PHASE II
TORRINGTON INVESTIGATION REPORT
VOLUME 1
THE TORRINGTON COMPANY
3702 WEST SAMPLE STREET
SOUTH BEND, INDIANA

PREPARED FOR:

THE TORRINGTON COMPANY
59 FIELD STREET
TORRINGTON, CONNECTICUT 06790

PREPARED BY:

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EXECUTIVE SUMMARY

Capsule Environmental Engineering, Inc. continued with its environmental investigation of the former Torrington Company, South Bend, Indiana, facility in February through April 1992 to further characterize the contamination present at the site. Capsule supervised the taking of eight soil borings in the pond #4 area to determine the extent of contamination in the area. All pond #4 soil samples were analyzed for total petroleum hydrocarbons (TPH), with selected samples also analyzed for Resource Conservation and Recovery Act (RCRA) total metals, pH, and cyanide. Thirteen soil borings were taken in the S-3 area to determine the location of a contaminant source. All S-3 area samples were analyzed for volatile chemical compounds (VOCs), with selected samples also analyzed for TPH.

Analytical results showed VOCs attributable to petroleum compounds, consistent with those found in fuel oil, present in the pond #4 area above practical quantitation limits (PQLs). Trace amounts of total RCRA metals and cyanide were also found in the pond #4 area. VOCs attributable to petroleum compounds and solvents were also present above quantitation limits in the S-3 area. The source of the contamination in the S-3 area appears to be beneath a concrete bermed area and along the western wall of the main building, with apparent contamination migration into the clean backfill of the underground storage tank excavation and beneath the building.

Capsule also supervised ground water sampling of the 20 monitoring wells on site in March 1992. Results from samples taken from 10 of the wells showed one or more of the compounds 1,1,1 trichloroethane (TCA), trichloroethylene (TCE), 1,1 dichroroethane (DCA), and 1,1 dichloroethylene (DCE) present above PQLs. The results support the conclusion that the contaminant plume continues to migrate and increase in concentration north of West Sample Street.

Other aspects of the investigation included installing an additional monitoring well north of West Sample Street, performing a water well log search for ground water receptors downgradient of the facility, and performing an Indiana Department of Environmental Management (IDEM) records search on facilities near the site. The monitoring well was installed in the lower aquifer north of West Sample Street. The water well log search at the State Department of Natural Resources located numerous wells within three miles downgradient of the site. The IDEM records search yielded information on the current voluntary remedial action at the Allied-Bendix facility located downgradient of the site.

Recommendations based on this investigation phase are as follows:

1. Remediate the pond #4 area by excavating and disposing of the TPH-contaminated soils in a licensed landfill.

2. Further investigate the extent of the S-3 area contamination.

3. Conduct a feasibility study to assess possible remedial alternatives for the S-3 area once the extent of contamination has been determined.

INTRODUCTION

At the request of The Torrington Company (Torrington), Capsule Environmental Engineering, Inc. (Capsule) has performed additional environmental investigation at Torrington's former manufacturing facility in South Bend, Indiana (Figure 1). The goals of the investigation were as follows:

1. To further characterize the extent and magnitude of soil contamination in the pond #4 area.

2. To determine if a contaminant source remained in the S-3 area.

3. To install an additional monitoring well in the lower aquifer north of West Sample Street for further plume delineation.

4. To complete a comprehensive sampling event of all monitoring wells installed to date.

5. To perform a water well log search to attempt to identify any ground water receptors downgradient of the facility.

6. To perform an Indiana Department of Environmental Management (IDEM) records search.

The results and interpretation of the field activities and the record searches have been compiled in this summary report and will be presented to the IDEM with Capsule's recommendations for any further investigation or actions at the site. The original work plan has been included in Appendix A to provide additional details.

This report includes some information discussed in Capsule's December 1991 Torrington Investigation Report. This information has been included to allow this document to be used independently of the previously prepared report.

BACKGROUND

The 16-acre site is located at 3702 West Sample Street in South Bend, Indiana, in St. Joseph County (Figure 1) and includes the parking area north of 3702 West Sample Street (Figure 2). The area is zoned for industrial, commercial, and residential use. Site features consist of the main building, the foundry building, five former storm water ponds, and the parking area north of 3702 West Sample Street. Four of the five former ponds have been filled to grade. Pond #1, the only pond remaining at the site, retains water during periods of heavy precipitation (Figure 2).

SITE HISTORY

Though site use prior to 1928 is not well documented, it is known that the site was used as a ball bearing manufacturing facility from 1928 to 1983. Torrington discontinued all industrial activities in 1983, and in 1984 they initiated an environmental investigation to evaluate property conditions. The contractor, Environmental Systems, Inc. (ESI), sampled sediments and water in the ponds and in two production wells on site. Results showed no dissolved metals or polychlorinated biphenyls (PCBs) in the pond sediments, but there were several volatile organic compounds (VOCs), including 1,1,1-trichloroethane (TCA), detected in pond #4. No VOCs or PCBs were identified above detection limits in the production wells (ESI, 1984).

Based on these initial results, the Indiana State Board of Health requested additional site investigation. Torrington retained Canonie Engineers, Inc. (Canonie) later in 1984 to further evaluate soil and ground water conditions at the site. The results from Canonie's investigation identified the following: mineral spirits, TCA, and 1,1-dichloroethane (DCA) in soils near the southwest corner of the main building; mineral spirits (light hydrocarbons) in pond sediments; and TCA, DCA, and 1,2-dichloroethene (DCE) in monitoring wells located downgradient of the tank area. An environmental assessment conducted by Harza Environmental Services, Inc. (HARZA) in late 1985 confirmed the presence of those compounds identified in the previous studies.

In 1986 three underground storage tanks (two fuel oil tanks and one cutting oil tank) and surrounding soils were removed along the southwestern corner of the main building. The excavated area was backfilled with clean material and repaved.

Best Environmental Services and Technology, Inc. (BEST) performed additional ground water and soil investigation of the site in 1991. Results from this investigation showed TCA and its associated degradation products in ground water monitoring wells located at the northern boundary of the site (W-10 and W-11).

In September 1991 Capsule conducted further investigation to assess soils in the pond #4 area and to define the condition of the ground water north of 3702 West Sample Street. Results of the investigation indicated that a sediment layer contaminated with a petroleum product was present in pond #4 and that ground water had been impacted north of 3702 West Sample Street.

IDEM FILE REVIEW

Capsule conducted a search of IDEM Solid and Hazardous Waste Section records on the adjacent Roach-Appleton Company (RACO) facility and on the Allied-Bendix facility located downgradient of the site. The records search was conducted for the RACO facility to

determine if any environmental actions had occurred on the property that could possibly be influencing site conditions on the Torrington site. The Allied-Bendix records were examined to:

1. Determine if the ground water recovery system currently operating at that facility was or could influence ground water flow at the Torrington site.

2. Access the remedial alternative chosen for the Allied-Bendix site for possible applicability to the Torrington site.

3. To gain better understanding of the IDEM mechanism for voluntary cleanups.

No records were located for the RACO facility at the IDEM. However, records were located concerning the remedial action currently underway at the Allied-Bendix facility located at 401 North Bendix Drive.

An initial hydrogeologic investigation report was released by Allied-Bendix in April 1981 to assess the hydrogeologic flow regime for ground water development purposes. No analytical data was taken at that time. In December 1981 a second report was released that discussed possible contamination of the ground water. This study indicated that the ground water was contaminated with VOCs and semi-VOCs or acid/base/neutral compounds. The Indiana State Board of Health was notified of the contamination in January of 1982. In 1982 a recovery well system was designed and installed. Since then, recovery wells have been periodically added to improve the effectiveness of the recovery system. Hydrogeologic information concerning pumping rates and the radius of influence of the ground water recovery system indicate that the recovery system should not be influencing ground water flow at the Torrington site.

An off-site ground water study was conducted in 1984 for the Allied-Bendix site, at the request of the St. Joseph's County Health Department, to determine if any drinking water sources had been impacted. The sampling event determined that no residential wells were being impacted by the Allied-Bendix facility. Allied-Bendix continues ground water analytical monitoring on a quarterly basis and operates 26 recovery wells for ground water contamination from naphtha and VOCs. Since Allied-Bendix is moving forward with a voluntary remedial action, no further investigation or regulatory action, other than file updates, have been conducted by the IDEM or U.S. EPA Region V.

The site ground water conditions at the Allied-Bendix facility are very similar to those at the Torrington site. The hydraulic conductivity of the aquifer at Allied-Bendix is approximately 321 feet per day compared to 360 feet per day at the Torrington site, and the aquifer is composed of the same large deposits of sand and gravel (Geraghty and Miller, 1981). Hydrogeologically, the aquifer at the Torrington site is the same aquifer encountered at the Allied-Bendix facility.

WATER WELL LOG REVIEW

A water well log search was conducted at the Indiana Department of Natural Resources. Due to the high productivity of the aquifer, numerous water wells were located within 3 miles downgradient of the Torrington site. A 3-mile radius was chosen as this is the common distance used for evaluating potential receptors of ground water contamination under the U.S. EPA Remedial Investigation/Feasibility Study Guidance document. A 3-mile radius also is used by the Hazard Ranking System (HRS) system, which the IDEM currently uses for ranking the potential environmental hazard associated with a given site. Due to the voluminous nature of the well logs, a separate volume containing the well logs and a topographic location map has been included as part of this report. Within the volume, the well logs have been separated into located and unlocated logs. The located maps contained adequate information concerning township, range, section, and quarter sections to be accurately located. The unlocated well logs did not provide adequate information for accurate location but have been included for completeness.

REGIONAL GEOLOGY

The regional geology in the South Bend area consists of thick fluvioglacial deposits composed of sands and gravel, with clay to sandy clay layers that vary in extent and thickness. Some areas of glacial lacustrine silts and clays are also present but tend to be randomly deposited throughout the sand and gravel. The glacial deposits rest unconformably on Devonian or Mississippian shale.

SITE GEOLOGY

The site geology is typical of the regional geology in the South Bend area. A thick deposit of sand and gravel comprises the first 58 to 60 feet of sediment, with gravel content tending to increase with depth. Beneath the sand and gravel, a hard, tight clay layer is encountered. The clay layer is 20 to 30 feet thick and rests atop additional sand and gravel deposits, similar to those above the clay layer. The clay layer occurs in all deep borings taken at the site, including the borings taken north of 3702 West Sample Street (Capsule, 1991). The clay layer pinches out to the east of the site, toward the Oliver Park municipal well field, according to area well logs (Canonie, 1984 and Figure 1).

REGIONAL HYDROGEOLOGY

Ground water flows through the glacial deposits toward the present-day St. Joseph River. Since the construction of the South Bend Dam in 1948, the St. Joseph River upstream of the dam recharges ground water from baseflow, while the ground water recharges the river downstream of the dam. Large amounts of permeable sand and gravel deposits and consistent recharge from precipitation to the ground water have created an aquifer capable of producing large quantities of ground water. Transmissivities of 100,000 to 500,000 gallons/day/foot have been observed in the South Bend area (Klaer and Stillman, 1948).

SITE HYDROGEOLOGY

The hard, tight clay layer acts as a confining unit dividing the aquifer into two units. The upper unit averages 60 feet in thickness, the clay layer is 20 to 30 feet in thickness, and the lower aquifer is approximately 90 feet in thickness. Shale bedrock is encountered at approximately 180 feet below grade and does not yield any substantial amount of ground water (Canonie, 1984).

All monitoring wells installed to date at the site are screened in the upper aquifer. Table 1 provides a summary of monitoring well construction. Static water elevations taken in March and April of 1992 are also included for the monitoring wells. Comparison of the water levels from March and April indicates that the water table is subject to fluctuations over a short time period. This is attributable to the high percentage of recharge that the aquifer receives from infiltration of precipitation. All monitoring well logs have been included in Appendix B for reference.

Some disparities in static water elevations are evident within each data set collected for March and April. The data sets have been determined to be valid, as field methods were examined and survey levels were deemed accurate based upon the observation that the September 1991 static water elevations were within normal flow patterns to the north. Both data sets were recorded during periods of increased precipitation. Because of this, the disparities are likely explained by:

1. Increased recharge to the aquifer over a short time span.

2. Differential infiltration rates across the site due to paved and non-paved areas within the site.

3. An unidentified pumping source(s) in the area is influencing gradient.

Figure 3 shows the static water levels for April 1992. Contours have not been applied, as the ground water measurements create a distorted view of the "normal" ground water flow pattern across the site. Static water elevations are scheduled to be taken in June 1992 for further comparison and evaluation.

Historically, the ground water flow in the upper aquifer is to the north, according to potentiometric surface maps of the site. Hydraulic conductivity at the site has been estimated to be 361 feet per day with a specific discharge of .25 feet per day at a gradient of .0007 foot per feet (BEST, 1991). Assuming a porosity of 35 percent for a sand and gravel, the ground water flow velocity is .72 feet per day. The specific discharge is the rate at which ground water would move through the aquifer if the aquifer were an open conduit. The ground water velocity reflects the flow rate through a porous media; and is therefore, a more

accurate representation of the ground water flow rate. This high ground water flow rate is conducive to relatively rapid transport and increased dilution and dispersion of contaminants. The low organic content of the aquifer materials also reduces retardation of any contaminants entering the ground water.

FIELD ACTIVITIES

Capsule supervised the taking of soil borings and the installation of one additional monitoring well the week of February 24, 1992. Eight soil borings were taken in the pond #4 area to delineate the horizontal and vertical extent of a sediment layer encountered during the September 1991 drilling event conducted by Capsule. A total of 13 soil borings were taken in the S-3 area located at the southwest corner of the main manufacturing building; nine borings were placed outside the building, and four borings were placed inside the building. The additional monitoring well (W-16) was placed north of 3702 West Sample Street at the northeast corner of the western parking lot (Figure 2). Each soil sample was screened with an HNu photoionization meter using field headspace techniques to aid in sample analysis selection. A detailed description of the field headspace technique is included in Appendix C. Results of the field screening are recorded on the boring logs included in Appendix D.

Drilling crews from the Layne-Northern, Lansing, Michigan, office performed all mechanical drilling. Environmental field technicians from the Canonie, Porter, Indiana, office conducted all hand augering activities. Borings in the pond #4 area were taken through hollow-stem augers advanced with an Acker rotary drilling rig. ASTM Standard Method D1586 was used to obtain soil samples with standard penetration methods modified to advance the sampler 24 inches, rather than the standard 18 inches. This allowed the collection of a greater volume of samples and decreased sampling time for the depth of the boring.

All borings in pond #4 were advanced to 8 feet with sampling terminated at 10 feet. The designator "PD4" was used for borings in the pond #4 area. Figure 2 shows the location of pond #4 relative to other site features. Figure 4 is a detailed drawing of the pond #4 area.

Six borings in the S-3 area were continuously sampled through hollow-stem augers with the drilling rig. Seven borings were taken with hand augers. Of the 13 borings taken in the S-3 area, nine borings were taken outside the main building, and four borings were taken inside the building. The designator "S3" was used for borings outside the building and "S3I" was used for borings within the building. Figure 2 shows the location of the S-3 area relative to other site features. The outside borings (S3-1 through S3-6) were advanced with hollow-stem augers and were taken to a depth of 12 feet with sampling terminated at 14 feet. Borings taken with a hand auger (S3-7 through S3-9 and S3I-1 through S3I-4) were advanced to 8 feet. Hand borings were terminated at a more shallow depth than the hollow-stem auger

borings, as the hand auger does not provide support to the borehole walls to prevent caving below the water table. Figure 5 shows the location of the borings in the S-3 area.

Since all borings breached the water table, they were abandoned with either a neat cement grout mixture or bentonite granules to remove the possibility of the boring acting as a conduit for contaminant migration. Borings drilled with hollow-stem augers were abandoned by tremieing the grout through the hollow-stem augers as they were withdrawn. Borings taken with hand augers were abandoned by allowing bentonite granules to free fall from ground level. Potable water was added for every 6 inches of granules installed to allow for adequate hydration of the bentonite.

Monitoring well W-16 was installed via mud rotary techniques with a Gus Pech drilling rig using potable water and bentonite drilling fluid. W-16 was installed to a depth of 58 feet below ground surface. The monitoring well was constructed of a 4-inch inner diameter (I.D.) flush joint threaded PVC casing and a 10-foot long, 10-slot 4-inch I.D. PVC screen. The filter pack was extended 2 feet above the top of the screen, and a 2-foot thick bentonite seal was added. The bentonite was allowed to hydrate for one hour before neat cement grout was tremied in placed. A locking steel protective casing was cemented in place atop the well head. The cement was sloped away from the well head to deter run-on. Three steel posts were cemented in place around the well head to provide protection from vehicular traffic. The grout was allowed to cure for 24 hours prior to development. The well was developed with block and surge techniques followed by pumping.

All development water, purge water, decontamination water, cuttings, and drilling fluids were containerized in 55-gallons drums. The drums were staged beneath the awning on the loading dock. Canonie was contracted to arrange for disposal of the drilling fluids, development water, purge water, and decontamination water. The drilling fluids were designated as nonhazardous special wastes by the IDEM and were accepted for disposal by the Prairie View Landfill, located near South Bend. All generated water will be disposed of through the sanitary sewer during the pond #4 remediation. Permission to discharge to the sanitary sewer was granted from the City of South Bend Department of Public Works on April 28, 1992. The cuttings generated from the pond #4 sampling activities will be disposed of with the bulk excavated soils when pond #4 undergoes remediation. The soil cuttings from the S-3 area are currently being profiled for disposal as hazardous waste through Chemwaste Management, Inc.

DECONTAMINATION PROCEDURES

All drilling rigs and equipment were decontaminated through steam cleaning upon arrival at the site. A decontamination area was established adjacent to the loading dock on the southern side of the main building. Clean Visqueen plastic sheeting was used to line the trough area. All decontamination water was containerized in 55-gallon drums for disposal.

All downhole tools were decontaminated through steam cleaning between each boring. Split-spoon samplers were decontaminated with trisodium phosphate (TSP) and water, rinsed in potable water, and double rinsed in distilled water. The hand augering equipment was washed with trisodium phosphate and water, rinsed with potable water, and double rinsed with distilled water before its initial use and between each boring thereafter.

All mechanical drilling equipment was steam cleaned before demobilizing from the site. All hand augering equipment was decontaminated with TSP and water, rinsed with potable water, and triple rinsed with distilled water.

SOIL SAMPLING ACTIVITIES

Soil samples were taken for laboratory analysis at the time of split-spoon sampling. All soil samples taken in pond #4 area were analyzed for TPH under EPA Method 9071, while selected samples were analyzed for RCRA metals, pH, and cyanide. All soils in the S-3 area forwarded for laboratory analysis were scheduled for VOCs analysis under EPA Method 8240, unless denoted, while selected samples were analyzed for TPH under EPA Method 9071 (Appendix E). Each soil sample was collected and tightly packed to minimize headspace in a 4-ounce capacity glass jar provided by Aspen Research Corporation (Aspen) of New Brighton, Minnesota. All samples were handled with new latex gloves to ensure sample integrity. Each sample jar was labeled and placed in a ziplock bag and stored in the field inside an ice cooler. All samples were shipped on ice within 48 hours of collection to Aspen for analysis.

GROUND WATER SAMPLING ACTIVITIES

On March 3 and 4, 1992, Canonie, under direct supervision of Capsule, performed ground water sampling on all of the site monitoring wells: W-1, W-2, W-3, W-4, W-5, W-7, W-8, W-9, W-12, W-13, W-16, W-10A, W-10B, W-11A, W-11B, W-14A, W-14B, W-15A, W-15B, and S-3. Static water elevations were taken prior to sampling each well and used to calculate the total water column volume. Prior to sampling, each well was stabilized by withdrawing a minimum of three water column volumes and monitoring for pH, temperature, and specific conductance. Samples were collected with zero headspace in 40 ml vials with Teflon septum liners, which were supplied by Aspen. Additional details of the field methods employed and the field stabilization forms are included in Appendix F. All samples were shipped to Aspen via Federal Express within 48 hours of collection.

QUALITY ASSURANCE/QUALITY CONTROL

All soil samples originally were designated to be run for low level volatiles by EPA Method 8240. Due to the high levels encountered in the samples, the purge and trap on the gas chromatograph/mass spectrometer (GC/MS) became overloaded. Subsequently, all analyses were changed to standard soil detection limits. In addition, to continue with the analysis while the GC/MS was being serviced, several samples were run under EPA Methods 601 and 602. This decision was made to avoid violating holding times and invalidating the laboratory

data. EPA Methods 601 and 602 are capable of detecting all compounds of interest at the site; however, these methods do not allow confirmation with a mass spectrometer, as does EPA Method 8240. Due to the high concentrations of the VOCs, an alternate reporting format was developed. In this format, quantitative values were reported for compounds within approximately 25 percent of their estimated quantitation limit (EQL). In other words, the PQL was multiplied four times to arrive at an EQL.

Field and trip blanks were taken during drilling and ground water sampling activities and analyzed for volatile organic compounds (Appendix E). Trip blanks were prepared by Aspen and shipped with the sampling jars and vials to the site. Trip blanks remained with the samples throughout field activities and were returned with collected samples to Aspen for analysis. Field blanks were taken during drilling activities from rinsate generated from the split-spoon samplers to verify decontamination techniques. A field blank was taken during ground water sampling activities from bailer rinsate to ensure decontamination procedures were valid.

Decontamination procedures were found to be adequate to ensure sample integrity, as no VOCs were detected in field or trip blanks (Tables 2 and 6 and Appendix E). Although acetone and methylene chloride were identified in the soil samples taken in pond #4 and S-3 area and not in the method blanks used by the laboratory for calibration, these two compounds are very common laboratory artifacts. Given the common occurrence of acetone and methylene chloride in laboratory analysis and the lack of previous detections of these compounds on the site by Capsule and previous contractors, the compounds are most likely attributable to laboratory interference.

FIELD OBSERVATIONS AND ANALYTICAL RESULTS

Based upon analytical results for the soil samples collected during drilling activities, VOCs attributable to petroleum compounds were present above PQLs in borings located in the pond #4 area (Figure 4). Based upon the TPH and benzene, ethylbenzene, toluene, and xylene (BETX) ratios, the compounds identified are consistent with those found in fuel oil. In addition, low to slightly elevated levels of total RCRA metals and cyanide were identified in pond #4. The highest concentration of metals was of chromium (33 μg/kg) and lead (61 μg/kg) in boring PD4-6 from 2 to 4 feet.

Based upon field headspace results, visual observation, and laboratory results, the concentrations of TPH and metals appear to be uniform throughout the sludge-like sediment layer. The sludge layer is encountered from 7 to 8 feet in the center of pond #4, but thins and occurs at shallower depths of 1.5 to 2 feet near the edge. A fine sand fill is encountered atop the sludge layer. This would be consistent with the shape of pond #4 prior to the filling; the majority of sediment would be expected to settle on the bottom of the pond, while

lesser amounts would be expected to settle on the sloped banks. The areal extent of pond #4 was found to be approximately 35 feet to the south from the concrete weir and 20 feet wide or the approximate width of the weir. The concrete weir was determined to be 18.5 feet by 5.5 feet and approximately 6 feet in depth. Tables 4, 5, and 6 provide summaries of soil analytical results for pond area #4.

Based upon analytical results for the soil samples collected during drilling activities, VOCs attributable to petroleum compounds and solvents were present above EQLs in borings located in the S-3 area (Appendix E and Tables 2, 3, and 4). Both TCA and its degradational product DCA were detected along with concentrations of TPH. The highest concentrations of TCA was detected in borings S3-3 at 2 to 4 feet (42,000 μg/kg) and in S3-6 at 6 to 8 feet (55,000 μg/kg). DCE was detected at lesser concentrations in S3-3 at 4 to 6 feet (3,100 μg/kg) and in S3-6 at 6 to 8 feet (5,900 μg/kg). Perchloroethylene (PCE) was also detected at lesser concentrations in borings S3-4 (150 μg/kg), S3-6 (150 μg/kg), and S3-9 (170 μg/kg). Boring S3-3 is located inside the concrete bermed area, while boring S3-6 is located 30 feet south of the bermed area. The TCA concentrations in the S-3 area occur at higher concentrations than the degradational product DCA, indicating this is the primary source area. The ratio of TCA to DCA tends to converge with depth as reflected by a greater concentration of DCA than TCA in S3-3 at the 12- to 14-foot interval versus the greater concentration of TCA than DCA in the 2- to 4-foot interval. This may be attributable to the enhanced degradation from the higher dissolved oxygen content in the saturated zone versus the unsaturated zone. TCA and DCA were also detected at lesser concentrations in the hand augered borings taken inside the building when compared to the results from the outside borings (Figure 5). Due to the high amount of visible petroleum contamination one soil sample from S3-6 was analyzed for PCBs. No PCBs were detected in the soil sample.

An examination of the field headspace results and visual observations further indicates that the solvent and TPH contamination originates in the bermed area and the area along the western wall of the main building (Figure 2). The contaminants appear to have migrated into the clean backfill of the tank excavation, as evidenced by the low to non-detect headspace readings in the unsaturated zone and the detection of elevated levels of contaminants at the water table and capillary fringe (Appendix D). The fill material was characterized by a uniform fine reddish-orange sand, as opposed to the generally more poorly sorted gray sand and gravel of the natural deposits.

Ground water samples taken from monitoring wells W-1, W-2, W-3, W-5, W-9, W-10A, W-11A, W-14A, W-15B, and W-16 showed no VOCs present above EQLs. Results from the ground water samples taken from the monitoring wells W-4, S-3, W-7, W-8, W-10B, W-11B, W-12, W-13, W-14B, and W15A indicate that one or more of the compounds TCA, TCE, DCA, and DCE are present above EQLs. Degradation products DCA and DCE are in higher concentrations than the TCA and TCE in the S-3 well located in the source area.

This supports the previously discussed observation, with respect to the soil profile in the S-3 area, that degradation increases with depth. Vinyl chloride, the terminal degradation product for the contaminants of interest, was detected at 43 μg/l in monitoring well S-3, but was not detected in downgradient monitoring wells. Ground water analytical results have been summarized in Table 6.

Figure 6 shows the total VOC concentration at each monitoring well based upon the March 1992 ground water sampling event. Total VOCs were used instead of individual compounds as degradation of the original contaminants has resulted in several chlorinated compounds occurring in the ground water. Results from the September 1991 ground water sampling event from the newly installed monitoring wells MW-14A, MW-14B, MW-15A, and MW-15B have also been included in parentheses adjacent to the respective monitoring well. Historical data prior to September 1991 has not been included as a direct comparison of VOC concentrations would not be valid. This is attributable to the differing sampling techniques and laboratories used for the previous investigations. Based upon the results of the September 1991 and April 1992 ground water sampling events, the VOC plume continues to migrate north of 3702 West Sample Street, and VOCs have been detected in monitoring well W-15A at 6 μg/l, which had previously been non-detect.

It should be noted that the September 1991 results Canonie reported for monitoring wells MW-14A and MW-14B were inadvertently switched. The results exhibited on Figure 6 are the corrected results for these monitoring wells. This error does not change the interpretation of the migration of the contaminant plume.

OBSERVATIONS AND CONCLUSIONS

The results and interpretations of this phase of the investigation focus on three areas of contaminant concern: the presence of contaminants in the S-3 area, the extent of the sludge-like sediment layer in pond #4, and the migration and distribution of contaminants downgradient of the main plant site. Records search information has resulted in the collection and location of numerous water wells and information concerning the RACO and Allied-Bendix facilities. The following is a summary of observations and conclusions based upon the field activities and records research:

> Pond #4 was determined to have a layer of sludge-like sediment covering the bottom and banks of the former pond beneath a layer of sand fill. The approximate dimensions of the pond were 20 feet in width, 35 feet in length, and 8 feet in depth and were determined through field headspace analysis, visual observations, and laboratory analytical results.

The contaminant of concern in pond #4 is TPH as fuel oil. No VOCs were detected above EQLs for soil samples taken directly from the sludge-like sediment. Metals and cyanide were above PQLs, but are considered to be in trace amounts.

The dimensions of the concrete weir are 18.5 feet by 5.5 feet by approximately 6 feet in depth. The weir also contains sludge and water.

TCA, DCA, PCE, and TPH as fuel oil were detected in soil samples taken in the S-3 area. The source area appears to be concentrated beneath a concrete bermed area and along the western wall of the main building.

PCBs were not detected in the soil sample taken in the S-3 area.

Contamination in the S-3 source area appears to have migrated into the clean backfill of the underground storage tank excavation and beneath the building, as indicated by the low field headspace values and visual observations made in the unsaturated zone of the backfill material.

The vertical extent of the contamination in the S-3 area has not been determined beyond the western site perimeter and beneath the main manufacturing building.

The ground water sampling event determined that the contaminant plume continues to migrate and increase in concentration north of 3702 West Sample Street. This is indicated by the detection of trans 1,2 DCE in monitoring well W-14B, which was previously non-detect in the September 1991 sampling event, and the confirmation of DCE and DCA in monitoring well W-14B.

Research conducted on the IDEM records for the RACO facility indicates that IDEM has received no reports of environmental investigations undertaken on the property. This does not indicate that environmentally impacting activities or materials are not present at the RACO facility.

The ground water remediation at the Allied-Bendix facility is a voluntary effort in which the IDEM is provided with data and reports as the documents are generated.

The ground water recovery system at the Allied-Bendix facility does not appear to be influencing ground water flow at the Torrington facility.

The aquifer parameters determined at the Allied-Bendix facility are similar to those determined for the Torrington site relative to hydraulic conductivity and transmissivity of the aquifer materials.

Ground water levels recorded in March and April 1992 are anomoulous when compared to historical data. The cause of the anomaly is suspected to be seasonal or attributable to a previously unidentified pumping source.

Numerous water wells were located within a 3-mile radius of the site. Due to the high number of water well logs, they have been compiled in two separate volumes of this report. Approximately 10 percent of the wells could not be located due to a lack of specific information concerning township, range, section, and quarter sections, but these still have been included to complete the collection.

The City of South Bend was unable to readily provide information concerning the use of residential wells for drinking water purposes.

RECOMMENDATIONS

Based upon the discussion of the results of this phase of the environmental investigation, the following recommendations are presented:

The pond #4 area should be remediated through excavation and disposal of the TPH contaminated soils in a landfill licensed by the State of Indiana to accept "special waste."

Further investigation should be conducted into the extent and magnitude of the contamination in the S-3 area. At the time of this report, the results of a soil gas survey are being compiled and confirmatory laboratory testing is being processed.

After the extent and magnitude of the contamination is determined, a feasibility study should be conducted to assess possible remedial alternatives for the area. The feasibility study should include the use of best available technology, cost benefit evaluations, and consideration of impacts on future property use.

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Geraghty and Miller, Report on Ground Water Contamination Conditions at Bendix Plant, December 1981.

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TABLE 1

MONITORING WELL INVENTORY

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TABLE 1
MONITORING WELL INVENTORY
THE TORRINGTON COMPANY, SOUTH BEND, INDIANA
MARCH AND APRIL 1992

Well I.D.	Diameter (Inches)	Depth of Well from T.O.C. (feet)	Elev. T.O.C. (Feet)	Screen Length (Feet)	Water Elev. (Feet) March	Water Elev. (Feet) April
W-1	5	64	713.09	5	706.09	705.51
W-2	5	37	712.59	5	704.29	704.38
W-3	5	61	712.59	5	705.35	704.89
W-4	5	33	712.90	5	704.12	704.02
W-5	5	35	713.32	5	704.19	704.12
S-3	4	24	710.12	5	704.24	704.18
W-7	4	31.8	714.02	5	704.52	704.52
W-8	4	59.3	713.71	5	703.91	703.91
W-9	2	54.6	714.71	10	704.52	704.35
W-10A	2	60	714.53	10	703.63	703.61
W-10B	2	28.1	714.59	10	703.64	703.59
W-11A	2	55.1	714.32	10	703.30	705.76
W-11B	2	30	714.56	10	703.79	705.98
W-12	2	29.8	712.83	10	704.06	-
W-13	2	25.3	713.95	10	704.15	-
W-14A	4	59	715.50	10	704.12	703.52
W-14B	2	41	714.94	10	†700.94	703.48
W-15A	2	32	714.50	10	703.60	703.58
W-15B	2	18	713.84	10	703.57	703.58
W-16	4	60	715.30	10	703.70	703.52

T.O.C. = Top of Casing
\+ = anomolous result
† = well head was obstructed by construction equipment
\- = well head not accessible at time of measurement

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TABLE 2

SOIL SAMPLE ANALYTICAL RESULTS - S-3 AREA

OUTSIDE BUILDING

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TABLE
SOIL SAMPLE ANALYTICAL RESULTS
S-3 AREA OUTSIDE BUILDING
EPA METHOD 8240
THE TORRINGTON COMPANY, SOUTH BEND, INDIANA
FEBRUARY 1992

Sample I.D.	S3-2	S3-2	S3-3	S3-3†	S3-3	S3-4	S3-5	S3-6	S3-6
Depth (feet)	4-6	8-10	4-6	4-6	12-14	4-6	8-10	6-8	8-10
Compound (ug/kg)									
1,1 DCE	ND	ND	3100	ND	ND	600	ND*	5900	ND*
Methylene Chloride	3200	3600	3300	1600**	2900	3300	3300	3300	3200
Chloroform	ND*	ND*	ND*	ND	ND	ND*	ND*	ND	ND*
1,1,1 TCA	ND	800	42000	9500	660	12000	3600	55000	2200
o-xylene	ND	ND	1200	see m,p-xylenes	ND	ND*	ND*	200	ND
1,1 DCA	ND	ND*	950	BPQL	920	410	ND	1000	ND
Perchloroethylene	ND	ND	ND*	BPQL	ND	150	ND	150	ND*
Toluene	ND	ND	400	360	ND	200	ND	ND*	ND
m,p-xylene	ND	ND	800	4300	ND*	ND*	ND	ND*	ND
Acetone	ND	ND	ND	ND	880	1100	ND	1100	ND
Benzene	ND	ND	ND	BPQL	ND	ND*	ND	ND	ND
TCE	ND	ND	ND*	ND	ND	ND*	ND	ND	ND
1,4 Dichlorobenzene	-	-	-	BPQL	-	-	-	-	-
Ethylbenzene	-	-	-	2500	-	-	-	-	

TABLE 2
SOIL SAMPLE ANALYTICAL RESULTS
S-3 AREA OUTSIDE BUILDING
EPA METHOD 8240
THE TORRINGTON COMPANY, SOUTH BEND, INDIANA
FEBRUARY 1992

Sample I.D.	S3-7	S3-8	S3-9	Equip Rinseate	Trip Blank	EQL	PQL†	Trip Blank	Equipment Rinse
Depth (feet)	8-8.5	8-8.5	8-8.5						
Compound (ug/kg)									
1,1 DCE	ND	ND*	ND	ND	ND	700	140	ND	ND
Methylene Chloride	2700	3200	2900	ND	ND	14000	270	ND	ND
Chloroform	ND*	ND	ND	ND	ND	700	270	ND	ND
1,1,1 TCA	1300	3500	660	ND	ND	700	410	ND	ND
o-xylene	370	330	170	ND	ND	700	see m,p-xylene	ND	ND
1,1 DCA	170	ND*	ND	ND	ND	700	270	ND	ND
perchloroethylene	ND*	ND*	170	ND	ND	700	270	ND	ND
Toluene	ND*	ND*	ND	ND	ND	700	140	ND	ND
m,p-xylene	170	190	ND*	ND	ND	700	280	ND	ND
Acetone	ND	ND	ND	ND	ND	14000	-	ND	ND
Benzene	ND	ND	ND	ND	ND	700	140	ND	ND
TCE	520	ND*	260	ND	ND	700	410	ND	ND
1,4 Dichlorobenzene	ND	ND	ND	ND	ND	700	100	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	700	140	ND	ND

EQL = estimated quantitation limit for EPA Method 8240
PQL† = practical quantitation limit for EPA methods 601 and 602
ND* = compound was detected, but at a level less than 20% of EQL
† = analyzed under EPA method 601 and 602 due to equipment malfunction
** = laboratory reagent contaminant

TABLE 3

SOIL SAMPLE ANALYTICAL RESULTS - S-3 AREA

INSIDE BUILDING

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228-124-434-29
051892
052892REV

TABLE
SOIL SAMPLE ANALYTICAL RESULTS
S-3 AREA INSIDE BUILDING
EPA METHOD 8240
THE TORRINGTON COMPANY, SOUTH BEND, INDIANA
FEBRUARY 1992

Sample I.D.	S3I-1*	S3I-2	S3I-3	S3I-4	EQL	PQL†		
Depth (feet)	2-2.5	6-6.5	6-6.5	8-8.5				
Compound (ug/l)								
,1 DCE	BPQL				700	140		
Methylene Chloride	1500**	3300	3600	3100	14000	270		
Chloroform				ND*	700	270		
,1,1 TCA		350	ND*		700	410		
-xylene		ND*	190		700	see m,p-xylene		
,1 DCA		260		ND*	700	270		
erchloroethylene		ND*	ND*		700	140		
Toluene		ND*			700	140		
n,p-xylene		ND*			700	280		
Acetone			ND*		14000	-		
Benzene				ND*	700	140		
TCE					700	410		
1,4 Dichlorobenzene						100		
Ethylbenzene						140		

D* = compound was detected but at a level less than 20% of EQL
= analyzed under EPA method 601 and 602 due to laboratory equipment malfunction
QL = estimated quantitation limit
QL† = practical quantitation limit
= laboratory reagent contaminant

TABLE 4

SOIL SAMPLE ANALYTICAL RESULTS

POND #4 AND S-3 AREA

TOTAL PETROLEUM HYDROCARBONS

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TAB.

SOIL SAMPLE ANALYTICAL RESULTS - POND #4 AND S-3 AREA
TOTAL PETROLEUM HYDROCARBONS
MODIFIED EPA 9071
THE TORRINGTON COMPANY, SOUTH BEND, INDIANA
FEBRUARY 1992

Sample I.D.	S3I-1	S3I-1	PD4-3	PD4-4	PD4-8	S3-1	S3-6
Depth (feet)	2-2.5	DUP 2-2.5	2-4	4-6	4-6	12-14	6-8
TPH (mg/kg)	23000	21000	4906	5400	5200	1100	10000
Sample I.D.	S3-6	S3-8	PQL				
Depth (feet)	DUP	8-8.5					
TPH (mg/kg)	13000	10000	200				

PQL = practical quantitation limit

TABLE 5

SOIL SAMPLE ANALYTICAL RESULTS

METALS AND CYANIDE

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TABL.
SOIL SAMPLE ANALYTICAL RESULTS
METALS AND CYANIDE
THE TORRINGTON COMPANY, SOUTH BEND, INDIANA
FEBRUARY 1992

Sample I.D.	PD4-2	PD4-6	PQL	EPA METHOD				
Depth (feet)	6-8	2-4						
Arsenic (mg/kg)	BPQL	3.2	0.98	6010				
Barium	6.4	51	0.15	6010				
Cadmium	0.32	1.4	0.15	6010				
Chromium	BPQL	33	0.35	6010				
Lead	BPQL	61	2.1	6010				
Mercury	0.031	0.58	0.02	7470				
Selenium	1.3	3.1	1.2	7740				
Silver	BPQL	BPQL	0.88	7760				
Cyanide	0.24	0.53	0.19	9010				

PQL = practical quantitation limit
BPQL = below

TABLE 6

GROUND WATER MONITORING WELL ANALYTICAL RESULTS

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052892REV

TABLE 6
GROUND WATER MONITORING WELL ANALYTICAL RESULTS
EPA METHOD 8240
THE TORRINGTON COMPANY, SOUTH BEND, INDIANA
FEBRUARY 1992

WELL I.D.	W-1	W-2	W-3	W-4	W-5	S-3	W-7	EQL
COMPOUND ug/l								
VINYL CHLORIDE	ND	ND	ND	ND	ND	43	ND	10
CHLOROETHANE	ND	ND	ND	7	ND	110	BEQL	10
1,1 DCE	ND	ND	ND	7	ND	50	BEQL	5
TRANS 1,2 DCE	ND	ND	ND	ND	ND	BEQL	ND	5
1,1 DCA	ND	ND	ND	82	BEQL	450	24	5
1,1,1 TCA	BEQL	ND	ND	81	ND	390	35	5
TCE	ND	ND	BEQL	ND	ND	73	ND	5
TOLUENE	ND	ND	ND	ND	ND	BEQL	ND	5

ND = not detected
EQL = estimated quantitation limit
BEQL = below estimated quantitation limit

TABLE 6
GROUND WATER MONITORING WELL ANALYTICAL RESULTS
EPA METHOD 8240
THE TORRINGTON COMPANY, SOUTH BEND, INDIANA
FEBRUARY 1992

WELL I.D.	W-8	W-9	W-10A	W-10B	W-11A	W-11B	W-12	EQL
COMPOUND ug/l								
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	5	10
CHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	10
1,1 DCE	ND	ND	ND	19	ND	5	14	5
TRANS 1,2 DCE	ND	ND	ND	ND	ND	ND	ND	5
1,1 DCA	BEQL	ND	ND	25	ND	BEQL	ND	5
1,1,1 TCA	8	ND	ND	110	ND	ND	ND	5
TCE	ND	ND	ND	16	ND	ND	ND	5
TOLUENE	ND	ND	ND	ND	ND	ND	ND	5

ND = not detected
EQL = estimated quantitation limit
BEQL = below estimated quantitation limit

TABLE 6
GROUND WATER MONITORING WELL ANALYTICAL RESULTS
EPA METHOD 8240
THE TORRINGTON COMPANY, SOUTH BEND, INDIANA
FEBRUARY 1992

WELL I.D.	W-13	W-14A	DUP W-14A	W-14B	W-15A	W-15B	W-16	EQL
COMPOUND ug/l								
VINYL CHLORIDE	BEQL	ND	ND	BEQL	ND	ND	ND	10
CHLOROETHANE	150	ND	ND	18	ND	ND	ND	10
1,1 DCE	BEQL	ND	ND	33	ND	ND	ND	5
TRANS 1,2 DCE	ND	ND	ND	ND	6	ND	ND	5
1,1 DCA	21	BEQL	BEQL	18	BEQL	ND	BEQL	5
1,1,1 TCA	ND	ND	ND	BEQL	ND	ND	ND	5
TCE	BEQL	ND	ND	BEQL	BEQL	BEQL	ND	5
TOLUENE	ND	ND	ND	ND	ND	ND	ND	5

ND = not detected
EQL = estimated quantitation limit
BEQL = below estimated quantitation limit

TABLE 6
GROUND WATER MONITORING WELL ANALYTICAL RESULTS
EPA METHOD 8240
THE TORRINGTON COMPANY, SOUTH BEND, INDIANA
FEBRUARY 1992

WELL I.D.	METHOD BLANK	TRIP BLANK	EQUIPMENT RINSE	EQL			
COMPOUND ug/l							
VINYL CHLORIDE	ND	ND	ND	10			
CHLOROETHANE	ND	ND	ND	10			
1,1 DCE	ND	ND	ND	5			
TRANS 1,2 DCE	ND	ND	ND	5			
1,1 DCA	ND	ND	ND	5			
1,1,1 TCA	ND	ND	ND	5			
TCE	ND	ND	ND	5			
TOLUENE	ND	ND	ND	5			

ND = not detected
EQL = estimated quantitation limit
BEQL = below estimated quantitation limit

FIGURES

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FIGURE 1

SITE LOCATION MAP

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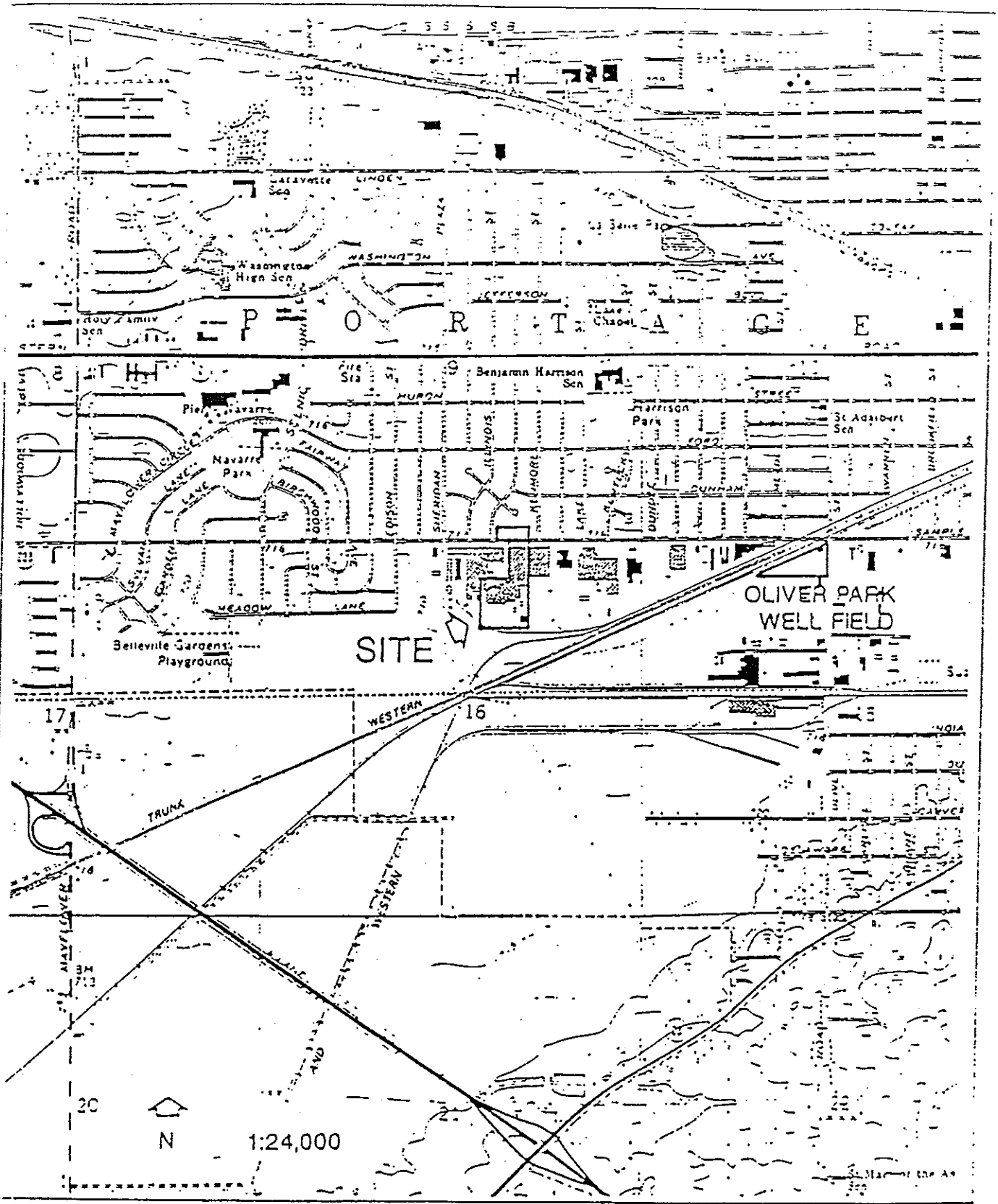

CAPSULE
ENVIRONMENTAL ENGINEERING INC.

THE TORRINGTON COMPANY
SOUTH BEND, INDIANA FACILITY

SITE LOCATION MAP

FIGURE 1

FIGURE 2

SITE MAP

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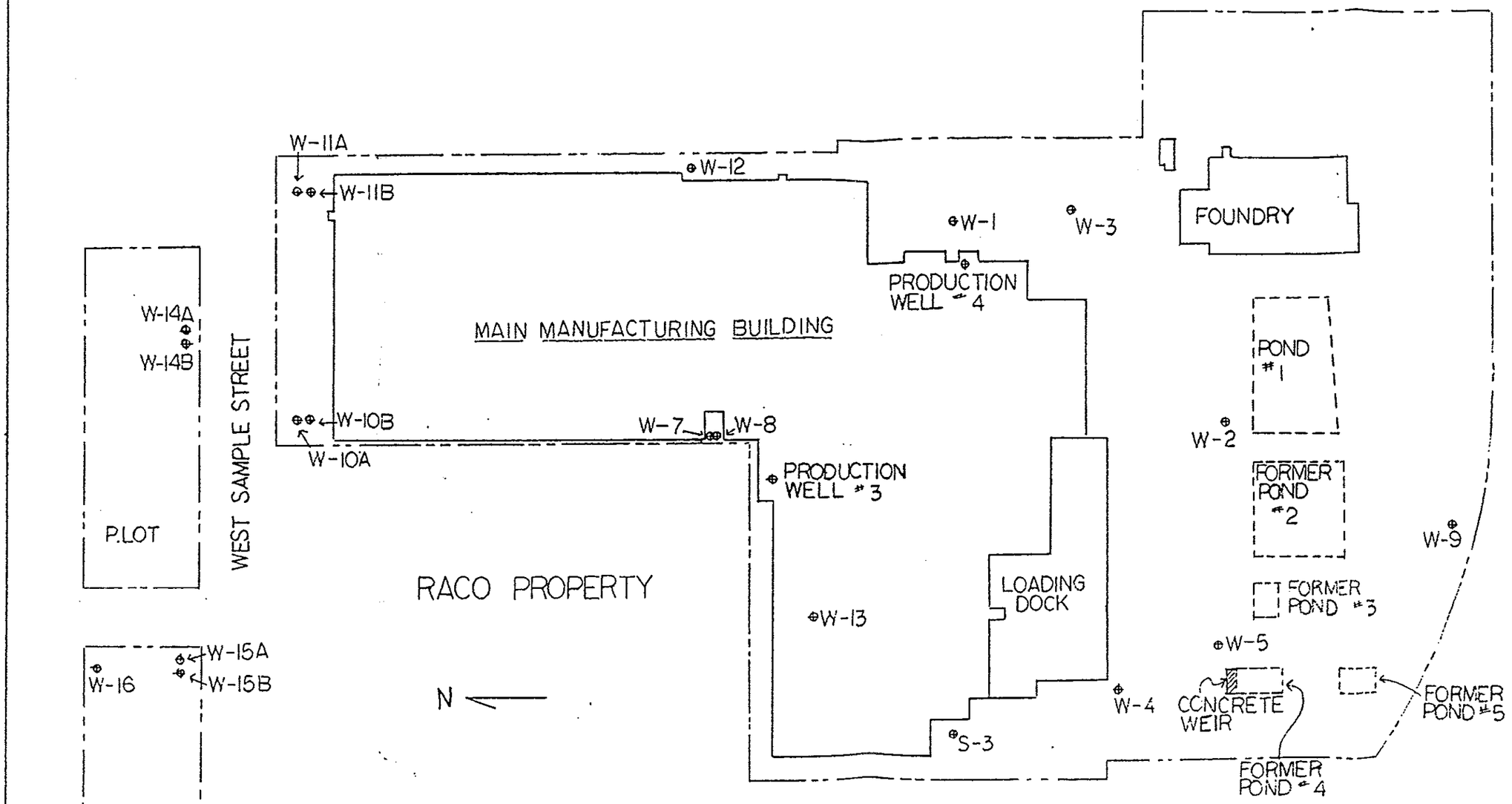

SITE MAP FIGURE 2

THE TORRINGTON CO.
SOUTH BEND, INDIANA

⊕ WELL

SCALE 1" = 120'

CAPSULE
ENVIRONMENTAL ENGINEERING INC

FIGURE 3

GROUND WATER STATIC EVALUATIONS MAP

APRIL 1992

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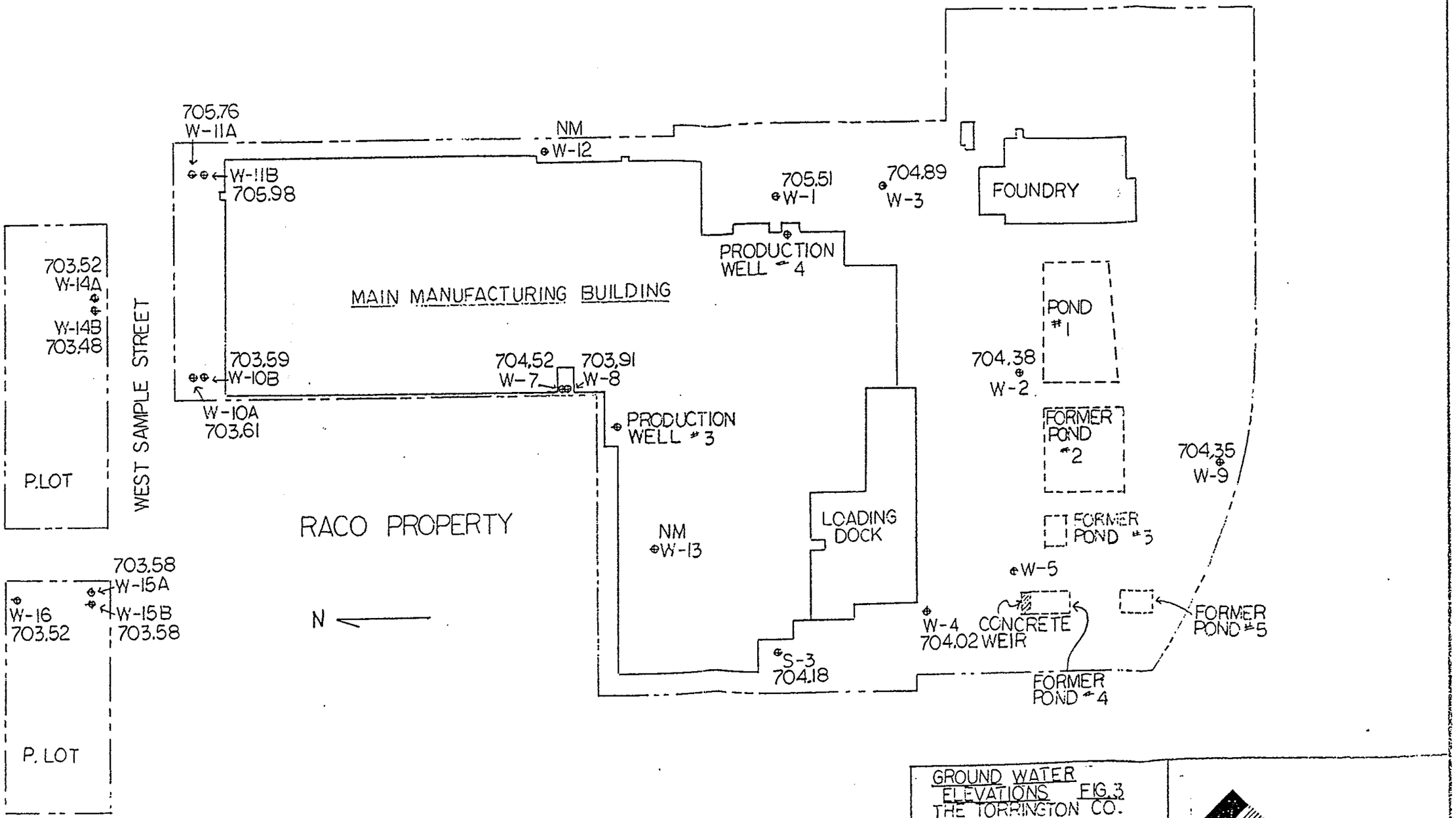
052892REV



GROUND WATER ELEVATIONS FIG. 3
THE TORRINGTON CO.
SOUTH BEND, INDIANA
APRIL 1992

⊕ WELL
NM = NOT MEASURED
SCALE 1 = 120

CAPSULE
ENVIRONMENTAL ENGINEERING INC

FIGURE 4

POND #4

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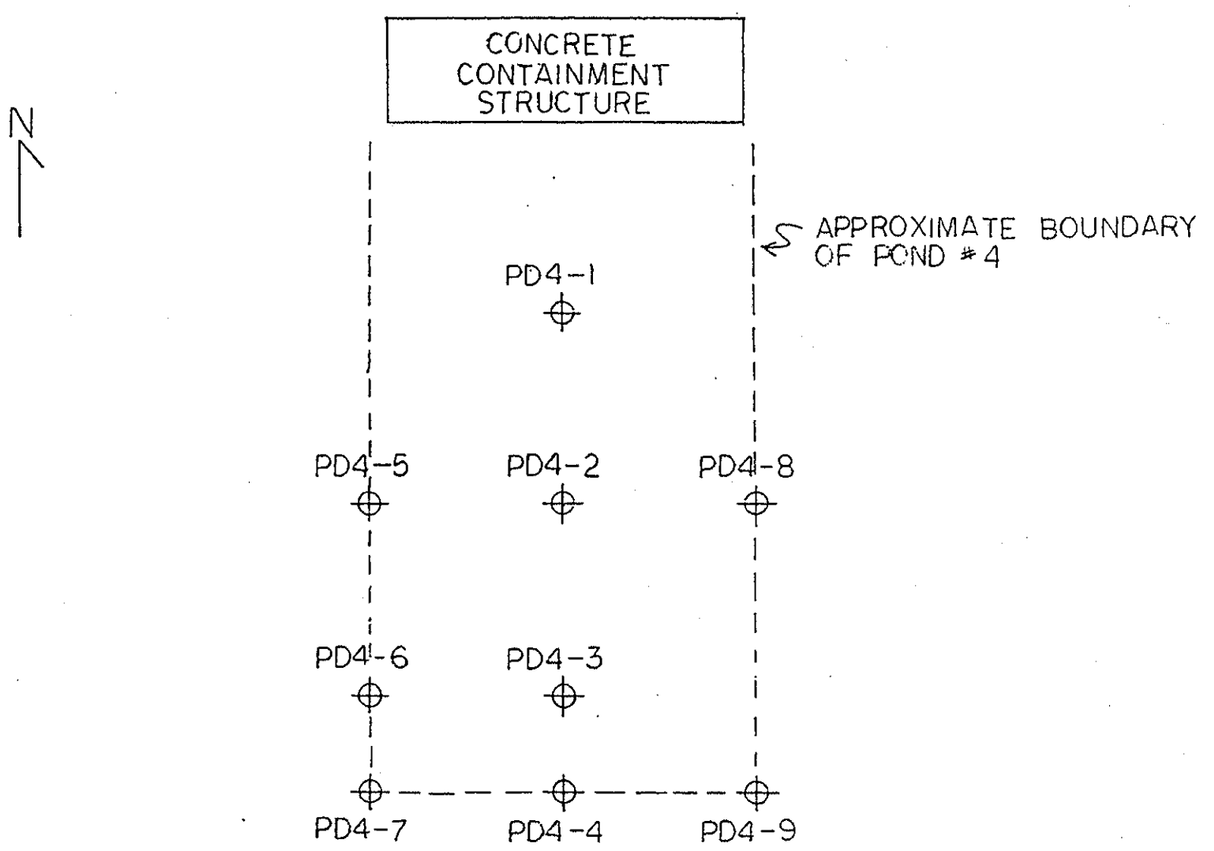

LEGEND ⊕ BORING	BORING LOCATION MAP POND #4 FIGURE 4	CAPSULE ENVIRONMENTAL ENGINEERING INC.
SCALE 1/8 INCH = 1 FOOT	THE TORRINGTON COMPANY SOUTH BEND, INDIANA FEBRUARY, 1992	

FIGURE 5

S-3 AREA

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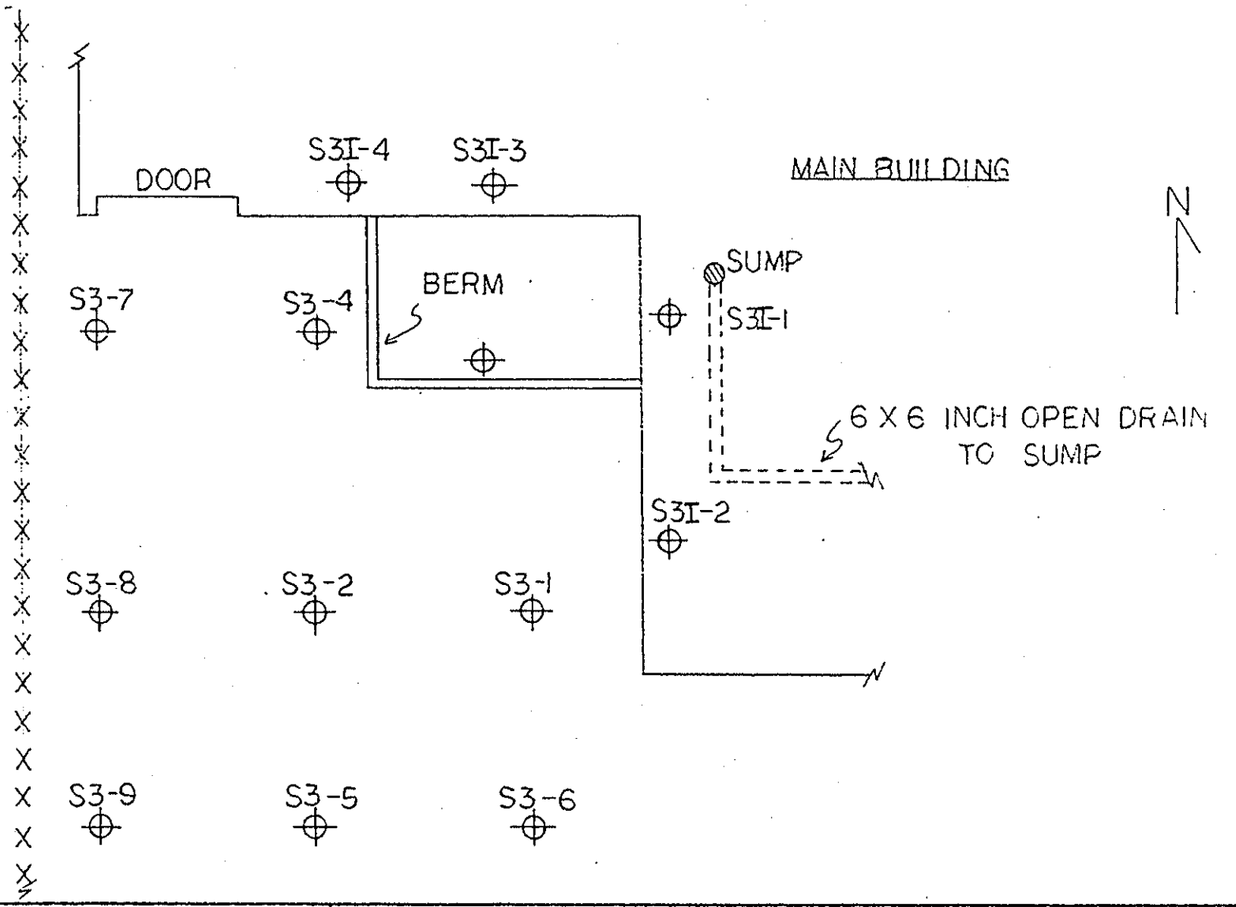

LEGEND

BORING

FENCE LINE

SCALE 3/32 INCH = 1 FOOT

BORING LOCATION MAP
S-3 AREA FIGURE 5

THE TORRINGTON COMPANY
SOUTH BEND, INDIANA
FEBRUARY, 1992

CAPSULE
ENVIRONMENTAL ENGINEERING INC

FIGURE 6

TOTAL VOC CONCENTRATIONS

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052892REV

ND
W-11A

W-11B
5

W-12
19

ND
W-1

ND
W-3

FOUNDRY

PRODUCTION
WELL #4

MAIN MANUFACTURING BUILDING

POND
#1

ND
W-2

FORMER
POND
#2

W-9

FORMER
POND #3

ND
W-5

(ND)
ND
W-14A

W-14B
69
(119)

P.LOT

WEST SAMPLE STREET

170
W-10B

W-10A
ND

59
W-7

8
W-8

PRODUCTION
WELL #3

RACO PROPERTY

171
W-13

LOADING
DOCK

117
W-4

CONCRETE
WEIR

FORMER
POND #5

FORMER
POND #4

S-3
1116

(ND)
6

W-15A

W-15B
ND
(ND)

W-16
ND

P. LOT

N

TOTAL VOC CONCS. (ppb)
FIGURE 6
THE TORRINGTON CO.
SOUTH BEND, INDIANA
MARCH 1992

● WELL
ND = NOT DETECTED
SCALE 1" = 120'

CAPSULE
ENVIRONMENTAL ENGINEERING INC

APPENDICES

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APPENDIX A

CAPSULE PROPOSED WORK PLAN

SGP:mmf
228-124-434-29
051892
052892REV

CAPSULE

January 13, 1991

Mr. Butch Longino
Assistant Plant Director
The Torrington Company
59 Field Street
Torrington, CT 06790

Dear Butch:

Per your request, Capsule Environmental Engineering, Inc. (Capsule) is submitting this proposal for further work relating to the former Torrington Company facility located in South Bend, Indiana (site). This quote expands on our December 31, 1991 proposal and is based on findings included in the December 1991 project report prepared by Capsule and our discussions relating to information required to negotiate Torrington's proposed plans with the Indiana Department of Environmental Management (IDEM).

It is important to present to the IDEM an accurate profile of problem areas at the site. This profile should include investigations performed or proposed in the problem areas, conclusions based upon supporting data, and recommendations for future actions at the site. To be adequately prepared to meet this objective, Capsule feels that there are eight tasks to be accomplished. The tasks are selected to emphasize to the IDEM that Torrington is taking a proactive role in addressing environmental concerns identified at the site. We feel that this is important in light of the duration of the investigative activities performed at the site. The following information describes each task and its strategic value in negotiations with the IDEM.

TASK 1: POND 4 EVALUATION

Results from the November 1991 investigation by Capsule suggest environmental concern with sediments in pond #4. This confirms results documented by previous contractors. Capsule feels it is critical to determine the horizontal and vertical extent of contaminated sediments and to classify the sediments for disposal. Defining the extent of contaminated sediments will

allow us to present the IDEM with a remediation proposal for pond #4. Since the IDEM assigns clean-up levels on a case-by-case basis, we do not suggest any remedial activities on pond #4 until we have met with them and negotiated a clean-up standard.

Capsule proposes the placement of eight soil borings in the pond #4 area to delineate the horizontal and vertical extent of contaminated sediments. We feel a minimum of eight borings will be required, as the former pond boundaries have been obscured due to topographic modifications and natural erosion.

The borings will be advanced to 10 feet below the ground surface or to the water table depending upon which depth is first encountered. The borings will be advanced using a hollow-stem auger and soil samples will be obtained with split-spoon samplers at continuous 2-foot intervals. Soil samples will be screened visually and with an HNu photoionization meter. To determine the vertical extent of the sediments, at least two samples will be obtained from each boring; the sample showing the highest response on the HNu and the sample showing the least response. All soil samples will be analyzed for volatile organic compounds (EPA Method 601), while selected samples will be analyzed for metals (EPA Method 6010) and cyanide (EPA Method 9010). At least one sample will be analyzed for toxic characteristics leaching procedure (TCLP) for waste classification.

TASK 2: S-3 AREA EVALUATION

Typically, once a contaminant source is removed, the contaminant concentrations in the ground water decrease with time. The decreases in concentration can be attributed directly to source removal and indirectly to dilution and dispersion of contaminants that entered the ground water prior to source removal, biodegradation, photolysis and hydrolysis. The last three causes of contaminant concentration reduction are compound-specific and may not be experienced by all organic compounds.

Based upon historical information generated by other consultants prior to Capsule's involvement at the site, the total VOC concentration does not appear to be diminishing at the S-3 well. This is an indication that there may be some residual contamination remaining in the soil from previous remedial activities, or the original VOC concentrations were extremely high and have not been reduced through natural ground water flow and various forms of degradation. The first alternative is more

likely than the second alternative, as the ground water flow through the site is known to be very rapid and thus would encourage high dilution, dispersion and degradation rates.

Capsule believes it is crucial to have all the source areas at the site identified prior to approaching the IDEM. Given the continued elevated VOC levels in well S-3 and the lack of documentation concerning the excavation and tank extraction, further investigation is needed to confirm or disprove the presence of residual contamination. Capsule proposes the placement of a minimum of six borings in the S-3 area to identify any residual contaminants remaining from the excavation and tank extraction previously performed. Six borings should allow for a determination of residual contamination. However, since the extent of the suspected residual contamination is not known, additional borings may be warranted. If, after the completion of six borings, Capsule field personnel feel additional borings are necessary, Torrington will be consulted to authorize further investigation.

The borings will be advanced, and samples screened and selected, as defined in Task 1. Soil samples in the S-3 area will be analyzed for volatile organic compounds.

TASK 3: COMPLETION OF MONITORING WELL NETWORK

Results of Capsule's investigation confirm off-site contaminant migration of VOCs in monitoring well 14A screened in the lower part of the aquifer, but no VOCs were detected in well 15B which is screened in the middle part of the aquifer. This indicates that contaminants are sinking through the water column as they migrate off-site. Well nest 15A/B contains monitoring wells screened in the middle and upper part of the aquifer. Ground water samples taken from these wells indicate that no VOCs are present above the method detection limit. Capsule recommends the installation of an additional monitoring well in the lower part of the aquifer at the 15A/B well nest to better identify the horizontal and vertical extent of the off-site plume.

TASK 4: GROUND WATER SAMPLING EVENT

The lack of a comprehensive sampling event of all the monitoring wells does not allow the interpretation of the relative travel time of the ground water plume. Capsule suggests conducting a complete sampling round of all the monitoring wells to assess the current contaminant concentrations and compare them with

previously collected data for travel time. This will allow us to support a monitoring plan based upon the potential extent of contamination.

TASK 5: WATER WELL LOG SEARCH

A complete water well log search has not been conducted on the site to identify potential human receptors. It is critical that any potential human receptors of contaminated ground water be identified, as this factor can largely be used to support our recommendations to the IDEM. Capsule proposes to conduct an inventory of water well logs maintained by the Indiana Department of Natural Resources and to conduct a file search at the South Bend public works department to identify any potential human ground water receptors.

TASK 6: IDEM DOCUMENT REVIEW

- The Allied Bendix facility, located north of the site, has been undergoing a ground water remediation effort in recent years. Capsule suggests examining state records concerning remedial measures requested by the IDEM at the Allied Bendix facility. This will provide us with relative information as to potential response actions that may be required at the site and possibly provide us with additional supporting technical data.

- The possibility that the adjacent RACO facility provided additional contamination to the site was presented in Capsule's report. Capsule recommends that an IDEM file search be conducted for any environmentally impacting activities which may have been or may be present at the RACO facility.

TASK 7: PROJECT SUMMARY REPORT

In view of the project's duration, the number of contractors involved with the project over the years and the amount of data generated to date, Capsule recommends preparing a historical summary of all investigative activities undertaken at the site, including the aforementioned tasks. Capsule's conclusions and recommendations would also be included with the report. The report would be structured to support Capsule's presentation during our meeting with IDEM and the logic of the recommendations made.

TASK 8: IDEM MEETING

At this time, Capsule envisions two staff members attending a meeting with the IDEM. The presentation would follow the format of the Project Summary Report described in Task 7. An oral historical perspective of work conducted at the site would be presented, excluding the most recent tasks undertaken by Capsule. We would then follow with a description of recent activities at the site including the rationale for performing the recent tasks, an explanation of how we arrived at our conclusions, and our resulting recommendations.

We have provided cost estimates for the proposed additional research and presentation in the attachment. If you should have any questions please feel free to contact me.

Sincerely,

CAPSULE ENVIRONMENTAL ENGINEERING, INC.

David R. Cushman
Vice President, Technical Services

DRC:SGP/mmf/cei/jat
Enclosures

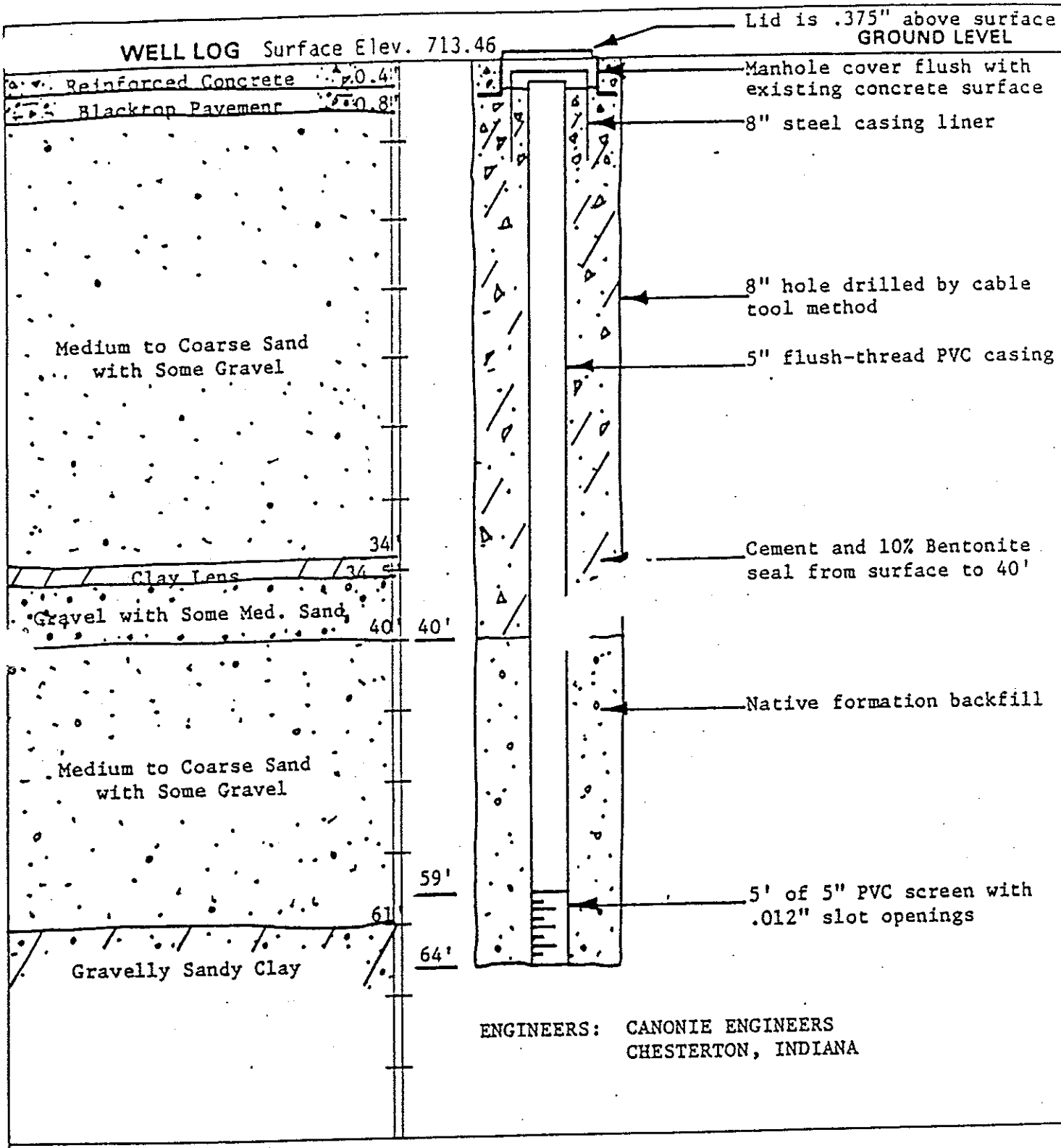
193-003-1

APPENDIX B

MONITORING WELL LOGS

SGP:mmf
228-124-434-29
051892
052892RBV

WELL LOG Surface Elev. 713.46



ENGINEERS: CANONIE ENGINEERS
CHESTERTON, INDIANA

City South Bend State Indiana

Location Approximately 50' East of Water Supply Well #4

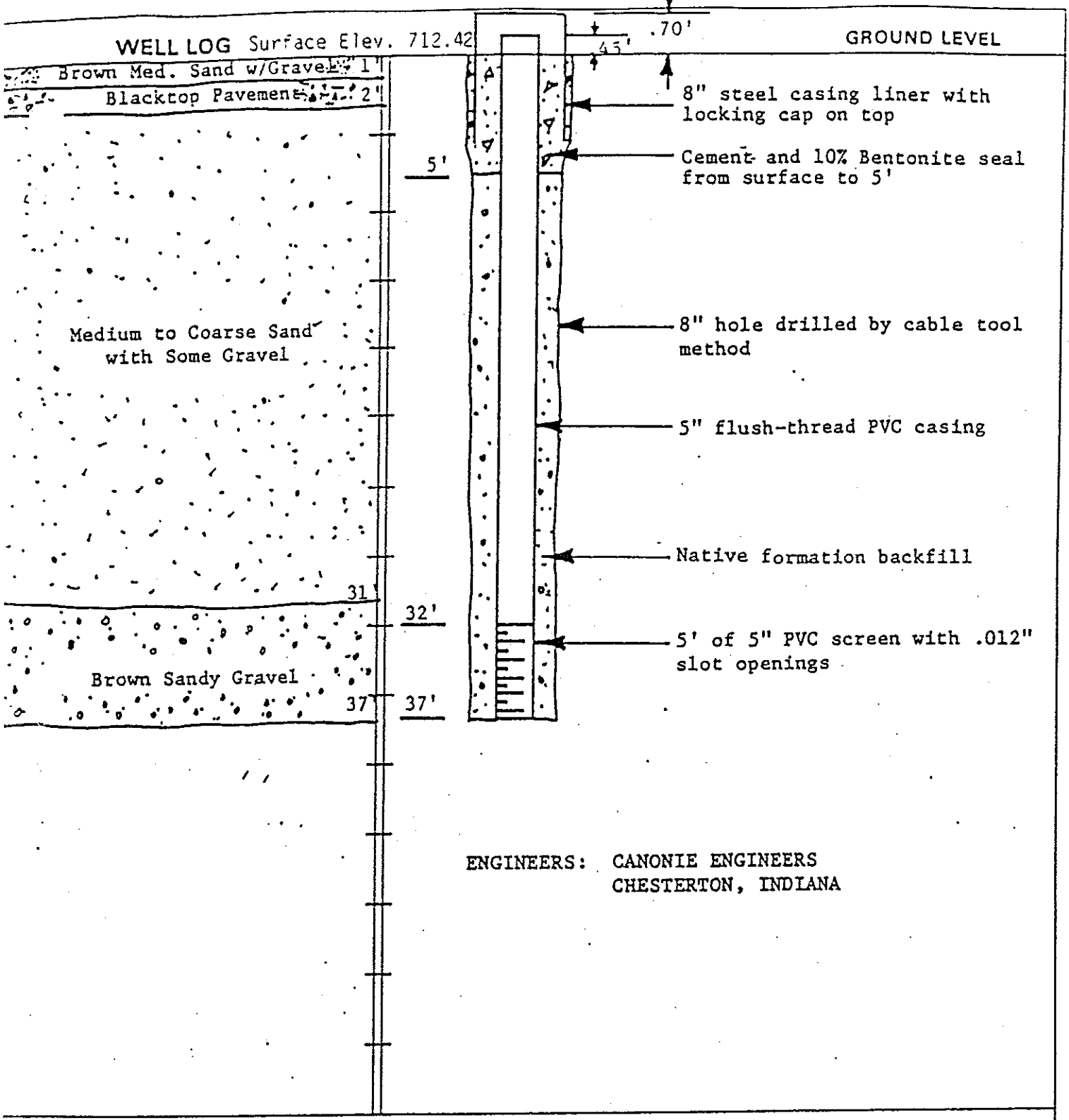
County St. Joseph Twp. Portage Section SE¼NW¼NE¼ of 16

Test Capacity _____ GPM. Static Water Level _____ ft. Pumping Level _____ ft. GPM/Ft. D.D.

Well No W-1

TORRINGTON COMPANY
SOUTH BEND, INDIANA

WELL LOG Surface Elev. 712.42



ENGINEERS: CANONIE ENGINEERS
CHESTERTON, INDIANA

City South Bend State Indiana

Location Off NW Corner of Pond #1

County St. Joseph Twp. Portage Section SE¼NW¼NE¼ of 16

Test Capacity _____ GPM. Static Water Level _____ ft. Pumping Level _____ ft.
Specific Capacity _____ GPM/Ft. D.D.
Date Drilled August 1, 1984
Driller John Blatz

Well No. W-2
TORRINGTON COMPANY
SOUTH BEND, INDIANA

WELL LOG Surface Elev. 712.90

GROUND LEVEL

Reinforced Concrete 0.4

Blacktop Pavement 0.4 - 0.8

Brown Gravelly Sand FILL 0.8 - 1.8

Medium to Coarse Sand with Some Gravel

40'

56'

61

61'

Gravelly Sandy Clay

Manhole cover flush with existing concrete surface

8" steel casing liner

8" hole drilled by cable tool method

5" flush-thread PVC casing

Cement and 10% Bentonite seal from surface to 40'

Native formation backfill

5' of 5" PVC screen with .012" slot openings

ENGINEERS: CANONIE ENGINEERS
CHESTERTON, INDIANA

City South Bend State Indiana

Location Approximately 15' East of NE Corner of Maintenance Shed "B"

County St. Joseph Twp. Portage Section SE¼NW¼NE¼ of 16

Test Capacity _____ GPM. Static Water Level _____ ft. Pumping Level _____ ft.

Specific Capacity _____ GPM/Ft. D.D.

Date Drilled August 10, 1984

Driller John Blatz

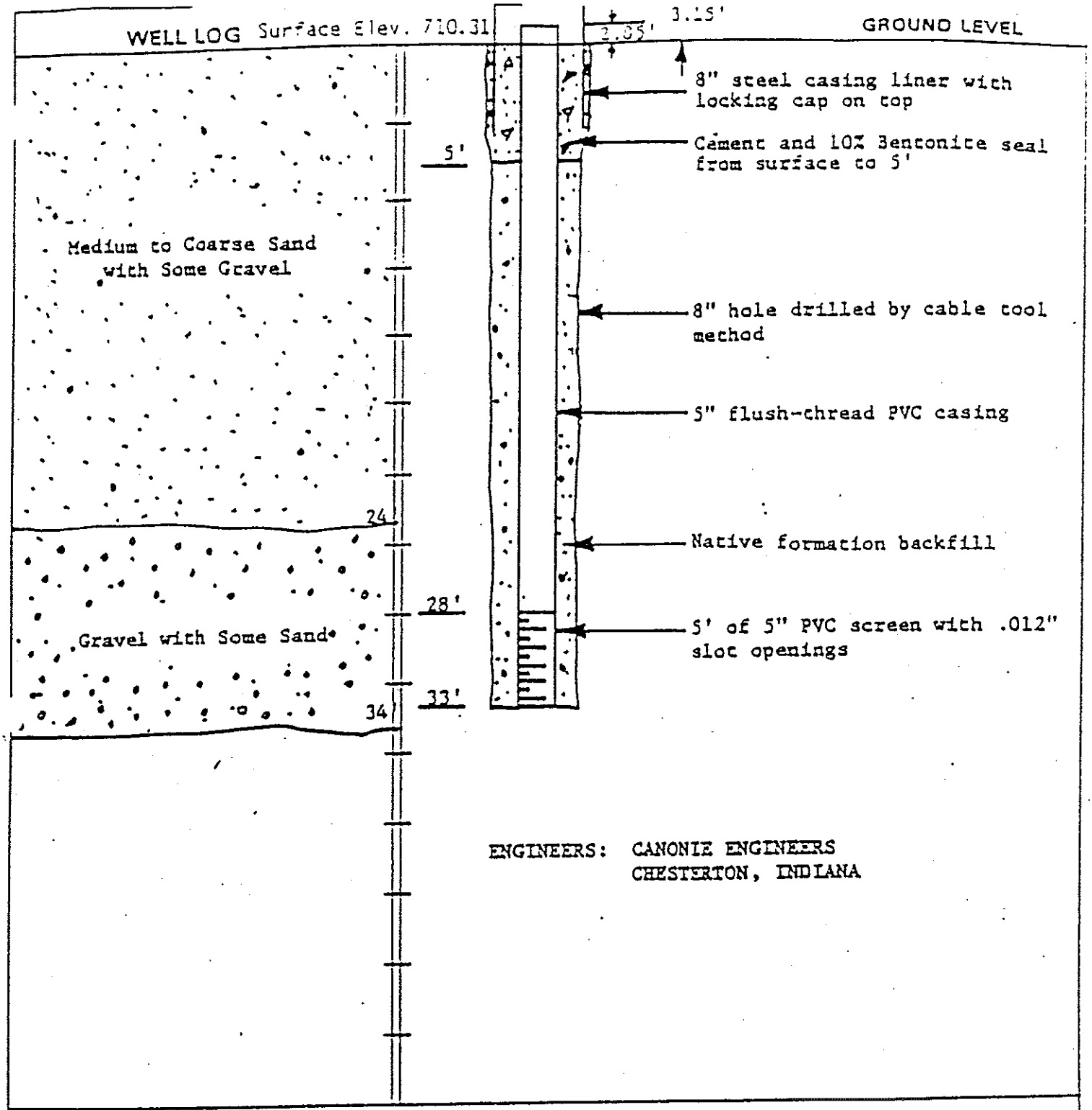
Job No. 4704

Well No. W-3

TORRINGTON COMPANY
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG Surface Elev. 710.31



ENGINEERS: CANONIE ENGINEERS
CHESTERTON, INDIANA

City South Bend State Indiana

Location Along East Edge of Mound Containing Buried Oil Tanks Just North of Pond #4

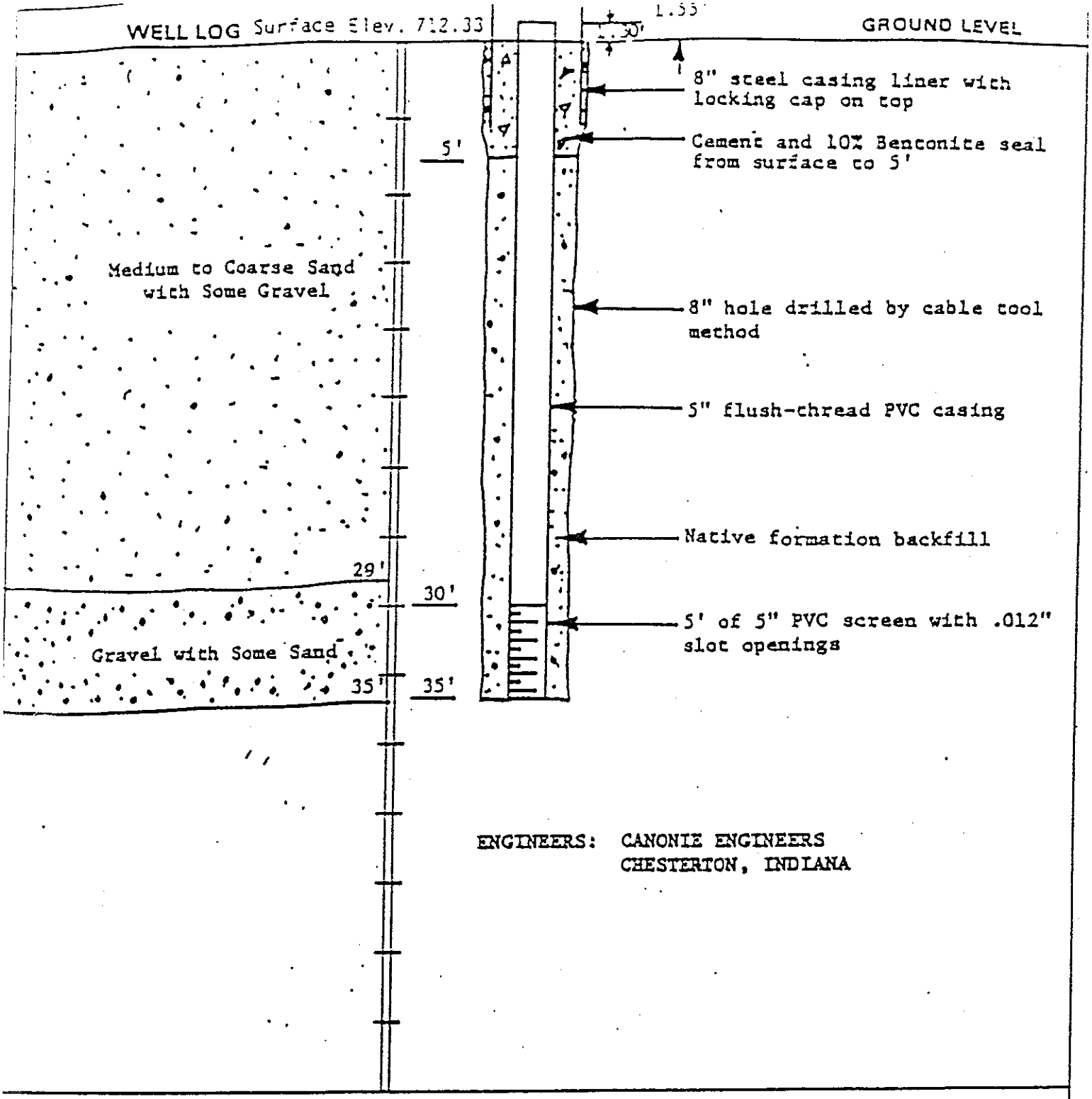
County St. Joseph Twp. Portage Section SE¼NW¼NE¼ of 16

Test Capacity _____ GPM. Static Water Level _____ ft. Pumping Level _____ ft.
Specific Capacity _____ GPM/Ft. D.D.
Date Drilled July 30, 1984
Driller John Blatz
Job No. 4704

Well No W-4
TORRINGTON COMPANY
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG Surface Elev. 712.33



ENGINEERS: CANONIE ENGINEERS
CHESTERTON, INDIANA

City South Bend State Indiana

Location On North Side of Line Between Pond #4 and Pond #3

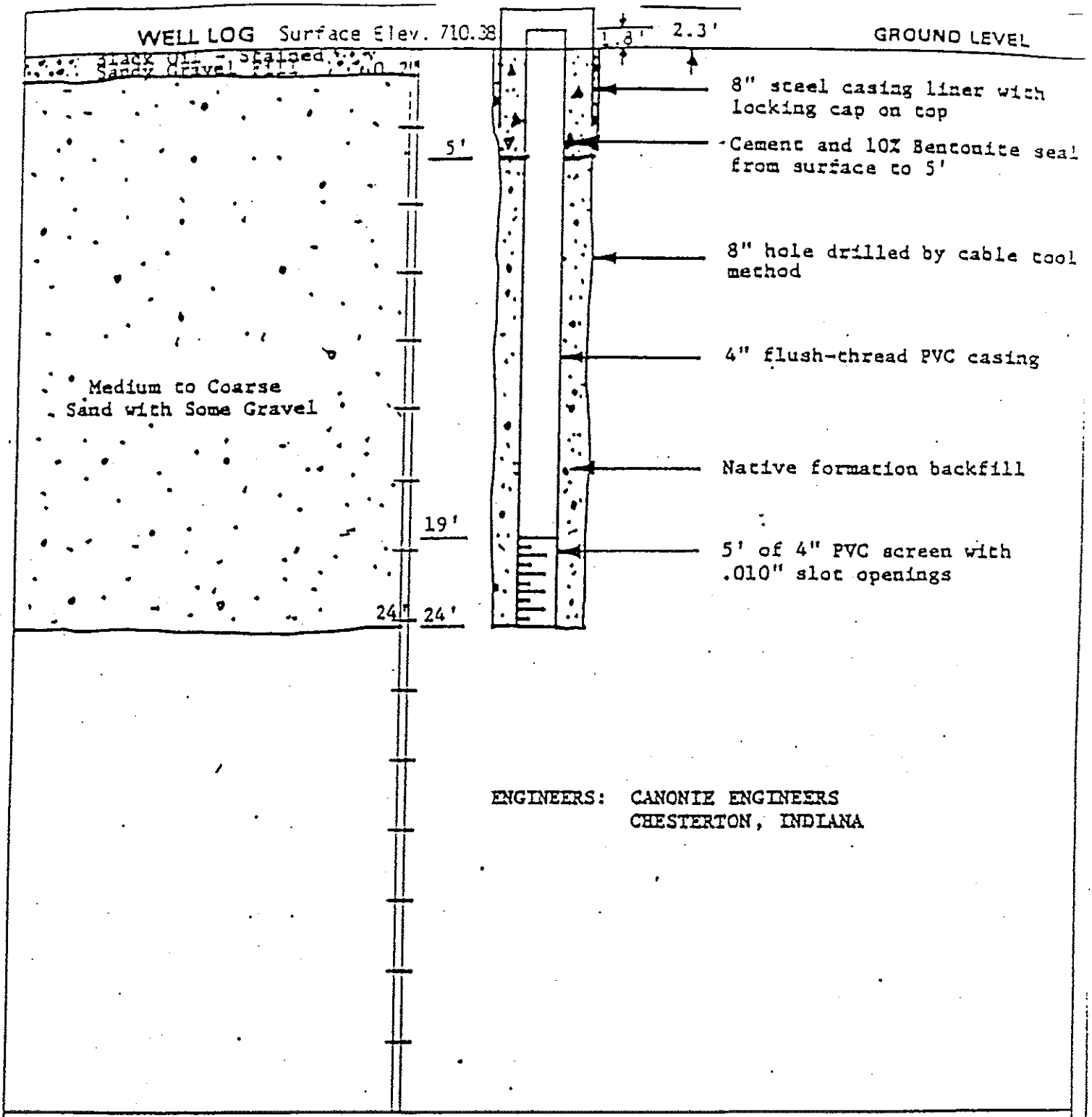
County St. Joseph Twp. Portage Section SE¼NW¼NE¼ of 16

Test Capacity _____ GPM. Static Water L _____ ft. Pumping Level _____ ft.
Specific Capacity _____ GPM/Ft. D.D.
Date Drilled July 31, 1984
Driller John Black
Job No. 4704

Well No W-5
TORRINGTON COMPANY
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG Surface Elev. 710.38



ENGINEERS: CANONIE ENGINEERS
CHESTERTON, INDIANA

City South Bend State Indiana

Location Next to above ground quench oil tanks on west side of plant

County St. Joseph Twp. Portage Section SE¼NW¼NE¼ of 16

Test Capacity _____ GPM. Static Water Level _____ ft. Pumping Level _____ ft.
Specific Capacity _____ GPM/Ft. D.D.
Date Drilled August 13, 1984
Driller John Blatz
Job No. 4704

Well No S-3

TORRINGTON COMPANY
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

Canonie

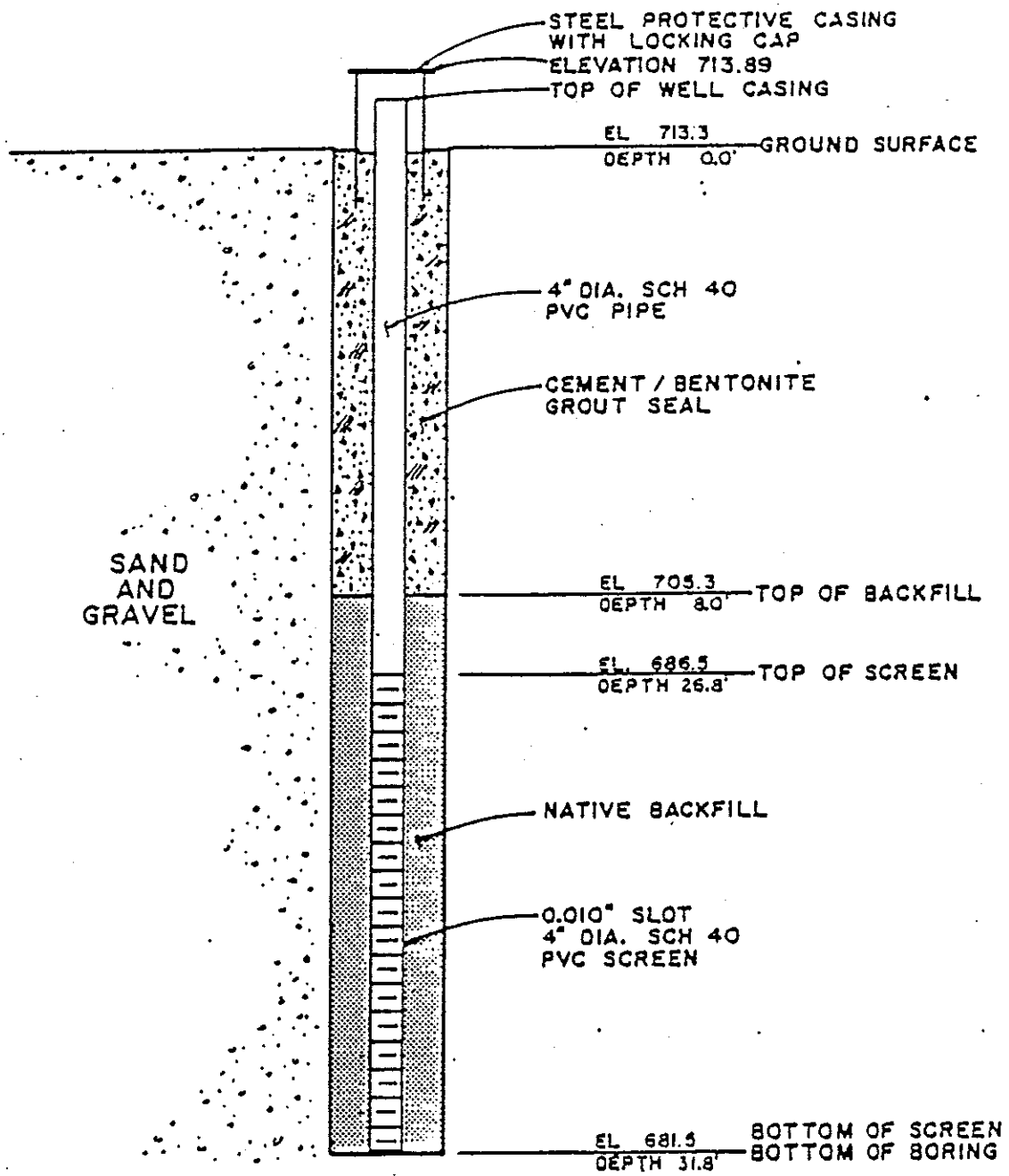
Observation Well Details

PROJECT No. 83-182

WELL No. W-7

PROJECT NAME BARNES AND THORNBURG

BORING LOCATION N 4550.88 E 5855.74* DATE 10-18-84 BY KMB



NOTE:
NOT DRAWN TO SCALE
* PLANT COORDINATES

Canonie

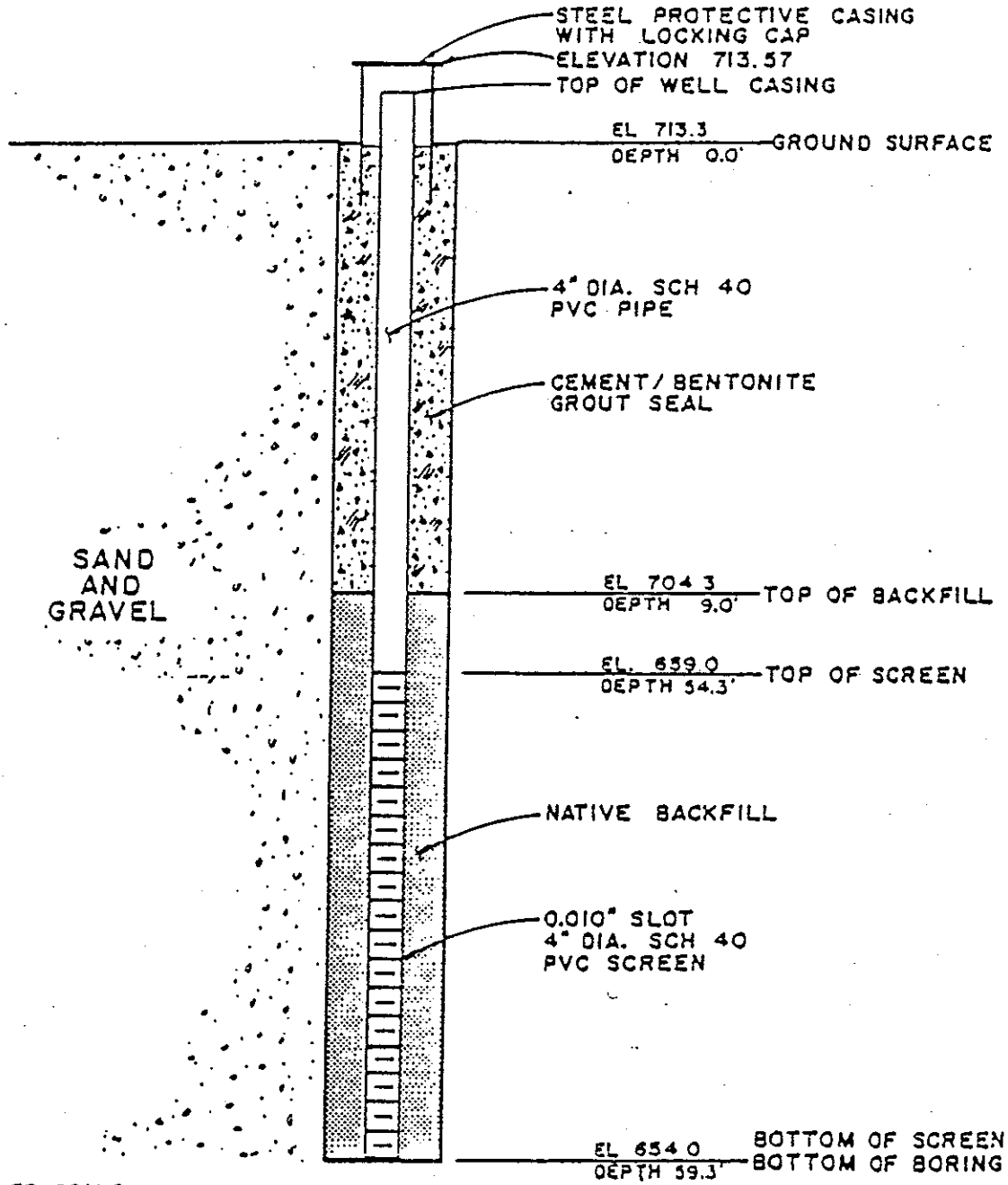
Observation Well Details

PROJECT No. 93-182

WELL No. W-9

PROJECT NAME BARNES AND THORNBURG

BORING LOCATION N 4542.42 E 5855.85* DATE 10-23-84 BY KMB



NOTE:
NOT DRAWN TO SCALE
* PLANT COORDINATES

BORING LOG

BORING NO. W-9

SHT ____ OF ____

D/A JOB NO. 900-13 PROJECT UEA / TORRINGTON

LOCATION SOUTH BEND, IN / MW-W DATE START 1-31-91 FINISH 2-1-91

WEATHER HAZY, 15° F TOP OF CASING ELEVATION 714.86 FT. MSL

GROUND ELEVATION 712.52 FT. MSL TOTAL DEPTH 58.5 FT.

DRILLED BY BEST ENVIRONMENTAL LOGGED BY MJS - DAILY & ASSOCIATES

CASING I.D. 3 3/8"

SPLIT SPOON SIZE 2" I.D.

TYPE HOLLOW STEM AUGER

DEPTH IN FEET	SAMPLE NO.	SAMPLE RECOVERY GC/PID SAMPLE NO.	N BLOWS/FT ASTM D-1586	AS BUILT MONITORING WELL DETAIL	SOIL & ROCK DESCRIPTION / COMMENTS
				WELL PROTECTOR; CEMENT GROUT	
				BENTONITE/PC DRY MIX	dark brown SILTY CLAY, organic
					2.5' 710.02
				7.2' 705.32	
				9.2' 703.32	light brown SAND, fine to medium w/some small pebbles
10		W1		BENTONITE SEAL	
	1				sample 1 is an auger cutting, collected w/ 30' of auger in the ground
20		W2			
				NATIVE SAND BACKFILL	GRAVEL @ 25.0' 687.52
		W3	@ 30'		NOTE: UNABLE TO CONDUCT SPLIT SPOON SAMPLING BECAUSE OF SOIL HEAVING. GROUND-WATER SAMPLES TAKEN @ 10' INTERVALS.
40	2	W4		2" PVC CASING	sample 2 is an auger cutting, collected w/55' of auger in the ground
				44.56' 667.96	
				2" PVC 0.010" SCREEN	
50		W5			
				54.56' 657.96	
	3				GRAVEL @ 55.0'
60					split spoon driven 56.5'-58.5', gray SANDY CLAY w/pebbles
					END OF BORING 58.5' 654.02

SOILS 58.5 FEET

ROCK NONE

TOTAL DEPTH 58.5 FEET

COMMENTS UPGRADENT/BACKGROUND MONITORING WELL

SEEPAGE WATER ENCOUNTERED, DEPTH 11.5 ELEV. 701.02

WATER LEVEL AT COMPLETION 7.64' ELEV. 704.88

WATER LEVEL ____ ELEV. ____ DATE/TIME ____

WATER LEVEL ____ ELEV. ____ DATE/TIME ____

ELEVATION MEASURING POINT GROUND SURFACE

DAILY & ASSOCIATES ENGINEERS INC. CHAMPAIGN & PEORIA, ILLINOIS

BORING LOG

BORING NO. MW-1CA

SHT 1 OF 2

D/A JOB NO. 900-13 PROJECT UEA / TORRINGTON

LOCATION SOUTH BEND, IN / MW-W DATE START 1-30-91 FINISH 1-30-91

WEATHER OVERCAST, 20° F TOP OF CASING ELEVATION 714.74 FT. MSL

GROUND ELEVATION 712.64 FT. MSL TOTAL DEPTH 60.0 FEET

DRILLED BY BEST ENVIRONMENTAL LOGGED BY MJS - DAILY & ASSOCIATES

CASING I.D. 3 3/8"

SPLIT SPOON SIZE 2" I.D.

TYPE HOLLOW STEM AUGER

DEPTH IN FEET	SAMPLE NO.	SAMPLE RECOVERY GC/PID SAMPLE NO.	N BLOWS/FT ASTM D-1586	AS BUILT MONITORING WELL DETAIL	SOIL & ROCK DESCRIPTION / COMMENTS
0	Au		Au	WELL PROTECTOR; CEMENT GROUT	black SILTY CLAY, organic
					2.5' 710.14
5	1		6	BENTONITE/ PC DRY MIX	light brown SAND, fine to medium, moist
	2		6		3" CLAYEY SILT @ 4.0'
				6.1' 706.54	6.5' 706.14
	3		SAND	8.1' 704.54	light brown SAND, fine, moist
				BENTONITE SEAL	7.0' 705.64
10	4				light brown SAND, fine to coarse w/some gravel
					10.0' 702.64
				NATIVE SAND & GRAVEL BACKFILL	light brown SAND, fine
					NOTE: SAND HEAVE IN AUGER 4 1/2', UNABLE TO WASH OUT OF AUGER. DECISION MADE TO AUGER DOWN THROUGH SAND STOPPING AT EVERY 10' TO SAMPLE GROUNDWATER WITH THE WATERA PUMP TO BE DEDICATED TO WELL.
15					
20	W1			2" I.D. PVC CASING	GRAVEL @ 22.0' 690.64
					DRILLER TO REPORT CHANGES IN AUGER BEHAVIOR, WILL DRIVE SPLIT SPOON WHEN CLAY IS ENCOUNTERED.
25					

SOILS 60.0 FEET

BEDROCK NONE

TOTAL DEPTH 60.0 FEET

COMMENTS FIRST NEW WELL INSTALLED AT THE SITE

SEEPAGE WATER ENCOUNTERED, DEPTH 8.0' ELEV. 704.64

WATER LEVEL AT COMPLETION 8.74' ELEV. 704.00

WATER LEVEL _____ ELEV. _____ DATE/TIME _____

WATER LEVEL _____ ELEV. _____ DATE/TIME _____

ELEVATION MEASURING POINT GROUND SURFACE

BORING LOG

BORING NO. W-10A

SHT 2 OF 2

D/A JOB NO. 900-13 PROJECT UEA / TORRINGTON

LOCATION SOUTH BEND, IN / MW-W DATE START 1-31-91 FINISH 1-31-91

WEATHER LIGHT SNOW TO MOSTLY SUNNY, 20°F TOP OF CASING ELEVATION 714.74 FT. MSL

GROUND ELEVATION 712.64 FT. MSL TOTAL DEPTH 60.0 FEET

DRILLED BY BEST ENVIRONMENTAL LOGGED BY MJS - DAILY & ASSOCIATES

CASING I.D. 3 3/8"

SPLIT SPOON SIZE 2" I.D.

TYPE HOLLOW STEM AUGER

DEPTH IN FEET	SAMPLE NO.	SAMPLE RECOVERY GC/PID SAMPLE NO.	N BLOWS/FT ASTM D-1586	AS BUILT MONITORING WELL DETAIL (CONTINUED)	SOIL & ROCK DESCRIPTION / COMMENTS
				2" I.D. PVC CASING	brown SAND, fine to coarse w/gravel
30		W2		NATIVE SAND & GRAVEL BACKFILL	NOTE:
		W3 @ 40'			1. AUGER CUTTING SAMPLE TAKEN @ 50' FOR GRAIN SIZE ANALYSIS #5 (FINE TO COARSE BROWN SAND W/GRAVEL).
				48.51' 664.13	
50	5	W4		2" I.D. PVC 0.010" SLOT SCREEN	2. HIT CLAY @ 57.5', 8' OF SAND & GRAVEL HEAVED INSIDE AUGER, COULD NOT WASH OUT, AUGERED DOWN TO 60', ENCOUNTERED LARGE GRAVEL (BOULDERS).
55					
				58.51' 654.13	
					60.0' 652.64
60					END OF BORING

S S 60.0 FEET

BEDROCK NONE

TOTAL DEPTH 60.0 FEET

COMMENTS

SEEPAGE WATER ENCOUNTERED, DEPTH 8.0' ELEV. 704.64

WATER LEVEL AT COMPLETION 8.74' ELEV. 704.00

WATER LEVEL ELEV. DATE/TIME

WATER LEVEL ELEV. DATE/TIME

ELEVATION MEASURING POINT GROUND SURFACE

BORING LOG

BORING NO. W-108
SHT 1 OF

D/A JOB NO. 900-13
PROJECT UEA / TORRINGTON
L ATION SOUTH BEND, IN / MW-W
DATE START 2-4-91 FINISH 2-4-91
WEATHER CLEAR, 50°F
TOP OF CASING ELEVATION 714.80 FT. MSL
GROUND ELEVATION 712.68 FT. MSL
TOTAL DEPTH 29.0 FEET
DRILLED BY : BEST ENVIRONMENTAL
LOGGED BY PB - BEST ENVIRONMENTAL

DEPTH IN FEET	SAMPLE NO.	SAMPLE RECOVERY GC/PID SAMPLE NO.	N BLOWS/FT ASTM D-1586	AS BUILT MONITORING WELL DETAIL	SOIL & ROCK DESCRIPTION / COMMENTS
				4"x5' WELL PROTECTOR LOCKABLE	CASING I.D. 3 3/8"
				CEMENT GROUT	SPLIT SPOON SIZE 2" I.D.
					TYPE HOLLOW STEM AUGER
				BENTONITE/ PC DRY MIX	dark brown SILTY CLAY, organic
				5.8' 706.88	2.5' 710.18
				7.8' 704.88	
10				BENTONITE SEAL NATIVE SAND BACKFILL	light brown SAND, fine to medium w/gravel
				18.13' 694.55	
20				2" PVC CASING	GRAVEL @ 22.0' 690.68
				2" PVC 0.010" SCREEN	
				28.13' 684.55	29.0' 683.68
30					END OF BORING
40					

S 29.0 FEET
BEDROCK NONE
TOTAL DEPTH 29.0 FEET
COMMENTS GROUNDWATER SAMPLING CONDUCTED DURING CONSTRUCTION OF W-10A

SEEPAGE WATER ENCOUNTERED, DEPTH 8.0' ELEV. 704.68
WATER LEVEL AT COMPLETION 8.68' ELEV. 704.00
WATER LEVEL ____ ELEV. ____ DATE/TIME ____
WATER LEVEL ____ ELEV. ____ DATE/TIME ____
ELEVATION MEASURING POINT GROUND SURFACE

BORING LOG

BORING NO. W-11A

SHT 1 OF 1

O/A JOB NO. 900-13 PROJECT UEA / TORRINGTON

CATION SOUTH BEND, IN / MW-W DATE START 2-1-91 FINISH 2-1-91

WEATHER PARTLY CLOUDY, 35° F TOP OF CASING ELEVATION 714.79 FT. MSL

GROUND ELEVATION 712.24 FT. MSL TOTAL DEPTH 56.5 FEET

DRILLED BY BEST ENVIRONMENTAL LOGGED BY MS / PB

CASING I.D. 3 3/8"

SPLIT SPOON SIZE 2" I.D.

TYPE HOLLOW STEM AUGER

DEPTH IN FEET	SAMPLE NO.	SAMPLE RECOVERY GC/PID SAMPLE NO.	N BLOWS/FT ASTM D-1586	AS BUILT MONITORING WELL DETAIL	SOIL & ROCK DESCRIPTION / COMMENTS
				4"x5' WELL PROTECTOR LOCKABLE	
				CEMENT GROUT	
				BENTONITE/ PC DRY MIX	0.5' SILTY CLAY & gravel
					2.5' dark brown SILTY CLAY, organic
				6.5' 705.74	light brown SAND, fine
				8.2' 704.04	
10		W1		BENTONITE SEAL	changes to brown SAND, fine to coarse w/gravel
				NATIVE SAND BACKFILL	
20		W2			GRAVEL @ 22.0' 690.24
		W3 @ 30'		2" PVC CASING	
40		W4			
				45.1' 667.14	
				2" PVC 0.010" SCREEN	GRAVEL @ 47.0' 665.24
50		W5			
				55.1' 657.14	gray SILTY CLAY @ 55.5' 656.74
					56.5' 655.74
					END OF BORING

S[illegible] 56.5 FEET

BEDROCK NONE

TOTAL DEPTH 56.5 FEET

COMMENTS

SEEPAGE WATER ENCOUNTERED, DEPTH 10.0' ELEV. 702.24

WATER LEVEL AT COMPLETION 8.29' ELEV. 703.95

WATER LEVEL ____ ELEV. ____ DATE/TIME ____

WATER LEVEL ____ ELEV. ____ DATE/TIME ____

ELEVATION MEASURING POINT GROUND SURFACE

BORING LOG

BORING NO. W-11S

SHT 1 OF 1

O/A JOB NO. 900-13 PROJECT UEA / TORRINGTON

CATION SOUTH BEND, IN / MW-W DATE START 2-4-91 FINISH 2-4-91

WEATHER CLOUDY, 45°F TOP OF CASING ELEVATION 714.79 FT. MSL

GROUND ELEVATION 712.29 FT. MSL TOTAL DEPTH 30.08 FEET

DRILLED BY BEST ENVIRONMENTAL LOGGED BY PB

CASING I.D. 3 3/8"

SPLIT SPOON SIZE 2" I.D.

TYPE HOLLOW STEM AUGER

DEPTH IN FEET	SAMPLE NO.	SAMPLE RECOVERY GC/PID SAMPLE NO.	N BLOWS/FT ASTM D-1586	AS BUILT MONITORING WELL DETAIL	SOIL & ROCK DESCRIPTION / COMMENTS
				4"x5' WELL PROTECTOR LOCKABLE	
				CEMENT GROUT	
				BENTONITE/ PC DRY MIX 4.16' 708.13	GRAVEL, dark brown SILTY CLAY, organic 2.5' 709.79
				6.16' 706.13	light brown SAND, fine to medium
10				BENTONITE SEAL	changes to brown SAND, fine to medium w/gravel
				NATIVE SAND BACKFILL	
				20.08' 692.21	
20				2" PVC CASING	GRAVEL @ 22.0' 690.29
				2" PVC 0.010" SCREEN	
				30.08' 682.21	30.08 682.21
30					END OF BORING
40					

ILS 30.08 FEET

BEDROCK NONE

TOTAL DEPTH 30.08 FEET

COMMENTS GROUNDWATER SAMPLING CONDUCTED DURING CONSTRUCTION OF W-11A

SEEPAGE WATER ENCOUNTERED, DEPTH 10.0' ELEV. 702.29

WATER LEVEL AT COMPLETION 8.33' ELEV. 703.96

WATER LEVEL ELEV. DATE/TIME

WATER LEVEL ELEV. DATE/TIME

ELEVATION MEASURING POINT GROUND SURFACE

BORING LOG

BORING NO. W-12

SHT 1 OF 1

O/A JOB NO. 900-13 PROJECT UEA / TORRINGTON

CATION SOUTH BEND, IN / MW-W DATE START 2-5-91 FINISH 2-5-91

WEATHER CLOUDY, 40° F TOP OF CASING ELEVATION 712.92 FT. MSL

GROUND ELEVATION 713.05 FT. MSL TOTAL DEPTH 29.81 FEET

DRILLED BY BEST ENVIRONMENTAL LOGGED BY PB

CASING I.D. 3 3/8"

SHELBY TUBE SIZE

TYPE HOLLOW STEM AUGER

DEPTH IN FEET	SAMPLE NO.	SAMPLE RECOVERY GC/PID SAMPLE NO.	N BLOWS/FT ASTM D-1586	AS BUILT MONITORING WELL DETAIL	SOIL & ROCK DESCRIPTION / COMMENTS
				8"x1' FLUSH MOUNT BOLT DOWN COVER (SEAL)	driveway, CONCRETE
				CEMENT GROUT	cinders w/fine-coarse brn. SAND
				BENTONITE/ PC DRY MIX	brown SANDY SILTY CLAY
				5.0' 708.05	gray SILTY CLAY, some coarse sand
				7.0' 710.05	
10		W1		BENTONITE SEAL	changes to brown SAND, fine to medium
				NATIVE SAND BACKFILL	
				19.81' 694.21	
20		W2		2" PVC CASING	
				2" PVC 0.010" SCREEN	GRAVEL @ 24.0' 689.05
				29.81' 683.24	29.81' 683.24
30		W3			END OF BORING
40					

LS 29.81 FEET

BEDROCK NONE

TOTAL DEPTH 29.81 FEET

COMMENTS

SEEPAGE WATER ENCOUNTERED, DEPTH 11.0' ELEV. 702.05

WATER LEVEL AT COMPLETION 8.71' ELEV. 704.34

WATER LEVEL ELEV. DATE/TIME

WATER LEVEL ELEV. DATE/TIME

ELEVATION MEASURING POINT GROUND SURFACE

BORING LOG

BORING NO. W-13

SHT 1 OF 1

O/A JOB NO. 900-13 | PROJECT UEA / TORRINGTON

LOCATION SOUTH BEND, IN / MW-W | DATE START 2-6-91 FINISH 2-6-91

WEATHER CLOUDY, 40° F | TOP OF CASING ELEVATION 714.01 FT. MSL

GROUND ELEVATION 714.22 FT. MSL | TOTAL DEPTH 57.0 FEET

DRILLED BY BEST ENVIRONMENTAL | LOGGED BY PB

CASING I.D. 3 3/8"

SPLIT SPOON SIZE 2" I.D.

TYPE HOLLOW STEM AUGER

DEPTH IN FEET	SAMPLE NO.	SAMPLE RECOVERY GC/PID SAMPLE NO.	N BLOWS/FT ASTM D-1586	AS BUILT MONITORING WELL DETAIL	SOIL & ROCK DESCRIPTION / COMMENTS
				8"x1' FLUSH MOUNT BOLT DOWN COVER (SEAL)	
				CEMENT GROUT	
				BENTONITE/ PC DRY MIX	1.0' 713.22 floor, CONCRETE
				6.83' 707.39	light brown FILL SAND
				8.83' 705.39	
10		W1			10.0' 704.22
				BENTONITE SEAL	
				NATIVE SAND BACKFILL	brown SAND, fine to medium w/some gravel
20		W2		2" PVC CASING	GRAVEL @ 22.0' 692.22
				25.29' 688.93	
				2" PVC 0.010" SCREEN	
30		W3		35.29' 678.93	
		W4	@ 40'		
50		W5			AUGER CUTTINGS SAMPLE @ 53.0'
	(53') W-13 SOIL				CLAY @ 57.0' NO SAMPLE POSSIBLE
					END OF BORING 657.22

SOIL 57.0 FEET

BEDROCK NONE

TOTAL DEPTH 57.0 FEET

COMMENTS

SEEPAGE WATER ENCOUNTERED, DEPTH 11.0' ELEV. 703.22

WATER LEVEL AT COMPLETION 9.83' ELEV. 704.39

WATER LEVEL ELEV. DATE/TIME

WATER LEVEL ELEV. DATE/TIME

ELEVATION MEASURING POINT GROUND SURFACE

APPENDIX C

Job No. 511027

Pipe extends ___ feet above ground level.

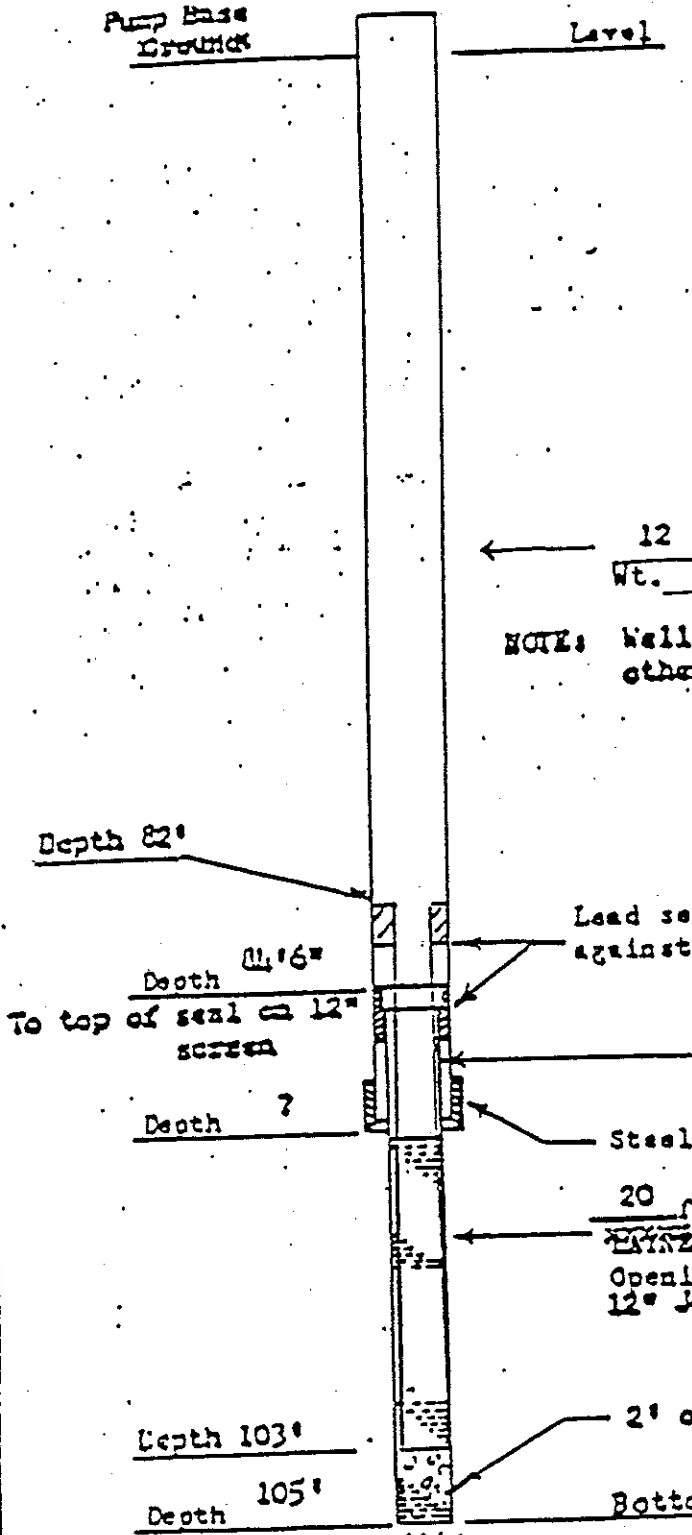
Location from Street or Road

Inside new bldg.

County St. Joseph

Township Portage

Section



Pipe Tally	Welded Threaded
Bottom	
Top	
Total	

Static Level ___

Pumped 328 GPM

at 45' pumping level

after ___ hours

Driller Schoon

Date Finished June 10, 1951

Not drawn to scale

All depths measured from Ground Level

LAYNE TUBULAR WELL No. 3

FOR TERRY-STOCK COUNTY

SOUTH BEND, IND.

LAYNE NORTHERN CO. INC.

MISHAWAKA, INDIANA

DRAWN BY	DRAWING No.
APPROVED BY	
DATE	

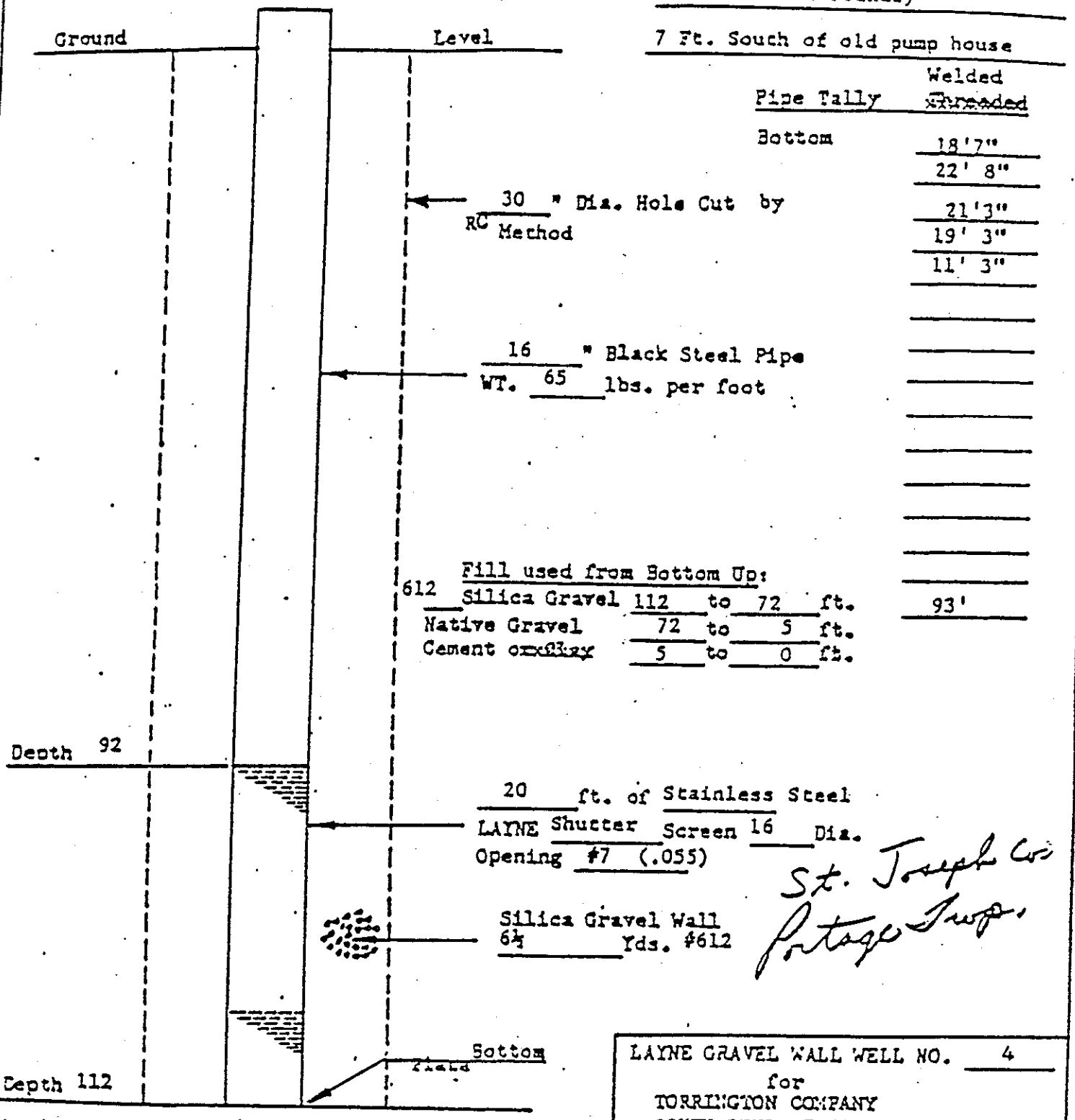
Pipe extends 1 feet above ground level

Job No. [illegible]

Location:

7 ft. East of Foundry

7 Ft. South of old pump house



Pipe Tally	Welded ~~Threaded~~
Bottom	18'7"
	22' 8"
	21'3"
	19' 3"
	11' 3"
	93'

St. Joseph Co
Portage Twp.

Static Level 13'

Pumped 1034 GPM

at 10 pumping level

Driller George Petz

Date Finished 4/5/65

Not drawn to scale

All depths measured from Ground Level

LAYNE GRAVEL WALL WELL NO. 4

for

TORRINGTON COMPANY

SOUTH BEND, Indiana

LAYNE NORTHERN CO. INC.

MISHAWAKA, INDIANA

DRAWN BY	DRAWING NO.
APPROVED BY	
DATE	

Layne-Northern Company

☐ TEST
☑ PERMANENT

Job No. _____

Well Log No. _____ City South Bend County _____

Owner The Torrington Co. Township _____

Section _____

Location State IN

From Land Description _____

From Street or Road _____

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Topsoil	0'	4'	4'	
Br. Sandy Clay, Soft	4'	6'	2'	
Fine to Course Gravel, Med. Sand	6'	21'	15'	
Fine to Course Gravel, Some Cobbles	21'	25'	4'	
Fine to Course Gravel, Some Course Sand	25'	39'	14'	
Fine to Course Gravel	39'	45'	6'	
Med. to Course Gravel, Cobbles	45'	56'	11'	
Br, Clay, Dry, Firm	56'	57'	1'	
Gray Clay, Dry, Very Firm	57'	60'	3'	

Hole 7 7/8" Dia Drilled by: Cable Tool _____ Rotary ✓ Jetting _____

Reverse Circ. _____ Bucket _____ Auger _____

Rotary Hole Grouted: Neat Cement _____ Drilling Mud _____ Other _____

Casing 4.5" OD From 3' " above ground to 47 feet below ground. Weight _____ Pounds per foot

Screen 4 " Set from 47' to 57 feet Make _____ Type PVC Slot _____

Pumping test _____ GPM drawdown to _____ feet after _____ hours pumping

Date Completed 2-26-92 Driller Jim Wheeler

APPENDIX C

FIELD HEADSPACE TECHNIQUE

SGP:mmf
228-124-434-29
051892
052892REV

FIELD HEADSPACE TECHNIQUE

The headspace technique is a common sample screening method by which soil samples can be screened for the presence of volatile organic compounds (VOCs) in the field. The technique is useful for sample selection for laboratory analysis and for determining the need for and locations of borings in the field. The technique is primarily limited by the instrument used for the field headspace technique. Secondary limitations can include extreme temperatures, high humidity or the relative amounts of different VOCs in a given sample; all of these together or each separately can influence the results.

Generally, an HNu photoionization meter or Foxboro organic vapor analyzer is used to obtain total readings of VOCs. Only VOCs with ionization potentials that are included in the range of the respective instrument can be detected; semi-volatile compounds, metals, cyanide, polychlorinated biphenyls (PCBs), and pesticides cannot be field screened with these instruments. Since the detectable compounds can only be measured as a total amount of the VOCs present, the readings obtained with this technique can only be considered qualitatively.

To assure representative daily readings, the field instrument is calibrated daily to the appropriate "span gas." The HNu is calibrated to a 100 ppm benzene standard, whereas the OVA is calibrated to a 100 ppm methane standard.

Field headspace readings are obtained by placing a portion of the sample in a 16-ounce glass jar until it is approximately two-thirds full. A piece of clean aluminum foil is placed over the top of the jar and secured with the jar lid. The sample is allowed to rest undisturbed for 10 minutes to allow VOCs to collect in the "headspace" above the sample. The lid is then removed, and the probe of the chosen field instrument is used to puncture a small hole in the foil to obtain a reading. The highest registered reading is recorded on the field log.

SGP:mmf
228-124-434-29
051892
052892REV

APPENDIX D

SOIL BORING LOGS

SGP:mmf
228-124-434-29
051892
052892REV

PROJECT: Torrington, South Bend DRILLER: Layne-Northern PAGE: 1 OF: 1
DATE: 9/15/91 LOGGER: S. Price BORING#: PD4-1
DRILLING METHOD: HSA WATER LEVEL: N/A TIME: 08:00

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	HNU	TIME
	Topsoil to 1.2 ft	2/6/4/5	50	0	08:10
	Dark brown fine sand to 2 ft				
	Black fine sand - Hydrocarbon odor	2/2/3/5	100	0	08:16
	Black silty fine sand to 5.2 ft. - Hydrocarbon odor	5/6/9/12	100	*	08:20
5	Gray fine sand to 6 ft.	4/6/8/11	100	*	08:24
	Same to 7 ft.				
	Medium gray medium sand with trace gravel	11/12/9/8	100	*	08:27
	Same				
10					
15	End of boring @ 10 ft.				
	* HNu malfunctioned - could not continue sampling.				
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend, Indiana DRILLER: Layne Northern PAGE: 1 OF: 1

DATE: February 24, 1992 LOGGED BY: S. Price, Capsule Env. Eng. BORING#: PD4-2

DRILLING METHOD: HSA

EPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	Dark brown medium sand to 1 ft, slight odor	3/3/5/9	100	3:21	0.5
	Dark gray medium sand, slight odor	6/7/9/9	100	3:29	3
	Dark gray medium sand, slight odor	2/2/10/10	100	3:35	17
5	Black fine very fine silty sludge-like material 7 to 8 feet, odor	3/6/7/7	100	3:42	100
	Gray coarse sand with trace gravel	4/5/9/10	100	3:46	1
	Wet @ 9'				
10	Terminated sampling @ 10 feet				
15					
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend, Indiana DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 24, 1992 LOGGED BY: S. Price, Capsule Env. Eng. BORING#: PD-4-3

DRILLING METHOD: HSA

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	Dark brown fine sand to 1.5 feet	3/6/5/10	100	4:34	7
	Dark gray fine sand Dark gray medium sand	5/5/2/2	30	4:37	15
		4/4/7/10	100	4:44	70
5	Black very fine silty sludge-like material 5 to 6 feet Gray coarse sand with gravel to 7.5 feet	2/4/7/5	100	4:48	3
	Gray fine sand	3/4/5/9	100	4:51	0
	Gray coarse to medium sand, wet @ 9 feet				
10	Sampling terminated @ 10 feet				
15					
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 25, 1992 LOGGED BY: S. Price, Capsule Env. Eng. BORING#: PD4-4

DRILLING METHOD: HSA

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	Medium brown fine to medium sand to 1.5 feet, black band of fine sand 1.5 to 1.7, slight odor, dark brown sand to 2 feet.	5/7/8/5	100	8:31	10
	Medium gray medium to coarse sand	5/3/5/7	100	8:34	200
		2/5/5/7	100	8:39	5
5		3/6/6/7	100	8:45	1
	Gray fine sand with trace gravel	3/6/9/11	100	8:50	0.5
	Wet @ 9 feet				
10	Terminated sampling @ 10 feet				
15					
20					
25					
30					
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45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 25, 1992 LOGGED BY: S. Price, Capsule Env. Eng. BORING#: PD4-5

DRILLING METHOD: HSA

EPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	Dark brown fine sand	3/5/7/9	100	10:15	0.5
	Medium gray medium sand with trace gravel, sligth odor	4/4/6/7	100	10:19	0.5
		4/2/2/5	100	10:26	7
5		2/9/11/11	15	10:33	0.5
	Gray coarse sand and gravel	3/3/6/7	25	10:36	0
	Wet @ 9 feet				
10	Terminated sampling @ 10 feet				
15					
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25					
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35					
40					
45					
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55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 25, 1992 LOGGED BY: S. Price BORING#: PD4-6

DRILLING METHOD: HSA

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	Medium brown fine sand with silt	4/4/5/4	100	11:05	0.5
		1/1/2/4	100	11:13	5
	Black very fine silt sludge-like material 3 to 4 feet, odor	5/5/7/9	100	11:19	70
5	Gray medium sand with trace gravel	5/6/9/9	100	11:23	7
		1/4/6/9	100	11:27	0
	Wet @ 9 feet				
10	Terminated boring at 10 feet				
15					
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 25, 1992 LOGGED BY: S. Price, Capsule Env. Eng. BORING#: PD4-7

DRILLING METHOD: HSA

EPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	Medium brown fine sand	3/3/5/8	100	1:05	0.5
	Medium brown medium to fine sand	4/3/4/7	100	1:10	1
	Medium brown medium sand	3/3/5/5	100	1:21	1
5	Medium gray medium to coarse sand with trace gravel	4/4/5/5	100	1:24	0
		4/6/8/9	100	1:28	0
	Wet @ 9 feet				
10	Terminated sampling @ 10 feet				
15					
20					
25					
30					
35					
40					
45					
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55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 25, 1992 LOGGED BY: S. Price, Capsule Env. Eng BORING#: PD4-8

DRILLING METHOD: HSA

EPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	Medium brown fine to medium sand	2/2/4/5	100	2:28	20
		2/8/6/2	20	2:32	20
	Same to 5.2 feet, black very fine silt sludge-like material from 5.2 to 5.7 feet	4/4/5/8	100	2:38	100
5	Gray coarse sand	3/3/5/8	100	2:42	5
		3/3/7/10	100	2:46	0
	Wet @ 9'				
10	Terminated sampling @ 10 feet				
15					
20					
25					
30					
35					
40					
45					
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55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 25, 1992 LOGGED BY: S. Price, Capsule Env. Eng. BORING#: PD4-9

DRILLING METHOD: HSA

EPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	Medium brown fine to silty sand, slight odor	3/6/6/10	100	3:23	1
		3/1/2/1	100	3:26	20
	Dark gray medium to coarse sand, black very fine silt sludge-like material 3 to 3.2 feet, odor	4/4/9/6	100	3:34	12
5	Gray coarse sand with gravel	3/6/6/10	100	3:39	1
		2/6/7/9	100	3:42	1
	Wet @ 9 feet				
10	Terminated sampling @ 10 feet				
15					
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 25, 1992 LOGGED BY: S. Price BORING#: S3-1

DRILLING METHOD: HSA

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	2 inch bituminous, aggregate from 2 to 6 inches	11/4/6/3	100	4:40	0
	Reddish brown fine to uniform fine sand (fill)	3/5/6/9	100	4:47	0.5
		0/3/1/1	0	4:50	--
5	Gray fine sand laminated with black sludge-like stains, slight odor	2/2/2/0	100	4:59	100
	Same without black staining, odor decreasing with depth, wet @ 8.5 feet	1/0/0/0	100	5:05	70
10		1/3/1/1	100	5:09	20
	Black silty sludge-like material, strong odor.				
	Terminated sampling @ 14 feet	1/1/2/5	100	5:13	20
15					
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 25, 1992 LOGGED BY: S. Price BORING#: S3-2

DRILLING METHOD: HSA

EPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	2 inches bituminous, 2 to 8 inches aggregate, reddish brown sand (fill)	6/0/8/8	100	9:05	0.5
		4/5/8/21	25	9:10	0
		2/7/8/5	50	9:17	0
5	Dark gray to black fine sand, odor 7 to 7.5 feet, reddish brown fine sand 7.5 to 8 feet	4/15/6/1	100	9:26	150
	Dark gray to black sludge-like silty sand, wet @ 8.5 feet	1/1/1/1	100	9:35	150
10		5/6/6/8	100	9:41	70
	Gray medium sand, 1 inch band of dark gray fine sand @ 13 feet, gray coarse sand and gravel	5/5/4/9	100	9:45	25
15	Sampling terminated @ 14 feet				
20					
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40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 26, 1992 LOGGED BY: S. Price BORING#: S3-3

DRILLING METHOD: HSA

EPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	Concrete to 8 inches, black silty sand 1.5 to 1.7 feet	1/0/0/0	15	10:31	50
	Reddish brown fine sand to 2.5 feet, black fine sand, 2.5 to 4 feet	1/0/1/2	100	10:34	75
	Fine to medium sand stained black, odor	2/1/2/2	100	10:36	1000
5		5/2/5/7	100	10:41	400
	Wet @ 8.5 feet	5/5/7/9	100	10:48	200
	Same with staining decreasing with depth, gray coarse sand and gravel, odor	2/7/7/8	100	10:50	50
10					
	Gray sand and gravel with interspersed black staining	5/9/10/10	100	10:56	50
	Sampling terminated @ 14 feet				
15					
20					
25					
30					
35					
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45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 26, 1992 LOGGED BY: S. Price BORING#: S3-4

DRILLING METHOD: HSA

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	2 inches bituminous, 6 inches aggregate, reddish brown fine sand to 1.5 feet (fill), black fine sand 1.5 to 2 feet, odor	4/7/10/55	100	12:44	7
	Reddish brown fine sand with interspersed black staining	6/7/7/7	100	12:47	10
	Staining increasing with depth	7/50+ refusal	25	12:54	15
5	Large cement fill pieces, high amount of rig chatter, discontinued boring @ 5 feet				
10					
15					
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25					
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45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 26, 1992 LOGGED BY: S. Price BORING#: S3-5

DRILLING METHOD: HSA

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	2 inches bituminous, 6 inches aggregate, reddish brown fine sand to 1.5 feet, dark brown silty sand to 2 feet	4/6/8/8	100	1:20	0
	Medium brown silty sand with trace sand	2/4/6/10	100	1:24	0
		8/3/4/4	100	1:28	0
5		7/1/1/39	0	1:36	-
	Medium brown medium sand and gravel 8 to 9.7 feet, cement fragments to 10.5 feet, wet @ 8.5 feet	7/27/10/5	50	1:44	3
10		7/8/9/10	100	2:02	0.5
	Gray sand and gravel 10.5 to 14.5 feet	5/9/11/14	100	2:08	0
	Sampling terminated @ 14 feet				
15					
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Layne-Northern PAGE: 1 OF: 1

DATE: February 26, 1992 LOGGED BY: S. Price BORING#: S3-6

DRILLING METHOD: Hand auger

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	2 inches bituminous, 6 inches aggregate	8/7/9/11	20	2:49	0
	1.5 to 2 feet reddish brown fine sand with trace gravel (fill)	14/14/5/3	100	3:00	0
		2/2/1/1	100	3:11	0
5	Dark brown fine sand (fill) with trace staining @ 7.2 feet	0 drove on wt.	100	3:15	500
	Same with trace staining @ 9.9 to 10 feet, wet @ 8.5 feet	9/9/17/10	100	3:20	1000
10	Dark gray sand and gravel	10/12/7/9	100	3:25	50
	Sampling terminated @ 12 feet				
15					
20					
25					
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35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Canonie PAGE: 1 OF: 1

DATE: February 27, 1992 LOGGED BY: S. Price BORING#: S3-7

DRILLING METHOD: Hand auger

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
		N/A			
	Reddish brown fine sand with trace gravel (fill)		100	12:59	0.1
			100	1:13	0.1
5			100	1:25	0.1
	Dark brown to black stained fine sand (fill)		100	1:32	50
	Sampling terminated at 8.5 feet due to caving @ water table				
10					
15					
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Canonie PAGE: 1 OF: 1

DATE: February 27, 1992 LOGGED BY: S. Price BORING#: S3-8

DRILLING METHOD: Hand auger

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
		N/A			
	Reddish brown fine sand with trace gravel (fill)		100	3:20	0
			100	3:27	0
5	Dark brown fine sand with trace gravel (fill)		100	3:37	0
	Black stained fine sand, odor		100	3:46	400
	Sampling terminated at 8.5 feet due to caving @ water table				
10	Sample interval 2 feet				
15					
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Canonie PAGE: 1 OF: 1

DATE: February 27, 1992 LOGGED BY: S. Price BORING#: S3-9

DRILLING METHOD: Hand auger

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
		N/A			
	Reddish brown fine sand with trace gravel (fill)		100	4:12	0
			100	4:20	0
5	Medium brown fine sand trace gravel (fill)		100	4:27	0.5
	Same with black staining, strong odor		100	4:40	400
	Sampling terminated at 8.5 feet due to caving @ water table				
10	Sample interval 2 feet				
15					
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Canonie PAGE: 1 OF: 1

DATE: February 28, 1992 LOGGED BY: S. Price BORING#: S31-1

DRILLING METHOD: Hand auger

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	1.5 feet concrete	N/A			
	Fine sand stained black, very strong odor (fill)		100	10:28	300
	Same with less staining mottled with dark brown fine sand		100	10:36	225
5			100	10:45	425
	Sampling terminated at 8.5 feet due to caving @ water table		100	10:51	50
	Sample interval 2 feet				
10					
15					
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Canonie PAGE: 1 OF: 1

DATE: February 28, 1992 LOGGED BY: S. Price BORING#: S3I-2

DRILLING METHOD: Hand auger

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	1.5 feet concrete	N/A			
	Fine sand stained black, very strong odor (fill)		100	11:12	15
	Same with less staining mottled with dark brown fine sand (fill)		100	11:15	20
5			100	11:25	50
	Sampling terminated at 8.5 feet due to caving @ water table		100	11:45	20
10	Sample interval 2 feet				
15					
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Canonie PAGE: 1 OF: 1

DATE: February 28, 1992 LOGGED BY: S. Price BORING#: S31-3

DRILLING METHOD: Hand auger

EPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	1 foot concrete	N/A			
	Fine sand stained black, very strong odor (fill)		100	1:25	5
			100	1:35	7
5	Fine gravel and sand stained black, very strong odor		100	1:40	450
			100	1:45	175
10				1:58	60
	Sampling terminated at 12.5 feet below the building floor due to caving @ water table @ 8.5 feet below grade			2:04	70
15	Sample interval 2 feet				
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

PROJECT: Torrington, South Bend IN DRILLER: Canonie PAGE: 1 OF: 1

DATE: February 28, 1992 LOGGED BY: S. Price BORING#: S31-4

DRILLING METHOD: Hand auger

DEPTH (FEET)	DESCRIPTION	N VALUES	% REC	TIME	HNU (ppm)
	1 foot concrete	N/A			
	Reddish brown fine sand with trace gravel (fill), slight odor		100	2:35	50
			100	2:50	75
5	Dark gray to black stained fine sand (fill), odor		100	3:05	35
			100	3:20	90
10				3:35	40
	Same with gravel, odor			3:45	60
	Sampling terminated at 12.5 feet below the building floor due to caving @ water table @ 8.5 feet below grade				
15	Sample interval 2 feet				
20					
25					
30					
35					
40					
45					
50					
55					
60					
65					

APPENDIX E

LABORATORY ANALYTICAL RESULTS

SGP:mmf
228-124-434-29
051892
052892REV

ARC
Aspen Research Corporation
Turning Questions into Answers

March 23, 1992

Mr. Bruce Bohnen
Capsule Environmental Engineering, Inc.
1970 Oakcrest Ave.
Roseville, MN 55113

Reference: Analysis of Soil Samples at IR Torrington, South Bend, IN
Capsule Project No. 228-124
ARC Project No. 4880
Sample No.'s 18692 - 18721
Sampling Dates Feb. 24, 25 & 26, 1992

Dear Mr. Bohnen:

We have completed the requested analyses on the above referenced project; enclosed please find a summary of the results obtained. The samples were identified as follows:

Sample Identification		Analysis	ARC Sample Number
S3-2	4'-6'	8240	18719
S3-2	8'-10'	8240	18711
S3-2	10'-12'	Archived	
S3-3	6'-8'	Archived	
S3-3	8'-10'	Archived	
S3-3	2'-4'	Archived	
S3-3	4'-6'	601 & 602	18716
S3-3	10'-12'	Archived	
S3-3	12'-14'	8240	18717
S3-4	4'-6'	8240	18713
S3-5	8'-10'	8240	18721
S3-6	8'-10'	8240	18708
S3-6	6'-8'	8240	18709
S3-6	6'-8'	TPH	18710
PD4-2	2'-4'	Archived	
PD4-2	4'-6'	Archived	
PD4-2	8'-10'	Archived	
PD4-3	0'-2'	Archived	
PD4-3	2'-4'	Archived	
PD4-3	6'-8'	Archived	
PD4-3	8'-10'	Archived	
PD4-4	0'-2'	Archived	
PD4-4	2'-4'	Archived	
PD4-4	6'-8'	Archived	
PD4-5	0'-2'	Archived	

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Sample Identification	Analysis	ARC Sample Number
PD4-5 2'-4'	Archived	
PD4-5 6'-8'	Archived	
PD4-5 8'-10'	Archived	
PD4-6 0'-2'	Archived	
PD4-6 4'-6'	Archived	
PD4-6 6'-8'	Archived	
PD4-6 8'-10'	Archived	
PD4-7 0'-2'	Archived	
PD4-7 2'-4'	Archived	
PD4-7 6'-8'	Archived	
PD4-7 8'-10'	Archived	
PD4-9 0'-2'	Archived	
PD4-9 2'-4'	Archived	
PD4-9 6'-8'	Archived	
PD4-9 6'-8'	Archived	
PD4-9 8'-10'	Archived	
S3-1 6'-8'	Archived	
S3-1 0'-2'	Archived	
Trip Blank	8240	18692
Equipment Rinsate	8240	18695

The soil samples and aqueous trip and field blanks were analyzed for the following parameters as described in Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition.

Parameter	Test Method
Volatile Organic Compounds	Modified Method 8240
Volatile Organic Compounds	Methods 601 & 602
Arsenic, barium, cadmium, chromium, Lead, selenium	Method 6010
Selenium	Method 7470
Silver	Method 7760
Mercury	Method 7470
Cyanide	Method 9010
TPH	Modified Method 9071

Initially, the soil samples were to be analyzed for low level volatiles by Method 8240. Because of the high volatile levels encountered in the samples causing the purge trap to over load, it required the Method 8240 analyses to be changed to standard soil detection limits. Since the objective of the low level detection was to identify and report volatiles which might not be reported in the standard 8240 soil analysis, an alternative reporting formate was developed and provided in the Method 8240 tables. Analyts reported in the tables as "ND*" mean the analyt was positively identified by mass spectrometry but the analyt is less than 20% of the estimated quantitation limit (EQL). Quantitative values were reported for analyts down to approximately 25% of their EQL. Using this reporting format, we still were able to meet the objectives of the project.

The results described here are included in the following tables:

Table 1. Analysis for Semivolatile Organic Compounds by Modified Method 8240
Table 2. Analysis for Semivolatile Organic Compounds by Modified Method 601
Table 3. Analysis for Semivolatile Organic Compounds by Modified Method 602
Table 4. Analysis for Total Petroleum Hydrocarbons by Modified Method 9071

Thank you for selecting Aspen Research Corporation. We look forward to providing you with continued analytical support and service. As always, we welcome your comments regarding the quality of the service you have received. If you have any questions, please do not hesitate to call me.

Sincerely,

Will Wood

Will Wood
Director, Chemical Analysis Department
ASPEN RESEARCH CORPORATION

Encl.

Table 1

Analysis for Volatile Organic Compounds by Modified Method 8240 SW-846 3rd Edition

Capsule Environmental Engineering Project ID: PN# 228-124, Torrington S. Bend
Sampling Date: February 24-25, 1992
Aspen Research Corporation Project ID: 4850

Sample ID:	EQL	Meth Bl.	S3-6 8-10	S3-6 6-8'	S3-2 8-10	S3-4 4-6'	S3-3 4-6'	S3-3 12-1
ARC ID:	Soil	00000	18708	18709	18711	18713	18716	18717
Analyte	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Chloromethane	1400	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	1400	ND	ND	ND	ND	ND	ND	ND
Bromomethane	1400	ND	ND	ND	ND	ND	ND	ND
Chloroethane	1400	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	1400	ND	ND	ND	ND	ND	ND	ND
Acetone	14000	ND	ND	1100	ND	1100	ND	880
1,1-Dichloroethene	700	ND	ND *	5900	ND	600	3100	ND
Carbon disulfide	700	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	14000	ND	3200	3300	3600	3300	3300	2900
Acrylonitrile	700	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	700	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	700	ND	ND *	1000	ND *	410	950	920
Chloroform	700	ND	ND *	ND	ND *	ND *	ND *	ND
1,2-Dichloroethane	700	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	7000	ND	ND	ND	ND	ND	ND	ND
2-Butanone	14000	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	700	ND	2200	55000	800	12000	42000	660
Carbon tetrachloride	700	ND	ND	ND	ND	ND	ND	ND
Benzene	700	ND	ND	ND	ND	ND *	ND	ND
Trichloroethene	700	ND	ND	ND	ND	ND *	ND *	ND
1,2-Dichloropropane	700	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	700	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl vinyl ether	1400	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	700	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	700	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	700	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	700	ND	ND *	150	ND	150	ND *	ND
Chlorodibromomethane	700	ND	ND	ND	ND	ND	ND	ND
Bromoform	700	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	1400	ND	ND	ND	ND	ND	ND	ND
Toluene	700	ND	ND *	ND *	ND	200	400	ND
2-Hexanone	1400	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	700	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	700	ND	ND *	ND *	ND	ND *	800	ND *
o-Xylene	700	ND	ND *	200	ND	ND *	1200	ND
Styrene	700	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	700	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
File Name:		>A4112	>A4113	>A4114	>A4115	>A4116	>A4117	>A4118
Analysis Date:		920310	920310	920310	920310	920310	920310	920310

Key:
ND = Not Detected
EQL = Estimated Quantitation Limit
BEQL * detected but at a concentration Below the Estimated Quantitation Limit

Table 1 (Cont)

Analysis for Volatile Organic Compounds by Modified Method 8240 SW-846 3rd Edition

Capsule Environmental Engineering Project ID: PN# 228-124, Torrington S. Bend
Sampling Date: February 24-25, 1992
Aspen Research Corporation Project ID: 4850

Sample ID:	EQL	S3-2 4-6'	S3-5 8-10
ARC ID:	Soil	18719	18721
Analyte	ug/Kg	ug/Kg	ug/Kg
Chloromethane	1400	ND	ND
Vinyl chloride	1400	ND	ND
Bromomethane	1400	ND	ND
Chloroethane	1400	ND	ND
Trichlorofluoromethane	1400	ND	ND
Acetone	14000	ND	ND
1,1-Dichloroethene	700	ND	ND *
Carbon disulfide	700	ND	ND
Methylene chloride	14000	3200	3300
Acrylonitrile	700	ND	ND
trans-1,2-Dichloroethene	700	ND	ND
1,1-Dichloroethane	700	ND	150
Chloroform	700	ND *	ND *
1,2-Dichloroethane	700	ND	ND
Vinyl acetate	7000	ND	ND
2-Butanone	14000	ND	ND
1,1,1-Trichloroethane	700	ND	3600
Carbon tetrachloride	700	ND	ND
Benzene	700	ND	ND
Trichloroethene	700	ND	ND
1,2-Dichloropropane	700	ND	ND
Bromodichloromethane	700	ND	ND
2-Chloroethyl vinyl ether	1400	ND	ND
cis-1,3-Dichloropropene	700	ND	ND
trans-1,3-Dichloropropene	700	ND	ND
1,1,2-Trichloroethane	700	ND	ND
Tetrachloroethene	700	ND	ND
Chlorodibromomethane	700	ND	ND
Bromoform	700	ND	ND
4-Methyl-2-pentanone	1400	ND	ND
Toluene	700	ND	ND
2-Hexanone	1400	ND	ND
Chlorobenzene	700	ND	ND
Ethylbenzene	700	ND	ND
m,p-Xylene	700	ND	ND
o-Xylene	700	ND	ND *
Styrene	700	ND	ND
1,1,2,2-Tetrachloroethane	700	ND	ND
1,3-Dichlorobenzene	700	ND	ND
1,4-Dichlorobenzene	700	ND	ND
1,2-Dichlorobenzene	700	ND	ND
File Name:		>A4119	>A4120
Analysis Date:		920310	920310

Key:
ND = Not Detected
EQL = Estimated Quantitation Limit
BEQL = detected but at a concentration Below the Estimated Quantitation Limit

Table 1 (Cont)

Analysis for Volatile Organic Compounds by Modified Method 9240 SW-846 3rd Edition

Capsule Environmental Engineering Project ID: PN# 228-124, Torrington
Sampling Date: February 26, 1992
Aspen Research Corporation Project ID: 4480

Analyte	Sample ID: EQL ARC ID: Water ug/L	Meth Bl. 00000 ug/L	Boiled H2O 18692 ug/L	Eq Rinsate 18695 ug/L
Chloromethane	10	ND	ND	ND
Vinyl chloride	10	ND	ND	ND
Bromomethane	10	ND	ND	ND
Chloroethane	10	ND	ND	ND
Trichlorofluoromethane	10	ND	ND	10
Acetone	100	ND	ND	ND
1,1-Dichloroethene	5	ND	ND	ND
Carbon disulfide	5	ND	ND	ND
Methylene chloride	100	ND	ND	ND
Acrylonitrile	5	ND	ND	ND
trans-1,2-Dichloroethene	5	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND
Chloroform	5	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
Vinyl acetate	50	ND	ND	ND
2-Butanone	100	ND	ND	ND
1,1,1-Trichloroethane	5	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND
Benzene	5	ND	ND	ND
Trichloroethene	5	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
Bromodichloromethane	5	ND	ND	ND
2-Chloroethyl vinyl ether	10	ND	ND	ND
cis-1,3-Dichloropropene	5	ND	ND	ND
trans-1,3-Dichloropropene	5	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND
Chlorodibromomethane	5	ND	ND	ND
Bromoform	5	ND	ND	ND
4-Methyl-2-pentanone	50	ND	ND	ND
Toluene	5	ND	ND	ND
2-Hexanone	50	ND	ND	ND
Chlorobenzene	5	ND	ND	ND
Ethylbenzene	5	ND	ND	ND
m,p-Xylene	5	ND	ND	ND
o-Xylene	5	ND	ND	ND
Styrene	5	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND
1,3-Dichlorobenzene	5	ND	ND	ND
1,4-Dichlorobenzene	5	ND	ND	ND
1,2-Dichlorobenzene	5	ND	ND	ND
File Name:		)A1084	)A1085	)A1086
Analysis Date:		920304	920304	920304

Key:
ND = Not Detected
EQL = Estimated Quantitation Limit
BEQL = detected but at a concentration Below the Estimated Quantitation Limit

Table 2

Analytical Results for EPA Method 601
& cis-1,2-Dichloroethene

Capsule Project ID: Torrington
Sampling Date: February 25, 1992
Analysis Date: March 8, 1992
ARC Project ID: 4880

ARC Number: 18715

Analyte	S3-3 4-6 (ug/kg)	MDL	PQL	Blank (ug/L)	Blank (ug/L)	MDL	PQL
Dichlorodifluoromethane	ND	82	820	ND	ND	0.6	6
Chloromethane	ND	68	680	ND	ND	0.5	5
Vinyl Chloride	ND	27	270	ND	ND	0.2	2
Bromomethane	ND	41	410	ND	ND	0.3	3
Chloroethane	ND	68	680	ND	ND	0.5	5
Trichlorofluoromethane	ND	54	540	ND	ND	0.4	4
1,1-Dichloroethene	220	14	140	ND	ND	0.1	1
Methylene Chloride	***1600	27	270	***12	ND	0.2	2
trans-1,2-Dichloroethene	ND	27	270	ND	ND	0.2	2
1,1-Dichloroethane	BPQL	27	270	ND	ND	0.2	2
cis-1,2-Dichloroethene	ND	14	14	ND	ND	0.1	1
Chloroform	ND	27	270	ND	ND	0.2	2
1,1,1-Trichloroethane	9500	41	410	ND	ND	0.3	3
Carbon Tetrachloride	ND	54	540	ND	ND	0.4	4
1,2-Dichloroethane	ND	14	140	ND	ND	0.1	1
Trichloroethene	ND	41	410	ND	ND	0.3	3
1,2-Dichloropropane	ND	27	270	ND	ND	0.2	2
Bromodichloromethane	ND	27	270	ND	ND	0.2	2
2-Chloroethyl vinyl ether	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	ND	8	80	ND	ND	0.06	0.6
trans-1,3-Dichloropropene	ND	5	50	ND	ND	0.04	0.4
1,1,2-Trichloroethane	ND	27	270	ND	ND	0.2	2
Tetrachloroethene	BPQL	27	270	ND	ND	0.2	2
Dibromochloromethane	ND	14	140	ND	ND	0.1	1
Chlorobenzene	ND	12	120	ND	ND	0.09	0.9
Bromoform	ND	27	270	ND	ND	0.2	2
1,1,2,2-Tetrachloroethane	ND	27	270	ND	ND	0.2	2
1,3-Dichlorobenzene	ND	11	110	ND	ND	0.08	0.8
1,4-Dichlorobenzene	BPQL	10	100	ND	ND	0.07	0.7
1,2-Dichlorobenzene	ND	12	120	ND	ND	0.09	0.9
ELCD, PID filespecs							
P00000-	65.37			65.35	65.38		
E00000-	65.37			65.35	65.38		

Key
NA = Not Analyzed
ND = Not Detected
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
BPQL = Below Practical Quantitation Limit

***=Contamination in Labroatory Reagent

Table 3

Analytical Results for BETX by EPA Method 602

Capsule Project ID:Torrington
Sampling Date: February 26, 1992
Analysis Date: March 8,1992
ARC Project ID: 4880

Arc Number: 18715

Analyte	S3-3 4-6 (ug/kg)	MDL	PQL	Lab Blank (ug/L)	Lab Blank (ug/L)	MDL	PQL
Benzene	BPQL	14	140	ND	ND	0.1	1
Toluene	360	14	140	ND	ND	0.1	1
Ethylbenzene	2500	14	140	ND	ND	0.1	1
m,p&o-xylenes	4300	28	280	ND	ND	0.2	2
PID filespecs							
P00000-	65.37			65.35	65.37		

Key

ND = Not Detected
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
BPQL = Below Practical Quantitation Limit

Table 4

Total Petroleum Hydrocarbons
By Modified EPA 9071

Capsule Project ID: Torrington S. Bend, IN.
ARC Project No: 4880
Sampling Date: 26-Feb-92
Analysis Date: 28-Feb-92

Sample	ARC Sample ID	Gravimetric TPH (mg/Kg)
S3-6 6-8'	18710	10000
S3-6 6-8' DUP	18710	13000
Blank	-	BPQL
	PQL	200

PQL = Practical Quantitation Limit
BPQL = Below Practical Quantitation Limit

ARC
Aspen Research Corporation
Turning Questions Into Answers

March 23, 1992

Mr. Bruce Bohnen
Capsule Environmental Engineering, Inc.
1970 Oakcrest Ave.
Roseville, MN 55113

Reference: Analysis of Soil Samples at IR Torrington, South Bend, IN
Capsule Project No. 228-124
ARC Project No. 4897
Sample No.'s 18842 - 18854
Sampling Dates Feb. 27 & 28, 1992

Dear Mr. Bohnen:

We have completed the requested analyses on the above referenced project; enclosed please find a summary of the results obtained. The samples were identified as follows:

Sample Identification		Analysis	ARC Sample Number
S3-7	8'-8.5'	8240	18842
S3-8	8'-8.5'	8240	18844
S3-8	8'-8.5'	TPH	18845
S3-9	8'-8.5'	8240	18846
S3I-1	2'-2.5'	601 & 602	18848
S3I-1	2'-2.5'	TPH	18849
S3I-1	4'-4.5'	Achived	
S3I-1	6'-6.5'	Achived	
S3I-1	8'-8.5'	Achived	
S3I-2	6'-6.5'	8240	18850
S3I-2	2'-2.5	Achived	
S3I-2	4'-4.5'	Achived	
S3I-2	8'-8.5	Achived	
S3I-3	6'-6.5'	8240	18852
S3I-3	2'-2.5'	Achived	
S3I-3	4'-4.5'	Achived	
S3I-3	8'-8.5'	Achived	
S3I-3	10'-10.5'	Achived	
S3I-3	12'-12.5'	Achived	
S3I-4	2'-2.5'	Achived	
S3I-4	4'-4.5'	Achived	
S3I-4	6'-6.5'	Achived	
S3I-4	8'-8.5'	8240	18854
S3I-4	10'-10.5'	Achived	
S3I-4	12'-12.5'	Achived	

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The soil samples and aqueous trip and field blanks were analyzed for the following parameters as described in Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition.

Parameter	Test Method
Volatile Organic Compounds	Modified Method 8240
Semivolatile Organic Compounds	Modified Method 8270
Arsenic, barium, cadmium, chromium, Lead, selenium	Method 6010
Selenium	Method 7470
Silver	Method 7760
Mercury	Method 7470
Cyanide	Method 9010
TPH	Modified Method 9071

Initially, the soil samples were to be analyzed for low level volatiles by Method 8240. Because of the high volatile levels encountered in the samples causing the purge trap to over load, it required the Method 8240 analyses to be changed to standard soil detection limits. Since the objective of the low level detection was to identify and report volatiles which might not be reported in the standard 8240 soil analysis, an alternative reporting formate was developed and provided in the Method 8240 tables. Analyts reported in the tables as "ND*" mean the analyt was positively identified by mass spectrometry but the analyt is less than 20% of the estimated quantitation limit (EQL). Quantitative values were reported for analyts down to approximately 25% of their EQL. Using this reporting format, we still were able to meet the objectives of the project.

The results described here are included in the following tables:

Table 1. Analysis for Semivolatile Organic Compounds by Modified Method 8240
Table 2. Analysis for Semivolatile Organic Compounds by Modified Method 601
Table 3. Analysis for Semivolatile Organic Compounds by Modified Method 602
Table 4. Analysis for Total Petroleum Hydrocarbons by Modified Method 9071

Thank you for selecting Aspen Research Corporation. We look forward to providing you with continued analytical support and service. As always, we welcome your comments regarding the quality of the service you have received. If you have any questions, please do not hesitate to call me.

Sincerely,

ASPEN RESEARCH CORPORATION

Will Wood

Will Wood

Encl.

Table 1

Analysis for Volatile Organic Compounds by Modified Method 8240 SW-846 3rd Edition

Capsule Environmental Engineering Project ID: PMS 223-124, Farrington S. Road
Sampling Date: February 27-28, 1992
Aspen Research Corporation Project ID: 4897

Sample ID:	EQL	Meth Blank	S3-7 8-8.5	S3-8 8-8.5	S3-9 8-8.5	S3 I-2 6-7	S3 I-3 6-7	S3 I-4 8-9
ARC ID:	Soil	00080	18842	18844	18846	18850	18852	18854
Analyte	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Chloromethane	1400	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	1400	ND	ND	ND	ND	ND	ND	ND
Bromomethane	1400	ND	ND	ND	ND	ND	ND	ND
Chloroethane	1400	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	1400	ND	ND	ND	ND	ND	ND	ND
Acetone	14000	ND	ND	ND	ND	ND	ND *	ND
1,1-Dichloroethene	700	ND	ND	ND *	ND	ND	ND	ND
Carbon disulfide	700	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	14000	ND	2700	3200	2900	3300	3600	3100
Acrylonitrile	700	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	700	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	700	ND	170	ND *	ND	260	ND	ND *
Chloroform	700	ND	ND *	ND	ND	ND	ND	ND *
1,2-Dichloroethane	700	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	7000	ND	ND	ND	ND	ND	ND	ND
2-Butanone	14000	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	700	ND	1300	3500	660	350	ND *	ND
Carbon tetrachloride	700	ND	ND	ND	ND	ND	ND	ND
Benzene	700	ND *	ND	ND	ND	ND	ND	ND *
Trichloroethene	700	ND	520	ND *	260	ND	ND	ND
1,2-Dichloropropane	700	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	700	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl vinyl ether	1400	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	700	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	700	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	700	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	700	ND	ND *	ND *	170	ND *	ND *	ND
Chlorodibromomethane	700	ND	ND	ND	ND	ND	ND	ND
Bromoform	700	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	1400	ND	ND	ND	ND	ND	ND	ND
Toluene	700	ND	ND *	ND *	ND	ND *	ND	ND
2-Hexanone	1400	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	700	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	700	ND	170	190	ND *	ND *	ND	ND
o-Xylene	700	ND	370	330	170	ND *	190	ND
Styrene	700	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	700	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
File Name:		)84128	)84129	)84130	)84131	)84132	)84133	)84134
Analysis Date:		920310	920310	920310	920310	920310	920310	920310

Key:
ND = Not Detected
EQL = Estimated Quantitation Limit
JEQL = detected but at a concentration Below the Estimated Quantitation Limit

Table 2

Analytical Results for EPA Method 601
& cis-1,2-Dichloroethene

Capsule Project ID: Torrington
Sampling Date: February 28, 1992
Analysis Date: March 8, 1992
ARC Project ID: 4897

ARC Number: 13848

Analyte	SJ T-1 2-2.5 (ug/kg)	MDL	PQL	Blank (ug/L)	Blank (ug/L)	MDL	PQL
Dichlorodifluoromethane	ND	82	820	ND	ND	0.6	6
Chloromethane	ND	68	680	ND	ND	0.5	5
Vinyl Chloride	ND	27	270	ND	ND	0.2	2
Bromomethane	ND	41	410	ND	ND	0.3	3
Chloroethane	ND	68	680	ND	ND	0.5	5
Trichlorofluoromethane	ND	54	540	ND	ND	0.4	4
1,1-Dichloroethene	BPQL	14	140	ND	ND	0.1	1
Methylene Chloride	***1500	27	270	***12	ND	0.2	2
trans-1,2-Dichloroethene	ND	27	270	ND	ND	0.2	2
1,1-Dichloroethane	ND	27	270	ND	ND	0.2	2
cis-1,2-Dichloroethene	ND	14	14	ND	ND	0.1	1
Chloroform	ND	27	270	ND	ND	0.2	2
1,1,1-Trichloroethane	5400	41	410	ND	ND	0.3	3
Carbon Tetrachloride	ND	54	540	ND	ND	0.4	4
1,2-Dichloroethane	ND	14	140	ND	ND	0.1	1
Trichloroethene	ND	41	410	ND	ND	0.3	3
1,2-Dichloropropane	ND	27	270	ND	ND	0.2	2
Bromodichloromethane	ND	27	270	ND	ND	0.2	2
2-Chloroethyl vinyl ether	NA	NA	NA	NA	NA	NA	NA
cis-1,3-Dichloropropene	ND	8	80	ND	ND	0.06	0.6
trans-1,3-Dichloropropene	ND	5	50	ND	ND	0.04	0.4
1,1,2-Trichloroethane	ND	27	270	ND	ND	0.2	2
Tetrachloroethene	540	27	270	ND	ND	0.2	2
Dibromochloromethane	ND	14	140	ND	ND	0.1	1
Chlorobenzene	ND	12	120	ND	ND	0.09	0.9
Bromoform	ND	27	270	ND	ND	0.2	2
1,1,2,2-Tetrachloroethane	ND	27	270	ND	ND	0.2	2
1,3-Dichlorobenzene	ND	11	110	ND	ND	0.08	0.8
1,4-Dichlorobenzene	ND	10	100	ND	ND	0.07	0.7
1,2-Dichlorobenzene	ND	12	120	ND	ND	0.09	0.9
ELCD, PID filespecs							
P00000-	65.36			65.35	65.38		
E00000-	65.36			65.35	65.38		

Key
NA = Not Analyzed
ND = Not Detected
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
BPQL = Below Practical Quantitation Limit

***=Contamination in Labroatory Reagent

Table 3

Analytical Results for BETX by EPA Method 602

Capsule Project ID:Torrington
Sampling Date: February 28, 1992
Analysis Date: March 8,1992
ARC Project ID: 4897

Arc Number: 18848

Analyte	S3 I-1 2-2.5 (ug/kg)	MDL	PQL	Lab Blank (ug/L)	Lab Blank (ug/L)	MDL	PQL
Benzene	BPQL	14	140	ND	ND	0.1	1
Toluene	BPQL	14	140	ND	ND	0.1	1
Ethylbenzene	420	14	140	ND	ND	0.1	1
m,p&o-xylenes	630	28	280	ND	ND	0.2	2
PID filespecs P00000-	65.36			65.35	65.37		

Key

ND = Not Detected
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
BPQL = Below Practical Quantitation Limit

Table 4

Total Petroleum Hydrocarbons
By Modified EPA 9071

Capsule Project ID: Torrington S. Bend, IN.
ARC Project No: 4897
Sampling Date: 28-Feb-92
Analysis Date: 03-Mar-92

Sample	ARC Sample ID	Gravimetric TPH (mg/Kg)
S3 I-1 2-2.5'	18849	23000
S3 I-1 2-2.5 DUP.	18849	21000
Blank	-	BPQL
	PQL	50

PQL = Practical Quantitation Limit
BPQL = Below Practical Quantitation Limit

Table 4 (Cont)

Total Petroleum Hydrocarbons
By Modified EPA 9071

Capsule Project ID: Torrington S. Bend, IN.
ARC Project No: 4897
Sampling Date: 27-Feb-92
Analysis Date: 06-Mar-92

Sample	ARC Sample ID	Gravimetric TPH (mg/Kg)
S3-8 8-8.5'	18845	10000
Blank	-	BPQL
	PQL	50

PQL = Practical Quantitation Limit
BPQL = Below Practical Quantitation Limit

March 23, 1992

ARC
Aspen Research Corporation
Turning Questions into Answers

Mr. Bruce Bohnen
Capsule Environmental Engineering, Inc.
1970 Oakcrest Ave.
Roseville, MN 55113

Reference: Analysis of Soil Samples at IR Torrington, South Bend, IN
Capsule Project No. 228-124
ARC Project No. 4850
Sample No.'s 18654 - 18671
Sampling Date 2/24/92

Dear Mr. Bohnen:

We have completed the requested analyses on the above referenced project; enclosed please find a summary of the results obtained. The samples were identified as follows:

Sample Identification	Analysis	ARC Sample Number
PD4-2 6'-8'	8240	18654
PD4-2 6'-8'	Metals	18655
PD4-2 6'-8'	Cyanide	18655
PD4-3 2'-4'	8240	18656
PD4-3 2'-4'	TPH	18656
PD4-4 4'-6'	8240	18657
PD4-4 4'-6'	TPH	18658
PD4-5 4'-6'	8240	18659
PD4-6 2'-4'	8240	18660
PD4-6 2'-4'	Metals	18661
PD4-6 2'-4'	Cyanide	18661
PD4-7 4'-6'	8240	18662
PD4-8 4'-6'	82401	18664
PD4-8 4'-6'	TPH	18665
PD4-9 2'-4'	8240	18666
S3-1 12'-14'	8240	18668
S3-1 12'-14'	TPH	18669
Trip Blank	8240	18670
Field Blank	8240	18671

West County Road D
New Brighton, MN 55112-3522

Phone (612) 631-9234
FAX (612) 631-9270

The soil samples and aqueous trip and field blanks were analyzed for the following parameters as described in Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition.

Parameter	Test Method
Volatile Organic Compounds	Modified Method 8240
Semivolatile Organic Compounds	Modified Method 8270
Arsenic, barium, cadmium, chromium, Lead, selenium	Method 6010
Selenium	Method 7470
Silver	Method 7760
Mercury	Method 7470
Cyanide	Method 9010
TPH	Modified Method 9071

Initially, the soil samples were to be analyzed for low level volatiles by Method 8240. Because of the high volatile levels encountered in the samples causing the purge trap to over load, it required the Method 8240 analyses to be changed to standard soil detection limits. Since the objective of the low level detection was to identify and report volatiles which might not be reported in the standard 8240 soil analysis, an alternative reporting formate was developed and provided in the Method 8240 tables. Analyts reported in the tables as "ND*" mean the analyt was positively identified by mass spectrometry but the analyt is less than 20% of the estimated quantitation limit (EQL). Quantitative values were reported for analyts down to approximately 25% of their EQL. Using this reporting format, we still were able to meet the objectives of the project.

The results described here are included in the following tables:

Table 1. Analysis for Semivolatile Organic Compounds by Modified Method 8240
Table 2. Analysis for Total Petroleum Hydrocarbons by Modified Method 9071
Table 3. Analysis for Metals by Methods 6010, 7470, 7740 and 7760
Table 4. Analysis for Cyanide by 9010

Thank you for selecting Aspen Research Corporation. We look forward to providing you with continued analytical support and service. As always, we welcome your comments regarding the quality of the service you have received. If you have any questions, please do not hesitate to call me.

Sincerely,

ASPEN RESEARCH CORPORATION

Will Wood

Will Wood

Encl.

Table 1

Analysis for Volatile Organic Compounds by Modified Method 8240 SW-846 3rd Edition

Capsule Environmental Engineering Project ID: PN# 223-124, Torrington S. Bend
Sampling Date: February 24-25, 1992
Aspen Research Corporation Project ID: 4950

Sample ID:	EQL	Meth Bl.	PB4-2 6-8	PB4-3 2-4	PB4-4 4-6	PB4-5 4-6	PB4-6 2-4	PB4-7 4-6
ARC ID:	Soil	00000	18654	18656	18657	18659	18660	18662
Analyte	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Chloromethane	1400	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	1400	ND	ND	ND	ND	ND	ND	ND
Bromomethane	1400	ND	ND	ND	ND	ND	ND	ND
Chloroethane	1400	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	1400	ND	ND	ND	ND	ND	ND	ND
Acetone	14000	ND	ND	ND	680	1300	1200	1300
1,1-Dichloroethene	700	ND	ND	ND	ND	ND	ND	ND
Carbon disulfide	700	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	14000	ND	3100	3500	3300	3100	3500	3200
Acrylonitrile	700	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	700	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	700	ND	ND	ND	ND	ND	ND	ND
Chloroform	700	ND	ND *	ND *	ND *	ND	ND *	ND *
1,2-Dichloroethane	700	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	7000	ND	ND	ND	ND	ND	ND	ND
2-Butanone	14000	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	700	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	700	ND	ND	ND	ND	ND	ND	ND
Benzene	700	ND	ND	ND *	ND *	ND *	ND *	ND *
Trichloroethene	700	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	700	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	700	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl vinyl ether	1400	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	700	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	700	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	700	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	700	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	700	ND	ND	ND	ND	ND	ND	ND
Bromoform	700	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	1400	ND	ND	ND	ND	ND	ND	ND
Toluene	700	ND	ND	ND *	ND *	ND *	ND	ND *
2-Hexanone	1400	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	700	ND	ND	ND *	ND	ND *	ND	ND *
m,p-Xylene	700	ND	ND	ND *	ND	ND *	ND	ND *
o-Xylene	700	ND	ND	ND *	ND	ND *	ND	ND *
Styrene	700	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	700	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
File Name:		)A4102	)A4103	)A4104	)A4105	)A4106	)A4107	)A4108
Analysis Date:		920309	920309	920309	920309	920309	920310	920310

Key:
ND = Not Detected
EQL = Estimated Quantitation Limit
BEQL = detected but at a concentration Below the Estimated Quantitation Limit

Table 1 (Cont)

Analysis for Volatile Organic Compounds by Modified Method 8240 SW-846 3rd Edition

Capsule Environmental Engineering Project ID: PNB 228-124, Torrington S. Bend
Sampling Date: February 24-25, 1992
Aspen Research Corporation Project ID: 4850

Sample ID:	EQL	Meth Bl.	S3-6 8-10	S3-6 6-8'	S3-2 8-10	S3-4 4-6'	S3-3 4-6'	S3-3 12-1
ARC ID:	Soil	00000	18708	18709	18711	18713	18716	18717
Analyte	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Chloromethane	1400	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	1400	ND	ND	ND	ND	ND	ND	ND
Bromomethane	1400	ND	ND	ND	ND	ND	ND	ND
Chloroethane	1400	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	1400	ND	ND	ND	ND	ND	ND	ND
Acetone	14000	ND	ND	1100	ND	1100	ND	880
1,1-Dichloroethene	700	ND	ND *	5900	ND	600	3100	ND
Carbon disulfide	700	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	14000	ND	3200	3300	3600	3300	3300	2900
Acrylonitrile	700	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	700	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	700	ND	ND *	1000	ND *	410	950	920
Chloroform	700	ND	ND *	ND	ND *	ND *	ND *	ND
1,2-Dichloroethane	700	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	7000	ND	ND	ND	ND	ND	ND	ND
2-Butanone	14000	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	700	ND	2200	55000	800	12000	42000	660
Carbon tetrachloride	700	ND	ND	ND	ND	ND	ND	ND
Benzene	700	ND	ND	ND	ND	ND *	ND	ND
Trichloroethene	700	ND	ND	ND	ND	ND *	ND *	ND
1,2-Dichloropropane	700	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	700	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl vinyl ether	1400	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	700	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	700	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	700	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	700	ND	ND *	150	ND	150	ND *	ND
Chlorodibromomethane	700	ND	ND	ND	ND	ND	ND	ND
Bromoform	700	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	1400	ND	ND	ND	ND	ND	ND	ND
Toluene	700	ND	ND *	ND *	ND	200	400	ND
2-Hexanone	1400	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	700	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	700	ND	ND *	ND *	ND	ND *	800	ND *
o-Xylene	700	ND	ND *	200	ND	ND *	1200	ND
Styrene	700	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	700	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	700	ND	ND	ND	ND	ND	ND	ND
File Name:		)R4112	)R4113	)R4114	)R4115	)R4116	)R4117	)R4118
Analysis Date:		920310	920310	920310	920310	920310	920310	920310

Key:
ND = Not Detected
EQL = Estimated Quantitation Limit
BEQL = detected but at a concentration Below the Estimated Quantitation Limit

Table 1 (Cont)

Analysis for Volatile Organic Compounds by Modified Method 8240 SW-846 3rd Edition

Canonie Environmental Engineering Project ID: PN# 229-124, Farrington S. Bend
Sampling Date: February 24-25, 1992
Aspen Research Corporation Project ID: 4850

Sample ID:	EQL	P04-8 4-6	P04-9 2-4	S3-1 12-1
ARC ID:	Soil	18664	18666	18668
Analyte	ug/Kg	ug/Kg	ug/Kg	ug/Kg
Chloromethane	1400	ND	ND	ND
Vinyl chloride	1400	ND	ND	ND
Bromomethane	1400	ND	ND	ND
Chloroethane	1400	ND	ND	ND
Trichlorofluoromethane	1400	ND	ND	ND
Acetone	14000	ND	850	1200
1,1-Dichloroethene	700	ND	ND	ND
Carbon disulfide	700	ND	ND	ND
Methylene chloride	14000	3500	3300	3300
Acrylonitrile	700	ND	ND	ND
trans-1,2-Dichloroethene	700	ND	ND	ND
1,1-Dichloroethane	700	ND	ND	ND
Chloroform	700	ND *	ND *	ND *
1,2-Dichloroethane	700	ND	ND	ND
Vinyl acetate	7000	ND	ND	ND
2-Butanone	14000	ND	ND	ND
1,1,1-Trichloroethane	700	ND	ND	ND
Carbon tetrachloride	700	ND	ND	ND
Benzene	700	ND *	ND *	ND *
Trichloroethene	700	ND	ND	ND
1,2-Dichloropropane	700	ND	ND	ND
Bromodichloromethane	700	ND	ND	ND
2-Chloroethyl vinyl ether	1400	ND	ND	ND
cis-1,3-Dichloropropene	700	ND	ND	ND
trans-1,3-Dichloropropene	700	ND	ND	ND
1,1,2-Trichloroethane	700	ND	ND	ND
Tetrachloroethene	700	ND	ND	ND
Chlorodibromomethane	700	ND	ND	ND
Bromoform	700	ND	ND	ND
4-Methyl-2-pentanone	1400	ND	ND	ND
Toluene	700	ND	ND *	ND
2-Hexanone	1400	ND	ND	ND
Chlorobenzene	700	ND	ND	ND
Ethylbenzene	700	ND	ND	ND *
m,p-Xylene	700	ND	ND	ND *
o-Xylene	700	ND	ND	ND *
Styrene	700	ND	ND	ND
1,1,2,2-Tetrachloroethane	700	ND	ND	ND
1,3-Dichlorobenzene	700	ND	ND	ND
1,4-Dichlorobenzene	700	ND	ND	ND
1,2-Dichlorobenzene	700	ND	ND	ND
File Name:		)R4109	)R4110	)R4111
Analysis Date:		920310	920310	920310

Key:
ND = Not Detected
EQL = Estimated Quantitation Limit
* BEQL = detected but at a concentration Below the Estimated Quantitation Limit

Table 1 (Cont)

Analysis for Volatile Organic Compounds by Modified Method 8240 SW-846 3rd Edition

Caosule Environental Engineering Project ID: PMI 229-124, Torrington S. Bend
Sampling Date: February 24-25, 1992
Aspen Research Corporation Project ID: 4850

Sample ID:	EQL	S3-2 4-6'	S3-5 8-10
ARC ID:	Soil	18719	18721
Analyte	ug/Kg	ug/Kg	ug/Kg
Chloromethane	1400	ND	ND
Vinyl chloride	1400	ND	ND
Bromomethane	1400	ND	ND
Chloroethane	1400	ND	ND
Trichlorofluoromethane	1400	ND	ND
Acetone	14000	ND	ND
1,1-Dichloroethene	700	ND	ND *
Carbon disulfide	700	ND	ND
Methylene chloride	14000	3200	3300
Acrylonitrile	700	ND	ND
trans-1,2-Dichloroethene	700	ND	ND
1,1-Dichloroethane	700	ND	150
Chloroform	700	ND *	ND *
1,2-Dichloroethane	700	ND	ND
Vinyl acetate	7000	ND	ND
2-Butanone	14000	ND	ND
1,1,1-Trichloroethane	700	ND	3600
Carbon tetrachloride	700	ND	ND
Benzene	700	ND	ND
Trichloroethene	700	ND	ND
1,2-Dichloropropane	700	ND	ND
Bromodichloromethane	700	ND	ND
2-Chloroethyl vinyl ether	1400	ND	ND
cis-1,3-Dichloropropene	700	ND	ND
trans-1,3-Dichloropropene	700	ND	ND
1,1,2-Trichloroethane	700	ND	ND
Tetrachloroethene	700	ND	ND
Chlorodibromomethane	700	ND	ND
Bromoform	700	ND	ND
4-Methyl-2-pentanone	1400	ND	ND
Toluene	700	ND	ND
2-Hexanone	1400	ND	ND
Chlorobenzene	700	ND	ND
Ethylbenzene	700	ND	ND
m,p-Xylene	700	ND	ND
o-Xylene	700	ND	ND *
Styrene	700	ND	ND
1,1,2,2-Tetrachloroethane	700	ND	ND
1,3-Dichlorobenzene	700	ND	ND
1,4-Dichlorobenzene	700	ND	ND
1,2-Dichlorobenzene	700	ND	ND
File Name:		VA4119	VA4120
Analysis Date:		920310	920310

Key:
ND = Not Detected
EQL = Estimated Quantitation Limit
BEQL = detected but at a concentration Below the Estimated Quantitation Limit

Table 1 (Cont)

Analysis for Volatile Organic Compounds by Modified Method 8240 SW-846 3rd Edition

Capsule Environmental Engineering Project ID: PN# 228-124, Farrington So Bend
Sampling Date: February 24-25, 1992
Aspen Research Corporation Project ID: 4850

Sample ID:	EQL	Meth Blank	Trip Blank	Field Blank
ARC ID:	Water	00000	18670	18671
Analyte	ug/L	ug/L	ug/L	ug/L
Chloromethane	10	ND	ND	ND
Vinyl chloride	10	ND	ND	ND
Bromomethane	10	ND	ND	ND
Chloroethane	10	ND	ND	ND
Trichlorofluoromethane	10	ND	ND	ND
Acetone	100	ND	ND	ND
1,1-Dichloroethene	5	ND	ND	ND
Carbon disulfide	5	ND	ND	ND
Methylene chloride	100	ND	ND	ND
Acrylonitrile	5	ND	ND	ND
trans-1,2-Dichloroethene	5	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND
Chloroform	5	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND
Vinyl acetate	50	ND	ND	ND
2-Butanone	100	ND	ND	ND
1,1,1-Trichloroethane	5	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND
Benzene	5	ND	ND	ND
Trichloroethene	5	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND
Bromodichloromethane	5	ND	ND	ND
2-Chloroethyl vinyl ether	10	ND	ND	ND
cis-1,3-Dichloropropene	5	ND	ND	ND
trans-1,3-Dichloropropene	5	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND
Chlorodibromomethane	5	ND	ND	ND
Bromoform	5	ND	ND	ND
4-Methyl-2-pentanone	50	ND	ND	ND
Toluene	5	ND	ND	ND
2-Hexanone	50	ND	ND	ND
Chlorobenzene	5	ND	ND	ND
Ethylbenzene	5	ND	ND	ND
m,p-Xylene	5	ND	ND	ND
o-Xylene	5	ND	ND	ND
Styrene	5	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND
1,3-Dichlorobenzene	5	ND	ND	ND
1,4-Dichlorobenzene	5	ND	ND	ND
1,2-Dichlorobenzene	5	ND	ND	ND
File Name:		)A1042	)A1043	)A1044
Analysis Date:		920226	920227	920227

Key:
ND = Not Detected
EQL = Estimated Quantitation Limit
JEQL = detected but at a concentration below the Estimated Quantitation Limit

Table 2

Total Petroleum Hydrocarbons
By Modified EPA 9071

Capsule Project ID: Torrington S. Bend, IN.
ARC Project No: 4850
Sampling Date: Feb. 24-25, 1992
Analysis Date: 26-Feb-92

Sample	ARC Sample ID	Gravimetric TPH (mg/Kg)
PD 4-3 2-4 ft	18656	4900
PD 4-4 4-6 ft	18658	5600
PD 4-8 4-6 ft	18665	5200
S 3-1 12-14 ft	18669	1100
Blank	-	BPQL
	PQL	200

PQL = Practical Quantitation Limit
BPQL = Below Practical Quantitation Limit

Table 3

Results of Analysis for
Metals

Capsule Project ID: Torrington, S. Bend
Capsule Project #: 228-124
Sampling Date: February 24-25, 1992
Received Date: February 26, 1992
ARC Project ID: 4850

ARC Number	18655	18661		
Sample ID	PD4-2, 6-8'	PD4-6, 2-4'	Blank	PQL
	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Arsenic	BPQL	3.2	BPQL	0.98
Barium	6.4	51	BPQL	0.15
Cadmium	0.32	1.4	BPQL	0.15
Chromium	BPQL	33	BPQL	0.35
Lead	BPQL	61	BPQL	2.1
Mercury	0.031	0.58	BPQL	0.02
Selenium	1.3	3.1	BPQL	1.2
Silver	BPQL	BPQL	BPQL	0.88

Key:
PQL = Practical Quantitation Limit
BPQL = Below Practical Quantitation Limit
Ag was analyzed by FLAA (EPA Method 7760)
As, Ba, Cd, Cr, and Pb were analyzed by ICP (EPA Method 6010)
Se was analyzed by GFAA (EPA Method 7740)
Hg was analyzed by CVAA (EPA Method 7470)

Table 4

Results of Analysis for
Cyanide
(EPA Method 9010)

Capsule Project ID:	Torrington, S. Bend
Capsule Project #:	228-124
Sampling Date:	February 24-25, 1992
Received Date:	February 26, 1992
ARC Project ID:	4850

ARC Number	Sample ID	Cyanide mg/Kg
18655	PD4-2, 6-8'	0.24
18661	PD4-6, 2-4'	0.53
	Blank	BPQL
	PQL	0.19

KEY:
PQL = Practical Quantitation Limit
BPQL = Below Practical Quantitation Limit

ARC
Aspen Research Corporation
Turning Questions into Answers

March 23, 1992

Mr. Bruce Bohnen
Capsule Environmental Engineering, Inc.
1970 Oakcrest Ave.
Roseville, MN 55113

Reference: Analysis of Soil Samples at IR Torrington, South Bend, IN
Capsule Project No. 228-124
ARC Project No. 4993
Sample No.'s 19130 - 19193
Sampling Dates March 3 & 4, 1992

Dear Mr. Bohnen:

We have completed the requested analyses on the above referenced project; enclosed please find a summary of the results obtained. The samples were identified as follows:

Sample Identification	Analysis	ARC Sample Number
W-1	8240	19145
W-2	8240	19148
W-3	8240	19151
W-4	8240	19169
W-5	8240	19157
W-7	8240	19163
W-8	8240	19160
W-9	8240	19154
W-12	8240	19175
W-13	8240	19166
W-16	8240	19193
W-10A	8240	19181
W-10B	8240	19178
W-11A	8240	19181
W-11B	8240	19187
W-14A	8240	19190
W-14A Dup	8240	19191
W-14B	8240	19136
W-15B	8240	19142
S-3	8240	19172
Trip Blank	8240	19130
Equipment Rinsate	8240	19133

West County Road D
New Brighton, MN 55112-3522

Phone (612) 631-9234
FAX (612) 631-9270

The soil samples and aqueous trip and field blanks were analyzed for the following parameters as described in Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition.

Parameter	Test Method
Volatile Organic Compounds	Modified Method 8240

The results described here are included in the following tables:

Table 1. Analysis for Volatile Organic Compounds by Modified Method 8240

Thank you for selecting Aspen Research Corporation. We look forward to providing you with continued analytical support and service. As always, we welcome your comments regarding the quality of the service you have received. If you have any questions, please do not hesitate to call me.

Sincerely,

ASPEN RESEARCH CORPORATION

Will Wood

Encl.

Table 1

Analysis for Volatile Organic Compounds by Modified Method 8240 SW-846 3rd Edition

Capsule Environmental Engineering Project ID: PN# 228-124, Torrington S. Bend
Sampling Date: March 3-4, 1992
Aspen Research Corporation Project ID: 4993

Analyte	Sample ID: EQL ARC ID: Water ug/L	Meth Bl. 08000 ug/L	Trip Bl. 19130 ug/L	Eq.Rinse 19133 ug/L	U-14B 19136 ug/L	U-15A 19139 ug/L	U-15B 19142 ug/L	U-1 19145 ug/L	U-2 19148 ug/L
Chloromethane	10	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	10	ND	ND	ND	BEQL	ND	ND	ND	ND
Bromomethane	10	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	10	ND	ND	ND	18	ND	ND	ND	ND
Trichlorofluoromethane	10	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	100	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	ND	ND	ND	33	ND	ND	ND	ND
Carbon disulfide	5	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	100	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	5	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	5	ND	ND	ND	ND	6	ND	ND	ND
1,1-Dichloroethane	5	ND	ND	ND	18	BEQL	ND	ND	ND
Chloroform	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	50	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	100	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	ND	ND	ND	BEQL	ND	ND	BEQL	ND
Carbon tetrachloride	5	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	5	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	BEQL	BEQL	BEQL	ND	ND
1,2-Dichloropropane	5	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	5	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl vinyl ether	10	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	5	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	5	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	5	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	50	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	50	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	5	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	5	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
File Name:		>A4139	>A4142	>A4143	>A4144	>A4145	>A4146	>A4147	>A4148
Analysis Date:		920311	920311	920311	920311	920311	920311	920311	920311

Key:
ND = Not Detected
EQL = Estimated Quantitation Limit
BEQL = detected but at a concentration Below the Estimated Quantitation Limit

Table 1 (Cont)

Analysis for Volatile Organic Compounds by Modified Method 8240 SW-846 3rd Edition

Capsule Environmental Engineering Project ID: PN# 228-124, Torrington S. Bend
Sampling Date: March 3-4, 1992
Aspen Research Corporation Project ID: 1993

Sample ID:	EQL	U-3	U-9	U-5	U-8	U-7	U-13	U-4	S-3
ARC ID:	Water	19151	19154	19157	19160	19163	19166	19169	19172
Analyte	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Chloromethane	10	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	10	ND	ND	ND	ND	ND	BEQL	ND	43
Bromomethane	10	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	10	ND	ND	ND	ND	BEQL	150	7	110
Trichlorofluoromethane	10	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	100	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	ND	ND	ND	ND	BEQL	BEQL	7	50
Carbon disulfide	5	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	100	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	5	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	BEQL
1,1-Dichloroethane	5	ND	ND	BEQL	BEQL	24	21	82	450
Chloroform	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	50	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	100	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	BEQL	ND	ND	8	35	ND	81	390
Carbon tetrachloride	5	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	5	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	ND	ND	ND	ND	BEQL	ND	73
1,2-Dichloropropane	5	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	5	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl vinyl ether	10	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	5	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	5	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	5	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	50	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	BEQL
2-Hexanone	50	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	5	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	5	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
File Name:		)A4149	)A4150	)A4151	)A4152	)A4153	)A4154	)A4156	)A4157
Analysis Date:		920311	920311	920311	920311	920311	920311	920311	920311

Key:
ND = Not Detected
EQL = Estimated Quantitation Limit
BEQL = detected but at a concentration Below the Estimated Quantitation Limit

Table 1 (Cont)

Analysis for Volatile Organic Compounds by Modified Method 8240 SW-846 3rd Edition

Capsule Environmental Engineering Project ID: PHN 228-124, Torrington S. Bend
Sampling Date: March 3-4, 1992
Aspen Research Corporation Project ID: 4993

Sample ID:	EQL	W-12	W-10B	W-10A	W-11A	W-11B	W-14A	W-14A Dup.	W-16
ARC ID:	Water	19175	19178	19181	19184	19187	19190	19191	19193
Analyte	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Chloromethane	10	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl chloride	10	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	10	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	10	5	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	10	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	100	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	5	14	19	ND	ND	5	ND	ND	ND
Carbon disulfide	5	ND	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	100	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	5	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	5	ND	25	ND	ND	BEQL	BEQL	BEQL	BEQL
Chloroform	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl acetate	50	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	100	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	5	ND	110	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	5	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	5	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	5	ND	16	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	5	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	5	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl vinyl ether	10	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	5	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	5	ND	ND	ND	ND	ND	ND	ND	ND
Chlorodibromomethane	5	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	5	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-pentanone	50	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	5	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	50	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
m,p-Xylene	5	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	5	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	5	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	5	ND	ND	ND	ND	ND	ND	ND	ND
File Name:		>A4158	>A4159	>A4160	>A4161	>A4162	>A4163	>A4164	>A4165
Analysis Date:		920311	920311	920311	920311	920311	920312	920312	920312

Key:
ND = Not Detected
EQL = Estimated Quantitation Limit
BEQL = detected but at a concentration below the Estimated Quantitation Limit

Aspen Research Corporation

436 West County Rd. D, St. Paul, MN 55112-3522
Tel: 612/ 631-9234 Fax: 612/ 631-9270

April 15, 1992

Mr. Bruce Bohnen
Capsule Environmental Engineering, Inc.
1970 Oakcrest Ave.
Roseville, MN 55113

Reference: Analysis of Soil Sample at IR
Torrington, South Bend, IN
Capsule Project No. 228-124
ARC Project No. 5116
Sample No.'s 19584
Sampling Date. February 26, 1992

Dear Mr. Bohnen:

We have completed the requested analysis on the above referenced project; enclosed please find a summary of the result obtained. The sample was identified as follows:

Sample Identification	Analysis	ARC Sample Number
S3-6 6'-8'	8240	18709

The soil sample was analyzed for polychlorinated biphenyls by EPA Method 8080A as described in Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition.

Thank you for selecting Aspen Research Corporation. We look forward to providing you with continued analytical support and service. As always, we welcome your comments regarding the quality of the service you have received. If you have any questions, please do not hesitate to call me.

Sincerely,

Will Wood

Will Wood
Director, Chemical Analysis Department
ASPEN RESEARCH CORPORATION

Encl.

TABLE 1

Analytical results for
SW-846 Method 8080A Polychlorinated Biphenyls

Capsule Project ID: IR Torrington Facility
Sampling Date: February 26, 1992
ARC Project ID: 5116

Sample ID	S3-6 6'-8'	MDL	PQL
ARC #	19584		
Concentration[1]	mg/Kg	mg/Kg	mg/Kg
	ND	0.03	0.15

Key:

ND = Not Detected
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
1 = parts per million on an "as is" weight basis

ARC™
Aspen Research Corporation
436 West County Rd. D, St. Paul, MN 55112-3522
Tel: 612/ 631-9234 Fax: 612/ 631-9270

FILE

April 15, 1992

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APR 21 1992
CAPSULE

Mr. Bruce Bohnen
Capsule Environmental Engineering, Inc.
1970 Oakcrest Ave.
Roseville, MN 55113

Reference: Analysis of Soil Sample at IR
Torrington, South Bend, IN
Capsule Project No. 228-124
ARC Project No. 5116
Sample No.'s 19584
Sampling Date. February 26, 1992

Dear Mr. Bohnen:

We have completed the requested analysis on the above referenced project; enclosed please find a summary of the result obtained. The sample was identified as follows:

Sample Identification	Analysis	ARC Sample Number
S3-6 6'-8'	~~8240~~ 8080A	18709

The soil sample was analyzed for polychlorinated biphenyls by EPA Method 8080A as described in Test Methods for Evaluating Solid Wastes, SW-846, 3rd Edition.

Thank you for selecting Aspen Research Corporation. We look forward to providing you with continued analytical support and service. As always, we welcome your comments regarding the quality of the service you have received. If you have any questions, please do not hesitate to call me.

Sincerely,

Will Wood

Will Wood
Director, Chemical Analysis Department
ASPEN RESEARCH CORPORATION

Encl.

TABLE 1

Analytical results for
SW-846 Method 8080A Polychlorinated Biphenyls

Capsule Project ID: IR Torrington Facility
Sampling Date: February 26, 1992
ARC Project ID: 5116

Sample ID	S3-6 6'-8'	MDL	PQL
ARC #	19584		
Concentration[1]	mg/Kg	mg/Kg	mg/Kg
	ND	0.03	0.15

Key:

ND = Not Detected
MDL = Method Detection Limit
PQL = Practical Quantitation Limit
1 = parts per million on an "as is" weight basis

APPENDIX F

GROUND WATER SAMPLING INFORMATION

SGP:mmf
228-124-434-29
051892
052892REV

Canonie Environmental

Canonie Environmental Services Corp.
800 Canonie Drive
Porter, Indiana 46304
Phone: 219-926-8651
Fax: 219-926-7169

April 13, 1992

91-450-05

Mr. Bruce Bohnen
Capsule Environmental
1970 Oak Crest Avenue
Suite 215
St. Paul, MN 55113

Letter Report
Ground Water Sampling
Former Torrington Facility
South Bend, Indiana

Dear Mr. Bohnen:

This letter report, prepared by Canonie Environmental Services Corp. (Canonie) details the field activities associated with ground water sampling at the former Torrington Facility in South Bend, Indiana.

Canonie collected ground water samples from 20 ground water monitoring wells on March 3 and 4, 1992 as listed in Table 1. Samples were submitted to Aspen Research Corporation (ARC) for volatile organics analysis (VOA). A discussion of the field sampling procedures is presented below.

Ground Water Sampling

Prior to sampling, all wells were purged of at least three volumes or until pH, temperature, and specific conductance were stabilized. The volume of water standing in the well (one well volume) was calculated by using the following equation:

$$V = \pi\left(\frac{D}{2}\right)^2 H$$

where: V = volume of water in the well (ft^3)
D = inside diameter of well (ft)
H = height of water column in the well (ft)
(depth to bottom of the well minus the depth to ground water)

The two-inch-diameter wells were purged using a high-density polyethylene (HDPE) bailer. Four-inch- and five-inch-diameter wells were purged with a submersible pump. Purge water from the wells was contained on-site in 55-gallon drums for future disposal. Ground water samples from the monitoring wells were recovered for VOA with a dedicated HDPE disposable bailer. Copies of the field sample data logs are attached with this report. Throughout the sampling activities, a flame-ionization detector organic vapor analyzer was used to monitor volatile organic compounds in the breathing zone.

In addition to the monitoring well samples, an equipment rinseate sample, a trip blank, and a field duplicate were collected. All samples were placed in a cooler and shipped by Capsule to ARC for analysis (U.S. Environmental Protection Agency Modified Method 8240). Table 2 presents the organic compounds detected in the samples collected as reported to Canonie by Capsule.

If you have any questions concerning this report or if you require any additional information, please do not hesitate to call.

Very truly yours,

Paul W. Lambert, CPG
Project Manager

PWL/aw

Attachments

TABLE 1

GROUND WATER MONI
SAMPLED MAR(
FORMER TORRINGTON M
SOUTH BEND, I

Looks like Canonie used the Best Env TOC elevations from 1991, not the 1984 Canonie Survey elevations

gw3 4/2/13

Well No.	Well Diameter (inches)	Depth of Well from TOC (feet)	Top of Casing (feet)	W. Elev (f	nal Reading		pH	Conductivit (umhos)
S-3	2	24	710.16	70			6.72	413
W-1	5	64	712.17	70			7.75	1,000
W-2	5	37	712.86	70			8.43	510
W-3	5	61	711.97	704.35	162	14.0	7.80	1,000
W-4	5	33	713.21	704.35	75	12.2	7.14	1,018
W-5	5	35	713.58	704.37	80	10.2	7.92	930
W-7	4	31.8	713.63	704.27	40	13.5	7.29	780
W-8	4	59.3	713.91	704.03	95	12.6	7.20	1,200
W-9	2	54.6	714.86	704.46	22	12.8	7.59	1,090
W-10A	2	60	714.74	704.26	25	14.9	7.25	1,190
W-10B	2	28.1	714.80	703.22	10	14.4	7.06	944
W-11A	2	55.1	714.79	703.90	25	14.9	7.12	1,153
W-11B	2	30	714.79	702.96	10	15.3	7.12	1,000
W-12	2	29.8	712.92	702.28	10	14.8	7.29	988

TABLE 1

GROUND WATER MONITORING WELLS
SAMPLED MARCH 1992
FORMER TORRINGTON METALS FACILITY
SOUTH BEND, INDIANA
(Continued)

Well No.	Well Diameter (inches)	Depth of Well from TOC (feet)	Top of Casing (feet)	Water Elevation (feet)	Volume purged (gal)	Final Reading		
						Temp (°C)	pH	Conductivity (umhos)
W-13	2	25.3	714.01	704.32	10	12.7	7.27	980
W-14A	4	59	715.50	704.20	90	15.3	7.18	1,018
W-14B	2	41	714.94	701.19	14	5.7	7.60	980
W-15A	2	32	714.50	701.30	10	7.7	8.10	1,160
W-15B	2	18	713.84	701.19	5	7.8	7.40	1,310
W-16	4	60			88	14.8	7.11	1,300

TABLE 2

VOLATILE ORGANIC COMPOUNDS
DETECTED (ug/l) IN GROUND WATER SAMPLES
FORMER TORRINGTON METALS FACILITY
SOUTH BEND, FACILITY

Compound	EPA MCL (1991)	Estimated Detection Limit	Method Blank	Trip Blank	Equipment Rinse	W-1
Vinyl Chloride	2	10	ND	ND	ND	ND
Chloroethane	-	10	ND	ND	ND	ND
1-1-Dichloroethene	7	5	ND	ND	ND	ND
Trans-1,2-dichloroethene	100	5	ND	ND	ND	ND
1,1-Dichlorethane	-	5	ND	ND	ND	ND
1,1,1-Trichloroethane	200	5	ND	ND	ND	BEQL
Trichloroethene	5	5	ND	ND	ND	ND

VOLATILE ORGANIC COMPOUNDS
DETECTED (ug/l) IN GROUND WATER SAMPLES
FORMER TORRINGTON METALS FACILITY
SOUTH BEND, FACILITY
(Continued)

Compound	W-2	W-3	W-4	W-5	W-7	W-8	W-9	W-10A	W-10B
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	7	ND	BEQL	ND	ND	ND	ND
1-1-Dichloroethene	ND	ND	7	ND	BEQL	ND	ND	ND	19
Trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichlorethane	ND	ND	82	BEQL	24	BEQL	ND	ND	25
1,1,1-Trichloroethane	ND	BEQL	81	ND	35	8	ND	ND	110
Trichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	16

TABLE 2

VOLATILE ORGANIC COMPOUNDS
DETECTED (ug/l) IN GROUND WATER SAMPLES
FORMER TORRINGTON METALS FACILITY
SOUTH BEND, FACILITY
(Continued)

Compound	W-11A	W-11B	W-12	W-13	W-14A	W-14A Dup.	W-14B	W-15A	W-15B	W-16	S-3
Vinyl Chloride	ND	ND	ND	BEQL	ND	ND	BEQL	ND	ND	ND	4
Chloroethane	ND	ND	5	150	ND	ND	18	ND	ND	ND	110
1-1-Dichloroethene	ND	5	14	BEQL	ND	ND	33	ND	ND	ND	50
Trans-1,2-dichloroethene	ND	ND	ND	ND	ND	ND	ND	6	ND	ND	BEQL
1,1-Dichlorethane	ND	BEQL	ND	21	BEQL	BEQL	18	BEQL	ND	BEQL	450
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	BEQL	ND	ND	ND	390
Trichloroethene	ND	ND	ND	BEQL	ND	ND	BEQL	BEQL	BEQL	ND	73

Notes:

(1) All concentrations in ug/l (ppb).
(2) ND = Not Detected.
(3) BEQL = Detected but at a concentration below the estimated quantitation limit.
(4) - = No MCL listed for particular compounds.

Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. 91450.05

WELL No. S-3

FIELD ENGINEER WJC

PAGE ____ OF ____

PROJECT NAME Torrington Metals

DATE 3/4/92

DIAMETER OF WELL (d), INCHES 2

TOTAL DEPTH OF WELL FROM T.O.C., FEET 24

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 18.12

WATER LEVEL 5.88'

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = 0.12(d)² W), GALLONS . . 10

PUMPING EQUIPMENT USED Disposable Bailer

WEATHER Clear 60°'s

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
14:50		0	6.71	14.0	441	Cloudy
14:55		3	6.74	11.8	391	"
15:01		7	6.74	11.7	472	"
15:05		10	6.76	11.9	416	"
15:10		12	6.72	11.9	413	"

86-79 Rev. 3-88

Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. 91 [illegible]

WELL No. W-1

FIELD ENGINEER WEA

PAGE ____ OF ____

PROJECT NAME Torrington Metals

DATE 3 3 92

DIAMETER OF WELL (d), INCHES 5

TOTAL DEPTH OF WELL FROM T.O.C., FEET 64

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 57

WATER LEVEL 7.00

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = 0.12(d)² W), GALLONS . . 175

PUMPING EQUIPMENT USED Fultz Pump

WEATHER Partly Cloudy 50°F

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
11 25		0	9.15	8.3	150	CLEAR
11 50		50	8.00	9.6	1020	"
		100	8.25	11.1	1030	"
12:44		150	7.78	10.2	1000	"
13:00		175	7.75	11.3	1000	"

86-79 Rev. 1-6

Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. 9:450 CG

WELL No. W 2

FIELD ENGINEER WJC

PAGE ____ OF ____

PROJECT NAME Torrington Metals

DATE 3.5.92

DIAMETER OF WELL (d), INCHES 5

TOTAL DEPTH OF WELL FROM T.O.C., FEET 31

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 28.7

WATER LEVEL 2.3

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = $0.12(d)^2 W$), GALLONS . . 87

PUMPING EQUIPMENT USED Fultz Pump

WEATHER Sunny 50° F

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
15:17		0	8.75	18.1	240	CLEAR
17:34		30	8.06	18.3	465	"
17:46		60	8.45	18.2	500	"
18:00		90	8.43	16.3	510	"

86-79 Rev. 1-86

Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. [illegible]

WELL No. MW 2

FIELD ENGINEER WEC

PAGE ____ OF ____

PROJECT NAME TORRINGTON METALS DATE 3 3 92

DIAMETER OF WELL (d), INCHES 5

TOTAL DEPTH OF WELL FROM T.O.C., FEET 61

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 54

WATER LEVEL T.O.C.

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = 0.12(d)² W), GALLONS . . 162

PUMPING EQUIPMENT USED Fultz Pump

WEATHER Sunny 50°;

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
13:22		0	8.72	12.9	132	CLEAR
13:50		55	7.71	17.1	990	"
14:11		100	8.00	14.1	1010	"
14:35		150	7.88	14.1	1000	"
14:50		175	7.80	14.0	1000	"

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Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. 91-450-05

WELL No. W-1

FIELD ENGINEER WSC

PAGE ____ OF ____

PROJECT NAME Thornton Metals DATE 3-4-92

DIAMETER OF WELL (d), INCHES 5

TOTAL DEPTH OF WELL FROM T.O.C., FEET 33

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 24.22 WATER LEVEL 8.78

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = $0.12(d)^2 W$), GALLONS . . 75

PUMPING EQUIPMENT USED Fluid Pump

WEATHER Sunny 60°F

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
11:47		0	6.66	12.6	1025	CLEAR
12:00		25	7.11	11.9	1020	"
12:13		50	7.14	12.2	1018	"
12:25		75	7.14	12.2	1018	"

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Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. 91 [illegible]

WELL No. MW 5

FIELD ENGINEER WGL

PAGE ____ OF ____

PROJECT NAME Tuscumbia Metals DATE 3 5 92

DIAMETER OF WELL (d), INCHES 5

TOTAL DEPTH OF WELL FROM T.O.C., FEET 35

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 25.87 WATER LEVEL 9.13

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = 0.12(d)² W), GALLONS . . 80

PUMPING EQUIPMENT USED Fultz Pump

WEATHER Sunny 50°s

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
17.01		0	8.84	12.3	330	Slightly Silty Brown
18:20		30	7.90	11.0	900	Clear
18:35		60	7.97	10.8	920	"
18:45		80	7.92	10.2	930	"

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CanonieEnvironmental

WELL DEVELOPMENT LOG

PROJECT No. 91-450-02

WELL No. W-7

FIELD ENGINEER [illegible]

PAGE ____ OF ____

PROJECT NAME Torrington Metals

DATE 3-4-92

DIAMETER OF WELL (d), INCHES 4

TOTAL DEPTH OF WELL FROM T.O.C., FEET 31.8

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . . 22.30 Water Level 9.50

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (V_w, WHERE $V_w = 0.12(d)^2 W$), GALLONS . . . 40

PUMPING EQUIPMENT USED Fultz Pump

WEATHER Sunny 55°F

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
10:15		0	7.55	12.8	598	Brown
10:25		15	7.35	12.9	794	Clearing
10:32		25	7.32	13.4	801	"
10:45		40	7.37	13.5	798	Clear
10:50		50	7.29	13.5	780	"

Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. [illegible]

WELL No. MW-[illegible]

FIELD ENGINEER [illegible]

PAGE _____ OF _____

PROJECT NAME [illegible] DATE 5/1/92

DIAMETER OF WELL (d), INCHES 4

TOTAL DEPTH OF WELL FROM T.O.C., FEET 59.3

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 49.5 WATER LEVEL [illegible]

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = $0.12(d)^2 W$), GALLONS . . 95

PUMPING EQUIPMENT USED Fuji Pump

WEATHER Sunny 55°F

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
9:00		0	7.14	12.6	1120	CLEAR
9:15		30	7.25	12.6	1200	"
9:25		60	7.26	12.6	1200	"
9:41		90	7.21	12.7	1200	"
9:45		100	7.20	12.6	1200	"

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Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. [illegible]

WELL No. MW-1

FIELD ENGINEER [illegible]

PAGE ____ OF ____

PROJECT NAME Torrington Metals DATE 3 3 92

DIAMETER OF WELL (d), INCHES 2

TOTAL DEPTH OF WELL FROM T.O.C., FEET 54.66

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . 44.41

WATER LEVEL 10.19

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = 0.12(d)² W), GALLONS . 22

PUMPING EQUIPMENT USED Disposable Bailer

WEATHER Sunny 50°'s

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
15:55		0	7.65	16.3	830	Silty Light Brown
16:02		5	7.49	16.4	940	"
16:28		10	7.16	14.8	1060	"
16:35		15	7.16	15.0	1070	"
16:46		20	7.17	14.6	1070	"
16:57		24	7.62	14.0	1080	"
17:10		26	7.69	13.3	1060	"
17:15		29	7.96	13.1	1090	"
17:20		31	7.59	12.8	1090	"

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Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. [illegible]

WELL No. W-[illegible]

FIELD ENGINEER W.C.

PAGE ____ OF ____

PROJECT NAME Terra Tungsten Metals DATE 3-9-92

DIAMETER OF WELL (d), INCHES 2

TOTAL DEPTH OF WELL FROM T.O.C., FEET 60

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 49.1 Water Level 10.9'

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = 0.12(d)² W), GALLONS . . 25

PUMPING EQUIPMENT USED Disposable Bailer

WEATHER Sunny 60's

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
14:50		0	7.76	15.5	1040	Clear
15:02		5	7.24	14.9	1345	Clear
15:12		10	7.16	14.5	1371	Slightly Cloudy
15:25		15	7.24	15.0	1180	"
15:35		20	7.24	14.7	1190	"
15:45		25	7.25	14.9	1190	"

86-79 Rev. [illegible]

Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. 9145.[illegible]

WELL No. W 103

FIELD ENGINEER K.S.

PAGE ____ OF ____

PROJECT NAME Torrington Metals DATE 3/1/92

DIAMETER OF WELL (d), INCHES 2

TOTAL DEPTH OF WELL FROM T.O.C., FEET 28.1

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 19

WATER LEVEL 10.9'

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = 0.12(d)² W), GALLONS . . 10

PUMPING EQUIPMENT USED Disposable Bailer

WEATHER Sunny 60°'s

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
14.50		0	7.17	14.5	934	Clear
14.55		2.5	6.98	14.2	953	"
15.00		5.0	6.97	14.5	1024	Slightly Cloudy
15.07		7.5	7.01	14.6	969	"
15.15		10	7.06	14.4	944	"

86-79 Rev. [illegible]

Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. 91 450 [illegible]

WELL No. 11A

FIELD ENGINEER WJK

PAGE ____ OF ____

PROJECT NAME Torrington Metals DATE 3-1-92

DIAMETER OF WELL (d), INCHES 2

TOTAL DEPTH OF WELL FROM T.O.C., FEET 55.1

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 48.98 WATER LEVEL 6.12

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = 0.12(d)² W), GALLONS . . 25

PUMPING EQUIPMENT USED Disposable Bailer

WEATHER Clear 60°F

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
		—	7.36	17.5	1050	Cloudy
		5	7.30	16.7	980	Clearing
		10	7.15	15.5	1000	Clearing
		15	7.18	14.9	1136	Cloudy
		20	7.20	14.8	1000	"
16 45		25	7.12	14.9	1153	"

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Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. 91 45.. 02
WELL No. 11 B
FIELD ENGINEER NJC
PAGE ____ OF ____

PROJECT NAME Torrington Metals DATE 3 4 92

DIAMETER OF WELL (d), INCHES 2
TOTAL DEPTH OF WELL FROM T.O.C., FEET 30
HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 19.23 WATER LEVEL 10.77
MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = 0.12(d)² W), GALLONS . . 10

PUMPING EQUIPMENT USED Disposable Bailer
WEATHER Clear - 60°'s

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
16 22		—	7.12	14.8	1167	Clear
		2.5	7.07	15.1	1080	Slightly Cloudy
		5.0	7.08	15.3	1040	"
		7.5	7.09	15.3	1000	"
		10.0	7.12	15.3	1000	"

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Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. 71 4[illegible]

WELL No. W-12

FIELD ENGINEER W.C.

PAGE ____ OF ____

PROJECT NAME Torrington Metals DATE 3/4/92

DIAMETER OF WELL (d), INCHES 2

TOTAL DEPTH OF WELL FROM T.O.C., FEET 29.8

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 21.03 Water Level 8.77

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = 0.12(d)² W), GALLONS . . 10

PUMPING EQUIPMENT USED Disposable Bailer

WEATHER Sunny 60°F

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
13:02		0	7.05	14.6	958	Cloudy
13:20		4	7.29	14.6	946	"
13:25		8	7.22	14.6	992	"
13:32		12	7.29	14.8	988	"

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Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. 91 4510 .03

WELL No. W-13

FIELD ENGINEER Bill Cole

PAGE ____ OF ____

PROJECT NAME Torrington Metals

DATE 3-4-92

DIAMETER OF WELL (d), INCHES 2

TOTAL DEPTH OF WELL FROM T.O.C., FEET 25.5

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . 15.5

WATER LEVEL 9.50

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = $0.12(d)^2$ W), GALLONS . . 10

PUMPING EQUIPMENT USED Bailer

WEATHER Sunny 60° F

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
14:10		—	7.16	13.1	641	Cloudy Brown
14:15		2.5	7.23	12.9	901	Cloudy
14:20		5.0	7.27	12.8	940	"
14:25		7.5	7.26	12.7	980	"
14:30		10.0	7.27	12.7	980	"

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Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. 9145.06

WELL No. MW-1

FIELD ENGINEER W.J.L.

PAGE ____ OF ____

PROJECT NAME Torrington Metals

DATE 3-4-92

DIAMETER OF WELL (d), INCHES 4

TOTAL DEPTH OF WELL FROM T.O.C., FEET 59

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 47.62

WATER LEVEL 11.38

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = 0.12(d)² W), GALLONS . . 90

PUMPING EQUIPMENT USED Fultz Pump

WEATHER Sunny 60°'s

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
15 45		0	7.19	17.1	1021	CLEAR
15 55		30	7.20	15.7	1018	"
16 05		60	7.15	15.2	1018	"
16 15		90	7.18	15.3	1018	

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Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. [illegible]

WELL No. MW-[illegible]

FIELD ENGINEER WCF

PAGE _____ OF _____

PROJECT NAME Tonawanda Metals DATE 3/3/92

DIAMETER OF WELL (d), INCHES 2

TOTAL DEPTH OF WELL FROM T.O.C., FEET 41

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 27

WATER LEVEL 14.0

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = $0.12(d)^2 W$), GALLONS . . 14

PUMPING EQUIPMENT USED Disposable Bailer

WEATHER Fog - warm 40°F

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
9:15		0	7.25	6.5	900	VERY SILTY BROWN
9:30		5	7.48	6.1	960	
9:40		10	7.36	5.9	970	
9:50		15	7.60	5.7	980	

86-79 Rev. [illegible]

Canonie Environmental

WELL DEVELOPMENT LOG

PROJECT No. 91450.05

WELL No. W-5A

FIELD ENGINEER WGC

PAGE _____ OF _____

PROJECT NAME Torrington Metals DATE 3 3 92

DIAMETER OF WELL (d), INCHES 2

TOTAL DEPTH OF WELL FROM T.O.C., FEET 32

HEIGHT OF GROUND WATER COLUMN IN WELL (W), FEET . . . 21.1

WATER LEVEL 10.90

MINIMUM QUANTITY OF GROUND WATER TO BE PURGED (Vw, WHERE Vw = $0.12(d)^2 W$), GALLONS . . 10

PUMPING EQUIPMENT USED Disposable Bailer

WEATHER Fog + Wind 40°s

TIME	PUMPING RATE (GPM)	TOTAL VOLUME (GAL)	pH	TEMP °C	SPECIFIC CONDUCTANCE µMHOS	NOTES
10:27		0	7.74	8.6	1100	Very Silty Brown
10:31		3	8.10	8.1	1160	"
10:34		7	7.99	7.8	1180	"
10:37		10	8.10	7.7	1160	"

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