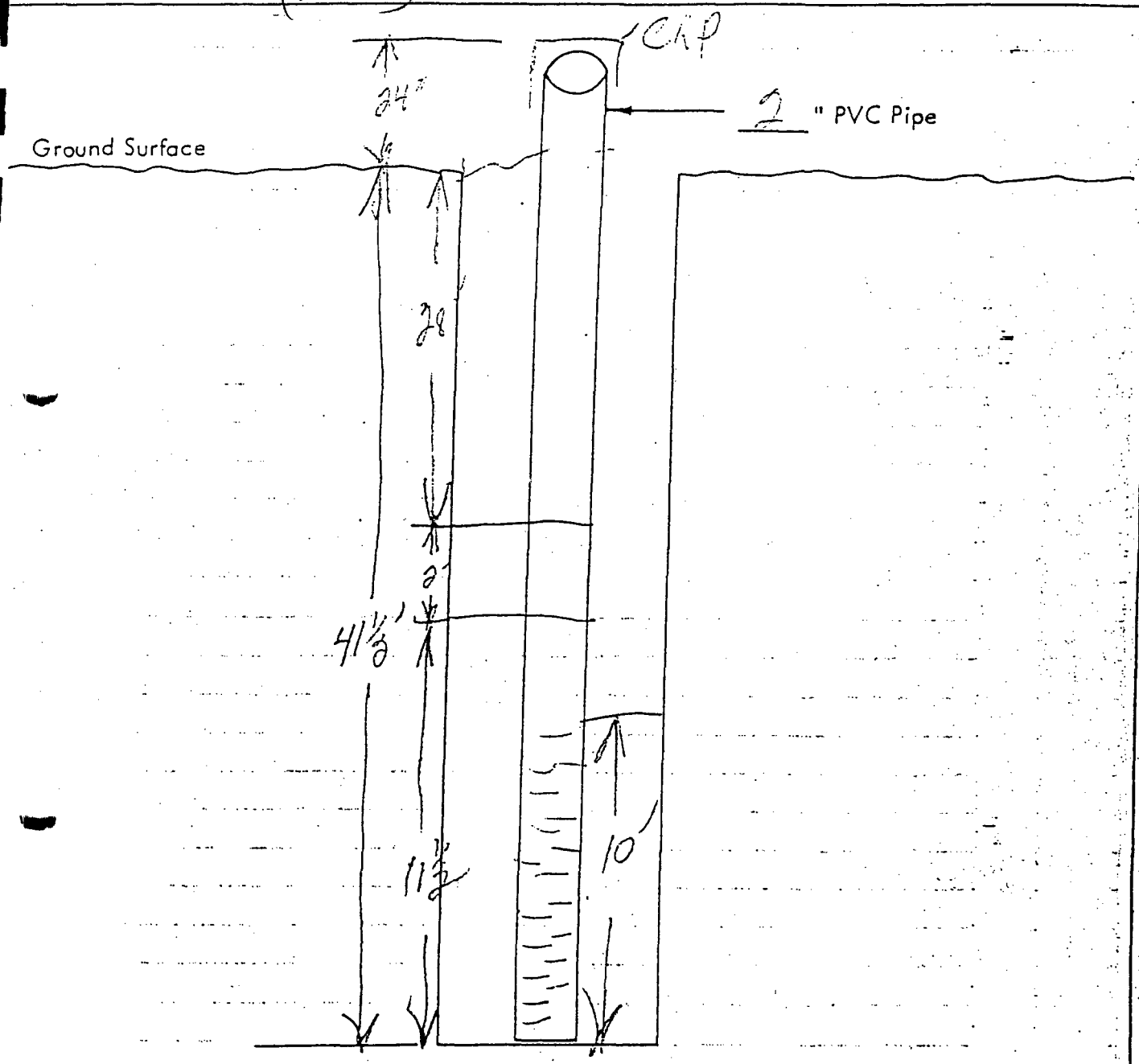
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 28 (HB-28) Contract No. Date Installed



NOTES:

BEI 023445

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

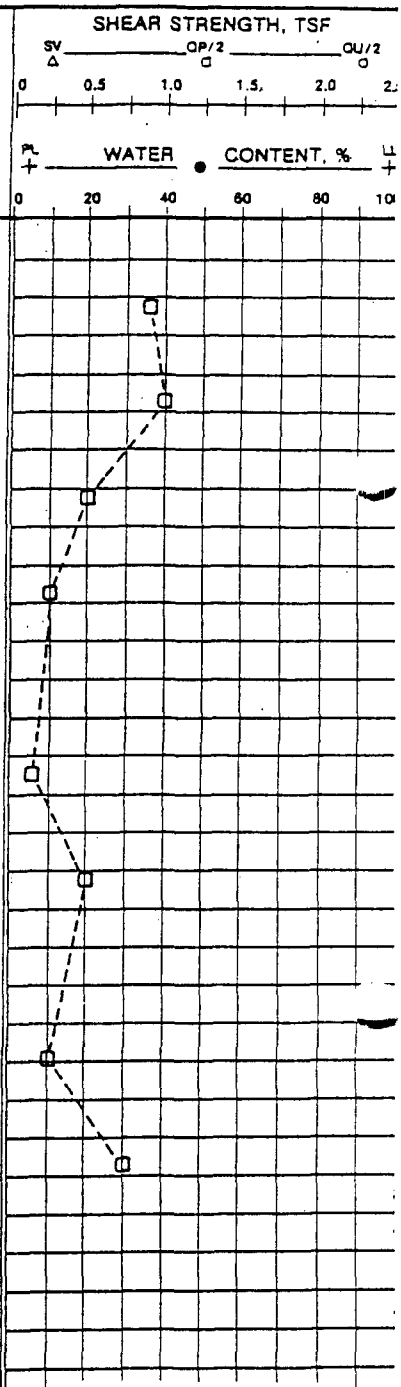
BORING 29 (HB-29) CONTRACT 465-78

DRILLED BY Roberts LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery Investigation PIEZOMETER Yes

DATE DRILLED 6/9/78 DRILLING METHOD Hollow Auger

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Br. Silty CLAY w/Roots		
	1	SS		Gray CLAY w/Oxidized Spots & Stains	2-4	
5	2	SS		-w/Silty Pockets @ 4.0'	3-6	
	3	SS		Brown & Gray CLAY w/Silt & Traces Of Sand	1-3	
10	4	SS		Gray SILT w/Oxidized Stains & Traces Of Sand	3-4	
	5	SS		Brown Clayey Silt w/Traces Of Fine Sand	1-1	
15	6	SS		Gray Silty CLAY	2-2	
	7	SS		Gray CLAY w/Oxidized Stains	2-3	
20	8	SS		Intermixed Gray CLAY & CLAY w/Si. & Oxidized Stains	1-W/H	
	9	SS		Gray CLAY w/Si. & Traces Of Sand	W/H-2	
25	10	SS		Gray CLAY w/Oxidized Spots & Stains	2-3	
	11	SS		Brown Fine SAND w/Fuel Odor -Silty From 26.5' To 33.0' -Gray From 31.0' To 43.0'	5-3	
30	12	SS		-w/Clayey Lenses @ 31.5'	4-10	
	13	SS		-w/Silt @ 34.0'	6-7	
35	14	SS		Cont'd	14-17	



BEI 022601

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 29 Cont'd (HB-29) CONTRACT 465-78

DRILLED BY Roberts — LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery Investigation — DATE DRILLED 6/9/78

DRILLING METHOD Hollow Auger — PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		Gray Fine SAND w/Fuel Odor		
				-w/Silt @ 34.0		
	15	SS		-Gravelly Fine To Coarse @36.5	20-22	
				-Fine To Medium @ 39.0'		
40	16	SS			7-17	
				-Fine To Coarse @ 41.5'		
	17	SS			12-17	
				-Brownish-Gray Fine To Med. From 44.0' To 48.0'		
45	18	SS			21-31	
	19	SS			14-17	
				-Brown Fine To Coarse w/ Gravel @ 49.0'		
50	20	SS			16-17	
				T. O. B.		
55						

SHEAR STRENGTH, TSF — SV △ — QP/2 □ — QU/2 ○ — 0 0.5 1.0 1.5 2.0

WATER CONTENT, % — 0 20 40 60 80

BEI 022602

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

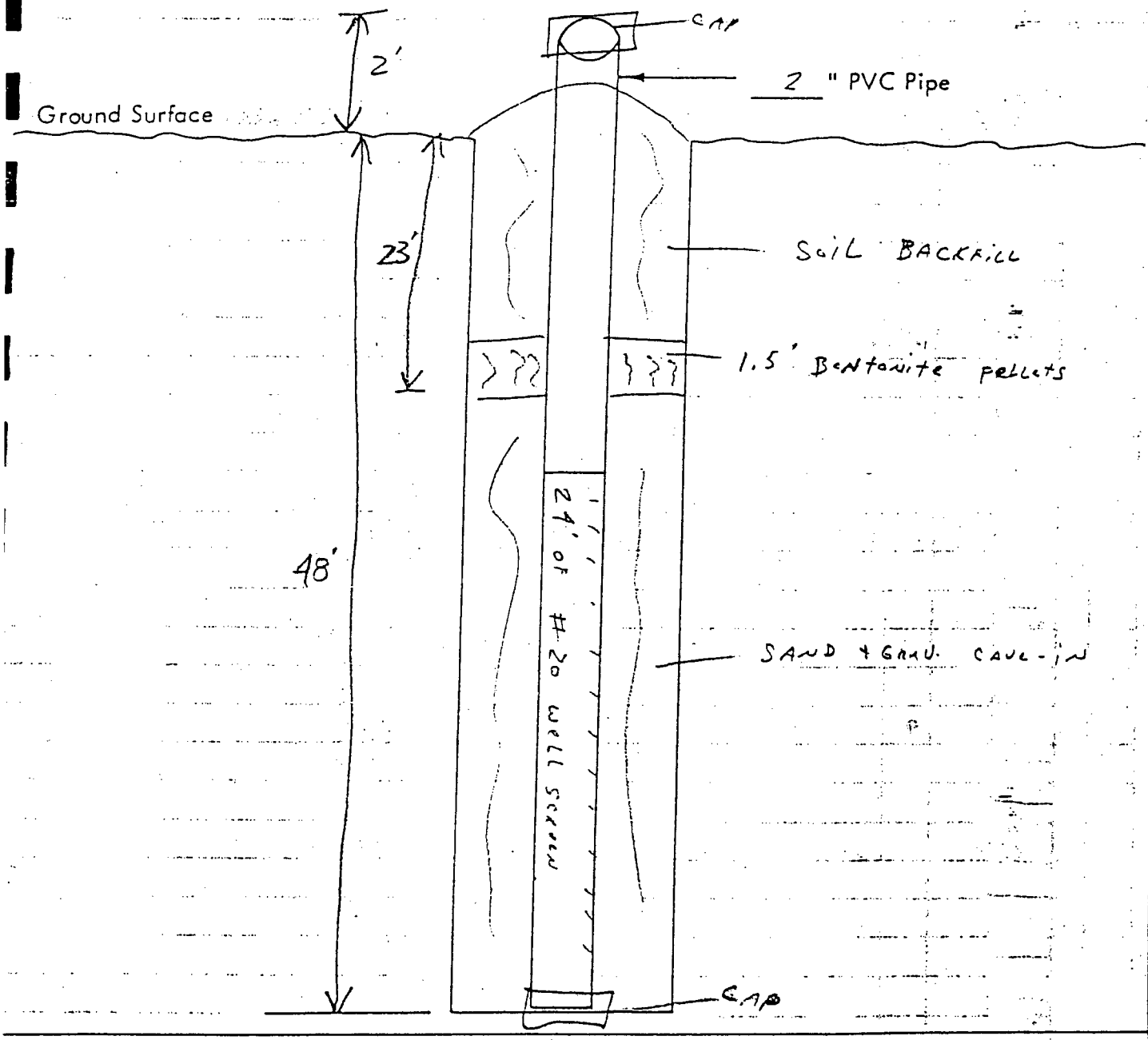
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. B-29 (HB-29) Contract No. 465 Date Installed 6-9-78



NOTES:

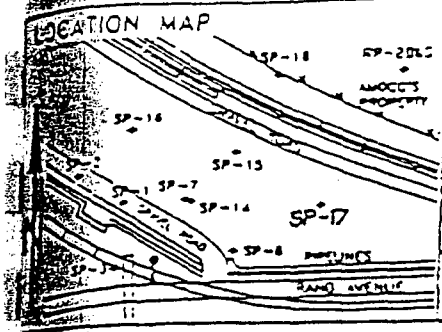
BEI 023446

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

LOCATION MAP



SHELL OIL COMPANY - WELL LOG

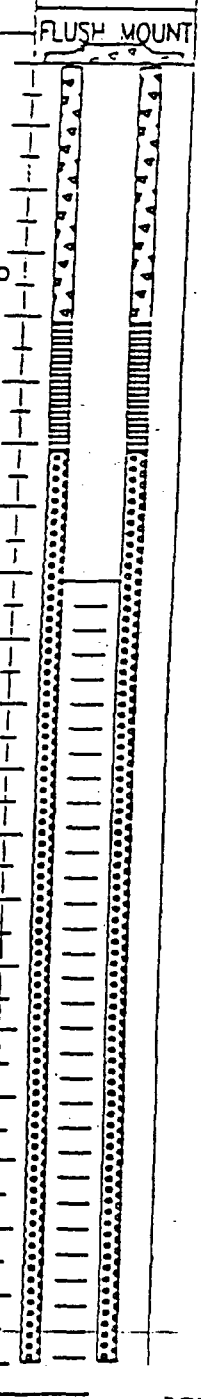
WELL NUMBER	SP-17	LOCATION	WRMC SPILL AREA
DATE	1-13-90	WEATHER	CLOUDY MID 50's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	28'-6' WB-40 SAND	SEAL	0'-4' GROUT 4'-6' BENTONITE

CASING ▶ TYPE SCHEDULE-40 PVC DIAMETER 4" LENGTH 8' HOLE DIA. 10"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 20' TOTAL DEPTH 28'

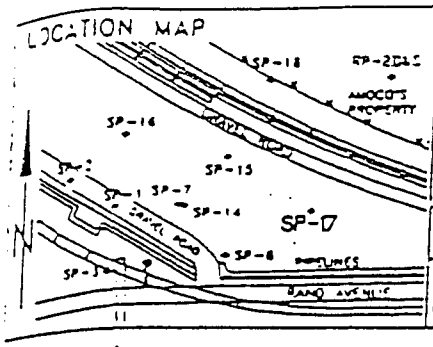
CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
						0			
						1			
						2			
						3		Pushed	0.00'-1.42' CLAY, dark gray grading into mottled light gray and tan.
m		stiff	plas	1	45.6	4	1.42		
						5			
						6			
						7			
						8		2	0.00'-0.72' SILT, light gray with some mottled tan, product odor.
		soft	plas	2	262	9	1.08	2	
		soft	plas					4	0.72'-1.08' CLAY, mottled light gray with some tan, product odor.
						10		3	
						11			
						12			
						13		2	0.00'-1.72' CLAY, mottled light gray and tan, silty, product odor.
		soft	plas	3	1009	14	1.72	2	
								5	
						15		4	
						16			
						17			
		soft	plas			18		3	0.00'-0.93' SILT, gray-brown, clayey, slight product odor.
		soft	plas	4	1233	19	1.81	2	0.93'-1.81' SILT, gray-brown grading into light gray, very sandy, wet with product.
								2	
						20			

WELL COMPLETION



LEGEND: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022452



SHELL OIL COMPANY - WELL LOG

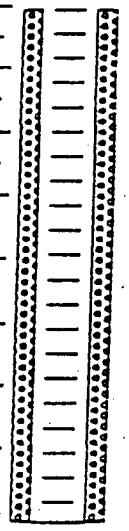
WELL NUMBER	SP-17	LOCATION	WRMC SPILL AREA
DATE	1-13-90	WEATHER	CLOUDY MID 50's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	28'-6' WB-40 SAND	SEAL	0'-4' GROUT 4'-6' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 8' HOLE DIA. 10"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 20' TOTAL DEPTH 28'

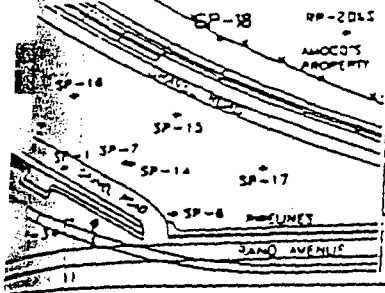
MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
						20			
						21			
						22			
ist		soft	plas			23			0.00'-0.87' CLAY, light gray mottled with some tan.
d	poor	vloose		5	672	24	1.36	1 2 4 5	0.87'-0.99' SAND, medium gray with bands of dark gray, fine-to very fine-grained, sub-rounded.
						25			
ist		soft	plas						0.99'-1.12' CLAY, light gray, silty.
t	poor	vloose				26			1.12'-1.36' SAND, medium gray with bands of dark gray, fine-to very fine-grained, sub-rounded.
						27			
						28			
st		soft	plas	6	27.5	29	1.56	2 3 3 3	0.00'-1.04' CLAY, light gray grading into red-gray, product odor.
t	poor	vloose			7.7				1.04'-1.56' SAND, very fine-grained, clayey, slight product odor.
						30			
						31			
						32			
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			

WELL COMPLETION



NATION GROUT SAND SCREEN BENTONITE CASING WATER LEVEL

BEI 022459



WELL NUMBER ▶ SP-18		LOCATION ▶ WRMC SPILL AREA	
DATE ▶ 1-14-90		WEATHER ▶ SUNNY MID 50's	
LOGGED BY ▶ R. CHAPIN		DRILLED BY ▶ MATHIS INC.	
DRILLING METHOD ▶ 6.25" HOLLOW-STEM AUGER		SAMPLING METHOD ▶ TWO-FOOT SPLIT SPOON	
GRAVEL PACK ▶ 46'-30' WB-SAND		SEAL ▶ 0'-28' GROUT 28'-30' BENTONITE	

G ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 31' HOLE DIA. 10"

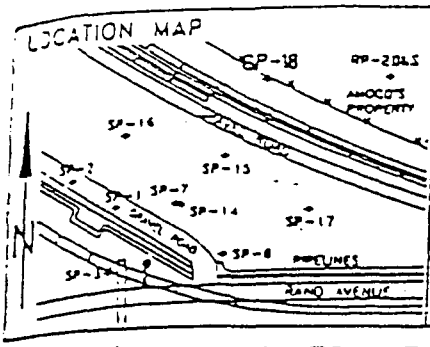
EEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 15' TOTAL DEPTH 46'

DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
				0			
				1			
				2			
				3		Pushed	0.00'-1.45' CLAY, gray.
	plas	1	1.1	4	1.45		
				5			
				6			
				7			
				8		2	0.00'-1.77' CLAY, mottled tan and light gray with some red-brown splotches.
soft	plas	2	35.1	9	1.77	3	
						3	
						3	
				10			
				11			
loose				12			0.00'-0.39' SAND, light brown and tan, very fine-to fine-grained, subrounded, grades into silt.
				13		1	
soft	plas					2	0.39'-0.56' SILT, light brown and tan.
soft	plas	3	415	14	1.48	2	0.56'-0.72' CLAY, light brown and tan.
loose						3	0.72'-1.03' SAND, brown, very fine to-fine-grained, subrounded, silty.
				15			
soft	plas			16			1.03'-1.48' CLAY, light brown and tan.
				17			
soft	plas						0.00'-2.00' CLAY, light tan grading into light gray and then into dark gray, rust colored clay filled burrows from 0.18'-0.31', very slight product odor near burrows.
				18		2	
		4	885	19	2.00	2	
						2	
				20		2	

WELL COMPLETION: FLUSH MOUNT

ANATION: GROUT, BENTONITE, SAND, CASING, SCREEN, WATER LEVEL

BEI 022454



SHELL OIL COMPANY - WELL LOG

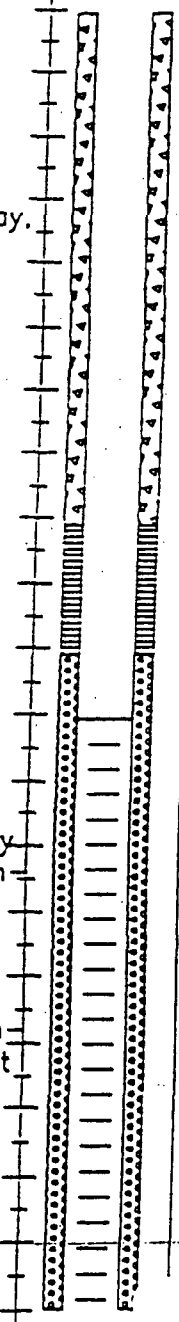
WELL NUMBER	SP-18	LOCATION	WRMC SPILL AREA
DATE	1-14-90	WEATHER	SUNNY MID 50's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	46'-30' WB-SAND	SEAL	0'-28' GROUT 28'-30' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 31' HOLE DIA. 10"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 15' TOTAL DEPTH 46'

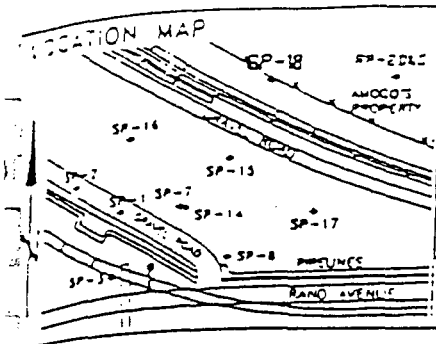
MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
						20			
						21			
						22			
						23			
damp		soft	plas	5	14.5	24	1.63	2, 2, 2, 3	0.00'-1.63' CLAY, blue to greenish-gray, silty.
						25			
						26			
						27			
wet		soft	v plas	6	3.7	28	2.00	2, 2, 1, 3	0.00'-2.00' CLAY, gray.
						29			
						30			
						31			
						32			
		soft	v plas			33			0.00'-0.34' CLAY, red-brown, very sticky.
mod		loose		7	3.6	34	1.57	3, 10, 13, 8	0.34'-1.57' SAND, gray, fine-to medium grained, subrounded, bands of red-brown clay, product odor in cuttings.
						35			
poor		loose				36			0.00'-1.01' SAND, gray, fine-to medium grained, subrounded, product odor in cuttings, organic matter bands @ .23', .27', .31'-.33', .56'-.62' and .72'-.85'.
						37			
						38			
		soft	v plas	8	69.1	39	1.95	2, 2, 3, 4	1.01'-1.13' CLAY, gray.
poor		loose							1.13'-1.95' SAND, gray, fine -to very fine-grained, with thin beds of coal.
						40			

WELL COMPLETION



EXPLANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022455



SHELL OIL COMPANY - WELL LOG

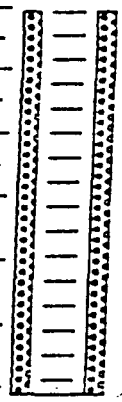
WELL NUMBER	SP-18	LOCATION	WRMC SPILL AREA
DATE	1-14-90	WEATHER	SUNNY MID 50's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	46'-30' WB-SAND	SEAL	0'-28' GROUT 28'-30' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 31' HOLE DIA. 10"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 15' TOTAL DEPTH 46'

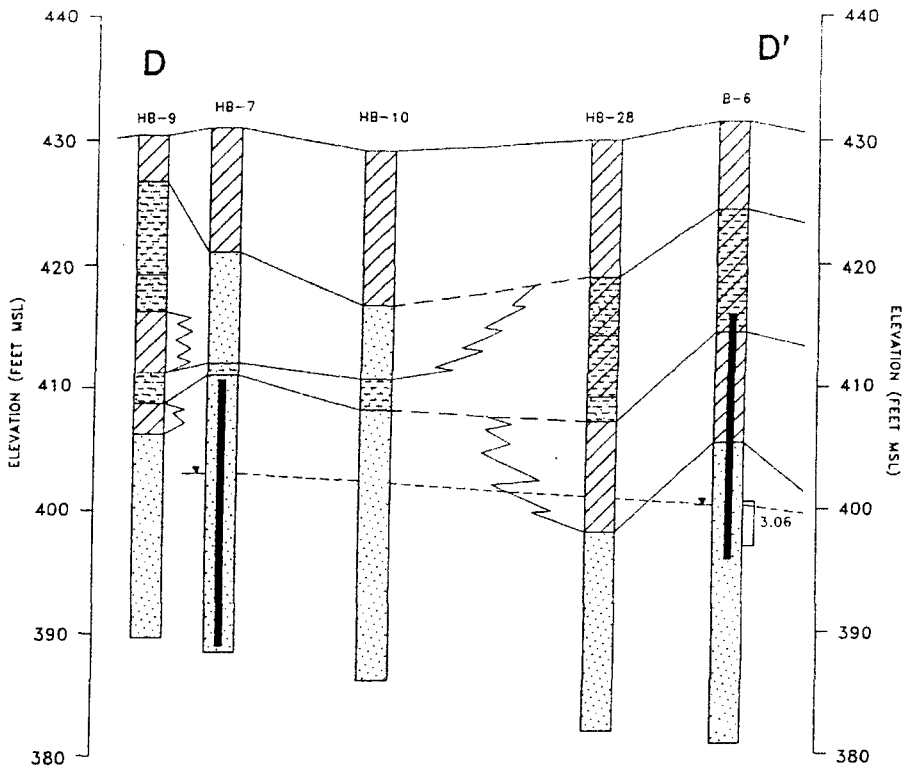
SOIL CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
						40			
						41			
						42			
						43			
	mod	loose		9	1051	44	1.63	↓ 1 3 3	0.00'-1.63' SAND, gray, fine- to medium-grained, subrounded.
						45			
						46			
						47			
						48			
	mod	loose		10	1180	49	2.00	3 2 3 3	0.00'-0.37' SAND, gray, fine-to medium-grained, subrounded. 0.37'-1.85' SAND, gray, medium-to coarse-grained, some small pebbles, subrounded to rounded.
	mod	loose							
						50			
	mod	loose				51			1.85'-2.00' GRAVEL, small pebbles, subrounded.
						52			
						53			
						54			Hole drilled to 48'; filled back in to 46'.
						55			
						56			
						57			
						58			
						59			
						60			

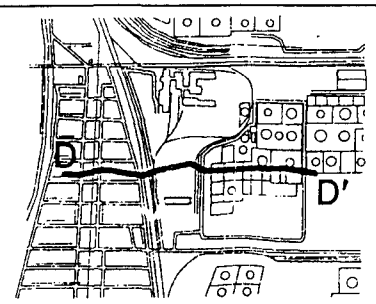
WELL COMPLETION



BEI 022456

EXPLANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL





LOCATOR MAP

EXPLANATION

- CLAY
- SILT
- SAND
- GRAVEL
- SCREENED INTERVAL
- STATIC WATER LEVEL (CORRECTED FOR HYDROCARBON THICKNESS)
- 1.8 HYDROCARBON THICKNESS IN FEET

NOTE:
1. Monitoring wells or boreholes located in Hartford have been relabeled with a "H" prefix on cross section.
2. Fluid measurements were made in July 1990.

HORIZONTAL SCALE IN FEET
0 300 600
0 10 20
VERTICAL SCALE IN FEET

General Note:
This profile was developed by interpolation between widely spaced boreholes. Only at the borehole locations should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.

John Mathes & Associates, Inc.

CROSS SECTION D - D'

CLARK OIL COMPANY
HARTFORD, ILLINOIS
122327

DWG NO. 4

DRAWN BY	CHECKED BY	DOCUMENT MANAGER	PROJECT MANAGER
DTS 10/5/90	BB 10/5/90	KM 10/15/90	LB 10/15/90

B REV. DATE 9/7/90

RECORD OF SUBSURFACE EXPLORATION

BORING 9 (HB-9) CONTRACT 465-78

JOHN MATHES & ASSOCIATES

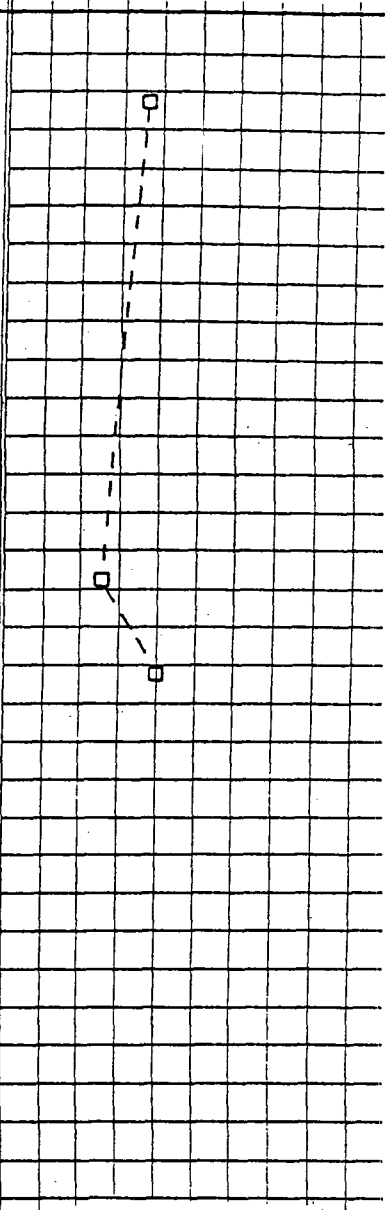
DRILLED BY Gotsch DATE DRILLED 5/30/78 LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	1	SS		Brown Silty CLAY -w/Fine Roots @ 0' -w/Traces Of Fine Sand @1.5'	2-3	
5	2	SS		Brown To Gray Clayey Fine Sandy SILT	1-1	
	3	SS			2-1	
10	4	SS			3-4	
	5	SS		Grayish-Brown Clayey Silty Fine SAND	2-1	
15	6	SS		Brownish-Gray Silty CLAY w/ Oxidized Spots, Stains, & Traces Of Fine Sand	1-2	
	7	SS		Gr. CLAY w/Si. & Oxidized Stains	3-3	
20	8	SS		Brownish-Gray Silty Fine SAND	6-8	
	9	SS		Interbedded Brown & Gray Si. CLAY & CLAY w/Si. & Oxi. Stains	3-7	
25	10	SS		Grayish-Brown Fine SAND -w/Clayey Pockets @ 24' -Silty From 24' To 35.5' -Brown From 26.5' To 28'	5-5	
	11	SS			8-8	
30	12	SS		-Gray Below 31.5'	7-7	
	13	SS			13-13	
35				Cont'd		

SHEAR STRENGTH, TSF: SV △ QP/2 □ QU/2 ○ (0, 0.5, 1.0, 1.5, 2.0)

PL + WATER ● CONTENT, % (0, 20, 40, 60, 80)



BEI 022569

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 9 Cont'd (HB-9) CONTRACT 465-78

JOHN MATHES & ASSOCIATES

DRILLED BY Gotsch DATE DRILLED 5/30/78 LOGGED BY Schweigert

PROJECT Phase II Hydrocarbon Recovery DRILLING METHOD Hollow Auger PIEZOMETER Yes

SURFACE ELEVATION

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL	BLOWS	DRY UNIT WEIGHT PCF
	14	SS			11-13	
				-w/Silt Below 36.5'		
	15	SS			11-7	
40	16	SS		T. O. B.	6-9	
45						

SHEAR STRENGTH, TSF — SV △ — QP/2 □ — QU/2 ○ — 0 0.5 1.0 1.5 2.0

PL + — WATER ● CONTENT, % — 0 20 40 60 80

BEI 022570

GROUND WATER DEPTH AT COMPLETION 28.5' AFTER _____ HRS. _____ AFTER _____ HRS. _____

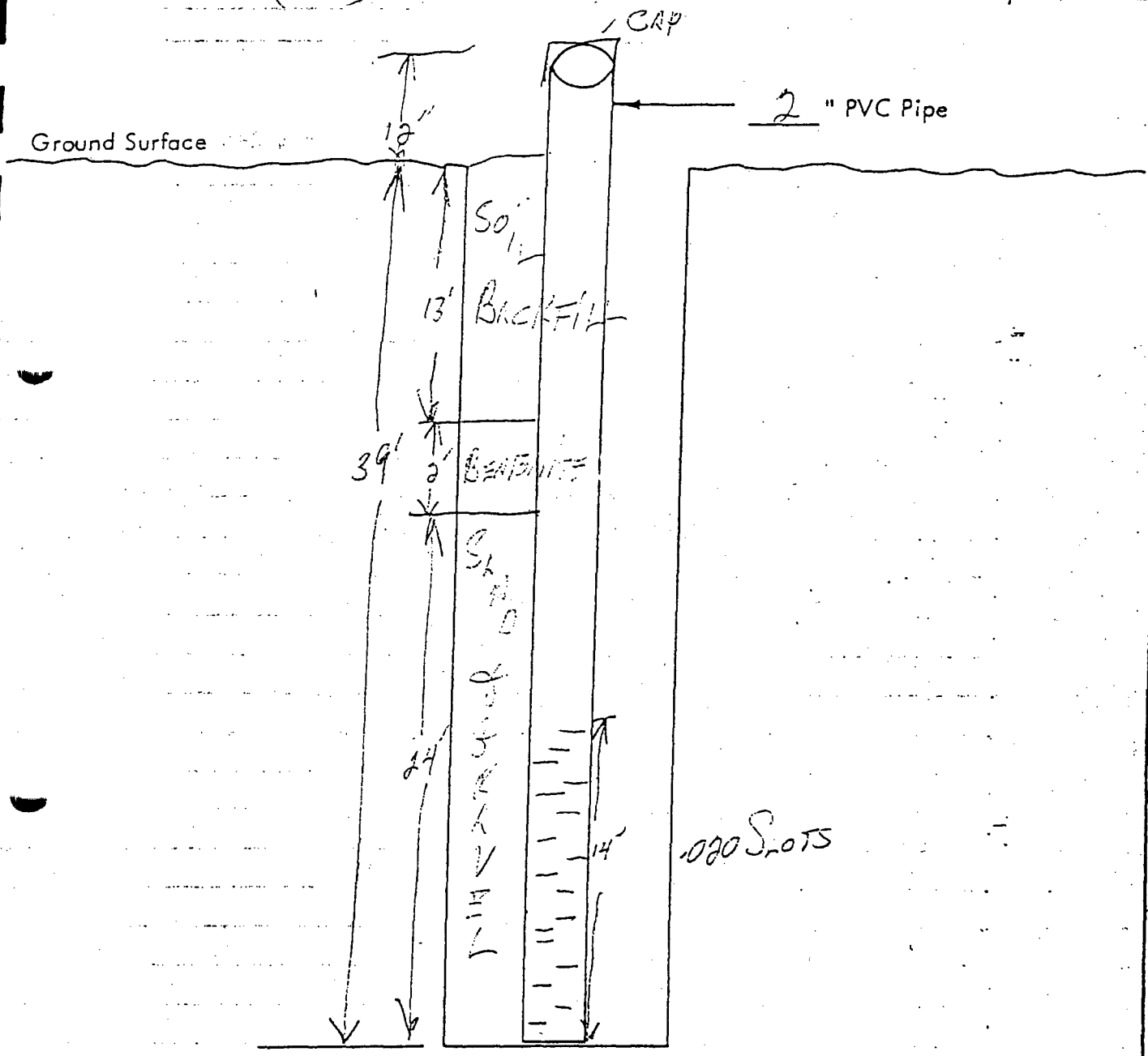
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 9 (HB-9) Contract No. 465 Date Installed 5/30/78



NOTES:

BEI 023428

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

BORING 7 (HB-7) CONTRACT 465-78

DRILLED BY Roberts DATE DRILLED 5/26/78 LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery DRILLING METHOD Hollow Auger PIEZOMETER Yes

SURFACE ELEVATION

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL	BLOWS	DRY UNIT WEIGHT PCF
				Br. CLAY w/Roots		
	1	SS		Grayish-Brown CLAY w/Silt To Dark Brown Silty CLAY w/ Fine Sand, Fill	6-5	
5	2	SS			2-2	
	3	SS		-w/Rock & Brick Fragments @ 6'	4-4	
10	4	SS		Gray CLAY w/Silt, Oxidized Spots, Stains, & Fi. Sandy Pockets	2-4	
	5	SS		Gray Silty Fine SAND -w/CLAY from 11' To 15'	3-5	
15	6	SS			3-5	
	7	SS			4-5	
20	8	SS		Gray Fine Sandy Silt	4-5	
	9	SS		Gray Fine SAND -Silty From 21' To 27.5' -w/A Faint Fuel Odor From 23' To 27.5'	5-6	
25	10	SS			6-6	
	11	SS		-w/A Fuel Odor From 28.5' To 40'	6-7	
30	12	SS		-Medium To Fine w/Traces Of Silt @ 28.5'	14-17	
	13	SS		-Gray & Brown Fine To Medium w/Silt From 31' To 35'	14-21	
35	14	SS		Cont'd	14-19	

SHEAR STRENGTH, TSF — SV △ QP/2 □ QU/2 ○ — 0 0.5 1.0 1.5 2.0

PL + WATER CONTENT, % ● — 0 20 40 60 80

BEI 022565

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

RECORD OF SUBSURFACE EXPLORATION

BORING 7 Cont'd (HB-7) CONTRACT 465-78

DRILLED BY Roberts LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery DATE DRILLED 5/26/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				-Fine To Medium w/Coarse Sand @ 36'		
	15	SS			11-18	
				-Brown Fine To Medium w/ Silt @ 38.5'		
	16	SS			13-13	
40				-Silty w/Clay @41'		
	17	SS			13-15	
				T. O. B.		
45						

SHEAR STRENGTH, TSF: SV △ — QP/2 □ — QU/2 ○ (0, 0.5, 1.0, 1.5, 2.0, 2)

PL + — WATER ● — CONTENT, % — LL + (0, 20, 40, 60, 80, 10)

BEI 022566

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

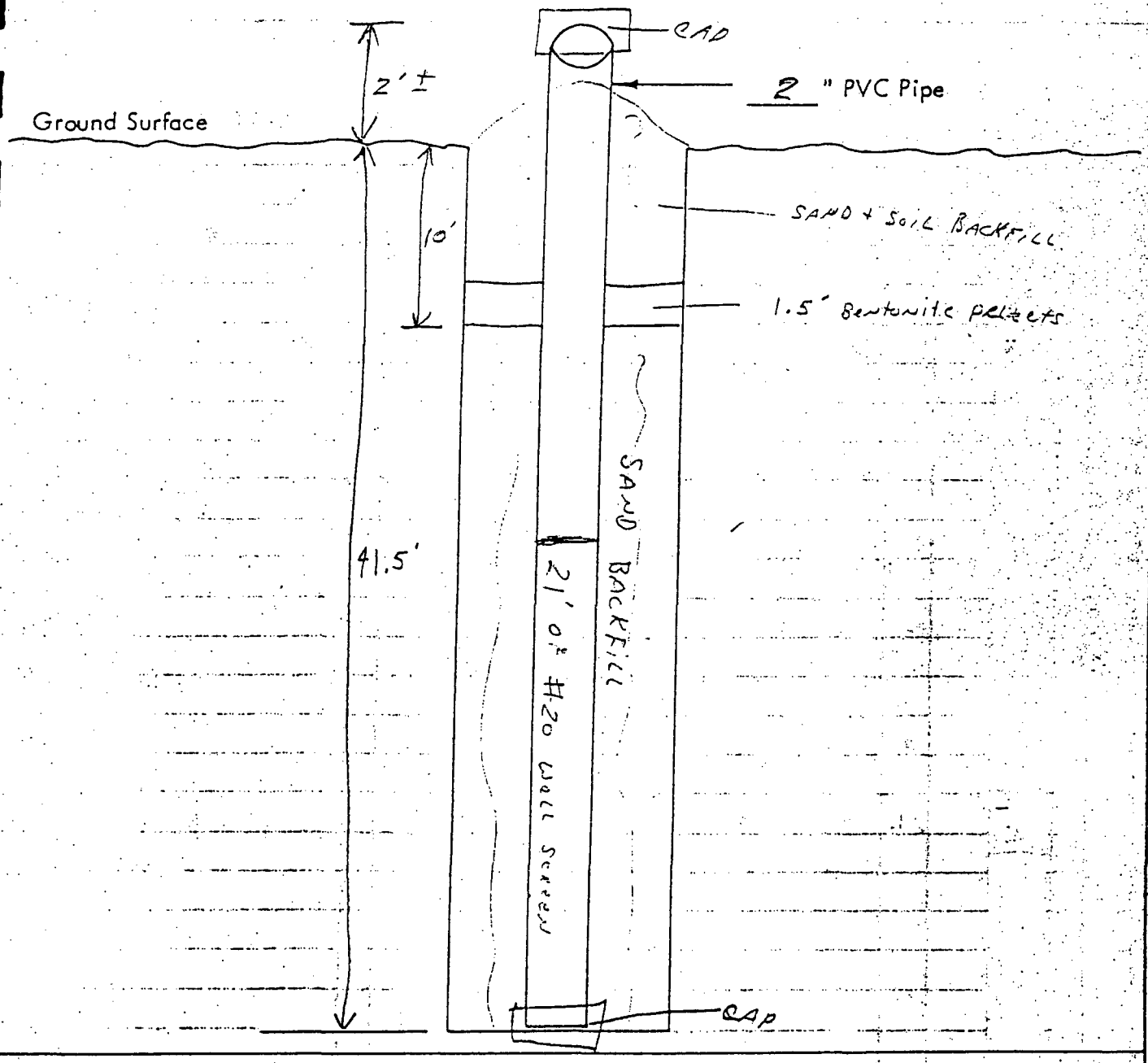
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. B-7 (HB-7) Contract No. 465 Date Installed 5-26-78



NOTES:

BEI 023426

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

BORING 10 (HB-10) CONTRACT 465-78

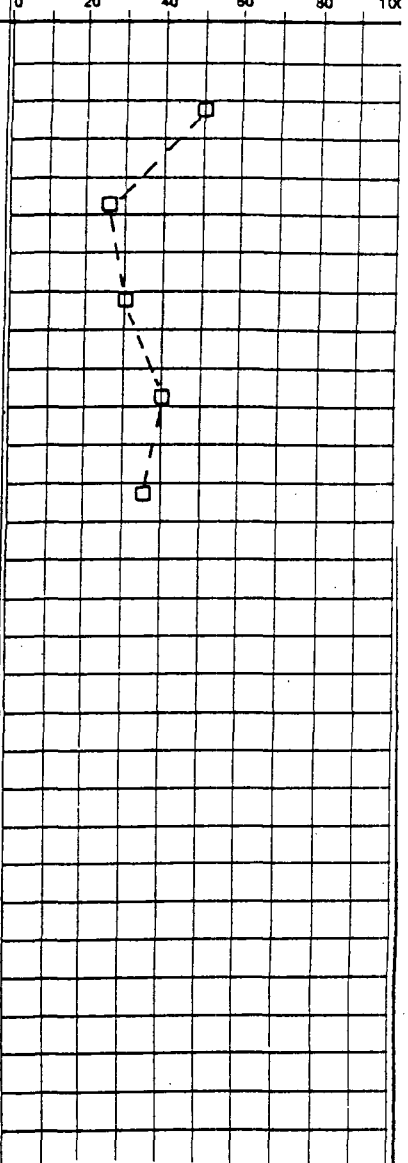
JOHN MATHES & ASSOCIATES

LOGGED BY Schweigert
PIEZOMETER Yes
DATE DRILLED 5/26/78
DRILLING METHOD Hollow Auger
DRILLED BY Gotsch
PROJECT Phase II - Hydrocarbon Recovery

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Br. Si. CLAY & Cinders, Fill		
	1	SS		Brown & Dk. Gr. CLAY w/ Oxidized Spots	3-6	
5	2	SS		Brownish-Gray CLAY w/Silt & Silty Fine Sandy Pockets	3-3	
	3	SS		Gray To Gray & Dk. Gray CLAY w/Oxidized Spots & Stains	3-4	
10	4	SS		-w/Slickensides @ 6.5'	3-3	
	5	SS		Brownish-Gray Silty CLAY w/Fine Sand	3-6	
15	6	SS		Brown Silty Fine SAND w/ Traces Of Clay	3-3	
	7	SS			3-3	
20	8	SS		Brown Fine Sandy SILT w/ Clay	3-6	
	9	SS		Brown Fine SAND -Silty w/A Faint Fuel Odor From 21.5' To 28'	4-5	
25	10	SS		-Dk. Gr. w/Traces Of Clay @ 26.5'	2-3	
	11	SS			2-4	
30	12	SS		-w/A Fuel Odor From 29' To 38' -Fine To Medium @ 29'	7-7	
	13	SS		-Fine To Medium w/Silt @ 31.5'	9-13	
35				Cont'd		

SHEAR STRENGTH, TSF — SV △ — QP/2 □ — QU/2 ○ — 0 0.5 1.0 1.5 2.0 2.5

PL + — WATER ● CONTENT, % — + LL — 0 20 40 60 80 100



BEI 022571

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 10 Cont'd (HB-10) CONTRACT 465-78

DRILLED BY Gotsch DATE DRILLED 5/26/78 LOGGED BY Schweigert

PROJECT Phase II - Hydrocarbon Recovery DRILLING METHOD Hollow Auger PIEZOMETER Yes

SURFACE ELEVATION

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		-Gr. w/ Silt @ 34'	5-6	
	15	SS		-Dk. Gr. Si. From 36.5' To 43'	11-13	
40	16	SS		-w/ A Faint Fuel Odor & Traces Of Clay Below 29'	7-13	
	17	SS		T. O. B.	8-9	
45						

SHEAR STRENGTH, TSF — SV Δ, QP/2 □, QU ○ — 0, 0.5, 1.0, 1.5, 2.0

WATER CONTENT, % — PL +, ● — 0, 20, 40, 60, 80

BEI 022572

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

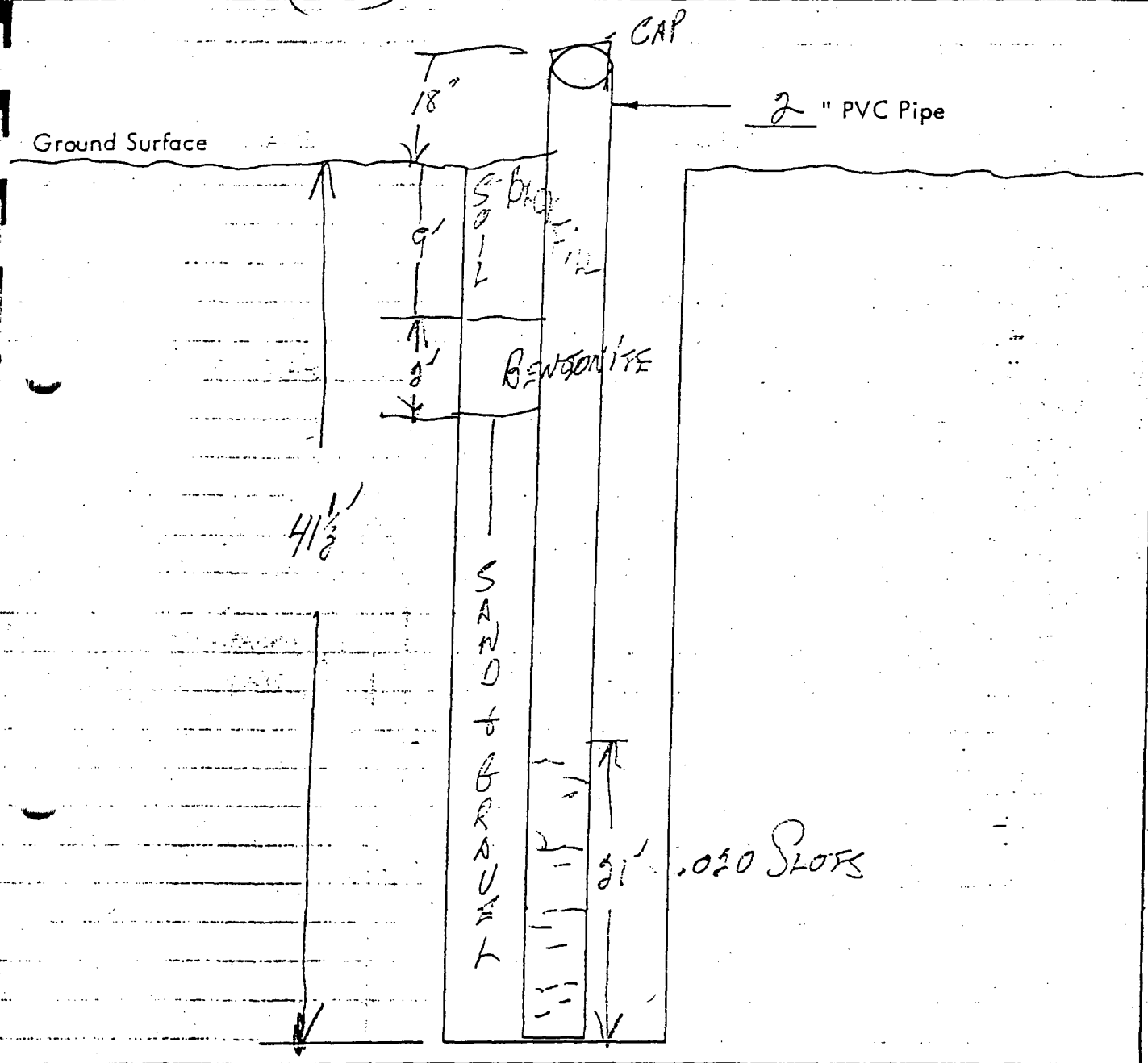
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 10 (HB-10) Contract No. Date Installed



NOTES:

BEI 023429

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

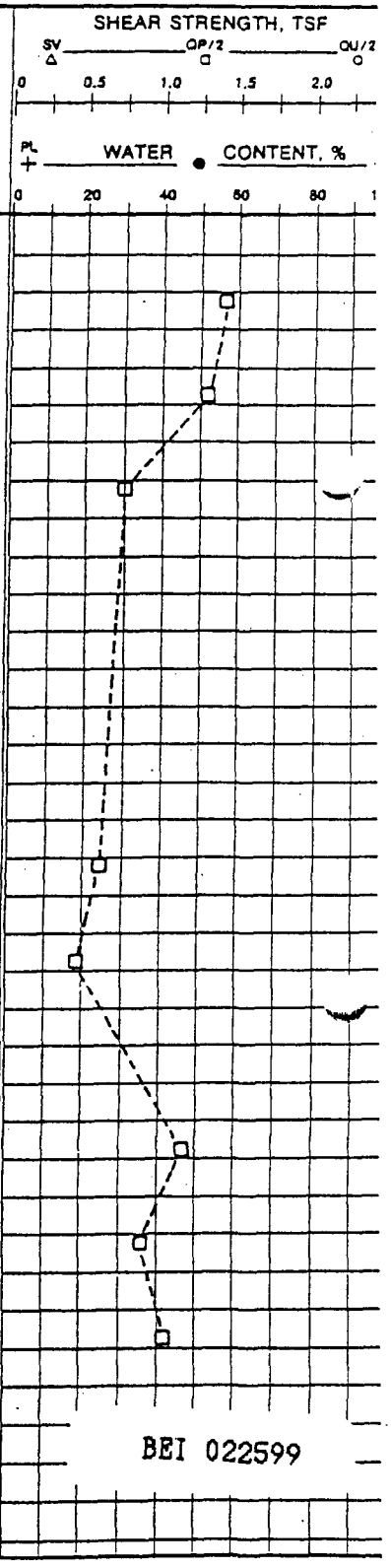
BORING 28 (HB-28) CONTRACT 465-78

DRILLED BY Gotsch LOGGED BY Schweigert

PROJECT Phase II Hydrocarbon Recovery Investigation DATE DRILLED 6/8/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Brown & Dk. Gr. Silty CLAY		
	1	SS		Dk. Br. CLAY w/Silt & Traces Of Fine Sand	6-7	
5	2	SS		Brown & Dark Gray CLAY w/ Oxidized Spots	3-5	
	3	SS		Brownish-Gray CLAY w/Silt Oxidized Stains & Traces Of Sand	2-2	
10	4	SS		Gray Silty CLAY w/Traces Of Fine Sand	2-4	
	5	SS		Brown Fine Sandy SILT	1-2	
15	6	SS		Gray Fine Sandy Clayey SILT	1/12"-1	
	7	SS		Gray CLAY w/Silt	2-3	
20	8	SS		Dk. Gr. & Gr. CLAY w/Silt & Traces Of Fine Sand	1-2	
	9	SS		Gray Clayey Fine Sandy SILT	1-2	
25	10	SS		Gray Silty CLAY & CLAY w/Si. & Traces Of Fine Sand	2-3	
	11	SS		Mottled Gray & Brown CLAY	2-3	
30	12	SS		-Gray @ 29.0'	2-3	
	13	SS		Gray Silty CLAY Brown Fine SAND w/Fuel Odor	7-8	
35	14	SS		-Fine To Medium @ 34.0' Cont'd	7-10	



BEI 022599

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 28 Cont'd (HB-28) CONTRACT 465-78

DRILLED BY Gotsch LOGGED BY Schweigert

PROJECT Phase II Hydrocarbon Recovery Investigation DATE DRILLED 6/8/78

PIEZOMETER Yes DRILLING METHOD Hollow Auger

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		Brown Fine Fine To Medium SAND w/Fuel Odor		
	15	SS		-Brownish-Gray Fine @ 36.5'	13-15	
45	16	SS		-Gray Fine To Medium Below 44.0'	17-19	
	17	SS		T. O. B.	13-16	
50						

SHEAR STRENGTH, TSF — SV △ — OP/2 □ — QU/2 ○ — 0 0.5 1.0 1.5 2.0

+ WATER ● CONTENT, % — 0 20 40 60 80 1

BEI 022600

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

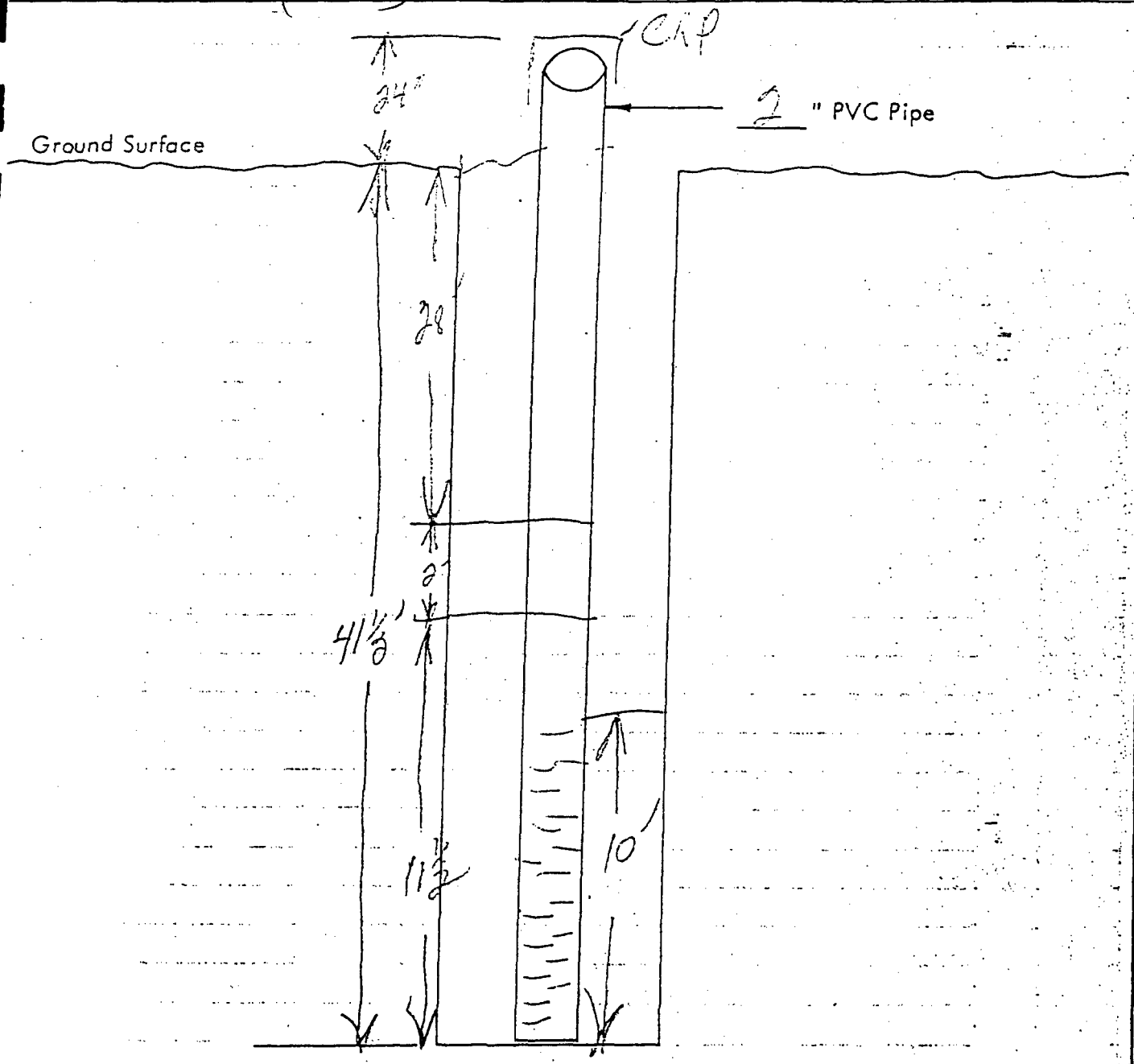
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 28 (HB-28) Contract No. Date Installed



NOTES:

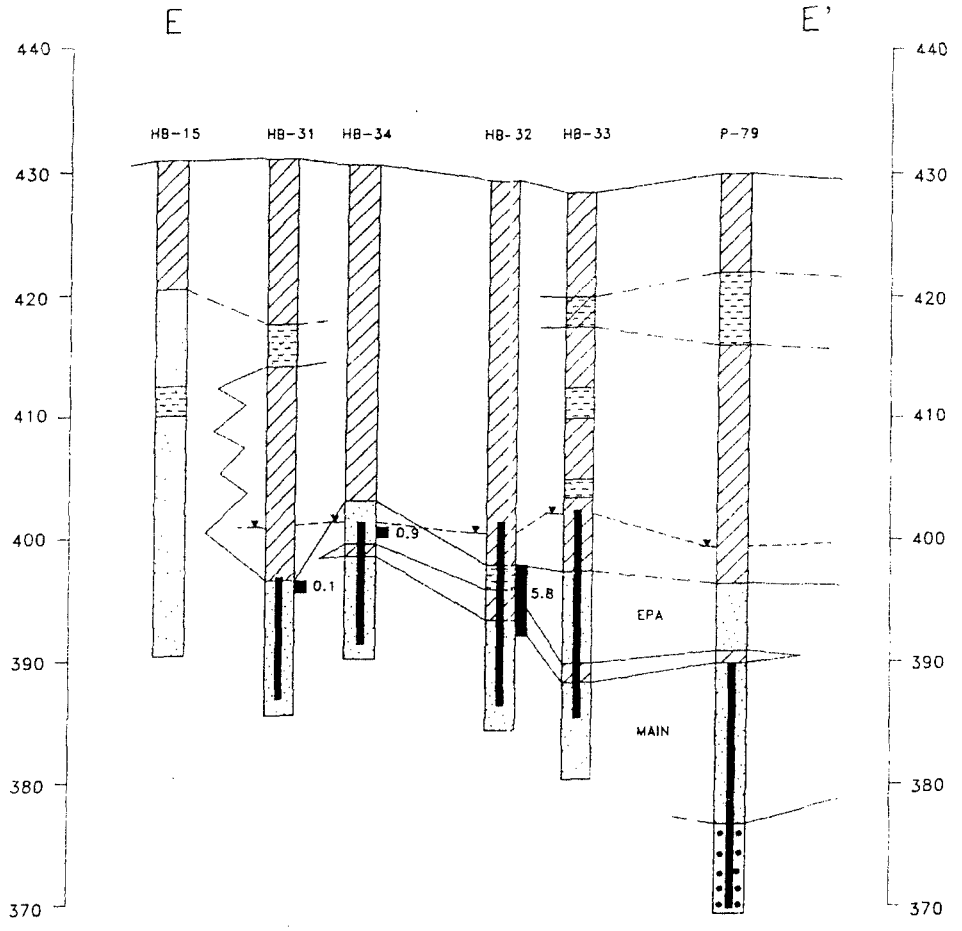
BEI 023445

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

PROJECT MANAGER	
DOCUMENT MANAGER	
CHECKED BY	
DRAWN BY	
REV. DATE 8/22/90	



EXPLANATION

CLAY
SILT
SAND
GRAVEL

.25 HYDROCARBON THICKNESS IN FEET

STATIC WATER LEVEL (CORRECTED FOR HYDROCARBON THICKNESS)

General Note:

This profile was developed by interpolation between widely spaced boreholes. Only at the borehole locations should it be considered as an approximately accurate representation and then only to the degree implied by the notes on the borehole logs.

HORIZONTAL SCALE IN FEET
0 300 600
0 10 20
VERTICAL SCALE IN FEET

John Mathes & Associates, Inc.

ESI [illegible]

CLARK OIL COMPANY
HARTFORD, ILLINOIS
122327

RECORD OF SUBSURFACE EXPLORATION

BORING 15 (HB-15) CONTRACT 465-78

LOGGED BY Schweigert
PIEZOMETER Yes
DATE DRILLED 6/1/78
DRILLING METHOD Hollow Auger
DRILLED BY Gotsch
PROJECT Phase II, Hydrocarbon Recovery

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Dark Gray Silty CLAY w/Br. Fine Sand Seams		
	1	SS		-w/Roots @ 0'	3-2	
5	2	SS		Gray CLAY w/Si., Oxidized Spots & Stains, & Traces Of Fine Sand	2-3	
	3	SS		Gray Silty CLAY w/Traces Of Fine Sand	2-2	
10	4	SS		-w/Oxidized Spots & Stains @ 9'	2-2	
	5	SS		Gray To Brown Silty Fine SAND	5-5	
15	6	SS		-w/Clay Pockets @ 14'	3-3	
	7	SS		Interbedded Brown Silty Fine SAND & Fine Sandy SILT w/Oxi. Stains	3-5	
20	8	SS		Br. Fine Sandy SILT w/Traces Of Clay	3-5	
	9	SS		Brown Silty Fine SAND	5-7	
25	10	SS		-w/Traces Of Clay From 25' To 31'	5-6	
	11	SS			12-12	
30	12	SS		-Gray @ 29'	5-5	
	13	SS		-Dark Gray Clayey w/Traces Of Cinders @ 31.5'	11-13	
35				Cont'd		

SHEAR STRENGTH, TSF — SV △ QP/2 □ QU/2 ○ — 0 0.5 1.0 1.5 2.0 2

WATER CONTENT, % — PL + LL ● — 0 20 40 60 80 10

BEI 022579

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 15 Cont'd (HB-15) CONTRACT 465-78

DRILLED BY Gotsch LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery DATE DRILLED 6/1/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV △, QP/2 □, QU/2 ○; 0, 0.5, 1.0, 1.5, 2.0, 2.) / WATER CONTENT, % (PL +, ●, LL +; 0, 20, 40, 60, 80, 10)
	14	SS		-Gray Below 34'	12-17		
	15	SS			11-10		
40	16	SS		T. O. B.	11-15		
45							

BEI 022580

GROUND WATER DEPTH AT COMPLETION 23.5' AFTER ____ HRS. ____ AFTER ____ HRS. ____

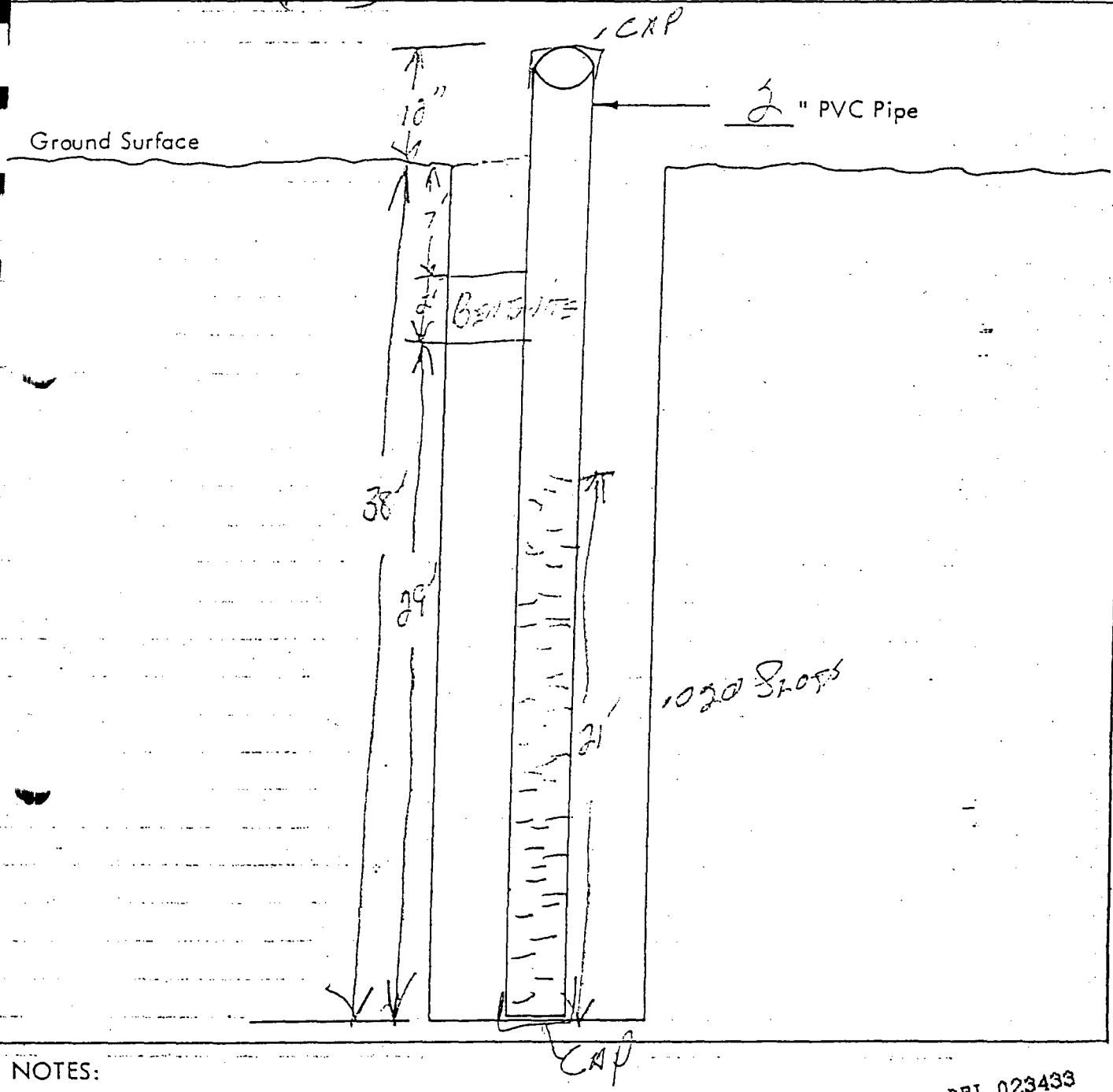
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 15 (HB-15) Contract No. Date Installed



NOTES:

BEI 023433

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

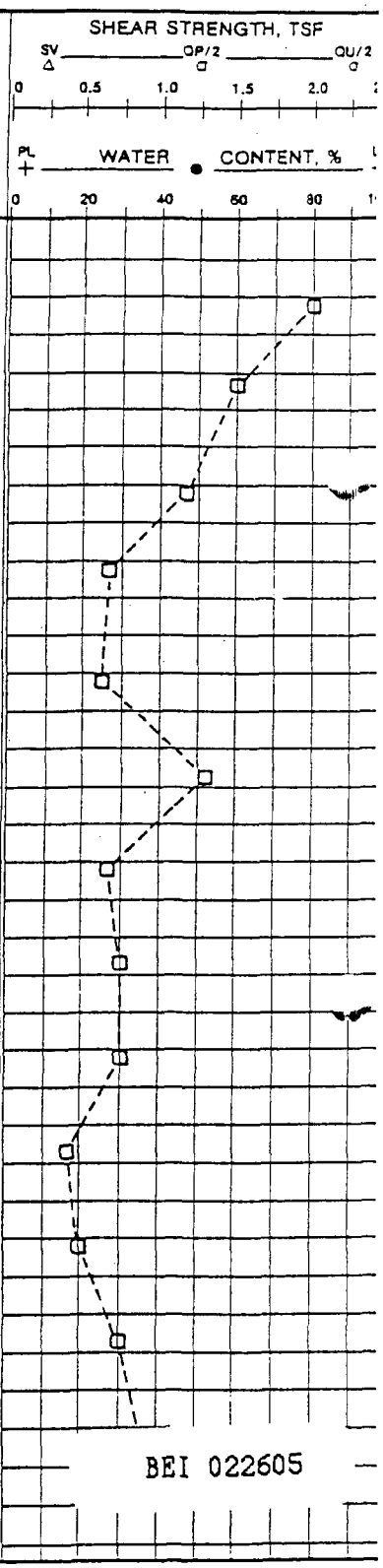
Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

BORING 31 (HB-31) CONTRACT 465-78

DRILLED BY Gotsch LOGGED BY Black
PROJECT Phase II, Hydrocarbon Rec. DATE DRILLED 6/8/78
DRILLING METHOD H.A. PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Gr.& Br.Si.CLAY &CLAY w/Roots		
	1	SS		Dark Gray Silty CLAY w/Fine Roots & Traces of Sand	2-2	
				Dark Gray CLAY		
5	2	SS		Gray CLAY w/Silt, Fine Sand Oxidized Spots & Stains	2-4	
	3	SS			3-4	
				Gray Silty CLAY w/Sandy Seams		
10	4	SS			2-2	
	5	SS		Interbedded Gray Si.CLAY & CLAY w/Silt & Silty Fine SAND Seams	2-2	
15	6	SS		Gray Fine Sandy Clayey SILT w/Oxidized Stains	1/12"-1	
				Gray Fine Sandy SILT		
	7	SS		Gray Silty CLAY w/Oxidized Stains	1-2	
20	8	SS		Gray CLAY w/Oxidized Spots & Stains	1-3	
	9	SS		Gray CLAY w/Silt Oxidized Spots & Stains	2-2	
25	10	SS		Gray to Dark Gray Silty CLAY interbedded w/Fine Sandy Silt Partings & Seams	2-2	
	11	SS			1-2	
30	12	SS			2-2	
				Dark Gray CLAY		
	13	SS			2-4	
35	14	SS		cont'd	6-7	



BEI 022605

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 31 Cont'd (HB-31) CONTRACT 465-78

JOHN MATHES & ASSOCIATES

LOGGED BY Black
PIEZOMETER Yes
DATE DRILLED 6/8/78
DRILLING METHOD H.A.
DRILLED BY Gotsch
PROJECT Phase II, Hydrocarbon Rec.

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		Gray Fi.SAND w/Fuel Odor		
				-Silty @ 34.5'		
				-Dark Gray @ 36.5'		
	15	SS		-Br.-Gr., Gravelly @ 39.0'	4-7	
				-Fine to Coarse w/Silt From 39.0 to 43.0'		
40	16	SS			6-11	
				-Gray Below 41.5'		
	17	SS		-Traces of Gravel @ 41.5'	17-22	
				-Coarse to Fine w/Gravel @ 44.0'		
45	18	SS		T.O.B.	18-17	
50						

SHEAR STRENGTH, TSF: SV △ — QP/2 □ — QU/2 ○ (0, 0.5, 1.0, 1.5, 2.0)

WATER CONTENT, % (PL +, ●) (0, 20, 40, 60, 80)

BEI 022606

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

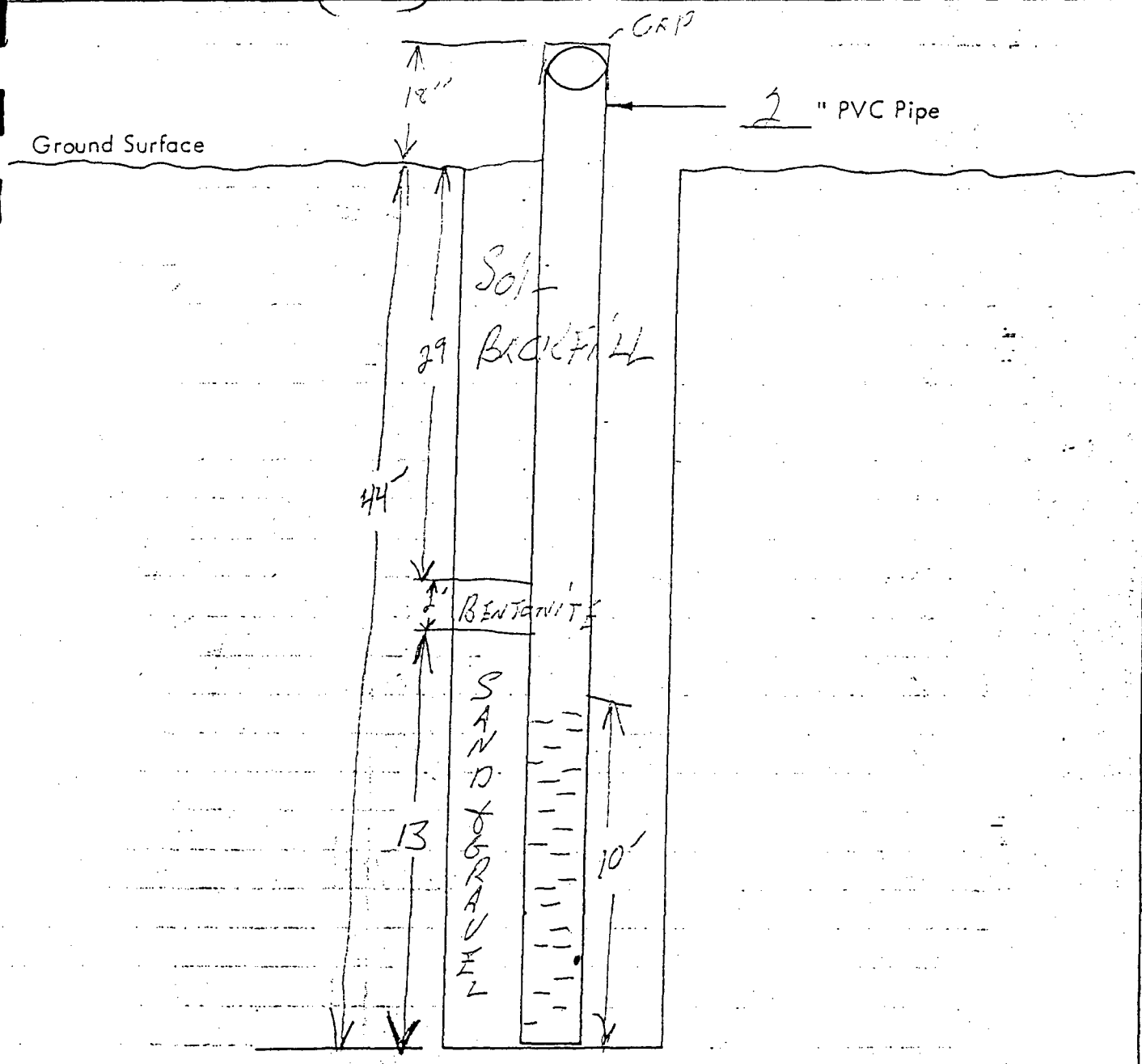
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 31 (HB-31) Contract No. Date Installed



NOTES:

BEI 023448

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

BORING 34 (HB-34) CONTRACT 465-78

DRILLED BY Gotsch LOGGED BY Black

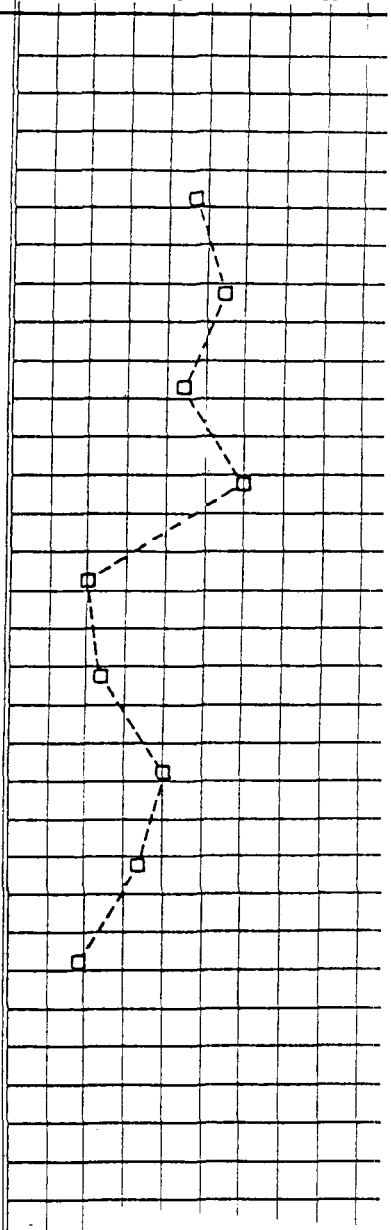
PROJECT Phase II, Hydrocarbon Recovery Investigation DATE DRILLED 6/12/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	1	SS		Dk. Gr. To Dk. Br. Silty CLAY w/Roots & Traces Of Sand	2-3	
				Brownish-Gr. CLAY w/Sandy Lenses & Silt		
5	2	SS		Dk. Gr. CLAY w/Oxidized Spots & Sand	1-2	
	3	SS			2-4	
10	4	SS		Gray Silty CLAY w/Oxidized Stains & Fine Sand	3-4	
	5	SS		Gray CLAY w/Silt, Oxidized Spots & Stains	3-5	
15	6	SS		-w/Fuel Odor Below 14.0'	2-1	
	7	SS		-w/Traces Of Fine Sand @ 16.5'	1-2	
20	8	SS			2-2	
	9	SS		Gr. CLAY w/Oxidized Spots & Stains & Fuel Odor	2-3	
25	10	SS		Brownish-Gray CLAY w/Silt, Fine Sand, Sandy Lenses & Fuel Odor	2-1	
	11	SS		Gr. Si. w/Fuel Odor & Traces Of Fine Sand	2-4	
30	12	SS		Gray Fine SAND w/Fuel Odor -Silty w/Clay @ 27.5' -Fine To Medium w/Silt @29.0'	4-4	
	13	SS		Gray CLAY Gr. Fine To Medium Silty SAND w/Fuel Odor	6-7	
35	14	SS		Cont'd	10-10	

SHEAR STRENGTH, TSF — SV △ — CP/2 □ — QU/2 ○ — 0 0.5 1.0 1.5 2.0

PL + — WATER CONTENT, % ● — 0 20 40 60 80 1



BEI 022611

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 34 Cont'd (H8-34) CONTRACT 465-78

DRILLED BY Gatsch LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation DATE DRILLED 6/12/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION)	BLOWS	DRY UNIT WEIGHT PCF
				Gray Fine To Medium SAND w/Fuel Odor		
	15	SS		-Silty To 35.5'	5-6	
				-Fine w/Filt From 36.5'		
40	16	SS		T. O. B.	11-15	
45						

SHEAR STRENGTH, TSF: SV △ QP/2 □ QU/2 ○ 0 0.5 1.0 1.5 2.0 2.

PL + WATER ● CONTENT, % + LL 0 20 40 60 80 10

BEI 022612

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

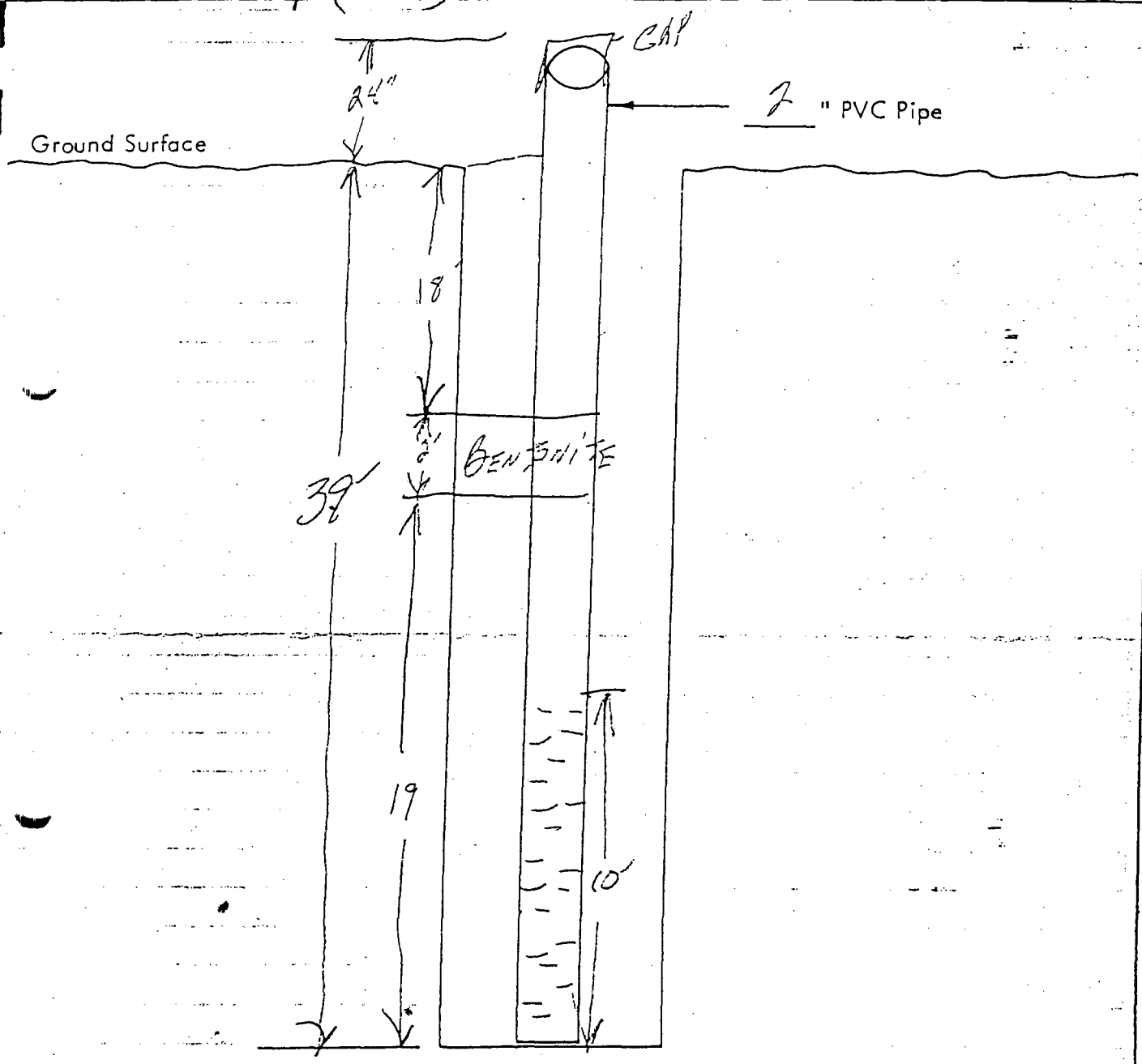
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 34 (HB-3A) Contract No. Date Installed



NOTES:

BEI 023451

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

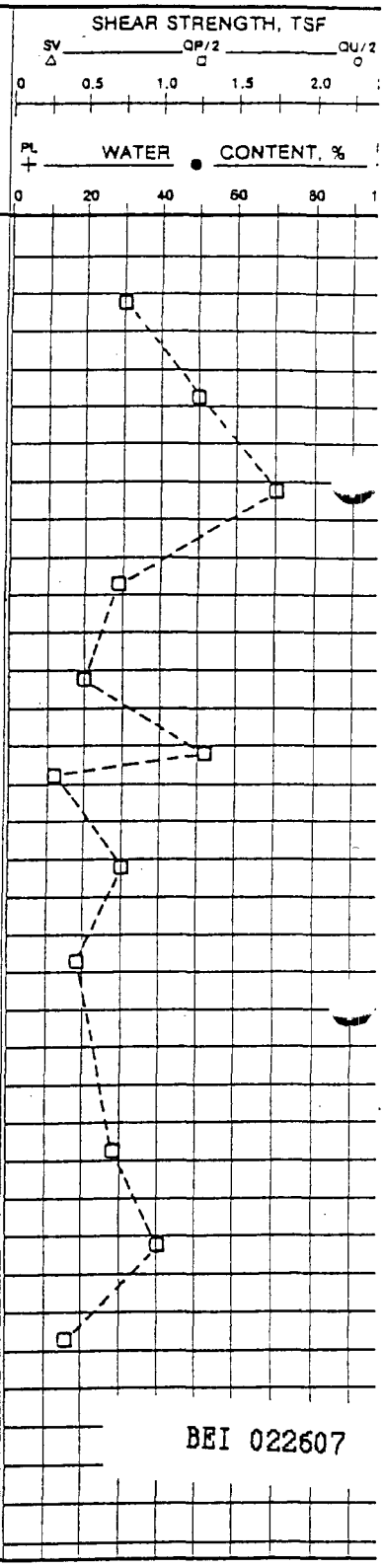
BORING 32 (HB-32) CONTRACT 465-78

DRILLED BY Gotsch DATE DRILLED 6/6/78 LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

SURFACE ELEVATION

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL	BLOWS	DRY UNIT WEIGHT PCF
				Dk.Gr. Si.CLAY & CLAY w/Roots		
	1	SS		Dk. Gr. Si. CLAY w/Grayish Brown Fine Sandy Silty Clay Seam	4-4	
5	2	SS		Dk. Gr. CLAY w/Oxidized Spots	3-5	
	3	SS		Dk. Gr. & Gray Sandy CLAY w/Oxidized Spots	3-4	
10	4	SS		Dk. Gr. & Gr. Sa. Si. CLAY w/ Oxi. Spots	2-3	
	5	SS		Gray CLAY w/Oxidized Spots & Stains, Fi. Sandy Silt Lenses & Silty Clay Seams	2-2	
15	6	SS	Encountered Water @ 14.0'	-w/Fuel Odor @ 14.0'	1-2	
	7	SS		Gray Silty CLAY w/Fine Sandy Lenses, Sand Seams & Pockets w/Fuel Odor	1-2	
20	8	SS			1/12'-1"	
	9	SS		Dk. Gr. Fine Sandy Silty CLAY	1-2	
25	10	SS		Gr. CLAY w/Fuel Odor -w/Fine Sand Partings @ 24.0'	2-2	
	11	SS		-w/Oxidized Stains @ 26.5'	2-3	
30	12	SS			1-2	
	13	SS		Brownish-Gr. Fine To Medium SAND w/Silt & Fuel Odor	6-7	
35	14	SS		Gray Silty CLAY w/Fuel Odor Cont'd	6-9	



BEI 022607

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 32 Cont'd (HB-32) CONTRACT 465-78

DRILLED BY Gotsch DATE DRILLED 6/6/78 LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		Dk. Gr. Fine To Coarse SAND w/Fuel Odor		
	15	SS		-w/Silt To 43.0' -Gray Below 36.5' -Fine @ 36.5'	6-7	
40	16	SS		-Gravelly Fine To Coarse @ 39.0'	9-13	
	17	SS		-Gravelly Fine To Medium @ 41.5' -Fine To Coarse @ 44.0'	13-14	
45	18	SS	N/R	T. O. B.	16-19	
50						

SHEAR STRENGTH, TSF — SV △ QP/2 □ QU/2 ○ — 0 0.5 1.0 1.5 2.0

WATER CONTENT, % — PL + ● — 0 20 40 60 80

BEI 022608

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

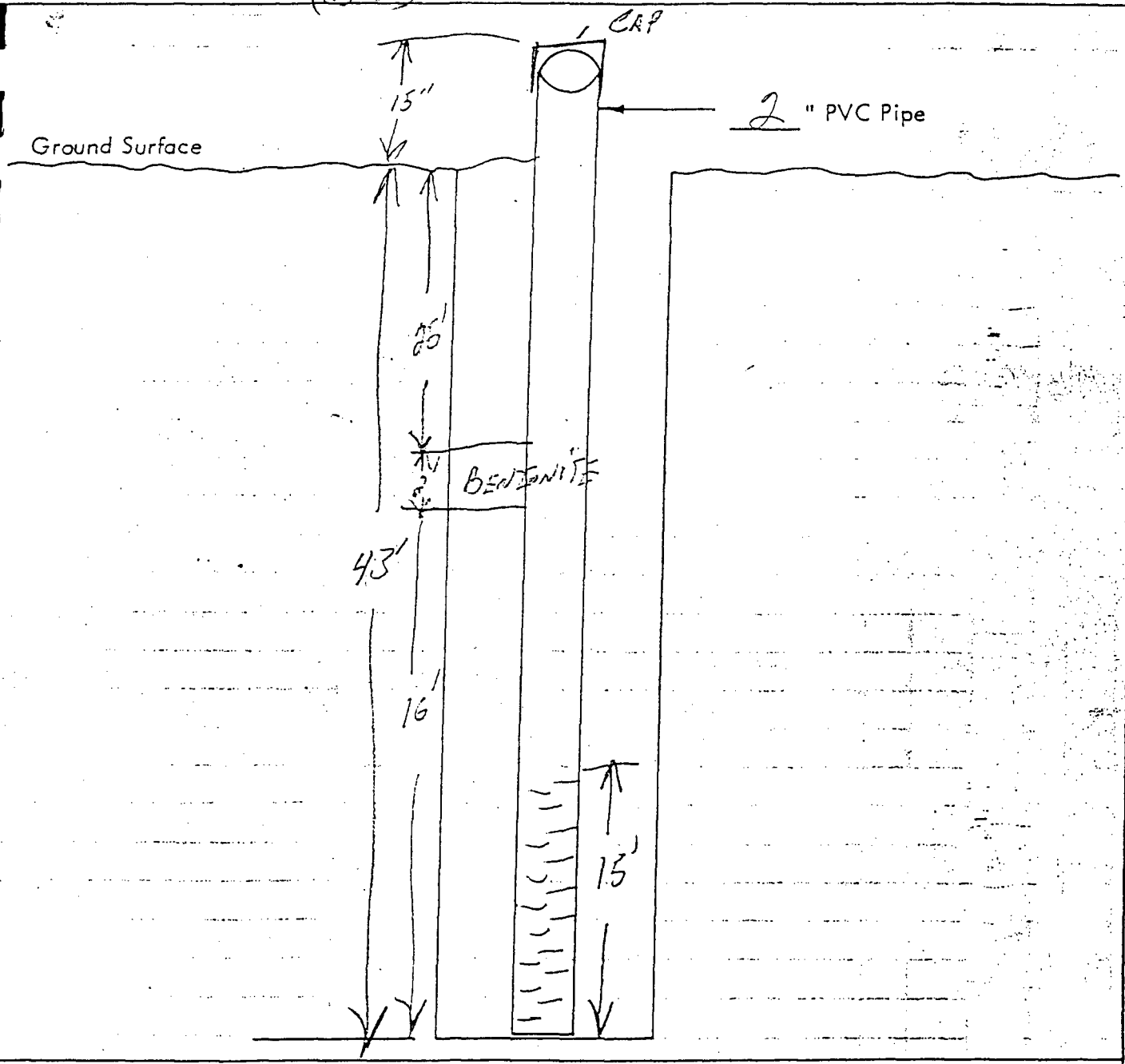
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 32 (HB-32) Contract No. Date Installed



NOTES:

BEI 023449

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

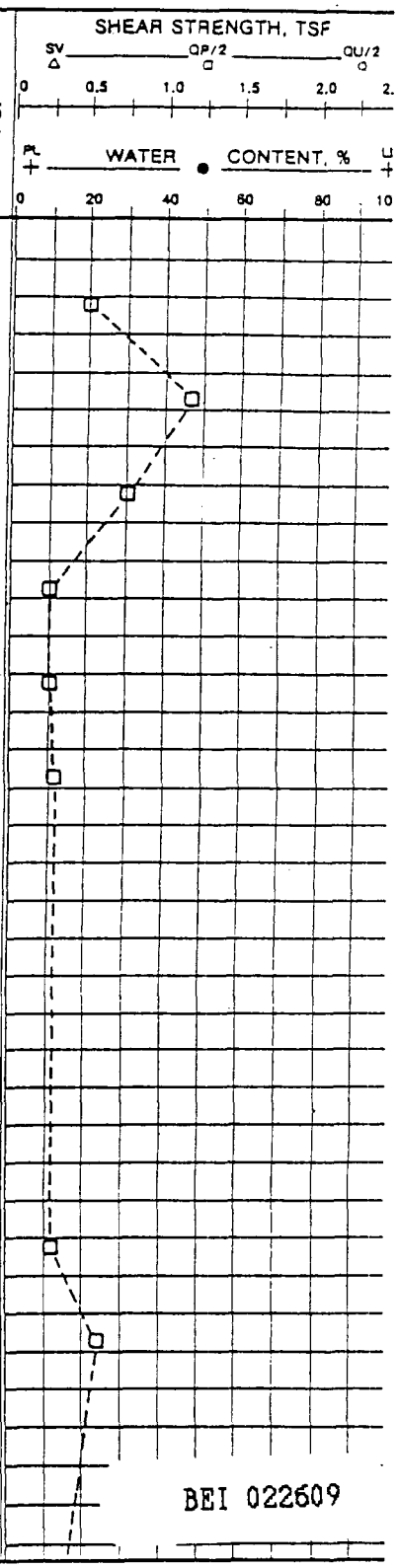
BORING 33 (HB-33) CONTRACT 465-78

DRILLED BY Roberts LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation PIEZOMETER Yes

DATE DRILLED 6/6/78 DRILLING METHOD Hollow Auger

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	1	SS		Dk. Br. CLAY w/Si. & Traces Of Sand	4-3	
5	2	SS		Dk. Gr. CLAY w/Oxidized Spots	4-7	
	3	SS		-Gray w/Oxidized Spots & Stains & Traces Of Sand From 6.0'	2-3	
10	4	SS		Gray & Brown Sandy Clayey SILT	2-3	
	5	SS		Gray & Brown Silty CLAY w/ Fine Sand	2-1	
15	6	SS		-w/Calcareous Matter @ 14.0'	1-2	
	7	SS		Gray & Brown Clayey SILT w/ Fine Sand	1-1	
20	8	SS		Gr. & Br. Fine Sandy Silty CLAY -Brown From 21.5'	1-1	
	9	SS			3-4	
25	10	SS		Gr. Fine Sandy SILT	1-2	
	11	SS		Dk. Gr. Silty CLAY	1-2	
30	12	SS		Dk. Gr. CLAY w/Silt	2-3	
	13	SS		Gr. Fine SAND w/Silt & Fuel Odor	10-14	
35	14	SS		Cont'd	11-14	



BEI 022609

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 33 Cont'd (HB-33) CONTRACT 465-78

DRILLED BY Roberts LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation PIEZOMETER Yes

DATE DRILLED 6/6/78 DRILLING METHOD Hollow Auger

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		Gr. Fine SAND w/Silt & Fuel Odor		
	15	SS			10-7	
				Dk. Gr. Silty CLAY		
40	16	SS			2-25	
				Gr. Fine To Coarse SAND w/Silt & Fuel Odor		
	17	SS		-Gravelly From 40.3' To 43.0'	23-22	
45	18	SS		-w/Gravel @ 44.0'	12-20	
				-Fine To Medium @ 46.5'		
	19	SS			20-26	
				T. O. B.		
50						

SHEAR STRENGTH, TSF — SV △ QP/2 □ QU/2 ○ — 0 0.5 1.0 1.5 2.0

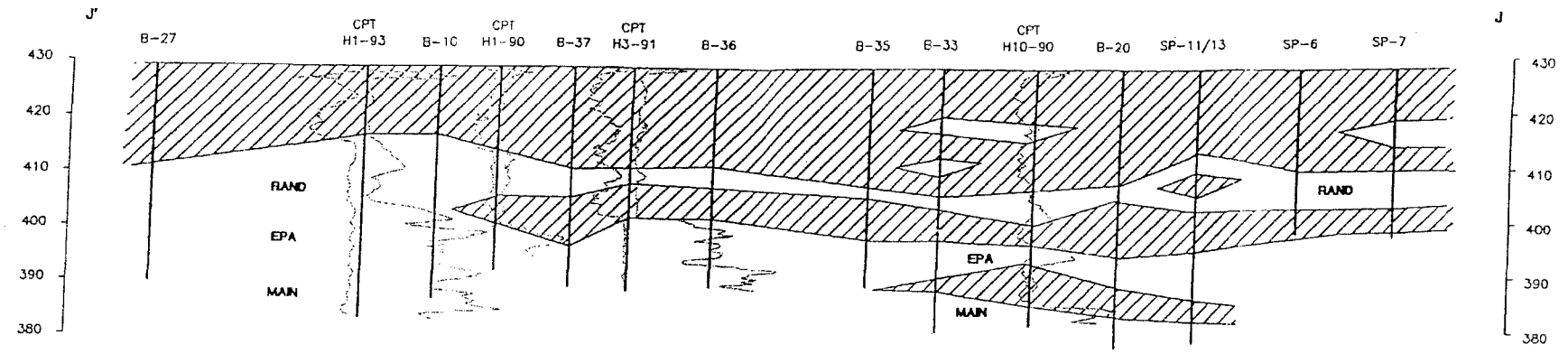
WATER CONTENT, % — PL + ● — 0 20 40 60 80

BEI 022610

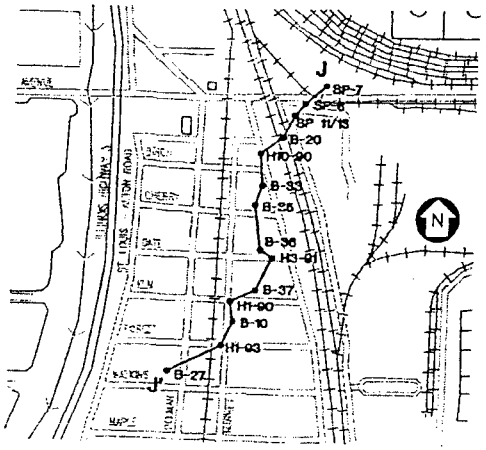
GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates



LOCATOR MAP



EXPLANATION

CPT H6-90 — CONE PENETROMETER PROBE HOLE

CONE END BEARING RESISTANCE
APPROXIMATE HORIZONTAL SCALE: 1 INCH = 300 TONS PER SQUARE FOOT

FRICTION RATIO (%)
APPROXIMATE HORIZONTAL SCALE: 1 INCH = 24 PERCENT

FRICTION RATIO = FRICTION SLEEVE RESISTANCE / CONE END BEARING RESISTANCE × 100

B-27 — SOIL BOREHOLE/MONITORING WELL

GENERAL STRATUM DESCRIPTION

RAND-	SANDY SILT, SILTY SAND, CLAYEY SILT
EPA-	SILTY SAND, SANDY SILT, SAND
MAIN-	SAND, SILTY SAND, GRAVELLY SAND
	CLAY, SILT, OCCASSIONALLY WITH SAND

General Notes:

This profile was developed by interpolation between widely spaced boreholes and probe holes. *Only at the borehole and probe hole locations should it be considered as an approximately accurate representation.*

RAND, EPA, and MAIN are names for local stratigraphic units.

Cone penetrometer testing was performed by Stratigraphics (1990, 1991), and Fugro Geosciences (1993).

Soil borings drilled and monitoring wells installed in 1978 (HB series) and 1990 (SP series).

Ground surface elevations are approximate.

HORIZONTAL SCALE IN FEET
0 200 400

VERTICAL SCALE IN FEET
0 20 40

122489AA-001
REV. DATE
10/22/93

Burlington Environmental Inc.

GEOLOGIC CROSS SECTION J-J'

CLARK OIL
HARTFORD, ILLINOIS
122489

FIGURE 1

RECORD OF SUBSURFACE EXPLORATION

BORING 27 (HB-27) CONTRACT 465-78

JOHN MATHES & ASSOCIATES

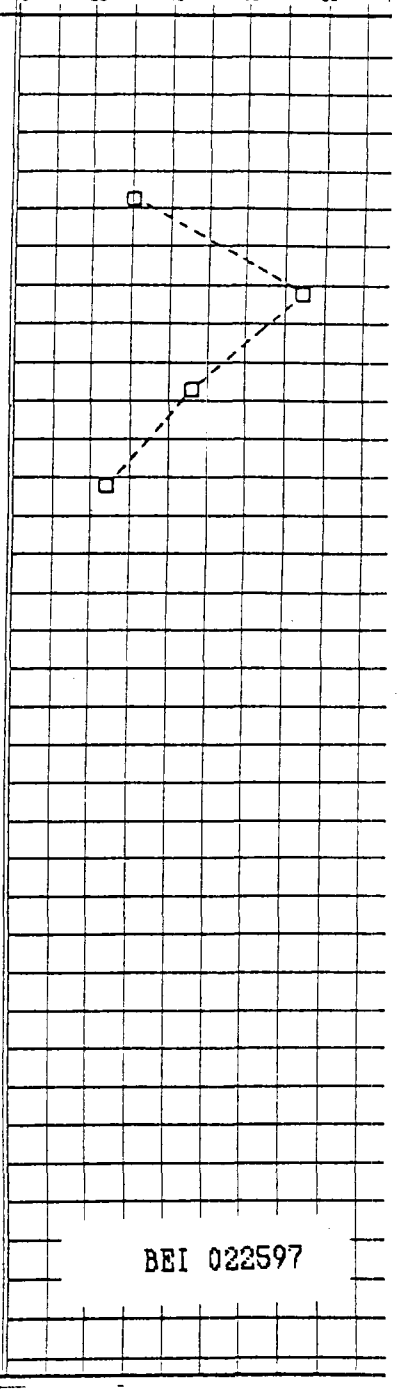
DRILLED BY Gotsch DATE DRILLED 6/9/78 LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				CINDERS & SOIL		
	1	SS		Black CLAY & CINDERS	2-3	
5	2	SS		Brownish-Gray CLAY w/Oxi. Spots, Stains & Silty Pockets	3-3	
	3	SS			4-5	
10	4	SS			2-2	
	5	SS		Interbedded Gray CLAY Silty CLAY & Fine Sandy SILT Seams	2-3	
15	6	SS		Gray Silty CLAY w/Sandy & Silt Seams	3-2	
	7	SS			4-3	
20	8	SS		Brown Fine SAND -Silty To 28.0' -w/Clayey Pockets @ 19.0'	5-8	
	9	SS			4-6	
25	10	SS		-w/Traces Of Clay @ 24.0'	4-6	
	11	SS		-Gray From 26.5' To 33.0'	5-5	
30	12	SS		-w/Silt @ 29.0'	10-12	
	13	SS		-Silty From 31.5' To 38.0' -w/Traces Of Clay @ 31.5'	5-7	
35	14	SS		-Brown @ 34.0' Cont'd	4-5	

SHEAR STRENGTH, TSF: SV △ QP/2 □ QU/2 ○ (0, 0.5, 1.0, 1.5, 2.0)

PL + WATER ● CONTENT, % (0, 20, 40, 60, 80)



BEI 022597

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 27 Cont'd (HB-27) CONTRACT 465-78

JOHN MATHES & ASSOCIATES

DRILLED BY Gotsch LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery Investigation DATE DRILLED 6/9/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL ELEVATION	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV △, QP/2 □, QU/2 ○; 0, 0.5, 1.0, 1.5, 2.0, 2.5) / WATER CONTENT, % (0, 20, 40, 60, 80, 100)
	14	SS		Brown Silty Fine SAND			
				-Brownish-Gray @ 36.5'			
	15	SS			17-19		
				-Gray w/Silt @ 39.0'			
40	16	SS			7-9		
				T. O. B.			
45							

BEI 022598

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

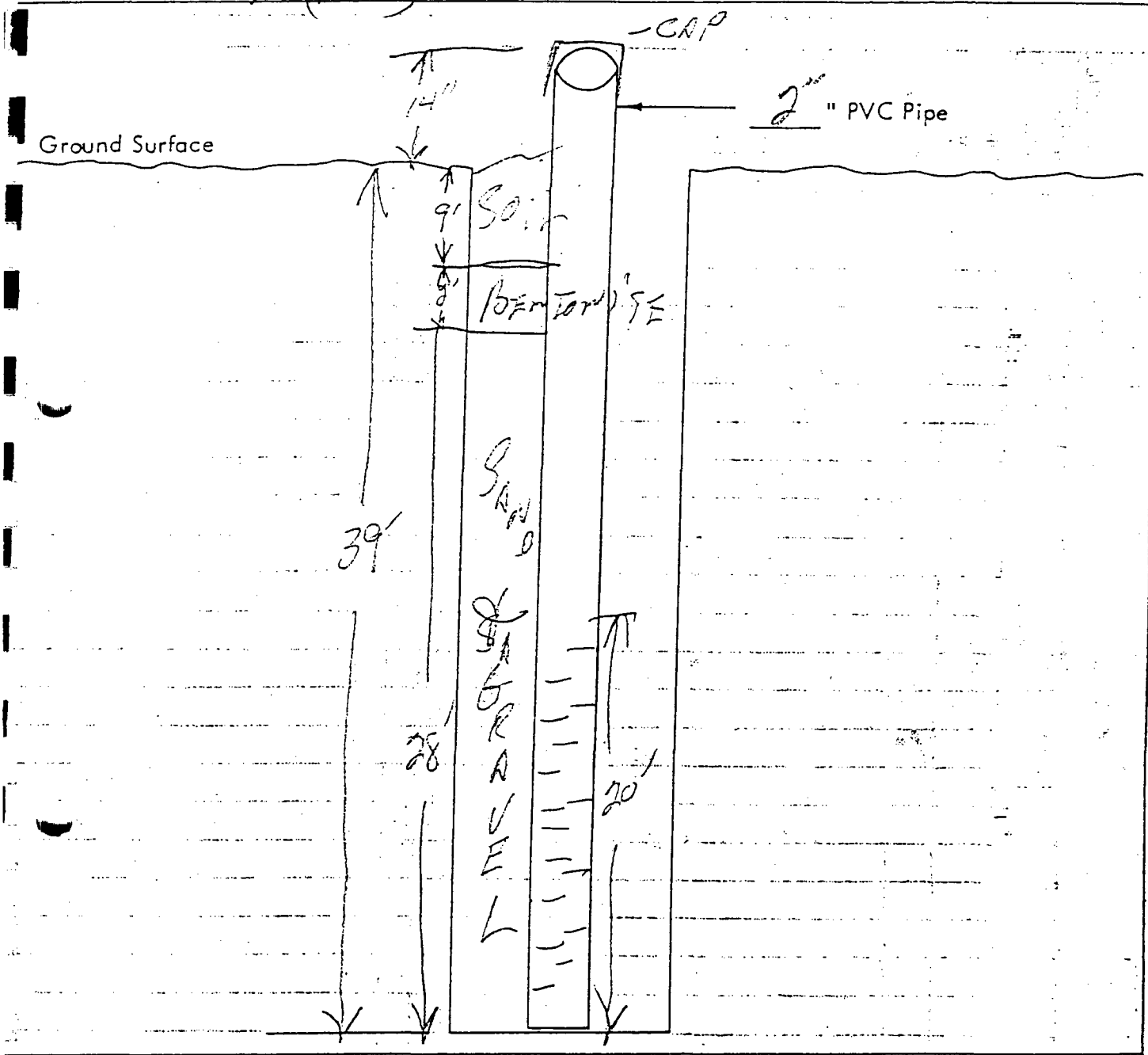
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 27 (HB-27) Contract No. Date Installed



NOTES:

BEI 023444

nformation Checklist: Type of Backfill Soil Strata

ype of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

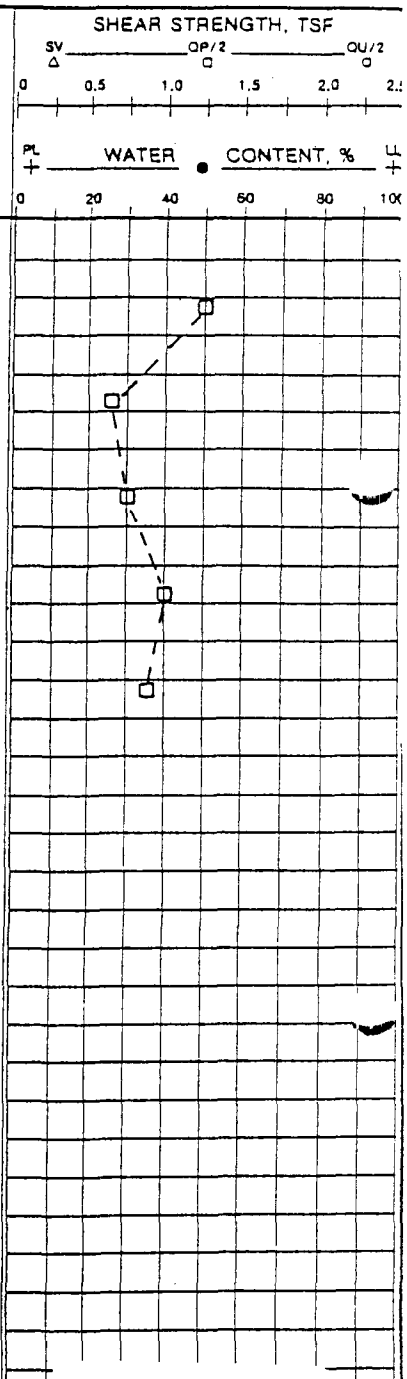
BORING 10 (HB-10) CONTRACT 465-78

DRILLED BY Gotsch LOGGED BY Schweigert

PROJECT Phase II - Hydrocarbon Recovery DATE DRILLED 5/26/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Br. Si. CLAY & Cinders, Fill		
	1	SS		Brown & Dk. Gr. CLAY w/ Oxidized Spots	3-6	
5	2	SS		Brownish-Gray CLAY w/Silt & Silty Fine Sandy Pockets	3-3	
	3	SS		Gray To Gray & Dk. Gray CLAY w/Oxidized Spots & Stains	3-4	
10	4	SS		-w/Slickensides @ 6.5'	3-3	
	5	SS		Brownish-Gray Silty CLAY w/Fine Sand	3-6	
15	6	SS		Brown Silty Fine SAND w/ Traces Of Clay	3-3	
	7	SS			3-3	
20	8	SS		Brown Fine Sandy SILT w/ Clay	3-6	
	9	SS		Brown Fine SAND -Silty w/A Faint Fuel Odor From 21.5' To 28'	4-5	
25	10	SS			2-3	
	11	SS		-Dk. Gr. w/Traces Of Clay @ 26.5'	2-4	
30	12	SS		-w/A Fuel Odor From 29' To 38' -Fine To Medium @ 29'	7-7	
	13	SS		-Fine To Medium w/Silt @ 31.5'	9-13	
35				Cont'd		



BEI 022571

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 10 Cont'd (HB-10) CONTRACT 465-78

DRILLED BY Gotsch DATE DRILLED 5/26/78 LOGGED BY Schweigert

PROJECT Phase II - Hydrocarbon Recovery DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV △, QP/2 □, QU/2 ○; 0, 0.5, 1.0, 1.5, 2.0) / WATER CONTENT, % (PL +, ● ; 0, 20, 40, 60, 80)
	14	SS		-Gr. w/ Silt @ 34'	5-6		
	15	SS		-Dk. Gr. Si. From 36.5' To 43'	11-13		
40	16	SS		-w/ A Faint Fuel Odor & Traces Of Clay Below 29'	7-13		
	17	SS		T. O. B.	8-9		
45							

BEI 022572

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

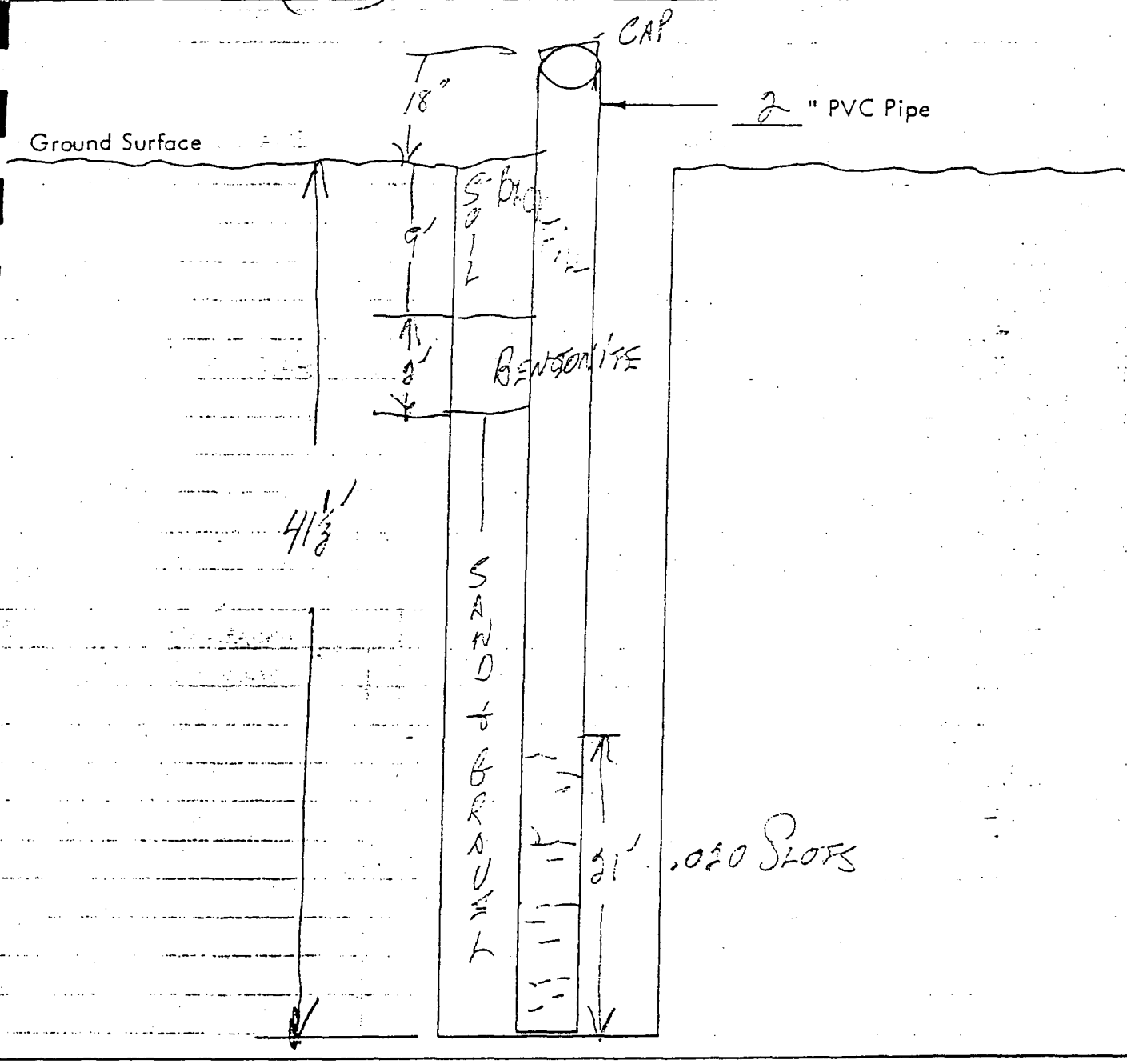
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 10 (HB-10) Contract No. Date Installed



NOTES:

BEI 023429

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

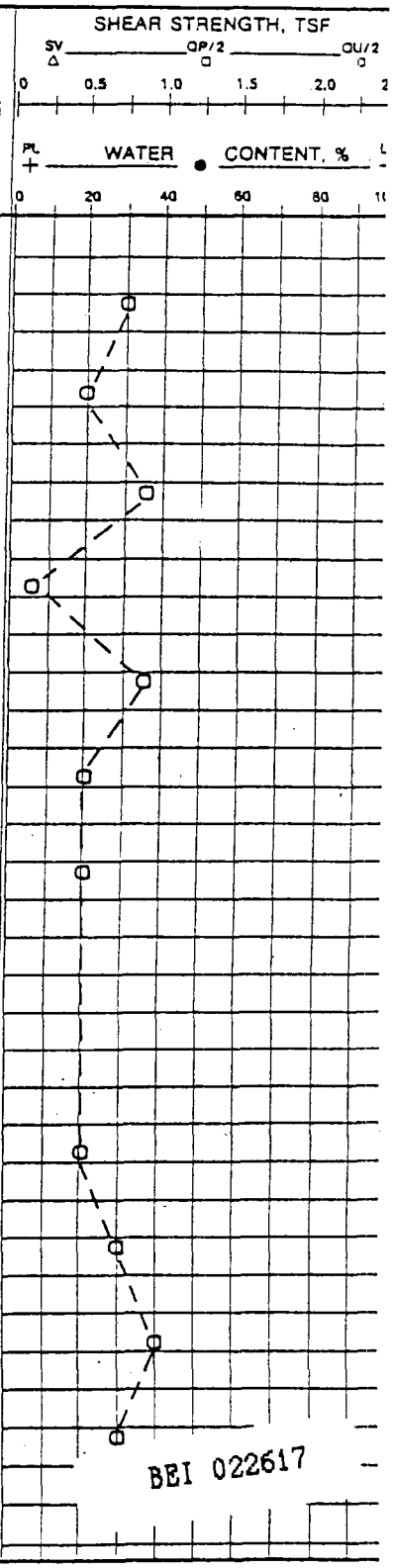
RECORD OF SUBSURFACE EXPLORATION

BORING 37 (HB-37) CONTRACT 465-78

JOHN MATHES & Associates

LOGGED BY Schweigert
PIEZOMETER Yes
DATE DRILLED 6/14/78
DRILLING METHOD Hollow Auger
DRILLED BY Roberts
PROJECT Phase II, Hydrocarbon Recovery

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Dk. Br. Si. CLAY w/Roots		
	1	SS		Dk. Br. To Br. CLAY w/Silt	3-4	
5	2	SS			2-2	
	3	SS		Dk. Br. CLAY w/Oxidized Spots	3-3	
10	4	SS		Gr. Silty CLAY w/Oxidized Spots & Stains	2-3	
	5	SS		Gr. CLAY w/Oxidized Spots & Stains	3-3	
15	6	SS		Gr. Silty CLAY w/Oxidized Spots & Stains	1-2	
	7	SS		Brown & Gr. CLAY w/Silt	1-2	
20	8	SS		Gr. Clayey SILT w/Traces Of Fine Sand	2-2	
	9	SS		Br. SILT w/Clay & Traces Of Fine Sand	2-1	
25	10	SS		Gr. CLAY w/Silt	2-2	
	11	SS		Gr. CLAY -w/Oxidized Spots & Stains @ 26.5'	2-3	
30	12	SS		-w/Fine Sandy Lenses @ 29'	2-3	
	13	SS		Br. CLAY w/Silt	2-9	
35	14	SS		Br. Fine SAND -Silty @ 32.5' Cont'd	6-11	



BEI 022617

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 37 Cont'd (HB-37) CONTRACT 465-78

DRILLED BY Roberts DATE DRILLED 6/14/78 LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV △, QP/2 □, QU/2 ○; 0, 0.5, 1.0, 1.5, 2.0, 2.) / WATER CONTENT, % (PL +, ●, LL +; 0, 20, 40, 60, 80, 10)
	14	SS		-w/A Fuel Odor From 34' To 40.5'			
	15	SS		-Gray Fine To Medium Below 36.5'	6-11		
40	16	SS		T. O. B.	7-11		
45							

BEI 022618

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

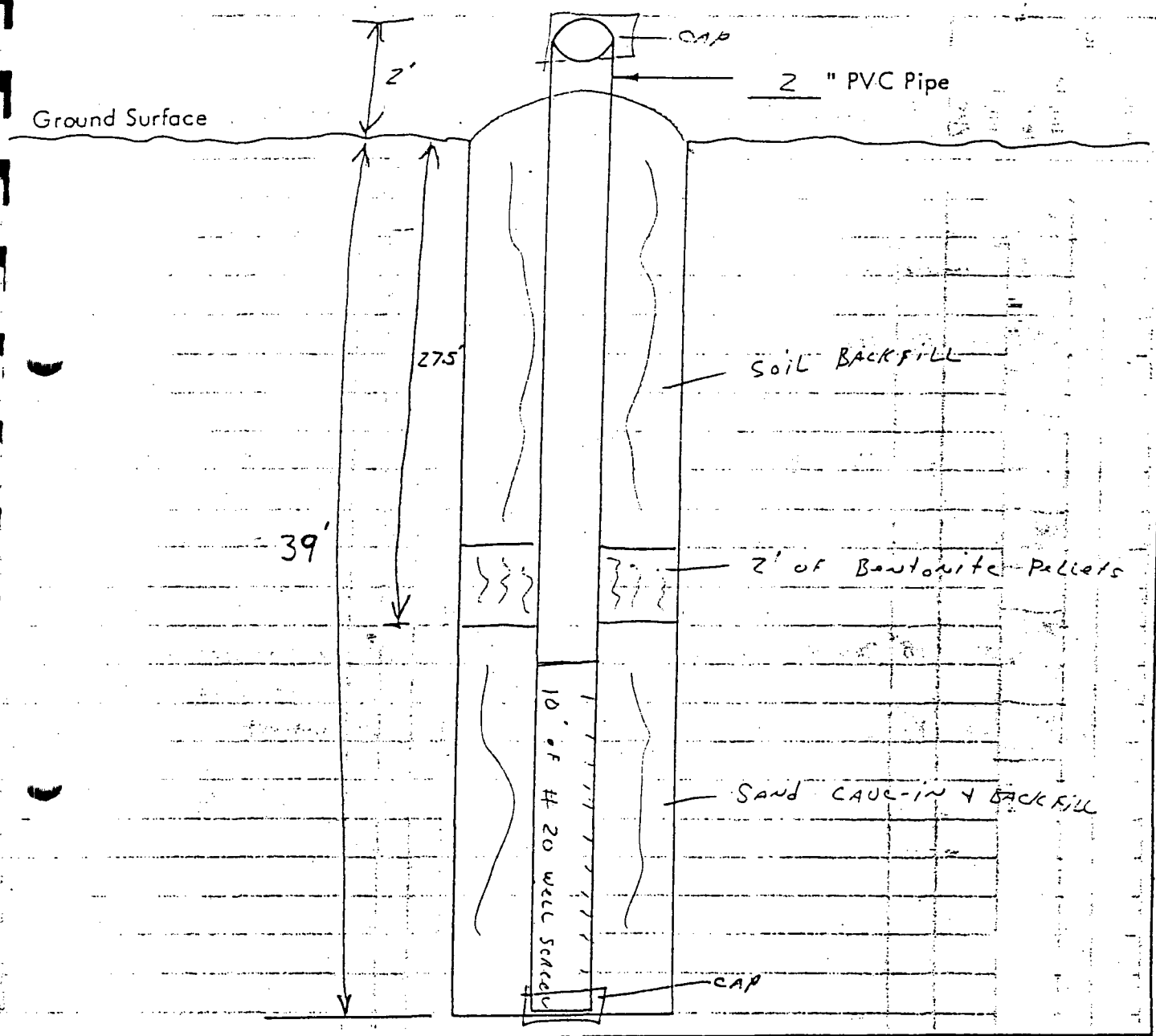
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. B-37 (HB-37) Contract No. 465 Date Installed 6-14-78



NOTES:

BEI 023454

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

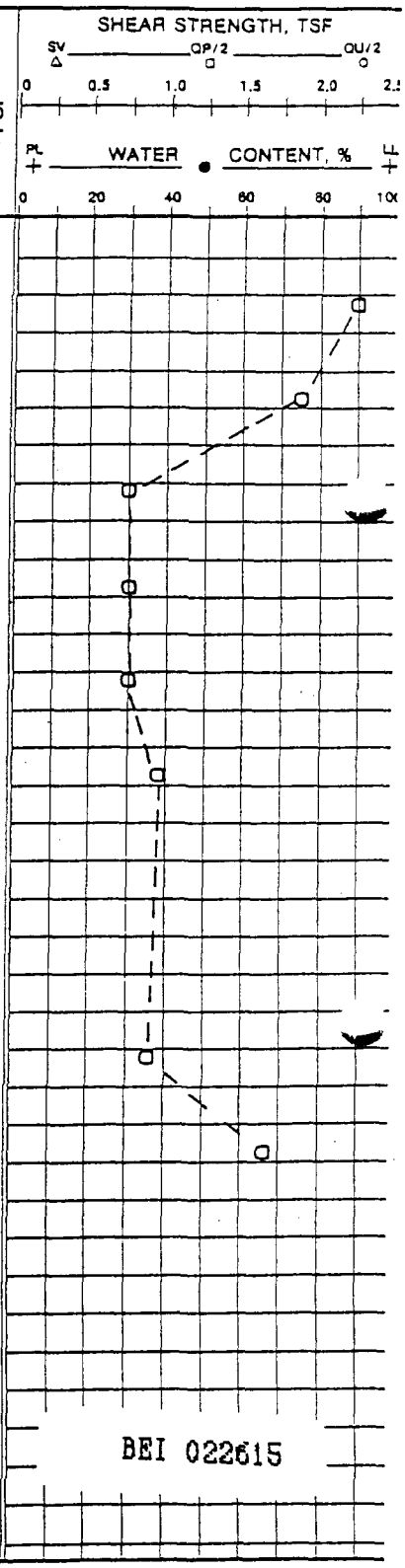
Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

BORING 36 (HB-36) CONTRACT 465-78

DRILLED BY Gotsch LOGGED BY Schweigert
PROJECT Phase II, Hydrocarbon Recovery DATE DRILLED 6/13/78
DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Br. Si. CLAY & CLAY w/Roots		
	1	SS		Dk. Br. CLAY	4-5	
5	2	SS		-w/Oxidized Spots @ 4'	4-6	
	3	SS		Brownish-Gray CLAY w/Silt & Oxidized Spots & Stains	2-3	
10	4	SS		Brownish-Gray Silty CLAY w/Oxidized Spots, Stains, & Traces Of Fine Sand	3-2	
	5	SS		Brown & Gray CLAY w/Silty Pockets	2-3	
15	6	SS		Brown & Gray CLAY w/Silt	2-2	
	7	SS		Brown Silty CLAY w/Traces Of Fine Sand	3-4	
20	8	SS		Brown Clayey SILT w/Traces Of Fine Sand	2-4	
	9	SS		Gr. CLAY & Silty CLAY w/ Oxidized Spots, & Stains, & Partings	3-3	
25	10	SS		Gray To Brown CLAY w/Oxi. Spots & Stains.	3-4	
	11	SS		Brown Fine SAND -Clayey @ 26.5'	4-9	
30	12	SS		-w/Silt & A Fuel Odor From 29' To 40.5' -w/Traces Of Gravel @31.5'	8-13	
	13	SS			7-8	
35	14	SS		Cont'd	8-11	



BEI 022615

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 36 Cont'd (HB-36) CONTRACT 465-78

DRILLED BY Gotsch LOGGED BY Schweigert

PROJECT Phase II Hydrocarbon Recovery DATE DRILLED 6/13/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV △ — OP/2 □ — QU/2 ○; 0, 0.5, 1.0, 1.5, 2.0) / WATER CONTENT, % (PL +, ● ; 0, 20, 40, 60, 80)
	14	SS		Brown Fine Sand w/Silt & A Fuel Odor			
	15	SS		-Fine To Medium @ 39'			
40	16	SS		T. O. B.			
45							

BEI 022616

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

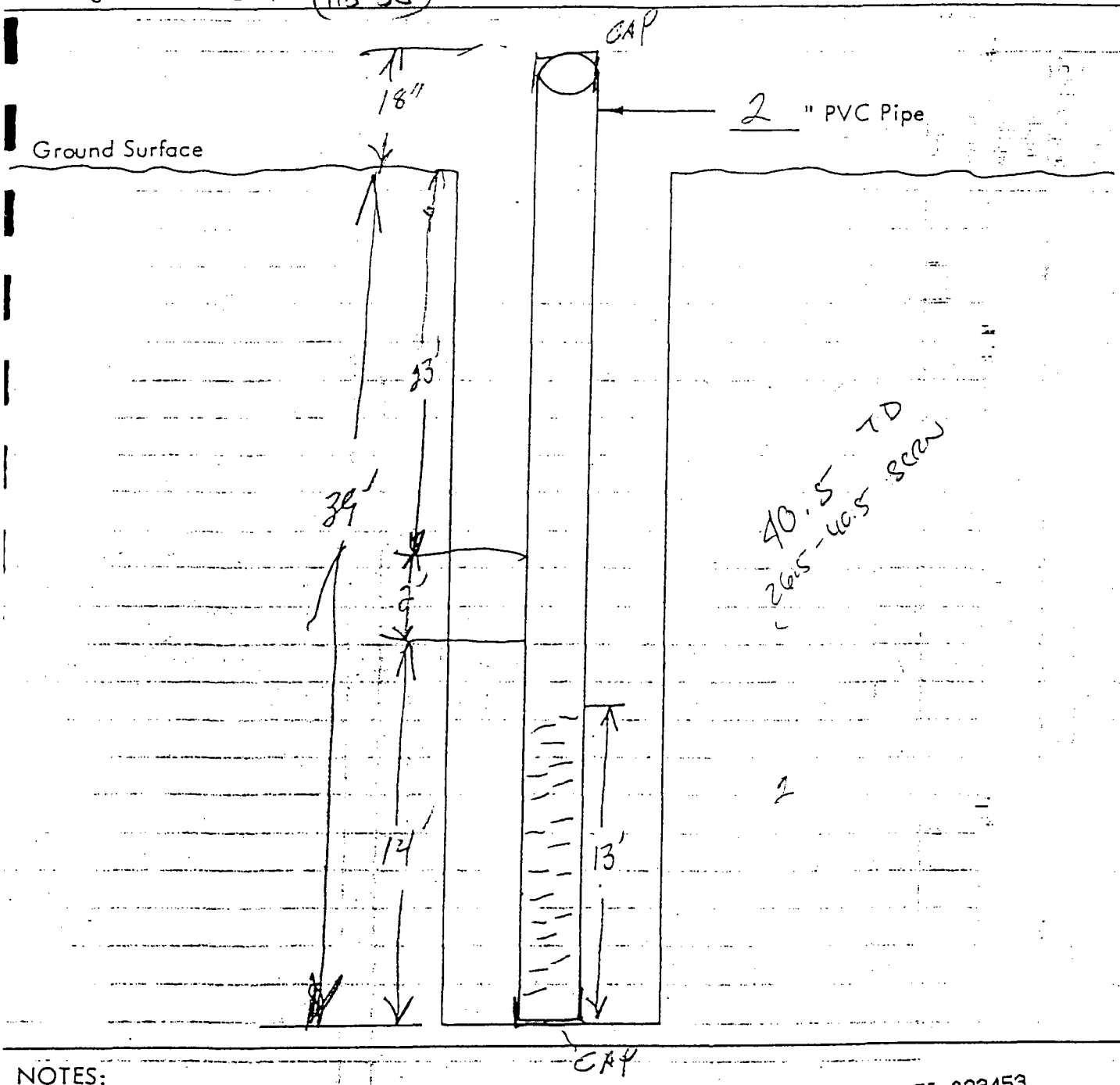
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 36 (HB-36) Contract No. Date Installed



NOTES:

BEI 023453

nformation Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

RECORD OF SUBSURFACE EXPLORATION

BORING 35 (HB-35) CONTRACT 465-78

JOHN MATHES & ASSOCIATES

LOGGED BY Schweigert
PIEZOMETER Yes
DATE DRILLED 6/13/78
DRILLING METHOD Hollow Auger
DRILLED BY Roberts
PROJECT Phase II, Investigation Hydrocarbon Recovery

SURFACE ELEVATION

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL	BLOWS	DRY UNIT WEIGHT PCF
				Dk. Br. Silty CLAY w/Traces Of Roots		
	1	SS		Dk. Br. & Dk. Gr. CLAY w/ Silt & Traces Of Fine Sand	2-2	
5	2	SS		Dk. Gr. & Br. To Grayish-Brown CLAY w/Oxidized Spots & Stains	4-6	
	3	SS			2-3	
10	4	SS		Gray CLAY w/Silt, Silty & Clayey Pockets, & Oxidized Spots & Stains	4-3	
	5	SS		Gray & Brown To Gray CLAY -w/Oxidized Spots & Stains @ 14'	2-2	
15	6	SS			2-1	
	7	SS		Dk. Gr. Silty CLAY w/Traces Of Fine Sand	1-1	
20	8	SS			1-2	
	9	SS		Dk. Gr. Clayey SILT w/ Traces Of Fine Sand	1-2	
				Gray CLAY		
25	10	SS			3-4	
				Dk. Gr. CLAY w/Silt		
	11	SS		Gray CLAY	1-2	
30	12	SS			2-3	
	13	SS		Br. To Gr. Fine SAND -w/Clayey Pockets @ 31.5' -w/Silt & A Fuel Odor From 31.5' To 38'	7-11	
35	14	SS		Cont'd	4-7	

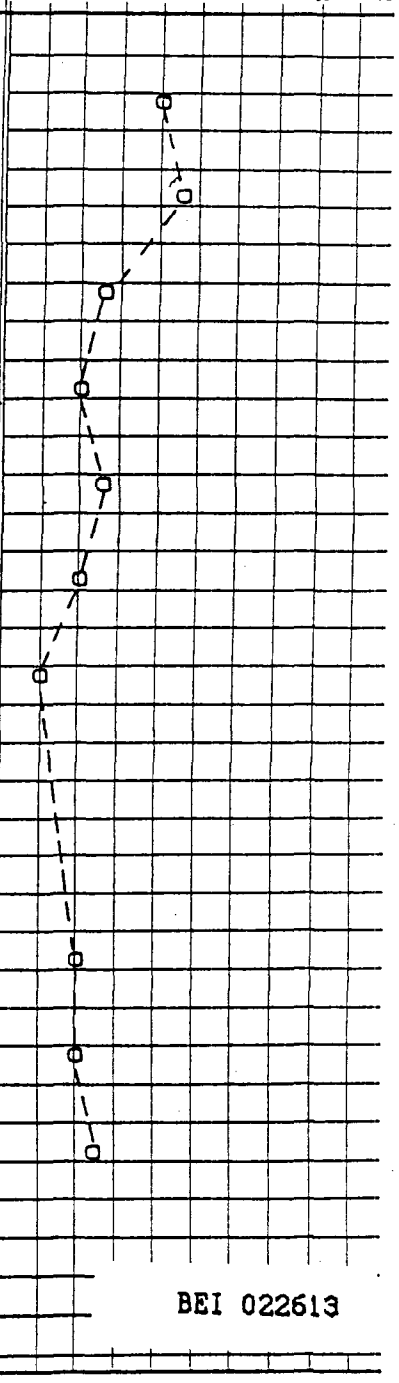
SHEAR STRENGTH, TSF

SV △ — QP/2 □ — QU/2 ○

0 0.5 1.0 1.5 2.0 2.

PL + — WATER ● CONTENT, % — LL +

0 20 40 60 80 10



BEI 022613

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 35 Cont'd (HB-35) CONTRACT 465-78

DRILLED BY Roberts DATE DRILLED 6/13/78 LOGGED BY Schweigert

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV △, QP/2 □, QU/2 ○; 0, 0.5, 1.0, 1.5, 2.0) / WATER CONTENT, % (PL +, ● ; 0, 20, 40, 60, 80)
	14	SS		Gr. Fine SAND w/Silt & A Fuel Odor			
	15	SS			9-16		
				-Silty @ 39'			
40	16	SS		T. O. B.	8-15		
45							

BEI 022614

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

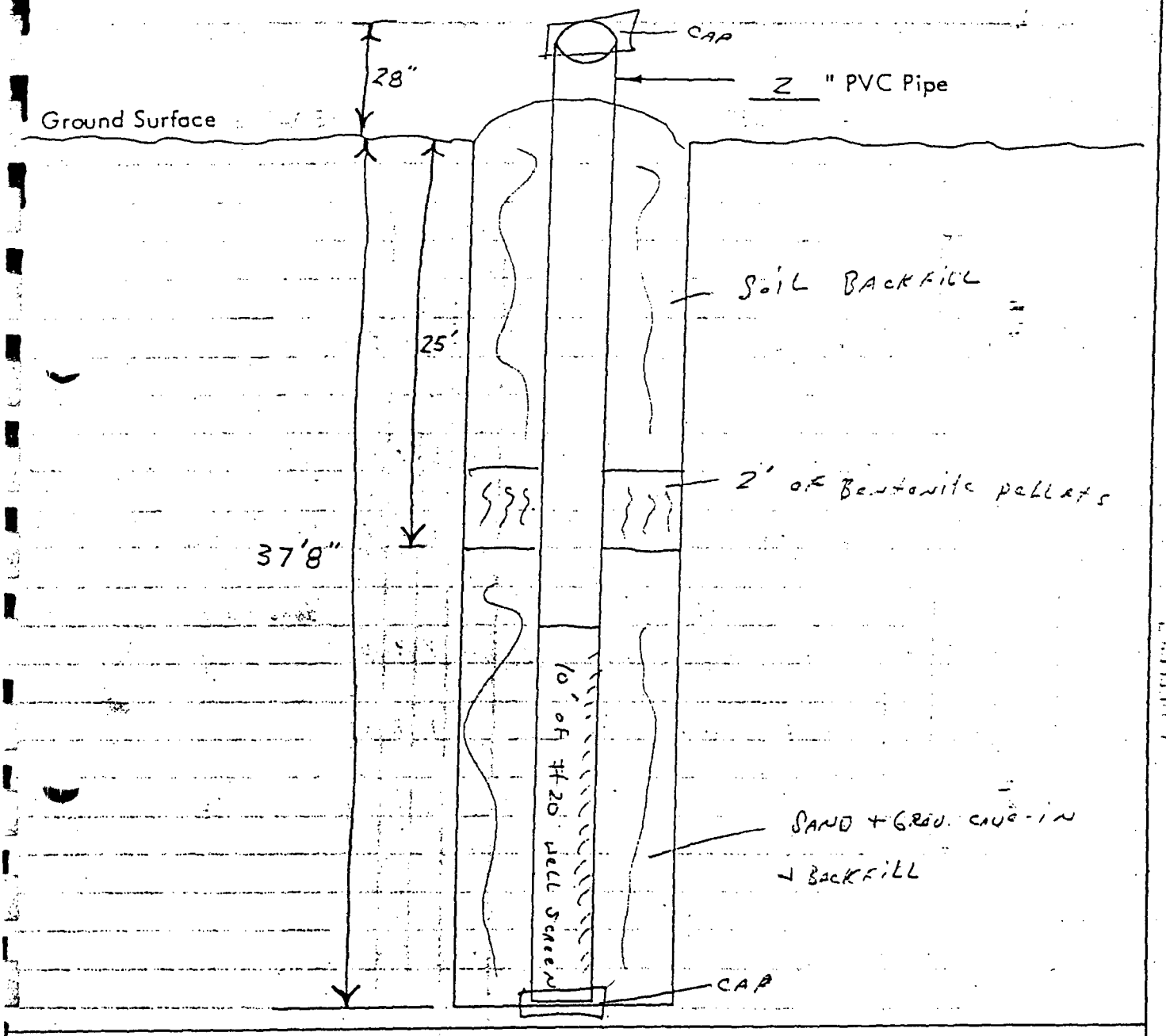
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. B-35 (HB-35) Contract No. 465 Date Installed 6-14-78



NOTES:

BEI 023452

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface

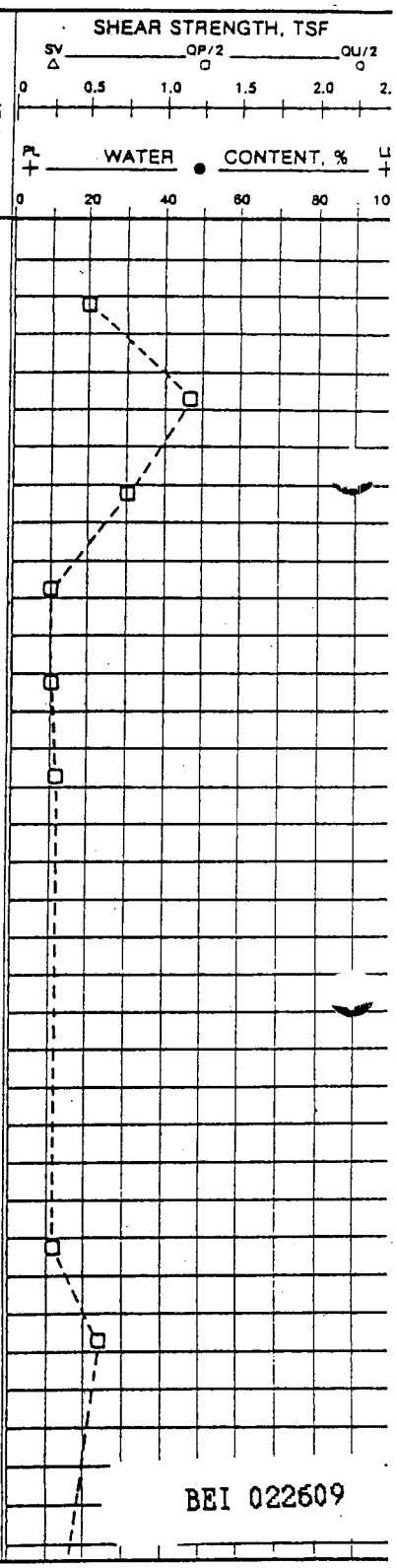
RECORD OF SUBSURFACE EXPLORATION

BORING 33 (HB-33) CONTRACT 465-78

DRILLED BY Roberts DATE DRILLED 6/6/78 LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	1	SS		Dk. Br. CLAY w/Si. & Traces Of Sand	4-3	
5	2	SS		Dk. Gr. CLAY w/Oxidized Spots	4-7	
	3	SS		-Gray w/Oxidized Spots & Stains & Traces Of Sand From 6.0'	2-3	
10	4	SS		Gray & Brown Sandy Clayey SILT	2-3	
	5	SS		Gray & Brown Silty CLAY w/ Fine Sand	2-1	
15	6	SS		-w/Calcareous Matter @ 14.0'	1-2	
	7	SS		Gray & Brown Clayey SILT w/ Fine Sand	1-1	
20	8	SS		Gr. & Br. Fine Sandy Silty CLAY -Brown From 21.5'	1-1	
	9	SS			3-4	
25	10	SS		Gr. Fine Sandy SILT	1-2	
	11	SS		Dk. Gr. Silty CLAY	1-2	
30	12	SS		Dk. Gr. CLAY w/Silt	2-3	
	13	SS		Gr. Fine SAND w/Silt & Fuel Odor	10-14	
35	14	SS		Cont'd	11-14	



BEI 022609

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 33 Cont'd (HB-33) CONTRACT 465-78

DRILLED BY Roberts DATE DRILLED 6/6/78 LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		Gr. Fine SAND w/Silt & Fuel Odor		
	15	SS			10-7	
				Dk. Gr. Silty CLAY		
40	16	SS			2-25	
				Gr. Fine To Coarse SAND w/Silt & Fuel Odor		
	17	SS		-Gravelly From 40.3' To 43.0'	23-22	
45	18	SS		-w/Gravel @ 44.0'	12-20	
				-Fine To Medium @ 46.5'		
	19	SS		T. O. B.	20-26	
50						

SHEAR STRENGTH, TSF — SV △ QP/2 □ QU/2 ○ — 0 0.5 1.0 1.5 2.0

WATER CONTENT, % — PL + ● — 0 20 40 60 80

BEI 022610

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

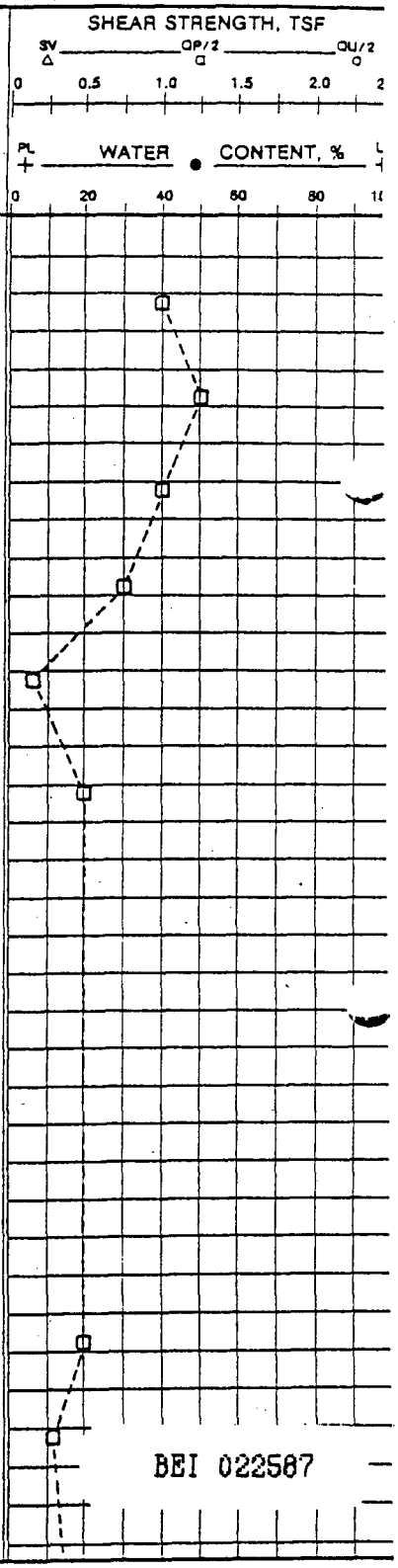
RECORD OF SUBSURFACE EXPLORATION

BORING 20 (HB-20) CONTRACT 465-78

DRILLED BY Roberts DATE DRILLED 6/12/78 LOGGED BY Black

PROJECT Phase II, Hydrocarbon Rec. DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Black Silty CINDERS		
	1	SS		Black CLAY w/Silt	2-3	
5	2	SS		Dark Gray CLAY	2-5	
	3	SS		Gr.CLAY w/Silt, Oxidized Spots & Stains & Traces of Fine Sand	2-3	
10	4	SS		Gray CLAY w/Oxidized Spots & Stains	2-3	
	5	SS		Brownish-Gray Fine Sandy Silty CLAY	1-1	
15	6	SS		Gr.CLAY w/Silt Seams	1-2	
	7	SS		Gray Silty CLAY w/Traces of Fine Sand	1-1	
20	8	SS			1-1	
	9	SS		Gray Fine Sandy SILT w/1" Clay Seams @ 23.0'	1-2	
25	10	SS		Gray Silty CLAY w/Fine Sand & 3" Clay Seam @ 25.5'	3-2	
	11	SS		Dark Gray Fine Sandy Silty CLAY w/Clay Seams	2-2	
30	12	SS		Dark Gray CLAY w/Silt	1-2	
	13	SS		-Dark Brown & Gray w/ Traces of Fine Sand @ 31.5'	2-3	
35	14	SS		Cont'd	8-12	



BEI 022587

GROUND WATER DEPTH AT COMPLETION ____ AFTER ____ HRS. ____ AFTER ____ HRS. ____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 20 Cont'd (HB-20) CONTRACT 465-78

DRILLED BY Gotsch LOGGED BY Black
PROJECT Phase II, Hydrocarbon Rec. DATE DRILLED 4/12/78
DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
	14	SS		Dk. Gray Silty Fine SAND		
	15	SS		-Gray Fine to Medium w/ Silt @ 36.5'	5-7	
40	16	SS		Dark Gray Silty CLAY w/ Fine Sand	W/H-4	
	17	SS		-Interbedded w/Fine Sand Seams & Partings @ 41.5'	2-4	
45	18	SS		Dark Gray CLAY w/Silt	8-17	
	19	SS		Gray Coarse to Fine SAND w/Silt & Fuel Odor -Fine to Medium @ 46.5' -Fine to Coarse @ 49.0'	21-25	
50	20	SS			12-14	
				T.O.B.		
55						

SHEAR STRENGTH, TSF — SV △ QP/2 □ QU/2 ○ — 0 0.5 1.0 1.5 2.0 2.

WATER CONTENT, % — PL + LL + — 0 20 40 60 80 10

BEI 022588

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

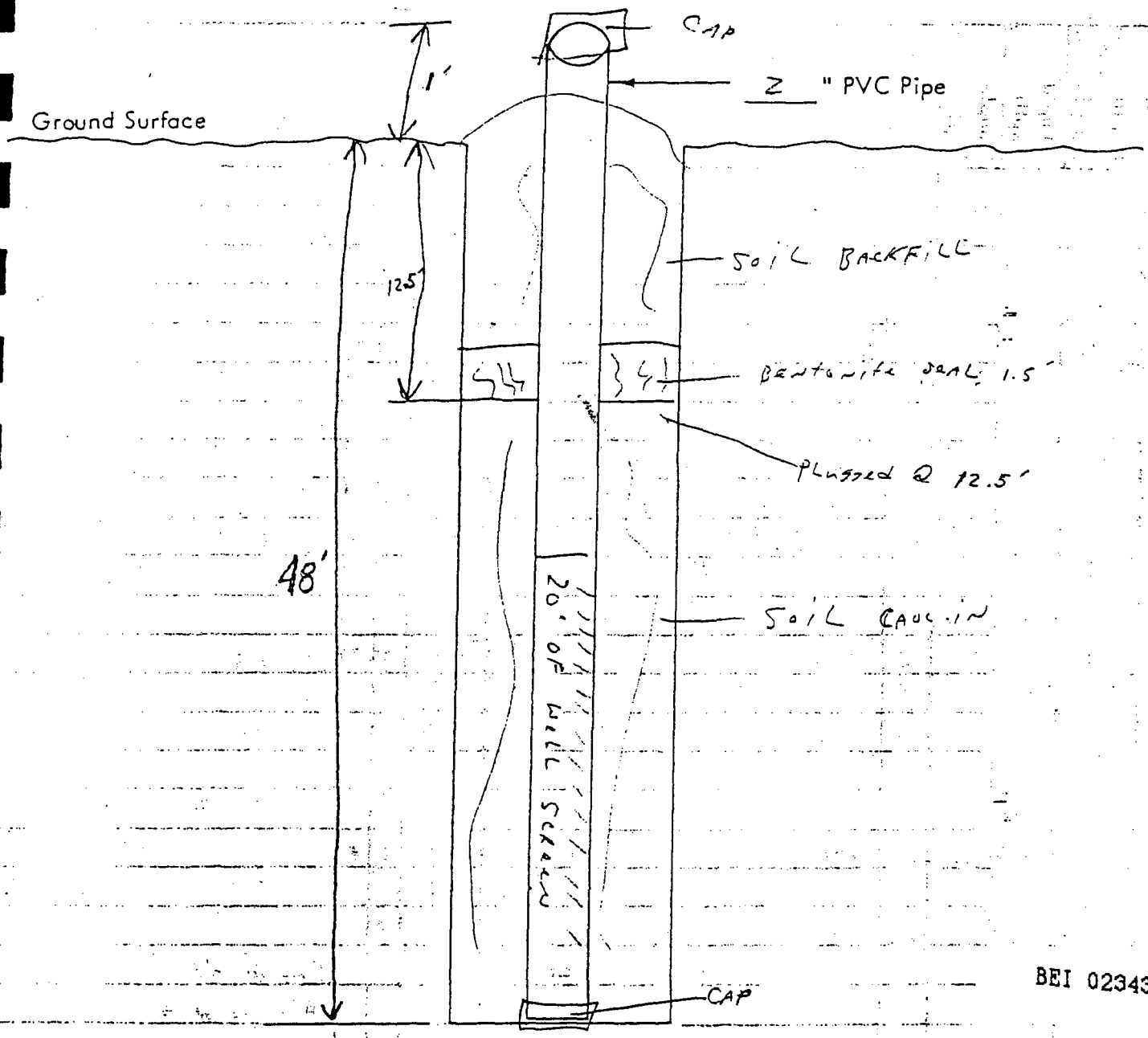
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. B-20 (HB-20) Contract No. 465 Date Installed 6-12-78



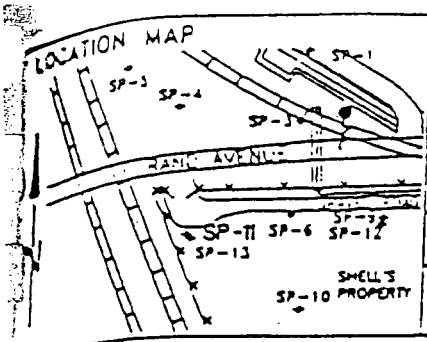
BEI 023439

NOTES: Hole plugged @ 13' - Re-drilled 25' plugged again @ 12.5'

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface



SHELL OIL COMPANY - WELL LOG

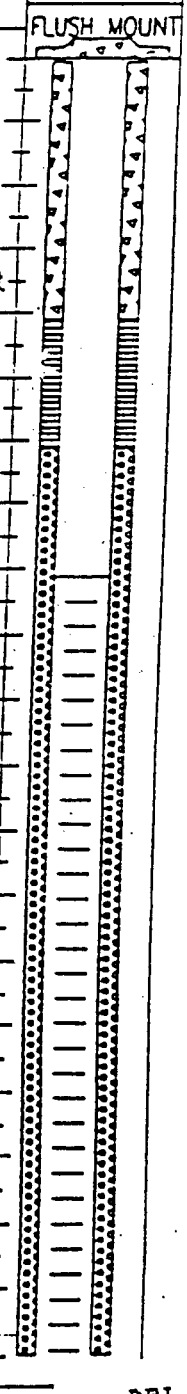
WELL NUMBER	SP-11	LOCATION	TANNERY
DATE	1-9-90	WEATHER	WINDY LOW 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	28'-6' WB-40 SAND	SEAL	0'-4' GROUT 4'-6' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 10' HOLE DIA. 10"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 20' TOTAL DEPTH 28'

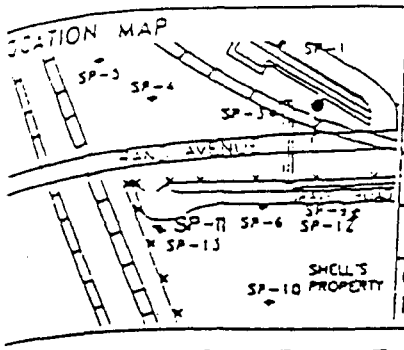
WELL CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
		soft	plastic	1	2.6	4	0.98	1, 3, 3, 4	0.00'-0.98' CLAY, mottled gray and light tan.
		soft	plastic	2	11.6	9	1.24	1, 2, 2, 3	0.00'-1.24' CLAY, mottled light tan and light gray, silty.
		v soft	v plas	3	2.3	14	2.00	pushed, 1, 2, 3	0.00'-2.00' CLAY, light gray, mottled light tan.
		loose		4	125.3	17			0.00'-0.54' SAND, gray, fine-grained, slight product odor.
		soft	plastic			18		pushed	0.54'-0.92' SILT, gray, sandy.
		loose				19	1.67	pushed, pushed	0.92'-1.32' SAND, gray, fine-grained, product odor.
		soft	plastic			20		1	1.32'-1.67' CLAY, gray, sandy, product odor.

WELL COMPLETION



LEGEND: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022437



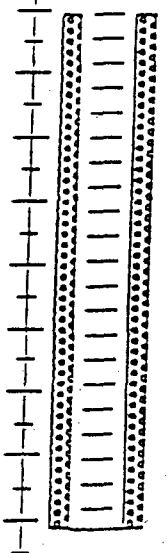
SHELL OIL COMPANY - WELL LOG

WELL NUMBER	SP-11	LOCATION	TANNERY
DATE	1-9-90	WEATHER	WINDY LOW 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	28'-6' WB-40 SAND	SEAL	0'-4' GROUT 4'-6' BENTONITE

CASING	TYPE SCHEDULE 40 PVC	DIAMETER 4"	LENGTH 10'	HOLE DIA. 10"	
SCREEN	TYPE S.40 PVC	SLOT 0.01"	DIAMETER 4"	LENGTH 20'	TOTAL DEPTH 28'

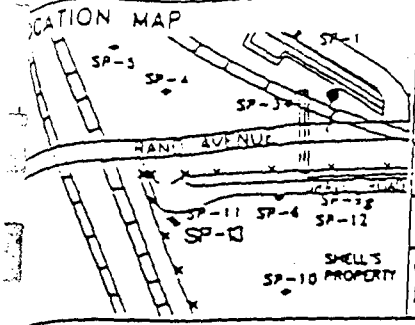
SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
					20			
					21			
					22			
					23			
mod	loose		5	3.1	24	2.00	pushed pushed pushed 2	0.00'-1.11' SAND, light brown, very fine-grained. 1.11'-1.70' SAND, gray, very fine-grained.
mod	loose				25			
v soft	v plas				26			1.70'-2.00' CLAY, gray, sandy.
					27			
					28			
v soft	v plas		6	5.2	29	2.00	pushed pushed pushed 1	0.00'-2.00' CLAY, gray, very sticky.
					30			
					31			
					32			
					33			
					34			
					35			
					36			
					37			
					38			
					39			
					40			

WELL COMPLETION



BEI 022438

LEGEND: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL



SHELL OIL COMPANY - WELL LOG

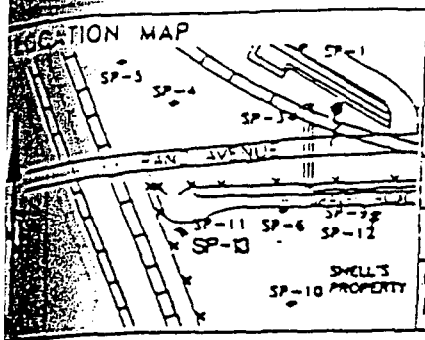
WELL NUMBER	SP-13	LOCATION	WRMC SPILL AREA
DATE	1-13-90	WEATHER	SUNNY MID 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	8.25 HOLLOW-STEM AUGER 5.875" MUD ROTARY	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	50'-29' WB-40 SAND	SEAL	0'-27' GROUT 27'-29' BENTONITE

CASING	TYPE SCHEDULE 40 PVC	DIAMETER	6" 4"	LENGTH	28' 30'	HOLE DIA.	10" 6"
SCREEN	TYPE S.40 PVC SLOT 0.01"	DIAMETER	4"	LENGTH	20'	TOTAL DEPTH	50'

SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	HP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20			6" CASING 4" CASING Description of the shallow section of this well is on SP-11 well log. Well SP-11 is 6' NNW to well SP-13.	FLUSH MOUNT

BEI 022442

EXPLANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL



SHELL OIL COMPANY - WELL LOG

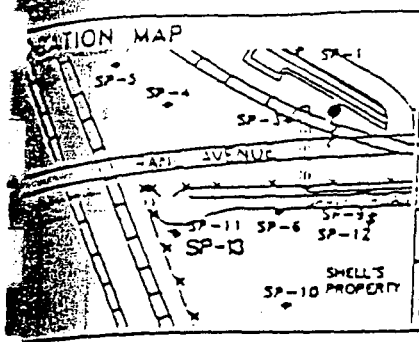
WELL NUMBER	SP-13	LOCATION	WRMC SPILL AREA
DATE	1-13-90	WEATHER	SUNNY MID 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	8.25" HOLLOW-STEM AUGER 5.875" MUD ROTARY	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	50'-29' WB-40 SAND	SEAL	0'-27' GROUT 27'-29' BENTONITE

CASING	TYPE SCHEDULE 40 PVC	DIAMETER	6" 4"	LENGTH	28' 30'	HOLE DIA.	10" 6"
SCREEN	TYPE S.40 PVC	SLOT 0.01"	DIAMETER 4"	LENGTH 20'		TOTAL DEPTH	50'

CONSISTENCY / SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					20				
					21				
					22				
					23			6" CASING	
					24				
					25				
					26				
					27				
					28			4" CASING	
					29				
					30				
					31				
					32				
mod. loose					33		6	0.00'-0.63' SAND, gray, fine-to medium-grained, subrounded.	
		1	23.7		34	0.63	13 18 34		
					35				
mod. loose					36			0.00'-0.31' SAND, gray, fine-to medium-grained, some coarse-grained, subrounded.	
					37				
hard								0.31'-0.38' COAL, black, anthracite.	
mod. loose					38		12	0.38'-0.72' SAND, medium-to coarse-grained, some fine-and very coarse-grained with some small pebbles, subrounded to rounded.	
		2	4.7		39	0.72	19 7 9		
					40				

EXPLANATION: GROUT, BENTONITE, SAND, CASING, SCREEN, WATER LEVEL

BEI 022443



SHELL OIL COMPANY - WELL LOG

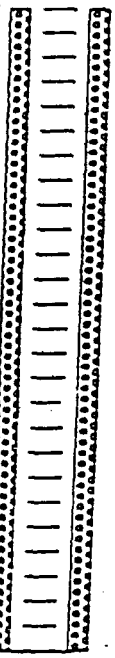
WELL NUMBER	SP-13	LOCATION	WRMC SPILL AREA
DATE	1-13-90	WEATHER	SUNNY MID 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	8.25" HOLLOW-STEM AUGER 5.875" MUD ROTARY	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	50'-29' W8-40 SAND	SEAL	0'-27' GROUT 27'-29' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC — DIAMETER 6" 4" — LENGTH 28' 30' — HOLE DIA. 10" 6"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 20' — TOTAL DEPTH 50'

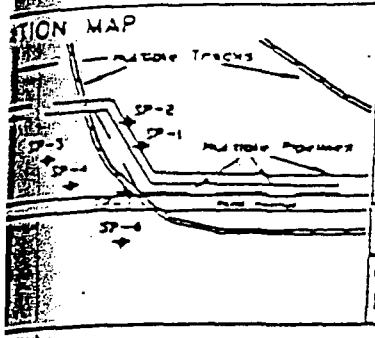
SOIL #	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
					40			
					41			
					42			
	soft	plas						0.00'-0.34' SILT, gray, clayey.
	soft	plas			43			0.31'-0.49' CLAY, gray, silty.
	poor loose						3	0.49'-0.53' SAND, gray, very fine-to fine-grained, subrounded.
			3	3.2	44	1.47	3	
	soft	plas					5	0.53'-0.83' CLAY, gray, silty.
	poor loose						5	
					45			0.83'-0.96' SAND, gray, very fine- to fine-grained, subrounded.
	soft	plas			46			0.96'-1.21' CLAY, gray, silty.
	poor loose							1.21'-1.47' SAND, gray, very fine-to fine-grained, subrounded.
					47			
					48			
	poor loose						20	0.00'-1.21' SAND, gray, medium-to coarse-grained, some small pebbles, subrounded to well-rounded, different product odor.
			4	117.2	49	1.21	31	
							24	
							19	
					50			
					51			
					52			
					53			
					54			
					55			
					56			
					57			
					58			
					59			
					60			

WELL COMPLETION



EXPLANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022444



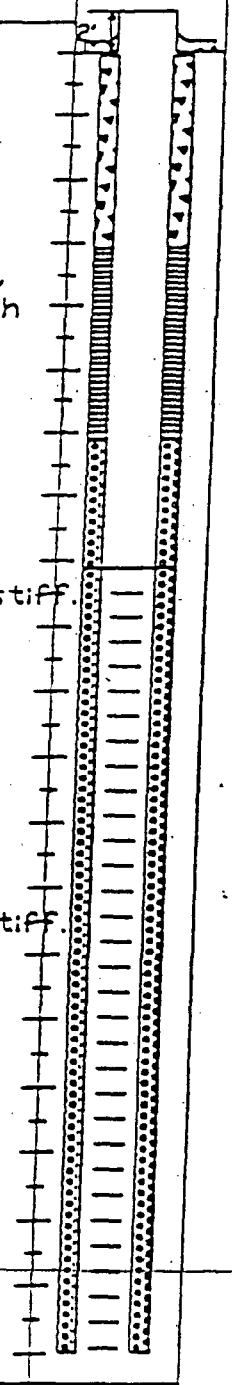
SHELL OIL COMPANY-WELL LOG

WELL NUMBER	SP-6	LOCATION	WRMC SPILL AREA
DATE	12-29-89	WEATHER	RAIN 40's
LOGGED BY	HENRY WISE	DRILLED BY	JOHN MATHIS, INC.
DRILLING METHOD	10.25' HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	30'-6'=24'	SEAL	0'-3' GROUT 6'-3'=3' BENTONITE

CASING	TYPE SCHEDULE 40 PVC	DIAMETER 4"	LENGTH 10'	HOLE DIA. 12"
SCREEN	TYPE S.40 PVC SLOT 0.020"	DIAMETER 4"	LENGTH 20'	TOTAL DEPTH 30'

DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
				0, 1, 2, 3			
	sl.	1	2.3	4	1.05'	2, 4, 8, 9	0.00'-1.05' CLAY, dark grey, stiff, becomes olive-grey with depth.
				5, 6, 7			
	mod.	2	0.6	8, 9	1.15'	1, 1, 3, 3	0.00'-1.15' CLAY, tan, moderately stiff.
				10, 11, 12			
	plastic	3	4.4	13, 14	2.00'	1, 2, 2, 1	0.00'-2.00' CLAY, tan, moderately stiff.
				15, 16, 17			
		4	1078	18, 19, 20	1.75'	0, 0, 1, 2	0.00'-1.75' SILT, tan

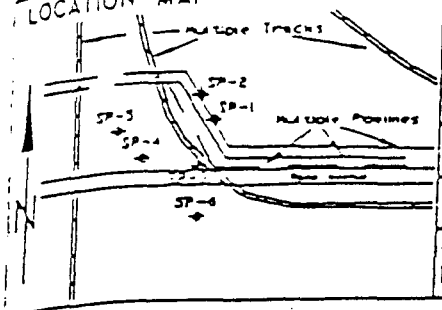
WELL COMPLETION



GROUT SAND SCREEN

BEI 022427

LOCATION MAP



SHELL OIL COMPANY-WELL LOG

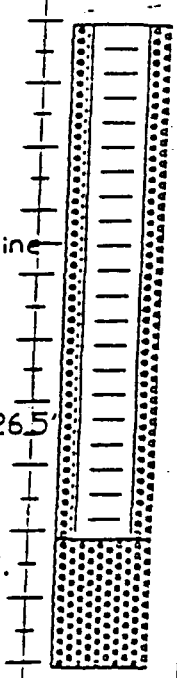
WELL NUMBER	SP-6	LOCATION	WRMC SPILL AREA
DATE	12-29-89	WEATHER	RAIN 40's
LOGGED BY	HENRY WISE	DRILLED BY	JOHN MATHIS, INC.
DRILLING METHOD	10.25' HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	30'-6'=24'	SEAL	0'-3' GROUT 6'-3'=3' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 10' HOLE DIA. 12"

SCREEN ▶ TYPES.40 PVC SLOT 0.020" DIAMETER 4" LENGTH 20' TOTAL DEPTH 30'

MOISTURE CONDITION	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
						20			
						21			
						22			
						23			
sat	well	soft		5	12.3	24	1.50'	1 1 2 3	0.00'-1.50' SAND, dark grey, very-fine grained.
						25			
						26			Driller reports clay begins at 26.5'
						27			
						28			
sat			mod.	5	3.7	29	1.55'	0 0 2 3	0.00'-1.55' CLAY, grey, slightly stiff.
						30			
						31			
						32			
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			

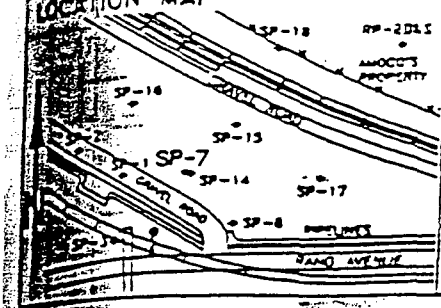
WELL COMPLETION



EXPLANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022428

LOCATION MAP



SHELL OIL COMPANY-WELL LOG

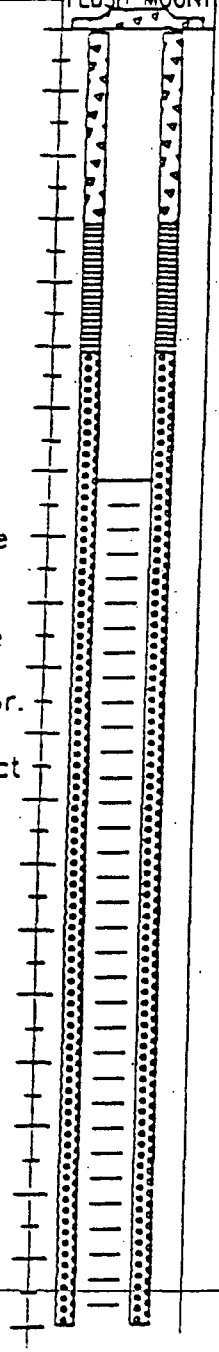
WELL NUMBER	SP-7	LOCATION	WRMC SPILL AREA
DATE	1-10-90	WEATHER	SUNNY, 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	27'-5' WB-40 SAND	SEAL	3'-0' GROUT, 28'-27' & 5'-3' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 7' HOLE DIA. 10"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 20' TOTAL DEPTH 28'

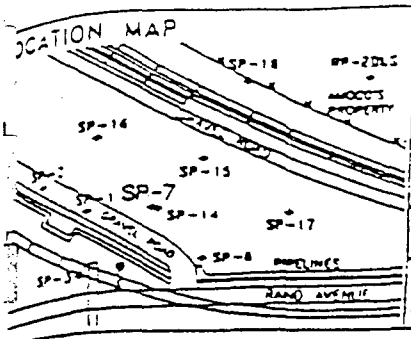
CONSISTENCY	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
	hard	plastic	1	1365	0–4	0.91	2, 11, 26, 20	0.00'–0.91' CLAY, gray with mottled brown.
	soft	plastic	2	769	8–10	1.58	1, 3, 4, 4	0.00'–0.98' CLAY, light gray with some mottled light and dark brown, silty, product odor.
	soft	plastic						0.98'–1.31' SILT, light gray, with some mottled light and dark brown, clayey, product odor.
	loose				10–13			1.31'–1.58' SAND, light gray-tan, very fine-grained, strong product odor.
	soft	plastic	3	>2000	13–15	0.88	1, 3, 2, 3	0.00'–0.88' CLAY, tan, product odor.
	soft	plastic	4	>2000	18–20	1.76	PUSHED, PUSHED, 1, 2	0.00'–1.76' SILT, light gray with some mottled brown, strong product odor.

WELL COMPLETION



LEGEND: GROUT, BENTONITE, SAND, CASING, SCREEN, WATER LEVEL

BEI 022429



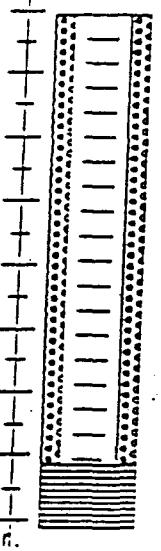
SHELL OIL COMPANY-WELL LOG

WELL NUMBER	SP-7	LOCATION	WRMC SPILL AREA
DATE	1-10-90	WEATHER	SUNNY, 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	27'-5' WB-40 SAND	SEAL	3'-0' GROUT, 28'-27' 5'-3' BENTONITE

SING	TYPE SCHEDULE 40 PVC	DIAMETER 4"	LENGTH 7'	HOLE DIA. 10"	
CREEN	TYPE S.40 PVC	SLOT 0.01"	DIAMETER 4"	LENGTH 20'	TOTAL DEPTH 28'

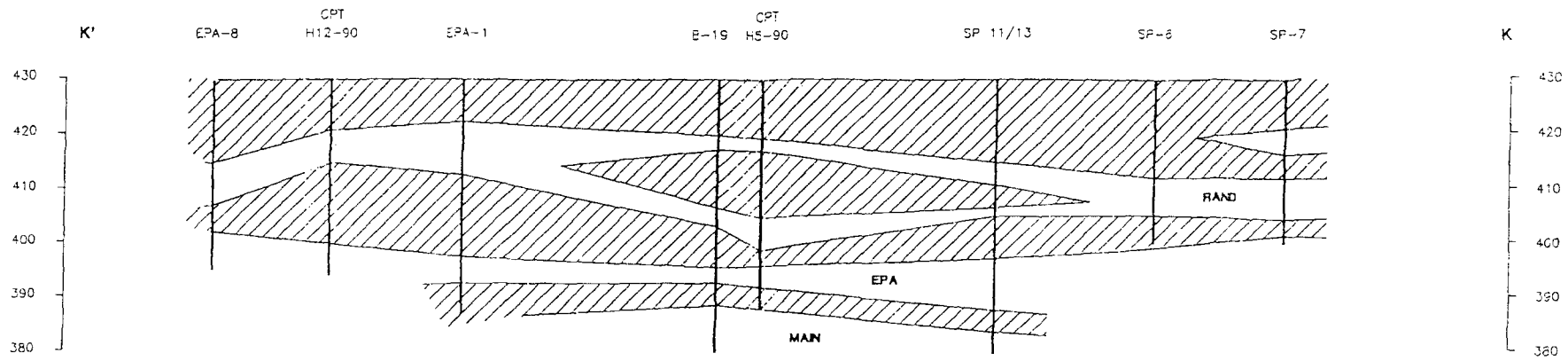
SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
					20			
					21			
					22			
					23			
mod			5	623	24	1.31	1	0.00'-0.18' SAND, brown, fine-to medium-grained, subrounded.
							2	
mod	vloose						1	0.18'-0.32' SAND, gray, fine-to very fine-grained, subrounded.
							2	
	soft	plastic			25			0.32'-0.48' SILT, gray, sandy.
	soft	plastic						0.48'-1.12' CLAY, gray.
	soft	plastic			26			1.12'-1.31' SILT, gray, clayey.
					27			
					28			
	soft	plastic	6	1710			1	0.00'-1.07' CLAY, red-gray, product odor.
d	vloose				29	1.91	3	1.07'-1.18' SAND, gray, very fine-to fine-grained, subrounded.
				>2000			5	
mod	vloose						6	1.18'-1.91' SAND, gray, fine-to medium-grained, subrounded, strong product odor.
					30			
					31			
					32			
					33			
					34			
					35			
					36			
					37			
					38			
					39			
					40			

WELL COMPLETION

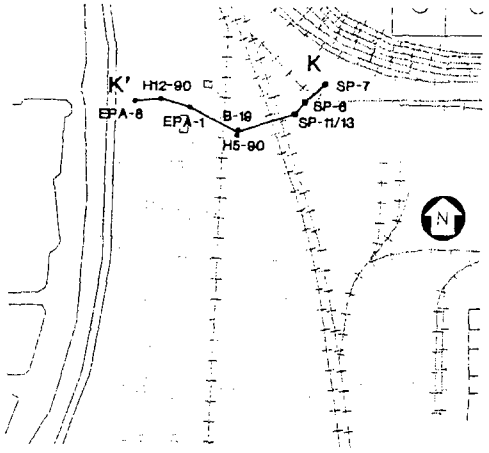


BEI 022430

ION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL



LOCATOR MAP



EXPLANATION

CPT
H6-90

CONE PENETROMETER PROBE HOLE

CONE END BEARING RESISTANCE
APPROXIMATE HORIZONTAL SCALE
1 INCH = 300 TONS PER SQUARE FOOT

FRICTION RATIO (%)
APPROXIMATE HORIZONTAL SCALE
1 INCH = 24 PERCENT

$$\text{FRICTION RATIO} = \frac{\text{FRICTION SLEEVE RESISTANCE}}{\text{CONE END BEARING RESISTANCE}} \times 100$$

H8-27

SOIL BOREHOLE/MONITORING WELL

GENERAL STRATUM DESCRIPTION

RAND:	SANDY SILT, SILTY SAND, CLAYEY SILT
EPA:	SILTY SAND, SANDY SILT, SAND
MAIN:	SAND, SILTY SAND, GRAVELLY SAND
	CLAY, SILT, OCCASSIONALLY WITH SAND

General Notes:

This profile was developed by interpolation between widely spaced boreholes and probe holes. Only at the borehole and probe hole locations should it be considered as an approximately accurate representation.

RAND, EPA, and MAIN are names for local stratigraphic units.

Cone penetrometer testing was performed by Stratigraphics (1990, 1991), and Fugro Geosciences (1993).

Soil borings drilled and monitoring wells installed in 1978 (H8 and EPA series) and 1990 (SP series).

Ground surface elevations are approximate.

BEI 022402

HORIZONTAL SCALE IN FEET
0 150 300

VERTICAL SCALE IN FEET
0 20 40

122489AK-002
REV. DATE
10/22/93

Burlington Environmental Inc.

GEOLOGIC CROSS SECTION K-K'

CLARK OIL
HARTFORD, ILLINOIS
122489

FIGURE 2

BORING NO. 8 DATE April 29 1978 2:50 PM ELEV.

Madison County
Hartford

Personnel
M. Mierkerk
D. Tolan
D. Wieties

Location of Boring
NW Corner of school property - intersection of Route 3 and Rand.

SAMPLE NO.	SOIL HORIZON FROM ELEV.	SOIL HORIZON TO ELEV.	SAMPLE LIMITS TOP	SAMPLE LIMITS BOTTOM	NUMBER OF BLOWS		MOISTURE CONTENT	COLOR MOISTURE COMPACTNESS CONSIST
	0.0	4.0						Black top Soil
1	4.0	16.0	5.0	6.5				Brown & Gray, mottled, very damp, silty clay
2			10.0	11.5				Same as above
3	16.0	24.0	15.0	16.5				Brown, moist, silt, some shell piece
4			20.0	21.5				Same as above
5	24.0	29.0	25.0	26.5				Gray & Brown, mottled, very damp, silty
6	29.0		30.0	31.5				Brown, moist, fine-medium grained sand
7			35.0	36.5				No Return
8			45.0	46.5				No Return

2" PVC pipe installed to 42 ft. dep
bottom 20 feet slotted

slotted interval 22 - 42 feet
stick-up 2.5 feet
Gravel Pack 15 to 42 feet
Bentonite & Soil Backfill 0 to 15

32.0 ft to H2O from top of casing 6.0

BEI 025524

RECORD OF SUBSURFACE EXPLORATION

BORING E. P. A. 8 CONTRACT 453-78

DRILLED BY I. E. P. A. DATE DRILLED 4/20/78 LOGGED BY

PROJECT Hydro Carbon Recov. Invest. DRILLING METHOD PIEZOMETER 44', 2" PVC Pipe

SURFACE ELEVATION 429.6

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV, QP/2, QU/2) 0 0.5 1.0 1.5 2.0 2.5 / WATER CONTENT, % 0 20 40 60 80 100
				Black TOPSOIL			
5	1	SS		Mottled Brown & Gray Silty CLAY			
10	2	SS					
15	3	SS		Brown Silt w/Shell Fragments			
20	4	SS					
25	5	SS		Mottled Gray & Brown Silty CLAY			
30	6	SS		Brown Fine To Medium SAND			
35	7	SS	No Rec.	T. O. B. @ 45'			

GROUND WATER DEPTH AT COMPLETION 32' AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

Illinois Environmental Protection Agency

BORING NO. 1 DATE 4/5/78 ELEV. 430.49

Madison Co.
Hartford

Personnel
M. Nienkerk
D. Tolan
T. Scotese

Location of Boring
SW corner of the intersection of Rand & Delmar (school yard) NE, NE, SE, Sec 33, T5N, R9W

SOIL HORIZON FROM ELEV.	SOIL HORIZON TO ELEV.	SAMPLE LIMITS TOP	SAMPLE LIMITS BOTTOM	NUMBER OF BLOWS		MOISTURE CONTENT	COLOR MOISTURE COMPACTNESS CONSISTENCY
5°	6.5						Dk gr & br mot., moist, clay w/ organics
°	11.5						Br & gr, moist, sand v. fine w/ organics
5°	16.5						Same as above - wetter
°	21.5						Gr, v. moist, silty clay, some organic, (Petro Sm slight
5°	26.5						Same as above - (no petro. smell)
°	[illegible]1.5						Blue gray, moist clay
[illegible]			8				Note: At 30° ft petro smell coming up [illegible]
[illegible]	36.5						Gr & br, sand (wet) med. grained - strong petro smell
°	41.5						gr, wet, silt, some organic mat (petro smell
							Note: H_2O at 38° feet
							Depth to H_2O 34.2 ft - 3:55 P.M.
							TD 42.2
							5:00 PM - 2 water samples (1 qt. each) collected from boring
							6:15 PM - Boring Backfilled with 40 pounds bentonite & borehole cuttings
							Tuesday April 18, 1978 - Redrilled hole to install PVC pipe - TD 45 ft
							45 ft 2" PVC pipe installed bottom 20 ft slotted - Stick-up = 0.4 ft.
							Gravel Backfill 25 to 45 feet
							Bentonite " 23 to 25 feet
							Borehole cuttings Backfill 0 to 23 feet
							8.2 ft to H_2O from top of casing 4:05 PM

RECORD OF SUBSURFACE EXPLORATION

BORING E. P. A. 1 CONTRACT 453-78

LOGGED BY

PIEZOMETER 45', 2" PVC Pipe

DRILLING METHOD

PROJECT Hydro Carbon Recov. Invest.

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION 430.5')	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV △, QP/2 □, QU/2 ○; 0, 0.5, 1.0, 1.5, 2.0, 2.5) / WATER CONTENT, % (PL +, ●, LL +; 0, 20, 40, 60, 80, 100)
				Dark Gray & Brown Mottled CLAY w/Organics			
5	1	SS					
10	2	SS		Brown & Gray Very Fine SAND w/Organics			
15	3	SS					
20	4	SS	Petro. Odor	Gray Silty CLAY, Some Organics			
25	5	SS					
30	6	SS	Petro Odor Coming Up Hole @ 30'	Blueish Gray CLAY			
35				Gray & Brown Medium SAND			
				Cont'd			

GROUND WATER DEPTH AT COMPLETION 34.2' AFTER - HRS. AFTER HRS.

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING E. P. A. 1 Cont'd CONTRACT 453-78

DRILLED BY I. E. P. A. LOGGED BY

PROJECT Hydro Carbon Recov. Invest. DATE DRILLED 4/5/78

DRILLING METHOD PIEZOMETER 45', 2" PVC Pipe

SURFACE ELEVATION 395.5'

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (0, 0.5, 1.0, 1.5, 2.0, 2.5) / WATER CONTENT, % (0, 20, 40, 60, 80, 100)
	7	SS	Strong Petro Odor	Gray & Brown Medium SAND			
40	8	SS	Petro Odor	Gray SILT, Some Organic Matter			
				T. O. B.			
45							

GROUND WATER DEPTH AT COMPLETION 34.2' AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

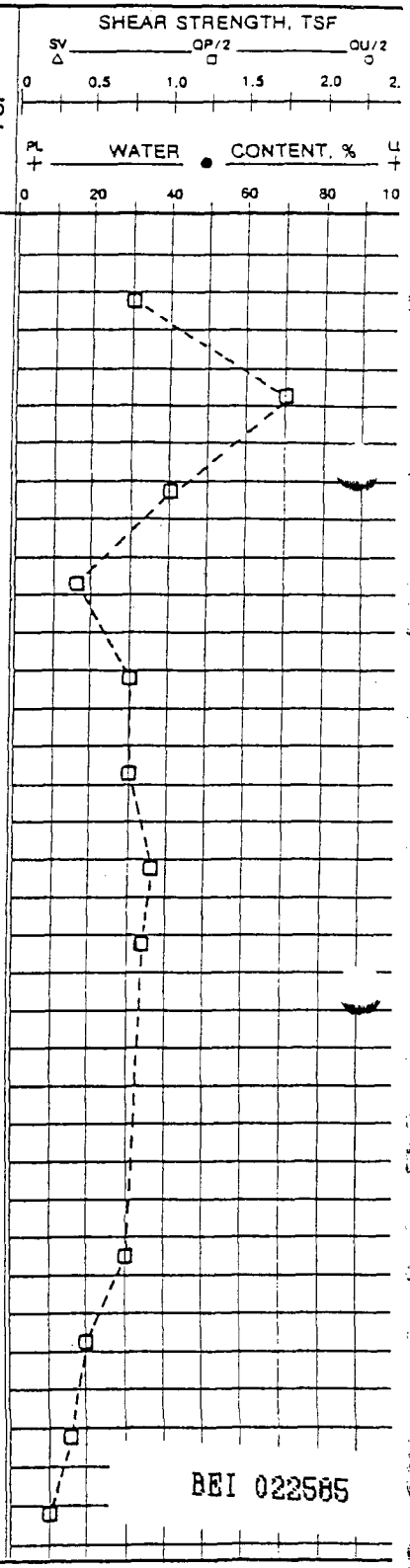
BORING 19 (HB-19) CONTRACT 465-78

DRILLED BY Gotsch LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation DATE DRILLED 6/5/78

DRILLING METHOD Hollow Auger PIEZOMETER Yes

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (SURFACE ELEVATION ____)	BLOWS	DRY UNIT WEIGHT PCF
				Gr. & Br. Si. CLAY w/Rock		
	1	SS		Dk. Gr. CLAY w/Silt, Sand & Oxidized Spots	2-3	
5	2	SS		Dk. Gr. CLAY w/Oxidized Spots	3-4	
	3	SS		Gray CLAY w/Silt, Traces Of Sand & Dk. Gr. Pockets	3-4	
10	4	SS		Gr. Fi. Sandy Silty CLAY w/Fuel Odor	2-2	
	5	SS		Gr. Silty Fine SAND w/Fuel Odor	2-3	
15	6	SS		Gray CLAY w/Oxidized Spots, Silty Clay Seams & Fuel Odor	1-2	
	7	SS			1-1	
20	8	SS		Gray Silty CLAY w/Sandy Silt Lenses & Pockets & Fuel Odor	2-2	
	9	SS			1-1	
25	10	SS	Encountered Water @ 24.0	Brownish-Gray Fine To Medium SAND w/Fuel Odor & 1" Clay Seam	1/12"	
	11	SS		Dark Gray CLAY w/Silt & Fuel Odor	2-2	
30	12	SS		Dark Gray CLAY	2-3	
	13	SS			2-2	
35	14	SS		Dk. Gr. CLAY w/Si. & Fuel Odor; Dk. Gr. Si. Fi. SAND w/Fuel Odor Cont'd	6-14	



BEI 022585

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF SUBSURFACE EXPLORATION

BORING 19 Cont'd (HB-19) CONTRACT 465-78

DEPTH (FT.)	SAMPLE NUMBER	SAMPLE TYPE	NOTES	DESCRIPTION OF MATERIAL (ELEVATION)	BLOWS	DRY UNIT WEIGHT PCF	SHEAR STRENGTH, TSF (SV, QP/2, QU/2) 0 0.5 1.0 1.5 2.0 2 / WATER CONTENT, % (PL, L) 0 20 40 60 80 10
	14	SS		Dk. Gr. Si. Fi. SAND w/Fuel Odor			
	15	SS		Dk. Gr. Fine Sandy SILT w/Fuel Odor	2-3		
40	16	SS		Dk. Gr. Fi. Sandy Silty CLAY w/Fuel Odor	1-2		
				Dk Gr. CLAY w/Silt & Fuel Odor			
	17	SS		Gray Fine To Coarse SAND	14-16		
45	18	SS		-w/Gravel To 45.5'	19-20		
				-w/Silt @ 46.5'			
	19	SS			12-16		
				-Fine To Medium @ 49.0'			
50	20	SS		T. O. B.	13-17		
55							

DRILLED BY Gotsch DATE DRILLED 6/5/78 LOGGED BY Black

PROJECT Phase II, Hydrocarbon Recovery Investigation DRILLING METHOD Hollow Auger PIEZOMETER Yes

BEI 022586

GROUND WATER DEPTH AT COMPLETION _____ AFTER _____ HRS. _____ AFTER _____ HRS. _____

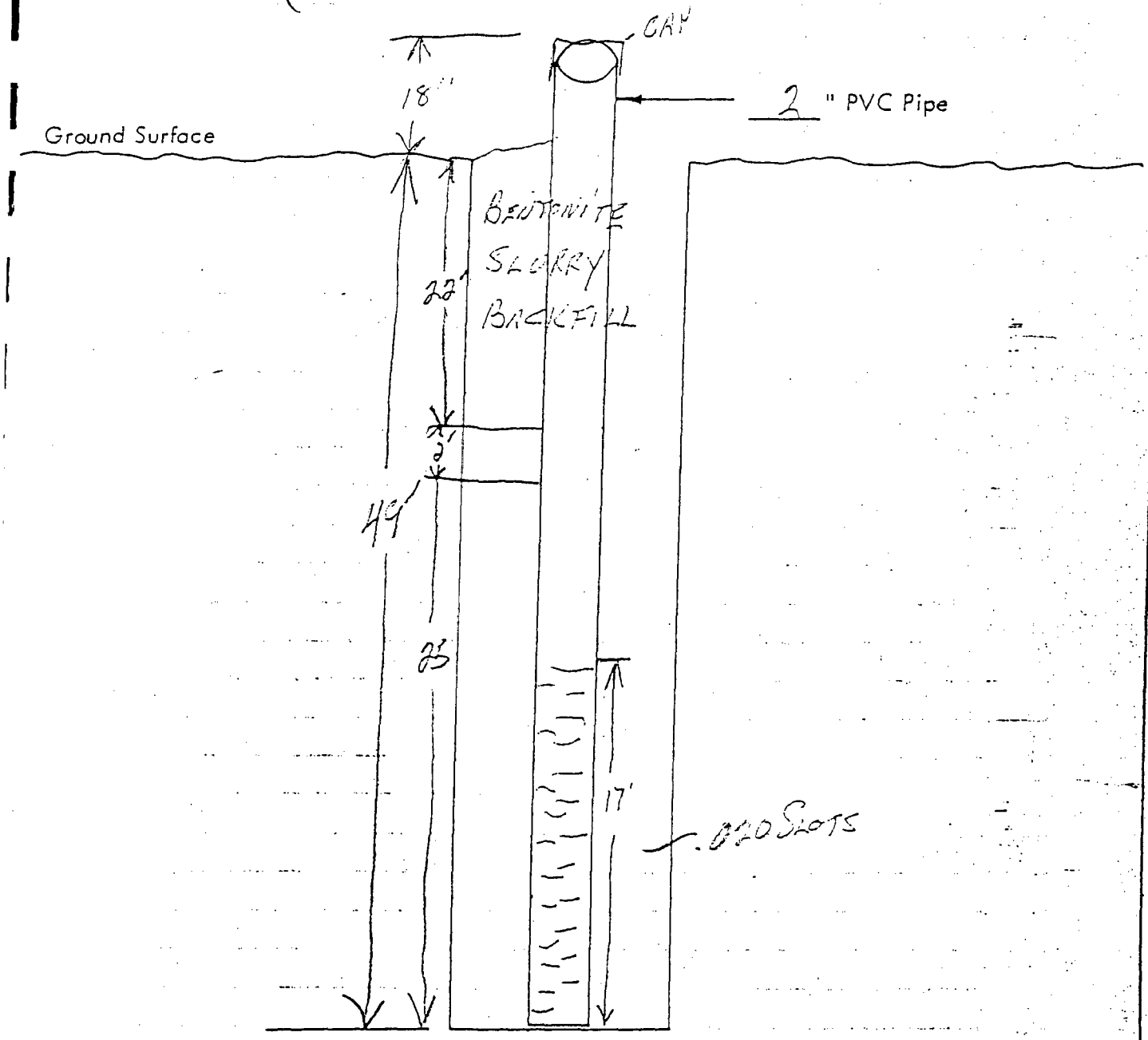
SCALE 1" = 5'

JOHN MATHES & Associates

RECORD OF PIEZOMETER INSTALLATION

JOHN MATHES & ASSOCIATES

Boring No. 19 (HB-19) Contract No. Date Installed



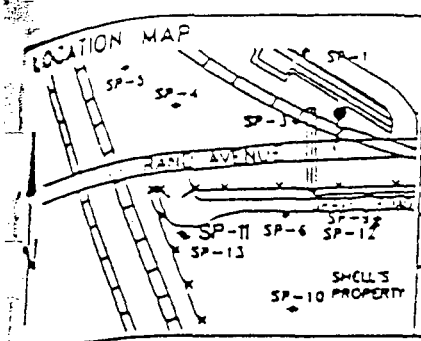
NOTES:

BEI 023436

Information Checklist: Type of Backfill Soil Strata

Type of Screen Length of Screen Length of Pipe Height of Pipe Above Ground

Cap on Bottom Cap on Top How Sealed at Surface



SHELL OIL COMPANY - WELL LOG

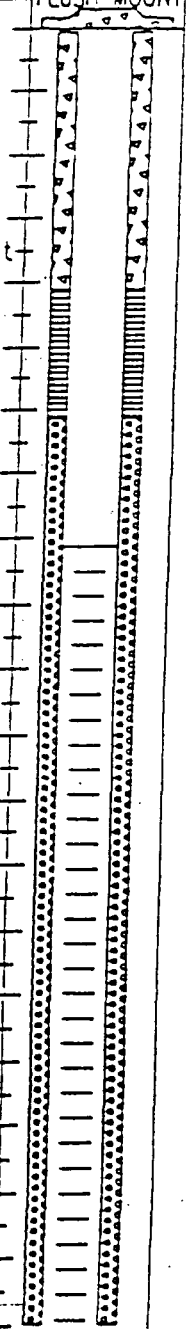
WELL NUMBER	SP-11	LOCATION	TANNERY
DATE	1-9-90	WEATHER	WINDY LOW 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	28'-6' W8-40 SAND	SEAL	0'-4' GROUT 4'-6' BENTONITE

CASING	TYPE	DIAMETER	LENGTH	HOLE DIA.
	SCHEDULE 40 PVC	4"	10'	10"

SCREEN	TYPE	SLOT	DIAMETER	LENGTH	TOTAL DEPTH
	S.40 PVC	0.01"	4"	20'	28'

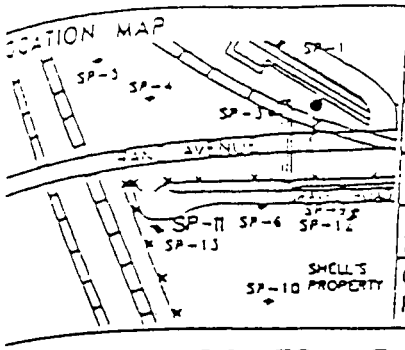
Soil Content	Sorting	Density	Plasticity	Sample Number	TIP Reading (PPM)	Depth	Sample Recovery	Penetration Resistance	Lithology/Remarks
soft			plastic	1	2.6	0–4	0.98	1, 3, 3, 4	0.00'–0.98' CLAY, mottled gray and light tan.
soft			plastic	2	11.6	8–9	1.24	1, 2, 2, 3	0.00'–1.24' CLAY, mottled light tan and light gray, silty.
v soft			v plastic	3	2.3	13–14	2.00	pushed, 1, 2, 3	0.00'–2.00' CLAY, light gray, mottled light tan.
loose						17			0.00'–0.54' SAND, gray, fine-grained, slight product odor.
soft			plastic			18		pushed	0.54'–0.92' SILT, gray, sandy.
loose				4	125.3	19	1.67	pushed, pushed	0.92'–1.32' SAND, gray, fine-grained, product odor.
soft			plastic			20		1	1.32'–1.67' CLAY, gray, sandy, product odor.

WELL COMPLETION: FLUSH MOUNT



GROUT | SAND | SCREEN | BENTONITE | CASING | WATER LEVEL

BEI 022437



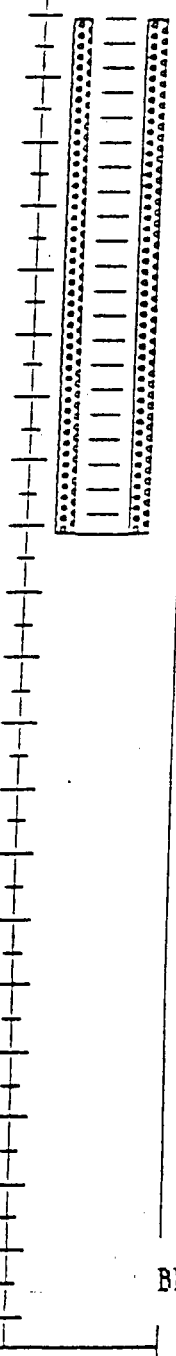
SHELL OIL COMPANY - WELL LOG

WELL NUMBER	SP-11	LOCATION	TANNERY
DATE	1-9-90	WEATHER	WINDY LOW 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	28'-6' WB-40 SAND	SEAL	0'-4' GROUT 4'-6' BENTONITE

SING	TYPE SCHEDULE 40 PVC	DIAMETER 4"	LENGTH 10'	HOLE DIA. 10"	
REEN	TYPE S.40 PVC SLOT 0.01"	DIAMETER 4"	LENGTH 20'	TOTAL DEPTH 28'	

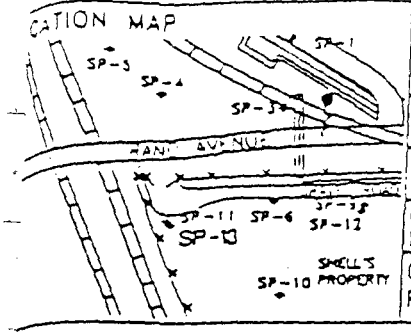
SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
					20			
					21			
					22			
					23			
mod	viccose		5	3.1	24	2.00	pushed pushed pushed 2	0.00'-1.11' SAND, light brown, very fine-grained. 1.11'-1.70' SAND, gray, very fine-grained.
					25			
v soft	v plas				26			1.70'-2.00' CLAY, gray, sandy.
					27			
					28			
v soft	v plas		6	5.2	29	2.00	pushed pushed pushed 1	0.00'-2.00' CLAY, gray, very sticky.
					30			
					31			
					32			
					33			
					34			
					35			
					36			
					37			
					38			
					39			
					40			

WELL COMPLETION



BEI 022438

TION GROUT SAND SCREEN
BENTONITE CASING WATER LEVEL



SHELL OIL COMPANY - WELL LOG

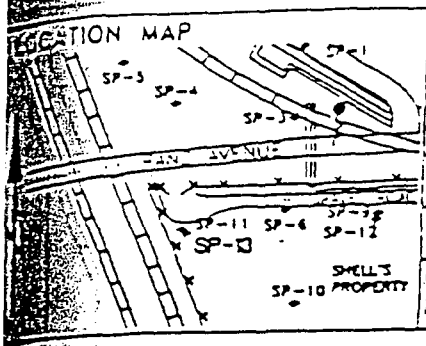
WELL NUMBER	SP-13	LOCATION	WRMC SPILL AREA
DATE	1-13-90	WEATHER	SUNNY MID 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	8.25 HOLLOW-STEM AUGER 5.875" MUD ROTARY	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	50'-29' WB-40 SAND	SEAL	0'-27' GROUT 27'-29' BENTONITE

SING	TYPE SCHEDULE 40 PVC	DIAMETER	6" 4"	LENGTH	28' 30'	HOLE DIA.	10" 6"
SCREEN	TYPE S.40 PVC SLOT 0.01"	DIAMETER	4"	LENGTH	20'	TOTAL DEPTH	50'

SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	HP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
					0				FLUSH MOUNT
					1			6" CASING	
					2			4" CASING	
					3				
					4			Description of the shallow section of this well is on SP-11 well log. Well SP-11 is 6' NNW to well SP-13.	
					5				
					6				
					7				
					8				
					9				
					10				
					11				
					12				
					13				
					14				
					15				
					16				
					17				
					18				
					19				
					20				

BEI 022442

LANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL



SHELL OIL COMPANY - WELL LOG

WELL NUMBER	SP-13	LOCATION	WRMC SPILL AREA
DATE	1-13-90	WEATHER	SUNNY MID 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	8.25" HOLLOW-STEM AUGER 5.875" MUD ROTARY	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	50'-29' W8-40 SAND	SEAL	0'-27' GROUT 27'-29' BENTONITE

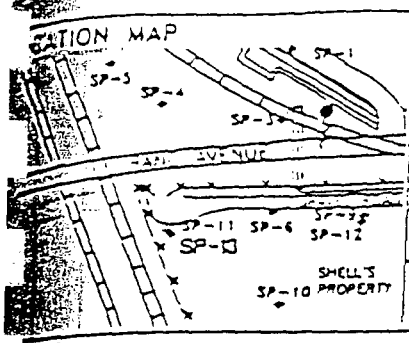
CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 6" 4" LENGTH 28' 30' HOLE DIA. 10" 6"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 20' TOTAL DEPTH 50'

COMPETENCY	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
						20			
						21			
						22			
						23			6" CASING
						24			
						25			
						26			
						27			
						28			4" CASING
						29			
						30			
						31			
						32			
mod.	loose					33		6	0.00'-0.63' SAND, gray, fine-to medium-grained, subrounded.
			1	23.7		34	0.63	13 18 34	
						35			
mod.	loose					36			0.00'-0.31' SAND, gray, fine-to medium-grained, some coarse-grained, subrounded.
						37			
mod.	hard								0.31'-0.38' COAL, black, anthracite.
mod.	loose					38		12	0.38'-0.72' SAND, medium-to coarse-grained, some fine-and very coarse-grained with some small pebbles, subrounded to rounded.
			2	4.7		39	0.72	19 7 9	
						40			

EXPLANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022443



SHELL OIL COMPANY - WELL LOG

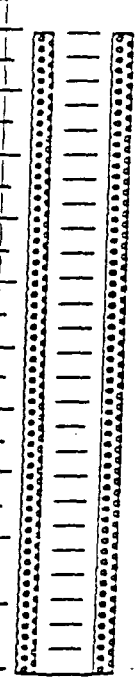
WELL NUMBER	SP-13	LOCATION	WRMC SPILL AREA
DATE	1-13-90	WEATHER	SUNNY MID 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	8.25" HOLLOW-STEM AUGER 5.875" MUD ROTARY	SAMPLING METHOD	TWO-FOOT SPLIT SPOON
GRAVEL PACK	50'-29' WB-40 SAND	SEAL	0'-27' GROUT 27'-29' BENTONITE

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 6" 4" LENGTH 28' 30' HOLE DIA. 10" 6"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 20' TOTAL DEPTH 50'

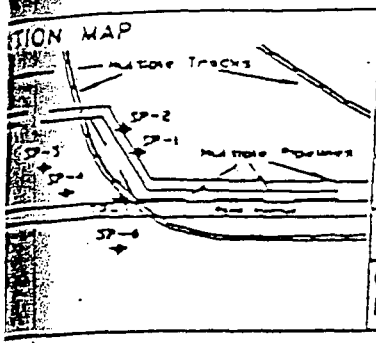
CONSISTENCY	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
					40			
					41			
					42			
soft		plas						0.00'-0.34' SILT, gray, clayey.
soft		plas			43			0.31'-0.49' CLAY, gray, silty.
poor	loose						3	0.49'-0.53' SAND, gray, very fine-to fine-grained, subrounded.
			3	3.2	44	1.47	3	
							5	
soft		plas					5	0.53'-0.83' CLAY, gray, silty.
poor	vloose				45			0.83'-0.96' SAND, gray, very fine- to fine-grained, subrounded.
soft		plas			46			0.96'-1.21' CLAY, gray, silty.
poor	vloose							1.21'-1.47' SAND, gray, very fine-to fine-grained, subrounded.
					47			
poor	loose				48		20	0.00'-1.21' SAND, gray, medium-to coarse-grained, some small pebbles, subrounded to well-rounded, different product odor.
			4	117.2	49	1.21	31	
							24	
							19	
					50			
					51			
					52			
					53			
					54			
					55			
					56			
					57			
					58			
					59			
					60			

WELL COMPLETION



EXPLANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022444

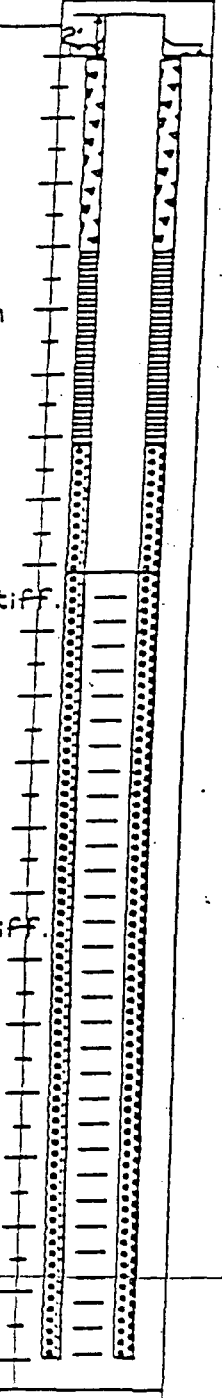


SHELL OIL COMPANY-WELL LOG

WELL NUMBER	SP-6	LOCATION	WRMC SPILL AREA
DATE	12-29-89	WEATHER	RAIN 40's
LOGGED BY	HENRY WISE	DRILLED BY	JOHN MATHIS, INC.
DRILLING METHOD	10.25' HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	30'-6'=24'	SEAL	0'-3' GROUT 6'-3'=3' BENTONITE

G	TYPE SCHEDULE 40 PVC	DIAMETER 4"	LENGTH 10'	HOLE DIA. 12"
N	TYPE S.40 PVC SLOT 0.020"	DIAMETER 4"	LENGTH 20'	TOTAL DEPTH 30'

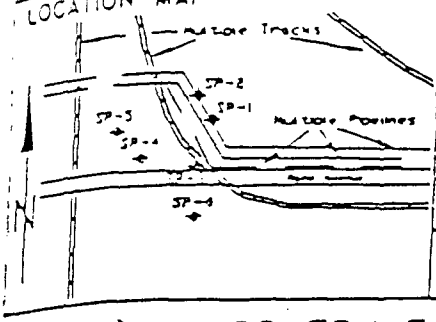
DENSITY	PLASTICITY	SAMPLE NUMBER	HP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS	WELL COMPLETION
st		1	2.3	1.05'		2, 4, 8, 9	0.00'-1.05' CLAY, dark grey, stiff, becomes olive-grey with depth.	
mod		2	0.6	1.15'		1, 1, 3, 3	0.00'-1.15' CLAY, tan, moderately stiff.	
plastic		3	4.4	2.00'		1, 2, 2, 1	0.00'-2.00' CLAY, tan, moderately stiff.	
		4	1078	1.75'		0, 0, 1, 2	0.00'-1.75' SILT, tan	



GROUT SAND SCREEN

BEI 022427

LOCATION MAP



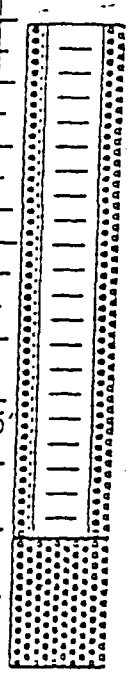
SHELL OIL COMPANY-WELL LOG

WELL NUMBER	SP-6	LOCATION	WRMC SPILL AREA
DATE	12-29-89	WEATHER	RAIN 40's
LOGGED BY	HENRY WISE	DRILLED BY	JOHN MATHIS, INC.
DRILLING METHOD	10.25' HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	30'-6'=24'	SEAL	0'-3' GROUT 6'-3'=3' BENTONITE

CASING	TYPE SCHEDULE 40 PVC	DIAMETER 4"	LENGTH 10'	HOLE DIA. 12"
SCREEN	TYPES.40 PVC SLOT 0.020"	DIAMETER 4"	LENGTH 20'	TOTAL DEPTH 30'

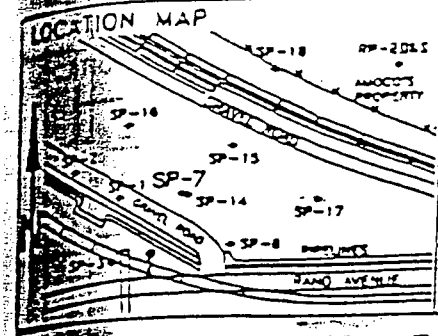
MOISTURE CONTENT	SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	HP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
						20			
						21			
						22			
						23			
sat	well	soft		5	12.3	24	1.50'	1 1 2 3	0.00'-1.50' SAND, dark grey, very-fine grained.
						25			
						26			Driller reports clay begins at 26.5'
						27			
						28			
sat			mod.	5	37	29	1.55'	0 0 2 3	0.00'-1.55' CLAY, grey, slightly stiff.
						30			
						31			
						32			
						33			
						34			
						35			
						36			
						37			
						38			
						39			
						40			

WELL COMPLETION



EXPLANATION: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022428



SHELL OIL COMPANY-WELL LOG

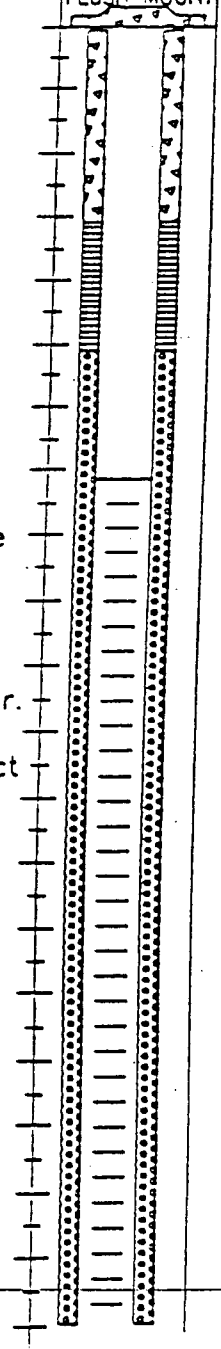
WELL NUMBER	SP-7	LOCATION	WRMC SPILL AREA
DATE	1-10-90	WEATHER	SUNNY, 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	6.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	27'-5' WB-40 SAND	SEAL	3'-0' GROUT 28'-27' BENTONITE 5'-3'

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 7' HOLE DIA. 10"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 20' TOTAL DEPTH 28'

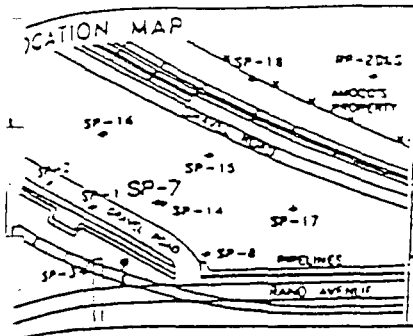
SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
	hard	plastic	1	1365	3–4	0.91	2, 11, 26, 20	0.00'–0.91' CLAY, gray with mottled brown.
	soft	plastic	2	769	8–9	1.58	1, 3, 4, 4	0.00'–0.98' CLAY, light gray with some mottled light and dark brown, silty, product odor.
	soft	plastic						0.98'–1.31' SILT, light gray, with some mottled light and dark brown, clayey, product odor.
	loose				11–12			1.31'–1.58' SAND, light gray-tan, very fine-grained, strong product odor.
	soft	plastic	3	>2000	13–14	0.88	1, 3, 2, 3	0.00'–0.88' CLAY, tan, product odor.
	soft	plastic	4	>2000	18–19	1.76	PUSHED, PUSHED, 1, 2	0.00'–1.76' SILT, light gray with some mottled brown, strong product odor.

WELL COMPLETION



LEGEND: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

BEI 022429



SHELL OIL COMPANY-WELL LOG

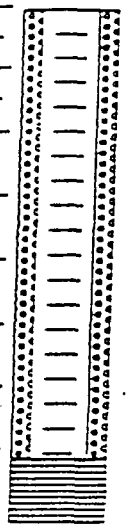
WELL NUMBER	SP-7	LOCATION	WRMC SPILL AREA
DATE	1-10-90	WEATHER	SUNNY, 40's
LOGGED BY	R. CHAPIN	DRILLED BY	MATHIS INC.
DRILLING METHOD	8.25" HOLLOW-STEM AUGER	SAMPLING METHOD	TWO-FOOT SPLIT-SPOON
GRAVEL PACK	27'-5' WS-40 SAND	SEAL	3'-0' GROUT, 28'-27' BENTONITE, 5'-3'

CASING ▶ TYPE SCHEDULE 40 PVC DIAMETER 4" LENGTH 7' HOLE DIA. 10"

SCREEN ▶ TYPE S.40 PVC SLOT 0.01" DIAMETER 4" LENGTH 20' TOTAL DEPTH 28'

SORTING	DENSITY	PLASTICITY	SAMPLE NUMBER	TIP READING (PPM)	DEPTH	SAMPLE RECOVERY	PENETRATION RESISTANCE	LITHOLOGY/REMARKS
					20			
					21			
					22			
					23			
mod	loose		5	623	24	1.31	1, 2, 1, 2	0.00'-0.18' SAND, brown, fine-to medium-grained, subrounded. 0.18'-0.32' SAND, gray, fine-to very fine-grained, subrounded.
mod	loose							
	soft	plastic			25			0.32'-0.48' SILT, gray, sandy.
	soft	plastic						0.48'-1.12' CLAY, gray.
	soft	plastic			26			1.12'-1.31' SILT, gray, clayey.
					27			
	soft	plastic	6	1710	28		1	0.00'-1.07' CLAY, red-gray, product odor.
mod	loose				29	1.91	3, 5	1.07'-1.18' SAND, gray, very fine-to fine-grained, subrounded.
mod	loose			>2000			6	1.18'-1.91' SAND, gray, fine-to medium-grained, subrounded, strong product odor.
					30			
					31			
					32			
					33			
					34			
					35			
					36			
					37			
					38			
					39			
					40			

WELL COMPLETION



LEGEND: GROUT, SAND, SCREEN, BENTONITE, CASING, WATER LEVEL

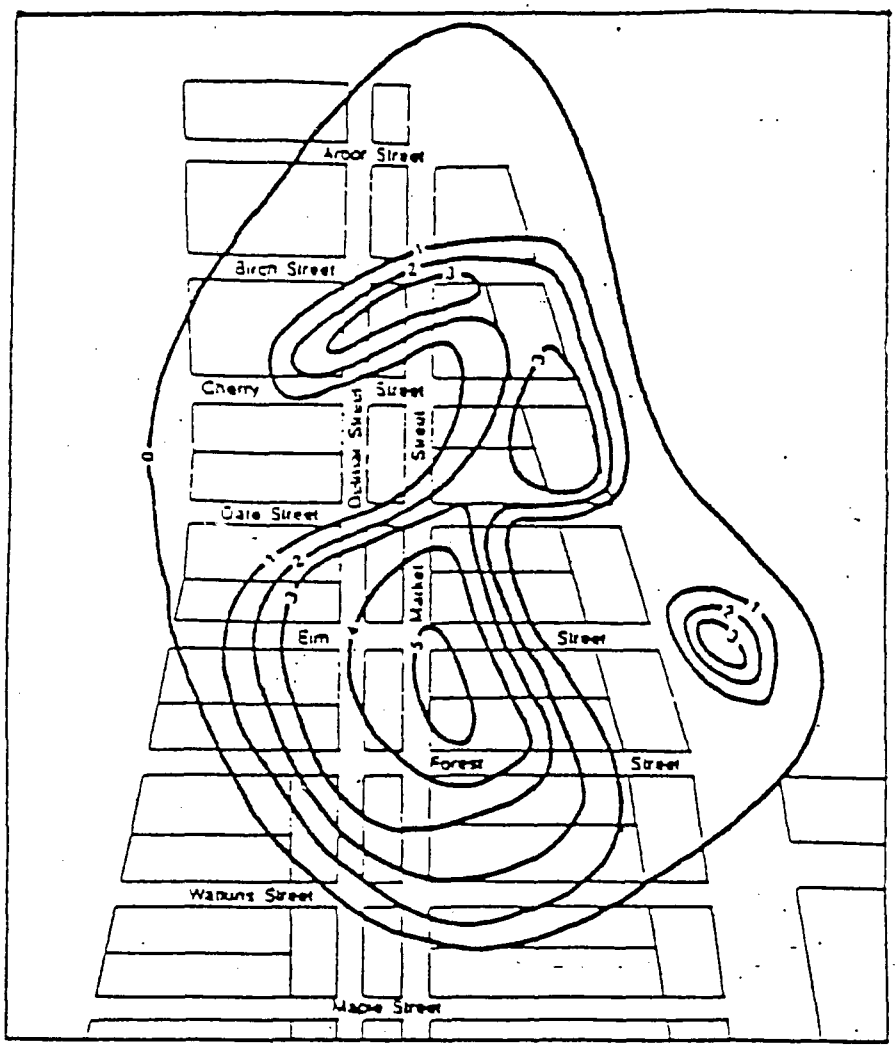
BEI 022430

Clayton GROUP SERVICES

APPENDIX B-3

FIGURE 5 – THICKNESS OF PETROLEUM PRODUCTS OCCURRING ON THE TOP OF THE PIEZOMETRIC SURFACE IN HARTFORD, ILLINOIS (1982)

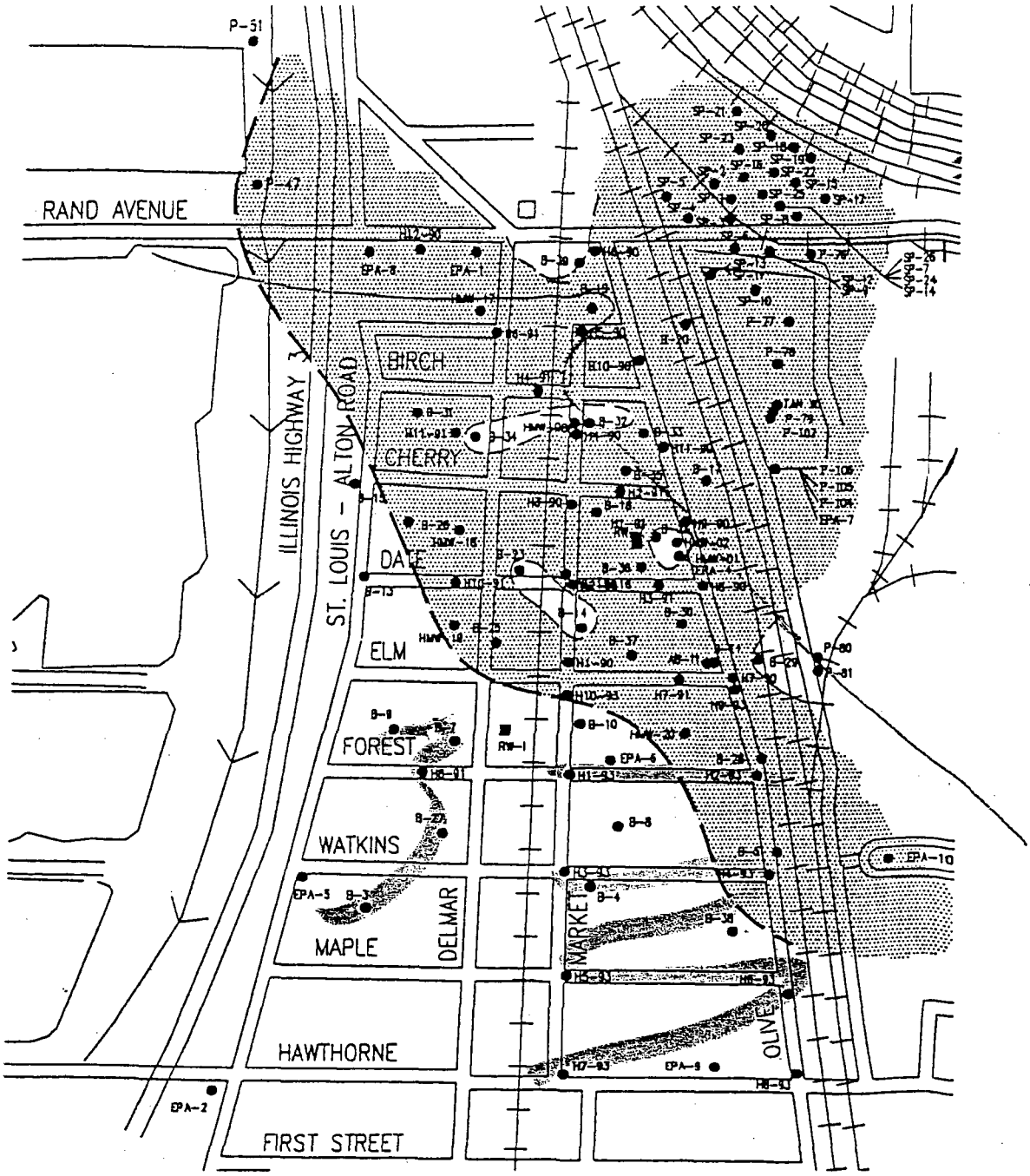
Figure 5 - Thickness of Petroleum Products occurring on the top of the Piezometric Surface in Hartford, Illinois.



Contour Lines in Foot Intervals.
Source: Mathes, 1982.

APPENDIX B-4

FIGURE 4 – APPROXIMATE AERIAL EXTENT OF THE RAND SAND FROM A 1993 BURLINGTON ENVIRONMENTAL INC. REPORT (F.K.A MATHES)



EXPLANATION

APPROXIMATE EXTENT OF RAND SAND

APPROXIMATE LOCATION OF THE INTERSECTION OF THE RAND SAND WITH THE EPA AND MAIN SANDS

0 500 1000

SCALE IN FEET

N

Burlington Environmental Inc.

APPROXIMATE AREAL EXTENT OF THE RAND SAND

122489AL-002
REV. DATE
10/19/93

CLARK OIL
HARTFORD, ILLINOIS
122489

FIGURE 4