APPENDIX E

BEST ENVIRONMENTAL, "SUBSURFACE ENVIRONMENTAL ASSESSMENT AND REMEDIAL ACTION PLAN", APRIL 1991

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Subsurface Environmental Assessment and Remedial Action Plan

Torrington Site
3702 W. Sample Street
South Bend, Indiana

Prepared For:
Urban Enterprise Association of South Bend, Inc.

April 1991

BEST Environmental, Inc.

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1.0 INTRODUCTION

BEST Environmental, Inc. (BEST) was retained by Urban Enterprise Association (UEA) to provide an assessment of groundwater quality and remedial action plan at Torrington Company's Bantam Bearing Division plant in South Bend, Indiana. Daily & Associates, Engineers, Inc. (D & A) was subcontracted by BEST to assist in the assessment. This report summarizes the findings obtained and recommendations made from field investigations and laboratory analysis performed in January and February, 1991.

1.1 BACKGROUND

The Torrington Company purchased the Bantam Bearing Company of South Bend in 1928 (Figure 1). Although it is not clear from historical data, it appears that the Bantam Bearing company began to manufacture metal bearings at the subject facility in 1898. Metal bearing fabrication continued until Torrington decided to close the South Bend plant in September of 1983 because of a decline in the bearing market. As part of a responsible facility closure plan, a series of environmental site assessments were performed by others to assess the likelihood of the presence of

environmental hazardous substances or waste at the subject facility. In the most recent study, conducted by BEST for UEA (October, 1990), a summary of previous investigations and analytical findings are presented. The following report is intended to supplement the findings of the previous studies. It is not intended to be taken as a critique or evaluation of previous investigations. A list of those prior studies referred to during the preparation of this report is contained in the references following report text.

1.2 PURPOSE

The objective of this subsurface investigation was to assess subsurface conditions at the Torrington site regarding the reported presence of volatile organic compounds and dissolved metals in the groundwater and VOC in the pond soils. This investigation was conducted within the approved work scope so that a remedial action plan could be prepared which contains suggestions and cost estimates for remediation of potentially contaminated groundwater and/or soils.

The observations in this report are based upon the data obtained from soil and groundwater samples collected at the indicated locations. This report does not reflect variations which may occur between boring and monitoring

well locations across the site.

Any statements noted herein which are made in relation to documentation review and federal-state environmental regulations is based upon our experience as environmental professionals and engineers and is not intended to be deemed a legal opinion or conclusion. Statements made regarding regulated substances, likewise, provide an opinion only of the potential environmental liabilities associated with ownership of the subject property. It is the responsibility of the UEA or other interested parties to make their own interpretation as to the suitability of the subject site for their intended purpose and potential environmental liability. No other warranty, expressed or implied is made in this evaluation.

1.3 SCOPE

Based upon the previous studies and environmental site assessments, UEA decided to commission an assessment of groundwater conditions across the site and investigate subsurface soil conditions at two (2) pond locations. A work plan was submitted by BEST to UEA in December, 1990 which contained the following tasks:

1. Purge and sample all existing monitoring wells;

2. Install, develop and sample monitoring wells at three (3) down gradient locations and one (1) upgradient location;

3. Conduct exploratory subsurface investigations to the "watertable" at two (2) pond locations (Nos. 4 and 5); and

4. collect two (2) soil samples to determine background metals concentrations.

2.0 FIELD OPERATIONS

The field investigation at the Torrington site occurred between January 28 and February 8, 1991. The investigation consisted of three (3) phases: sampling existing monitoring wells; installation, development and sampling of new monitoring wells; and soil sampling to the "watertable" at selected pond locations. Exploratory field operations were limited only to the upper aquifer at the Torrington site.

2.1 MONITORING WELLS

A total of seven (7) additional monitoring wells were installed at the site. Continuing with the number system established from the existing monitoring well program, the new wells were numbered W-9 through W-13. New and existing

monitoring well locations are shown on Plate 1. There is a total of fifteen (15) monitoring wells at the Torrington Site.

Soil borings were made with truck mounted power boring equipment, utilizing a hollow stem continuous flight auger system. Soil sampling was accomplished, except as noted, by advancing the borehole with split-spoon sampler in accordance with ASTM D1586 "Penetration Test and Split-Barrel Sampling of Soils". Description and identification of soil samples was performed by using the visual-manual procedure in accordance with ASTM D2488. Because of the saturated unconsolidated granular soils and hydrostatic pressure encountered while advancing the boreholes below the watertable, representative soil sample recovery below the watertable was not economically feasible. Field operations were modified so that groundwater samples were retrieved at discrete depths for field analysis using methods described later in this report.

Drilling augers and other downhole equipment were cleaned with a trisodium phosphate (TSP) wash and a pressure water rinse prior to beginning work and between each boring location. The split spoon sampler was cleaned with a detergent/water wash followed by a methanol/distilled water

rinse in between each use. Potable water obtained from site sources and utilized for decontamination operations was tested for Volatile Organic Compounds (VOC) with a field GC/PID - none were detected. At Torrington's direction, all soil cuttings, and purge waters except as noted, were placed and sealed in 55-gallon drums, labeled and left at the site.

The seven (7) new monitoring wells were installed into 7-1/2-inch diameter boreholes. At monitoring well locations W-10 and W-11, two (2) wells (designated A and B) were installed at each location. Wells W-10A and W-10B extend down to 60.61 ft. (654.13 ft. MSL) and 30.25 ft. (684.55 ft. MSL) respectively. Wells W-11A and W-11B extend down to 55.10 ft. (657.14 ft. MSL) and 30.0 ft. (682.29 ft. MSL) respectively. Both wells W-10A and W-11A extend down to the sandy clay that separates an upper and lower aquifer. Well W-9 was installed at a location judged to be hydraulically upgradient from the existing and new monitoring wells. W-9 also extends down to the sandy clay layer 56.90 ft. (657.96 ft. MSL). Wells W-12 and W-13 were installed so that the bottom of the screens were set at 29.6 ft. (657.32 ft. MSL) and 35.0 ft. (679.01 ft. MSL) from the top of casing. Prior to installation of well W-13, the borehole was advanced to the sandy clay layer approximately 60 ft. so that groundwater samples could be retrieved and sampled at

discrete depth intervals.

All new monitoring wells, W-9 through W-13, were constructed of ten (10) foot sections of two-inch I.D. schedule 40 PVC casing with threaded joints. Screens were constructed of five (5) foot sections of No. 10 machine-slotted PVC material. The annular space between well screens and casing filled-in with native coarse grain materials up to the watertable. A two (2) foot thick bentonite seal was placed above the watertable, with the remaining annular space sealed with portland cement/bentonite mixture to within three (3) feet of the ground surface (a depth equivalent to the mean frost level). Above ground well protectors with locking caps were installed at wells W-9, W-10A, W-10B, W-11A, and W-11B. Flush mounted protective casings with manhole covers were installed at wells W-12 and W-13 at paved surfaces within potential vehicle and equipment traffic areas. All well protectors and protective casings were cemented in place. Well W-13 was added during field operations at the request of Torrington's representative to expand the scope of the groundwater assessment. All costs associated with installation and sampling of well W-13 were incurred by the Torrington Company. Monitoring well construction details are provided in Appendix B. Monitoring

well elevation data for existing and new wells are summarized in Table 1.

2.2 SOIL BORINGS

Five (5) locations were selected by the field engineer for subsurface exploration and sampling. These borings are numbered BP-1 through BP-5. The location for each of these borings was selected based on the pond locations shown on a site plan prepared by Canonie Engineers and the physical conditions of the existing grounds.

Soil borings were advanced to the watertable, and laboratory volatiles analysis was performed on pond #4 and #5 soils. Exploratory subsurface investigation methods employed during this phase of operation were explained in the preceding section - Monitoring Wells. Soil sampling, identification and equipment decontamination was also performed in accordance with the methods previously described herein. All boreholes were backfilled with a bentonite/soil cutting mixture. Soil boring logs and soil descriptions are provided in the Appendix.

2.3 SAMPLE COLLECTION METHODOLOGY

Monitoring Well Sampling

Groundwater samples for volatile organic and trace metals analyses were collected from existing 5-inch, 4-inch and 2-inch diameter monitoring wells. Additionally, seven (7) new 2-inch wells were installed and sampled. Plate 1 is a site plan showing the locations of all wells at the site. All groundwater samples were collected using a dedicated WaTerra sampling system, consisting of a 5/8" O.D. high-density polyethylene (HDPE) tubing and delrin plastic foot valve. A smaller diameter HDPE tube (1/4" O.D.) was inserted approximately seven (7) feet into the 5/8" O.D. sampling tube for volatile organic sampling. The small diameter tube allowed for a steady, laminar flow of sample water, minimizing the possibility of volatile losses.

Figure 2 is an illustration of the WaTerra sampler and the volatile sampling technique. Dedicated tubing and foot valves were used at each sampling location, thus eliminating the possibility of cross-contamination from sampling materials. Sample water for trace metals analyses was filtered into a polyethylene container preserved with concentrated nitric acid.

Disposable, in-line 0.45 um filters were attached directly to the WaTerra sampler for filtration. Dedicated filters were used at each sampling location.

The collection of a "representative" groundwater sample from monitoring wells has traditionally been a concern of environmental scientists. Volatile organic compounds are especially susceptible to losses due to agitation and de-gassing of the sample water. The recovery of volatile organics has been shown to be sensitive both to the method of sampling and the volume of water "purged" from a monitoring location prior to sampling.

The WaTerra sampling method described above has been reported to be a superior technique for the recovery of volatile compounds. In laboratory and field studies at the University of Waterloo, the recovery of volatile organics from the WaTerra pump was comparable to a positive displacement bladder pump. (The bladder pump has traditionally been accepted as the best sampling method for volatile organics. Bladder pumps, however, are difficult to decontaminate and cost-prohibitive to dedicate to a single sampling event.) Similar comparative studies of volatile recovery were reported in the Fall 1988 Groundwater

Monitoring Review. 1

Concentrations of analytes also vary depending upon volume of water purged from a monitoring location prior to sample collection. In an attempt to establish when the volatile concentrations were representative of the surrounding formation water, a "purge volume analysis" was performed on all monitoring wells. A single sample was collected at various purge volumes, and analyzed on-site with a portable gas chromatograph.

To facilitate the large purge of volumes required to do the purge volume analyses, a small 12 volt impeller pump was used to evacuate the wells. A small hose from the pump was placed just below the water surface, and a determined well volume was purged into 55-gallon drum containers. The desired well volume sample was then collected from the WaTerra pump as described above. The electric pump tubing contacted the well water at the surface only, while the WaTerra pump yielded a sample from the screened interval. The sample shipped to an analytical laboratory for GC/MS Method 8240 analysis was selected based on the field GC

1 Barker, J.F., and Dickout, R., "An Evaluation of Some Systems for Sampling Gas-Charged Ground Water for Volatile Organic Analysis", Groundwater Monitoring Review, fall 1988, Vol. 8, No. 3.

purge volume results. Based upon methods used and current sampling methodologies, groundwater samples selected for laboratory analysis appeared to be "representative".

Exploratory Drilling Sampling

In addition to the existing well sampling, ground water infiltrating boreholes prior to placement of the new monitoring wells was collected during exploratory drilling operations. This method was employed since representative saturated soil samples could not be retrieved because of native coarse materials heaving up inside the hollow-stem auger. Groundwater samples were retrieved by placing a dedicated WaTerra sampler at the bottom of the hollow-stem auger, and purging until two (2) WaTerra sample tubing volumes were removed. The discrete depth sample so obtained was immediately analyzed with the field GC. These results provided a vertical profile of volatile contaminants, and allowed optimization of the number and placement of well screens required to characterize subsurface conditions at each of the monitoring locations.

Pond Exploratory Sampling

Soil samples from each of the five (5) old ponds were

collected with a traditional split-spoon sampler. Sampling proceeded at two foot (2) intervals, and terminated at the surface of the water table. All soil samples were screened immediately with the portable GC. Samples for the field GC analyses were collected by placing a small amount of soil (approximately 1 g) into a tared vial containing 30 ml of reagent grade water. A Mettler Model PE 360 balance, accurate to $\pm$0.01g, was used for the field weight measurements. Soil samples for laboratory GC/MS Method 8240 VOC analyses were appropriately collected in 4 oz. glass containers with minimized headspace.

Soil Samples For Background Metals Determination

Two (2) soil samples were collected to determine background total metals concentrations on site. A sample of the fill sand used to provide a base for the concrete floors was collected from beneath the building. Care was taken to place this sample location as far away from any previous plant operation processes as possible. An office room located in the northwest section of the plant was chosen as the sample location (Plate 1). A concrete coring machine was utilized to advance a 4-inch diameter borehole through the concrete floor. Coring cuttings were carefully removed from the hole prior to sampling. A sample of the base sand

was removed from a depth of 18 inches with a cleaned stainless steel trowel and placed in a 4-ounce glass container with teflon lid. This sampling method duplicated the method utilized to collect soil samples from plant floor corings as reported in the BEST ENVIRONMENTAL ASSESSMENT, October 1990.

A second background soil sample was collected outside the plant building from auger cuttings produced during the installation of well W-9. Auger cuttings from a depth of approximately three (3) feet were placed in a 4-ounce container with teflon lid for analysis.

2.4 FIELD GC ANALYSES METHODOLOGY

All samples collected were analyzed on-site with a Photovac Model 1-S55 gas chromatograph photoionization detector (GC-PID). The GC-PID was equipped with a wide bore CPSIL : 5 capillary column encapsulated in an isothermal oven. The oven temperature was set at 40 degrees Centigrade. Zero-grade air was used as the carrier gas, with instrument flow rates set 8ml/minute. The instrument was configured in a "pre-column backflush" mode, comprised of a pre-column and an analytical column at a length ratio of 1 : 9. By programming the instrument to "backflush" heavier, slower

eluting compounds, the analysis time was decreased to the retention time of the last eluting desired analyte. The backflush allowed analyses to proceed rapidly with little chance of "carry-over" between samples.

The field GC-PID analyses utilized a "headspace" procedure for the qualitive determination of volatile organics. Aqueous headspace standards were prepared for the following compounds: trans-Dichloroethylene (trans-DCE); cis-Dichloroethylene (cis-DCE); Trichloroethylene (TCE); Perchloroethylene (PCE); 1,1,1-Trichloroethane (1,1,1-TCane); 1,1-Dichloroethane (1,1-DCane); Benzene; and Toluene. Ethylbenzene and Xylene(s) standards were also prepared for the pond soils analyses. The chlorinated solvent standards (trans-DCE; cis-DCE; PCE; 1,1,1-TCane; and 1,1-DCane) were made by injecting an appropriate microliter volume of a stock methanol standard into 30 ml of reagent grade water. Stock methanol standards were prepared at Daily Analytical Laboratories prior to the sampling event.

Aqueous headspace chlorinated solvent standards were made each day on-site. Standards for Benzene, Toluene, Ethylbenzene, and Xylene(s) (BETX) were prepared by diluting saturated aqueous solutions. Aqueous solubility data used in the standard preparation was taken from Mackay and

Sample vials were shaken vigorously to leach (potential) analytes into the water and establish vapor/liquid equilibrium prior to headspace analyses. Qualitative identifications were made by the retention time of the analytes. The isothermal oven served to minimize retention time drift. Qualitative identification was performed by the instrument peak area integrator and by chromatogram peak height measurement. The methodologies employed in utilizing the GC-PID follow the technology and procedures presented by USEPA Region 1 laboratory personnel. A brief bibliography on the use of portable instrumentation for environmental site assessments is provided in the reference list following the report narrative.

2.5 LABORATORY ANALYSIS, CHAIN-OF-CUSTODY AND SHIPPING PROCEDURES

Environmental Consultants, Inc. (ECI) Clarksville, Indiana provided volatile and metals analysis for the fifteen (15) wells. National Environmental Testing, Inc. (NET),

2. Mackay, D. and Shir, W.Y., "Critical review of Henry's Law Constants for Chemicals of Environmental Interest", Journal of Physical Chemistry, Vol. 10, No. 4, pp. 1187-1191, 1982.

Indianapolis, Indiana was also utilized to analyze "split" samples of wells W-7, S-3, W-9 and W-12 as a quality control measure. The two laboratories provided all sample containers and shipping coolers necessary for the project. Trip blanks were also provided by each laboratory and analyzed as part of the sampling protocol. Collected samples were immediately labeled and placed in coolers with "blue ice" for shipment. Prior to shipment a chain-of-custody document was completed and signed by the project manager and the courier. The document was then placed -17- inside the sample cooler for transport. United Parcel Service "Next Day Air" service was utilized to ensure timely delivery to the laboratory.

3.0 SITE DESCRIPTION

The subject property encompasses approximately fifteen (15) acres and is located at 3702 W. Sample Street, southwest of downtown South Bend, St. Joseph County in north-central Indiana (see Figure 1). Site improvements consist primarily of a 352,000 square foot industrial building with associated outbuildings and appurtenances. The facility has remained mostly vacant since it was closed in 1983.

3.1 REGIONAL GEOLOGY

Surficial deposits in St. Joseph County are composed of Pleistocene age glacial drift varying in thickness. Wisconsian glacialfluvial sand and gravels and some glaciolacustrine clays and silts comprise most of local surficial deposits. The sand and gravels are generally well sorted (poorly graded) and evenly bedded. These unconsolidated glacial deposits range in thickness from 80 to 200 feet. Interbedded within the sand and gravels are lenses of clay and sandy clay which vary in thickness and extent. Within the study area, the sand and gravel deposits are locally divided by a sandy clay layer which is approximately 20 to 30 feet thick. This clay layer is sufficiently impermeable to divide the sand and gravel deposits into two (2) separate unconfined or "watertable" aquifers, thereby creating an upper aquifer approximately 60 feet in thickness and a lower aquifer approximately 90 feet in thickness.

Unconsolidated glacial deposits are underlain by relatively impermeable blue-black shale formed during the Devonian or Mississippian period. The old bedrock land surface, heavily eroded by melting glaciers, was created by almost 280 million years of erosion. Deep valleys formed during this

erosive period were filled-in with large quantities of sand and gravel deposited during the Pleistocene glaciation.

3.2 REGIONAL HYDROGEOLOGY

Local groundwater hydrology has principally resulted from a glaciation. The sand and gravel deposited in the old St. Joseph-Kankakee River Valley during the Wisconsian period serves as the primary source of groundwater for this region. The present day St. Joseph River nearly follows the course of the ancient St. Joseph-Kankakee River. Previous studies indicate that the groundwater surface slopes gradually to the St. Joseph River and that the surface runoff within the study area is also directed toward the St. Joseph River.

There are two (2) aquifers which are reported to be below the subject site: an upper aquifer approximately 60 feet thick consisting of fine to coarse sands with some gravel; and a lower sand and gravel aquifer having a saturated thickness of approximately 90 ft. The aquifers are separated by a sandy clay till of varying thickness.

The lower aquifer is the source of groundwater for most major local industrial, commercial, and municipal users. The upper aquifer may be a source of groundwater for some

residential users.

The City of South Bend has municipal well fields at Oliver Park, approximately 1 mile to the east of the Torrington site, and at the municipal airport, approximately 3.0 miles north of the subject site. The city also operates a well field at the north station (Leeper Park) location, along the St. Joseph River, 3.0 miles northeast of the subject site.

These municipal wells are completed in the deeper sand and gravel deposits. The hydraulic conductivity of the lower aquifer is estimated at 200 feet per year.

Torrington production wells No. 3 and 4 are also completed in the deeper unconsolidated deposits. Well No. 3 was constructed so that a steel casing provides a seal through the clay layer (aquitard) that separates the upper and lower aquifer. This seal prevents water from the upper aquifer entering into the lower aquifer.

Well No. 4 was installed using a reverse circulation method. This method creates a pathway through the clay layer (aquitard) allowing production from both upper and lower aquifers. These two (2) wells are no longer being used.

Other studies indicate that the shallow (upper) aquifer may be used as a residential water source approximately 2 miles north of the site. A potential receptor survey was not conducted as part of this investigation. The hydraulic conductivity in the upper aquifer has been estimated to be between 35 to 350 feet per year with the flow toward the north/northeast.

4.0 DESCRIPTION OF SUBSURFACE CONDITIONS

4.1 SOILS

Subsurface exploratory data revealed that in undisturbed areas at the Torrington site, topsoil, approximately two and a half feet thick, overlies a light brown fine to medium sand. As the boreholes were advanced below the watertable, sampling methods were modified since representative soil samples could not be retrieved using the planned split spoon recovery method. At twenty-foot depths, 6 to 8 feet of coarse grain native materials were heaving up inside the hollow-stem auger under hydrostatic pressure. Deeper subsurface soil conditions were judged based upon auger response and soil cuttings brought to the surface. Groundwater was typically encountered at approximately 8 to 10 feet below the ground surface at all sampling locations.

Auger cuttings revealed that deeper unconsolidated materials consisted primarily of a brown, medium to coarse sand with some gravel until the sandy clay layer was encountered at approximately 60 feet below the ground surface. At all boreholes, based upon auger response, a gravel layer was encountered at approximately 22 to 25 feet below the ground surface.

Regional geologic information suggests that there is a potential for clay lenses to occur within the sand and gravel deposits of the upper aquifer system. Soil boring logs completed by others for well W-1 and Torrington production well No. 3 indicate that clay layers or lenses are present at the site (at 34 foot and 17 foot depths respectively). Although no clay lenses were found during this investigation at the Torrington site their presence within the upper aquifer, could have a significant bearing upon contaminant migration and recovery system design because of the physical characteristics of the contaminants present. (See item No. 2 of Section 5.0 for further discussion on this topic).

During exploratory operations at upgradient or background well W-9, the borehole was advanced 56.5 feet to the sandy clay layer which locally separates the upper and lower

aquifer systems beneath the site. A split-spoon sampler was driven 24 inches into this clay layer and a sample was recovered. The soil sample was described as a gray sandy clay with a trace of pebbles, and judged to be an unweathered glacial till. Based upon previous engineering experience, the physical characteristics of the clay soil sample were judged sufficient in density and consistency to hydraulically separate the upper and lower deposit. The thickness of this clay layer beneath the site as reported in Torrington production well logs for wells No. 3 and No. 4 range from 21 to 16 feet respectively.

4.2 GROUNDWATER HYDROLOGY

Water level elevations in site monitoring wells vary from 704.88 ft. MSL at upgradient well W-9 to 703.95 ft. MSL at downgradient well W-11. Water levels recorded in each of the wells on site do not vary significantly form those found in the 1984 Canonie study but are approximately three (3) to four (4) feet higher than those reported in the 1948 study conducted by F.H. Klaer, Jr., and R.W. Stallman. These differences are likely due to climatic variations, seasonal variations, and changes in industrial and public use rates.

While measured water levels in each well will vary, plotted groundwater surface (piezometric) contours (see Plate 1) indicate that the generalized direction of groundwater movement within the upper aquifer system at the Torrington site is from south to north. Interpretation of interpolated groundwater data suggests that south of the main plant in the vicinity of W-9, groundwater flow is slightly west of north, and north of the main plant building in the vicinity of W-10 and W-11, groundwater flow is slightly east of north. This appears to be a more northern direction of flow than previously reported in the 1948 study. The slight difference in direction of flow can be attributed to numerous factors, such as areas of heavy groundwater pumping (i.e. the groundwater remediation program underway at the Allied-Bendix facility located approximately one mile north of the Torrington site), variation of subsurface conditions within these glaciofluvial deposits, changes to local recharge and discharge area affected by development or changes in land uses, etc.

The results of pumping tests on municipal and industrial wells in the South Bend area showed aquifer transmissibilities ranging from 100,000 to 500,000 gallons per day per foot (GPD/FT). Water level measurements

indicate that the hydraulic gradient (s) across the Torrington site is approximately 0.0007 feet per foot (FT/FT). Based upon calculation methods using mean diameter, d-50 and d-10 grain sizes obtained from sieve analysis of collected "representative" soil samples, and previous study findings, hydraulic conductivity (K) within the upper aquifer is estimated to be approximately 2,700 gallons per day per square foot (GPD/SQ FT). Using a saturated thickness of 51 feet, the transmissivity (T) of the upper aquifer is estimated to be approximately 137,700 GPD/FT. Using the measured hydraulic gradient (s) of 0.0007 FT/FT and a saturated thickness (t) of 51 feet, the groundwater flow rate (specific discharge) across the site is estimated to be approximately one quarter (1/4) foot per day (FT/DAY).

4.3 ANALYTICAL RESULTS

Field GC Results - Groundwater Volatiles

The results of the purge of volume analyses are presented in Table 2 and graphically depicted in Figures 4 through 11. Included on each graph is a notation indicating the interval of collection for the single laboratory GC/MS Method 8240 sample.

Also included in Table 2 and in Figures 12 through 14 are the results of the exploratory (new well) borings and pond boring sample analyses. The results of the initial boring samples and subsequent monitoring well purge volume analyses correlate very well. Those compounds detected at various depths in the borings were also detected after the installation and sampling of monitoring wells.

At wells W-10A and W-10B, the initial boring and shallow well purge analyses both show the majority of the contamination occurring at the thirty (30) foot depth. At sixty (60) feet, the only compound detected (of the field-calibrated compounds listed above) was cis-Dichloroethylene (cis-DCE). Cis-DCE was rather ubiquitous at the site, detected in wells W-10A, W-10B, W-11A, W-11B, W-12, W-13, S-3, and W-7.

The graph of concentration versus depth in Figure 12 for boring 10 (well W-10A) may offer one explanation for the presence of cis-DCE in the wells screened at various depths. The cis-DCE curve is similar to that for 1,1,1-TCane, 1,1-DCane, and TCE, with an apparent peak at the thirty (30) foot depth and decreasing to none detected at forty (40) feet. At the fifty (50) foot depth, however, a much higher concentration (40 ug/L) is again detected.

Cis-DCE was also detected at a deeper depth in boring 11 (W-11A). The exception to this trend is at boring 13 (W-13), where the highest cis-DCE concentration was at twenty (20) foot depth.

Cis-DCE is a biodegradation product of Trichloroethylene (TCE) and 1,1,1-Trichloroethane. Vinyl Chloride is the final natural degradation product of these compounds (see Figure 3). The field GC was not calibrated for the detection of vinyl chloride. However, it should be noted that vinyl chloride's presence is a possibility related to the presence of cis-DCE. The natural degradiation process is anaerobic, and the deeper depths where cis-DCE was prevalent would likely provide an oxygen deficient environment conducive to the microbial transformations of the TCE and 1,1,1-TCane.

The purge volume analyses graphs shown in Figures 4 through 11, indicate that the amount of purging required to produce a "representative" sample may vary. At well S-3, the volatile concentrations appear constant from three (3) to seven (7) well volumes, but then increased significantly again at nine (9) and ten (10) well volumes. At wells W-3 and W-7, 1,1,1-Trichloroethane was detected initially, but decreased to less than detection limits. The WaTerra

sampling method used withdrew groundwater directly from the well screened area. This procedure does allow sampling from the surrounding soil formation, bypassing influences from the stagnant well column. The purge volume graphs illustrate where the laboratory GC/MS Method 8240 results would be on the respective concentration curves.

The field analyses at W-10B (30') during the actual boring reported a 1,1,1-TCane concentration of 360 ug/L at thirty (30) foot depth. The well was then constructed at this depth. On the subsequent field purge analyses, a 1,1,1-TCane concentration of 340 ug/L, was detected prior to any purging. As illustrated on the graph in Figure 8, the concentrations of volatile compounds then decreased with purging. The sample collected at seven (7) well purge volumes yielded field and laboratory results of 91 and 130 ug/L, respectively. Variations in levels of contamination found at different sampling intervals may be due to several factors.

Field GC and Laboratory Results - Pond Sediments

The pond samples were virtually devoid of volatile target parameters (Table 2 - pages 12 and 13). Trace amounts of 1,1-DCane and 1,1,1-TCane were detected in Pond 4 soil

sample; however, the concentrations were below a reliable quantitation limit with the GC-PID instrument. 1,1-DCane was detected in Pond 4 sediments at 560 ug/kg by ECI. No volatiles were detected in Pond 5 sediments by field GC nor by ECI. As mentioned, the borings were terminated at the surface of the water table.

Comparison of Field vs. Laboratory Analytical Results-Groundwater Volatiles

Table 3 is a summary of field GC-PID results vs. the corresponding laboratory GC/MS data. Also included in Table 3 are the results of four (4) sample locations "split" with a second laboratory.

All results appear to be consistent. At all sample locations, the laboratory GC/MS results confirm the "less than" detection values reported with the field analyses. There are two (2) data sets that show significant variances between concentrations of detected analyses. After seven (7) well volumes were removed at well S-3, the field GC result for 1,1-DCane (450 ug/L) was quite lower than the Environmental Consultants, Inc. (ECI) laboratory result (860 ug/L). National Environmental Testing, Inc. (NET) reported a concentration in the middle range (690 ug/L). As noted

above, the concentrations of volatiles did appear to increase with further purging at this monitoring location.

At well W-7, the field GC and ECI laboratory results both report similar concentrations of cis-DCE (45 and 62 ug/L, respectively). The NET split sample for this compound shows less than the method detection limit (<1 ug/L). It is difficult to discount the presence of cis-DCE here, as it was detected in all four (4) of the field purge volume analyses. Overall, the groundwater volatile organic compounds (VOC) data for field analyses and laboratory analyses were consistent.

Groundwater Metals

Total metal concentrations (ppb) for arsenic, chromium and lead found in all site monitoring wells are contained in Table 4. No significant levels of the three (3) metals were found in any of the wells, with most concentrations falling below detection limits. Relatively higher concentrations were indicated at W-11B than other wells. A review of the field sampling logs indicated a problem with the in-line filter used to collect the metals sample at this well. As a result, the sample collected was somewhat turbid. Turbidity indicates the presence of soil particles, on which metals

ions will absorb. The acid preservation method that was used as standard protocol likely desorbed the metals from the solids resulting in dissolved metals concentrations higher than originally existed. In any case the metals concentrations found at all wells on site were below EPA MCL's for drinking water (see Table 5).

Background Soil Metals

Table 4 also contains total metals results (ppm) for two (2 samples taken to assess representative background soil metals concentrations. Sample M-2 was taken outside the building from auger cuttings at well W-9. This location was chosen due to remoteness from the buildings and ponds. Total metal levels for all 8 (eight) RCRA metals were less than 5 mg/kg (ppm). Sample M-1 was taken from beneath the plant floor in an area judged to be well away from the previous plant operations and potential contamination. Total metals concentrations were considerably higher at M-1 for barium, chromium and lead (66.7, 10.8, and 76.6 ppm respectively) than at M-2.

The native sandy soil found at the site, described in all soil borings including the W-9 auger cuttings (M-2), consisted of a dark brown medium sand with some small

pebbles. This native soil appears in contrast to the bright orange to rusty fine sand found below the plant concrete floors. A review of the floor boring field logs from the October 1990 BEST ENVIRONMENTAL ASSESSMENT study indicated that nearly all of the soil samples analyzed were described as "orange-reddish fine sand". These observations and the fact that a common practice is to truck in quarry sand for base material in concrete construction may be offered as an explanation for the differences in total metals concentrations in the two sand types. Native soils often demonstrate wide ranging levels of naturally-occurring metals depending on soil types and location. Typical native soil total metals concentrations may range from 0.1-5.0 ppm, 1.0-40 ppm, 5.0-3000 ppm, and 2.0-200 ppm for silver, arsenic, chromium, and lead, respectively. 3

Comparison of Results With Previous Sampling Events

The BEST ENVIRONMENTAL ASSESSMENT of October 1990 includes a Table 3 summarizing the groundwater volatile (VOC) from four (4) previous sampling events. The data from the Canonie Environmental Assessment (1984) and two (2) BEST sampling

3 Hazardous Management Control Research Institute (HMCRI). 1988. soil Chemistry of Hazardous Material. Table 1.

events (1990) appear consistent with the findings of this report on the initial monitoring wells. The Harza report (1986) does seem to be at variance with all other data. Concentrations of volatiles do vary in some cases between the Canonie and BEST sampling events; however, temporal changes and different sampling methods and well purging volumes are certainly two explanations.

The data since 1984 are consistent with natural transformation processes. Figure 3 is a flowchart illustrating the breakdown products of 1,1,1-TCane, PCE, and TCE. The data from the 1990 BEST report and the current assessment both show higher concentrations of the biodegradiation products cis-DCE, vinyl chloride, and chloroethane. The rate and extent to which the chlorinated solvents will degrade completely to vinyl chloride is not known; however, increasing vinyl chloride concentrations over time are likely.

1,1-Dichyloroethylene (1,1-DCE) is a hydrolysis product of 1,1,1-TCane. The hydrolysis transformation is of course more rapid than the biodegradation process, and the 1,1-DCE compound had been detected since the initial 1984 Canonie Report.

5.0 DISCUSSION OF FINDINGS AND RECOMMENDATIONS

The objective of this subsurface investigation was to assess subsurface conditions at the Torrington site regarding the reported presence of volatile organic compounds and dissolved metals in the groundwater and VOC in the pond soils. This investigation was conducted within the approved work scope so that a remedial action plan could be prepared which contains suggestions and cost estimates for remediation of potentially contaminated groundwater and/or soils.

This report presents the observations and findings obtained from field and laboratory investigations of the Torrington site performed in January and February of 1991, and other information sources as referenced in the bibliography following the report narrative. This report also includes recommendations for further investigative work and includes suggestions and preliminary cost estimates for groundwater remediation, pit contents disposal, paint chip removal and disposal, as well as Pond #4 remediation.

After reviewing available information regarding the subsurface conditions of the Torrington site, the following observations can be made:

1. Analytical findings revealed that volatile organic compound (VOC) contamination was detected in groundwater retrieved at monitoring well locations W-4, S-3, W-7, W-10A, W-10B, W-11A, W-11B, W-12, W-13 and within site soils at Pond #4. The volatile organic compounds detected were: Chloroethane, 1,1-Dichloroethane; trans-1,2-Dichloroethylene; 1,1,1-Trichloroethane; Trichloroethylene; Vinyl Chloride; 1-1,1-Dichloroethene; and cis-1, 2-Dichloroethene. According to Susan Wyss of the State Clean-up Section, Environmental Response Department, IDEM, the State of Indiana uses the maximum contaminant levels (MCLs) contained in 40 CFR, Sections 141.60 and 141.11, Subpart G- National Revised Primary Drinking Water Regulations, Maximum Contaminant Levels for Organic Contaminants; and section 141.11: Subpart B- Maximum Contaminant Levels for Inorganic Chemicals for their groundwater remedial criteria. For those priority pollutants not listed in the Federal MCLs IDEM uses a risk analysis for each potential carcinogenic contaminant based upon risk exposure (at 10-6) to the population. Current and recently adopted MCLs (which will be effective as of July 30, 1992) are listed in Table 5. Those contaminants not contained in the federal MCLs will have to be evaluated using IDEM's

risk analysis methods to determine required clean-up objectives.

Table 3 details and compares the levels of VOC contaminants detected in groundwater samples using field GC-PID and laboratory GC/MS methods. MCLs were exceeded at four (4) monitoring wells locations S-3, W-7, W-10B, and W-12. Table 6 summarizes laboratory analytical results from collected groundwater samples and compares results with current and recently adopted federal MCLs. Exceeded MCLs are typed in bold. Of the eight (8) volatile organic contaminants detected at the site, only six (6) have adopted MCLs, other contaminant clean-up levels will have to be determined by IDEM using risk analysis methods, discussed above.

2. In addition to assessing groundwater quality at the Torrington site, one of the objectives of this investigation was to characterize subsurface geologic conditions at the site.

Previous studies indicated that a relatively thick (20 to 30 foot) impermeable clay layer exists below the site at approximately 60 feet. This clay layer separates two sand and gravel deposits, known at the

upper and lower aquifer. Soil boring logs, completed by others, indicate that within the upper aquifer, there are clay lenses, varying in thickness.

If clay lenses are shallow and near sources of a contaminate release they can act as a shelf, allowing a contaminant to pool or accumulate on its surface. These pockets of contamination or "perched pools" within the aquifer can later serve as a secondary source of contamination.

3. Analytical data confirmed previous study findings which indicate that the most significant area of contamination was found in the vicinity of Well S-3. This area has been and remains to be an area of remedial concern. MCLs are exceeded for five (5) priority pollutants at well S-3.

Contaminated groundwater was also found at down gradient wells W-7, W-10B, and W-12. While contaminant levels just slightly exceed MCL standards, parameter detection at these locations suggests that possible source areas, other than S-3, may be responsible for their presence. A brief discussion follows:

a. Analytical data revealed that when contamination was detected during exploratory operations, it appeared to be mostly located within a zone at approximately 30 to 40 feet below the ground surface. This could be attributed to a number of factors including contaminant solubility and dispersion properties, changes in hydraulic conductivity within the heterogeneous soil materials found on site, differing contaminant retention ability of the different size soil particles, etc. During the exploratory drilling operations, a gravel layer was detected at each of the borings at approximately 20 to 25 feet below the ground surface. This zone could exhibit higher values of hydraulic conductivity than the surrounding in-situ materials which in turn could attribute to increasing "flushing" of contaminants.

b. Hydrogeologic data indicates that the general direction of groundwater flow across the site is from south to north. While only low levels of contamination were detected at wells W-13 and W-7, down gradient from S-3, substantially more contamination was detected further down gradient

at W-10B. In fact, groundwater sampling performed during the initial exploratory operations at W-10 and during purge volume analysis of W-10B revealed that 1,1,1TCA levels exceeded the MCL.

Interpretation of groundwater data generally indicates the contamination found at W-7 and W-13 most likely originated from the S-3 area while an argument could be made supporting another source, it appears that the contamination found at W-10B also originated from the S-3 area. Further investigations may be appropriate to better define the source of contamination.

c. VOC contamination was also detected in the monitoring wells located along the east side of the plant. Low levels of contamination were found at W-2 by Canonie (1984) and at W-1 by BEST (1990). 1,1 DCE was detected at W-12 at levels exceeding the MCL. The general direction of groundwater movement across the site would make it very unlikely for S-3 to be the source of contamination of this area. Other potential sources could have been the Stoddard Solvent or Mobilmet-Omicron tanks located along the plant's

east side.

d. Chlorinated solvents will, under favorable environmental conditions, naturally biodegrade into simpler compounds. Figure 3 depicts the transformation of various volatile organic substances into simpler compounds. The general presence of 1,1,1 TCA degradation by-products, such as cis-1,2-DCE and trans-1,2,DCE and the absence of other detected compounds at the deeper depths of the upper aquifer can only be theorized at this time. Their occurrence could be due to changes in hydrologic conditions, such as changes in the direction and rate of groundwater flow as related to seasonal or climatic changes, or changes in subsurface geology, or their occurence could be made due to other potential sources not identified at this time. By-product containment levels were generally found to be well below MCL standards. Their presence indicates that degradation of the various detected volatile organic priority pollutants are in the advanced phases (see Figure 3).

e. Analytical data from upgradient well W-9 (see Plate 1) was interpreted to indicate that no detectable sources of groundwater contamination are originating from areas upgradient of the W-9 location. In other words, no contaminated groundwater was observed flowing onto the site at W-9. Additional upgradient wells may be needed at other locations on and off-site, to investigate groundwater quality coming on-site in the vicinity of W-10B.

4. Total dissolved metals data (Table 4) indicated that no significant levels of the three metals (arsenic, chromium and lead) were present in any of the site monitoring wells. In no case were MCL's for these metals exceeded at the site. A concern was expressed in a review of the BEST ENVIRONMENTAL ASSESSMENT (1990) in regard to groundwater metals concentrations detected in wells W-1 and S-3 from the August 9, 1990 sampling event. Although the September 10, 1990 sampling event data did not indicate the same elevated levels at wells W-1 and S-3, the present study analysis for groundwater metals was included to address this issue. A review of the field data logs for the August 9, 1990 sampling event indicated that the samples collected for metals

analyses were slightly turbid. As discussed above, turbidity can cause elevated metals results due to desorbtion of metal ions from the suspended soil particles during analytical procedures. Based upon the above reasoning, it is our opinion that the elevated metals concentrations detected at W-1 and S-3 in the August 9, 1990 samples are not representative of the true levels present at the site. The concentrations of dissolved groundwater metals indicated by the present study are most likely representative of the actual levels present. In as much, the dissolved metals concentrations should not complicate the treatment/remediation approaches for the groundwater.

5. Total metals results for the two (2) background soil samples (M-1 and M-2, Table 4) indicated considerably higher levels present in the sand comprising the subfloor soils. Physical descriptions from the site boring logs and sampling logs suggest that the subfloor soils are not native to the site and may have been brought in during construction of the plant. Higher background total metals concentrations (particularly for barium, chrome and lead) present in the concrete base sand may be responsible for the levels detected in the EPToxic (leachate) analysis conducted during

the BEST ENVIRONMENTAL ASSESSMENT (1990). Leachate metals concentrations for arsenic, cadmium and silver (those metals considered to be present on the site at levels potentially problematic) detected in the floor borings samples were in all cases less than 19 ppb. It is doubtful that levels of total metals necessary to produce leachate concentrations this low would constitute levels deemed necessary to remediate, especially if these total metal concentrations are representative of background levels. A resampling of the floor boring locations and subsequent total metals analysis would not appear necessary in light of the above data and considering that the groundwater does not indicate evidence of metals contamination.

6. Soil boring data from Pond #4 (BP-4) indicates the presence of a two (2) foot thick lens of dark, contaminated soil. Low levels of VOC were detected in both the field GC and laboratory analyses (Table 2 and 4) of these soils. Physical evidence of contamination alone may be sufficient cause to necessitate remediation. BEST also considers these soils at Pond #4 a potential source of groundwater contamination and therefore recommends further investigative study or excavation and disposal. No detectable levels of VOC

were found in soils from Pond #5 (BP-5).

6.0 SUMMARY

The purpose of this subsurface investigation was to assess groundwater quality at the Torrington site so that a remedial action plan and cost estimates could be prepared which addresses clean up of contaminated groundwater and/or soils.

1. Groundwater (VOC) contamination was detected at four (4) monitoring well locations at the Torrington site where collected water samples exceeded federally established MCL standards. Affected areas were located at wells S-3, W-7, W-10, and W-12.

2. Available data indicates the major source of groundwater (VOC) contamination at the site appears to be in the vicinity of well S-3. Previous remedial work included the removal of approximately 1600 cu. yds. of contaminated soil from this location.

3. Interpretation of analytical data and site hydrogeologic conditions suggest that the (VOC) contamination detected at wells W-7 and W-10B

originated from the S-3 area and that the contamination detected at well W-12 originated from another on-site source possibly located at the east side of the plant.

4. Groundwater total metals (arsenic, chromium and lead) were not detected on the site at concentrations in excess of the EPA MCL's. The groundwater does not appear to have been impacted by metals and therefore remediation of the VOC will not be complicated with a second contamination type.

5. Background total metals concentrations were higher in the non-native soils beneath the plant floors than background levels in soils native to the site. Leachate (EP Toxic) metals concentrations detected in floor borings samples taken during the BEST 1990 investigation may well be within levels attributable to the background total metals concentrations. BEST does not interpret available data to indicate remediation necessary in the sub-floor areas previously sampled.

6. Pond #4 sediments contain visual and VOC contamination. These sediments may also be a potential source of groundwater contamination. These soils will require

further investigations or remediaton. Cost estimates for excavation and disposal are based upon an area 75′ x 30′ x 3′ (estimated dimensions of Pond #4 from 1984 Canonie Report) and are contained in Appendix A.

7. Suggested remedial action measures and cost estimates for the removal and treatment of contaminated groundwater within the boundaries of the Torrington site are provided in Appendix A.

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TABLE 1

MONITORING WELL ELEVATION DATA

WELL NO.	GROUND ELEV.	TOP OF CASING ELEV.	DEPTH OF WELL	BOTTOM OF SCREEN ELEV.	DEPTH OF WATER	WATER LEVEL ELEV.
W-1	(713.46)	(712.17)	(64.08)	(649.46)	7.80	704.37
W-2	712.44 (712.42)	712.86 (712.87)	(37.08)	(675.44)	8.20	704.66
W-3	712.95 (712.90)	711.97	(61.08)	(651.95)	7.36	704.61
W-4	710.17 (710.31)	713.21 (713.16)	(33.08)	(677.17)	8.64	704.57
W-5	709.86 (712.33)	713.58 (713.63)	(35.08)	(677.33)	8.96	704.62
S-3	710.39 (710.38)	710.16	24.58	685.81	5.73	704.44
W-7	713.08	713.63	(35.08)	(678.08)	9.32	704.31
W-8	713.09	713.91	(61.08)	(652.09)	9.61	704.30
W-9	712.52	714.86	56.90	657.96	9.98	704.88
W-10A	712.64	714.74	60.61	654.13	10.74	704.00
W-10B	712.68	714.80	30.25	684.55	10.80	704.00
W-11A	712.24	714.79	57.65	657.14	10.84	703.95
W-11B	712.29	714.56	32.27	682.29	10.60	703.96
W-12	713.05	712.92	29.68	683.24	8.58	704.34
W-13	714.22	714.01	35.08	678.93	9.62	704.39

NOTES:

1. Figures in parenthesis were obtained from the 1984 Canonie report other data field measured.
2. All depths in feet, measured from top of casing.
3. All elevations in feet, mean sea level.

TABLE 2

GC-PID Field Screening Results (all units ug/L)

WELL W-1

Compound	Purge Volume 0 gal.	10 gal.	20 gal.	40 gal.	150 gal. (3 w.v.)*
trans-DCE	<5	<5	<5	<5	<5
cis-DCE	<5	<5	<5	<5	<5
TCE	<5	<5	<5	<5	<5
PCE	<5	<5	<5	<5	<5
1,1,1-TCane	<10	<10	<10	<10	<10
1,1-DCane	<10	<10	<10	<10	<10
Benzene	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5

WELL W-2

Compound	Purge Volume 0 gal.	40 gal. (1.5 w.v.)	80 gal. (3 w.v.)
trans-DCE	<2	<2	<2
cis-DCE	<5	<5	<5
TCE	<5	<5	<5
PCE	<5	<5	<5
1,1,1-TCane	<10	<10	<10
1,1-DCane	<10	<10	<10
Benzene	<5	<5	<5
Toluene	<5	<5	<5

* w.v. = Well volumes

TABLE 2
Page 2

WELL W-3

Compound	Purge Volume 0 gal.	100 gal. 2 w.v.	150 gal. 3 w.v.	230 gal. 4.6 w.v.
trans-DCE	<2	<2	<2	<2
cis-DCE	<5	<5	<5	<5
TCE	<5	<5	<5	<5
PCE	<5	<5	<5	<5
1,1,1-TCane	22	50	<10	<10
1,1-DCane	<10	<10	<10	<10
Benzene	<5	<5	<5	<5
Toluene	<5	<5	<5	<5

WELL S-3

Compound	Purge Volume 0 gal.	3 w.v.	5 w.v.	7 w.v.	9 w.v.	10 w.v.
trans-DCE	<10	<10	<10	<10	<10	<10
cis-DCE	170	540*	560*	510*	530*	630*
TCE	59	130	70	75	60	87
PCE	<50	<10	<10	<10	<10	<10
1,1,1-TCane	180	1030	1020	1030	1420	1470
1,1-DCane	120	520	490	450	600	615
Benzene	<10	<10	<10	<10	NT	<10
Toluene	<10	<10	<10	<10	NT	NT

* = peak off-scale
NT = Not Tested

TABLE 2
Page 3

WELL W-4

Compound	Purge Volume 0 gal.	1 w.v.	2 w.v.	3 w.v.	4 w.v.	5 w.v.
trans-DCE	<20	<20	<10	<10	<2	<2
cis-DCE	<50	<50	<25	<25	<5	<5
TCE	<50	<50	<25	<25	NT	<5
PCE	<50	<50	<25	<25	NT	<5
1,1,1-TCane	940	935	150	150	100	130
1,1-DCane	780	700	110	110	75	98
Benzene	<50	<50	<25	<25	<5	<5
Toluene	<50	<50	<25	<25	<5	<5

WELL W-5

Compound	Purge Volume 0 gal.	55 gal. 2 w.v.	80 gal. 3 w.v.	110 gal. 4 w.v.
trans-DCE	<2	<2	<2	<2
cis-DCE	<5	<5	<5	<5
TCE	<5	<5	<5	<5
PCE	<5	<5	<5	<5
1,1,1-TCane	<10	<10	<10	<10
1,1-DCane	<10	<10	<10	<10
Benzene	<5	<5	<5	<5
Toluene	<5	<5	<5	<5

NT = Not Tested

TABLE 2
Page 4

WELL W-7

Compound	Purge Volume 0 w.v.	1 w.v.	3 w.v.	5 w.v.
trans-DCE	<5	<5 (2.1)	<5 (2.8)	5
cis-DCE	10	41	45	45
TCE	<5	<5	<5	<5
PCE	<5	<5	<5	NT
1,1,1-TCane	81	<10 (8)	<10 (7)	<10
1,1-DCane	<30	<30	<30	<30
Benzene	<5	<5	<5	<5
Toluene	<5	<5	<5	<5

WELL W-8

Compound	Purge Volume 0 gal.	2 w.v.	3 w.v.
trans-DCE	<2	<2	<2
cis-DCE	<5	<5	<5
TCE	<5	<5	<5
PCE	<5	NT	NT
1,1,1-TCane	<10	<10	<10
1,1-DCane	<10	<10	<10
Benzene	<5	<5	<5
Toluene	<5	<5	<5

NT = Not Tested

TABLE 2
Page 5

WELL W-9

Compound	Purge Volume 0 w.v.	3 w.v.	7 w.v.
trans-DCE	<5	<5	<5
cis-DCE	<5	<5	<5
TCE	<5	<5	<5
PCE	NT	NT	NT
1,1,1-TCane	<10	<10	<10
1,1-DCane	<10	<10	<10

WELL 10-A (60')

Compound	Purge Volume 0 w.v.	1 w.v.	3 w.v.	5 w.v.	7 w.v.	9 w.v.
trans-DCE	<5	<5	<5	<5	<5	<5
cis-DCE	8	7	6	5	5	5
TCE	<5	<5	<5	<5	<5	<5
PCE	<5	<5	<5	<5	<5	<5
1,1,1-TCane	<10	<10	<10	<10	<10	<10
1,1-DCane	<10	<10	<10	<10	<10	<10
Benzene	<5	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5	<5

NT = Not Tested

TABLE 2
Page 6

WELL W-10B (30')

Compound	Purge Volume 0 w.v.	1 w.v.	3 w.v.	5 w.v.	7 w.v.	9 w.v	1
trans-DCE	<5	<5	<5	<5	<5	<5	
cis-DCE	<5 (1.8)	<5 (3)	<5 (4)	<5 (4)	<5(4)	<5(4)	
TCE	9	14	17	17	15	17	
PCE	<5	<5	<5	<5	<5	NT	
1,1,1-TCane	340	240	195	130	91	140	
1,1-DCane	<10(9)	21	23	22	22	21	
Benzene	<5	<5	<5	<5	<5	<5	
Toluene	<5	<5	<5	<5	<5	<5	

WELL W-11A (60')

Compound	Purge Volume 0 w.v.	3 w.v.	5 w.v.	7 w.v.	9 w.v.	11 w.v.
trans-DCE	<5	<5	<5	<5	<5	<5
cis-DCE	16	17	18	11	12	12
TCE	<5	<5	<5	<5	<5	<5
PCE	<5	<5	<5	<5	<5	<5
1,1,1-TCane	<10	<10	<10	<10	<10	<10
1,1-DCane	<10	<10	<10	<10	<10	<10

NT = Not Tested

TABLE 2
Page 7

WELL W-11B (30')

Compound	Purge Volume 1 w.v.	3 w.v.	5 w.v.	7 w.v.	9 w.v.	11 w.v.
trans-DCE	<5	<5	<5	<5	<5	<5
cis-DCE	<5(2.5)	11	11	13	11	13
TCE	<5	<5	<5	<5	<5	<5
PCE	<5	<5	<5	<5	<5	<5
1,1,1-TCane	<10	<10	<10	<10	<10	<10
1,1-DCane	<10	<10	<10	<10	<10	<10

WELL W-12

Compound	Purge Volume 0 w.v.	3 w.v.	7 w.v.
trans-DCE	<5	<5	<5
cis-DCE	<5 (1)	<5 (1)	<5 (1)
TCE	<5	<5	<5
PCE	<5	<5	NT
1,1,1-TCane	<10	<10	<10
1,1-DCane	<10	<10	<10

NT = Not Tested

TABLE 2
Page 8

WELL W-13

Compound	Purge Volume 0 w.v.	3 w.v.	5 w.v.	7 w.v.
trans-DCe	<5	<5	<5	<5
cis-DCE	17	<5 (3)	<5 (3)	<5 (1.6)
TCE	<5	<5	<5	<5
PCE	<5	<5	<5	<5
1,1,1-TCane	<10	<10	<10	<10
1,1-DCane	12	25	25	27

TABLE 2
Page 9

Boring 9 - Upgradient Groundwater Samples * (W-9)

Compound	10′	20′	30′	40′	50′
trans-DCE	<5	<5	<5	<5	<5
cis-DCE	<5	<5	<5	<5	<5
TCE	<5	<5	<5	<5	<5
PCE	<5	<5	<5	<5	<5
1,1,1-TCane	<10	<10	<10	<10	<10
1,1-DCane	<10	<10	<10	<10	<10
Benzene	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5

Boring 10 - Groundwater Samples * (W-10)

Compound	20′	30′	40′	50′
trans-DCE	<5	<5	<5	<5
cis-DCE	<5	<5 (2.3)	<5	40
TCE	<5 (4.7)	16	10	6
PCE	<5	<5	<5	<5
1,1,1-TCane	330	360	310	27
1,1-DCane	<15	28	12	<10
Benzene	<5	<5	<5	<5
Toluene	<5	<5	<5	<5

* = sampled with WaTerra pump at bottom of borehole

TABLE 2
Page 10

Boring 11 - Groundwater Samples (W-11A)

Compound	10′	20′	30′	40′	50′
trans-DCE	<5	<5	<5	<5	<5
cis-DCE	<5	<5	<5	10	15
TCE	<5	<5	<5	<5	<5
PCE	<5	<5	<5	<5	<5
1,1,1-TCane	<10	<10	<10	<10	<10
1,1-DCane	<10	<10	<10	<10	<10
Benzene	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5

Boring 13 - Groundwater Samples (W-13)

Compound	20′	30′	40′	50′	57′
trans-DCE	<5	<5	<5	<5	<5
cis-DCE	62	47	17	19	18
TCE	<5	<5	<5	<5	<5
PCE	<5	<5	<5	<5	<5
1,1,1-TCane	<10	<10	<10	<10	<10
1,1-DCane	<10	<25	38	26	22
Benzene	<5	<5	<5	<5	<5
Toluene	<5	<5	<5	<5	<5

TABLE 2
Page 11

Soil Borings - Pond 1 (mg/kg)

Compound	Split Spoon Depth 0-2′	2-4′	4-6′	6-8′	8-10′
trans-DCE	<0.05	<0.05	<0.05	NT	<0.05
cis-DCE	<0.05	<0.05	<0.05	NT	<0.05
TCE	<0.05	<0.05	<0.05	<0.05	<0.05
PCE	<0.05	<0.05	<0.05	<0.05	NT
1,1,1-TCane	<0.20	<0.20	<0.20	<0.20	<0.20
1,1-DCane	<0.20	<0.20	<0.20	NT	<0.20
Benzene	<0.05	<0.05	<0.05	<0.05	<0.05
Toluene	<0.05	<0.05	<0.05	<0.05	<0.05

Soil Borings - Pond 2 (mg/kg)

Compound	Split Spoon Depth 0-2′	2-4′	4-6′
trans-DCE	<0.05	<0.05	<0.05
cis-DCE	<0.05	<0.05	<0.05
TCE	<0.05	<0.05	<0.05
PCE	<0.05	<0.05	<0.05
1,1,1-TCane	<0.20	<0.20	<0.20
1,1-DCane	<0.20	<0.20	<0.20
Benzene	<0.05	<0.05	<0.05
Toluene	NT	<0.05	<0.05

NT = Not Tested

TABLE 2
Page 12

Soil Borings - Pond 3 (mg/kg)

Compound	Split Spoon Depth 0-2′	2-4′	4-6′
trans-DCE	<0.05	<0.05	<0.05
cis-DCE	<0.05	<0.05	<0.05
TCE	<0.05	<0.05	<0.05
PCE	<0.05	<0.05	<0.05
1,1,1-TCane	<0.20	<0.20	<0.20
1,1-DCane	<0.20	<0.20	<0.20
Benzene	<0.05	<0.05	<0.05
Toluene	<0.05	<0.05	<0.05

Soil Borings - Pond 4 (mg/kg)

Compound	Split Spoon Depth 0-2′	2-4′*	4-6′
trans-DCE	<0.05	<0.05	<0.05
cis-DCE	<0.05	<0.05	<0.05
TCE	<0.05	<0.05	<0.05
PCE	<0.05	<0.05	<0.05
1,1,1-TCane	NT	<0.20	<0.20 (0.1
1,1-DCane	<0.20 (0.16)	<0.20 (0.12)	<0.20 (0.0
Benzene	<0.05	<0.05	<0.05
Toluene	<0.05	<0.05	<0.05

* Laboratory sample taken at 2′-4′ depth.

TABLE 2
Page 13

Soil Borings - Pond 5 (mg/kg)

Compound	Split Spoon Depth 0-2′	2-4′*	4-6′
trans-DCE	<0.05	NT	<0.05
cis-DCE	<0.05	NT	<0.05
TCE	<0.05	<0.05	<0.05
PCE	<0.05	<0.05	<0.05
1,1,1-TCane	<0.20	<0.20	<0.20
1,1-DCane	<0.20	NT	<0.20
Benzene	<0.05	<0.05	<0.05
Toluene	<0.05	<0.05	<0.05

* Laboratory sample taken at 2′ - 4′ depth

TABLE 3

Comparison of Field GC-PID Results
versus
Laboratory GC/MS Method 8240 Results
Groundwater Volatiles
(all units ug/L)

	Field GC/PID	Environmental Consultants, Inc. (8240)	N.E.T., Inc. Split Sample (8240
W-1			
trans-DCE	<5	<5	
cis-DCE	<5	<5	
TCE	<5	<5	NT
PCE	<5	<5	
1,1,1-TCane	<10	<5	
1,1-DCane	<10	<5	
Benzene	<5	<5	
Toluene	<5	<5	
W-2			
trans-DCE	<5	<5	
cis-DCE	<5	<5	
TCE	<5	<5	
PCE	<5	<5	
1,1,1-TCane	<10	<5	NT
1,1-DCane	<10	<5	
Benzene	<5	<5	
Toluene	<5	<5	
W-3			
trans-DCE	<5	<5	
cis-DCE	<5	<5	
TCE	<5	<5	
PCE	<5	<5	NT
1,1,1-TCane	<10	<5	
1,1-DCane	<10*	<5	
Benzene	<5	<5	
Toluene	<5	<5	

* Lab sample collected after purging 3 well volumes - 1,1,1-TCane was detected in field at 0 and 2 well volumes.

NT- Not Tested

Table 3
Page 2

	Field GC/PID	Environmental Consultants, Inc. (8240)	N.E.T., Inc. Split Sample (824
S-3			
trans-DCE	<10	5	<5
cis-DCE	510	770	620
TCE	75	100	66
PCE	<10	<5	<5
1,1,1-TCane	1030	1700	1500
1,1-DCane	450	860	690
Benzene	<10	<5	<5
Toluene	<10	<5	<1
Chloroethane	NT	210	210
Vinyl Chloride	NT	26	<50
1,1-DCE	NT	33	6.2
W-4			
trans-DCE	<5	<5	
cis-DCE	<5	<5	
TCE	<5	<5	
PCE	<5	<5	NT
1,1,1-TCane	115	110	
1,1-DCane	76	87	
Benzene	<5	<5	
Toluene	<5	<5	
W-5			
trans-DCE	<5	<5	
cis-DCE	<5	<5	
TCE	<5	<5	
PCE	<5	<5	
1,1,1-TCane	<10	<5	NT
1,1-DCane	<10	<5	
Benzene	<5	<5	
Toluene	<5	<5	
W-7			
trans-DCE	<5 (2.8)	<5	<1
cis-DCE	45	62	<1
TCE	<5	<5	<1
PCE	<5	<5	<1
1,1,1-TCane	<10 (7)	7	6
1,1-DCane	<30	10	8
Benzene	<5	<5	<1
Toluene	<5	<5	<1
1,1-DCE	NT	10	2.6

NT - Not Tested

Table 3
Page 3

	Field GC/PID	Environmental Consultants, Inc. (8240)	N.E.T., Inc Spli Sample (824
W-8			
trans-DCE	<5	<5	
cis-DCE	<5	<5	
TCE	<5	<5	
PCE	NT	<5	NT
1,1,1-TCane	<10	<5	
1,1-DCane	<10	<5	
Benzene	<5	<5	
Toluene	<5	<5	
W-9			
trans-DCE	<5	<5	<1
cis-DCE	<5	<5	<1
TCE	<5	<5	<1
PCE	NT	<5	<1
1,1,1-TCane	<10	<5	<1
1,1-DCane	<10	<5	<1
Benzene	NT	<5	<1
Toluene	NT	<5	<1
W-10A			
trans-DCE	<5	<5	
cis-DCE	5	14	
TCE	<5	<5	
PCE	<5	<5	
1,1,1-TCane	<10	<5	NT
1,1-DCane	<10	<5	
Benzene	<5	<5	
Toluene	<5	<5	
W-10B			
trans-DCE	<5	<5	
cis-DCE	<5 (4)	7	
TCE	15	19	
PCE	<5	<5	
1,1,1-TCane	91*	130	NT
1,1-DCane	22	29	
Benzene	<5	<5	
Toluene	<5	<5	
1,1-DCE	NT	12	

*Lab sample collected at 7 well volumes purged. The field GC-PID resu
for 1,1,1-TCane at 5 and 9 well volumes were 130 and 140 ug/l, respect

NT - Not Tested

Table 3
Page 4

	Field GC/PID	Environmental Consultants, Inc. (8240)	N.E.T., Inc. Split Sample (8240)
W-11A			
trans-DCE	<5	<5	
cis-DCE	17	38	
TCE	<5	<5	
PCE	<5	<5	NT
1,1,1-TCane	<10	<5	
1,1-DCane	<10	<5	
Benzene	NT	<5	
Toluene	NT	<5	
W-11B			
trans-DCE	<5	<5	
cis-DCE	11	28	
TCE	<5	<5	
PCE	<5	<5	
1,1,1-TCane	<10	<5	
1,1-DCane	<10	<5	NT
Benzene	NT	<5	
Toluene	NT	<5	
W-12			
trans-DCE	<5	<5	<1
cis-DCE	<5 (1)	<5	<1
TCE	<5	<5	<1
PCE	<5	<5	<1
1,1,1-TCane	<10	<5	<1
1,1-DCane	<10 (7)	5	7
Benzene	NT	<5	<1
Toluene	NT	<5	<1
1,1-DCE	NT	32	29
Chloroethane	NT	<10	80
W-13			
trans-DCE	<5	<5	
cis-DCE	<5 (3)	<5	
TCE	<5	<5	
PCE	<5	<5	NT
1,1,1-TCane	<10	<5	
1,1-DCane	25	33	
Benzene	NT	<5	
Toluene	NT	<5	
Chloroethane	NT	36	

NT - Not Tested

TABLE 4

GROUNDWATER METALS, BACKGROUND SOIL METALS AND POND SOILS VOLATILE RESULTS

GROUNDWATER METALS (ug/L)

WELL	METAL (TOTAL)	ENVIRONMENTAL CONSULTANTS, INC. (ECI)	NATIONAL ENVIRONMENTAL TESTING, INC. (NET)
W-1	Arsenic	<2	
	Chromium	1	NT
	Lead	<1	
W-2	Arsenic	<2	
	Chromium	<1	NT
	Lead	<1	
W-3	Arsenic	<2	
	Chromium	<1	NT
	Lead	<1	
W-4	Arsenic	<2	
	Chromium	<1	NT
	Lead	<1	
W-5	Arsenic	<2	
	Chromium	<1	NT
	Lead	<1	
S-3	Arsenic	<2	<5
	Chromium	<1	<1
	Lead	<1	<5
W-7	Arsenic	<2	<5
	Chromium	<1	<1
	Lead	<1	<5
W-8	Arsenic	11	
	Chromium	<1	NT
	Lead	<1	
W-9	Arsenic	3	<5
	Chromium	1	<1
	Lead	<1	<5
W-10	Arsenic	7	
	Chromium	1	NT
	Lead	<1	

TABLE 4
Page 2

WELL	METAL (TOTAL)	ENVIRONMENTAL CONSULTANTS, INC. (ECI)	NATIONAL ENVIRONMENTAL TESTING, INC. (NET)
		(ug/L)	(ug/L)
W-10B	Arsenic	2	
	Chromium	1	NT
	Lead	1	
W-11A	Arsenic	3	
	Chromium	1	NT
	Lead	<1	
W-11B	Arsenic	15	
	Chromium	32	
	Lead	10	
W-12	Arsenic	<2	<5
	Chromium	1	<1
	Lead	<1	<5
W-13	Arsenic	<2	
	Chromium	1	NT
	Lead	<1	

SOIL METALS (mg/kg)

METAL (TOTAL)	SAMPLING LOCATION	
	M-1	M-2
Arsenic	2.94	2.14
Barium	66.7	<3
Cadmium	0.38	<0.2
Chromium	10.8	4.6
Lead	76.6	<3
Mercury	<0.1	<0.1
Selenium	<0.2	<0.2
Silver	<0.2	<0.2

TABLE 4
Page 3

LOCATION	VOLATILE	POND SOIL VOLATILES - ECI (ug/L)
BP-4 (Pond 4)	1,1-DCane	560
BP-5 (Pond 5)	None Detected	ND

TABLE 5

CURRENT AND PROPOSED FEDERAL MCL'S
(MAXIMUM CONTAMINANT LEVELS)

Table 5.a. - Current MCLs for Inorganic Chemicals1

Contaminant	Level, milligrams per liter (mg/L)
Arsenic	0.05
Barium	1.0
Cadmium	0.010
Chromium	0.05
Lead	0.05
Mercury	0.002
Nitrate (as N)	10.0
Selenium	0.01
Silver	0.05

Table 5.b. - Current MCLs For Organic Contaminants2

CAS No.	Contaminant	Level, milligrams per liter (mg/L)
71-43-2	Benzene	0.005
75-01-4	Vinyl Chloride	0.002
56-23-5	Carbon tetrachloride	0.005
107-06-2	1,2-Dichloroethane	0.005
79-01-6	Trichloroethylene	0.005
75-35-4	1,1-Dichloroethylene	0.007
71-55-6	1,1,1-Trichloroethane	0.20
106-46-7	para-Dichlorobenzene	0.075

1 Source: 40 CFR, Part 141.61, Revised as of July 1, 1989
2 Source: 40 CFR, Part 141.11, Revised as of July 1, 1989

Table 5.c. - Proposed MCL's and MCLGs3 for Inorganic Contaminants4

		MCLGs	MCLs
(1)	Asbestos	7 million fibers/liter (longer than 10 um)	7 million fibers/liter (longer than 10 um)
(2)	Cadmium	0.005 mg/L	0.005 mg/L
(3)	Chromium	0.1 mg/L	0.1 mg/L
(4)	Mercury	0.002 mg/L	0.002 mg/L
(5)	Nitrate	10 mg/L (as N)	10 mg/L (as N)
(6)	Nitrite	1 mg/L (as N)	1 mg/L (as N)
(7)	Total Nitrate and Nitrite	10 mg/L (as N)	10 mg/L (as N)
(8)	Selenium	0.05 mg/L	0.5 mg/L

Table 5.d. - Proposed MCLs & MCLGs for Volatile Organic Contaminants4

		MCLGs (mg/L)	MCLs (mg/L)
(1)	o-Dichlorobenzene	0.6	0.6
(2)	cis-1,2 Dichloroethylene	0.07	0.07
(3)	trans-1,2-Dichlorethylene	0.1	0.1
(4)	1,2-Dichloroprapane	0	0.005
(5)	Ethylbenzene	0.7	0.7
(6)	Monochlorobenzene	0.1	0.1
(7)	Styrene	0.1	0.1
(8)	Tetrachloraethylene	0	0.005
(9)	Toluene	1	1
(10)	Xylenes (total)	10	10

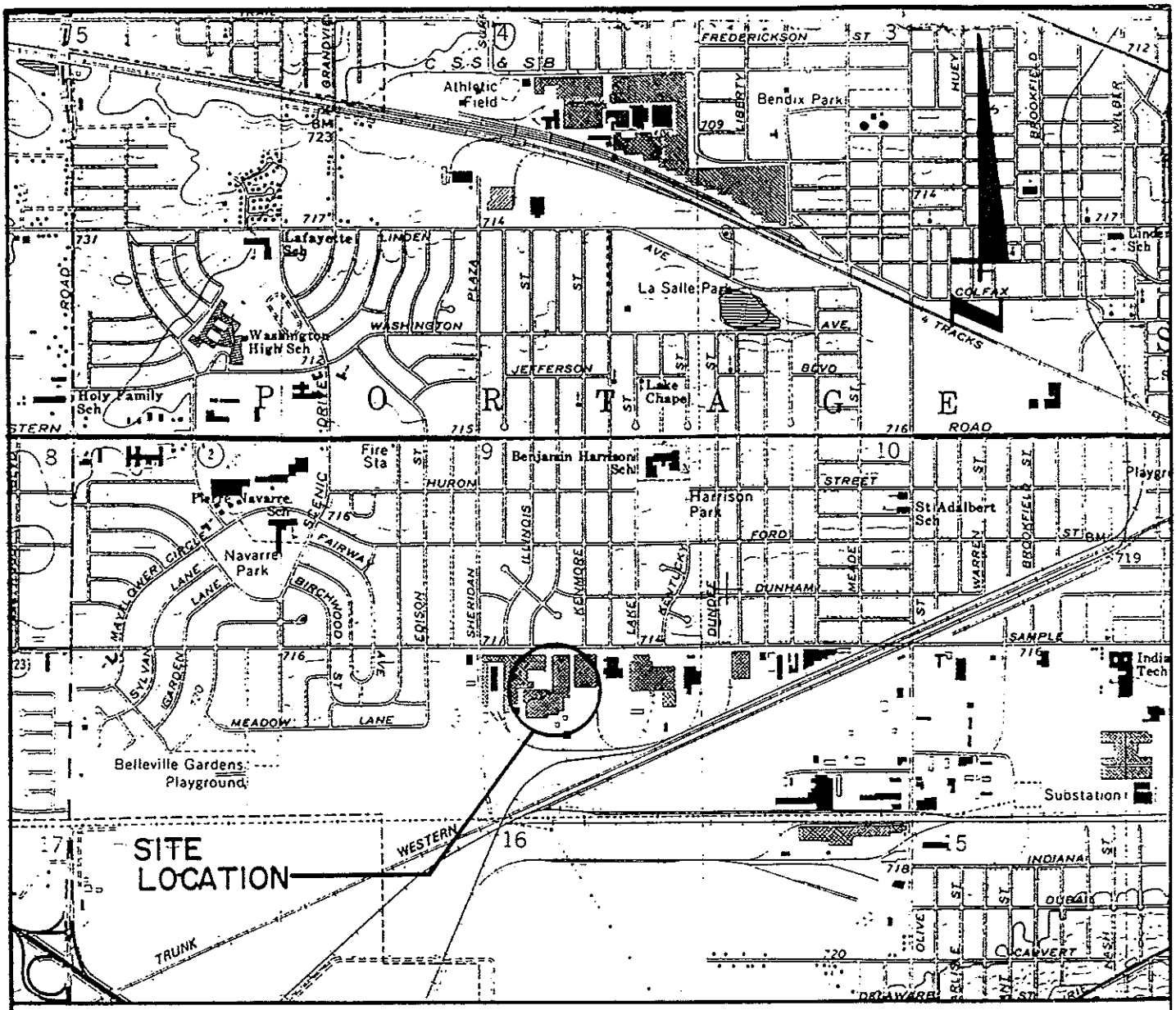
3 Maximum Contaminant Level Goal
4 Source: Fed reg Vol. 56, No.20, Jan. 30, 1991. The effective date of this new rule is July 30, 1992.

TABLE 6

A SUMMARY AND COMPARISON OF GROUNDWATER
ANALYTICAL RESULTS WITH CURRENT AND RECENTLY ADOPTED MCLS
PARTS PER BILLION (ppb)

MONITORING WELL.....		W1	W2	W3	W4	W5	S3	W7	W8	W9	W10A	W10B	W11A	W11B	W12	W13
DEPTH OF WELL.....		64.08'	37.08'	61.08'	33.08'	35.08'	24.58'	35.08'	61.08'	56.90'	60.61'	30.25'	56.55'	37.27'	29.68'	35.08'
PARAMETER	MCLS															
Arsenic (mg/l)	50	<2	<2	<2	<2	<2	<2	2	11	3	7	2	3	15	<2	<2
Chromium (mg/l)	50	1	<1	<1	<1	<1	<1	<1	<1	1	1	1	1	32	1	1
Lead (mg/l)	50	<1	<1	<1	<1	<1	<1	1	<1	<1	<1	<1	<1	10	<1	<1
1,1-Dichloro-ethane	--	---	---	---	87	---	860	10	---	---	---	29	---	---	5/6.7	33
1,1,1-Trichloro-ethane	200	---	---	---	110	---	1700	7	---	---	---	130	---	---	---	---
Chloroethane	---	---	---	---	---	---	210	---	---	---	---	---	---	---	80	36
Trans-1,2-Dichloroethylene	100*	---	---	---	---	---	5	---	---	---	---	---	---	---	---	---
Trichloro-ethylene	5	---	---	---	---	---	100	---	---	---	---	19	---	---	---	---
Vinyl Chloride	2	---	---	---	---	---	26	---	---	---	---	---	---	---	---	---
1,1-Dichloro-ethene	7	---	---	---	---	---	33	10	---	---	---	12	---	---	32/29	---
Cis-1,2-Dichloro-ethene	70*	---	---	---	---	---	770	62	---	---	14	7	38	28	---	---

* Effective July 30, 1992
Source - 40 CFR, Sections 141.11 & 141.61 and Federal Register, Vol. 56 No. 2, p. 3528, Jan. 30, 1991.



SCALE 1:24 000

0 ½ 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0 1 KILOMETER

CONTOUR INTERVAL 5 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

SOUTH BEND WEST, IND.
41086-F3-TF-024

1969
PHOTOREVISED 1986
DMA 3767 III NE-SERIES V851

QUADRANGLE LOCATION

Mapped, edited, and published by the Geological Survey
Revised in cooperation with Indiana Department of Natural Resources

Control by USGS, NOS/NOAA, and Indiana Flood Control and Water Resources Commission

Planimetry by photogrammetric methods from aerial photographs taken 1952. Topography by planetable surveys 1957–1958
Revised from aerial photographs taken 1967. Field checked 1969

FIGURE 1
LOCATION MAP
D/A NO. 900.13

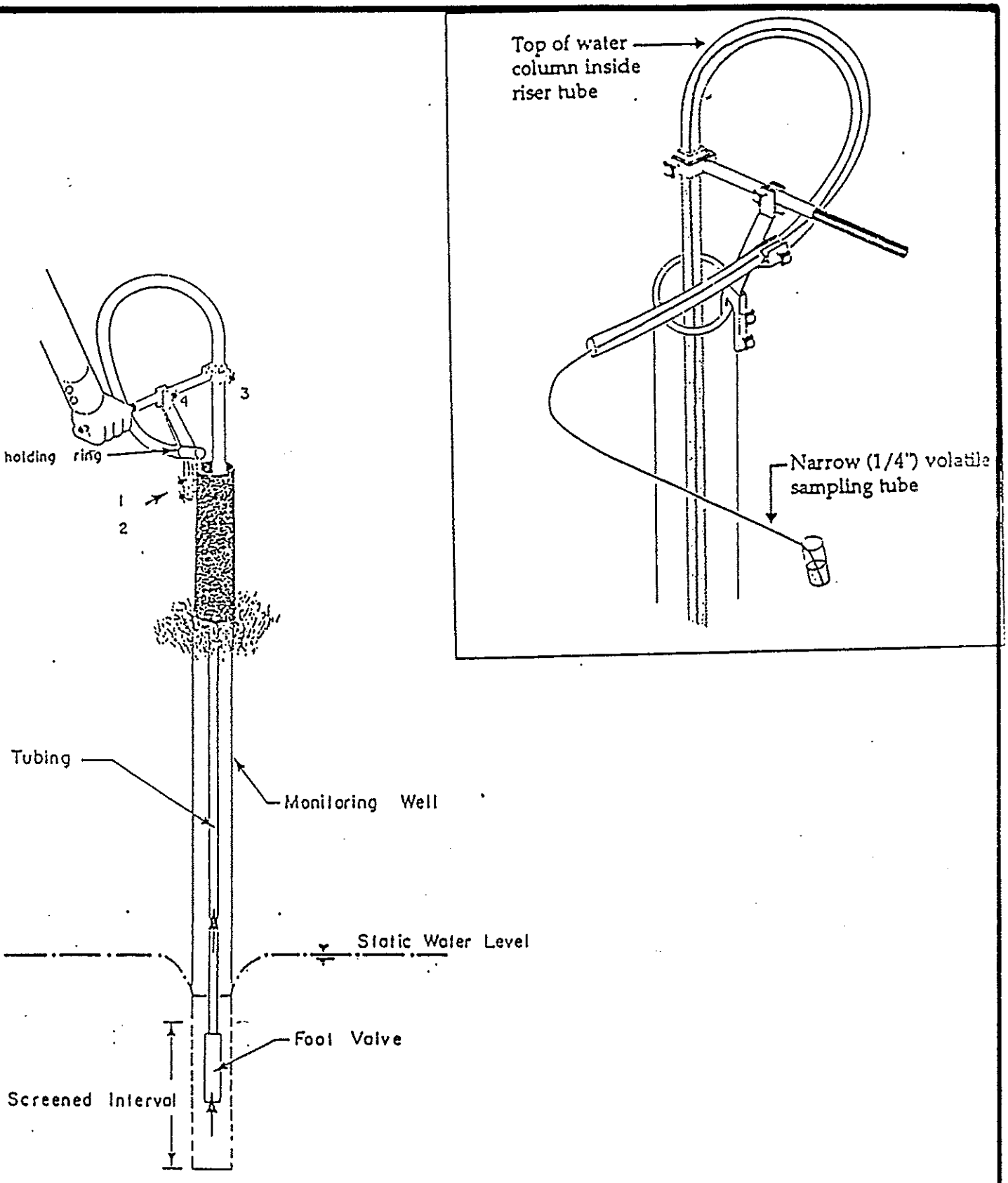
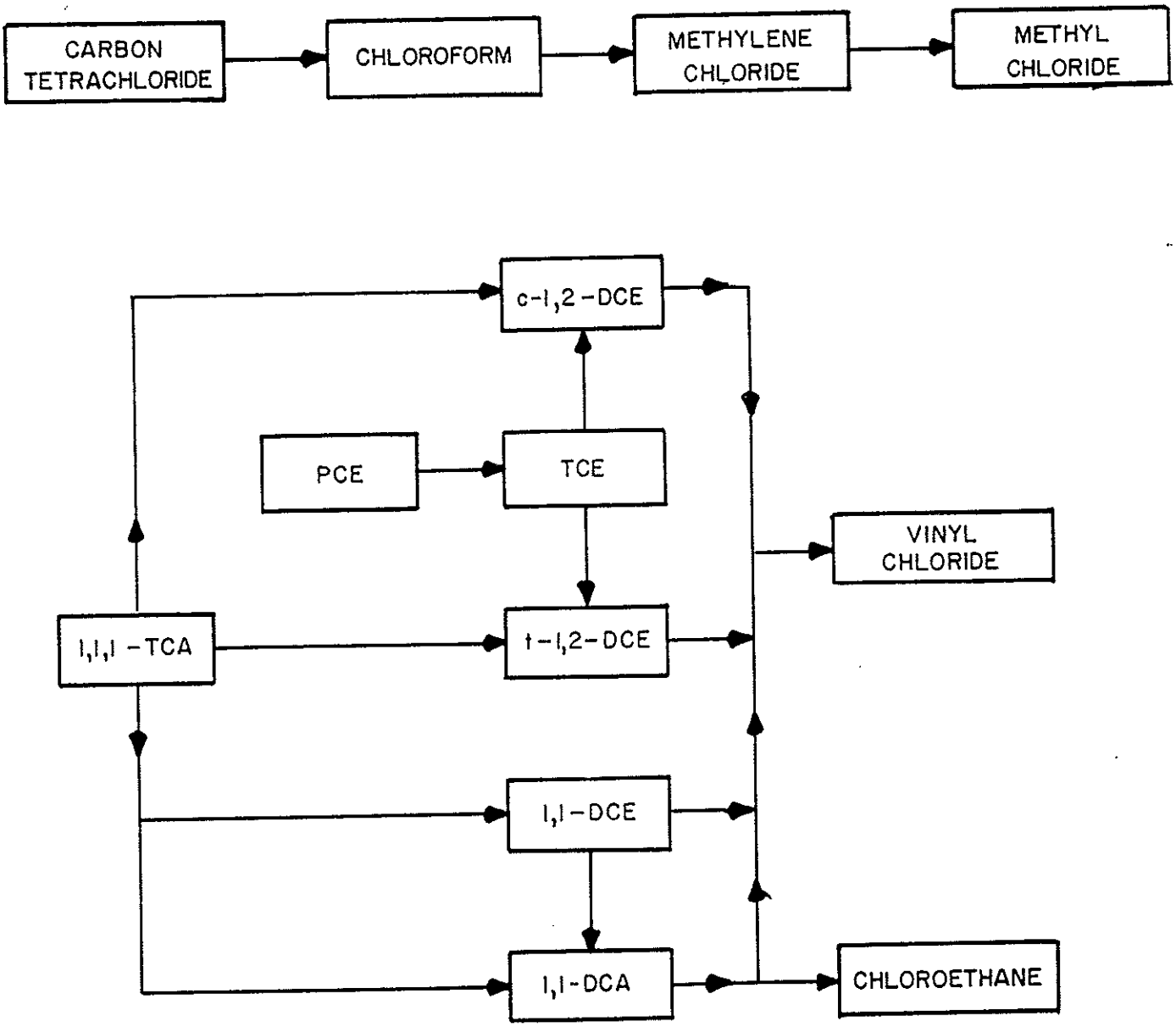


ILLUSTRATION OF WATERRA PUMP AND VOLATILE ORGANIC SAMPLING TECHNIQUE

FIGURE 2

D/A NO. 900.13 ; 3/1/91



TRANSFORMATION PATHWAYS FOR VARIOUS VOLATILE ORGANIC PRIORITY POLLUTANTS IN SOIL-GROUNDWATER SYSTEMS

FIGURE 3

SOURCE: L.R. SMITH & J. DRAGUN

D/A NO. 900.13; 3/1/91

S-3

Purge Analyses

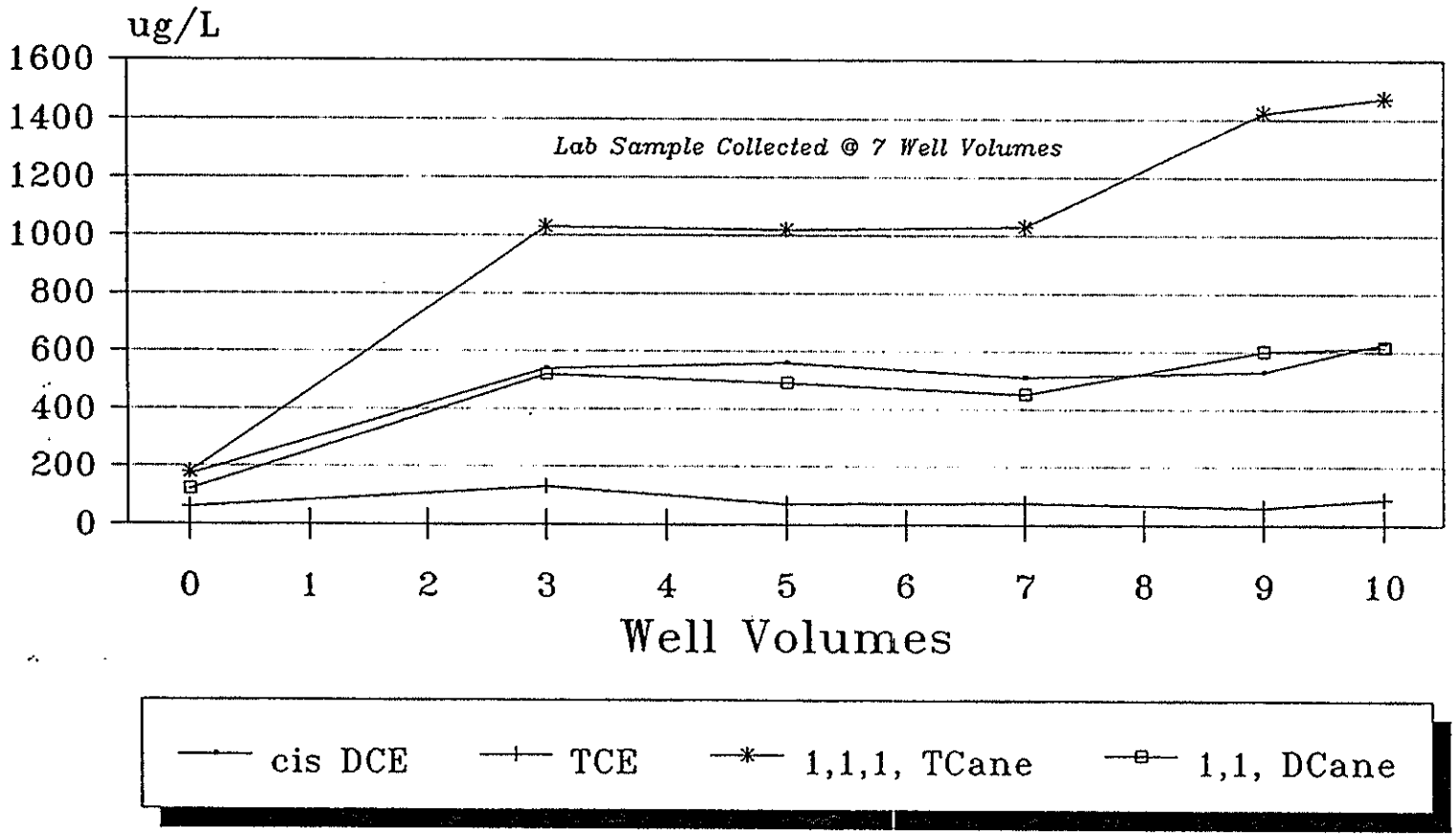


FIGURE 4

W-3
Purge Analyses

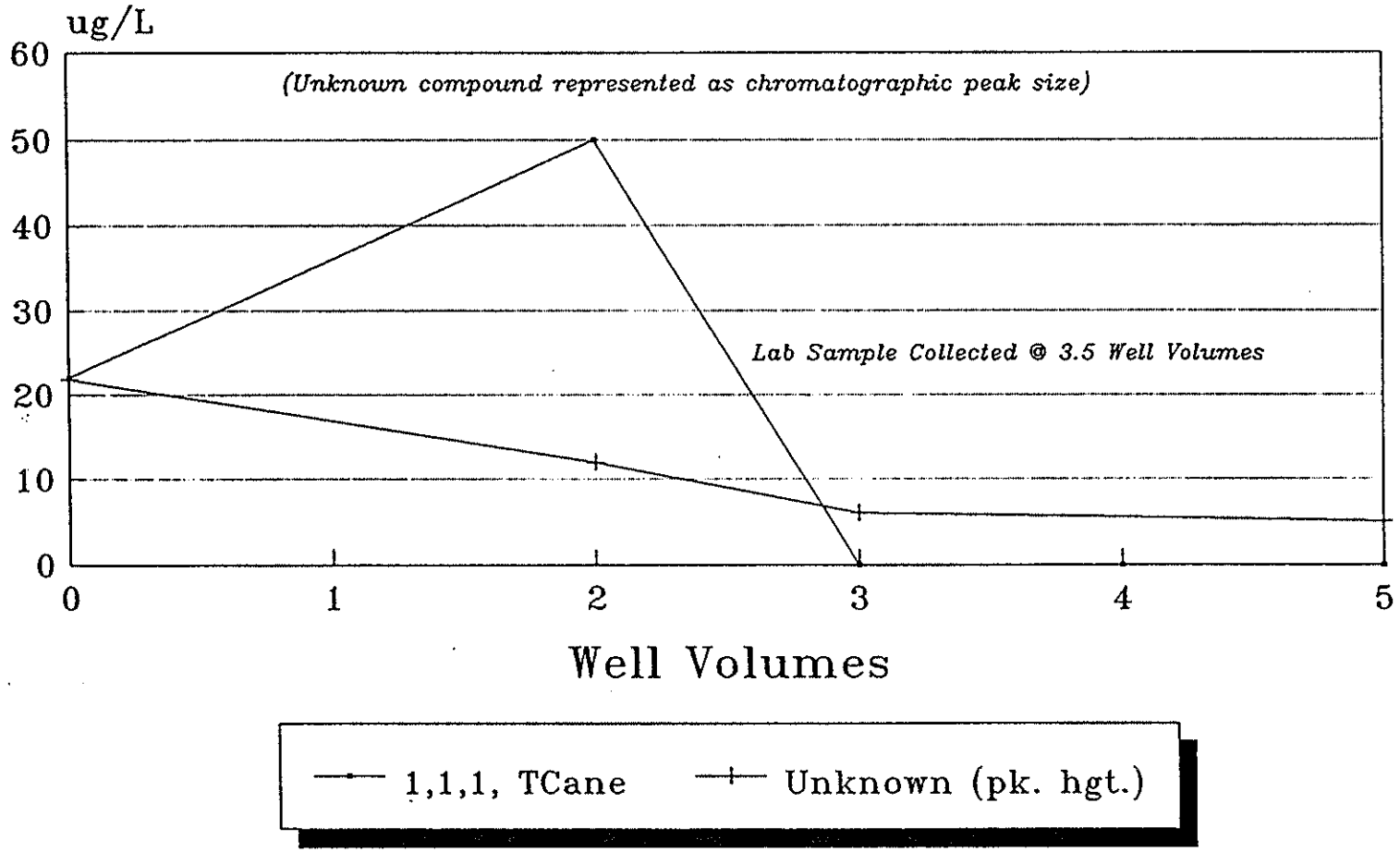


FIGURE 5

W-4
Purge Analyses

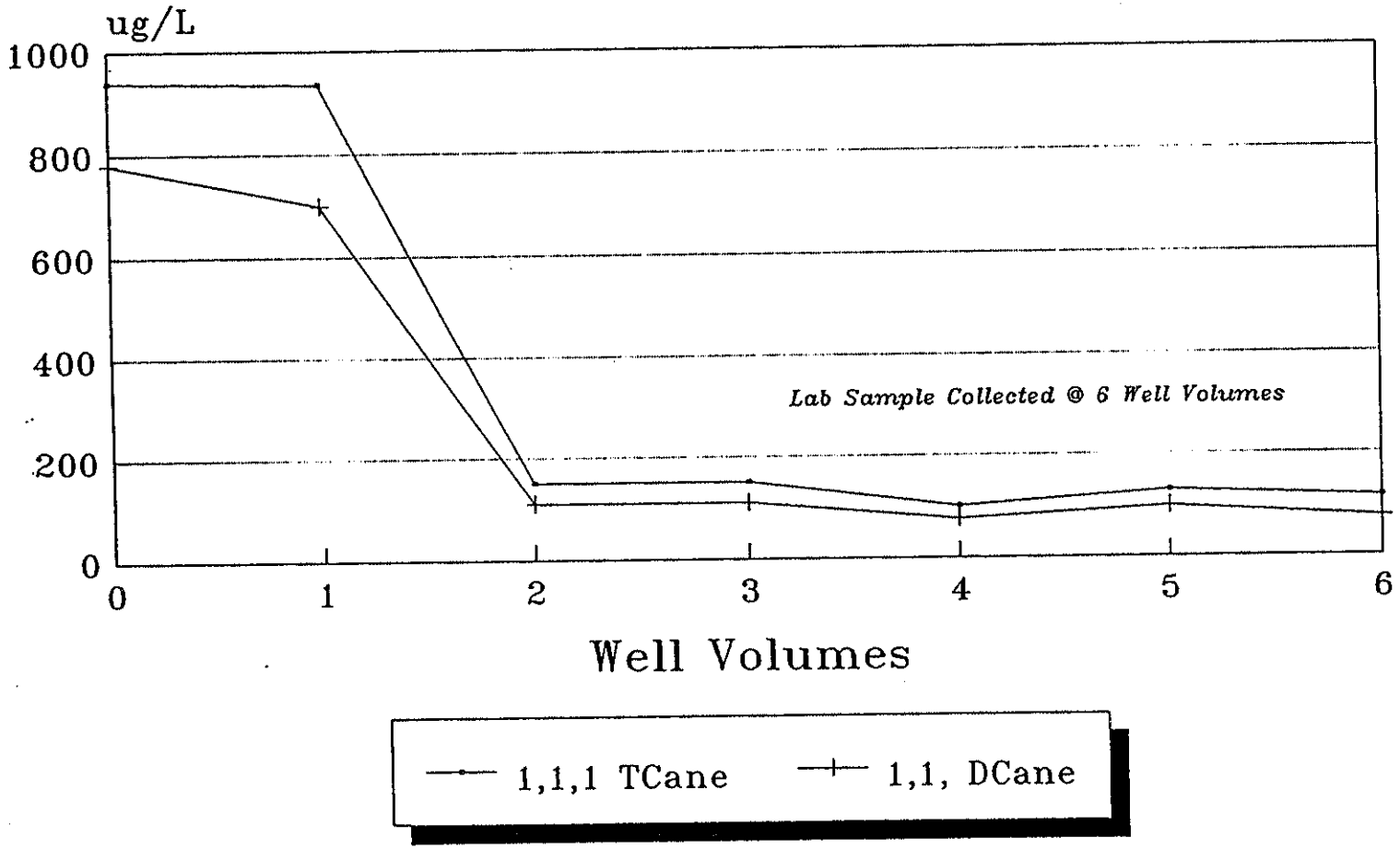


FIGURE 6

W-7

Purge Analyses

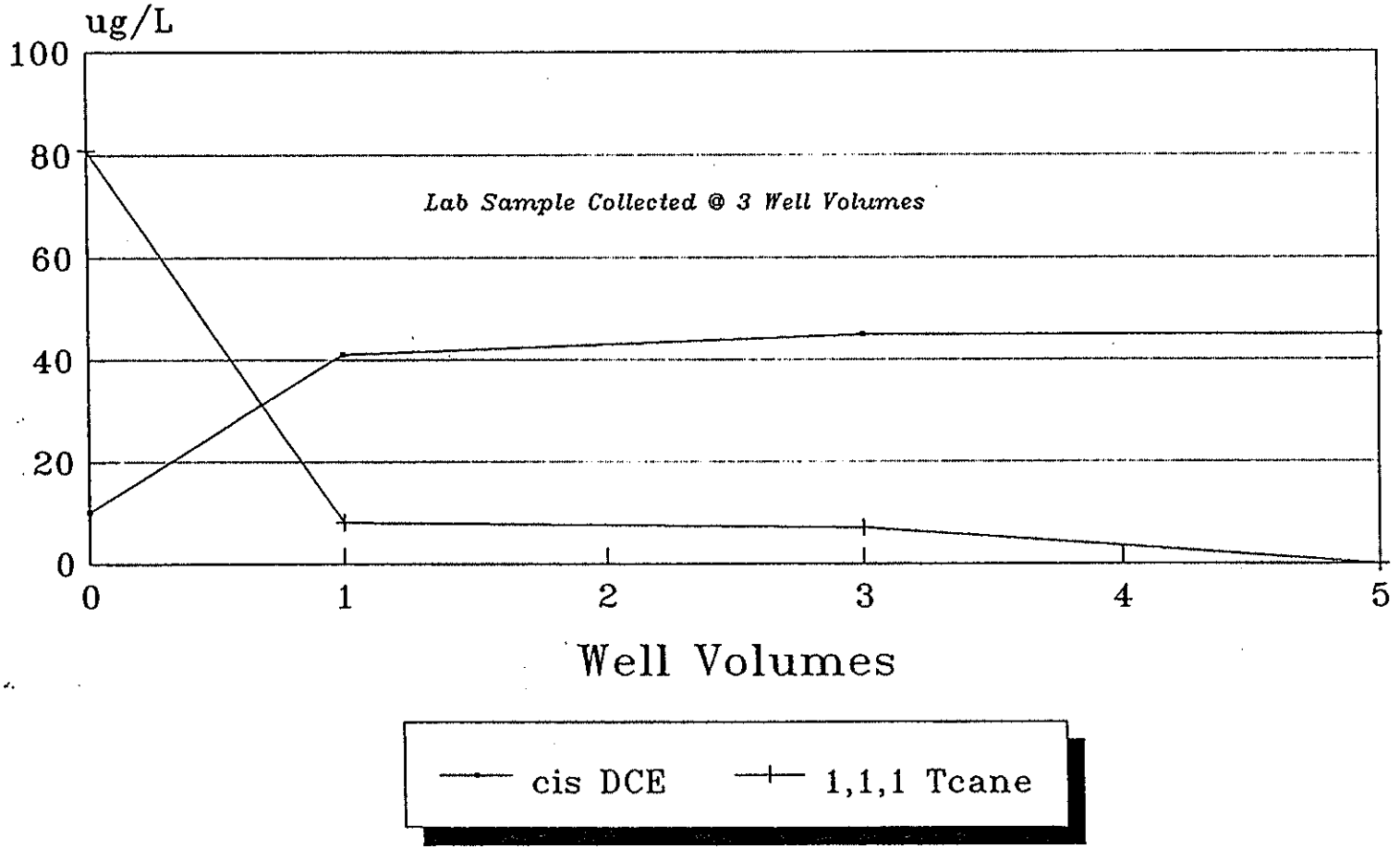
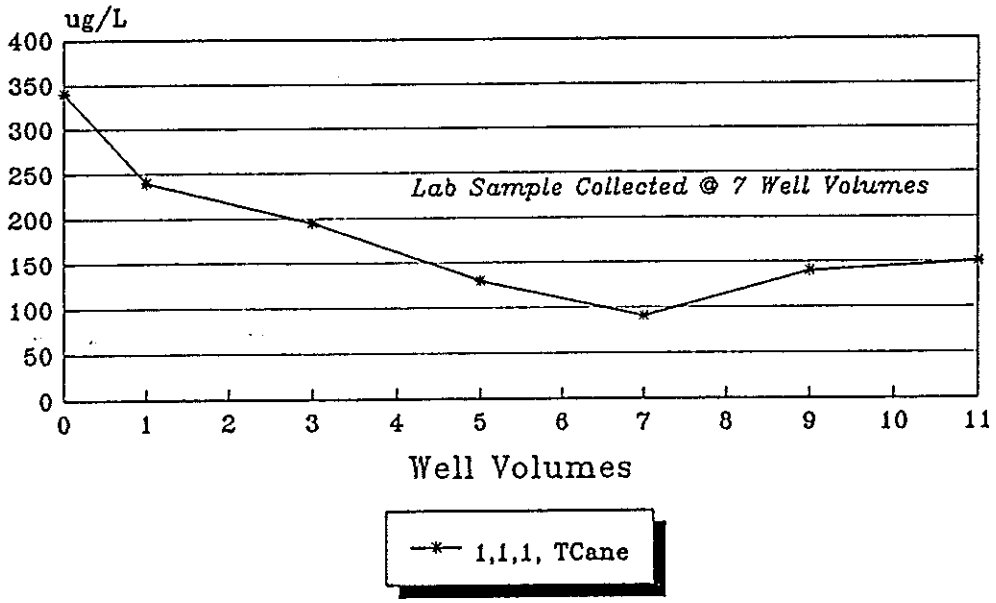


FIGURE 7

W-10B (Shallow)
Purge Analyses



W-10B (Shallow)
Purge Analyses

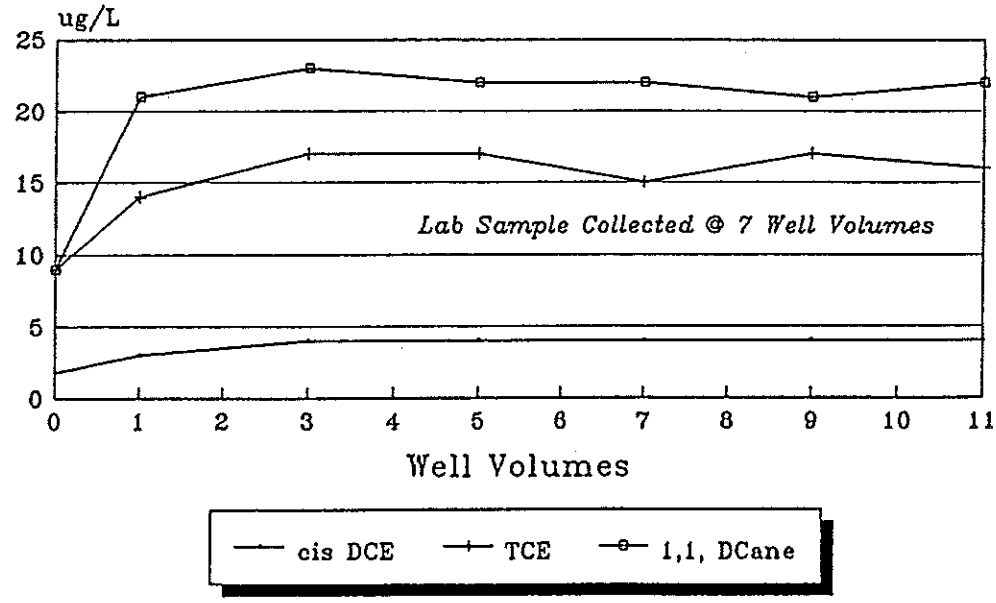


FIGURE 8

W-10A (Deep)
Purge Analyses

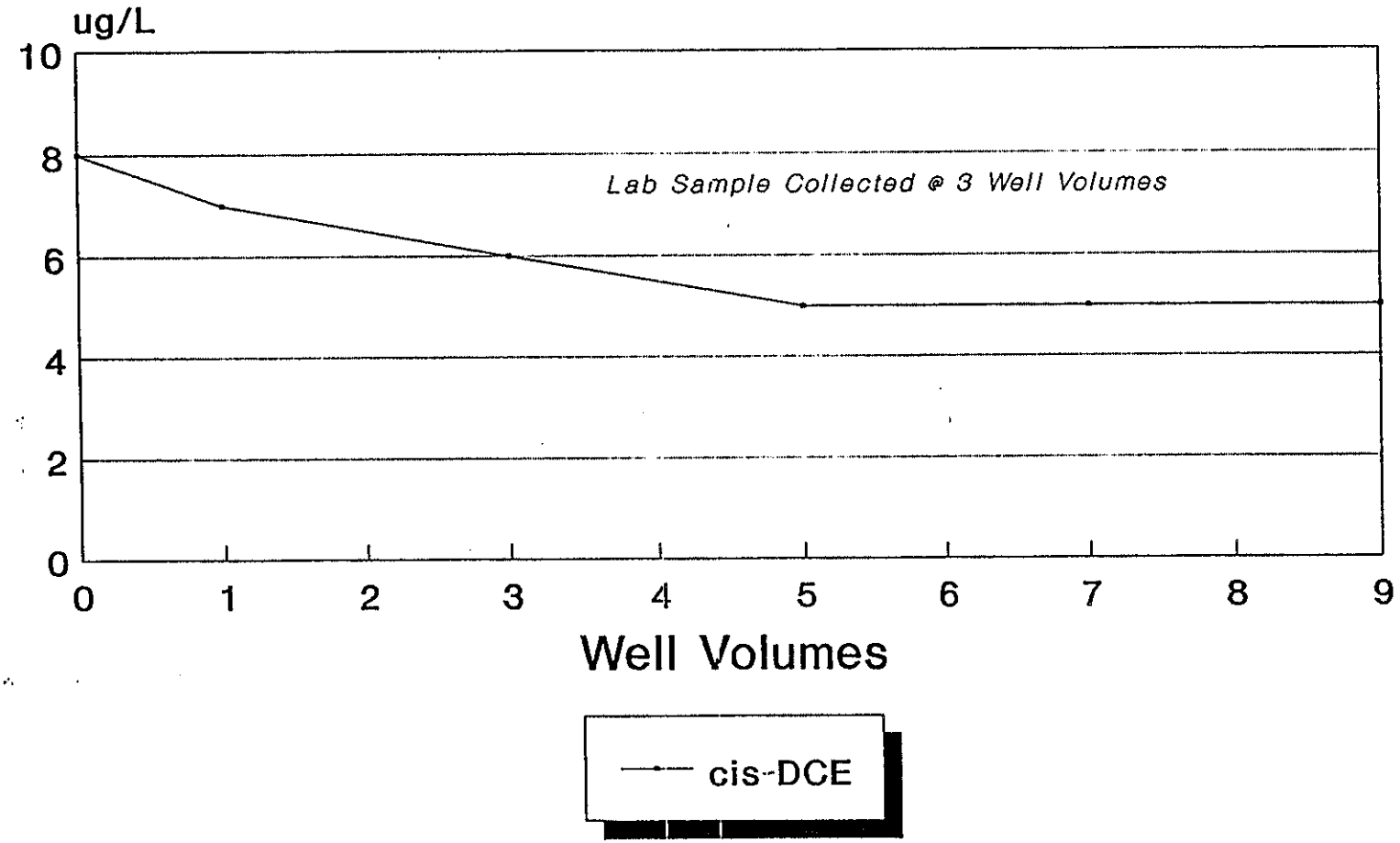
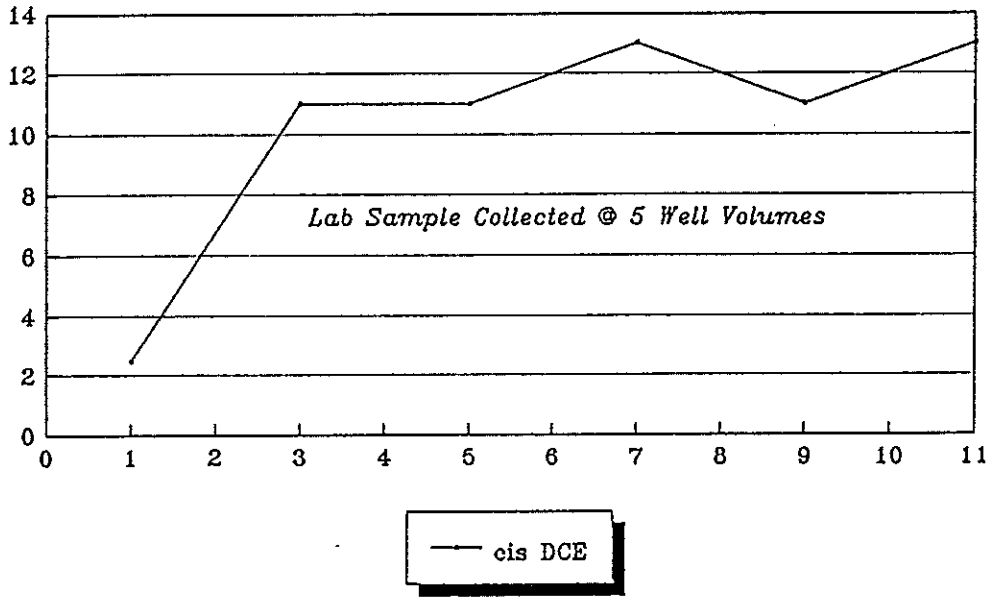


FIGURE 9

W-11B (Shallow)
Purge Analyses



W-11A (Deep)
Purge Analyses

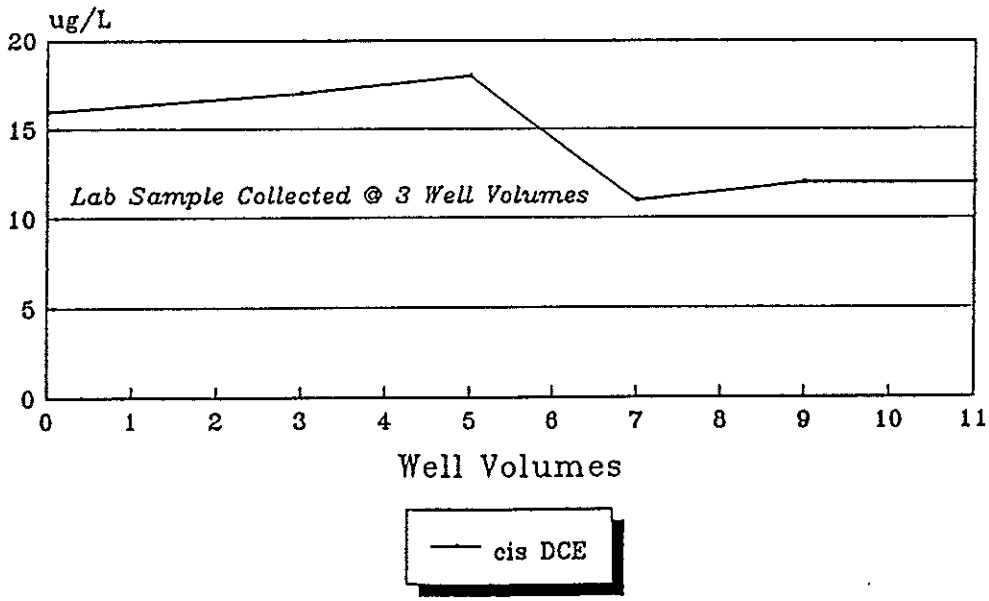


FIGURE 10

W-13
Purge Analyses

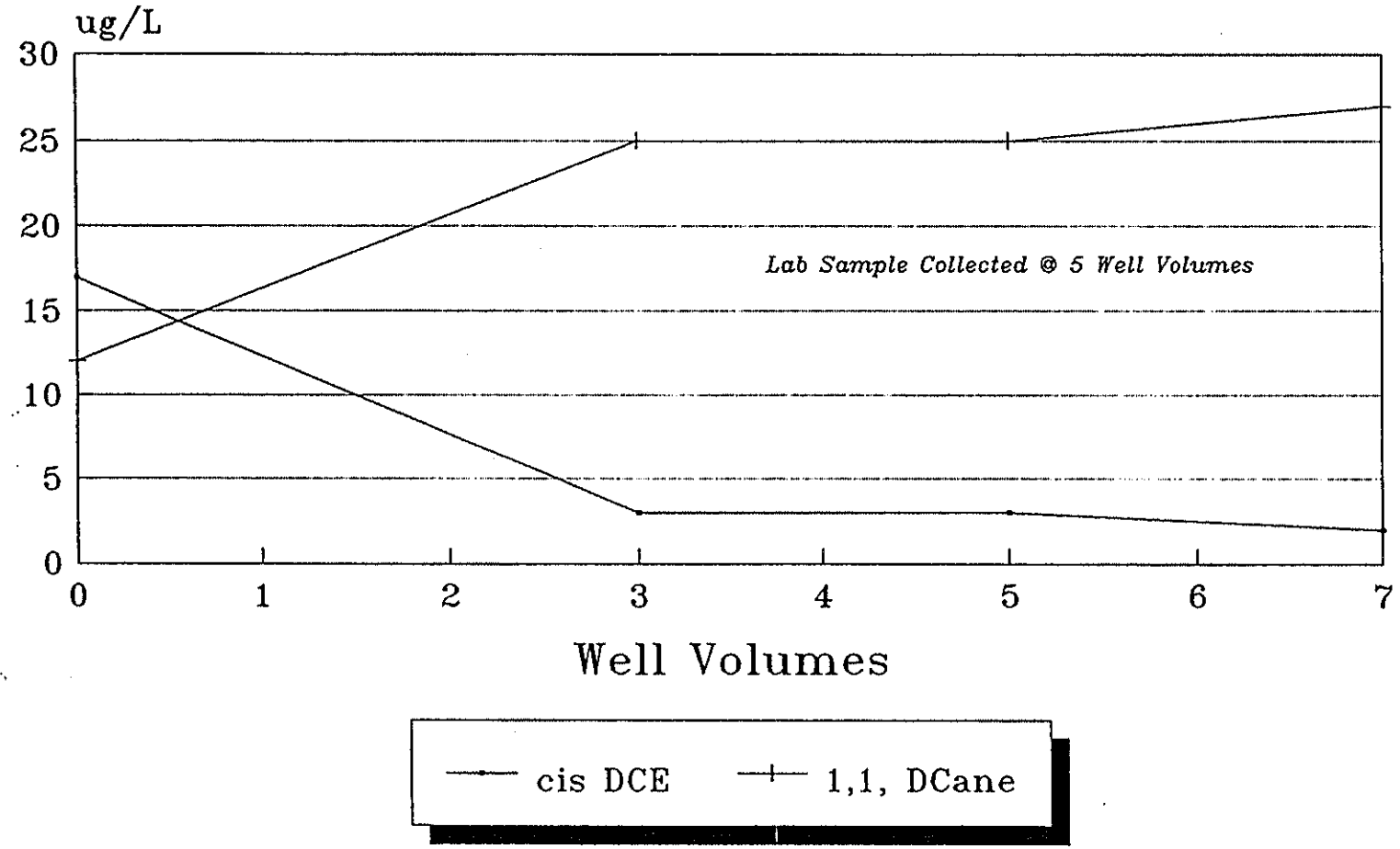
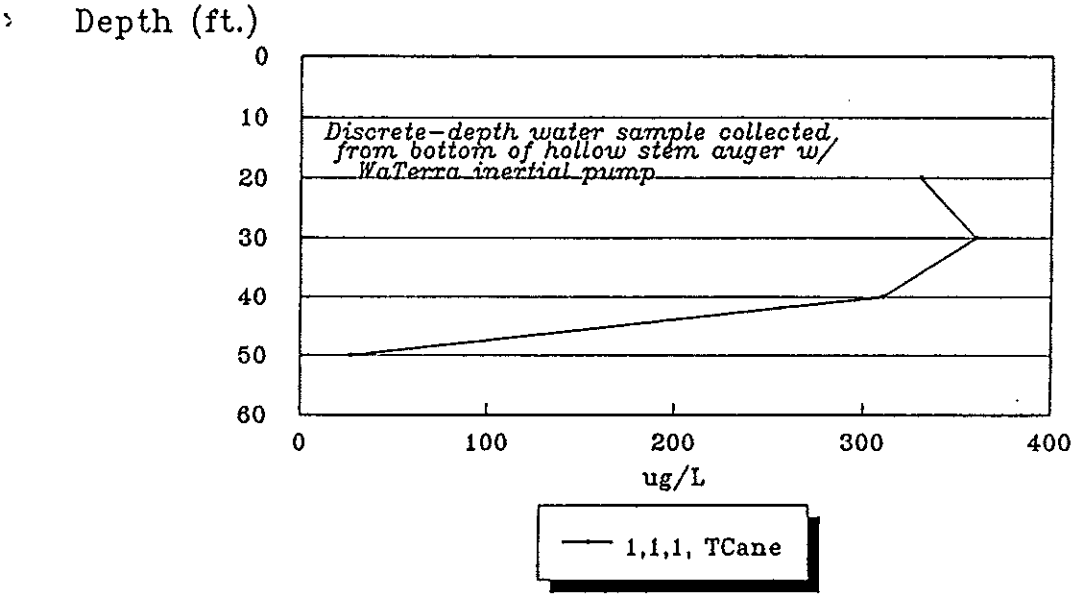


FIGURE 11

Boring 10
Concentration vs. Depth



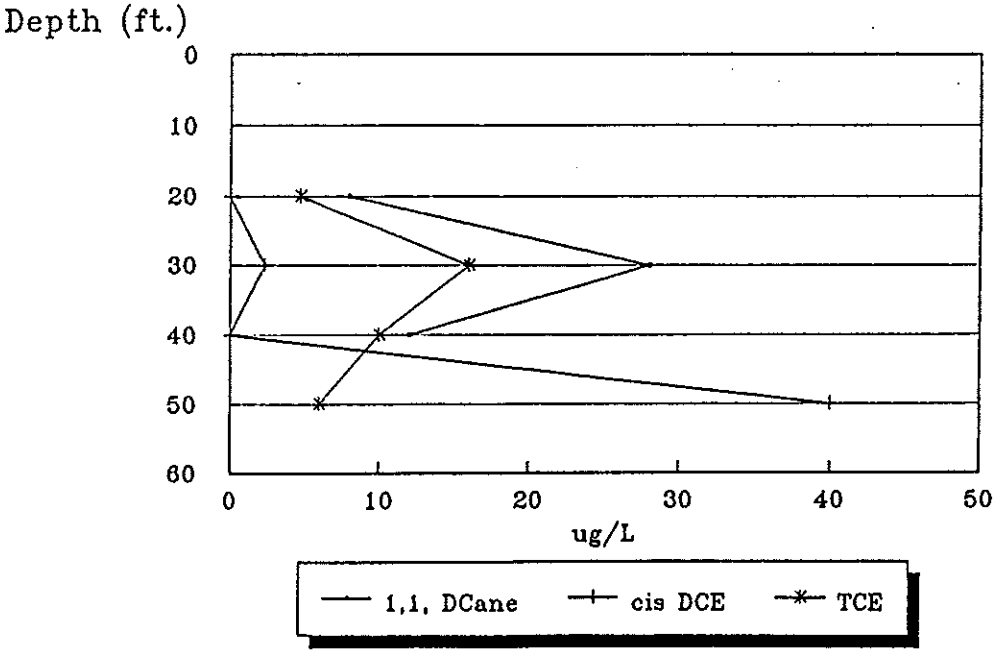


FIGURE 12

Boring 11
Concentration vs. Depth

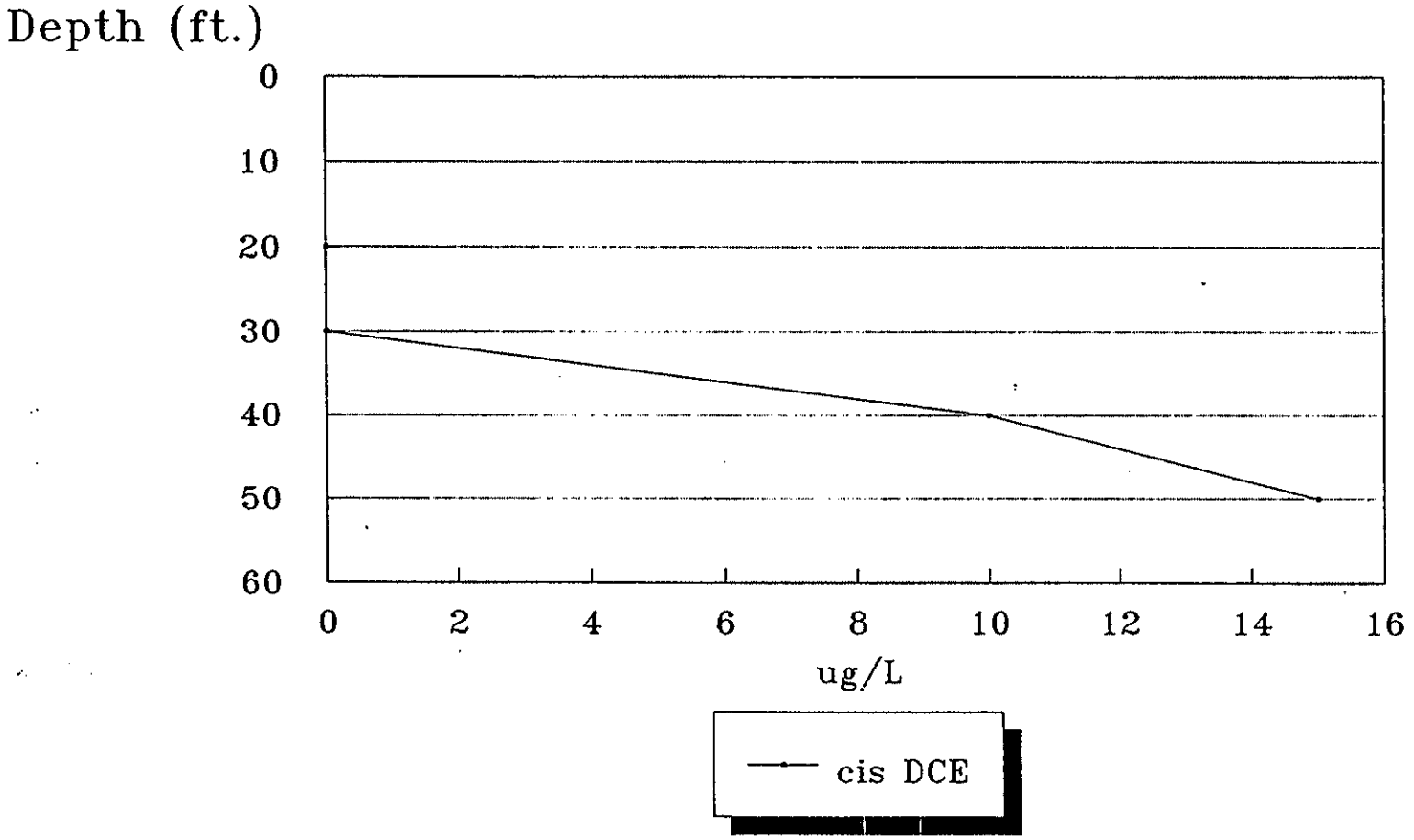


FIGURE 13

Boring 13
Concentration vs. Depth

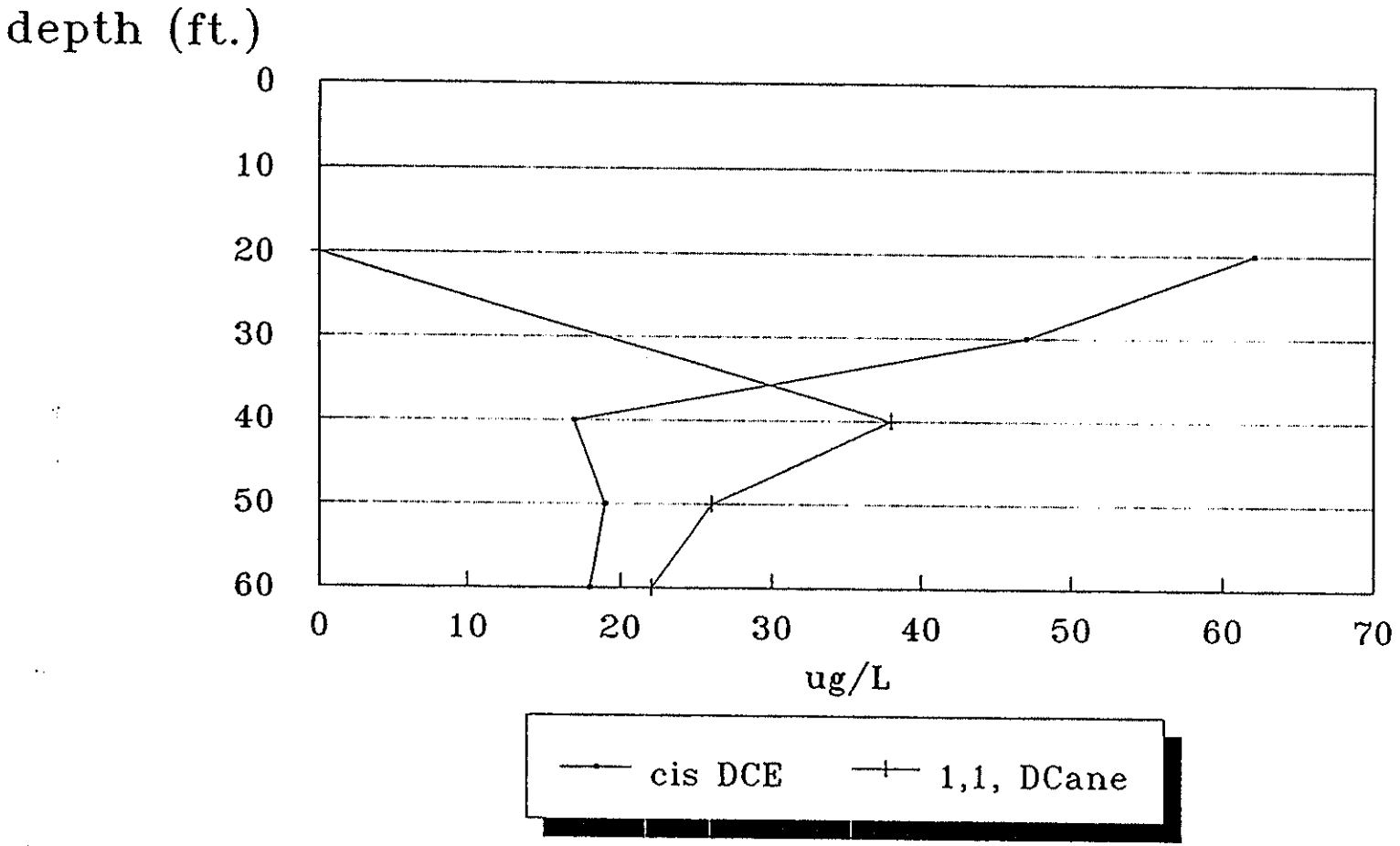


FIGURE 14

SAMPLE STREET

GUARD HOUSE

TBM-1, RR SPIKE IN UTILITY POLE ELEV.

704.00 704.10 704.20 704.30 704.40 704.50 704.60 704.70 704.80

LOCATION OF REMOVED STODDARD SOLVENT, 8,000 GAL TANK

LOCATION OF REMOVED MOBILMET-OMICRON, 8,000 GAL TANK

LOCATION OF REMOVED SHED B

SHED B

W-12 704.34

W-11 703.95

W-1, 707.27

W-3 704.61

FOUNDRY

A-3

QUENCH OIL

TORRINGTON WELL # 4

SHED A

TORRINGTON FACILITY

BP-1

POND #1

W-2 704.66

A-6

A-7

M-2

W-10 704.00

704.30

W-7

W-8

704.00 704.10 704.20 704.30

ESTIMATED DIRECTION OF GROUNDWATER FLOW

TBM-2, TOP OF WELL PROTECTOR, W-2 ELEV.

LOCATION OF FILLED-IN POND #2

TORRINGTON WELL # 3

CONC

BP-2

W-9 / M-1 704.86

LOCATION OF FILLED-IN POND #3

BP-3

LOCATION OF FILLED-IN POND #4

LOCATION OF FILLED-IN POND #5

W-13 704.39

SUMP

W-5, 704.62

W-4 704.57

BP-4

BP-5

A-1

A-5

SUMP (REMOVED)

A-4

A-2

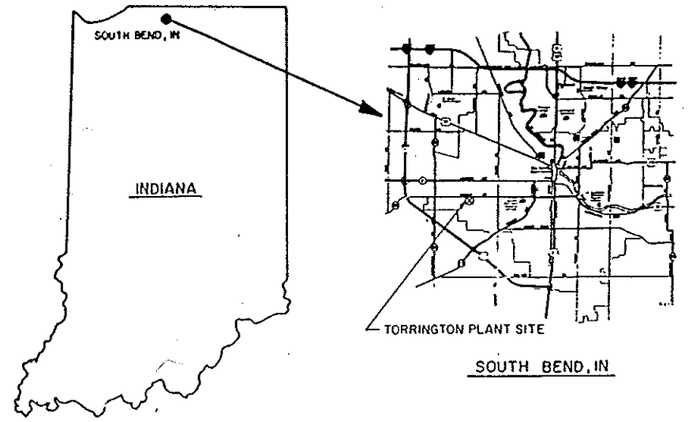
704.40 704.50 704.60 704.70 704.80

LOCATION OF REMOVED (2) FUEL OIL TANKS, 20,000 GAL EACH

LOCATION OF REMOVED WASTE OIL TANK, 8,000 GAL

LOCATION OF REMOVED 110 CUTTING OIL, 12,000 GAL

RACO FACILITY



LEGEND

- RAILROAD
- PROPERTY LINE
- FENCE
- A-2 SOIL BORING LOCATION
- W-1, 707.27 MONITORING WELL, WATER LEVEL ELEV
- 704.00 GROUNDWATER CONTOUR ELEVATION
- BP-3 NEW SOIL BORING LOCATION
- W-6, 704.86 NEW MONITORING WELL, WATER LEVEL ELEV
- M-2 BACKGROUND SOIL METALS SAMPLING LOCATION

NOTE
GROUNDWATER CONTOURS DEPICTED ARE A GENERALIZED INTERPRETATION OF THE PIEZOMETRIC SURFACE AT THE SITE THEY ARE BASED UPON WATER ELEVATIONS MEASURED AT 8 INTERPOLATED BETWEEN COMPLETED MONITORING WELL LOCATION. ACTUAL WATER LEVEL WILL VARY ACROSS THE SITE DEPENING UPON SPECIFIC SUBSURFACE & CLIMATIC CONDITIONS.

N

60 0 60
scale feet

SOURCE BASE MAP PROVIDED BY CANDINE ENGINEERS REPORT OF ENVIRONMENTAL ASSESSMENT OCTOBER 1984

Prepared by DAILY & ASSOCIATES, ENGINEERS, INC.

SITE PLAN SHOWING CONTOURS OF THE PIEZOMETRIC SURFACE TORRINGTON COMPANY BANTAM BEARING DIVISION SOUTH BEND, INDIANA

DATE 12/27/91 | PLATE NO. | DA FILE NO. 900.12 PAS

APPENDIX A

REMEDIAL PLAN & COST ESTIMATES

SITE REMEDIATION AND COST ESTIMATES

At the request of the Urban Enterprise Association (UEA) of South Bend, Indiana, the following discussion and cost estimates for a remedial action plan regarding groundwater and other remediation at the Torrington site are provided.

This remedial action plan and cost estimate is based upon analytical data obtained during this investigation and the interpretation of site hydrogeologic conditions. Daily & Associates and BEST Environmental claim no responsibility for any adverse consequences that my be caused by the implementation of this plan.

REMEDIAL ALTERNATIVES - GROUNDWATER

Currently, there are only a few proven groundwater remediation technologies available. Some of the methods most commonly used are 1) pump and treat, the method most widely used, 2) biological treatment, a form of pump and treat and 3) bioremediation, which is receiving more research and attention. The methods are as follows:

1. Pump and treat. Pump and treat is a method by which groundwater is extracted from a recovery well, pumped

to various aboveground treatment units and discharged into a municipal sewer system, or in rare instances, waters of the State (i.e. creek, stream, river or lake).

Many considerations must be made before a groundwater pump and treat system can be designed. These include: 1) soil permeability determined to enable the establishment of a pumping rate, 2) groundwater direction and flow rate, and 3) placement of a recovery well(s).

There are a number of treatment units which can be used individually in parallel, or in series that can treat contaminated groundwater. A few of the most commonly used units are discussed below. The treatment required is dependent on the contaminant concentrations and volume of flow.

Diffused air treatment. Air is introduced into the dissolved product phase (incoming contaminated groundwater) to separate the volatile constituents from the groundwater, thus reducing the amount of product in the groundwater. This unit is usually a holding tank containing piping or discs in the bottom in which air

is blown through to create a bubbling effect.

Air stripper. An air stripper works much like the diffused air unit, however, it's design is different. The air stripped is a tower packed full of various media with a blower at the bottom. The height of the stripper depends on the volume of water and contaminant concentrations which will pass through the unit. Dissolved product phase is pumped to the top and allowed to drop by gravity through the tower. The media in the tower increases the surface area of the liquid as drops through the tower. The blower in the bottom of tower forces air up as the liquid drops, again driving off volatiles from the groundwater. Media in the tower does have to be regularly acid rinsed to remove biological growth which accumulates.

In-line filters. In line filters can be placed in the system to collect dissolved solids which could be detrimental to other system components. The filters generally placed early in a treatment system, are made of stainless steel or felt and removable to enable periodic cleaning.

Carbon adsorption. Carbon adsorption is a process

which uses activated carbon to remove contaminants from the dissolved product phase. Carbon adsorption is usually used for polishing following pretreatment of groundwater. Contaminants adsorb to the activated carbon as they are passed through a canister. Carbon adsorption is a very effective treatment for removing contaminants, however it is an expensive process. Spent carbon has to be properly disposed of or rejuvenated by cleaning methods such as acid rinsing.

The advantages of a pump and treat system are as follows:

a. When correctly designed, installed and operated, a pump and treat system can restore a contaminated water supply back to a usable state.

b. The system can be used to remove a number of contaminants.

c. The system can be installed in a relatively small area.

The disadvantages of a pump and treat system are as follows:

a. The system can be expensive to install and operate.

b. A wide array of permits can be required (i.e. water pollution, air pollution and city building).

c. Weather problems may require the system to be housed in a building. Equipment may require environmental exposure protection.

d. A certified operator may be required to submit monthly discharge data to the state and/or local municipality.

2. Biological Treatment

Biological Treatment techniques used by municipal wastewater treatment facilities can be scaled down and applied to the removal of volatile organics compounds (VOCs) from groundwater. The VOCs serve as a food source for certain aerobic microorganisms that convert the organic compounds into carbon dioxide, water, energy and biological solids.

Biological treatment techniques include fixed film and

suspended growth biological processes. Fixed film biological processes are rotating biological contactors (RBC's), trickling filters and biotowers. In these methods, a thin film of aerobic microorganisms is maintained on artificial media exposed to process water and atmospheric oxygen.

In activated sludge treatment, which is a suspended growth process, a large community of microorganisms is maintained in a liquid environment. Oxygen is provided by vigorous aeration which mixes the solids and water. The aeration tank effluents are clarified prior to final disposal. Some of the settled sludge from the clarifier is returned to the activated sludge tanks to maintain the microbiological population and the remainder of the sludge is removed for further conditioning or temporary storage prior to final disposal.

Biological systems are more complex than other treatment systems. They require sludge handling and disposal. The system needs to be constantly monitored and adjusted so that the microbes remain acclimated to the quality of influent water. Biological treatment processes degrade VOC's to harmless by-products and are

applicable to a wide range of contaminants.

The advantages of biological treatment are as follows:

a. Proven technology for removing a wide range of organics.

b. Potential problems with air emission are minimized.

The disadvantages of biological treatment are as follows:

a. Higher capital, operating and maintenance costs.

b. Greater potential for malfunction.

c. System required more monitoring.

3.0 Bioremediation. Bioremediation is another form of groundwater treatment. Bioremediation is still relatively new and not commonly used. However, further studies may show this form of treatment to be very beneficial as a form of groundwater remediation.

Bioremediation is an in-situ process by which nutrients and/or microorganisms are introduced into the soil in an effort to promote the digestion of contaminants by microorganisms. The introduction of nutrients into the subsurface soil to stimulate/enhance the existing organisms appears to be the most widely used bioremediation technique.

The advantages of bioremediation are as follows:

a. Treatment occurs with little or no soil disruption. Soil does not have to be removed from the site, again reducing any liabilities associated with the landfills.

b. Soil remediation can occur in areas where excavation cannot.

c. Soil types may not be a determining factor in a clean-up. Soil limitations may not be as great.

d. Cost can be substantially less that other forms of remediation.

e. A wide range of contaminants can be treated, when other forms of remediation may be limited.

f. Remediation can occur in the saturated and unsaturated zone.

The disadvantages of bioremediation are as follows:

a. Clean-up schedules can extend beyond Agency time frames, cannot be considered in emergency situations.

b. Can require prolonged research before implementing clean-up.

c. Clean-up levels may not reach Agency specified objectives.

d. May require bench scale investigation reports before acceptance.

e. Biodegradation transforms target compounds into other regulated compounds, with lower MCL criteria, such as vinyl chloride, see Figure 3.

PROPOSED REMEDIAL ALTERNATIVES

The choice of a remedial strategy is governed by site conditions, available methods of remediation, and the potential impact on the areas affected by contamination. The best remedial alternatives should be selected on the basis of technical feasibility, cost, time constraints and clean-up criteria. Site specific factors affecting the selection of remedial alternatives were discussed earlier in the report.

Based upon the above criteria, we suggest that a groundwater recovery system with off-site biological treatment at the City of South Bend's wastewater treatment plant be proposed as the selected groundwater treatment method at the Torrington site. This system will employ a groundwater pump (recovery well) network located at those areas where groundwater contaminant levels exceeded MCL standards, Wells S-3, W-7, W-10B and W-12.

Currently, the City of South Bend allows industrial users to discharge untreated wastewater with total volatile organic compound (VOC's) levels of two (2) parts per million. From available groundwater data, it appears that recovered untreated groundwater could meet these discharge standards.

Highly contaminated groundwater can be blended and diluted with groundwater exhibiting lower VOC concentrations. Discussions with the Sanitary District will have to be made regarding potential organic and suspending solids loading excursions and possible pretreatment measures, if deemed necessary.

Cost of treatment as outlined herein, will be limited to capital, installation, replacement, and operation and maintenance (O&M) costs of the groundwater recovery and monitoring system. Additional operating and capital expenses associated with an on-site treatment system, will be eliminated by not having an operating on-site treatment system. Even though sanitary user fees will be included in the cost of operating the proposed groundwater recovery system, the overall operation of a pump and off-site treatment method as compared to a pump and on-site treatment method is judged to be more economical. We note that the groundwater remediation currently underway at the Allied-Bendix facility is also discharging recovered untreated contaminated groundwater into the sanitary sewer system. According to the South Bend Sanitary District, there is enough capacity at the wastewater treatment plant to accept the estimated hydraulic and organic loads to be discharged by the proposed groundwater recovery system to be located at

the Torrington site.

COST ESTIMATES - GROUNDWATER REMEDIATION

The following cost estimates associated with the development, installation and operation of a groundwater recovery system at the Torrington site are preliminary in nature and are provided for budgetary purposes. Further investigative work and analytical data may make it necessary to revise the scope of this plan and costs associated with its implementation.

DESCRIPTION AND OPERATION

Use:

A recovery well system to be utilized to collect and remove contaminated groundwater at the Torrington site.

Configuration:

A series of recovery wells, for a total of six (6), to be installed into the soil and extend down to the top of the clay layer located at approximately 60 feet below the ground surface. The wells will be screened from 30 to 60 feet.

This system shall be composed of three (3) wells, pumps and headers to be installed in a row in the S-3 area, with three (3) additional recovery wells and pumps to be installed at W-7, W-10 and W-12 locations. Recovered effluents will be discharged and blended into a submersible duplex pump station with dry valve pit-metering manhole, prior to discharge into sanitary district sewer system. Automatic flow recording and sampling equipment will be provided and made accessible to sanitary district personnel for data acquisition. Discharge is estimated to be 500,000 gallons per day (1/2 MGD) - continuous pumping.

Assume:

1. Recovery well and discharging piping system is completely separate from facility sanitary drain system. Additional savings could be made if discharge piping was connected to building sanitary drains, assuming drains could handle additional flows.
2. Four (4) foot deep trench for discharge piping.
3. Wells 60 foot deep.
4. Estimated time of operation - 10 years.
5. Estimated costs are for groundwater clean-up of the Torrington site only and are based upon information known to date.

6. No pretreatment required.

7. No suspended solid or organic excursions.

ESTIMATED COSTS OF DEEP WELL RECOVERY SYSTEM

CAPITAL COSTS

1. Header Pipe - 6" Dia. PVC
   200 L.F. @ $19.00/L.F.....$ 3,800

2. Discharge Piping - 4" Dia. PVC
   600 L.F. @ $14.00/L.F.....$ 8,400

3. Discharge Piping - 6" Dia. PVC
   1460 L.F. @ $19.00/L.F.....$ 27,740

4. Recovery Wells (Pumps, casing, valves) 4" Dia. PVC
   6 wells @ $3,500 ea.....$ 21,000

5. Duplex Pump Station - Wet Well & Dry Valve/Metering/
   Sample Manhole.....$100,000

6. Geotechnical & Design Engineering.....$ 20,000

   CAPITAL COSTS (SUBTOTAL).....$180,940
   CONTINGENCY ALLOWANCE (25%).....$ 45,235
   TOTAL CAPITAL COSTS.....$226,175

O & M COSTS (ANNUAL)

1. Monitoring Well Sampling
   12 Days (96 Hr./Yr.).....$ 6,000/yr.

2. Analysis
   24 Samples @ $250/sample.....$ 6,000/yr.

3. Electricity
   262,800 KWH/Yr. X $0.07/KWH.....$ 18,400/yr.

4. Sewer user fees (1/2 MGD)
   $0.74 per 100 Cu. Ft. Per Month.....$178,000/yr.

   TOTAL O & M COSTS.....$208,400/yr.

   TOTAL LIFE CYCLE COSTS.....$2,310,175/10 yrs.
   (OVER 10 YEARS)

COST ESTIMATES - PIT CONTENTS

Cost estimates for remediation in the form of off-site disposal for pit contents (as summarized in Table 1. of the BEST ENVIRONMENTAL ASSESSMENT, October, 1990) are as follows:

Estimates include labor, materials, transportation and disposal costs.

Pit	Material	Volume	Cost
P2			
P6	Oily Solids, Debris	15 cu. yds.	$4,750.00
P8			
P3	Oily Sludge (Hazardous)	1 Drum	$1,300.00
P5			
P7	Oil, Sludge Debris (Liquid)	10 Drums	$9,850.00
P10			

TOTAL PIT CONTENTS COST ESTIMATE.....$15,900.00

COST ESTIMATES - PAINT CHIPS

Remediation costs for paint chips are based upon air-aided removal of "loose and peeling" paint only and disposal as "hazardous" waste. Quantity of waste generated estimated to be 30 cubic yards. Costs including labor, materials, transportation and disposal are:

Labor and Materials (Removal).....$61,500.00

Analysis, Transportation and Disposal.....$13,400.00

Total Paint Chip Cost Estimate.....$74,900.00

COST ESTIMATES - POND #4 REMEDIATION

Cost estimates for excavation, transportation, landfill disposal, and backfilling of impacted soils are based upon area 75′ x 30′ x 3′ (250 cubic yards). Disposal costs may vary according to extent of contamination and characterization of the material. Estimates for both "non-hazardous special" and "hazardous" waste disposal are included should analysis indicate hazardous waste characteristics.

Labor, Material, Equipment (excavation and backfilling)
.....$ 7,500.00

Analysis, Disposal and Transportation (non-hazardous)
.....$ 10,250.00

Analysis, Disposal and Transportation (hazardous)
.....$102,500.00

Non-Hazardous	Hazardous
$17,750.00	$110,000.00

APPENDIX B

MONITORING WELL AS-BUILT DETAILS

BORING LOG

BORING NO. W-9

SHT 1 OF 1

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	light brown SAND, fine to medium w/some small pebbles
				9.2' 703.32; BENTONITE SEAL	
10		W1			
	1				sample 1 is an auger cutting, collected w/ 30' of auger in the ground
20		W2		NATIVE SAND BACKFILL	
		W3	@ 30'		GRAVEL @ 25.0' 687.52
					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'
					split spoon driven 56.5'-58.5', gray SANDY CLAY w/pebbles
60					END OF BORING 58.5' 654.02

SOILS 58.5 FEET

BEDROCK 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 ____

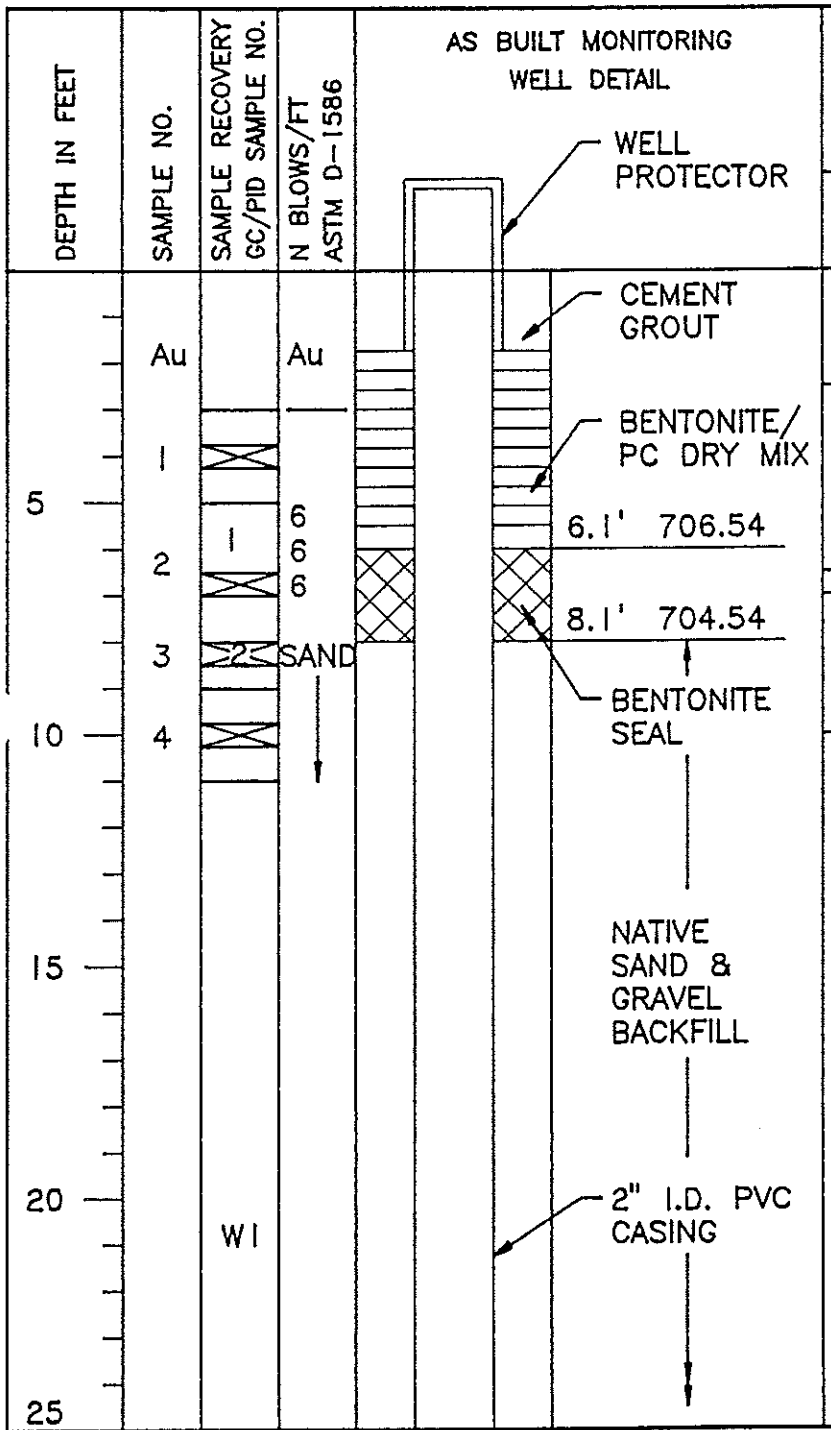
ELEVATION MEASURING POINT GROUND SURFACE

DAILY & ASSOCIATES ENGINEERS INC. CHAMPAIGN & PEORIA, ILLINOIS

BORING LOG

BORING NO. W-10A
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

SOIL & ROCK DESCRIPTION / COMMENTS

black SILTY CLAY, organic
2.5' 710.14

light brown SAND, fine to medium, moist
3" CLAYEY SILT @ 4.0'
6.5' 706.14

light brown SAND, fine, moist
7.0' 705.64

light brown SAND, fine to coarse w/some gravel
10.0' 702.64

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.

GRAVEL @ 22.0' 690.64

DRILLER TO REPORT CHANGES IN AUGER BEHAVIOR, WILL DRIVE SPLIT SPOON WHEN CLAY IS ENCOUNTERED.

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

DAILY & ASSOCIATES ENGINEERS INC. CHAMPAIGN & PEORIA, ILLINOIS

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
30		W2		2" I.D. PVC CASING; NATIVE SAND & GRAVEL BACKFILL	brown SAND, fine to coarse w/gravel
		W3	@ 40'		
				48.51' 664.13	
50	5	W4		2" I.D. PVC 0.010" SLOT SCREEN	NOTE: 1. AUGER CUTTING SAMPLE TAKEN @ 50' FOR GRAIN SIZE ANALYSIS #5 (FINE TO COARSE BROWN SAND W/GRAVEL). 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					60.0' 652.64 END OF BORING

SOILS 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

DAILY & ASSOCIATES ENGINEERS INC. CHAMPAIGN & PEORIA, ILLINOIS

BORING LOG

BORING NO. W-10B
SHT 1 OF 1

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

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	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					

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

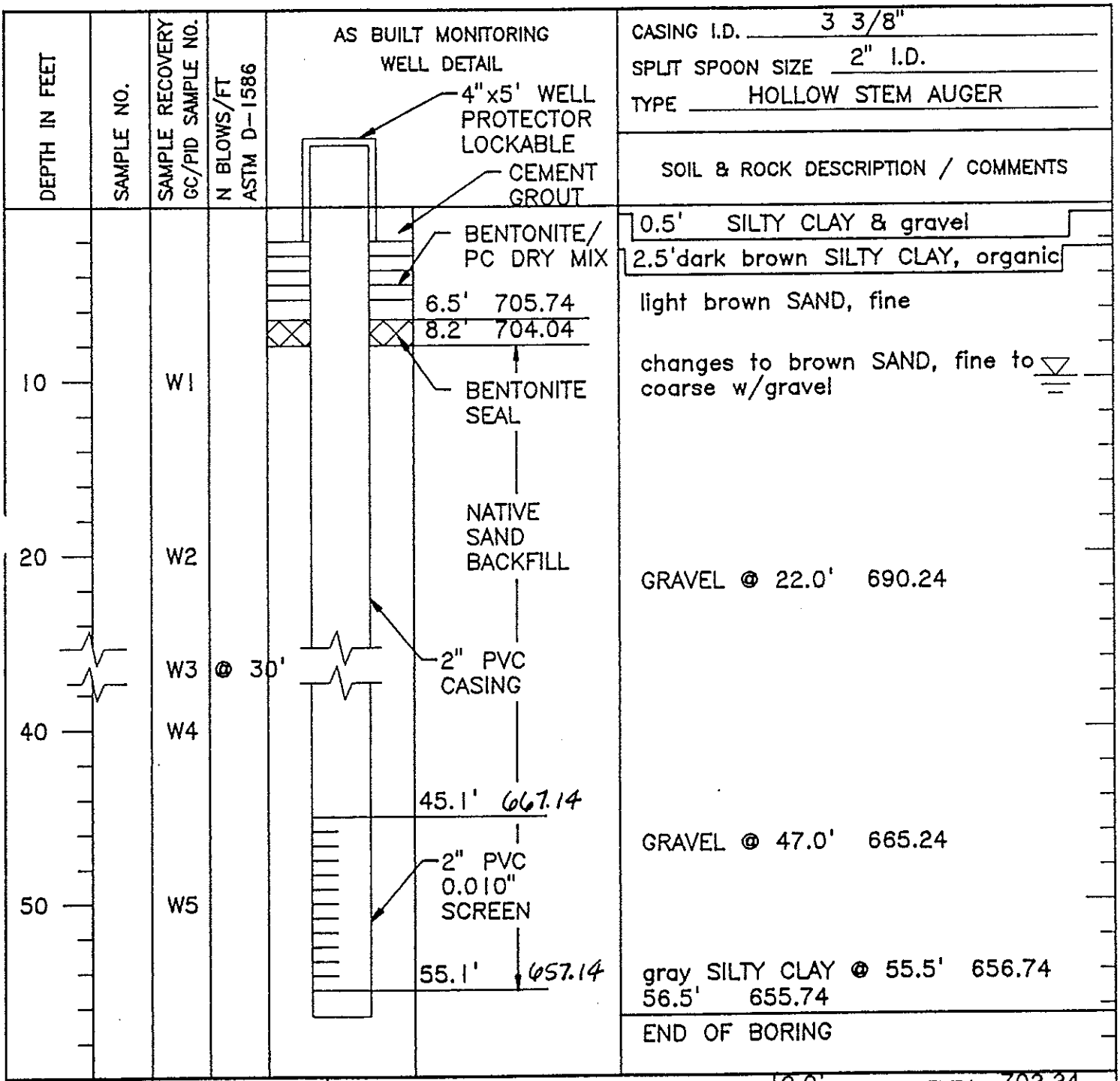
SEEPAGE WATER ENCOUNTERED, DEPTH 8.0' ELEV. 704.68
WATER LEVEL AT COMPLETION 8.68' ELEV. 704.00
WATER LEVEL ____ ELEV. ____ DATE/TIME ____
WATER LEVEL ____ ELEV. ____ DATE/TIME ____
ELEVATION MEASURING POINT GROUND SURFACE

DAILY & ASSOCIATES ENGINEERS INC. CHAMPAIGN & PEORIA, ILLINOIS

BORING LOG

BORING NO. W-11A
SHT 1 OF 1

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

SOIL & ROCK DESCRIPTION / COMMENTS

0.5' SILTY CLAY & gravel
2.5' dark brown SILTY CLAY, organic
light brown SAND, fine
changes to brown SAND, fine to coarse w/gravel
GRAVEL @ 22.0' 690.24
GRAVEL @ 47.0' 665.24
gray SILTY CLAY @ 55.5' 656.74
56.5' 655.74
END OF BORING

SOILS 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

DAILY & ASSOCIATES ENGINEERS INC. CHAMPAIGN & PEORIA, ILLINOIS

BORING LOG

BORING NO. W-11B

SHT 1 OF 1

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

LOCATION 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				30.08' 682.21	30.08 682.21
					END OF BORING
40					

SOILS 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

DAILY & ASSOCIATES ENGINEERS INC. CHAMPAIGN & PEORIA, ILLINOIS

BORING LOG

BORING NO. W-12
SHT 1 OF 1

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

SOILS 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

DAILY & ASSOCIATES ENGINEERS INC. CHAMPAIGN & PEORIA, ILLINOIS

BORING LOG

BORING NO. W-13

SHT 1 OF 1

D/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		BENTONITE SEAL	10.0' 704.22
				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	(53') W-13 SOIL	W5			AUGER CUTTINGS SAMPLE @ 53.0'
					CLAY @ 57.0' NO SAMPLE POSSIBLE
60					END OF BORING 657.22

SOILS 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

DAILY & ASSOCIATES ENGINEERS INC. CHAMPAIGN & PEORIA, ILLINOIS

APPENDIX C

SOIL BORING LOGS

BORING LOG

BORING NO. BP-1
SHT 1 OF 5

D/A JOB NO. 900-13 PROJECT UEA / TORRINGTON
LOCATION SOUTH BEND, IN / B-P DATE START 2-5-91 FINISH 2-5-91
WEATHER CLOUDY, 40° F
GROUND ELEVATION 711.94 FT. MSL TOTAL DEPTH 10.0'
DRILLED BY BEST LOGGED BY PB

CASING I.D. 3 3/8"
SPLIT SPOON SIZE 2" I.D.
TYPE HOLLOW STEM AUGER, CONTINUOUS SPLIT SPOON

DEPTH IN FEET	LAB SAMPLE NO.	SAMPLE RECOVERY	N BLOWS/FT ASTM D-1586	GC/PID SAMPLE NO.	SOIL & ROCK DESCRIPTION / COMMENTS
				#16	dark brown SANDY SILT, organic w/roots
				#17	light brown SAND, fine to medium, some small gravel
5	BP-1 SOIL			#18	light brown SAND, fine to medium
				#19	light gray SAND, fine to medium
				#20	light gray SAND, fine to medium, moist
10					END OF BORING
15					
20					
25					

SOILS 10.0'
BEDROCK NONE
TOTAL DEPTH 10.0'
COMMENTS

SEEPAGE WATER ENCOUNTERED, DEPTH 8.5' ELEV. 703.44
WATER LEVEL AT COMPLETION ELEV.
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. BP-2
SHT 2 OF 5

D/A JOB NO. 900-13 PROJECT UEA / TORRINGTON
LOCATION SOUTH BEND, IN / B-P DATE START 2-5-91 FINISH 2-5-91
WEATHER CLOUDY, FOG, 40° F
GROUND ELEVATION 708.88 FT. MSL TOTAL DEPTH 6.0'
DRILLED BY BEST LOGGED BY PB

CASING I.D. 3 3/8"
SPLIT SPOON SIZE 2" I.D.
TYPE HOLLOW STEM AUGER, CONTINUOUS SPLIT SPOON

DEPTH IN FEET	LAB SAMPLE NO.	SAMPLE RECOVERY	N BLOWS/FT ASTM D-1586	GC/PID SAMPLE NO.	SOIL & ROCK DESCRIPTION / COMMENTS
				#13	dark brown SANDY CLAY, organic light to dark brown SANDY SILT, some clay & gravel
				#14	SILTY SAND, dark brown, some gravel light gray SAND, fine to medium
5	BP-2 SOIL			#15	light gray SAND, fine to medium, moist
					END OF BORING
10					
15					
20					
25					

SOILS 6.0'
BEDROCK NONE
TOTAL DEPTH 6.0'
COMMENTS

SEEPAGE WATER ENCOUNTERED, DEPTH 4.5' ELEV. 704.38
WATER LEVEL AT COMPLETION ELEV.
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. BP-3
SHT 3 OF 5

D/A JOB NO. 900-13 PROJECT UEA / TORRINGTON
LOCATION SOUTH BEND, IN / B-P DATE START 2-5-91 FINISH 2-5-91
WEATHER CLOUDY, FOG, 40° F
GROUND ELEVATION 708.99 FT. MSL TOTAL DEPTH 6.0'
DRILLED BY BEST LOGGED BY PB

CASING I.D. 3 3/8"
SPLIT SPOON SIZE 2" I.D.
TYPE HOLLOW STEM AUGER, CONTINUOUS SPLIT SPOON

DEPTH IN FEET	LAB SAMPLE NO.	SAMPLE RECOVERY	N BLOWS/FT ASTM D-1586	GC/PID SAMPLE NO.	SOIL & ROCK DESCRIPTION / COMMENTS
					dark brown SILTY SAND, organic
				#9	light gray SANDY CLAY
				#10	light brown SAND, fine to medium
5				#12	light brown SAND, fine to medium, moist
					END OF BORING
10					
15					
20					
25					

SOILS 6.0'
BEDROCK NONE
TOTAL DEPTH 6.0'
COMMENTS

SEEPAGE WATER ENCOUNTERED, DEPTH 4.25' ELEV. 704.74
WATER LEVEL AT COMPLETION ELEV.
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. BP-4
SHT 4 OF 5

D/A JOB NO. 900-13 PROJECT UEA / TORRINGTON
LOCATION SOUTH BEND, IN / B-P DATE START 2-5-91 FINISH 2-5-91
WEATHER CLOUDY, FOG, 40° F
GROUND ELEVATION 709.20 FT. MSL TOTAL DEPTH 6.0'
DRILLED BY BEST LOGGED BY PB

CASING I.D. 3 3/8"
SPLIT SPOON SIZE 2" I.D.
TYPE HOLLOW STEM AUGER, CONTINUOUS SPLIT SPOON

DEPTH IN FEET	LAB SAMPLE NO.	SAMPLE RECOVERY	N BLOWS/FT ASTM D-1586	GC/PID SAMPLE NO.	SOIL & ROCK DESCRIPTION / COMMENTS
				#6	light brown SILTY CLAY, organic
					light brown SAND, some small gravel
	BP-4 LAB			#7	gray SAND, moist w/dark black stain "decompisition odor"
5	BP-4 SOIL			#8	light gray SAND, moist
					END OF BORING
10					
15					
20					
25					

SOILS 6.0'
BEDROCK NONE
TOTAL DEPTH 6.0'
COMMENTS

SEEPAGE WATER ENCOUNTERED, DEPTH 4.5' ELEV. 704.70
WATER LEVEL AT COMPLETION ELEV.
WATER LEVEL ELEV. DATE/TIME
WATER LEVEL ELEV. DATE/TIME
ELEVATION MEASURING POINT

DAILY & ASSOCIATES ENGINEERS INC. CHAMPAIGN & PEORIA, ILLINOIS

BORING LOG

BORING NO. BP-5
SHT 5 OF 5

D/A JOB NO. 900-13 PROJECT UEA / TORRINGTON
LOCATION SOUTH BEND, IN / B-P DATE START 2-5-91 FINISH 2-5-91
WEATHER CLOUDY, FOG, 40° F
GROUND ELEVATION 708.54 FT. MSL TOTAL DEPTH 6.0'
DRILLED BY BEST LOGGED BY PB

CASING I.D. 3 3/8"
SPLIT SPOON SIZE 2" I.D.
TYPE HOLLOW STEM AUGER, CONTINUOUS SPLIT SPOON

DEPTH IN FEET	LAB SAMPLE NO.	SAMPLE RECOVERY	N BLOWS/FT ASTM D-1586	GC/PID SAMPLE NO.	SOIL & ROCK DESCRIPTION / COMMENTS
				#3	dark brown SANDY SILT, organic, some clay
					light gray to black SILTY CLAY w/some sand
	BP-5 LAB			#4	light gray medium to soarse SAND, some gray silt
5	BP-5 SOIL			#5	
					END OF BORING
10					
15					
20					
25					

SOILS 6.0'
BEDROCK NONE
TOTAL DEPTH 6.0'
COMMENTS

SEEPAGE WATER ENCOUNTERED, DEPTH 4.5' ELEV. 704.04
WATER LEVEL AT COMPLETION ELEV.
WATER LEVEL ELEV. DATE/TIME
WATER LEVEL ELEV. DATE/TIME
ELEVATION MEASURING POINT GROUND SURFACE

DAILY & ASSOCIATES ENGINEERS INC. CHAMPAIGN & PEORIA, ILLINOIS

APPENDIX D

LABORATORY ANALYTICAL RESULTS

VIRONMENTAL CONSULTANTS, INC.
501 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

Date: 02/15/91 Page 1 of 1

Lab Control No.: 16,036

P.O. Number:

Job No.: 007357

ample Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well Water	GRAB	Well, W-1

Date Collected	Date Received	Collected By	Time of Collection
01-29-91	01/31/91	P. Barding	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	<0.002 mg/l	02/01/91	Isler	Atomic absorption Graphite furnace
Chromium, total	0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Lead, total	<0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	None Detected	02/11/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By:

ORIGINAL

Sample Number
WELL-W-1

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116036
Sample Matrix: WATER
Data Release Authorized By:

Case No:
QC Report No:
Contract No:
Date Sample Received: 01/31/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared:
Date Analyzed: 02/11/91
Conc/Dil Factor: 1. pH
Percent Moisture: (Not Decanted)

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
-35-3	1,1-Dichloroethane	5	U	108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	5	U	79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

IVIRONMENTAL CONSULTANTS, INC.
11 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

e Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Date: 02/15/91 Page 1 of 1

Lab Control No.: 16,037

P.O. Number:

Job No.: 007357

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well Water	GRAB	Well, W-2

Date Collected	Date Received	Collected By	Time of Collection
01-29-91	01/31/91	P. Barding	00:00 :

ameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	(0.002 mg/l	02/01/91	Isler	Atomic absorption Graphite furnace
Chromium, total	(0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Lead, total	(0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	None Detected	02/11/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

ORIGINAL

Sample Number
WELL-W-2

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116037
Sample Matrix: WATER
Data Release Authorized By: _____

Case No: _____
QC Report No: _____
Contract No: _____
Date Sample Received: 01/31/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared: _____
Date Analyzed: 02/11/91
Conc/Dil Factor: 1. pH _____
Percent Moisture: (Not Decanted) _____

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
75-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
75-34-3	1,1-Dichloroethane	5	U	108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	5	U	79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

ENVIRONMENTAL CONSULTANTS, INC.
1 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Date: 02/15/91 Page 1 of 1

Lab Control No.: 16,038

P.O. Number:

Job No.: 007357

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well Water	GRAB	Well, W-3

Date Collected	Date Received	Collected By	Time of Collection
01-29-91	01/31/91	P. Barding	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	(0.002 mg/l	02/01/91	Isler	Atomic absorption Graphite furnace
Chromium, total	(0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Lead, total	(0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	None Detected	02/11/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

ORIGINAL

Environmental Consultants

Sample Number
WELL-W-3

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116038
Sample Matrix: WATER
Data Release Authorized By:

Case No:
QC Report No:
Contract No:
Date Sample Received: 01/31/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared:
Date Analyzed: 02/11/91
Conc/Dil Factor: 1. pH
Percent Moisture: (Not Decanted)

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
75-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U	108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	5	U	79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

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Professional Laboratory Services

Laboratory Report

Date 02/15/91 Page 1 of 1

Lab Control No. 16,039

P.O. Number

Job No. 007357

ple Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well Water	GRAB	Well, W-4

Date Collected	Date Received	Collected By	Time of Collection
01-29-91	01/31/91	P. Barding	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	<0.002 mg/l	02/01/91	Isler	Atomic absorption Graphite furnace
Chromium, total	<0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Lead, total	<0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	Detected	02/11/91	Wilson	Gas chromatography Mass spectrometry
1,1-Dichloroethane	87. ug/l	02/11/91	Wilson	Gas chromatography Mass spectrometry
1,1,1-Trichloroethane	110. ug/l	02/11/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

tate Certification No. M-10-1

Analysis Reviewed By

ORIGINAL

Environmental Consultants

Sample Number
WELL-W-4

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116039
Sample Matrix: WATER
Data Release Authorized By: _____

Case No: _____
QC Report No: _____
Contract No: _____
Date Sample Received: 01/31/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared: _____
Date Analyzed: 02/11/91
Conc/Dil Factor: 1. pH _____
Percent Moisture: (Not Decanted) _____

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
-35-3	1,1-Dichloroethane	87		108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	5	U	79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	110		95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

ENVIRONMENTAL CONSULTANTS, INC.
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Professional Laboratory Services

Laboratory Report

Date: 02/15/91 Page 1 of 1

Lab Control No.: 16,040

P.O. Number:

Job No.: 007357

Sample Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well Water	GRAB	Well, W-5

Date Collected	Date Received	Collected By	Time of Collection
01-29-91	01/31/91	P. Barding	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	<0.002 mg/l	02/01/91	Isler	Atomic absorption Graphite furnace
Chromium, total	<0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Lead, total	<0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	None Detected	02/11/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

ORIGINAL

Consultants

Sample Number
WELL-W-5

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116040
Sample Matrix: WATER
Data Release Authorized By:

Case No:
QC Report No:
Contract No:
Date Sample Received: 01/31/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared:
Date Analyzed: 02/11/91
Conc/Dil Factor: 1. pH
Percent Moisture: (Not Decanted)

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
75-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
75-3	1,1-Dichloroethane	5	U	108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	5	U	79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

ENVIRONMENTAL CONSULTANTS, INC.
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Professional Laboratory Services

Laboratory Report

Date: 02/15/91 Page 1 of 2

Lab Control No.: 16,041

P.O. Number: Job No. 007357

Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well Water	GRAB	Well, S-3

Date Collected	Date Received	Collected By	Time of Collection
01-30-91	01/31/91	P. Barding	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	<0.002 mg/l	02/01/91	Isler	Atomic absorption Graphite furnace
Chromium, total	<0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Lead, total	<0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	Detected	02/11/91	Wilson	Gas chromatography Mass spectrometry
Chloroethane	210. ug/l	02/11/91	Wilson	Gas chromatography Mass spectrometry
1,1-Dichloroethane	860. ug/l	02/11/91	Wilson	Gas chromatography Mass spectrometry
trans-1,2-Dichloroethylene	5. ug/l	02/11/91	Wilson	Gas chromatography Mass spectrometry
1,1,1-Trichloroethane	1,700. ug/l	02/11/91	Wilson	Gas chromatography Mass spectrometry
Trichloroethylene	100. ug/l	02/11/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

ORIGINAL

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Environmental Consultants

Professional Laboratory Services

Laboratory Report

Date: 02/15/91 Page 2 of 3

Lab Control No.: 16,041

P.O. Number: Job No. 007357

ple Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well Water	GRAB	Well, S-3

Date Collected	Date Received	Collected By	Time of Collection
01-30-91	01/31/91	P. Barding	00:00 :

arameter	Results	Date Analyzed	Analyst	Method of Analysis
Vinyl chloride	26. ug/l	02/11/91	Wilson	Gas chromatography Mass spectrometry
1,1-Dichloroethene	33. ug/l	02/11/91	Wilson	Gas Chromatography Mass Spectrometry
cis-1,2-Dichloroethene	770. ug/l	02/11/91	Wilson	Gas chromatography Mass spectrometry

Remarks

State Certification No. M-10-1

Analysis Reviewed By

ORIGINAL

Sample Number
WELL-S-3

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116041
Sample Matrix: WATER
Data Release Authorized By:

Case No:
QC Report No:
Contract No:
Date Sample Received: 01/31/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared:
Date Analyzed: 02/11/91
Conc/Dil Factor: 1. pH
Percent Moisture: (Not Decanted)

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	26		71-43-2	Benzene	5	U
75-00-3	Chloroethane	210		10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
75-35-4	1,1-Dichloroethene	33		127-18-4	Tetrachloroethene	5	U
)-35-3	1,1-Dichloroethane	860		108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	770		79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5		108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	1700		95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	100					

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

ENVIRONMENTAL CONSULTANTS, INC.
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Environmental Consultants

Professional Laboratory Services

Laboratory Report

Date: 02/15/91 Page 1 of 1

Lab Control No.: 16,042

P.O. Number: Job No. 007357

Source:
Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To:
As above

00000-0000

Sample Description	Sample Type	Location	Date Collected	Date Received	Collected By	Time of Collection
Well Water	GRAB	Well, W-7	01-30-91	01/31/91	P. Barding	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	<0.002 mg/l	02/01/91	Isler	Atomic absorption Graphite furnace
Chromium, total	<0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Lead, total	<0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	Detected	02/11/91	Wilson	Gas chromatography Mass spectrometry
1,1-Dichloroethane	10. ug/l	02/11/91	Wilson	Gas chromatography Mass spectrometry
1,1,1-Trichloroethane	7. ug/l	02/11/91	Wilson	Gas chromatography Mass spectrometry
1,1-Dichloroethene	10. ug/l	02/11/91	Wilson	Gas Chromatography Mass Spectrometry
cis-1,2-Dichloroethene	62. ug/l	02/11/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

ORIGINAL

Consultants

Sample Number
WELL-W-7

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116042
Sample Matrix: WATER
Data Release Authorized By:

Case No:
QC Report No:
Contract No:
Date Sample Received: 01/31/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared:
Date Analyzed: 02/11/91
Conc/Dil Factor: 1. pH
Percent Moisture: (Not Decanted)

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
75-35-4	1,1-Dichloroethene	10		127-18-4	Tetrachloroethene	5	U
[illegible]-35-3	1,1-Dichloroethane	10		108-88-3	Toluene	5	U
[illegible]-59-2	Cis 1,2-Dichloroethene	62		79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	7		95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

VIRONMENTAL CONSULTANTS, INC.
1 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Date: 02/15/91 Page 1 of 1

Lab Control No.: 16,043

P.O. Number:

Job No.: 007357

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well Water	GRAB	Well, W-8

Date Collected	Date Received	Collected By	Time of Collection
01-30-91	01/31/91	P. Barding	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	0.011 mg/l	02/01/91	Isler	Atomic absorption Graphite furnace
Chromium, total	<0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Lead, total	<0.001 mg/l	02/04/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	None Detected	02/11/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

ORIGINAL

Consultants

Sample Number
WELL-W-8

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116043
Sample Matrix: WATER
Data Release Authorized By:

Case No:
QC Report No:
Contract No:
Date Sample Received: 01/31/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared:
Date Analyzed: 02/11/91
Conc/Dil Factor: 1. pH
Percent Moisture: (Not Decanted)

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
75-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U	108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	5	U	79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

NVIRONMENTAL CONSULTANTS, INC.
91 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

e Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Date: 02/15/91 Page 1 of 1

Lab Control No.: 16,044

P.O. Number:

Job No.: 007357

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
DI Water	GRAB	VOA Blank

Date Collected	Date Received	Collected By	Time of Collection
Unknown	01/31/91	P. Barding	00:00 :

rameter	Results	Date Analyzed	Analyst	Method of Analysis
Vol. Organic Compounds (1)	None Detected	02/11/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

ORIGINAL

Environmental Consultants

Sample Number
DI-WATER

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116044
Sample Matrix: WATER
Data Release Authorized By:

Case No:
QC Report No:
Contract No:
Date Sample Received: 01/31/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared:
Date Analyzed: 02/11/91
Conc/Dil Factor: 1. pH
Percent Moisture: (Not Decanted)

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
75-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U	108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	5	U	79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

Environmental Consultants

METHOD BLANK SUMMARY

Case No. _____ Region _____ Contractor ENV CONS INC Contract No. _____

File_ID_DL	Date of analysis	Frac	Matrix	Level	Inst ID	CAS_number	Compound_(HSL,_TIC,_unknown)	Conc.	Units	C
VOBK0211 5	02/11/91	VOA	W	L	FINN	354-58-5	Trichlorotrifluoroethane	38	ug/L	
VOBK0211	02/11/91	VOA	W	L	FINN	75-09-2	Methylene Chloride	38	ug/L	

Comments:

FORM IV

NVIRONMENTAL CONSULTANTS, INC.
391 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

ample Source

FEB 25 1991

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Date: 02/18/91 Page 1 of 1

Lab Control No.: 16,370

P.O. Number

Job No.: 007357

lill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well water	GRAB	Well W-9

ate Collected	Date Received	Collected By	Time of Collection
02-07-91	02/08/91	Client	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	0.003 mg/l	02/14/91	Isler	Atomic absorption Graphite furnace
Chromium, total	0.001 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
ead, total	(0.001 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	None Detected	02/13/91	Wilson	Gas chromatography Mass spectrometry

narks

(1) See attached list for target compounds & respective detection limits.

tate Certification No. M-10-1

Analysis Reviewed By

ORIGINAL

Environmental Consultants

Sample Number
WELL-W-9

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116370
Sample Matrix: WATER
Data Release Authorized By: BK

Case No:
QC Report No:
Contract No:
Date Sample Received: 02/08/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared:
Date Analyzed: 02/13/91
Conc/Dil Factor: 1. pH
Percent Moisture: (Not Decanted)

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
75-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U	108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	5	U	79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

IRONMENTAL CONSULTANTS, INC.
Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

Date 02/18/91 Page 1 of 1

Lab Control No. 16,371

P.O. Number

Job No. 007357

Sample Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location	Time of Collection
Well water	GRAB	Well W-10A	00:00 :

Date Collected	Date Received	Collected By
02-07-91	02/08/91	Client

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	0.007 mg/l	02/14/91	Isler	Atomic absorption Graphite furnace
Chromium, total	0.001 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
Lead, total	<0.001 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	Detected	02/13/91	Wilson	Gas chromatography Mass spectrometry
cis-1,2-Dichloroethene	14. ug/l	02/13/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

Environmental Consultants

Sample Number
WELL-10-A

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116371
Sample Matrix: WATER
Data Release Authorized By: _____

Case No: _____
QC Report No: _____
Contract No: _____
Date Sample Received: 02/08/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared: _____
Date Analyzed: 02/13/91
Conc/Dil Factor: 1 pH _____
Percent Moisture: (Not Decanted) _____

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
/5-35-3	1,1-Dichloroethane	5	U	108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	14		79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

ENVIRONMENTAL CONSULTANTS, INC.
391 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

Date: 02/18/91 Page 1 of 1

Lab Control No.: 16,372

P.O. Number:

Job No.: 007357

Sample Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well water	GRAB	Well W-10B

Date Collected	Date Received	Collected By	Time of Collection
02-07-91	02/08/91	Client	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	0.002 mg/l	02/14/91	Isler	Atomic absorption Graphite furnace
Chromium, total	0.001 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
Lead, total	0.001 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	Detected	02/13/91	Wilson	Gas chromatography Mass spectrometry
1,1-Dichloroethane	29. ug/l	02/13/91	Wilson	Gas chromatography Mass spectrometry
1,1,1-Trichloroethane	130. ug/l	02/13/91	Wilson	Gas chromatography Mass spectrometry
Trichloroethylene	19. ug/l	02/13/91	Wilson	Gas chromatography Mass spectrometry
1,1-Dichloroethene	12. ug/l	02/13/91	Wilson	Gas Chromatography Mass Spectrometry
cis-1,2-Dichloroethene	7. ug/l	02/13/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By: Brad Carey

ORIGINAL

Environmental Consultants

Sample Number
WELL-10-B

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116372
Sample Matrix: WATER
Data Release Authorized By: [signature]

Case No:
QC Report No:
Contract No:
Date Sample Received: 02/08/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared:
Date Analyzed: 02/13/91
Conc/Dil Factor: 1. pH
Percent Moisture: (Not Decanted)

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
5-35-4	1,1-Dichloroethene	12		127-18-4	Tetrachloroethene	5	U
75-35-3	1,1-Dichloroethane	29		108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	7		79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	130		95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	19					

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

ENVIRONMENTAL CONSULTANTS, INC.
391 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

Sample Source

Best Environmental
P.O. Box 576
155 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Date: 02/18/91 Page 1 of 1

Lab Control No.: 16,373

P.O. Number:

Job No.: 007357

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well water	GRAB	Well W-11A

Date Collected	Date Received	Collected By	Time of Collection
02-07-91	02/08/91	Client	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	0.003 mg/l	02/14/91	Isler	Atomic absorption Graphite furnace
Chromium, total	0.001 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
Lead, total	<0.001 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	Detected	02/13/91	Wilson	Gas chromatography Mass spectrometry
cis-1,2-Dichloroethene	38. ug/l	02/13/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

ORIGINAL

Environmental Consultants

Sample Number
WELL-W-11-A

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116373
Sample Matrix: WATER
Data Release Authorized By: BJC

Case No:
QC Report No:
Contract No:
Date Sample Received: 02/08/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared:
Date Analyzed: 02/13/91
Conc/Dil Factor: 1. pH
Percent Moisture: (Not Decanted)

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
[illegible]-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U	108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	38		79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

ENVIRONMENTAL CONSULTANTS, INC.
391 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

Date 02/18/91 Page 1

Lab Control No. 16,374

P.O. Number Job No. 00735

Sample Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To: As above

00000-0000

Sample Description: Well water
Sample Type: GRAB
Location: Well W-11B
Time of Collection: 00:00
Date Collected: 02-07-91
Date Received: 02/08/91
Collected By: Client

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	0.015 mg/l	02/14/91	Isler	Atomic absorption Graphite furnace
Chromium, total	0.032 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
Lead, total	0.010 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	Detected	02/13/91	Wilson	Gas chromatography Mass spectrometry
cis-1,2-Dichloroethene	28. ug/l	02/13/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

Analysis Reviewed By

Certification No. M-10-1

Environmental Consultants

Sample Number
WELL-W-11-B

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116374
Sample Matrix: WATER
Data Release Authorized By: _____

Case No: _____
QC Report No: _____
Contract No: _____
Date Sample Received: 02/08/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared: _____
Date Analyzed: 02/13/91
Conc/Dil Factor: 1. pH _____
Percent Moisture: (Not Decanted) _____

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
75-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U	108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	28		79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

ENVIRONMENTAL CONSULTANTS, INC.
391 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

Sample Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Date: 02/18/91 Page 1 of 1

Lab Control No.: 16,375

P.O. Number:

Job No.: 007357

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well water	GRAB	Well W-12

Date Collected	Date Received	Collected By	Time of Collection
02-07-91	02/08/91	Client	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	(0.002 mg/l	02/14/91	Isler	Atomic absorption Graphite furnace
Chromium, total	0.001 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
Lead, total	(0.001 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	Detected	02/13/91	Wilson	Gas chromatography Mass spectrometry
Chloroethane	80. ug/l	02/13/91	Wilson	Gas chromatography Mass spectrometry
1,1-Dichloroethane	5. ug/l	02/13/91	Wilson	Gas chromatography Mass spectrometry
1,1-Dichloroethene	32. ug/l	02/13/91	Wilson	Gas Chromatography Mass Spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

ORIGINAL

Environmental Consultants

Sample Number
WELL-W-12

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116375
Sample Matrix: WATER
Data Release Authorized By: _____

Case No: _____
QC Report No: _____
Contract No: _____
Date Sample Received: 02/08/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared: _____
Date Analyzed: 02/13/91
Conc/Dil Factor: 1 pH _____
Percent Moisture: (Not Decanted) _____

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	80		10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
75-35-4	1,1-Dichloroethene	32		127-18-4	Tetrachloroethene	5	U
75-35-3	1,1-Dichloroethane	5		108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	5	U	79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

NVIRONMENTAL CONSULTANTS, INC.
391 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional [illegible]

Laboratory Report

Date: 02/18/91 Page 1 of 1

Lab Control No.: 16,376

P.O. Number: Job No. 007357

ample Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Well water	GRAB	Well W-13

Date Collected	Date Received	Collected By	Time of Collection
02-07-91	02/08/91	Client	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	<0.002 mg/l	02/14/91	Isler	Atomic absorption Graphite furnace
Chromium, total	0.001 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
ead, total	<0.001 mg/l	02/13/91	Isler	Atomic absorption Graphite furnace
Vol. Organic Compounds (1)	Detected	02/13/91	Wilson	Gas chromatography Mass spectrometry
Chloroethane	36. ug/l	02/13/91	Wilson	Gas chromatography Mass spectrometry
1,1-Dichloroethane	33. ug/l	02/13/91	Wilson	Gas chromatography Mass spectrometry

marks

(1) See attached list for target compounds & respective detection limits.

tate Certification No. M-10-1

Analysis Reviewed By

Environmental Consultants

Sample Number
WELL-W-13

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116376
Sample Matrix: WATER
Data Release Authorized By: _____

Case No: _____
QC Report No: _____
Contract No: _____
Date Sample Received: 02/08/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared: _____
Date Analyzed: 02/13/91
Conc/Dil Factor: 1 pH _____
Percent Moisture: (Not Decanted) _____

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	36		10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
[illegible]-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
[illegible]-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
75-35-3	1,1-Dichloroethane	33		108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	5	U	79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

ENVIRONMENTAL CONSULTANTS, INC.
391 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

Date 02/18/91 Page 1 of 1

Lab Control No. 16,377

P.O. Number

Job No. 007357

ample Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
DI Water	GRAB	Trip Blank

Date Collected	Date Received	Collected By	Time of Collection
Unknown	02/08/91	Client	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Vol. Organic Compounds (1)	None Detected	02/13/91	Wilson	Gas chromatography Mass spectrometry

marks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

Environmental Consultants

Sample Number
DI-WATER

VOLATILE ORGANICS ANALYSIS DATA SHEET
VOLATILE COMPOUNDS
(Page 1)

Laboratory Name: ENV CONS INC
Lab Sample ID No: 116377
Sample Matrix: WATER
Data Release Authorized By: [signature]

Case No:
QC Report No:
Contract No:
Date Sample Received: 02/08/91

METHOD 8240

Concentration: LOW
Date Extracted/Prepared:
Date Analyzed: 02/13/91
Conc/Dil Factor: 1 pH
Percent Moisture: (Not Decanted)

CAS Number		ug/L		CAS Number		ug/L	
74-84-3	Chloromethane	10	U	124-48-1	Dibromochloromethane	5	U
74-83-9	Bromomethane	10	U	79-00-5	1,1,2-Trichloroethane	5	U
75-01-4	Vinyl Chloride	10	U	71-43-2	Benzene	5	U
75-00-3	Chloroethane	10	U	10061-01-5	Cis-1,3-Dichloropropene	5	U
75-09-2	Methylene Chloride	10	BU	75-25-2	Bromoform	5	U
67-64-1	Acetone	10	U	108-10-1	4-Methyl-2-Pentanone	10	U
75-15-0	Carbon Disulfide	5	U	591-78-6	2-Hexanone	10	U
75-35-4	1,1-Dichloroethene	5	U	127-18-4	Tetrachloroethene	5	U
75-35-3	1,1-Dichloroethane	5	U	108-88-3	Toluene	5	U
156-59-2	Cis 1,2-Dichloroethene	5	U	79-34-5	1,1,2,2-Tetrachloroethane	5	U
156-60-5	Trans-1,2-Dichloroethene	5	U	108-90-7	Chlorobenzene	5	U
67-66-3	Chloroform	5	U	100-41-4	Ethylbenzene	5	U
107-06-2	1,2-Dichloroethane	5	U	100-42-5	Styrene	5	U
78-93-3	2-Butanone	10	U		M & P Xylenes	5	U
71-55-6	1,1,1-Trichloroethane	5	U	95-47-5	O-Xylene	5	U
56-23-5	Carbon Tetrachloride	5	U	107-02-8	Acrolein	10	U
108-05-4	Vinyl Acetate	10	U	107-13-1	Acrylonitrile	10	U
75-27-4	Bromodichloromethane	5	U	110-75-8	2-Chloroethylvinylether	10	U
78-87-5	1,2-Dichloropropane	5	U	76-13-1	Trichlorofluoromethane	5	U
10061-02-6	Trans-1,3-Dichloropropene	5	U	75-71-8	Dichlorodifluoromethane	5	U
79-01-6	Trichloroethene	5	U				

B - Compound was detected in the QC blank.
U - Compound analyzed for but not detected. The reported value is the minimum attainable quantitation limit for the sample.

Environmental Consultants

Professional Laboratory Services

WATER SURROGATE PERCENT RECOVERY SUMMARY
(Page 1)

Case No. _____ Contract Laboratory ENV CONS INC Contract No. _____

	VOLATILE				SEMI-VOLATILE						PEST	
	Toluene-d8	Bromofluorobenzene	1,2-Dichloroethane-d4	Nitrobenzene-d5	2-Fluorobiphenyl	Terphenyl-d14	2-Fluorophenol	Phenol-d6	2,4,6-Tribromophenol	Dibutylchlorendate		
SMO TRAFFIC NO.	81 117	74 121	70 121	41 120	44 119	38 128	23 121	15 103	10 130	48 ** 136		
WELL-W-9	69*	98	110	_____	_____	_____	_____	_____	_____	_____		
WELL-10-A	76*	97	88	_____	_____	_____	_____	_____	_____	_____		
WELL-10-B	106	98	98	_____	_____	_____	_____	_____	_____	_____		
WELL-W-11-A	108	105	108	_____	_____	_____	_____	_____	_____	_____		
WELL-W-11-B	88	95	96	_____	_____	_____	_____	_____	_____	_____		
WELL-W-12	115	95	107	_____	_____	_____	_____	_____	_____	_____		
WELL-W-13	74*	103	99	_____	_____	_____	_____	_____	_____	_____		
MI-WATER	120*	101	111	_____	_____	_____	_____	_____	_____	_____		
RINSATE-BLA	90	97	102	_____	_____	_____	_____	_____	_____	_____		
VOBK0213	109	94	96									

* VALUES ARE OUTSIDE OF CONTRACT REQUIRED QC LIMITS
** ADVISORY LIMITS ONLY

Volatiles: ___4 out of __30; outside of QC limi
Semi-Volatiles: ____ out of __54; outside of QC limi
Pesticides: ____ out of ___9; outside of QC limi

Comments:

FORM II

Environmental Consultants

METHOD BLANK SUMMARY

ıse No. _____ Region _____ Contractor ENV_CONS_INC__ Contract No. _____

_File_ID_ DL___ __	Date of analysis	Frac	M t x	L e v	Inst ID__	CAS_number	Compound_(HSL,_TIC,_unknown)	_Conc.	Units
VOBK0213 Ø	02/13/91	VOA	W	L	FINN	75-09-2	Methylene Chloride	24	ug/L

Comments:

FORM IV

NET NATIONAL ENVIRONMENTAL TESTING, INC.®

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4266

ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

03-04-91

Sample No.: 34070

P.O. NO.: 892598

Sample Description: WELL S-3

Date Taken: 01-30-91

Date Received: 01-31-91

Parameters	Results	Units
Arsenic, Total by Furnace	<0.005	mg/L
Chromium, Total by Furnace	<0.001	mg/L
Lead, Total by Furnace	<0.005	mg/L

Steve Johnson
Project Manager

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4266

ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

03-04-91

Sample No.: 34070

P.O. NO.: 892598

Sample Description: WELL S-3

Date Taken: 01-30-91

Date Received: 01-31-91

Parameters	Results	Units
VOLATILE COMPOUNDS		
Acrolein	<50.	ug/L
Acrylonitrile	<50.	ug/L
Benzene	<5.0	ug/L
Bromodichloromethane	<5.0	ug/L
Bromoform	<5.0	ug/L
Bromomethane	<50.	ug/L
Carbon tetrachloride	166.	ug/L
Chlorobenzene	<5.0	ug/L
Chloroethane	210.	ug/L
2-Chloroethylvinyl ether	<5.0	ug/L
Chloroform	<5.0	ug/L
Chloromethane	<50.	ug/L
Dibromochloromethane	<5.0	ug/L
1,2-Dichlorobenzene	<5.0	ug/L
1,3-Dichlorobenzene	<5.0	ug/L
1,4-Dichlorobenzene	<5.0	ug/L
Dichlorodifluoromethane	<5.0	ug/L
1,1-Dichloroethane	690.	ug/L
1,2-Dichloroethane	<5.0	ug/L
1,1-Dichloroethene	6.2	ug/L
cis-1,2-Dichloroethene	620.	ug/L
trans-1,2-Dichloroethene	<5.0	ug/L
1,2-Dichloropropane	<5.0	ug/L
cis-1,3-Dichloropropene	<5.0	ug/L
trans-1,3-Dichloropropene	<5.0	ug/L
Ethyl benzene	<5.0	ug/L
Methylene chloride	<25.	ug/L
1,1,2,2-Tetrachloroethane	<5.0	ug/L
Tetrachloroethene	<5.0	ug/L

Steve Johnson
Project Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-19-91

Sample No.: 34070

P.O. NO.: 892598

Sample Description: WELL S-3

Date Taken: 01-30-91

Date Received: 01-31-91

Parameters	Results	Units
VOLATILE COMPOUNDS		
Tetrahydrofuran	<50.	ug/L
Toluene	<5.0	ug/L
1,1,1-Trichloroethane	1500.	ug/L
1,1,2-Trichloroethane	<5.0	ug/L
Trichloroethene	66.	ug/L
Trichlorofluoromethane	<5.0	ug/L
Vinyl chloride	<50.	ug/L
Xylenes, Total	<5.0	ug/L
Carbon disulfide	<5.	ug/L
2-hexanone	<50.	ug/L
Paraldehyde	<50.	ug/L
Methylethylketone	<50.	ug/L
Methylisobutylketone	<50.	ug/L
Styrene	<5.	ug/L
Vinyl acetate	<50.	ug/L
VOLATILE SURROGATE CPD.	RECOVERY	
Toluene - D8	103.	%
4-Bromo-1-fluorobenzene	101.	%
1,2 Dichloroethane - D4	101.	%

Steve Johnson
Project Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4266

ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-19-91

Sample No.: 34071

P.O. NO.: 892598

Sample Description: WELL W-7

Date Taken: 01-30-91

Date Received: 01-31-91

Parameters	Results	Units
Arsenic, Total by Furnace	<0.005	mg/L
Chromium,Total by Furnace	<0.001	mg/L
Lead, Total by Furnace	<0.005	mg/L

Steve Johnson
Project Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-19-91

Sample No.: 34071

P.O. NO.: 892598

Sample Description: WELL W-7

Date Taken: 01-30-91

Date Received: 01-31-91

Parameters	Results	Units
VOLATILE COMPOUNDS		
Acetone	<1.0	ug/L
Acrolein	<10.	ug/L
Acrylonitrile	<10.	ug/L
Benzene	<1.0	ug/L
Bromodichloromethane	<1.0	ug/L
Bromoform	<1.0	ug/L
Bromomethane	<10.	ug/L
Carbon tetrachloride	<1.0	ug/L
Chlorobenzene	<1.0	ug/L
Chloroethane	<10.	ug/L
2-Chloroethylvinyl ether	<1.0	ug/L
Chloroform	<1.0	ug/L
Chloromethane	<10.	ug/L
Dibromochloromethane	<1.0	ug/L
1,2-Dichlorobenzene	<1.0	ug/L
1,3-Dichlorobenzene	<1.0	ug/L
1,4-Dichlorobenzene	<1.0	ug/L
Dichlorodifluoromethane	<1.0	ug/L
1,1-Dichloroethane	7.9	ug/L
1,2-Dichloroethane	<1.0	ug/L
1,1-Dichloroethene	2.6	ug/L
cis-1,2-Dichloroethene	<1.0	ug/L
trans-1,2-Dichloroethene	<1.0	ug/L
1,2-Dichloropropane	<1.0	ug/L
cis-1,3-Dichloropropene	<1.0	ug/L
trans-1,3-Dichloropropene	<1.0	ug/L
Ethyl benzene	<1.0	ug/L
Methylene chloride	<5.0	ug/L
1,1,2,2-Tetrachloroethane	<1.0	ug/L
Tetrachloroethene	<1.0	ug/L

Steve Johnson
Project Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
6964 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-19-91

Sample No.: 34071

P.O. NO.: 892598

Sample Description: WELL W-7

Date Taken: 01-30-91

Date Received: 01-31-91

Parameters	Results	Units
VOLATILE COMPOUNDS		
Tetrahydrofuran	<10	ug/L
Toluene	<1.0	ug/L
1,1,1-Trichloroethane	6.0	ug/L
1,1,2-Trichloroethane	<1.0	ug/L
Trichloroethene	<1.0	ug/L
Trichlorofluoromethane	<1.0	ug/L
Vinyl chloride	<10.	ug/L
Xylenes, Total	<1.0	ug/L
Carbon disulfide	<1.	ug/L
2-hexanone	<10.	ug/L
Paraldehyde	<10.	ug/L
Methylethylketone	<10.	ug/L
Methylisobutylketone	<10.	ug/L
Styrene	<1.	ug/L
Vinyl acetate	<10.	ug/L
VOLATILE SURROGATE CPD.	RECOVERY	
Toluene - D8	104.	%
4-Bromo-1-fluorobenzene	104.	%
1,2 Dichloroethane - D4	99.	%

Steve Johnson
Project Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Midwest, Inc.
Indianapolis Division
8984 Hillsdale Court
Indianapolis, IN 46250
Tel: (317) 842-4261
Fax: (317) 842-4266

ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-25-91

Sample No.: 34573

P.O. NO.: 89-2598

Sample Description: W-9

Date Taken: 02-07-91

Date Received: 02-08-91

Parameters	Results	Units
Arsenic, Total by Furnace	<0.005	mg/L
Chromium, Total by Furnace	<0.001	mg/L
Lead, Total by Furnace	<0.005	mg/L

Steve Johnson
Project Manager

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ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-25-91

Sample No.: 34573

P.O. NO.: 89-2598

Sample Description: W-9

Date Taken: 02-07-91

Date Received: 02-08-91

Parameters	Results	Units
VOLATILE COMPOUNDS		
Acetone	<10.	ug/L
Acrolein	<10.	ug/L
Acrylonitrile	<10.	ug/L
Benzene	<1.0	ug/L
Bromodichloromethane	<1.0	ug/L
Bromoform	<1.0	ug/L
Bromomethane	<10.	ug/L
Carbon tetrachloride	<1.0	ug/L
Chlorobenzene	<1.0	ug/L
Chloroethane	<10.	ug/L
2-Chloroethylvinyl ether	<1.0	ug/L
Chloroform	<1.0	ug/L
Chloromethane	<10.	ug/L
Dibromochloromethane	<1.0	ug/L
1,2-Dichlorobenzene	<1.0	ug/L
1,3-Dichlorobenzene	<1.0	ug/L
1,4-Dichlorobenzene	<1.0	ug/L
Dichlorodifluoromethane	<1.0	ug/L
1,1-Dichloroethane	<1.0	ug/L
1,2-Dichloroethane	<1.0	ug/L
1,1-Dichloroethene	<1.0	ug/L
cis-1,2-Dichloroethene	<1.0	ug/L
trans-1,2-Dichloroethene	<1.0	ug/L
1,2-Dichloropropane	<1.0	ug/L
cis-1,3-Dichloropropene	<1.0	ug/L
trans-1,3-Dichloropropene	<1.0	ug/L
Ethyl benzene	<1.0	ug/L
Methylene chloride	<5.0	ug/L
1,1,2,2-Tetrachloroethane	<1.0	ug/L
Tetrachloroethene	<1.0	ug/L

Steve Johnson
Project Manager

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NET Midwest, Inc.
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Indianapolis, IN 46250
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Fax: (317) 842-4266

ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-25-91

Sample No.: 34573

P.O. NO.: 89-2598

Sample Description: W-9

Date Taken: 02-07-91

Date Received: 02-08-91

Parameters	Results	Units
VOLATILE COMPOUNDS		
Tetrahydrofuran	<10	ug/L
Toluene	<1.0	ug/L
1,1,1-Trichloroethane	<1.0	ug/L
1,1,2-Trichloroethane	<1.0	ug/L
Trichloroethene	<1.0	ug/L
Trichlorofluoromethane	<1.0	ug/L
Vinyl chloride	<10.	ug/L
Xylenes, Total	<1.0	ug/L
Carbon disulfide	<1.	ug/L
2-hexanone	<10.	ug/L
Paraldehyde	<10.	ug/L
Methylethylketone	<10.	ug/L
Methylisobutylketone	<10.	ug/L
Styrene	<1.	ug/L
Vinyl acetate	<10.	ug/L
VOLATILE SURROGATE CPD.	RECOVERY	
Toluene - D8	81.	%
4-Bromo-1-fluorobenzene	103.	%
1,2 Dichloroethane - D4	117.	%

Steve Johnson
Project Manager

NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-25-91

Sample No.: 34574

P.O. NO.: 89-2598

Sample Description: W-12

Date Taken: 02-07-91

Date Received: 02-08-91

Parameters	Results	Units
Arsenic, Total by Furnace	<0.005	mg/L
Chromium, Total by Furnace	<0.001	mg/L
Lead, Total by Furnace	<0.005	mg/L

Steve Johnson
Project Manager

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ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-25-91

Sample No.: 34574

P.O. NO.: 89-2598

Sample Description: W-12

Date Taken: 02-07-91

Date Received: 02-08-91

Parameters	Results	Units
VOLATILE COMPOUNDS		
Acetone	<10.	ug/L
Acrolein	<10.	ug/L
Acrylonitrile	<10.	ug/L
Benzene	<1.0	ug/L
Bromodichloromethane	<1.0	ug/L
Bromoform	<1.0	ug/L
Bromomethane	<10.	ug/L
Carbon tetrachloride	<1.0	ug/L
Chlorobenzene	<1.0	ug/L
Chloroethane	<10.	ug/L
2-Chloroethylvinyl ether	<1.0	ug/L
Chloroform	<1.0	ug/L
Chloromethane	<10.	ug/L
Dibromochloromethane	<1.0	ug/L
1,2-Dichlorobenzene	<1.0	ug/L
1,3-Dichlorobenzene	<1.0	ug/L
1,4-Dichlorobenzene	<1.0	ug/L
Dichlorodifluoromethane	<1.0	ug/L
1,1-Dichloroethane	6.7	ug/L
1,2-Dichloroethane	<1.0	ug/L
1,1-Dichloroethene	29.	ug/L
cis-1,2-Dichloroethene	<1.0	ug/L
trans-1,2-Dichloroethene	<1.0	ug/L
1,2-Dichloropropane	<1.0	ug/L
cis-1,3-Dichloropropene	<1.0	ug/L
trans-1,3-Dichloropropene	<1.0	ug/L
Ethyl benzene	<1.0	ug/L
Methylene chloride	<5.0	ug/L
1,1,2,2-Tetrachloroethane	<1.0	ug/L
Tetrachloroethene	<1.0	ug/L

Steve Johnson
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ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-25-91

Sample No.: 34574

P.O. NO.: 89-2598

Sample Description: W-12

Date Taken: 02-07-91

Date Received: 02-08-91

Parameters	Results	Units
VOLATILE COMPOUNDS		
Tetrahydrofuran	<10.	ug/L
Toluene	<1.0	ug/L
1,1,1-Trichloroethane	<1.0	ug/L
1,1,2-Trichloroethane	<1.0	ug/L
Trichloroethene	<1.0	ug/L
Trichlorofluoromethane	<1.0	ug/L
Vinyl chloride	<10.	ug/L
Xylenes, Total	<1.0	ug/L
Carbon disulfide	<1.	ug/L
2-hexanone	<10.	ug/L
Paraldehyde	<10.	ug/L
Methylethylketone	<10.	ug/L
Methylisobutylketone	<10.	ug/L
Styrene	<1.	ug/L
Vinyl acetate	<10.	ug/L
VOLATILE SURROGATE CPD.	RECOVERY	
Toluene - D8	103.	%
4-Bromo-1-fluorobenzene	102.	%
1,2 Dichloroethane - D4	107.	%

Steve Johnson
Project Manager

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ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-19-91

Sample No.: 34069

P.O. NO.: 892598

Sample Description: TRIP BLANK

Date Taken: Unknown

Date Received: 01-31-91

Parameters	Results	Units
Arsenic, Total by Furnace	<0.005	mg/L
Chromium, Total by Furnace	<0.001	mg/L
Lead, Total by Furnace	<0.005	mg/L

Steve Johnson
Project Manager

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ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-19-91

Sample No.: 34069

P.O. NO.: 892598

Sample Description: TRIP BLANK

Date Taken: Unknown

Date Received: 01-31-91

Parameters	Results	Units
VOLATILE COMPOUNDS		
Acetone	<1.0	ug/L
Acrolein	<10.	ug/L
Acrylonitrile	<10.	ug/L
Benzene	<1.0	ug/L
Bromodichloromethane	<1.0	ug/L
Bromoform	<1.0	ug/L
Bromomethane	<10.	ug/L
Carbon tetrachloride	<1.0	ug/L
Chlorobenzene	<1.0	ug/L
Chloroethane	<10.	ug/L
2-Chloroethylvinyl ether	<1.0	ug/L
Chloroform	<1.0	ug/L
Chloromethane	<10.	ug/L
Dibromochloromethane	<1.0	ug/L
1,2-Dichlorobenzene	<1.0	ug/L
1,3-Dichlorobenzene	<1.0	ug/L
1,4-Dichlorobenzene	<1.0	ug/L
Dichlorodifluoromethane	<1.0	ug/L
1,1-Dichloroethane	<1.0	ug/L
1,2-Dichloroethane	<1.0	ug/L
1,1-Dichloroethene	<1.0	ug/L
cis-1,2-Dichloroethene	<1.0	ug/L
trans-1,2-Dichloroethene	<1.0	ug/L
1,2-Dichloropropane	<1.0	ug/L
cis-1,3-Dichloropropene	<1.0	ug/L
trans-1,3-Dichloropropene	<1.0	ug/L
Ethyl benzene	<1.0	ug/L
Methylene chloride	<5.0	ug/L
1,1,2,2-Tetrachloroethane	<1.0	ug/L
Tetrachloroethene	<1.0	ug/L

Steve Johnson
Project Manager

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ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-19-91

Sample No.: 34069

P.O. NO.: 892598

Sample Description: TRIP BLANK

Date Taken: Unknown

Date Received: 01-31-91

Parameters	Results	Units
VOLATILE COMPOUNDS		
Tetrahydrofuran	<10	ug/L
Toluene	<1.0	ug/L
1,1,1-Trichloroethane	<1.0	ug/L
1,1,2-Trichloroethane	<1.0	ug/L
Trichloroethene	<1.0	ug/L
Trichlorofluoromethane	<1.0	ug/L
Vinyl chloride	<10.	ug/L
Xylenes, Total	<1.0	ug/L
Carbon disulfide	<1.	ug/L
2-hexanone	<10.	ug/L
Paraldehyde	<10.	ug/L
Methylethylketone	<10.	ug/L
Methylisobutylketone	<10.	ug/L
Styrene	<1.	ug/L
Vinyl acetate	<10.	ug/L
VOLATILE SURROGATE CPD.	RECOVERY	
Toluene - D8	106.	%
4-Bromo-1-fluorobenzene	103.	%
1,2 Dichloroethane - D4	100.	%

Steve Johnson
Project Manager

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ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-25-91

Sample No.: 34575

P.O. NO.: 89-2598

Sample Description: TRIP BLANK

Date Taken: 02-07-91

Date Received: 02-08-91

Parameters	Results	Units
Arsenic, Total	<0.005	mg/L
Chromium, Total	<0.001	mg/L
Lead, Total	<0.005	mg/L

Steve Johnson
Project Manager

NET NATIONAL ENVIRONMENTAL TESTING, INC.

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ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-25-91

Sample No.: 34575

P.O. NO.: 89-2598

Sample Description: TRIP BLANK

Date Taken: 02-07-91

Date Received: 02-08-91

Parameters	Results	Units
VOLATILE COMPOUNDS		
Acetone	<10.	ug/L
Acrolein	<10.	ug/L
Acrylonitrile	<10.	ug/L
Benzene	<1.0	ug/L
Bromodichloromethane	<1.0	ug/L
Bromoform	<1.0	ug/L
Bromomethane	<10.	ug/L
Carbon tetrachloride	<1.0	ug/L
Chlorobenzene	<1.0	ug/L
Chloroethane	<10.	ug/L
2-Chloroethylvinyl ether	<1.0	ug/L
Chloroform	<1.0	ug/L
Chloromethane	<10.	ug/L
Dibromochloromethane	<1.0	ug/L
1,2-Dichlorobenzene	<1.0	ug/L
1,3-Dichlorobenzene	<1.0	ug/L
1,4-Dichlorobenzene	<1.0	ug/L
Dichlorodifluoromethane	<1.0	ug/L
1,1-Dichloroethane	<1.0	ug/L
1,2-Dichloroethane	<1.0	ug/L
1,1-Dichloroethene	<1.0	ug/L
cis-1,2-Dichloroethene	<1.0	ug/L
trans-1,2-Dichloroethene	<1.0	ug/L
1,2-Dichloropropane	<1.0	ug/L
cis-1,3-Dichloropropene	<1.0	ug/L
trans-1,3-Dichloropropene	<1.0	ug/L
Ethyl benzene	<1.0	ug/L
Methylene chloride	<5.0	ug/L
1,1,2,2-Tetrachloroethane	<1.0	ug/L
Tetrachloroethene	<1.0	ug/L

Steve Johnson
Project Manager

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ANALYTICAL REPORT

Mr. Paul Barding
BEST ENVIRONMENTAL
P.O. Box 576
Channahon, IL 60410

02-25-91

Sample No.: 34575

P.O. NO.: 89-2598

Sample Description: TRIP BLANK

Date Taken: 02-07-91

Date Received: 02-08-91

Parameters	Results	Units
VOLATILE COMPOUNDS		
Tetrahydrofuran	<10	ug/L
Toluene	<1.0	ug/L
1,1,1-Trichloroethane	<1.0	ug/L
1,1,2-Trichloroethane	<1.0	ug/L
Trichloroethene	<1.0	ug/L
Trichlorofluoromethane	<1.0	ug/L
Vinyl chloride	<10.	ug/L
Xylenes, Total	<1.0	ug/L
Carbon disulfide	<1.	ug/L
2-hexanone	<10.	ug/L
Paraldehyde	<10.	ug/L
Methylethylketone	<10.	ug/L
Methylisobutylketone	<10.	ug/L
Styrene	<1.	ug/L
Vinyl acetate	<10.	ug/L
VOLATILE SURROGATE CPD.	RECOVERY	
Toluene - D8	104.	%
4-Bromo-1-fluorobenzene	103.	%
1,2 Dichloroethane - D4	102.	%

Steve Johnson
Project Manager

ENVIRONMENTAL CONSULTANTS, INC.
391 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

Date 02/18/91 Page 1 of 1

Lab Control No. 16,381

P.O. Number

Job No. 007357

ample Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Soil	GRAB	Boring soil pond 4

Date Collected	Date Received	Collected By	Time of Collection
02-07-91	02/08/91	Client	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Volatile Extraction	PERFORMED	02/14/91	Wilson	
Vol. Organic Compounds (1)	Detected	02/14/91	Wilson	Gas chromatography Mass spectrometry
',1-Dichloroethane	560. ug/kg	02/14/91	Wilson	Gas chromatography Mass spectrometry

marks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

ENVIRONMENTAL CONSULTANTS, INC.
391 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

Date 02/18/91 Page 1 of 1

Lab Control No. 16,380

P.O. Number

Job No. 007357

Sample Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Soil	GRAB	Boring soil pond 5

Date Collected	Date Received	Collected By	Time of Collection
02-07-91	02/08/91	Client	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Volatile Extraction	PERFORMED	02/14/91	Wilson	
Vol. Organic Compounds (1)	None Detected	02/14/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

ENVIRONMENTAL CONSULTANTS, INC.
391 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

Laboratory Report

Sample Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Date: 02/18/91 Page 1

Lab Control No.: 16,382

P.O. Number:

Job No.: 00735

Bill To:

As above

00000-0000

Sample Description	Sample Type	Location
Rinse water	GRAB	Rinsate Blank

Date Collected	Date Received	Collected By	Time of Collection
02-07-91	02/08/91	Client	00:00

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Vol. Organic Compounds (1)	None Detected	02/13/91	Wilson	Gas chromatography Mass spectrometry

Remarks

(1) See attached list for target compounds & respective detection limits.

State Certification No. M-10-1

Analysis Reviewed By

VIRONMENTAL CONSULTANTS, INC.
391 Newman Avenue • Clarksville, Indiana 47129 • Phone (812) 282-8481

Environmental Consultants

Professional Laboratory Services

mple Source

Best Environmental
P.O. Box 576
I55 & R6 Frontage Road N.W.
Channahon, IL 60410-
Attn: Mr. Paul Barding

Laboratory Report

Date 02/15/91 Page 1 of 1

Lab Control No. > 16,379

P.O. Number

Job No. 007357

l To:

As above

00000-0000

mple Description	Sample Type	Location
Soil	GRAB	Metal background M-2

te Collected	Date Received	Collected By	Time of Collection
02-07-91	02/08/91	Client	00:00 :

Parameter	Results	Date Analyzed	Analyst	Method of Analysis
Arsenic, total	2.14 mg/kg	02/14/91	Isler	Atomic absorption Graphite furnace
Barium, total	<3. mg/kg	02/12/91	Isler	Flame atomic abs.
Cadmium, total	<0.2 mg/kg	02/12/91	Isler	Flame atomic abs.
Chromium, total	4.6 mg/kg	02/12/91	Isler	Flame atomic abs.
Lead, total	<3. mg/kg	02/12/91	Isler	Flame atomic abs.
Mercury, total	<0.1 mg/kg	02/13/91	Hostettler	Atomic absorption Cold vapor
Selenium, total	<0.2 mg/kg	02/15/91	Isler	Atomic absorption Graphite furnace
Silver, total	<0.2 mg/kg	02/12/91	Isler	Flame atomic abs.

M-2 LOCATION:
Auger CUTTINGS
From W-9

Remarks

S ite Certification No. M-10-1

> Analysis Reviewed By

ORIGINAL