

Bruce Carter Associates, L.L.C.

ENVIRONMENTAL CONSULTANTS

AIR • WATER • SOLID WASTE • OSHA • REMEDIATION SERVICES

PHASE II INVESTIGATION REPORT

TWIGG CORPORATION 659 EAST YORK STREET MARTINSVILLE, INDIANA 46151

176 PP + 2 bg. maps

Project No. 7403 October 30, 1998

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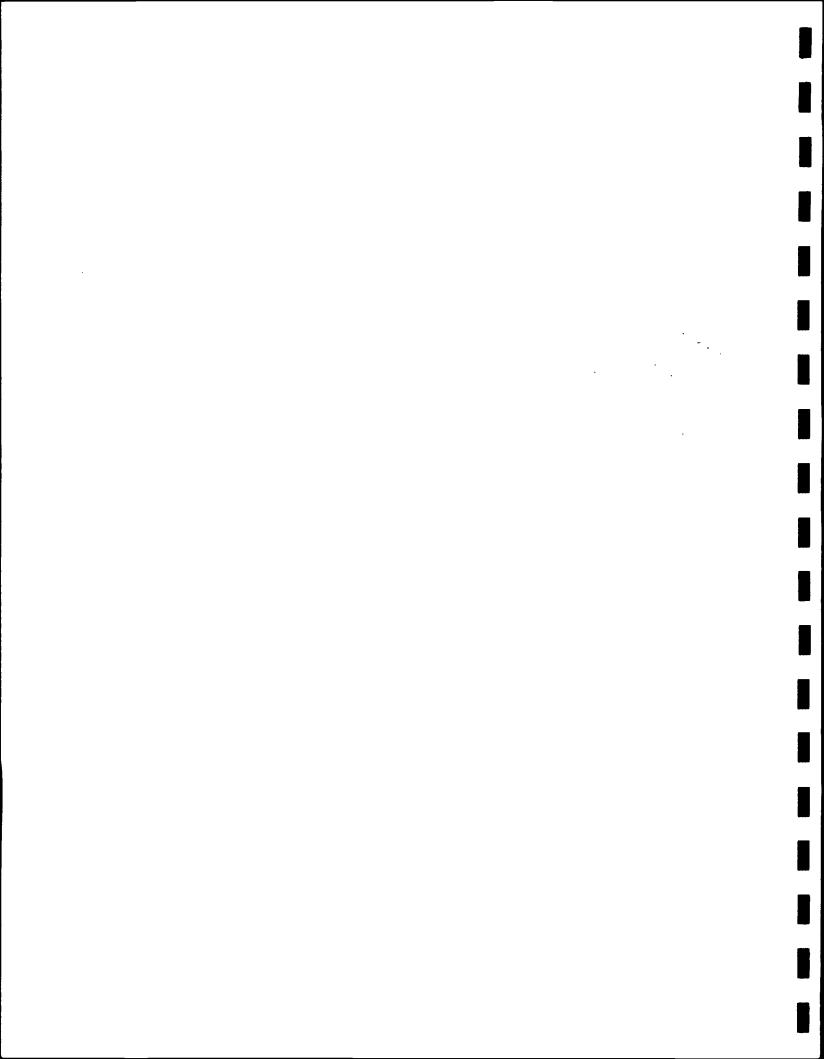


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1.0 INTRODUCTION

1.1 Site Location and History

The Twigg Corporation facility is located at 659 East York Street in Martinsville, Indiana (Figure 1). The site is located near the southeastern edge of Martinsville and is in the southeast and northeast quarter of the southeast quarter of Section 4, Township 11 North, Range 1 East (Washington Township) Morgan County, Indiana. The Twigg site and the neighboring Harmon-Motive facility are the only industrial sites in a primarily residential neighborhood.

Sanborn Fire Insurance maps, City Directories and Historical Aerial Photographs were reviewed to help determine site history. The southeast quarter of the main Twigg building was first constructed and operated prior to 1916 as the CG Chase Foundry and Machine Shop. The two small buildings to the east of the main building (Figure 2) were constructed between 1916 and 1942. The three buildings were variously operated as wood furniture factories, a wire gate factory, an aluminum fabricator (storm doors and windows), a vehicle repair shop, a warehouse and a heating and cooling contractor. Twigg Corporation (under a previous owner) first occupied the main building in the 1960's and took over the two small eastern building after 1978.

Twigg fabricates metal alloy parts for the aerospace industry and its process formerly included vapor degreasing of metal parts with chlorinated solvents. The Indiana Department of Environmental Management Office of Solid and Hazardous Waste Management (IDEM/OSHWM) inspected the (then current) hazardous waste accumulation storage area (Figures 2 and 3) in 1991 and issued a letter of violation requiring sampling. Soil sampling by Twigg in 1991 and 1992 confirmed the presence of tetrachloroethene (perc or PCE) in the soil in the waste storage

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area. In 1993 Farlow Environmental Engineer, Inc. (now Bruce Carter Associates, L.L.C. - BCA) was requested to prepare a work plan for an investigation of the extent and magnitude of contaminants associated with the former waste storage area (FWSA). The Work Plan was approved by IDEM in 1994 and the investigation was conducted from 1994 to 1998. Twigg filed an application to the IDEM/Office of Environmental Response/Voluntary Remediation Program (VRP) in 1997 and the Voluntary Remediation Agreement (VRA) was signed in September, 1997.

1.2 Other Documentation

1991-1992 Alt & Witzig Reports

Two reports dated January 8, and June 8, 1992 were prepared for Twigg by Alt & Witzig Engineering, Inc. of Indianapolis (A & W, 1992a and 1992b) and were submitted to IDEM/OSHWM. The reports discuss investigations in 1991-1992 which included 15 boring to depths of 16 to 20 feet in and around the FWSA. Soil samples were collected continuously, field screened for VOCs and eleven were analyzed for VOCs. The investigations confirmed the presence of PCE in shallow soils in the FWSA and in soil near the water table (approximately eight (8) to 20 feet, BGS) beyond the FWSA.

1996 Harmon-Motive Report

A report dated September 6, 1996 prepared by Heritage Environmental Services, Inc. was provided to Twigg by Harman-Motive (Harman) and was reported submitted to IDEM (HES, 1996). The report summarizes groundwater investigation results and delineates the extent and magnitude of chlorinated and non-chlorinated VOCs on and near the Harman facility. The CVOCs in the Harman plume include PCE, TCA and their degradation products. The Harman data indicate that a groundwater plume of CVOCs are present on its site which may adjoin the Twigg plume but which does not significantly overlap it. Harman

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began remediation of the plume in 1996 utilizing soil vapor extraction, air sparging and nutrient enhancement. Further information on the plume is included in Section 3.5.

1.3 Summary of Results

The investigation showed that the only contaminants present in the FWSA are chlorinated volatile organic compounds (CVOCs) and metals - lead (Pb), chromium (Cr) and cadmium (Cd). The metals are limited to the shallow soil in the FWSA and are below Tier II clean-up goals. The CVOCs are primarily in soil near the water table and in the groundwater. The CVOC plume in the groundwater extends around the Twigg site and downgradient (west) about ½ mile. The CVOCs include PCE, 1,1,1-Trichloroethane (TCA) and their degradation products. This report details the investigation and its results.

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2.0 STATEMENT OF WORK

A "Workplan for Performing a RCRA Investigation" dated March, 1994 was approved by IDEM/OSHWM. The workplan included a QAPP for the soil investigation. The QAPP has been modified to include methodologies used for the groundwater investigation (mostly 1996-98). It is submitted under a separate cover as Appendix A to this report.

2.1 Objectives of Phase II Investigation

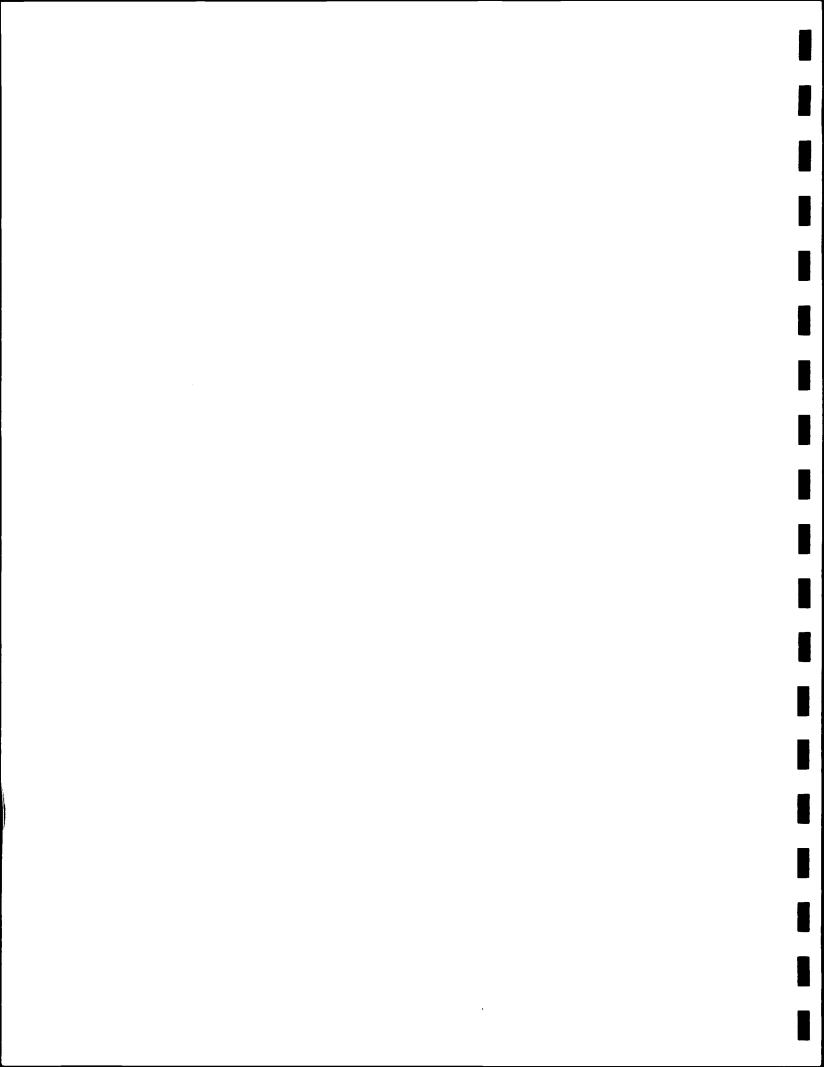
(not applicable)

2.2 Site Safety Plan

(see Appendix B)

2.3 Quality Assurance Project Plan

(see Appendix A)



3.0 SITE CHARACTERIZATION

3.1 Baseline Ecological Assessment

3.1.1 Ecological Assessment

Exposure Pathways

There are no ecological exposure pathways associated with the Twigg groundwater CVOC plume. The plume appears to be stable and the nearest likely point of discharge is Nutter Ditch, located 3,000 feet downgradient (west) of the leading edge. Ecological exposure pathways to CVOCs and metals in the subsurface soil are limited to burrowing animals, tree roots and exposure through excavation of affected soil.

Surface soil (0-2 inch) likely contains no CVOC due to volatility and the fact that the waste drums have not been stored in the FWSA for several years. There is potential ecological exposure to metals in surface soils thru surface water runoff from the FWSA. The area is level, with little runoff and high infiltration. However, some runoff flows to surface drains then through approximately 1500 feet of storm sewers southeast to Sartor Ditch, which flows to Indian Creek 1.5 miles south of the site.

The site, the plume area and all adjoining areas (the affected area) are fully developed industrial, residential and commercial areas. No endangered, threatened or rare species, high quality natural communities or areas, surface water, aquatic life, wetlands, flood plains or riparian zones are present in or near the affected area. Vegetation and wildlife observed in the affected area are limited to those typically found in an urban environment. No stressed vegetation or wildlife was observed.

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Expose of surface water runoff to contaminants is possible only in the FWSA, which is level with little runoff. Some surface water runoff from the FWSA flows through storm sewers about 1500 feet southeast to Sartor Ditch, which flows to Indian Creek about 1.5 miles south of the site. Sartor Ditch is a channelized drainage ditch with limited vegetation and little or no flood plain along most of its course. For the last 3/4 mile north of Indian Creek the banks are lined with trees and the ditch is in the 100-year flood-plain (Appendix C, Tab 3). Two minor wetlands are located adjacent to the ditch 1/4 mile (0.1 acre) and ½ mile (0.5 acre) north of Indian Creek. The ditch is probably intermittent and may be recharged from groundwater. Flow was observed to be minimal during the dry fall season and the ditch may be dry during drought. Sartor Ditch is not shown on the U.S. Fish and Wildlife Service's "National Wetlands Inventory Map" as a wetland or riverine habitat. There are no documented endangered, threatened or rare species and no high quality natural communities or areas along Sartor Ditch.

Exposure Estimate

Cadmium, Chromium and Lead are present in shallow (0-2 feet) soil above background levels. No dissolved Cadmium, Chromium or Lead was detected in shallow groundwater present at approximately nine feet BGS. Therefore, it is likely that dissolved metals are not detectable in surface water runoff from the FWSA either. The concentrations of metals in suspended particulate would likely be similar to that found in the shallowest soil samples (0-6"). Average shallow soil (0-6") concentrations are:

Cadmium	=	3.0 ppm	(Background = 0.5 ppm)
Chromium	=	216 ppm	(Background = 24 ppm)
Lead	=	51 ppm	(Background = 53 ppm)

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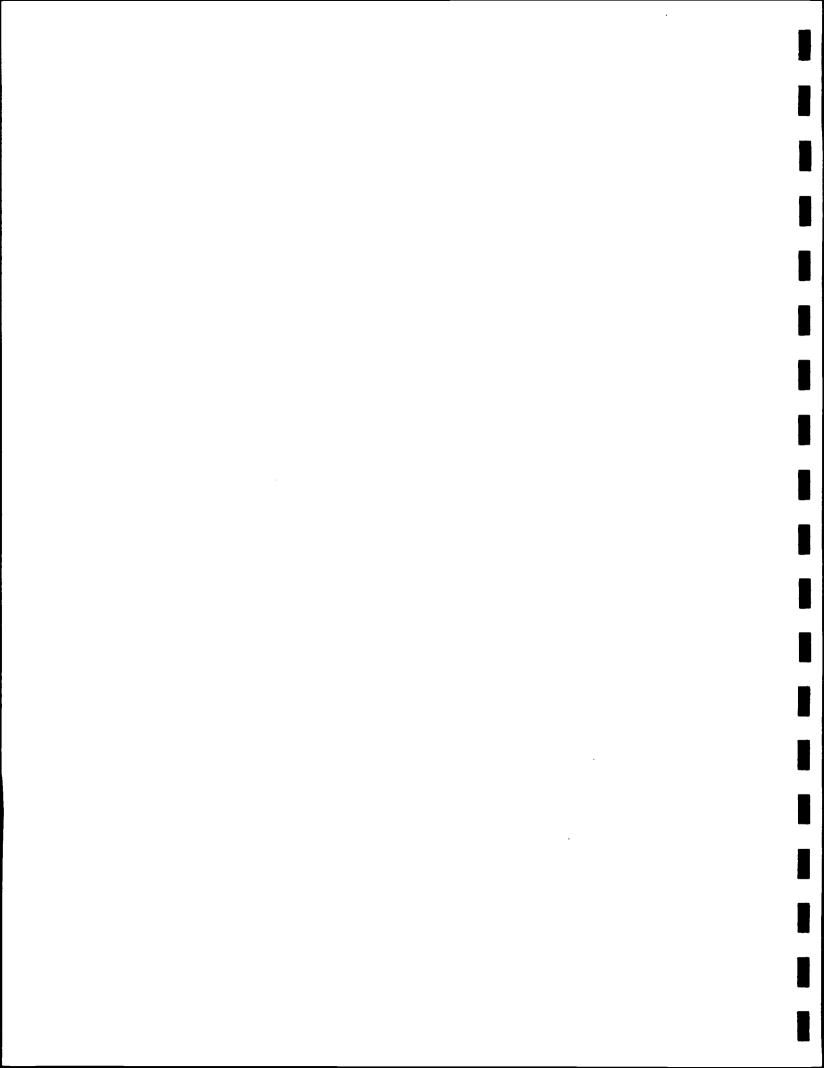
Thus, Cadmium and Chromium could potentially be above background levels in suspended sediment. (See Section 3.5 for discussion of metals concentrations in soil.)

Sartor Ditch southeast of the Twigg site drains an area of approximately 1,600 acres while the storm sewers near Twigg drain roughly 130 acres and the FWSA is approximately 0.08 acre. Thus, runoff from the FWSA would likely constitute less than 0.1% of the flow in storm runoff to Sartor Ditch near Twigg. Storm sewer discharge from near Twigg likely constitutes roughly 5% of flow in Sartor Ditch. Thus, metals in suspended sediments from the FWSA would be expected to cause an increase in the storm sewer discharge of only 0.5% for Cadmium and 0.8% for Chromium above background suspended sediment levels.

Dissolved metal concentrations in the shallow groundwater are below detection limits (5 ppb) and dissolved concentrations in surface water runoff are likely proportional to surface soil. Thus, the potential impact of dissolved metal concentrations on Sartor Ditch are also likely to be trivial. Even if all of the Chromium (approx. 14 lbs) and Cadmium (approx.0.2 lbs) in the top two inches in the FWSA were to dissolve into rainwater over a ten year period (40 inches of rainfall per year) the dissolved concentration in the runoff would be 1.9 ppm Chromium and 26 ppb Cadmium. The dissolved concentration in the storm sewer discharge would only be 1.2 ppb Chromium and 0.02 ppb Cadmium above background levels.

Potential Effects

For more sensitive aquatic species (salmon, daphnids and cladoceron) the U.S. EPA recommends an ambient water quality of less than 11 ppb Chromium (U.S. EPA, 1986). The water quality criterion for Cadmium is approximately 1 ppb (it is hardness dependent) for the protection of aquatic species.



Risk Characterization

The only potential ecological exposure (other than roots and burrowing animals) is through storm water runoff to Sartor Ditch. There are no environmentally significant areas or species on or near the affected area or Sartor Ditch and the closest wetland is 3/4 mile downstream of the storm water outfall. Worst case potential discharges of contaminants to Sartor Ditch are well below levels recommended by the U.S. EPA to avoid stresses on aquatic species.

3.1.2 Background Hydrogeologic Assessment

As estimated from the U.S. Geologic Survey Martinsville Quadrangle ten foot contour interval 7.5 minute topographic map, the elevations of the site and the neighboring areas is approximately 605 (± 5) feet MSL. A survey of the monitoring wells on the Twigg site and west of the site indicates ground elevation varies from approximately 603.0 to 606.5 feet MSL. The topography of the neighborhood is essentially level. Surface drainage from the site is to the southeast approximately 1500 feet via storm sewers to Sartor Ditch which flows 1.5 miles southwest to Indian Creek and then to the White River.

According to the "Soil Survey of Morgan County", soil near the site is Martinsville loam which is characterized as nearly level, deep, well drained soil on outwash plains (USDA,1981). The soil is typically a brown loam underlain by a clay loam and a sandy loam to a depth of approximately five (5) feet. The substratum varies from silty clay loam to sand.

Underlying soils near the site are Holocene age alluvial deposits of sand, gravel and silt, and Wisconsinin age outwash deposits, chiefly of sand and gravel (IDNR, 1989). Unconsolidated deposits near the site are reported to a depth of approximately 100 feet (INDR, 1983) below ground surface and are underlain by Borden group Mississippian Age siltstone and shale (INDR, 1987 and USGS,

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1994). Well logs (Tab 4) from Martinsville show primarily sand and gravel deposits to depths of approximately 100 feet underlain by shale bedrock. Several logs also identify isolated layers of fine grained material within the sand and gravel. Martinsville is located within the Norman Upland physiographic region which is characterized by narrow, flat-topped divides and deep V-shaped valleys.

The aquifer beneath the site is part of a surficial sand and gravel aquifer which extends throughout the White River Valley. The surficial sand and gravel deposits extend approximately one mile north, south and east of the site. The aquifer is hydraulically connected to (and fed by) buried aquifers to the east and drains to the White River located 2.4 miles west of the site. Typical hydraulic conductivities for the regional aquifer are 8×10^{-3} to 5×10^{-1} cm/sec (USGS, 1994). The water table is commonly within ten feet of the surface in the valley.

Two small lakes and Nutter Ditch (Figure 1) are approximately downgradient (west) of the site. The lakes are former gravel pits which based on interviews with long-time residents, have been inactive for 20-30 years. They have little or no drainage basins and likely have little impact on groundwater flow. Nutter ditch is continuous and likely drains groundwater during high water table or possibly all the time. Active gravel pits are located on the east bank of the White River and may be downgradient of the site.

3.2 Background Concentrations

In accordance with the 1994 work plan, background soil samples were collected at several locations and tested for Cadmium, Chromium and Lead. The background borings are 100 to 500 feet from the FWSA and were sampled at the same depth intervals as the borings in the FWSA. Sampling and analytical methods and results are discussed in Sections 3.3, 3.4 and 3.5. The results showed that some soil samples in the FWSA contain metals above background concentrations. Cleanup objective for this project will not be based on

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background, but will be based on Tier II Cleanup Goals.

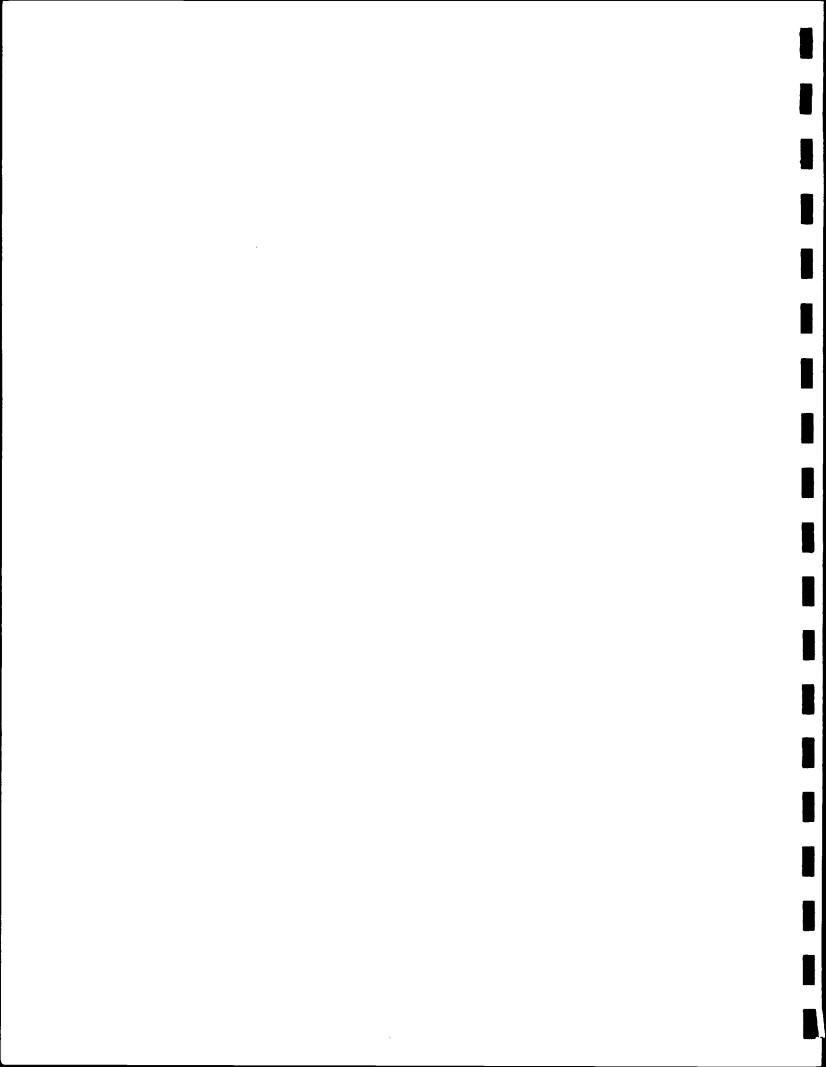
3.3 Sampling Methodology

The purpose of the investigation was to determine the extent and magnitude of CVOCs and metals (Cd, Cr and Pb) in the soil and groundwater on and near the Twigg property. The FWSA was the focus of the metals investigation and appears to be the primary source area for CVOCs present in the soil and groundwater over an extended area. The investigations included soil borings, groundwater probes, monitoring wells and private wells. Sample locations are shown on Figure 4.

The initial phases of the investigation included installation of nearly all of the borings on and near the Twigg site in 1994-95 to determine the extent of metals and CVOCs in the soil. The next phases of the investigation (1996-97) included a groundwater probe investigation to determine the extent of the groundwater plume. The last phase (1997-98) of the investigation included installing the remaining monitoring wells and two to three rounds of groundwater samples to confirm the extent and magnitude of the groundwater plume. Sampling of private wells was also performed in 1996-98 to evaluate potential impact on drinking water.

A total of 28 borings (including duplicate and off-set borings) were drilled at a total of 17 locations during this investigation. Drilling was performed by Haskett Drilling Service, Inc., Soil and Exploration Services, Inc. and Earth Exploration, Inc. using truck-mounted drill rigs with 3.25-inch or 4.25- inch hollow stem augers (HSAs). Borings in which monitoring wells were installed were performed with 4.25-inch HSAs, while those in which monitoring wells were not installed were generally performed with 3.25-inch HSAs.

Split spoon soil samples were collected in 16 of the locations at intervals varying from 0.5 feet to 10 feet, while one boring (MW-9) was blank drilled. At most boring locations on



and near the Twigg site the soil was sampled at 0.5-foot-intervals to 2 feet then at one-foot to two-foot intervals to eight feet below grade. Below that depth samples were generally collected at five-foot-intervals. In borings MW-5 through MW-8 soil samples were collect at five or ten foot intervals.

The depth of the borings varied from 8.0 feet to 101.5 feet. Four borings locations (A,B,C,D) were sampled to 8.0 feet and six locations were sampled to depths of 25 to 50 feet. One location each was extended to 60 feet (MW-8), 81 feet (MW-6) and 101.5 feet (MW-1D).

Approximately 200 soil samples were collected and usually classified based on the Unified Soils Classification System (ASTM D-2484-85). Soil samples at most locations were screened by means of field headspace tests with a PID and/or colorimetric tubes. Drilling information, visual soil classifications and field screening results are summarized on the boring logs which are included in Appendix E (Tab 5).

Drilling and sampling followed a prescribed program of quality assurance and decontamination to minimize potential bias of samples. Split spoons, spatulas and other equipment that came into contact with soil samples were washed with a detergent solution and rinsed between samples. Procedures also included power washing augers before each boring and use of disposable gloves when handling soil samples. Sampling procedures are discussed in detail in the QAPP. Drilling, soil sampling, screening and decontamination procedures were performed in accordance with the QAPP.

A total of ten borings were completed as monitoring wells. One monitoring well was lost (MW-2) and two were nested at the same location (MW-1 and MW-1D). Monitoring well depth varied from 17 feet to 60 feet. Most well screens were placed based on groundwater probe results, soil analyses or field screening results to ensure that the peak CVOC concentration depth is monitored. Monitoring wells were constructed of 2-inch

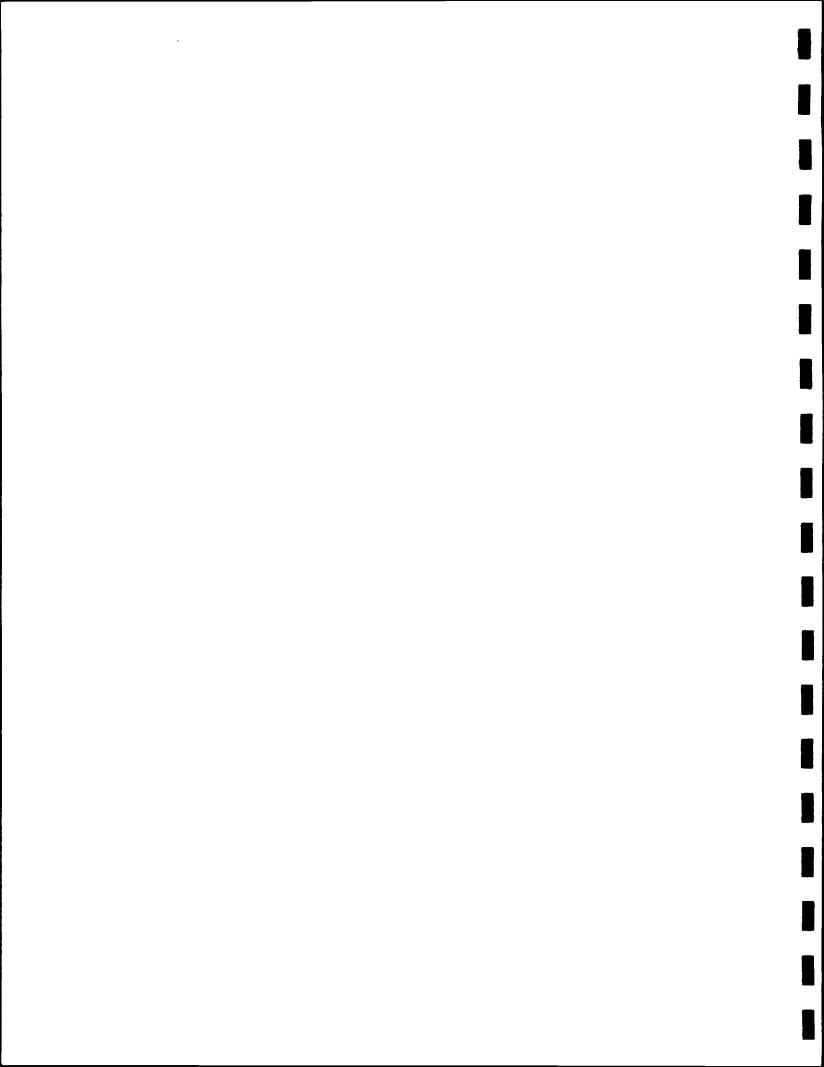
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I.D. schedule 40 threaded PVC with 10-foot factory slotted 10-slot (0.01 inch) well screen. The well screens were installed at the water table in MW-1, MW-3 and MW-9, but below the water table at all other locations due to the sinking nature of the plume. A single monitoring well (MW-1D) was placed below the plume to confirm thickness and monitor for changes. The hole annulus of each well was sealed with bentonite and a flush-mounted steel protective casing with locking cap was installed at the surface. Information regarding monitoring well construction is summarized on the boring logs (Tab 5).

The groundwater probe survey included collecting groundwater samples by means of a direct drive sampling system and analyzing the samples in a mobile laboratory. The sampling and analysis was performed by Innovative Probing Solutions of Mount Vernon, Illinois. A total of 28 groundwater samples were collected at 18 probe locations from depths of 17 to 45 feet. At most locations groundwater samples were collected from one depth (often 35 feet) but at several locations samples were collected from multiple depths in order to delineate the vertical extent of the plume.

All groundwater probe samples were analyzed in a mobile laboratory by a gas chromatograph with a flame ionization detector and an electron capture detector (GC/ECD). Mobile laboratory QC samples included method blanks and calibration check samples. To verify field results six samples were split with the duplicates being analyzed by a fixed laboratory. Results from the standard laboratory analysis of the six samples averaged approximately twice as high as the mobile laboratory results.

The top of the inner casing of each monitoring well was surveyed by Holloway Associates of Mooresville, Indiana relative to a benchmark from the City of Martinsville Flood Boundary Map. The resultant elevations were adjusted by +0.19 foot to match the surveyed elevations of Harman-Motive's monitoring wells. The adjustment was made to allow water levels from Harman-Motive wells to be measured and compared directly with



those of Twigg. A single well (MW-1D) was resurveyed by BCA and the elevation corrected by -0.08 foot.

All groundwater monitoring wells were developed by removing 10 to 20 well volumes of formation water. The wells were developed until the formation water was essentially free of fine particulate or monitoring parameters (temperature, conductivity) were stable. Development was performed with an electric submersible pump or a teflon bailer.

Several rounds of water level measurements were obtained on Twigg wells including one round (June 26, 1998) which was coordinated with a round of water level measurements performed by HES on the Harman wells. Groundwater elevations are summarized in Table 1 and include the Harman wells for June 26.

After measuring the water levels, but prior to sampling, each well was purged by removing at least three well volumes of formation water. The wells were purged with a teflon bailer or an electric submersible pump until the water was essentially free of fine particulate or monitoring parameters were stable.

Two full rounds of groundwater samples were collected on March 25-27 and June 25-26, 1998. Additional confirmation samples were collected on May 22, July 23 and September 9, 1998. A total of 22 monitoring well samples and five monitoring well field QC samples were collected. Groundwater sampling was performed on March 26-27, 1998 with an electric pump and on subsequent dates with a bottom-filling, bottom-discharging Teflon bailer. Groundwater sampling log sheets are included in Tab 6.

To reduce the possibility of cross-contamination of wells and sample bias, all groundwater sampling equipment was decontaminated between monitoring wells. Wells expected to have little or no contamination were purged and sampled prior to purging and sampling wells expected to have higher concentrations of contaminants. This procedure reduces

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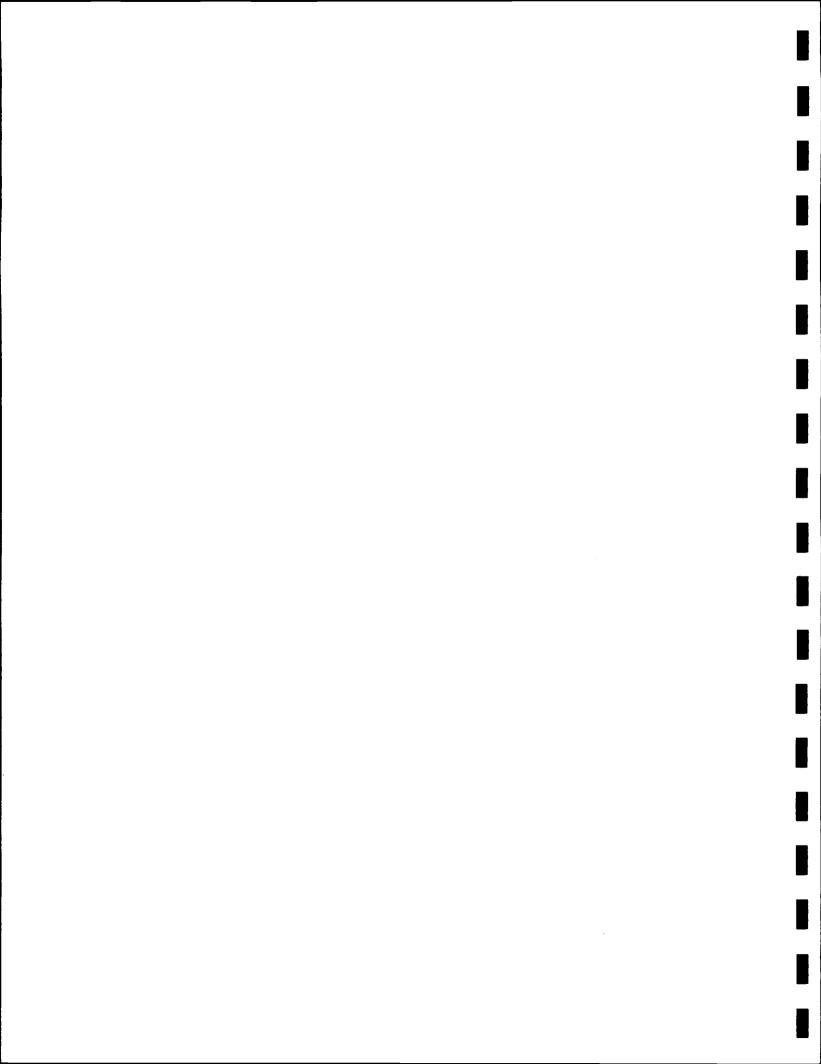
TABLE 1
GROUNDWATER ELEVATIONS
TWIGG CORPORATION
MARTINSVILLE, INDIANA

		11-A	1-Aug-94	26-M	26-Mar-98	22-M	22-May-98	25-Ji	25-Jun-98	26-Jı	26-Jun-98
	TIC		Mΰ		МS		ВW		ωS		ВW
Monitoring	Elevation	Depth to	Elevation								
Well I.D.	(ft MSL)	GW (ft)	(feet)								
MW-1S	603.78	9.52	594.26	10.17	593.61	8.92	594.86	6.95	596.83	6.85	596.93
MW-1D	603.78			10.17	593.61	8.92	594.86	6.95	596.83	6.85	596.93
MW-2	603.74	8.91	594.83	NA*							
MW-3	604.75	10.84	593.91	11.77	592.98	10.335	594.42	8.36	596.39	8.32	596.43
MW-4	604.35			11.665	592.69	10.24	594.11	8.29	90'965	8.27	596.08
MW-5	602.71			13.395	589.32	11.395	591.32	9.45	593.26	9.36	593.35
MW-6	603.3			13.96	589.34	11.925	591.38	96.6	593.32	9.88	593.42
MW-7	606.38			17.05	589.33	14.975	591.41	12.97	593.41	12.86	593.52
MW-8	604.05			15.85	588.20	13.645	590.41	11.56	592.49	11.46	592.59
MW-9	604.12			9.595	594.53	8.455	595.67	6.52	597.6	6.49	597.63

*well paved over and lost

RMO	HARMON WELLS	7e-Jı	26-Jun-98
	TIC		МЭ
Monitoring	Elevation	Depth to	Elevation
Well I.D.	(ft MSL)	GW (ft)	(feet)
ETS-MW1	603.10	92.9	596.34
ETS-MW2	601.99	5.93	596.06
ETS-MW3	601.93	7.68	594.25
MW-6R	603.29	68.9	596.40
MW-10	603.05	7.92	595.13
MW-13	604.11	8,48	595.63
MW-17	602.80	69' 2	595.11
MW-18	603.69	8.45	595.24
MW-19	603.86	99.8	595.31
MW-22	602.24	7.40	594.84

26-Jun-98	ВW	Elevation	(feet)	595.08	595.41	595.43	594.72	595.05	596.21	596.23	594.39	
J6-1		Depth to	GW (ft)	7.11	66'2	8.17	7.28	6.04	6.31	7.47	26.7	
HARMON WELLS	TIC	Elevation	(ft MSL)	602.19	603.40	603.60	602.00	601.09	602.52	603.70	602.34	
HARMON		Monitoring	Well I.D.	MW-23	MW-24	MW-25	MW-27	MW-28	MW-30	MW-32	EE-MW	



the possibility of transferring contaminants to a clean well and obtaining false positive results for that monitoring well. In addition, to check field procedures, a total of three field blanks and two field duplicates were collect during the 1998 sampling.

The field blank collected on March 27, 1998 was found to contain approximately 1% carryover from the previous sample (MW-6). The carry over was probably due to the use of low density polyethylene (LDPE) for the pump discharge tubing. LDPE has been shown to sorb CVOCs, thus making decontamination problematic. The impact of carryover in the first round of samples was likely trivial since clean wells were sampled first, then low level wells were sampled and wells with higher CVOC concentrations were sample last. None-the-less all subsequent sampling was performed with Teflon bailers.

Private well surveys were performed in 1996 and 1998 to determine whether any private wells were located within the CVOC plume and affected by the plume. In December, 1996 the Martinsville Water Department was contacted to determine what residences in southern Martinsville utilized private wells as their sole source of water. Thirteen of the addresses identified were relatively near or potentially downgradient of the plume. Water samples were sought from all of the locations and four of the locations located closest to the Twigg and the CVOC plume were sampled on December 3, 1996 or February 19, 1997. In July, 1998 a letter (Tab 7) was delivered to every residence within the plume area requesting information on and access to on-site (backup) private wells. Two residences were identified and the wells were sampled on July 28, 1998. Well sampling procedures are discussed in the QAPP.

Sample collection, decontamination, sample containers, preservation, and documentation procedures were performed in accordance with the QAPP, except as otherwise noted. Auger cuttings from contaminated locations were drummed and stored on-site to be treated with the remediation system when it is installed (per agreements with IDEM/OSHWM and VRP project managers).

3.4 Sample Analysis

A total of 82 soil samples were analyzed for Cd, Cr and Pb by EPA method 6010 (ICP). Sample locations, matrices, analytical methods, contains and preservation are summarized in Table 2. The samples included 20 samples and 23 duplicates/replicates from the FWSA and 39 samples (including four duplicates) from background locations. A groundwater sample from the FWSA (MW-1) was analyzed for eight RCRA metals by methods 6010 and 7470 (for mercury). Monitoring well MW-1 was also resampled and analyzed for Pb by method 7421. Analytical work was performed by PACE (formerly CCAS) of Indianapolis and National Environmental Testing (NET) of Indianapolis. The laboratory QAPs are attached to and are summarized in the BCA QAPP (Appendix A). The analytical laboratory reports and chain-of-custody forms for the soil samples are included in Appendix H (Tab 8) and the results are summarized in Table 3. The analytical laboratory reports and chain-of-custody form for the groundwater sample are included in Tab 9 and the results for Cd, Cr and Pb are included in Table 3.

A total of 20 soil samples from the FWSA were tested for pH by method 9045 by PACE. The analytical laboratory report is included in Appendix H (Tab 8).

A total of 71 soil samples (including two field duplicates) were analyzed for CVOCs by EPA methods 8010, 8240 and 8260. These included four soil samples from FB-1 (MW-1) that were analyzed for all VOCs by method 8240. Fifty-seven of the soil samples (including two field duplicates) from FB-1 through FB-8 were analyzed for halogenated VOCs by EPA method 8010. Eleven soil samples from MW-6 and MW-8 were analyzed for CVOCs by method 8260. The analytical laboratory reports and chain-of-custody forms for the soil samples are included in Appendix H (Tab 8) and the results are summarized in Table 4.

A total of 41 water samples were analyzed by EPA method 8260 for CVOCs including 23 monitoring well samples, two field duplicates, three field blanks, six groundwater probe

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field duplicates, and seven private wells samples. One groundwater sample from monitoring well MW-1 (March 27, 1998) was analyzed for VOCs by method 8260, SVOCs by method 8270, PCBs by method 8080, pesticides and herbicides by method 8150. The analytical laboratory reports and chain-of-custody forms are included in Appendix I (Tab 9) for the monitoring well samples, Appendix J (Tab 10) for the field probe samples and Appendix K (Tab 11) for the private well samples. The laboratory raw data printout for MW-1 (March 27, 1998) is included under a separate cover (Volume V). The laboratory results are summarized in Table 5 for the field probes, Table 6 for the monitoring wells and Table 7 for the private wells.

TABLE 2

SUMMARY OF SAMPLE

CONTAINERS AND METHODS

Locations	Matrix	Method	Container	Preservation
A to D, FB-1 to	Soil	6010	4 oz. Glass w/Teflon-	Cool or Ice
FB-8			lined screw cap	
FB-1 to FB-8,	Soil	8010, 8240,	4 oz Glass w/Teflon-	Cool or Ice
MW-6, MW-8		8260	lined screw cap	
MW-1S	Groundwater	6010, 7421,	500 mL plastic	Cool or Ice
		7470	w/HNO ₃ to pH<2	
All MWs, Fps,	Groundwater	8260	40 mL vial w/Teflon-	Cool or Ice
Private Wells			lined septum, HC1 to	
			pH<2	
MW-1S	Groundwater	8270, 8080,	1 L glass	Cool or Ice
,		8150		

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TABLE 3
TOTAL METALS (mg/kg) IN FORMER WASTE STORAGE AREA
SUMMARY OF ANALYTICAL LABORATORY RESULTS
Twigg Corp. Project #7403

			Boring A							
		Mean	# of	Highest	Boring	Boring	Boring	Background Non-Resid.	Non-Resid.	esidential
Metal	Depth	Conc.	samples	ample conc	В	ပ	D	Mean + 3SD	Tier II Goal	ier II Goal
S	0-0.5	9.75*	9	17	1.4	1.2	<0.5	2.45	1,020	135
ర		462*	9	1600	71	26	120	138.13	10,000	1,350
Pb		189*	9	1000	18	18	10	145.65	1,000	400
S	0.5-1.0	<0.5*	3	<0.5	<0.5	<0.5	<0.5	1.61	1,020	135
స		12*	3	15	4.4	24	8.1	29.01	10,000	1,350
Pb		24.3*	3	36	5	100	12	273.34	1,000	400
PO	1.0-1.5	<0.5*	3	<0.5	<0.5*	<0.5*	<0.5*	00.00	1,020	135
ວັ	1	9.46*	3	14	8.05*	12.7*	10.8*	7.89	10,000	1,350
Pb		43*	3	85	7.5*	16.8*	26.5*	88.48	1,000	400
PO	1.5-2.0	<0.5*	8	<0.5	<0.5*	<0.5*	<0.5	<0.5	1,020	135
స		5.9*	ε	9.8	*8.8	11.3*	6.7*	69.6	10,000	1,350
Pb		11*	3	18	12.5*	7.2*	15.5*	25.02	1,000	400
PO	3.0-4.0	<0.5*	4	<0.5	<0.5*	<0.5*	<0.5*	<0.5	730	730
C		8.67*	4	15	*50.6	9.95*	12.5*	19.54	7,300	7,300
Pb		1.85*	4	7.4	7.55*	5.6*	*9'6	7.44	1,000	400

> Tier II Residential Goal (but less than Non-Residential Goal)

^{*} mean of 2 or more samples from same location

MONI	MONITORING WELL MW-1 (7-17"	. MW-1 (7-17		
	3/25/98	86/6/6	Non-Resid.	Residential
Metal	(mg/L)	(mg/L)	Tier II Goal	Tier II Goal
පු	<0.005		0.051	0.005
స	<0.010		0.510	0.100
Pb	<0.080	<0.005	0.015	0.015

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TOTAL METALS (mg/kg) IN FORMER WASTE STORAGE AREA

Bkgnd	Avg+3SD	2.4	138.1	145.6	1.6	29.0	273.3	0.0	7.9	88.5	0.0	6.7	25.0	0.0	19.5	7.4
Dec-94 Bkgnd	D2							<0.5	6.5	24	<0.45	9	<4.5	<0.5	13	9.2
Aug-94		<0.5	120	10	<0.5	8.1	12	<0.5	15	55	<0.5	7.4	31	<0.5	12	10
Dec-94	C2							<0.5*	7.4*	4.5*	0.46*	.56'9	<4.6*	<0.5	12	<4.7
Aug-94	၁	1.2	16	18	5.0>	24	100	9.0>	18	59	<0.5	20	7.2	5.0>	7.9	8.8
Dec-94	B2							<0.5	7.7	5.2	<0.47	10	<4.7	<0.5	9.4	6.9
Aug-94	B [1.4	71	18	<0.5	4.4	5	<0.5	8.4	9.6	<0.5	9.7	25	<0.5	8.7	8.2
Dec-94	A3	3.1	15	<4.7	<0.46	15	12	<0.47	8.48	85	<0.46	6.4	18	<0.47*	5.15*	<4.5*
Dec-94	A2	10.95**	117**	279.75**	<0.47	6	36	<0.49	6.5	<5.0	<0.44	2.7	<4.4	<0.47	9.4	<4.6
Aug-94	٧	14	1600	200	S:0>	12	25	<0.5	1.4	44	<0.5	8.6	15	<0.5	15	7.4
	Depth	0-0.5			0.5-1.0			1.0-1.5	T		1.5-2.0			3.0-4.0		
	Metal	පි	ర	P _b	P O	ర	P P	පී	ర	2	S	ర	P _b	ပ္ပ	ర	P Q

>Background Avg+3SD Sample and field duplicate

**mean of sample, two lab duplicates and one field duplicate: Cd Average (15, 2.1, 17, 9.7) = 10.95
Cr Average (130, 18, 180, 140) = 117
Pb Average (60, 18, 1000, 41) = 279.75
This sample shows excessive heterogeneity.

TOTAL METALS (mg/kg) IN BACKGROUND SAMPLES

	Avg + 3SD	2.45	138.13	145.65	1.61	29.01	273.34	0.00	7.89	88.48	0.00	9.69	25.02	0.00	19.54	7.44
	SD (n-1) /	0.64	38.11	30.74	0.43	6.45	67.85	00.0	0.67	24.36	0.00	1.07	5.28	0.00	3.73	2.23
	Average	0.51	23.79	53.43	0.33	9.67	69.79	0.00	5.88	15.41	0.00	6.47	9.19	0.00	8.36	0.74
	FB-8	0.00	6.80	37.00	0.70	7.30	190.00	0.00	5.75	0.00	0.00	4.80	0.00	0.00	9.20	0.00
	FB-7	00:00	09'9	33.00	00:00	7.70	0.00	00.0	6.70	6.40	00.0	5.90	9.50	00.00	7.50	00:00
	FB-6	00:00	14.00	49.00	00:00	4.90	8.50	00:00	5.80	00:00	00:00	06.9	5.40	00:00	5.30	6.70
	F8-5	09:0	8.20	100.00	09.0	8.60	100.00	00:0	00.9	6.80	00:00	8.20	9.40	00:00	11.00	0.00
	FB-4b							00.0	2:00	00.00				00.0	7.40	0.00
	FB-4	05:0	8.90	82.00	00'0	9.60	29.00	0.00	5.50	9.00	0.00	09:9	15.00	0.00	5.60	0.00
	FB-3	1.80	110.00	63.00	00'0	8.60	51.00	00:00	5.30	77.00	00:00	5.90	15.00	00'0	00:9	00:0
	FB-2b							00.0	7.15	21.50	00.0	7.00	10.00	00.0	17.00	0.00
	FB-2	0.70	12.00	10.00	1.00	24.00	110.00	00:0	5.70	18.00				00'0	6.20	0.00
 	Depth	0.0-0.5			0.5-1.0			1.0-1.5			1.5-2.0			3.0-4.0		
	Metal	ප	ర	P _b	S	ర	Pb	පි	ö	Pb	PO	ర	8	g Ö	ঠ	Pb

Mean of sample and field duplicate: FB-2b (1.0-1.5), FB-6 (3.0-4.0), FB-8 (1.0-1.5)

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TABLE 4 SOIL SAMPLES - VOCs ANALYTICAL LABORATORY RESULTS TWIGG - MARTINSVILLE, Project No. 7403

		Other			Organic Compound			
Boring	Depth (ft)	VOCs	PCE	TCE	1,1-DCE	c-DCE	TCA	1,1-DCA
FB-1	0.5-1.0	1	0.700	0.012	•	<u> </u>	0.0041	•
(MW-1S)	4.0-6.0	1,2	0.260	0.0063			0.007	•
,	9.0-11.0	1	42.000		•	-	0.580	•
	14.0-16.0	1,2	•		-	_	-	-
	19.0-21.0		•	•	-		•	
	24.0-26.0	1	=		-	•		
	29.0-31.0	1	-				<u> </u>	-
MW-1D	45 - 46		•			-	_	· · · · · · · · · · · · · · · · · · ·
	55.5 - 56	.00000000000000000000000000000000000000	0.032	•		•	•	•
	65.5 - 66	200000000000000000000000000000000000000	0.002	<u> </u>		_	-	-
	74.5 - 75						-	
	81.0			\$2000.000000000000000000000000000000000		-		•
	01.0		•				-	
ED 0	2040	•	•			-		
FB-2	3.0-4.0	1	-	•	•	•	•	-
(MW-2)	8.5-10.5	-	•	• _	•	•		
	13.5-15.5	1	•	• ************************************	•	-	0.100	-
	18.5-20.5	•	=		-	-		-
	23,5-25 5	1		-	-			÷
FB-3	9.0-11.0		0.780	•	•	-	0.210	-
(MW-3)	14.0-16.0	•	0.410	•	•	•	0.260	
	19.0-21.0	1	•	•	•	•	0.066	•
	24.0-26.0	1		•	-	-	-	•
	29.0-31.0	1		-	-	4	ī	•
FB-4	4.0-5.0	-	•	•		•	•	-
(MW-4)	8.5-10.5	_	0.180	•	•	•		•
(13.5-15.5		8,400		•	-	0.240	
	18.5-20.5	-	3.000				•	
	23.5-25.5		0.530		0.032		1.700	
	28.5-30.5	-	- 0.000		•		0.400	
	34.0-35.5	3	-	-	-	•	9. 100	•
	39.0-40.5	3		-	-	-	_	-
	44.0-45.5	3.4	•		-	-	-	-
50.5	CONTRACTOR CONTRACTOR CONTRACTOR		Annual Company of the				<u>-</u>	-
FB-5	3.0-4.0	1	-	•	-	<u>-</u>	-	-
	8.5-10.5	1	•	•	-	-		
	13.5-15.5	1	-		-	•	-	-
	18.5-20.5	1	•	•		-	-	-
FB-6	4.0-5.0	-	•	-	•	-	•	•
	9.0-10.5	-	0.110		•		•	•
	14.0-15.5	-	0.750	-	<u> </u>	<u> </u>	•	•
	19.0-20.5	-	7.700	-				•
	24.0-25.5	-	1.700	•	-	-	•	-
	29.0-30.5	-	•	•	•	-	0.027	•
	34.0-35.5	*****		-	•			-
	39.0-40.5	•	÷	•	-	•	-	-
FB-7	4 0-5.0				-	•	-	•
· - ·	9.0-10.5		-	-	-	-	-	
	14.0-15.5	-	•	•	0.041	•	0.810	
	19.0-20.5			0.0280	0.150		2.500	
	24.0-25.5	-		- 0.0200	0.052	-	1.100	
			•		0.002		1.100	-
i	29.0-30.5	- 4	<u>.</u>	-	-	-	÷	-
ED 0	34.0-35.5	- ,4				-	-	-
FB-8	1.0-1.5	-		-		A RESERVED TO A SECURE OF CONTRACT A DES	-	-
	9.0-10.5			Ŧ	-	+		
	14.0-15.5		•	•	•	•	0.130	-
	19.0-20.5	-	0.490	<u> </u>	0.015	-	0.550	
	24.0-25.5	-		<u> </u>		-	0.500	<u> </u>
	29.0-30.5	-	-		•		0.052	<u> </u>
	34.0-35.5	-			-	-	-	·
	39.0-40.5	-	-	-	•	•	0.030	
	44.0-45.5	•	÷	•	-	-	-	•
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TABLE 4 (CONT.)

Twigg Corporation

PN: 7403

						Volatile Organi	c Compound (ppm)	
Boring	Depth (ft)	Note	PCE	TCE	1,1-DCE	c-DCE	TCA	1,1-DCA
MW-6	45.0	5	•	•		-	3.000	0.037
	55.0	5	•	•		•	2.700	0.100
	60.0	5	•	•			0.940	0.037
	65.0	5		•		•	0.770	0.470
	75 - 76	5	-	•		•	-	-
	84.5-85.5	5				-	-	-
	95 - 96	5	•	•		•	0.012	0.008
	99.5 - 100	5	•				0.028	0.015
MW-8	45.0	5		•		•	0.130	0.020
	55.0	5		**************************************		-	•	-
	60.0	5		-		•	0.029	0.021
TIER II R	esidential Goal	Surface	12.5	58.2	1.07	1,000	1,000	1,000
		Subsurface	0.227	0.076	0.084	17.1	229	40.1
TIER II N	on-Resid Goal	Surface	101	25	0.15	1,000	1,000	973
		Subsurface	8.01	25.7	0.08	102	1,000	1,000

- 1) Methylene chloride was detected in sample as well as in blank or value was between the Minimum Detection Limit and the Practical Quantification Limit; other VOCs ND
- 2) Acetone was detected between the Minimum Detection Limit and the Practical Quantification Limit
- 3) Methylene chloride was detected in sample.
- 4) Mean of sample and field duplicate
- 5) DL = 5 ppb
- "-" = none detected

blank space = not analyzed
=Clean for two or more consecutive samples

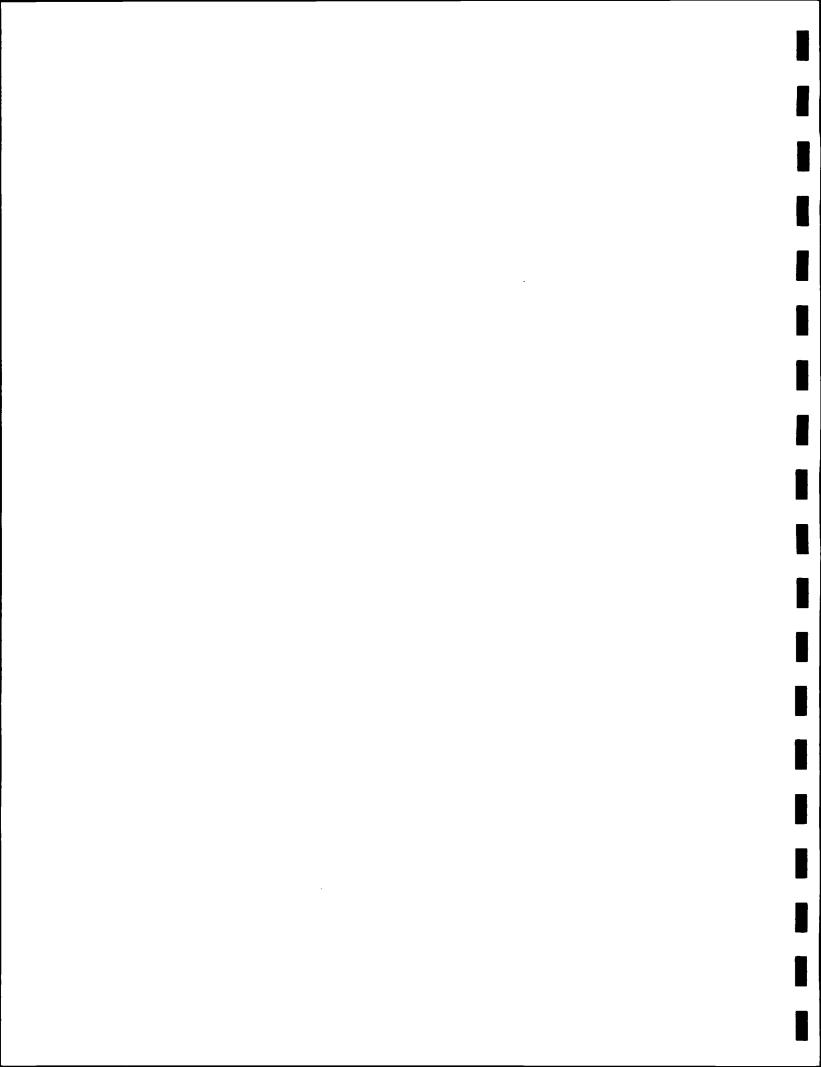


TABLE 5 GROUNDWATER PROBE SURVEY MOBILE & FIXED LAB RESULTS TWIGG - MARTINSVILLE

		Volatile Organic Compound (ppb)						
Probe	¬ }				J	(FP-	t-DCE,	
Location	Depth (ft)	PCE	TCE	c-DCE	TCA	1,1-DCA	VC & CA	Lab
December 4-	-5, 1996							
FP-1	16.9	<1	<1	<1	<1	<1		mobile
	25.0	<1	<1	9	1662	7		mobile
	35.0	<1	<1	15	3513	7		mobile
	45.0	<1	<1	4	895	5		mobile
	15.0	<2	<2	<2	<2	<2	<2	fixed
	25.0	<2	<2	19	3100	89	<2	fixed
	35.0	<2	<2	44	8000	660	<2	fixed
	45.0	<2	<2	27	2700	700	<2	fixed
					•			
FP-2	17.4	<1	<1	<1	<1	<1		mobile
	25.0	<1	<1	<1	<1	<1		mobile
FP-3	17.4	<1	<1	<1	<1	<1		mobile
	25.0	<1	<1	<1	6	<1		mobile
	35.0	<1	BMDL	<1	2754	<1		mobile
FP-4	17.1	<1	<1	<1	<1	<1		mobile
FP-5	17.5	<1	<1	<1	<1	<1		mobile
_	35.0	<1	<1	<1	<1	<1		mobile
FP-6	35.0	<1	<1	<1	<1	<1		mobile
FP-7	35.0	<1	<1	<1	1320	<1		mobile
FP-8	35.0	<1	<1	<1	<1	<1	!	mobile
FP-9	35.0	<1	<1	<1	<1	<1		mobile
	45.0	<1	<1	<1	<1	<1		mobile
April 9-10, 19	997							
FP-10	20.0	<1	<1	<1	7	<1		mobile
	20.0	<5	<5	<5	19	<5	<2	fixed
FP-11	15.0	3	<1	<1	<1	<1		mobile
	15.0	<5	<5	<5	<5	<5	<2	fixed
FP-12	25.0	<1	<1	<1	5	<1		mobile
	35.0	<1	<1	<1	74	<1		mobile
	45.0	<1	<1	<1	109	<1		mobile
FP-13	35.0	<1	<1	<1	<1	<1		mobile
FP-14	35.0	<1	<1	<1	<1	<1		mobile
FP-15	35.0	<1	<1	<1	<1	<1		mobile
FP-16	35.0	<1	<1	<1	<1	<1		mobile
FP-17	35.0	<1	<1	<1	<1	<1		mobile
FP-18	20.0	<1	<1	<1	<1	<1		mobile

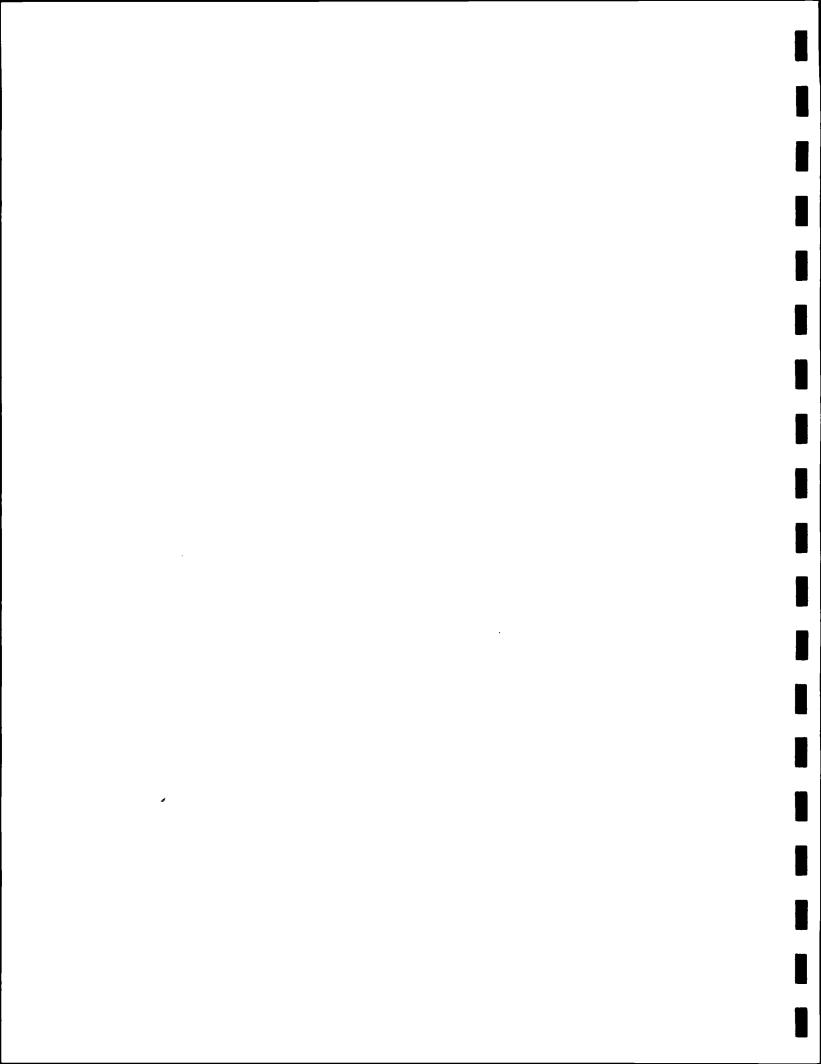


TABLE 6

GROUNDWATER MONITORING WELLS SUMMARY OF ANALYTICAL LABORATORY RESULTS

TWIGG - MARTINSVILLE, IN Project No. 7403 (thru September, 1998)

				V	olatile Org	anic Comp	ound (ppb)		
Monitoring	Screen									Total
Well	Depth (ft)	Date	PCE	TCE	c-DCE	1,1-DCE	TCA	1,1-DCA	t-DCE	CVOCs
MW-1S	7-17	6/26/98	7000	140	21	3 _	<5	<5	<5	7164
		3/27/98	2800	< 5	< 5	<5	11	< 5	<5	2811
MW-1D	50-60	9/9/98	<1	<1	<1	<1	<1	<1	<1	<1
}		9/9/98	<1	<1	<1	<1	<1	<1	<1	<1
•		7/23/98	<1	<1	<1	<1	<1	<1	<1	<1
1		6/25/98	490	33	7	<5	59	<5	<5	589
1		3/27/98	<1	<1	<1	<1	<1	<1	<1	<1
MW-3	7-17	6/26/98	180	<5	10	<5	64	<5	< <u>5</u>	254
l		4/8/98	210	3	19	<1	62	3		297
									_	
MW-4	15-25	6/26/98	8200	110	30	5	630	<5	<5	8975
		6/26/98	8200	130	73	<1	880	12	<5	9295
		3/27/98	7600	<u>61</u>	29	<1	440	6	<1	8136
		6/13/96*	6100	<50	<50	<50	280	<50		6380
	İ	9/14/95*	10000	16 0	13	14	1200	<5		11387
MW-5	30-40	6/25/98	<1	<1	<1	<1	<1	<1	<1	<1
		3/27/98	<1	<1	<1	<1	<1	<1	<1	<1
_										
MW-6	30-40	6/25/98	<5	<5	38	380	7900	46	<5	8364
1		3/27/98	<1	<1	32	320	7100	39	<1	7491
MW-7	26-36	6/25/98	<1	<1	<1	<1	<1	<1	<1_	<1
		3/26/98	<1	<1	<1	<1	<1	<1	<1	<1
MW-8	40-50	6/25/98	<5	<5	<5	<1	<5	32	<5	32
		5/22/98	<5	<5	<5	<5	<5	26	<5	26
		3/27/98	<1	<1	<1	<1	<1	29	<1	29
MW-9	10-20	6/25/98	<1	<1	<1	<1_	<1	<1	<1	<1
		3/27/98	<1	<1	<1	<1	<1	<1	<1	<1
Fld Eq Blnk	after MW1D	9/9/98	<1	<1	<1	<1	<1	<1	<1	<1
Fld Eq Blnk	after MW4	6/26/98	<1	<1	<1	<1	<1	<1	<1	<1
Fld Eq Blnk	after MW6	3/27/98	<1	<1	<1	<1	52	<1	<1	52
Tier II Reside	ential Goal		5	5	70	7	200	640		
Tier II Non-R		Goal	56	260	1022	7	9198	10220		

* sampling and analysis performed by HES for Harmon

ABREVIATIONS

PCE = tetrachloroethene
TCE = trichloroethene

c-DCE = cis-1,2-Dichloroethene t-DCE = trans-1,2-Dichloroethene 1,1-DCE = 1,1-Dichloroethene TCA = 1,1,1-Trichloroethane VC = Vinyl Chloride CA = Chloroethane

DCA = 1,1-Dichloroethane

CVOCs = Chlorinated Volatile Organic Compounds

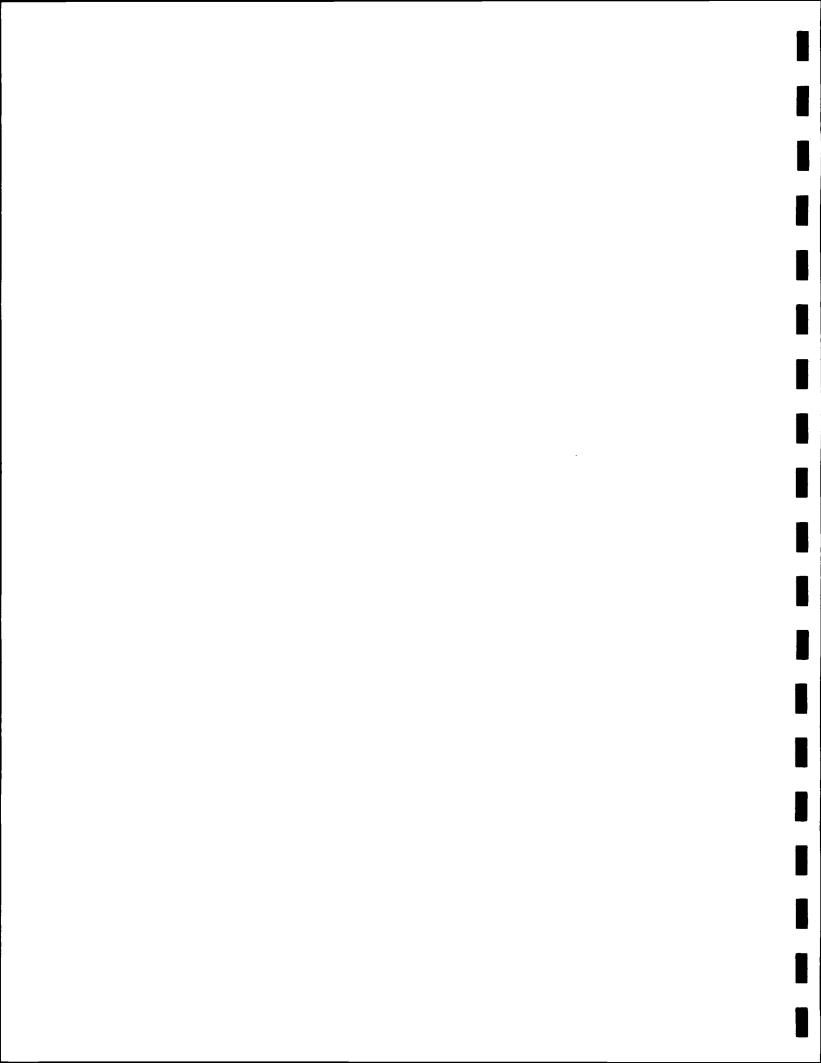


TABLE 7 PRIVATE WELL SURVEY ANALYTICAL LABORATORY RESULTS - SUMMARY MARTINSVILLE

	_ [/olatile Org	anic Com	pound (ppl	o)			
Well Location	Depth (ft)	PCE	TCE	c-DCE	TCA	1,1-DCA	1,1-DCE_	t-DCE	VC & CA	Total
December 3, 19	96									
960 S. Ohio	unkn	<2	<2	<2	<2	<2		<2	<2	<2
910 S. Grant	unkn	<2	<2	<2	<2	<2		<2	<2	<2
Twigg Well	unkn	<2	<2	<2	<2	<2		<2	<2	<2
February 19, 19	97			_						
1310 S. Cherry	unkn	<5	<5	<5	<5	<5		<5	<2	<5
610 W. Dixon	unkn	<5	<5	<5	<5	<5		<5	<2	<5
July 28, 1998							-<>			
10 6 0 S. Ohio	25-29	<5	41	210	160	17	(30)	<5		458
1139 Marilyn	19-23	<1	<1	<1	<1	<1	` ≻1 ′_	<1		<1

ABREVIATIONS

PCE = tetrachloroethene

TCE = trichloroethene

c-DCE = cis-1,2-Dichloroethene

t-DCE = trans-1,2-Dichloroethene

1,1-DCE = 1,1-Dichloroethene

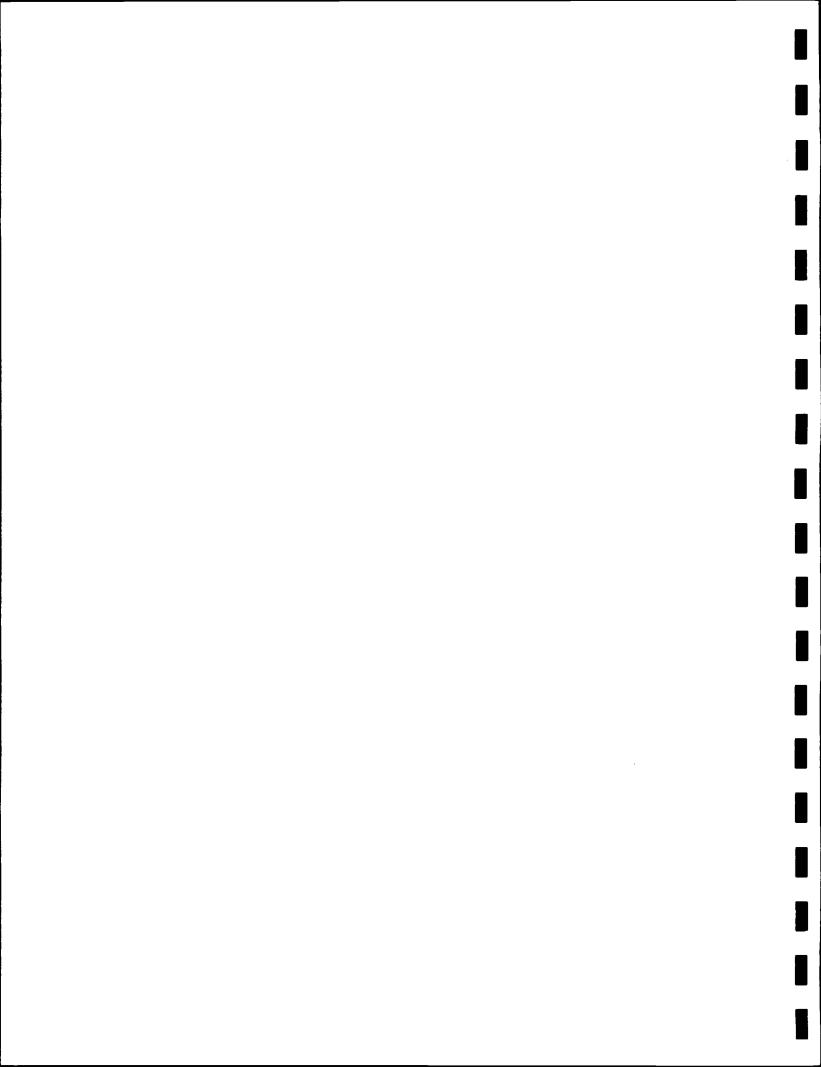
VC = Vinyl Chloride

TCA = 1,1,1-Trichloroethane

DCA = 1,1-Dichloroethane

CA = Chloroethane

OTHER RESIDENCES RELYING	ON PRIVATE WELLS FOR WATER SUPPL
ADDRESS	RESPONSE
940 South St. Clair Street	No Answer
940 East Gray Street	Resident Declined Sample
990 East Warren Street	No Answer
1340 South Catherine Street	Resident Declined Sample
1390 South Catherine Street	No Answer
1330 South Josephine Street	No Answer
1290 South Marion Street	No Answer
1340 South Mulberry Street	No Answer
590 West Dixon Street	Resident Declined Sample



3.5 Site Investigation Results

3.5.1 Hydrogeologic Investigation Results

Boring logs are included in Tab 5 and soils are summarized on Cross-Section AA' (Figure 8). The cross-section location is shown on Figure 4 and the regional hydrogeology is summarized in Section 3.1.2. Subsurface soils in the study area are alluvial or outwash deposits, primarily of sand. Sand deposits extend to approximately 100 feet and are underlain by siltstone or claystone. Boring MW-6 extended to 101.5 feet and encountered clay at 100 feet and shale at approximately 101 feet BGS. Soils overlying the bedrock are predominantly well graded and poorly graded fine to medium sand with trace to little fines and gravel. Sand and gravel layers were identified at MW-6 and MW-8 at approximately 45-50 feet and at MW-6 at approximately 70-96 feet BGS. At MW-1 a layer of silt with little clay and little to some fine sand was found at 75 feet to termination of the boring at 81 feet BGS. A layer of silty sand was also identified at MW-1 at approximately 55 to 60 feet BGS.

Near the ground surface a layer of finer-grained soil was found which was typically silty sand, but also included clayey sand and some sandy lean clay or silt. The ground surface in covered with pavement (roads and parking lots), buildings, topsoil/grass and gravel (FWSA). The surficial silty sand layer varies in thickness from zero at MW-4 to approximately 12 feet at FB-8 and is generally 6-10 feet thick.

Water level measurements are listed in Table 1 for five dates. Groundwater fluctuated from over 10 feet to approximately 7 feet BGS at MW-1 in the FWSA. The high water level in June, 1998 corresponded to a month of high precipitation, but may also be indicative of the seasonal fluctuation.

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The water level data for June 26 includes the Harmon wells as well as the Twigg wells. The water table elevations for June 26 are shown on Figure 4 and the potentiometric contours are plotted for the affected area. The apparent groundwater flow direction is west to west-southwest. Review of water level data for other dates shows little variation in the apparent groundwater flow direction.

Nested wells (MW-1 and MW-1D) are located in the FWSA and are screened at 7-17 feet and 50-60 feet, respectively. No difference was observed in the water levels in these two wells indicating the absence of a vertical hydraulic gradient. Based on the difference between the groundwater elevations at MW-1 and MW-8 (a distance of 2220 feet) the gradient varied from 0.0024 (2.4 feet per thousand) in March, 1998 to 0.0020 (2.0 feet per thousand) in June, 1998.

Constant head permeability tests were performed on eight of the nine monitoring wells during this investigation. The field data and calculations are included in Appendix L (Tab 12) and the results are summarized in Table 8. Based on the method of Bower & Rice (Bower, 1976) the hydraulic conductivity varies from 1.2 x 10⁻³ cm/sec at MW-9 to 6.9 x 10⁻² cm/sec at MW-8. The variation in conductivity relates to soil type in that MW-9 is screened in sand and gravel and has the highest conductivity. Monitoring wells MW-1, MW-1D and MW-9 were screened partly in silty sand layers (or were at a depth likely to include silty sand) and were found to have lower conductivities. Monitoring well MW-3 was not tested but has a lower conductivity (based on slow recharge) apparently due to higher silt content in the soil.

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TABLE 8

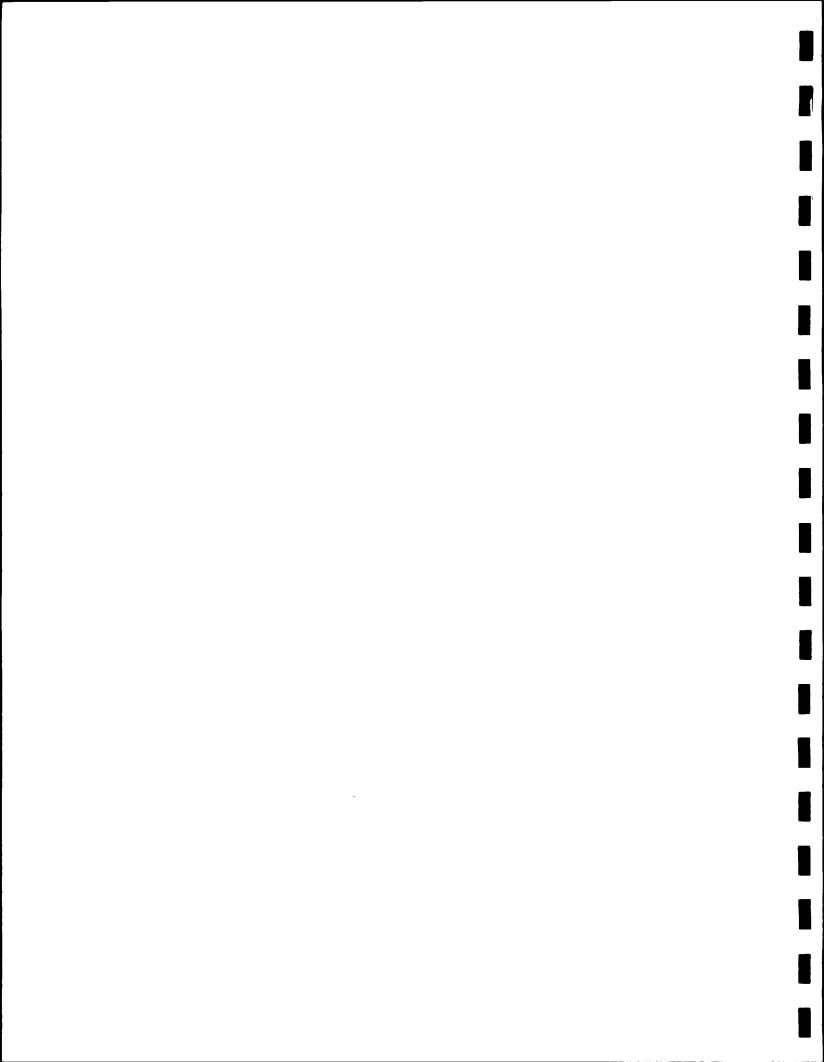
Summary of Monitoring Well

Permeability Tests

Twigg, Martinsville, Project 7403

Location	Constant Head Permeability
	Results (cm/sec)
MW-1	8.5 x 10 ⁻³
MW-1D	9.8 x 10 ⁻³
MW-4	4.9 x 10 ⁻²
MW-5	1.8 x 10 ⁻²
MW-6	2.2 x 10 ⁻²
MW-7	2.9 x 10 ⁻²
MW-8	6.9 x 10 ⁻²
MW-9	1.2 x 10 ⁻³

Geometric Mean Permeability = 1.6×10^{-2} cm/sec



The geometric (logarithmic) mean of a series hydraulic conductivity measurements at independent locations is considered to be the best statistical representation of the conductivity of the layer as a whole. The geometric mean hydraulic conductivity of eight wells tested was found to be 1.6×10^{-2} cm/sec (45 feet/day). This permeability is within the range of published values (8 x 10^{-3} to 5 x 10^{-1} cm/sec) for the regional aquifer (USGS, 1994).

The average (or apparent) horizontal linear velocity (v) of the groundwater in the aquifer can be evaluated from:

$$v = K (dh/dL)/n$$

Where dh/dL is the groundwater flow gradient, K is the hydraulic conductivity and n_e is the effective porosity. Assuming:

$$K = 1.6 \times 10^{-2} \text{ cm/sec}$$

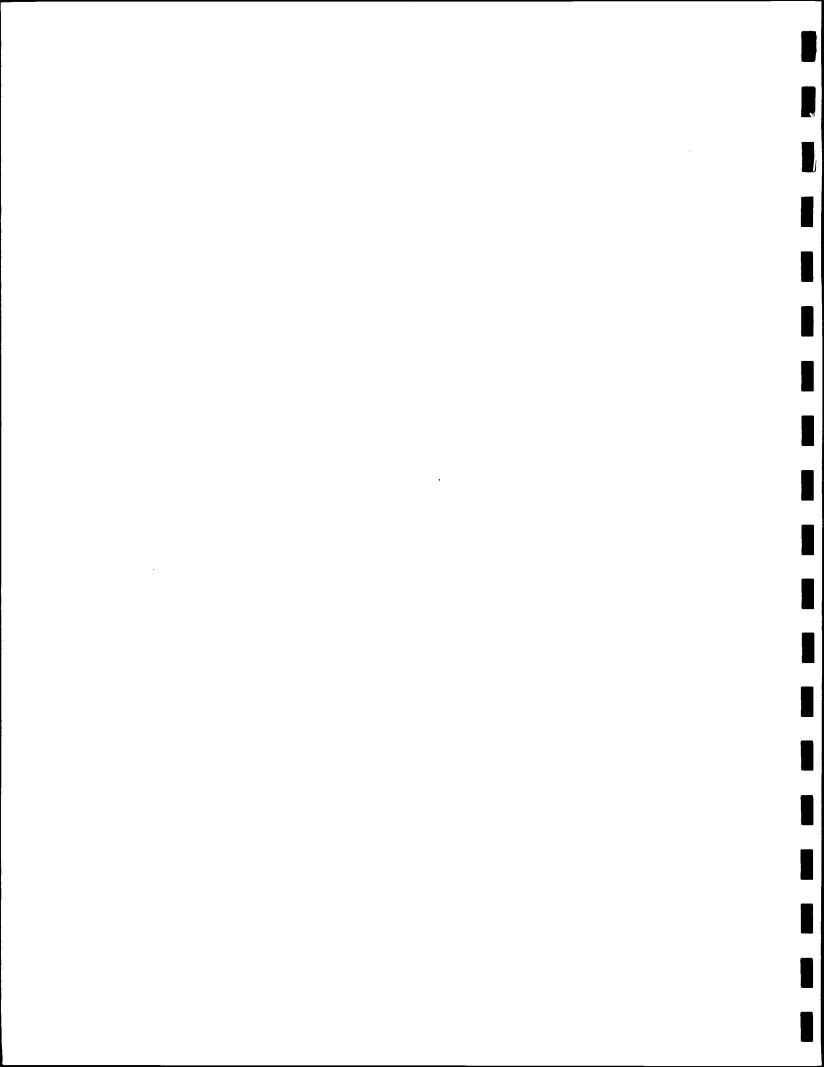
$$dh/dL = 0.0022$$

$$n_e = 0.20$$
 (typical value for sand)

then the average linear horizontal velocity of the groundwater in the aquifer would be approximately 1.8×10^{-4} cm/sec (182 ft/year).

3.5.2 Sample Analysis Results

The analytical laboratory reports and chain-of-custody forms are included in Tabs 8, 9, 10 and 11 and the lab results are summarized in Table 3 through 7.



Metals

Based on the results summarized in Table 3, all samples are within the Tier II Non-Residential Goals. Several soil sampling locations for Cd, Cr and Pb in the FWSA are more than three standard deviations above the mean of the background samples. The background samples were obtained from 200 to 800 feet from the FWSA. At one sample location (Boring A, 0-0.5 feet) Cr and Pb were each found in a single sample above the Tier II Residential goal (1600 ppm versus 135 ppm for Cd and 1000 ppm versus 400 ppm for Pb). However, several field duplicates and laboratory duplicates were performed at that location (Boring A, 0-0.5 feet) and all other laboratory results indicated much lower concentrations. The average of six analyses for Cr and Pb (as well as Cd) at Boring A, 0-0.5 feet was below the Tier II Residential Goal.

One groundwater monitoring well was sampled and tested for dissolved metals (8 RCRA metals) including Arsenic, Barium, Cadmium, Chromium, Lead, Mercury, Selenium and Silver. None of the analytes (except Barium at 0.034 ppm) was detected above the reporting limit. The concentrations of Cd, Cr and Pb, if present, are below the Tier II Residential Goal for groundwater.

Non-Chlorinated VOCs, SVOCs and pH

Four soil samples (0.5-1.0, 4.0-6.0, 9.0-11.0, 14-16) from FB-1 and one groundwater sample from MW-1 were analyzed for VOCs by method 8240 or 8260. No non-chlorinated VOCs were detected above the reporting limit in any of the samples. Acetone was detected in two soil samples below the reporting limit but was not detected in the groundwater.

Acetone is a common laboratory contaminant and its presence may have

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been a laboratory artifact.

Twenty (20) soil samples from the FWSA were tested for pH by method 9045. The pH values ranged from 7.94 to 9.66 and averaged 8.40. The highest pH values were at the surface (0-1.0 feet) and were due to the presence of limestone gravel.

A groundwater sample from MW-1 was analyzed for SVOCs, PCBs, Pesticides and Herbicides (Tab 9). No SVOCs, PCBs, Pesticides, or Herbicides were detected. Monitoring well MW-1 is located in the center of the FWSA and is screened (7-17') at the top of the aquifer (typically 8-9 feet). This is the most likely location to find contaminants, if they were present. These data appear to confirm the absence of hazardous materials other than CVOCs, Pb, Cd and Cr in the FWSA.

Petroleum range gasoline hydrocarbons were reported detected by the mobile laboratory (Tab 10) during one of the groundwater probe surveys. The most significant levels were west of the plume area, near Morton Avenue. However, the observed levels were very low and no benzene, ethylbenzene, toluene or xylene (BETX) was detected in a confirmation (split) sample analyzed by the (fixed) analytical laboratory.

Chlorinated VOCs - Soil

Methylene Chloride (MeC1) was detected in most of the soil samples from four (of approximately ten) analytical batches. The concentrations were low and there was no apparent pattern to the detections. MeC1 was also detected in the laboratory method blank for three of the four affected sample batches. No MeC1 was detected in the groundwater at MW-1. Therefore, the reported detection of MeC1 in the soil samples is almost

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certainly a laboratory artifact.

Six chlorinated VOCs were detected in the soil and/or groundwater at or near the Twigg site. These include Tetrachloroethene (PCE), Trichloroethene (TCE), cis-1,2-Dichloroethene (c-DCE), 1,1,1-Trichloroethane (TCA), 1,1-Dichloroethane (DCA) and 1,1-Dichloroethene (1,1-DCE). No other CVOCs were detected in the soil or groundwater. Tables 4, 5, 6 and 7 summarize the analytical laboratory reports for soil, groundwater probes, groundwater monitoring wells and private wells, respectively.

CVOCs were detected in a total of 34 soil samples including samples from the vadose zone, from the top of the aquifer and from the aquifer matrix. CVOC was detected in both surface soil (0-2 feet) and subsurface soil (>2 feet) in the FWSA. The maximum concentration in the soil was found to be 42.0 mg/kg (ppm) in FB-1 at 9.0-11.0 feet. The water table at MW-1 (FB-1) varies from approximately 7 to 10 feet BGS, thus the sample was from the top of the aquifer or the capillary fringe.

No CVOCs were detected in vadose zone soils outside the FWSA (Figure 5). At the capillary fringe/ top of the aquifer CVOC was found to extend an estimated 400 feet west of the FWSA (Figure 6). Beyond the limits indicated on Figure 5, CVOC, if present, is found only below the top of the water table.

CVOC was confirmed to be in the soil at depths of up to 65 feet BGS (MW-6). CVOC (TCA and DCA) was also reported detected in the two deepest samples from MW-6 at 95-96 and 99.5-100 feet. However, both samples are likely to be sampling or analytical artifacts since they are

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separated from the plume and (in the case of the deepest sample) are from a dense clay layer not conducive to contaminant migration. In any case, the concentrations of TCA and DCA in the two deep samples are below levels of concern. A single soil sample form MW-1D at 55.5-56.0 feet was reported to contain PCE (below the Tier II goal for residential property). Monitoring well MW-1D is screened from 50 to 60 feet and no PCE was detected in groundwater from the well in three of four samples.

Subsurface soil (>2 feet) on the Twigg property exceeds the Tier II non-residential goal for PCE and 1,1-DCE. Subsurface soil off the Twigg property exceeds the Tier II Residential goal for PCE (and possibly 1,1-DCE) near and below the water table. Other CVOCs do not exceed Tier II goals in the soil.

Below the water table, the presence of CVOC in the soil is indicative of its presence in the groundwater at that point. Thus, soil concentrations were used to help define the extent and magnitude of CVOCs in the groundwater.

Chlorinated VOCs - Groundwater

CVOCs were detected in groundwater samples from six of 18 probe locations (at multiple depths), five of nine monitoring wells (multiple sampling events) and at one of eight private wells tested. Concentrations of CVOCs range to over 7,000 ppb at MW-1, MW-4 and MW-6. The concentrations of individual analytes ranged up to 8200 ppb PCE, 160 ppb TCE, 73 ppb c-DCE, 7900 ppb TCA, 46 ppb DCA and 380 ppb 1,1-DCE. PCE was the only compound found in the groundwater on Twigg property in excess of Tier II Non-Residential goals. PCE, TCE, TCA and 1,1,-

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DCE were found or are estimated to be present in groundwater off the Twigg site in excess of the Tier II Residential goals.

No CVOCs were detected in MW-9, MW-1D, MW-5 and MW-7 at a limit of 1 ppb. CVOCs were reported in a sample from MW-1D on June, 1998 (589 ppb) but not in March, 1998 nor in resampling in July and September 1998. The data from June is most likely a sampling or analytical artifact.

The estimated horizontal and vertical extent and magnitude of CVOCs in the groundwater are shown on Figures 7,8 and 9. The concentration isopleths are based primarily on monitoring wells and are supplemented by groundwater probe results and soil concentrations. The concentration isopleths are also shown for the adjoining Harman-Motive plume. The Harman plume isopleths are taken from 1996 report provided by Harman. Since remediation of the Harman plume began in 1996, it is likely that concentrations in the center of the plume have decreased.

Based on the analytes and concentrations at MW-4, FB-8, HMW-19, 24, 25, and 31 the CVOCs detected in HMW-31 and 25 are likely due to transverse dispersion from the axis of the Twigg plume near MW-4 and FB-8, while CVOCs at HMW-19 and 24 are due to the Harmon plume. It is not known, but is possible that some overlap of the plumes is present east of HMW 24 and 25.

The center of the Twigg plume extends cross-gradient north from south street to the southern edge of the main Twigg building. Only moderate transverse dispersion is evident, while substantial downgradient migration has occurred. The Twigg plume is estimated to be 2,850 feet long and 650 feet wide at it's widest. The total affected area is approximately 8.2 acres,

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while the area in excess of Tier II goals is somewhat less. In the western two-thirds of the plume the predominant species is TCA and the Tier II goal is 200 ppb TCA. The eastern third of the plume is predominantly PCE and the Tier II goal is 5 ppb PCE (56 ppb on the Twigg site).

The plume varies from 7 to 11 feet thick at MW-6 and FB-2 to approximately 55 feet thick at MW-6. The CVOCs appear to have entered the aquifer primarily in the FWSA and migrated downgradient to the west. The center of the plume quickly sinks below the top of the aquifer and within approximately 400 feet downgradient of the FWSA no CVOCs are found in the groundwater at the top of the aquifer (Figure 8). The center of the plume sinks from the top of the aquifer (10 feet) at MW-1, to 15-20 feet at MW-4, to 20-25 feet at FB-8, to 35 feet at MW-6 and to 45 feet at MW-8.

Concentrations of CVOC at MW1 varied substantially between two samplings: 2811 ppb on March 27 and 7164 ppb on June 26. The difference is likely due to change in the water level, which rose three feet from ten to seven feet BGS. Monitoring well MW-1 is screened at 7-17 feet and the highest soil CVOC concentrations were found at MW-1 at the water table. Thus, changes in the water table would be expected to affect the groundwater concentrations. Other wells varied only slightly because they are screened below the top of the aquifer, where the concentrations are more stable.

The variation of the plume from primarily PCE in the eastern one-third to primarily TCA in the western two-thirds may reflect two factors. The most recent (since the 1980's) degreasing solvent in use at Twigg was PCE, but may have been primarily TCA in the past. The western part of

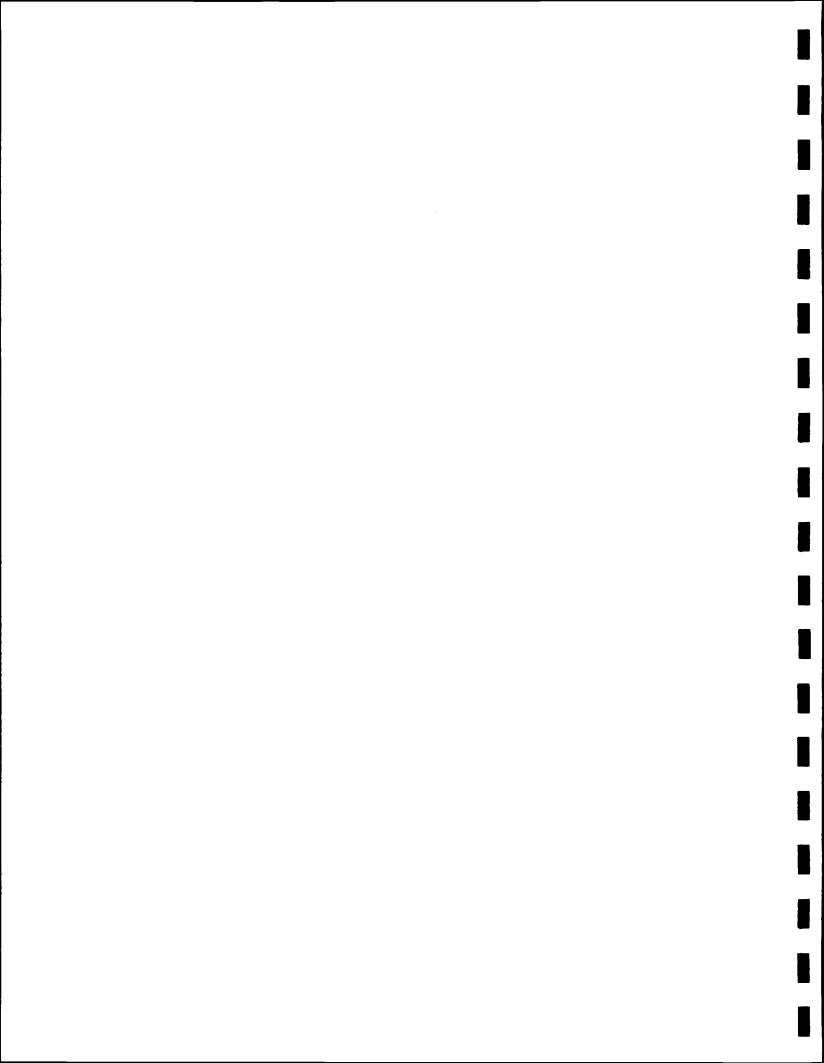
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plume may reflect prior usage of TCA. The second factor is chromatographic separation. TCA has a higher solubility and lower K_{∞} (organic carbon to water partition coefficient) than PCE; thus TCA migrates and disperses faster and farther.

The presence of TCE, c-DCE, DCA and 1,1-DCE is due to microbial sequential reductive dechlorination of PCE and TCA (Bouwer, 1983, Barrio-Lage, 1985; Chaudhry, 1991) TCE and c-DCE are anaerobic biodegradation products of PCE, while DCA and 1,1-DCE are the degradation products of TCA. The presence of 1,1-DCE may also be due to abiotic degradation (Vogel, 1987). These are the likely degradation pathways:

Many samples were also analyzed for VC and CA, but none was detected. This may be due to rapid dispersion, volatilization and degradation and/or low rates of generation of VC and CA.

Addresses identified in the private wells survey as using on-site private wells are shown on Figures 4 and 7. Groundwater samples were tested from eight private wells including two (Twigg well and 1060 S. Ohio St.) located within the plume area. No CVOCs were detected in any of the wells except 1060 S. Ohio St. (Table 7).



The three locations in or closest to the plume (Twigg well, 1060 S. Ohio St. and 1139 Marylin St.) are back-up wells used solely for non-potable purposes (car washing, yard and fire suppression). Affected residents were notified of the results of the survey and requested to continue restricting groundwater use to non-potable activities (Tab 7). No evidence of cross-connections was observed at any of the locations with both a private well and city water.

CVOC Migration Rate

All dissolved aquifer constituents adsorb to and desorb from the aquifer solid matrix. When at a dynamic equilibrium and assuming a linear relationship, this distribution between the solid and liquid phase can be described by a linear equilibrium distribution coefficient (K):

$$K_d = mg \text{ chemical adsorbed/kg soil}$$

 $mg \text{ chemical dissolved/liter of water}$

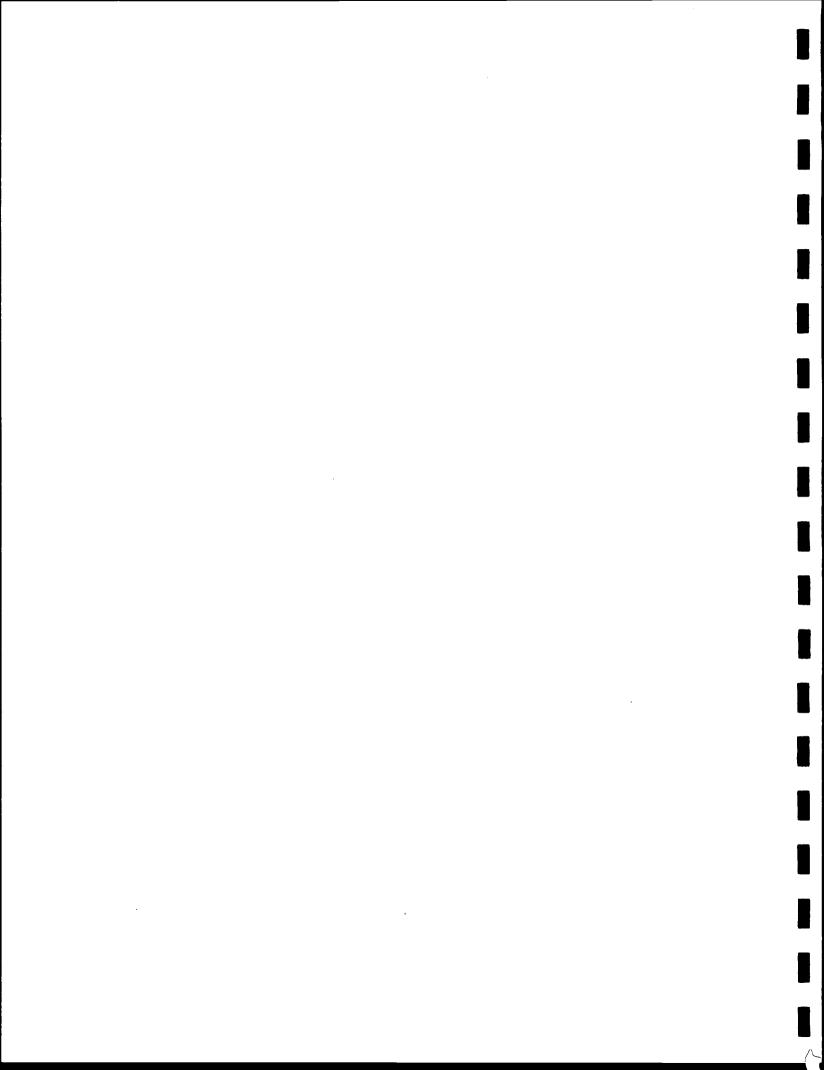
Soil and groundwater concentrations were measured at the same depth at MW-8, MW-6 and MW-4 (see Figure 7 and Tables 4, 5 and 6). At MW-8 the K_d value for 1,1-DCA may be estimated as:

$$K_d = (150 \text{ ug/kg})/(109 \text{ ug/l}) = 1.4 \text{ l/kg}$$

At MW-6 for 1,1,1-TCA K_d may be estimated:

$$K_d = (3,000 \text{ ug/kg})/(2,700 \text{ ug/kg}) = 1.1 \text{ l/kg}$$

At MW-4, based on average soil values in the screened interval, K_d for PCE may be estimated:



$$K_d = (3977 \text{ ug/kg})/(7900 \text{ ug/kg}) = 0.5 \text{ l/kg at MW-4}$$

It has been commonly found that K_d is directly related to the organic carbon content (f_{∞}) of the solid phase. Therefore, an organic carbon distribution coefficient (K_{∞}) is often used:

$$K_{oc} = K_d/f_{oc}$$

The VRP Guidance Manual lists the following K_{oc} values:

Compound	K_{∞} (1/kg)
PCE	66.9
TCA	142
DCA	30.2

Based on the estimated K_d values and the literature values for K_{∞} , the f_{∞} at the four locations may be estimated as:

Location	$\underline{\mathbf{f}}_{\mathbf{oc}}$	% <u>OC</u>
MW-8	0.046	4.6
MW-6	0.0077	0.77
MW-4	0.0074	0.74

A typical aquifer soil would be expected to contain approximately 0.01% to 1.0% total organic carbon. The f_{oc} calculated for MW-8 is higher than normally found in an aquifer soil matrix. If the f_{oc} value calculated for MW-4 and MW-6 is used for MW-8 then the K_d for DCA would be:

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$$K_d = K_{oc} F_{oc} = 30.2 \times 0.0076 = 0.23 \text{ l/kg}$$

The adsorption of dissolved organic species from the groundwater onto the solid matrix has the effect of retarding the migration of dissolved organic constituents such as PCE. The average downgradient velocity of the retarded species (v_x) at 50% of the initial concentration can be described by the relationship:

$$v_x = v/[1 + (b/n_e) \times k_d]$$
 $v = average linear groundwater velocity (182 feet/year)$
 $b = bulk density of solid matrix (1.99 kg/1 or 124 lb/ft^3)$
 $n_e = effective porosity (0.20)$
 $K_d = distribution coefficient$
 $= 0.23 l/kg for DCA at MW-8$
 $= 1.1 l/kg for TCA at MW-6$
 $= 0.5 l/kg for PCE at MW-4$

This suggests that the average downgradient contaminant migration velocity may be approximately:

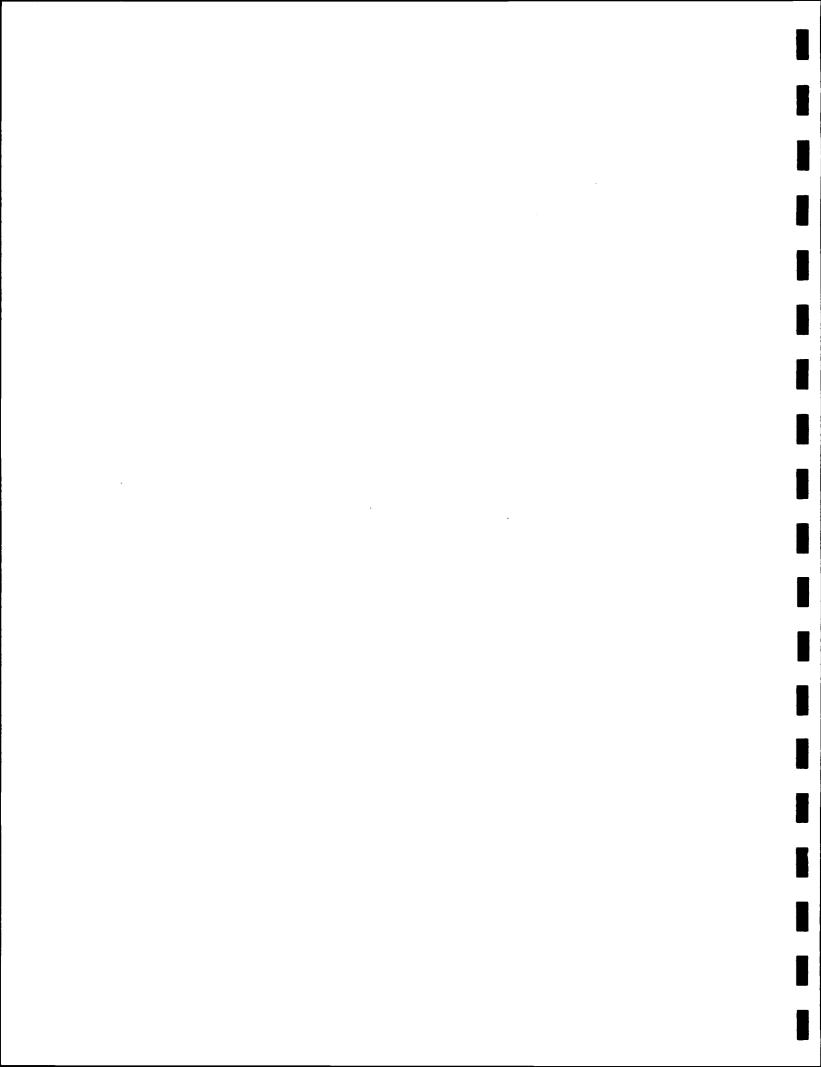
Compound	<u>Location</u>	V_x est. (ft/yr)
DCA	MW-8	55
TCA	MW-6	15
PCE	MW-4	30

Based on site history PCE may have been in the groundwater for 10 to 20 years. The leading edge of the PCE plume has migrated approximately 700 feet

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downgradient from the FWSA. The average migration rate for the edge of the PCE plume has been 35-70 feet per year. Similarly, the leading edge of TCA has migrated approximately 2,000 feet in 20-40 years, suggesting an average travel rate of 50-100 feet per year. The leading edge of DCA is approximately 2600 feet downgradient suggesting an average migration rate of 65-130 feet per year. These rates are similar but slightly higher than current travel rate estimates based on $K_{\rm d}$

All plumes eventually stabilize and CVOC plumes that are 20 to 40 years old are usually considered stable. The monitoring results at the leading edge of the plume (MW-8) and near the center of the plume (MW-4 and MW-6) have been stable during the investigation. Thus, it is likely that this plume is also stable.



4.0 CONCLUSIONS

4.1 Summary of Extent of Contamination

The horizontal and vertical extent of CVOCs and metals appears to be well defined. Metals (Cd, Cr and Pb) are above background levels in the surface and subsurface soil in the FWSA but were below Tier II goals and were not detected in the groundwater. CVOCs were detected in the soil at up to 42,000 ppb in the FWSA and in the groundwater at up to 8704 ppb in the groundwater plume. The CVOCs detected were PCE (and degradation products TCE and c-DCE) and TCA (and degradation products DCA and 1,1-DCE). The groundwater CVOC plume extends approximately 2,600 feet downgradient (west-southwest) from the FWSA and is probably stable. The CVOC plume sinks as it migrates westward and was not detected at the top of the aquifer beyond approximately 400 feet west of the FWSA. No other VOCs, SVOCs, PCBs, Herbicides, Pesticides or Metals were detected in the groundwater in the FWSA.

4.2 Summary of Potential Risks

Potential human exposure pathways include excavation of soil on the Twigg site, ingestion of groundwater and exposure to vapors through migration to basements. Direct exposure to affected soils in the FWSA could occur during subsurface excavation. Vapor migration may occur laterally through the vadose zone or upward from the top of the aquifer. The area of exposure to vapor migration is limited to the area with CVOC at the top of the aquifer. This includes the Twigg site, and seven residential and one business site south and west of the Twigg site. Based on visual inspection, only one of the residences is thought to include a basement.

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Drinking water throughout the project area is provided by the City of Martinsville. The city wellfield is located one mile northwest of the site and is not downgradient. Three private wells located in or near the plume are back-up wells used solely for non-drinking water purposes. Several residences rely on private wells for drinking water but are not near the plume. Five such residences were tested for CVOCs and none were detected. The nearest downgradient private wells are 600-1,600 feet west-southwest of the leading edge of the plume.

4.3 Preliminary Remedial Options

6.3.1 Metals

No remedial action is anticipated for the metals in the soil in the FWSA. All individual replicates are below the Tier II non-residential goals for cadmium, chromium and lead. The average concentrations for each sample location/depth are below the Tier II residential goals. Therefore the site will be closed with respect to metals under the Tier II goals without remediation.

6.3.2 CVOCs - Cleanup Goals

The CVOC plume extends under 50-60 individual properties in excess of Tier II residential goals for PCE, TCA, TCE or 1,1-DCE.

No CVOCs are present at the top of the aquifer for the western two-thirds of the plume. Therefore the only potential exposure route is through drinking water. If access to drinking water could be controlled through deed restrictions, then a risk assessment could be performed to determine appropriate clean-up goals in the absence of immediate potential exposure routes. In the eastern one-third of the plume CVOC is present at the top of the aquifer. If access to drinking water were controlled through deed restrictions, a risk assessment would be needed to established appropriate clean-up goals based on vapor phase exposure only.

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In the absence of off-site deed restrictions the clean-up goals for off-site soil and groundwater would be Tier II Residential and Tier II Non-Residential for the Twigg site.

6.3.3 CVOCs - Remedial Options

Intrinsic Bioremediation

Intrinsic bioremediation is currently occurring throughout most of the plume. This is evidenced by the presence of biodegradation products throughout the plume and the prevalence of such compounds in some areas. In some areas intrinsic bioremediation, dispersion and volatilization will be sufficient to achieve the remedial goals.

Enhanced Bioremediation

Natural biodegradation may be enhanced by the application of nutrients to the groundwater. Methanotrophic bacteria may be enhanced by the addition of a cometabolite such as methane or other short chain hydrocarbons. Aerobic bacteria would also be enhanced by the addition of oxygen. The addition of nutrients could be achieved through injection wells screened below the plume.

Soil Vapor Extraction

The most cost-effective means of removing high volatility compounds from a permeable vadose zone is often soil vapor extraction (SVE). SVE is also often an affective means of removing CVOCs from the top of the water table. A vacuum blower would draw air through wells screened in the vadose zone. Venting the air to the atmosphere would require an air emissions permit and may require treatment if emission rates are high. In addition, SVE may be used to remove air sparging gases from the vadose zone (see Air Sparging).

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Air Sparging

This option includes pumping compressed air into the aquifer below the plume. The air bubbles rise through the water column volatilizing CVOCs. The sparged air passes through the vadose zone and vents to the atmosphere unless it is drawn into SVE wells. This option is generally cost effective.

Pump and Treat

The affected groundwater could be removed through high capacity, or many lower capacity wells. The groundwater would be treated on the surface and discharged. Treatment could include air stripping, carbon adsorption, biological treatment or UV/ozonation. Pump and treat is not a cost-effective means of remediating low solubility groundwater constituents, such as CVOCs.

Soil Excavation/Disposal

The affected soils in the FWSA could be excavated and treated/disposed offsite as hazardous waste. This is cost prohibitive due to the volume of the soil in the FWSA and the cost of off-site treatment and disposal.

4.4 Remediation Work Plan

A Remediation Work Plan is expected to be submitted 90 days after approval of the Phase II Investigation Report. If additional field investigation is required prior to approval of the Investigation Report, then submittal of the Work Plan would be delayed.

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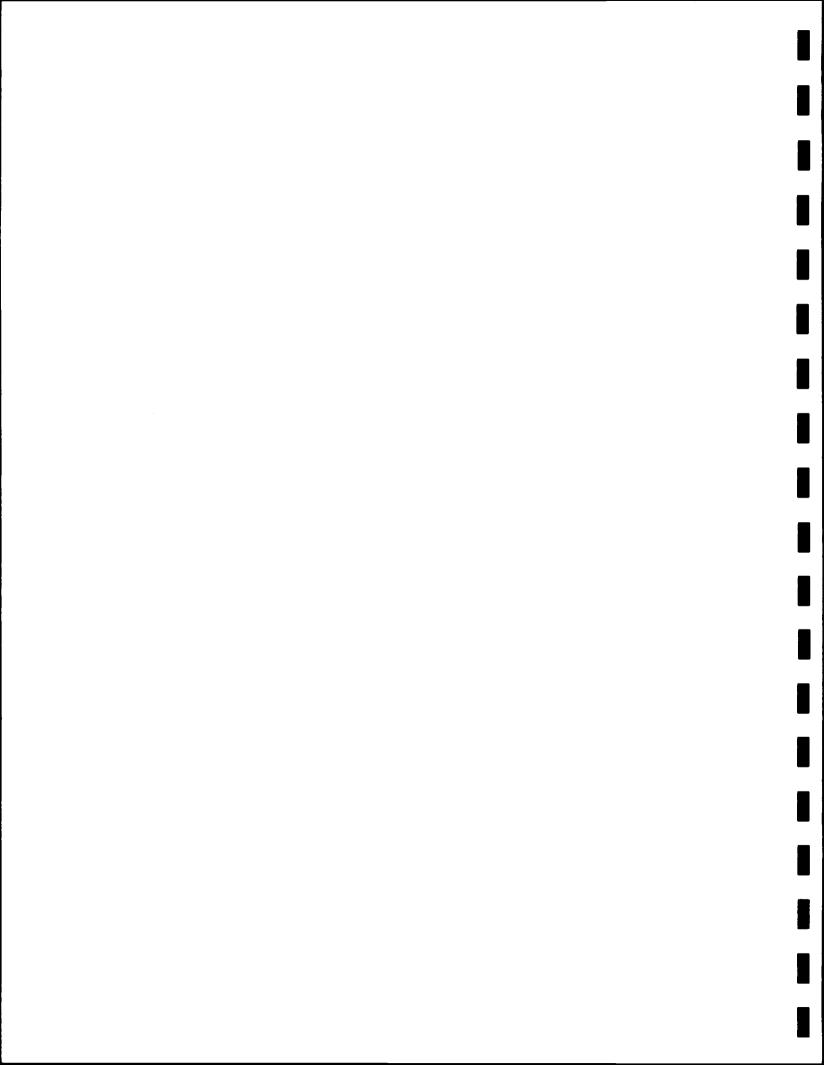
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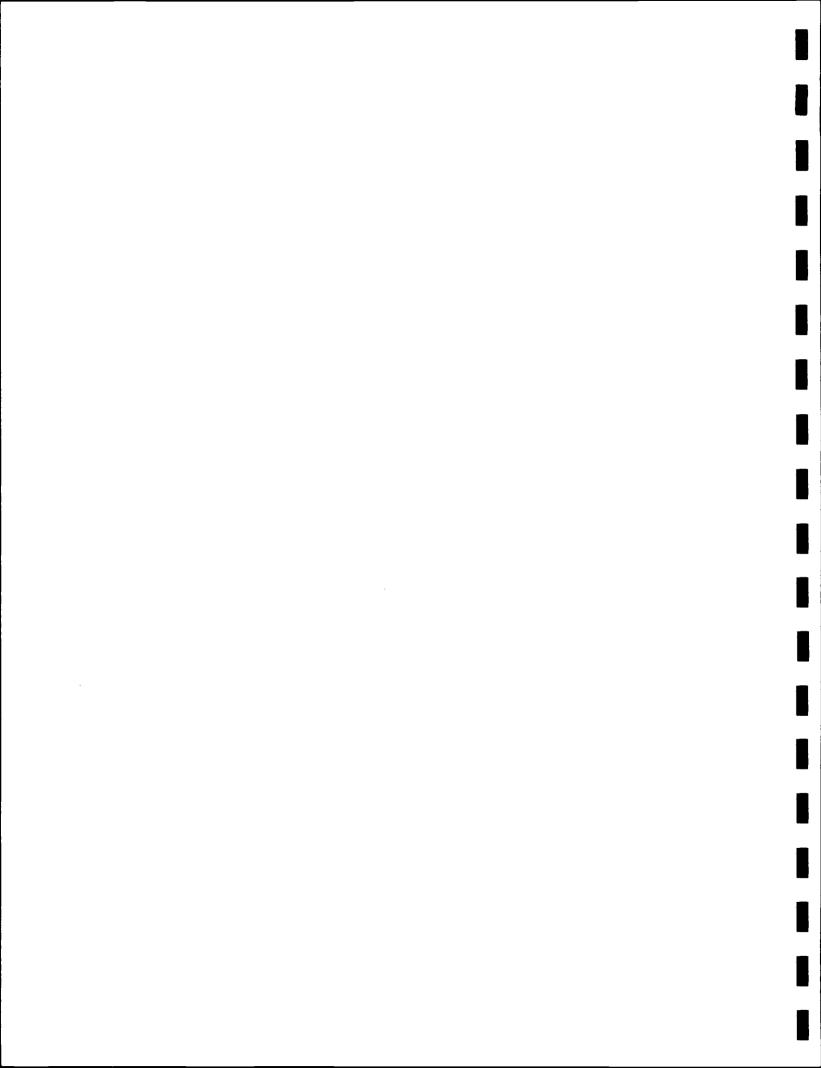
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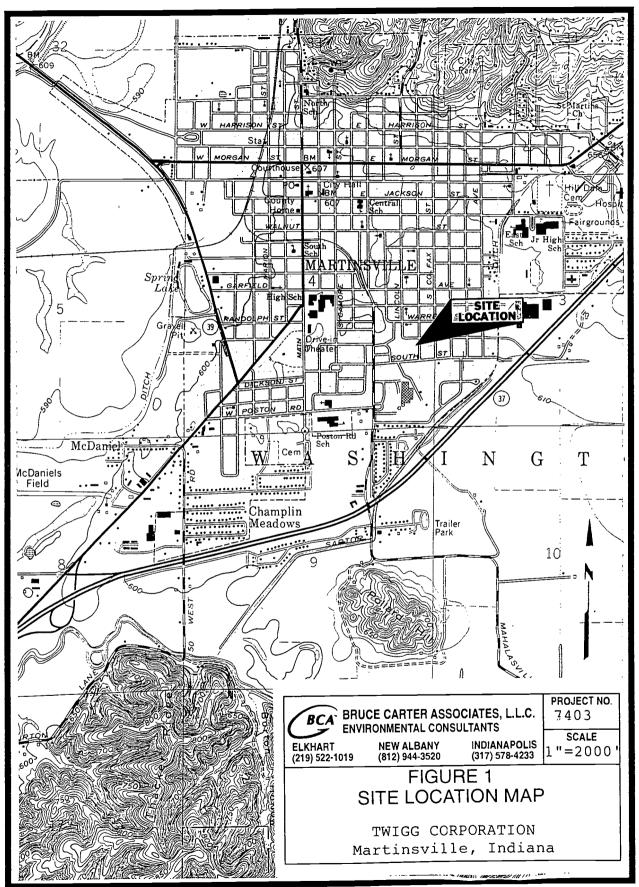
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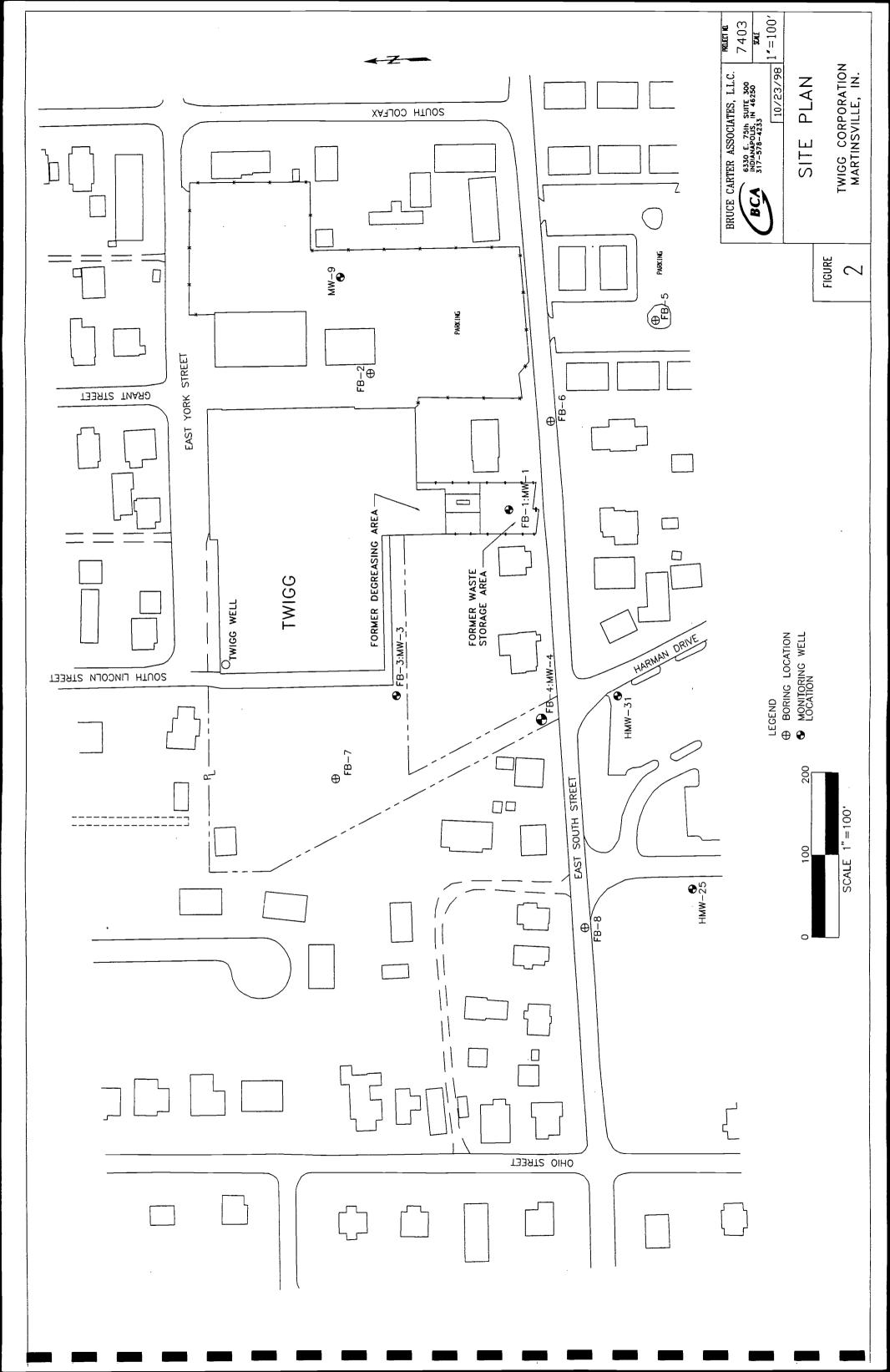
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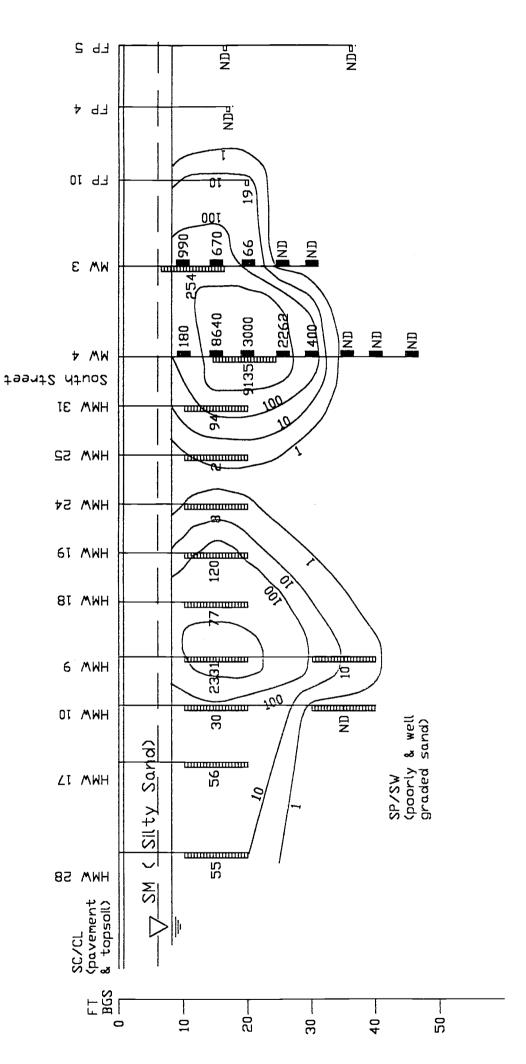




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NOTES

Groung Surface = 603±1ft MSL CVOC = Chlorinated Volatile Organic Compounds Concentration in HMV Wells From 1996 Harmon Motive Data



0' 15' 30' Vertical Scale : 1"= 15'

Location and (ppb) (1996–97)

Groundwater Probe CVOC Concentration

174

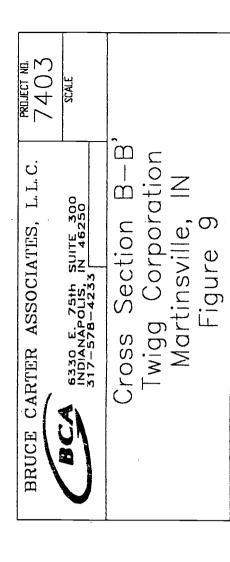
CVOC Concentration Contour

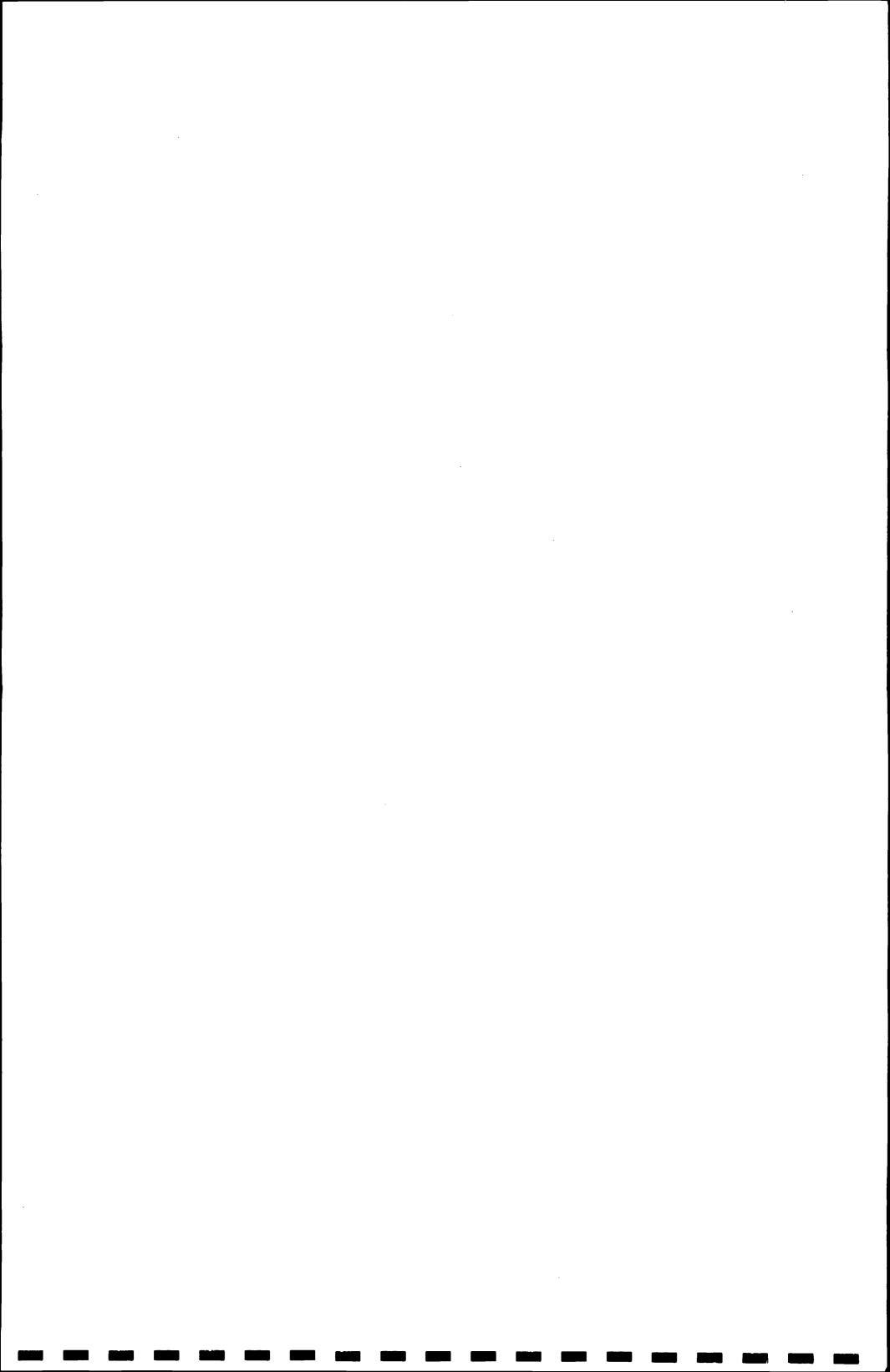
Monitoring Well Location and CVOC Concentration (ppb) (3/98)

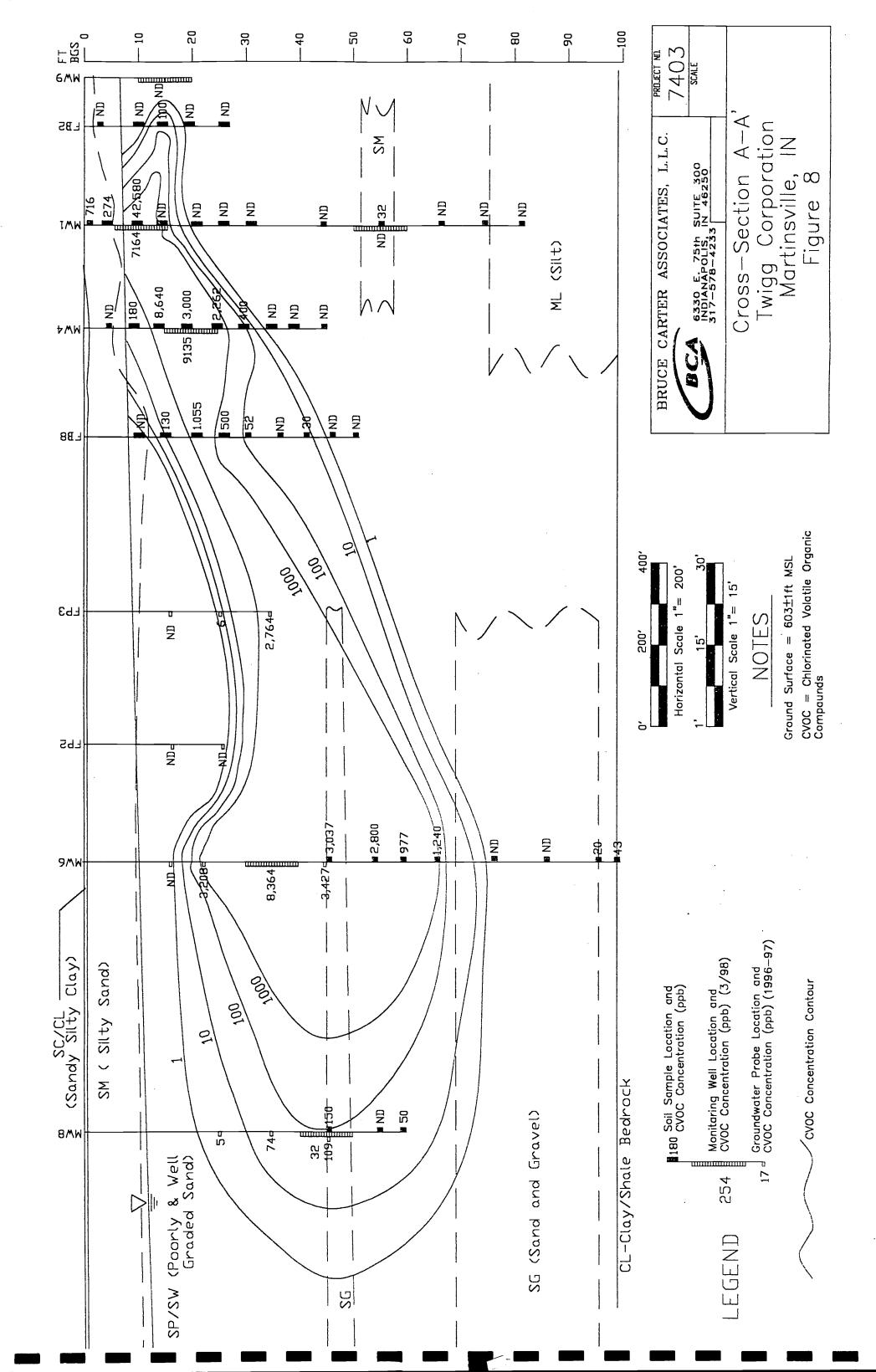
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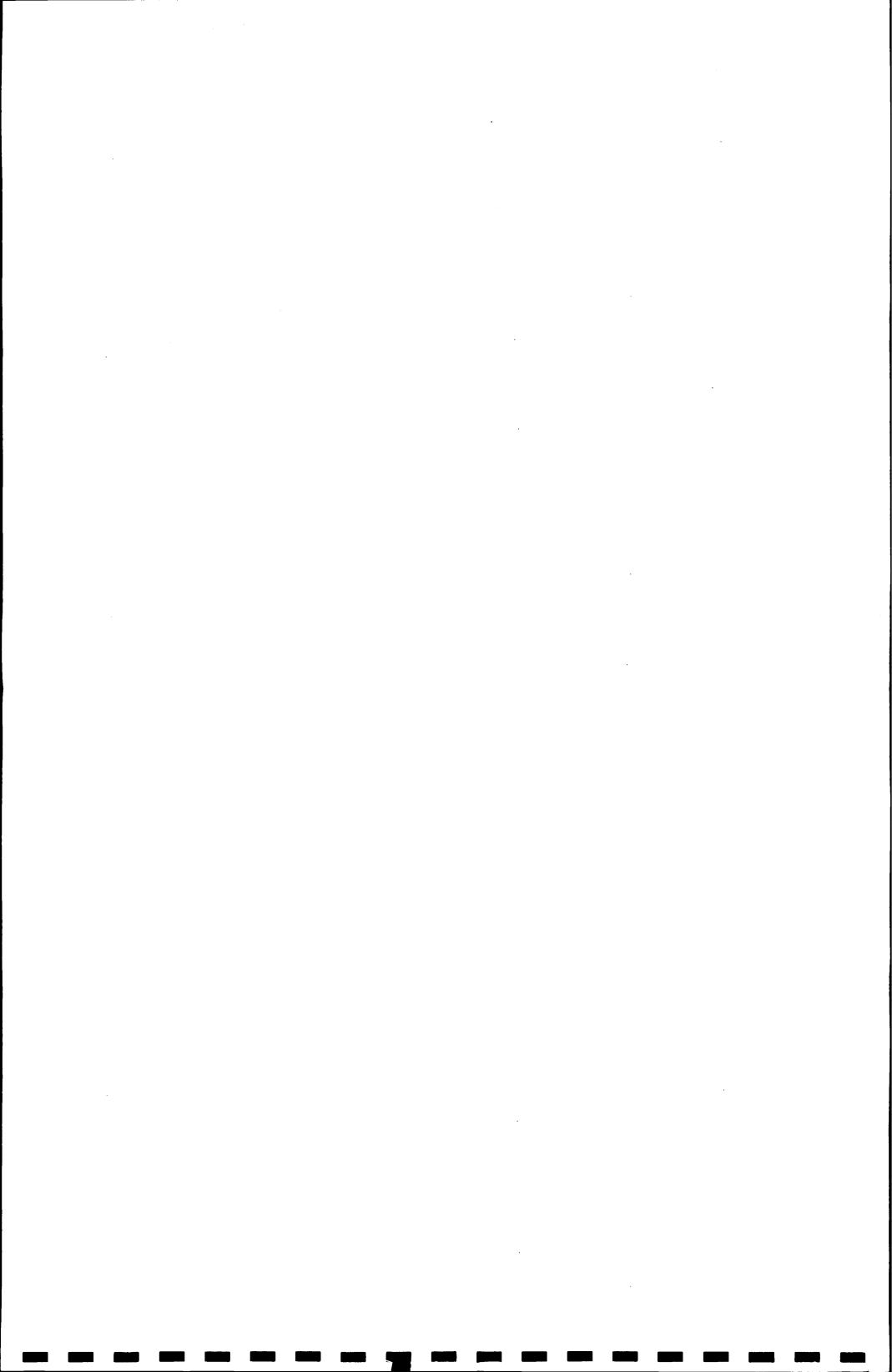
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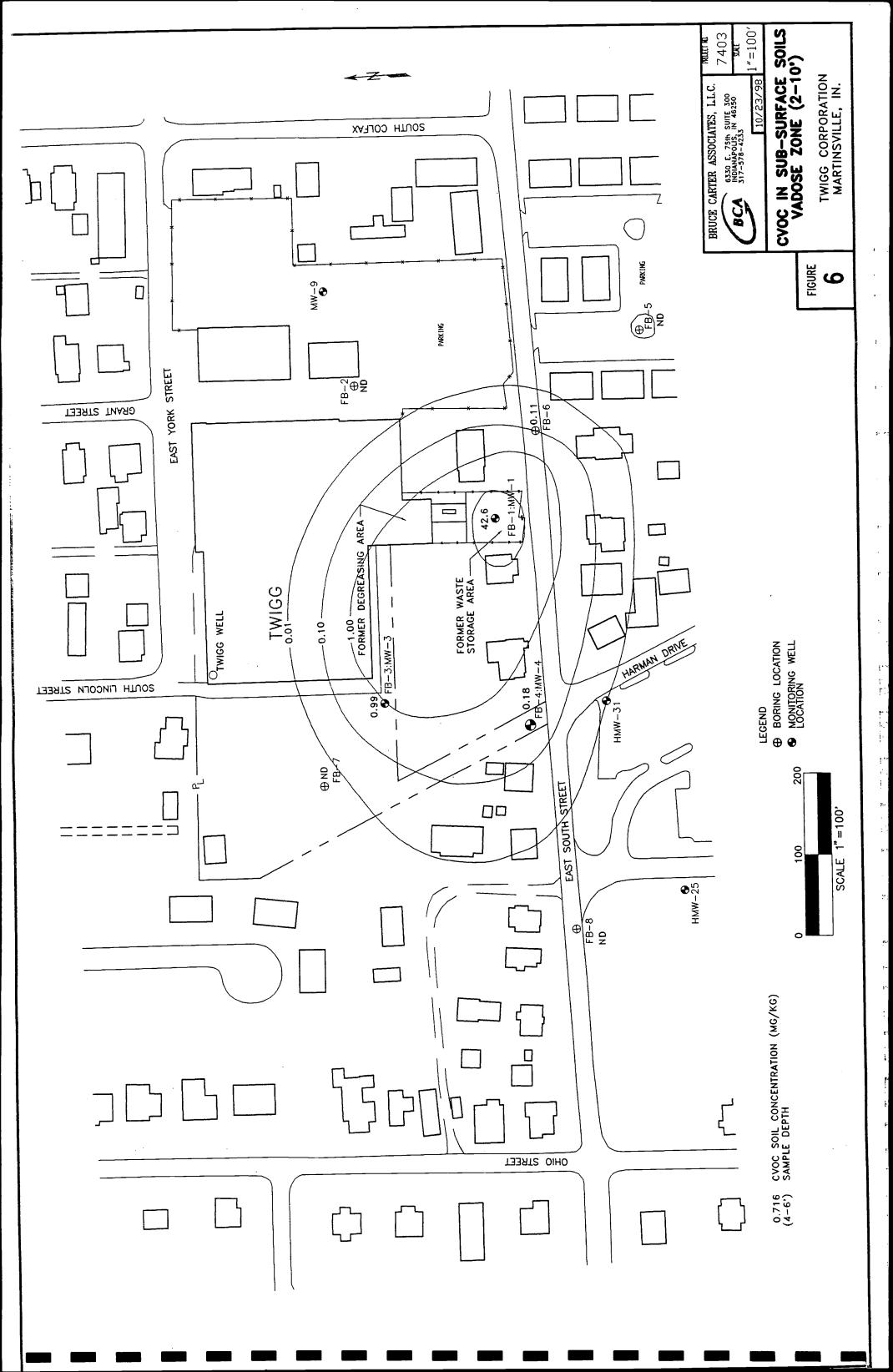
180 Soil Sample Location and CVOC Concentration (ppb)



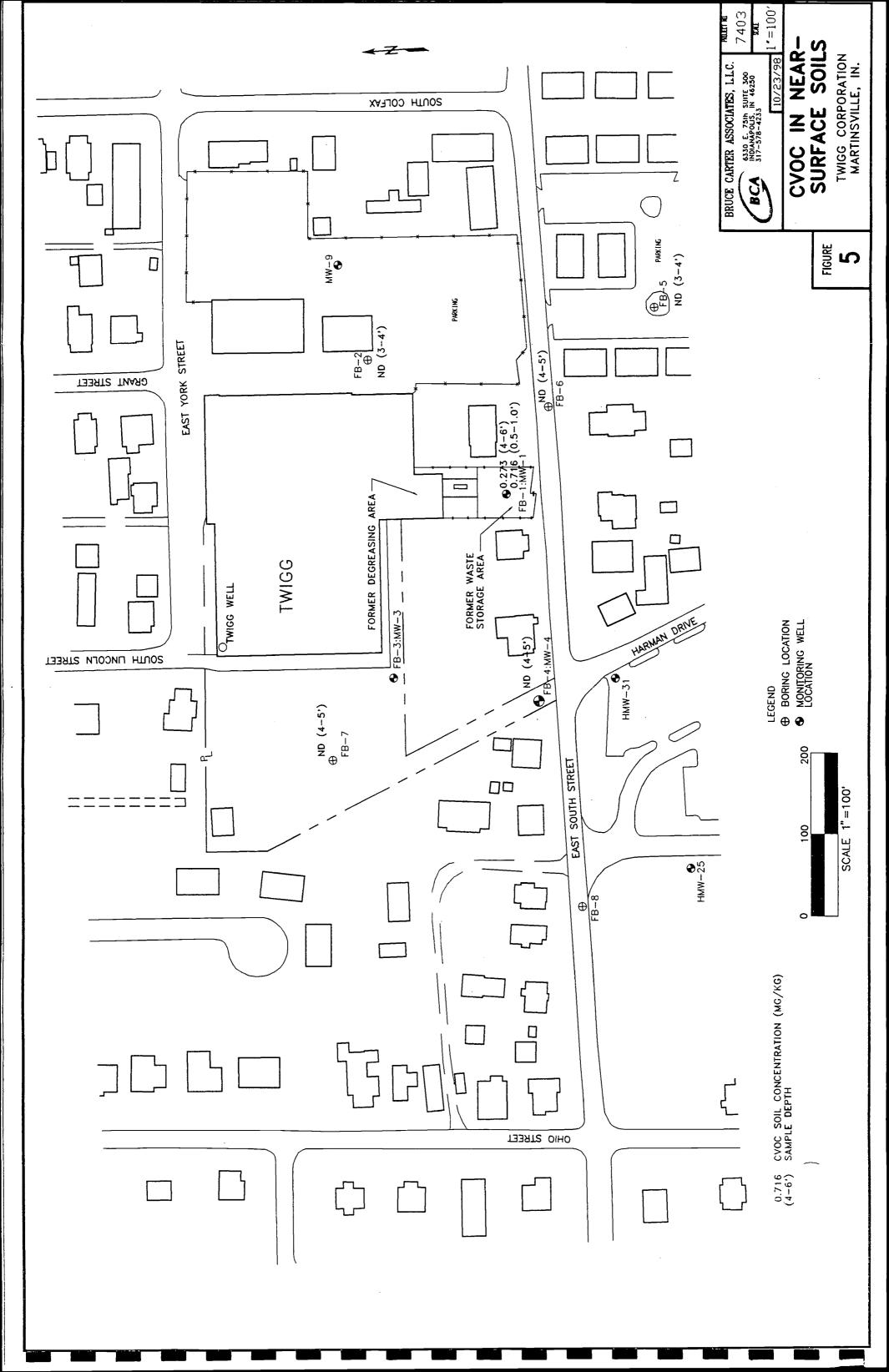


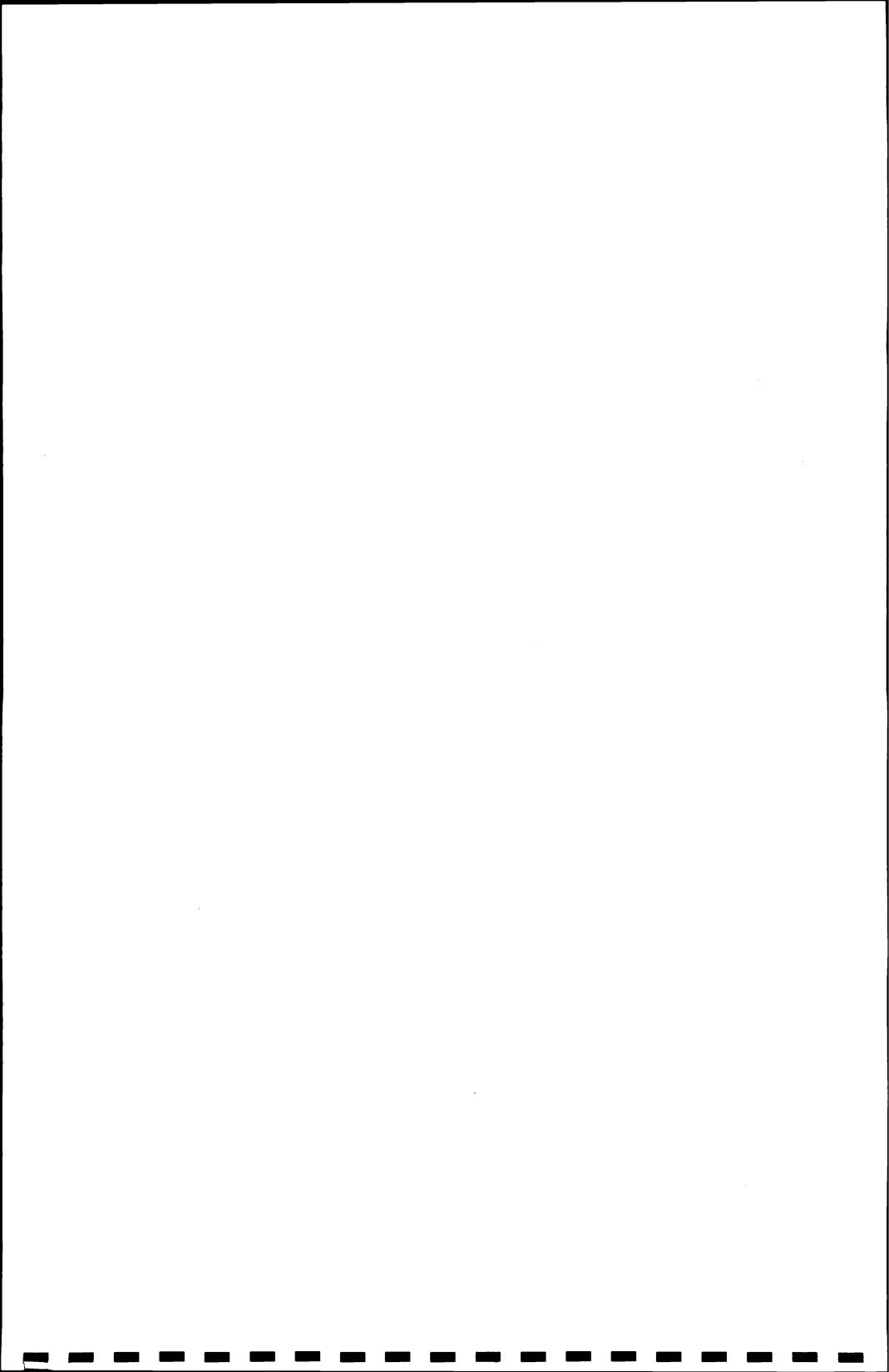


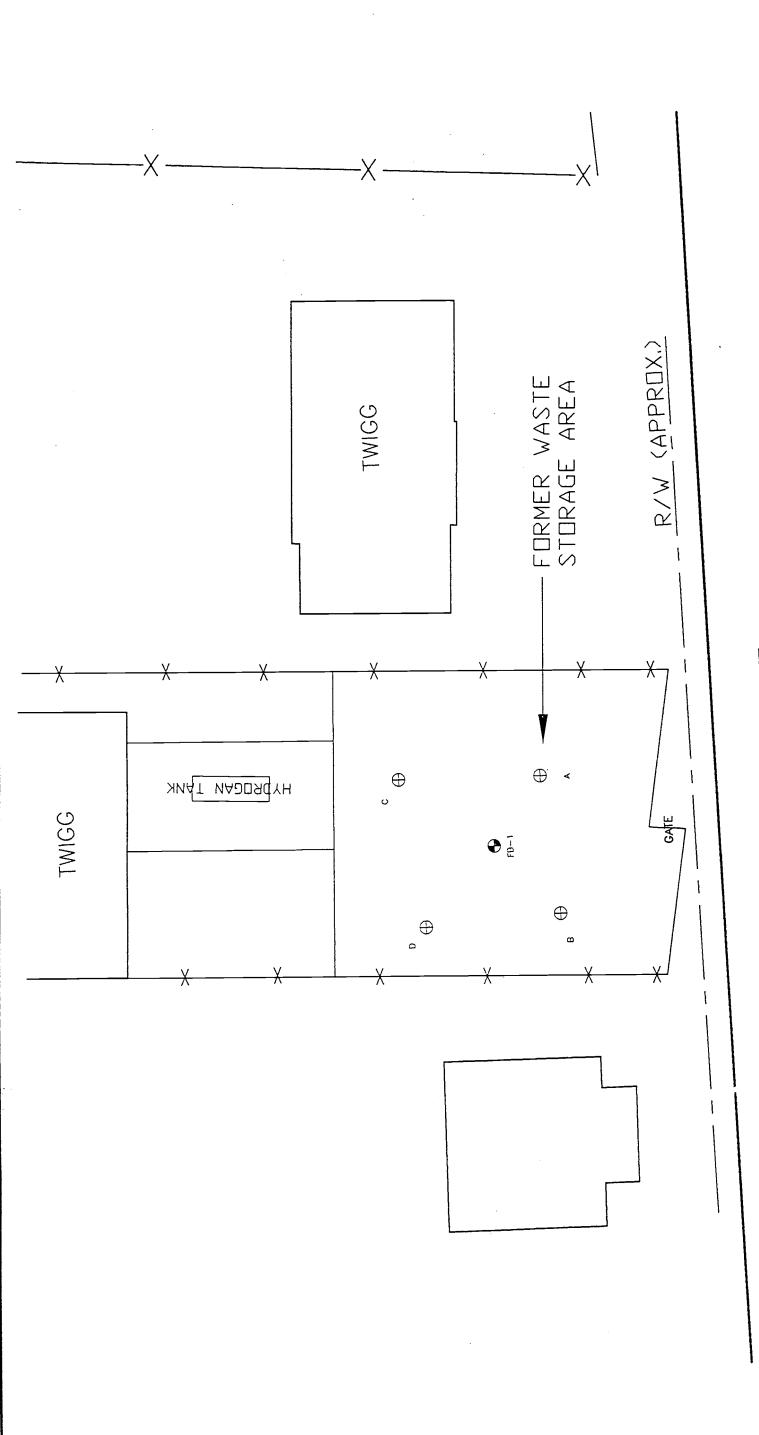




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EAST SOUTH STREET



LEGEND

BORING LOCATION

MONITORING WELL
LOCATION

BRUCE CARTER ASSOCIATES, LL.C. 7403

BCA 6330 E. 75th SUITE 300

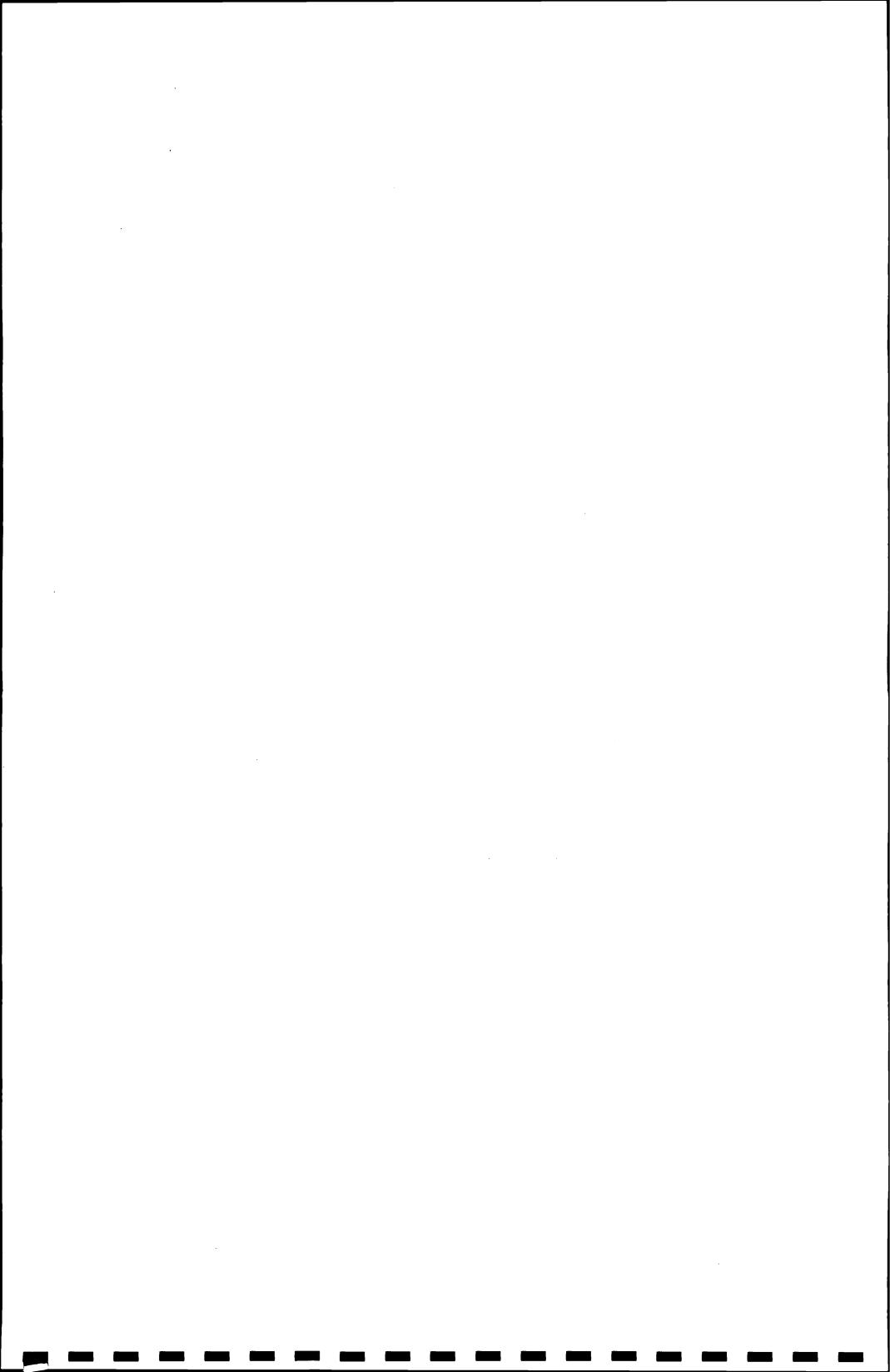
BCA 110/22/98 1 = 20

FURMER WASTE STURAGE AREA

TWIGG CORPORATION MARTINSVILLE, INDIANA

FIGURE

3



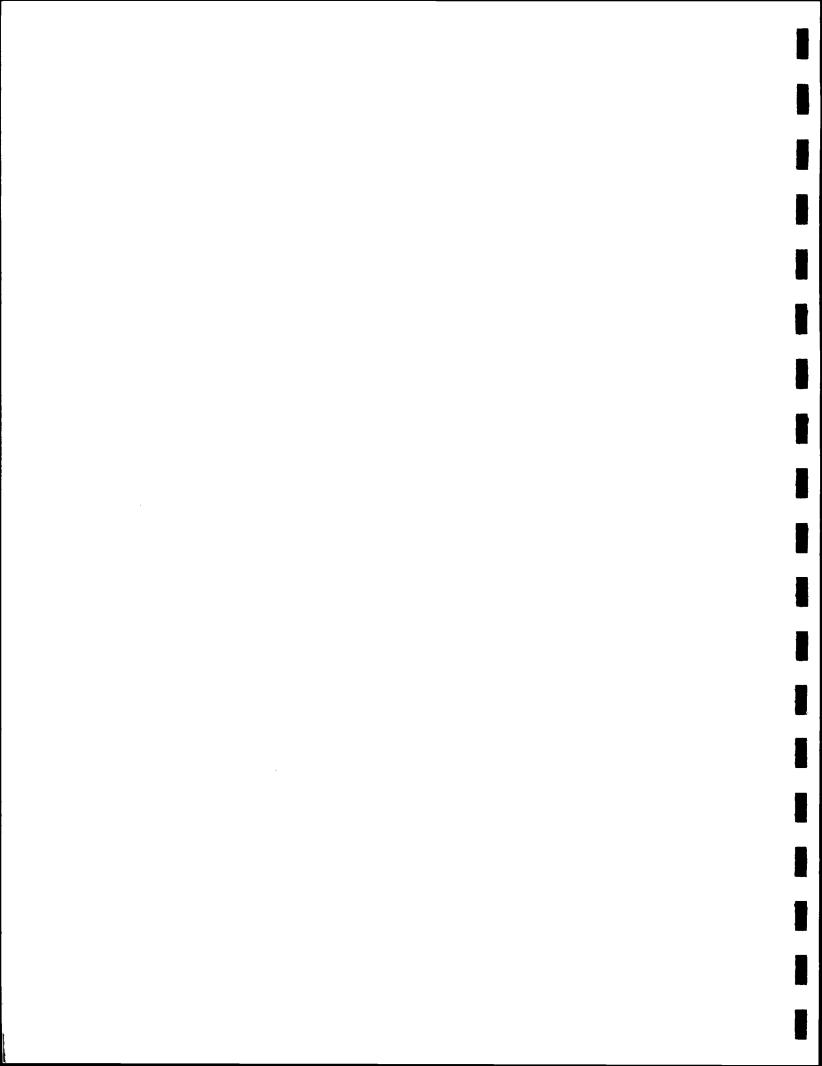
EMERGENCY PHONE NUMBERS

Police See Page 5 for other numbers and directions Location 625 York GArea West
Street Address SITE SAFETY PLAN Project No.: Twice Corp. - Martinsville, IN
Project No.: 7403 1997-98 BRUCE CARTER ASSOCIATES, L.L.C. Indianapolis, Indiana

Prepared by: John Kilmer Su Eng (name) (position)

Approved by: DRossell Faulow Pit Safety Mann (name) (position)

Date:



THE SITE SAFETY PLAN MUST:

- 1. Describe the known hazards and evaluate the risks associated with the incident and with each activity conducted.
- 2. Describe requirements for an environmental surveillance program.
- 3. Delineate work areas.
- 4. Describe Levels of Protection to be worn by personnel and delineate specific job functions.
- 5. List key personnel and alternates responsible for site safety, response operations, and protection of the public. In addition, list key personnel and alternates of public and private organizations who could become associated with the response.
- 6. Establish procedures to control site access.
- 7. Describe decontamination procedures for personnel and equipment.
- 8. Establish site emergency procedures.
- 9. Address emergency medical care for injuries and toxicological problems, as well as routine medical.
- 10. Specify any routine and special training required for responders.
- 11. Establish procedures for protecting workers from weatherrelated problems.

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SITE SAFETY PLAN

SITE	DESCRIPTION
Loca	tion: 625 E. York and aveas to the west or
E	South St, & E. Excamore Et.
Addr	·
Topo	ographical Features: Essentially flat
	in du strid
Pres	ent Land Use: Site is melet fabric Arras west are resident
	counding Land Uses: Residential except Harmon-Motive
	tached residential
Site	e Owner: Twigg
Owne	er Address: Same
Owne	er Contact: Ralph Heitner
	ephone Number: 3/7-342-7/26
	conditions: Industrial. Off-ste = Residential.
Site	e Conditions: <u>Industrial</u> . Utt-ste = hestential.
Site	Communication System: Oval /phones
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3.	ENTRY OBJECTIVES/TYPE OF WORK		•
	RI/FS Investigation	· .	
	Direct Prive Probing, Dvilling, God	Wtr Sampling,	Site/Area
	Recongissance		
	necondition (e)		
С.	BRUCE CARTER ASSOCIATES FARLOW ENVIRONMENTAL'S ON-SITE AUTHORIS	TY/RESPONSIBILITY	
	Prime Contractor	QA/QC Oversite _	
	Sub-Contractor	Other	_ (define)
	Technical Consultant		
D.	PROJECT ORGANIZATION		
	Project Manager:	Kilmer	
	Project Safety Office:	11 Farlow	
	On-site Supervisor/Engineer: T, K, I MG	er/DR Faulow	
	Field Team Members:	· •	
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E.	OTHER PARTIES (ON-SITE OR REGULATO	PRY	
		Company/Agency Innovative Probing Sol	Rep. Name	Phone 616 - 444 - 7900
	Contractor(s):	Soil Explanation Service Earth Exploration	es d	317 - 273 -1690
	Federal:	N/A		
	State:	N/4		
	Local:	NA		
.	CITE COMMON			
F.	SITE CONTROL			
	i	s Control Person an	d Method: Un- 3	ite supervisor
	Control = ve	vtel.		
	Site Map: Atta	ched site map c	learly showing	site control areas
	(Exc	lusion Zone, Contam	ination Reduction	Area, Hotline, Outer
	Cont	rol Line, Decontami	nation Corridor,	Support Area).
Site	Control Bounda	ry Field Marking By	7:	
Zone/	'Boundary		Marking Method	
Suppo	ort Area:			
Oute	Control Bound	ary:		
Decor	ntamination Area	a:		
Hotl	ine:			·
Excl	ısion Zone:	Probing - 1	>vill Head/Well	Head immediate
		avea.		

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INSERT PAGE 6 - G. CHEMICAL HAZARD EVALUATION

Soit-only shallow soil in waste storage area is

Chlorinated VOCs

compounds include PCE, TCE, c-DCE, TCA, DCA, 4-DCE. Some are suspected carcinogens. Potential exposore to site workers through the breathing of evaporated vapons. Volatilization the from soil and groundwater minimal due to the small quantities of soft in volved. [CVOCs have worning properties (odor) and can be detected w/ a PID far below OSHA PELS.

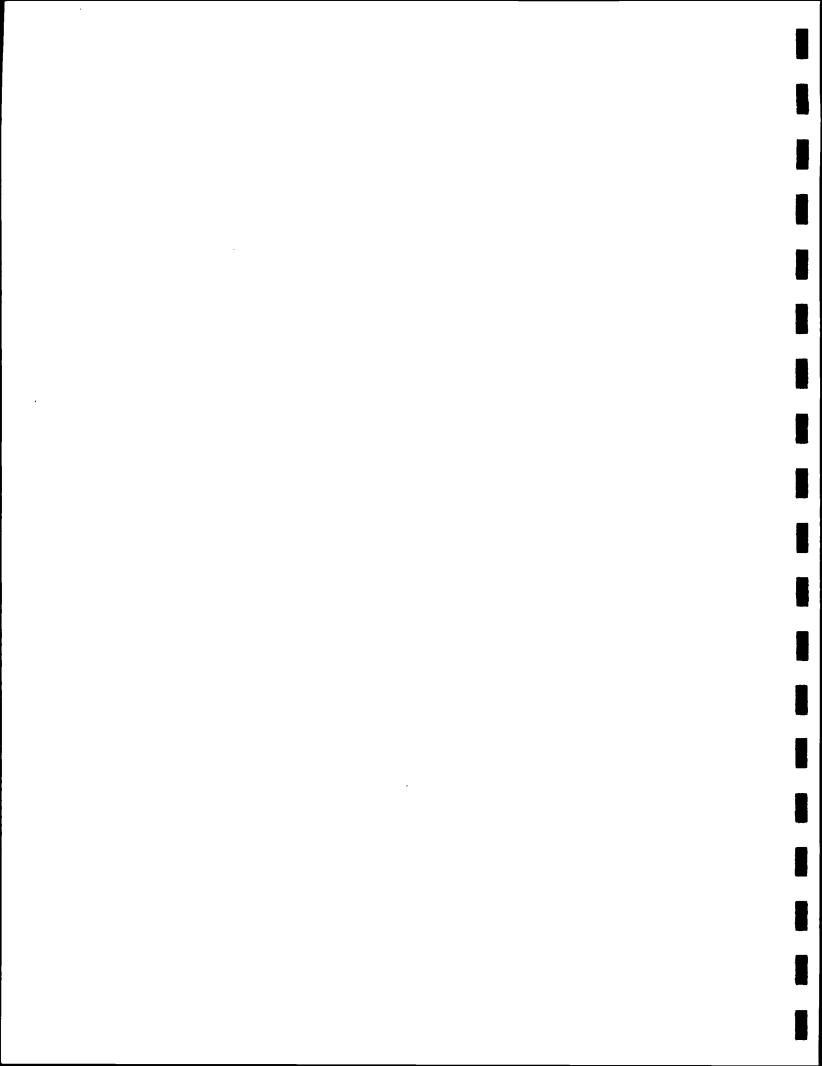
Motals

the waste storage area. Potential exposure may occur thro ingestion/breathing of dost. Pb, Cd & Cv concentrations are only slightly elevated, therefore the exposure visk is minimal. To further reduce exposure, minimal work in storage area during dusty conditions.

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H. PHYSICAL HAZARD EVALUATION

<u> Hazard</u>	Present (?)	Explanation
Electrical:	Yes	Drilling - overhead wives.
Excavation:		
Overhead:	N_o	
Confined Space:	No	
Heat Stress:	Yes	Minor Loving hot man sommer
Cold:	<u> Yes</u>	Minon during winter
Equipment:	Yes.	Probing Eduilling equipment
Drowning:	No	
OTHER:	No	
-		· · · · · · · · · · · · · · · · · · ·
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I. PERSONAL PROTECTIVE EQUIPMENT TO USE

Location	Job Function	Leve	l of	Protec	tion
A1/	Probing	A	В	С	(D)
All	Drilling	A	В	С	\bigcirc
All	6 W sampling	A	В	С	\bigcirc
All	Site Reconaisse	ance A	В	С	(D)
		A	В	С	D
		A	В	С	D
<u> </u>		A	В	С	D
		A	В	С	D
Level A:	ominated soils and GW in the for them is pecific Pi	Level			
	t .	NA	Δ.		
NA					
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		<u> </u>			

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	Level D: (hear glores Havd hat, & boots, - dv:11 head
Level C:	Level D:
NA	Have hot & boots - drill head
	é probe head
	Work clothes - All
· .	Inner gloves - when handling
	heavily contaminated soil
Other:	
MONITORING PROCEDURES (If required	d by the Project Leader)
Monitoring the site for identity a in all media:	and concentration of contamination
	· · · · · · · · · · · · · · · · · · ·
PID monitoring of soil a	rs veguired by on-site
suger visor	
·	
	-
Medical monitoring procedures for	evidence of personnel exposure:
NA	•
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Personnel monitoring procedures (chemicals and heat stress):
Chemicals - monitor soil w/ PID doving drilling act
Chemicals - monitor soil w/ PID doving drilling act. Heat - Keep plenty of fluide, monitor for early signs
Heat - there plenty of fluide, monitor for early signs
of heat stress
DECONTAMINATION AND DISPOSAL
Disposal Procedures (contaminated personnel, surfaces, materials, instruments, equipment, etc):
Drum soil & GudWti from contaminated locations. Press
wash drilling equipment. & soap and water for other
exposed surfaces and personnel
Disposal Procedures (contaminated equipment, supplies, disposables, washwater):
brunned Soil & GudWtr - hold for store of Twice for treatment w/
Gloves & misc trash - dispose with negular trash
EMERGENCY PROCEDURES
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In the event of personnel exposure (skin contact, inhalation, ingestion):
Contact hospital for extrem
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In the event of personnel injury:
Call Hospital/FMS
In the event of potential or actual fire or explosion:
Call Fire Department
In the event of potential or actual ionizing radiation exposure: N/A
1 .
In the event of environmental accident (spread of contamination outside sites):
Soil- sharel into droman.
Soil- shovel into dromas. Water - N/4
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М.	EMERGENCY	SERVICES	(Complete	here	or	have	separate	list	available
	on-site)								

•	
Location	<u>Telephone</u>
Emergency Medical Facility	
Morgan Co Hospital	342-8441
2200 John R Evooden	
Ambulance Service	
Roral Metro Amb. Suc.	800-539-2614
Roral Metro Amb Suc. Main é Gartield	
Fire Department	
Washington Town	342-6614
Martinerille City Fine Rept	
59 So. Vetterson	
1	
Police Department	
Martinsville Police Pept	¥-342-6614
59 So. Jefferson	
Poison Control Center	
I65 & 215+ St.	800-382-9097
Methodist Hospital	
Indonasdis In 46206	

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PERSONNEL POTENTIALLY EXPOSED TO HAZARDOUS SUBSTANCES Personnel Authorized to enter site No Entry Restrictions 2. 3. 4. 5. Other personnel assigned to handle hazardous substances (decontaminated, analyze samples) BEA Staff and subcontractors 2. 3. 5. ALTERNATIVE WORK PRACTICES (Describe alternative work practices not specified in this Chapter. Indicate work practices specified in the Chapter for which proposed alternative work practices will serve as substitute). SITE SAFETY PLAN AMENDMENTS/REVISIONS Amendment 1: Amendment 2:

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Amendment 3:

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Indiana Department of Natural Resources

Nature Preserves 402 W. Washington Street W267 Indianapolis, IN 46204-2748 PH: 317/232-4052 FAX: 317/233-0133

October 8, 1998

Mr. John W. Kilmer Bruce Carter Associates, LLC 6330 E. 75th Street, Suite 300 Indianapolis, IN 46250

Dear Mr. Kilmer:

I am responding to your request for information on the endangered, threatened, or rare (ETR) species, high quality natural communities, and natural areas documented from a project site in Martinsville and Sartor Ditch to Indian Creek in Martinsville, Morgan County, Indiana. The Indiana Natural Heritage Data Center has been checked and there are no ETR species and significant areas documented from this project area.

The information I am providing does not preclude the requirement for further consultation with the U.S. Fish and Wildlife Service as required under Section 7 of the Endangered Species Act of 1973. You should contact the Service at their Bloomington, Indiana office.

U.S. Fish and Wildlife Service 620 South Walker St. Bloomington, Indiana 47403-2121 (812)334-4261

At some point, you may need to contact the Department of Natural Resources' Environmental Review Coordinator so that other divisions within the department have the opportunity to review your proposal. For more information, please contact:

Larry Macklin, Director
Department of Natural Resources
attn: Stephen H. Jose
Environmental Coordinator
Division of Fish and Wildlife
402 W. Washington Street, Room W273
Indianapolis, IN 46204
(317)232-4080

Please note that the Indiana Natural Heritage Data Center relies on the observations of many individuals for our data. In most cases, the information is not the result of comprehensive field surveys conducted at particular sites. Therefore, our statement that there are no documented significant natural features at a site should not be interpreted to mean that the site does not support special plants or animals.

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Due to the dynamic nature and sensitivity of the data, this information should not be used for any project other than that for which it was originally intended. It may be necessary for you to request updated material from us in order to base your planning decisions on the most current information.

Thank you for contacting the Indiana Natural Heritage Data Center. You may reach me at (317)232-4052 if you have any questions or need additional information.

Sincerely,

Ronald P. Hellmich

Indiana Natural Heritage Data Center





Bruce Carter Associates, L.L.C.

ENVIRONMENTAL CONSULTANTS

AIR • WATER • SOLID WASTE • OSHA • REMEDIATION SERVICES

October 05, 1998

Mr, Ron Hellmich DNR Division of Nature Preserve 402 W. Washington Indianapolis, IN 46204

Dear Mr. Hellmich:

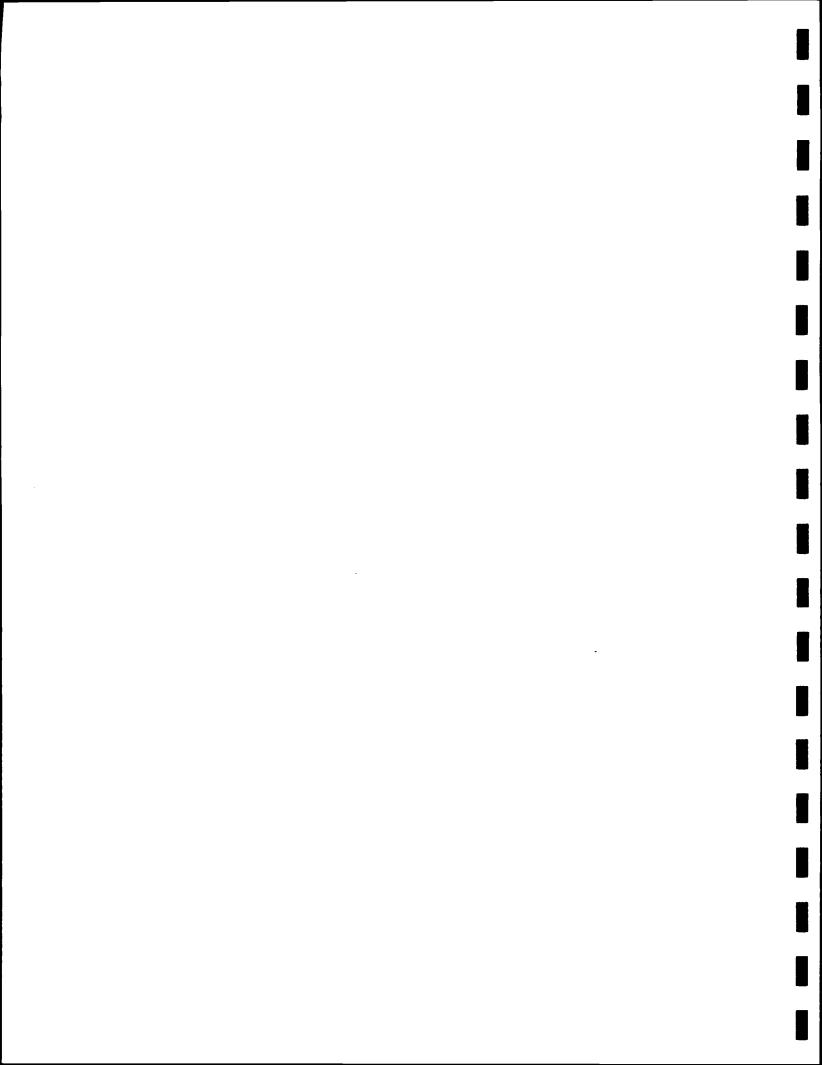
This is to request a database search for endangered, threatened, or rare species, high quality natural communities and high quality natural areas at sites in and near Martinsville, Morgan County, Indiana. The site includes an area in Martinsville and Sartor Ditch from Martinsville to Indian Creek. (See attached USGS map).

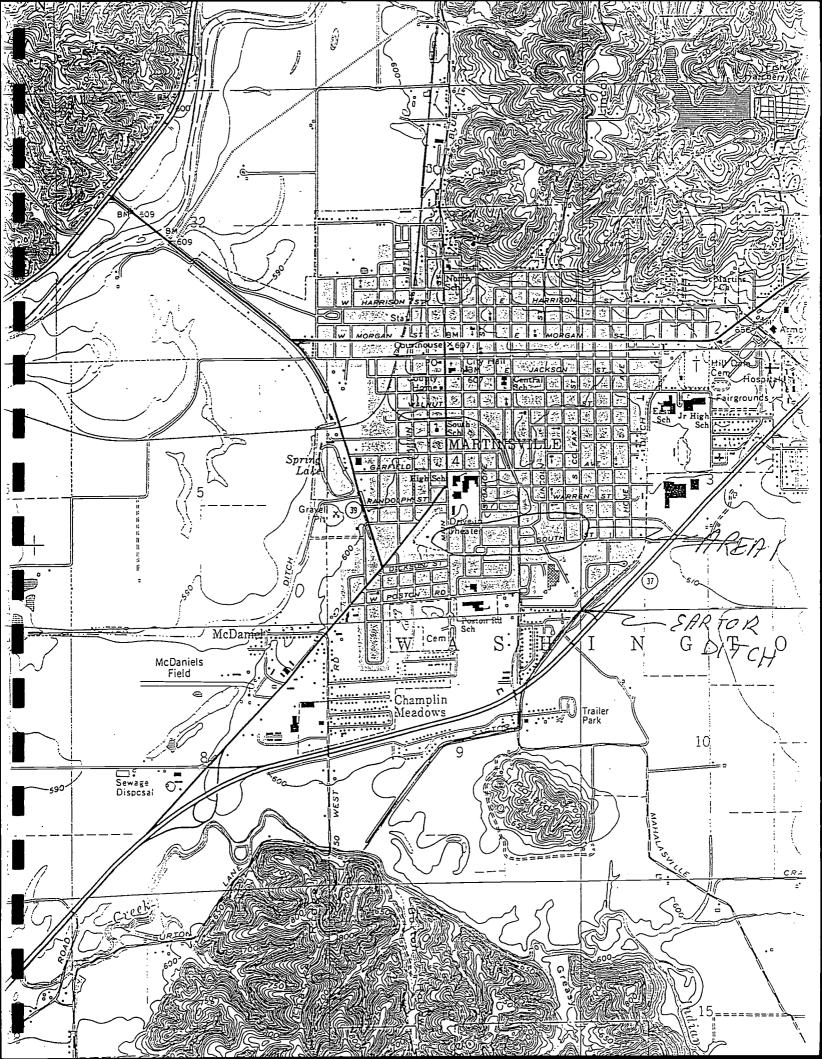
This is part of a larger report with an October 30 deadline. I need your information by October 14, if possible. Fax results when they are ready (578-4250). Please call if you have any questions (578-4233).

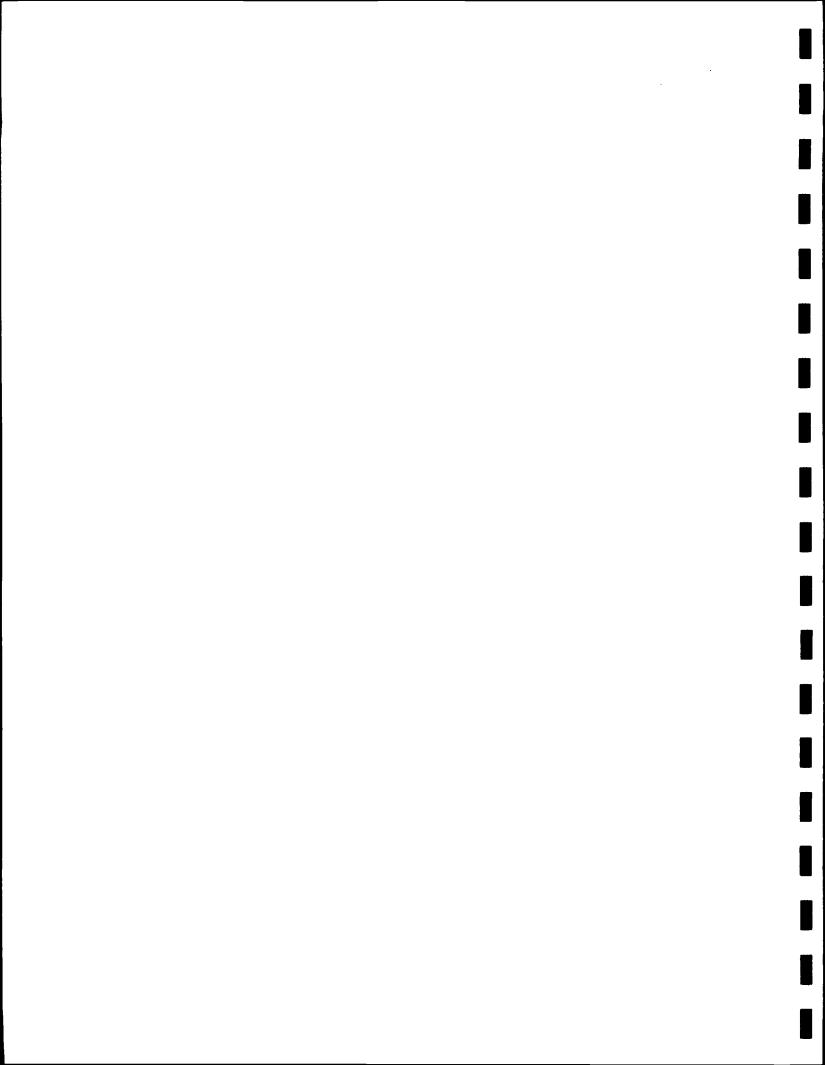
Very Truly Yours

Bruce Carter Associates, L.L.C.

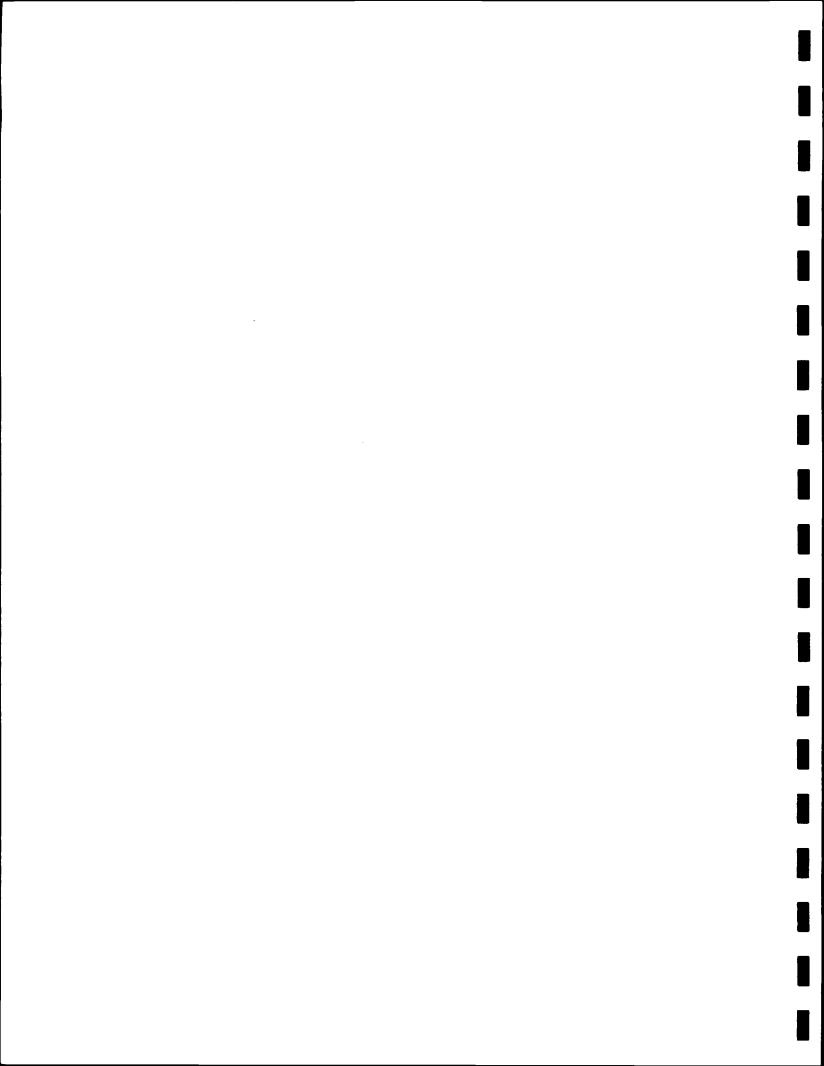
John W. Kilmer Senior Engineer



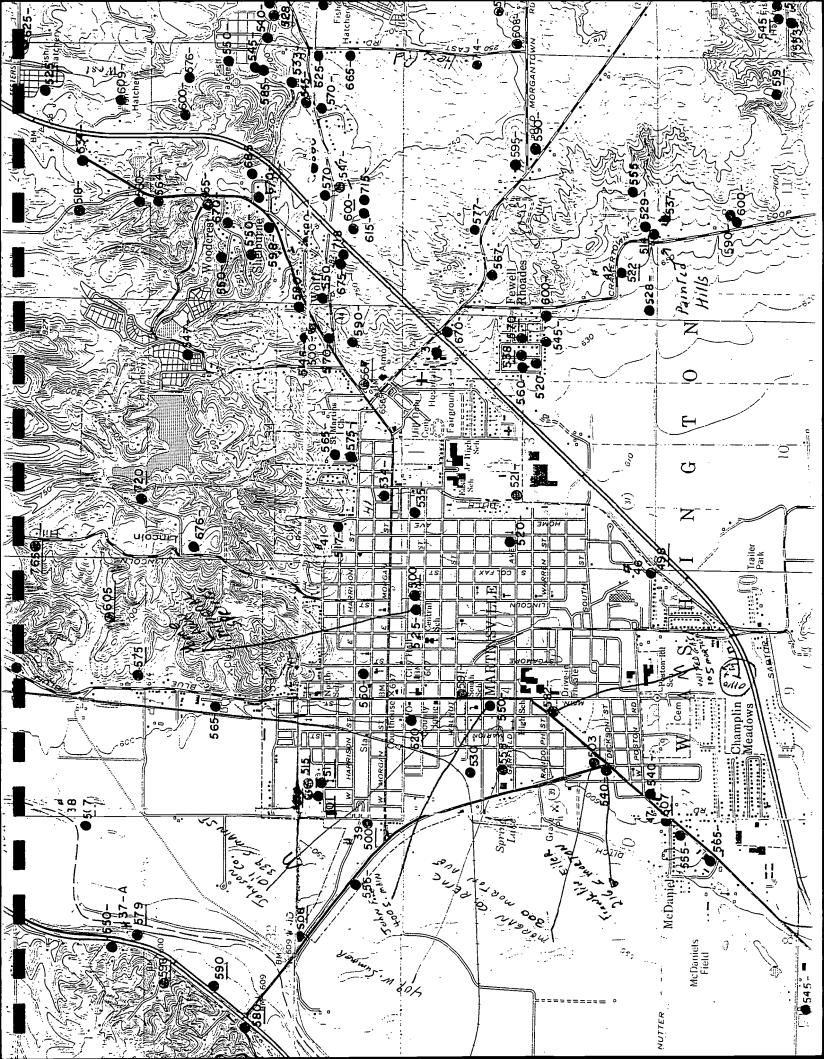


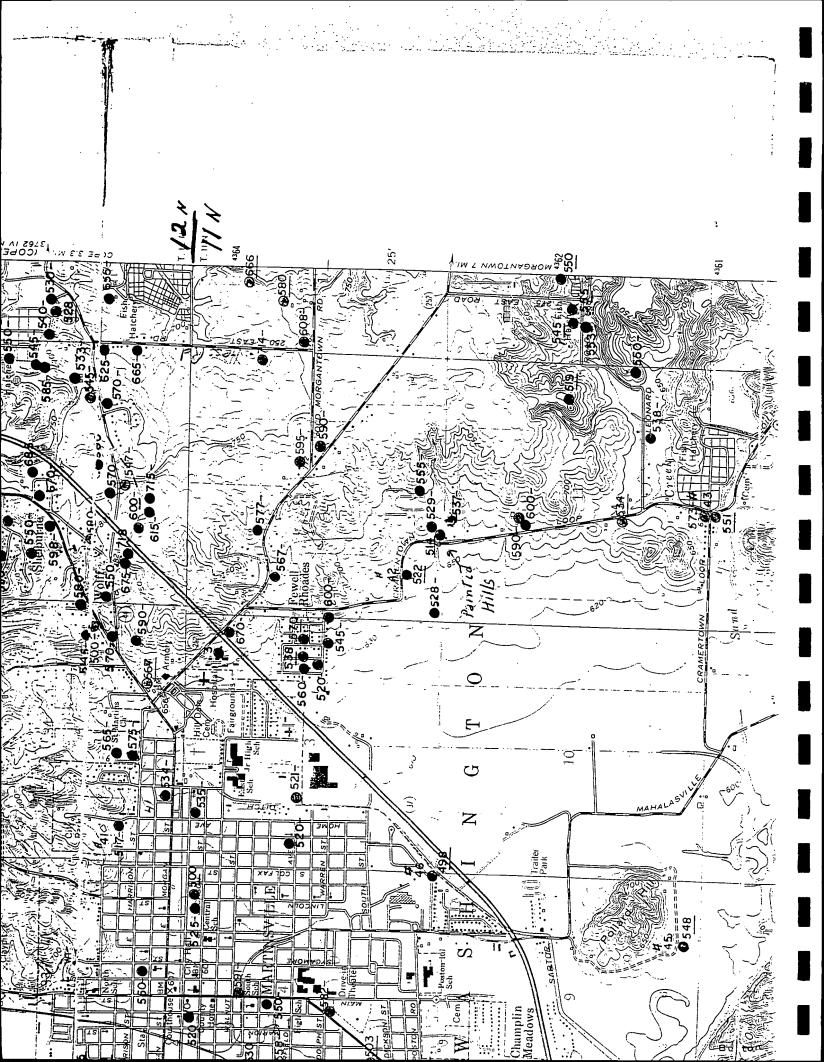


From "National Wettands Inventory Map"
US Fish and Wildlife Service Area 1 - 1/2 acre, PFOIA (Lacustvine, Forested, Broadleaf, Temporarily Floded, Prea 2 - 1/10 acrea, PEMC (Lacustrine, Emergent,
Seasonally Flooded) Indian Creek- R2UBH (Riverine, Lower Perennial, Unconsolodated Bottom, Permanently Flooded)











WELL LOCATION (Fill in completely)

County where drilled Morgan Civil Township Washing ton

Driving directions to the well location (Include county road names, numbers, sub-

divisions, lot number with consideration to intersecting roads and trip origination) There is space for a map on reverse side.

In martinsville 300 Morton ave.

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ļ		CONST	RUCT	ION	DETA	AILS		
	Type of well: Drilled	Gravel pack	□ Dr	iven		Other		
1	Use of well:			•				
	☐ Home	□ Industry				☐ Irrigation		,
	Public supply Method of drilling	y Stock	X Oti	her (s	pecify)	geothe	rm	<u>a/</u>
		ig: ☑ Rotary ☐ Jet	t 🗆 R	ev. r	otary	☐ Bucket rig		
П	Sasing length				meter			/
'[\		feet	ŀ			1	inches
.[Screen length			Dia	meter		·	/ `
IL	\		feet					inches
1 8	Screen slot size			Tota	al depti	h /		
1	Depth of pump s	etting						
	} ~							
'	ype of pump				7			
	Submersible	Shailow-	□ Dee	p-we	ર્શા (Other (specify)		
•			7					
		WELL	CARA	CITY	TEST	r		
•	check one)			$\overline{}$				-
_	Bailing	Pumping].
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_	epth to water)					\		feet
W	ater quality (cle.	ar, cloudy, odor, et	tc.)					/
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Mail completed record within 30 days to: DIVISION OF WATER INDIANA DEPARTMENT OF NATURAL RESOURCES

2475 DIRECTORS ROW INDIANAPOLIS, INDIANA 46241 PHONE (317) 232-4160

. •			
OWNER - CONTRACT	TOR		
Morgan County RE	me		
Address	·····		
300 Morton Ave. Mart.	nsville	IN	
Address			
Drilling contractor			_
Joseph Huser Services	Inc.		
		,	_
5728 S. Emerson Ave.	1 no	pls.	
Jor Husen, SHAWN CONEY, F	(EUIN M	, CKEA.	<i>و</i> د
6/88			
Greathermal wells - all	Simila		
WELL LOG			
Formations: type of material	From	То	
TOPSOIL / CLAY	O ft.	11	ft.
/	 		

CIAY, SAND, GRAVEL 11 GREY SHALE, SOFT 98

(Additional space for Well Log on reverse side)

FOR: ADMINISTRATIVE USE ONLY

01-01

15153

	(Well driller does not fill out)	u) 01-01 15155	
County My	Rge.		
Topo map		NM × NS	V S S S S C
	Ft. W of EL	evation (20)	Subdivision name
By Date 5-24-93	300 Ft. N. of St.	- 1	Lot no.
By Date	1 0 0 Ft. E of WL Bedrock elevat	levation 503 (4362 GOON
To the live to the	Ft. S of NL	vation	3018813

					of building	over 10 yeass /of south	location inells covered	REMC employee	well ver find by	Eormations: type of material	WELL LOG (Continued from front side)
									-	Fom	ide)
	,					:			f#	70	

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SKETCH SHOWING LOCATION

Locate with reference to highways, intersecting county roads, and distinctive landmarks.

UTM NORTH 4362900 M EAST 5488/0 **COMMENTS MC 503

DIVISION OF WATER RESOURCES INDIANA DEPARTMENT OF CONSERVATION 311 WEST WASHINGTON STREET INDIANAPOLIS, INDIANA



INFORMATION ON WELL LOCATION
County in which well was drilled: May Civil Township: Washington
(Ongressional tarmaking
Range: Number of section: Describe in your own words the well location with respect to nearby towns, roads, streets
or distinctive landmarks: Ly Mill South west of get 39 and 37 Highway
at Daine Coulers
con y species
C = 000
Name of owner: Marshine ile- Address 2/6 & Marion & Die Tirsville
Name of Well Drilling Contractor: Paul and
Address: Martinsuille und
Name of Drilling Equipment Operator: Paul Carrot
Completed depth of well:
Completed depth of well: 65 ft. Date well was completed: 3-4-61
Diameter of outside casing or drive pipe: 4 od Length: 42'
Diameter of inside casing or liner:Length:
Diameter of Screen: Jength: 5.25 Slot size: # 6 Shop
Type of Well: Drilled 🗹 Gravel Pack 🗌 Driven 🗌 Other
Jse of Well: For home For industry For public supply Stock
Method of Drilling: Cable Tools Driven Rev. Rotary Jet Driven
Static water level in completed well (Distance from ground to water level)
Pailer Test: Hours tested Rate Rate
umping Test: Hours tested 3 Rate g.p.m. Drawdownft. (Difference between static level and water ft. level at end of test)
Signature Paul Amor
Date
FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

This Water Well Record form is designed to record the most essential data concerning a water well. We request that you be as accurate as possible in recording this information as it may be of great assistance in the planning and development of new water supplies.

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REMARKS:

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted within thirty days after the completion of a well to the Division of Water Resources, Indiana Department of Conservation, 311 West Washington Street, Indianapolis, Indiana.

DIVISION OF WATER RESOURCES
INDIANA DEPARTMENT OF CONSERVATION
609 STATE OFFICE BUILDING
INDIANAPOLIS, INDIANA 46209
MElrose 3-6757

Martinsville Test for #1 Well

		ON WELL LOCAT		and the second of the second o
County in which well was di	rilled: Morno	Civi	1 Township: Na	li-To
Congressional township:	111	15		0
	(Fill in as comp	Letely as possibl	Number of se Le)	ection:
Describe in your own words				ls, streets
or distinctive landmarks:	Sault Me	elberg SI	by Til	e bulle
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			1.101.11	
	ill Wille	Test for A	and the second	
Name of lowner: Martins		Address	Martinson	
Name of Well Drilling Contr	actor: Jone	World		
Address:				**************************************
		0		
Name of Drilling Equipment (Uperator: / 0-2			7-
	INFORMAT	ION ON THE WEI	LL	
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Diameter of inside casing or				
lameter of Screen:	Length:		Slot size:	
ype of Well: Drilled V	Gravel Pack =] Driven 🗍	Other	
selof Well: For home	For industry :	Tror public	supply Ditest's	tock 🗍 ≒
ethod of Drilling: Cable				Driven
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WATER WELL LOG				
FORMATIONS (Color, type of material, hardness, etc.)	From	То	0. σ	COUNTY
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gravel	10	15	assific located ed rificat	ille
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gravel	53	60	Date Date Date	Well Well
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This Water Well Record form is designed to record the most essential data concerning a water well. We request that you be as accurate as possible in recording this information as it may be of great assistance in the planning and development of new water supplies.

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As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted within thirty days after the completion of a well to the Division of Water Resources, Indian Department of Conservation.

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DIVISION OF WATER RESOURCES INDIANA DEPARTMENT OF CONSERVATION 609 STATE OFFICE BUILDING INDIANAPOLIS, INDIANA 46209 MElrose 3-6757

Martinsvill #
2 Drilled

INFORMATION ON WELL LOCATION
County in which well was drilled: Morgon Civil Township: Washington
Ingressional township: // Range: Number of section:
Describe in your own words the well location with respect to nearby towns, roads, streets
distinctive landmarks: South Mulberg St. morth side
1) Tracks in back of The DT 1 PO-
1) Though in back of \$ 2 shap 75 from Plant
25 from Centa of rood :
Name of owner: Milliamill W/M #12 Dullal Address: Minimall
Name of owner: Malhamille 17:11 Address: Malinaville
me of Well Drilling Contractor: Frank Mollhum
Address: Dilings
Name of Drilling Equipment Operator: Pooly
INFORMATION ON THE WELL 7-10
Completed depth of well: 98 ft. Date well was completed: 1940
ameter of outside casing or drive nine: 4/2 7/1
Tameter of outside casing or drive pipe: 46-26m. length:
Diameter of inside casing or liner: Length:
rameter of Screen: 26-2 Length: 25 ft. Slot size: #6 # # 46
pe of Well: Drilled X Gravel Pack □ Driven □ Other
secof Well: For home For industry For public supply (2) Stock
chod of Drilling: Cable Tools 🖸 Rotary 🔘 Rev. Rotary 🔘 Jet 🗍 Driven 🗍
tatic water level in completed well (Distance from ground to water level) 20 lat ft.
ailer Test: Hours tested Rateg.p.m. Drawdown ft. (Difference between
static level and water piping Test: Hours tested 9 Rate 2/00 g.p.m. 17 ft. level at end of test)
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1 0 0 F 2 14-44
1944 (Signature J. 9. 1 Mes 2/595-
FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET 21-5-64
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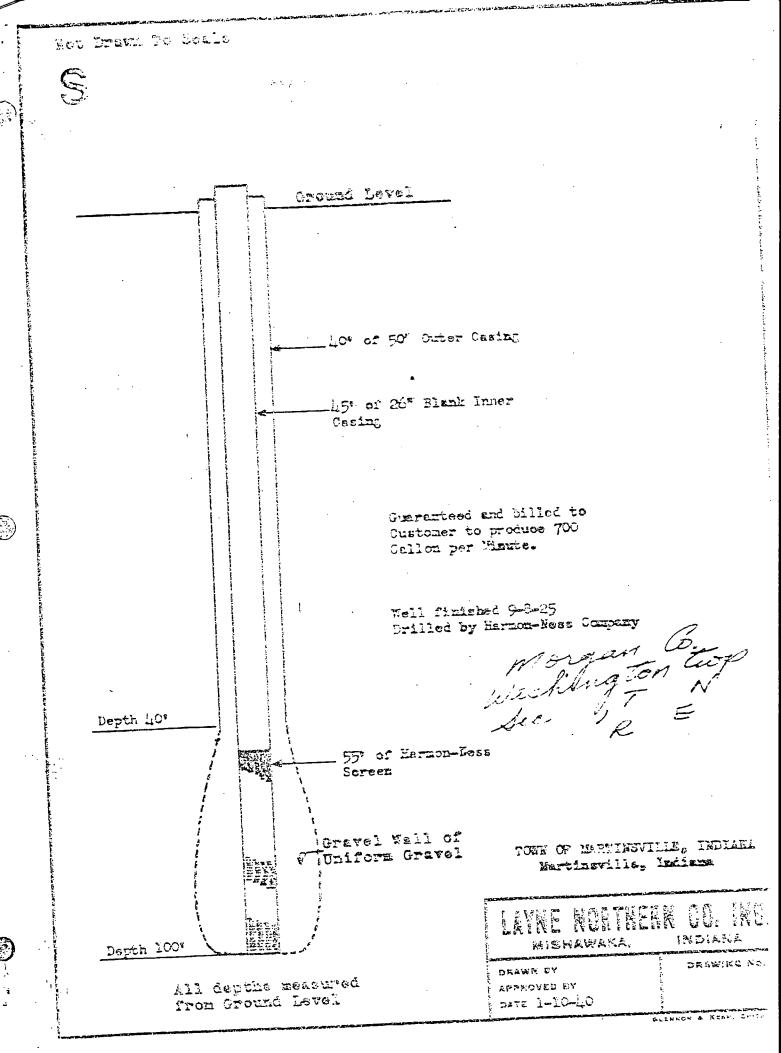
This Water Well Record form is designed to record the most essential data concerning as water well. We request that you be as accurate as possible in recording this information as it may be of great assistance in the planning and development of new water supplies.

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Please include all information possible in the space provided for well location.

As specified in Chapter 6 of the Acts of 1959, a copy of this report must be submitted within thirty days after the completion of a well to the Division of Water Resources, Indiana

Department of Conservation.



DIVISION OF WATER RESOURCES INDIANA DEPARTMENT OF CONSERVATION 311 WEST WASHINGTON STREET INDIANAPOLIS, INDIANA



WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which wall was drilled Maraga
County in which well was drilled: Margare Civil Township: Mashington
Congressional township: Range: Number of section: (Fill in as completely as possible)
Describe in your own words the well location with respect to nearby towns, roads, streets
or distinctive landmarks: thilled for south side shaping center at
south west edge of mortinbulle gunctions of 39 and 37
Highwort
Name of owner: Sam Kapan Address: South side shoping centr
Name of Well Drilling Contractor: Aud Comps
Address: A of a Martinille And
Name of Drilling Equipment Operator: Faul Carret
INFORMATION ON THE WELL
Completed depth of well: 67 ft. Date well was completed: Ach 11-61
Diameter of outside casing or drive pipe: 6 dd Length: 6/
Diameter of inside casing or liner: Length:
Diameter of Screen: Slot size: 50
Type of Well: Drilled Gravel Pack Driven Other Shiping Certs, and Sounds
Use of Well: For home For industry For public supply Stock
Method of Drilling: Cable Tools 🔀 Rotary 🗌 Rev. Rotary 🗋 Jet 🗍 Driven 🗍
Static water level in completed well (Distance from ground to water level)ft.
Bailer Test: Hours testedRateg.p.m. Drawdownft. (Difference between
Pumping Test: Hours tested 4 Rate \$2 g.p.m. Drawdownft. level at end of test)
Signature Saul Annos Date Meh. 11 — led
Date Theb. 11 - 64
FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

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DIVISION OF WATER DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA STATE OFFICE BUILDING

S

STATE OFFICE BUILDING INDIANAPOLIS, INDIANA 46204 Telephone 633-5267 Area Code 317

MINELL

WELL LOCATION (Fill in completely - Refer to instruction sheet)
County in which well was drilled Civil Township Civil Township
Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, lot number, distinction landmarks, etc.
NAME OF WELL OWNER and/or BUILDING CONTRACTOR
Well Owner Address U.S. GEO! OGICAL SURVEY
Building Contractor Address Address INDIANAPOLIS, IND. 46202
Name of Well Drilling Contractor: Name of Well Drilling Contractor:
Address
Name of Drilling Equipment Operator:
WELL INFORMATION Depth of well: 24 Date well was completed: 7/10/75 Diameter of casing or drive pipe: 21/9620 Total Length: 21
Diameter of liner (if used): Total Length:
Diameter of Screen:/ 1/4" Length:3" Slot Size:40
Type of Well: Drilled
Use of Well: For Home For Industry For Public Supply Completed
Method of Drilling: Cable Tools Rotary Rev. Rotary Jet Bucket Rig
Static water level in completed well (Distance from many)
Bailer Test: Hours Tested Page
Pumping Test: Hours Tested Rate g.p.m. Drawdown tt. (Drawdown is the difference between static level and water level at end of test)
Signature
Date

WATER WELL LOG

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From	То	۲	E T	
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DIVISION OF WATER RESOURCES INDIANA DEPARTMENT OF CONSERVATION 609 STATE OFFICE BUILDING INDIANAPOLIS, INDIANA 46209 MElrose 3-6757

INFORMATION: ON WELL LOCATION
County in which well was drilled: Therapa Civil Township:
Congressional township
Congressional township: Range: Number of section: Describe in your own words the well location with
Describe in your own words the well location with respect to nearby towns, roads, streets
for distinction of the streets
or distinctive landmarks: Martinsville Corner of Jackson and
Lawoln Land
AT Jackson 50 L
Name of Well-Drilling Contractor:
Name of Well Drilling Contractor:
Address: White Table 1997 And
Name of Drilling Equipment Operator:
INFORMATION ON THE WELL
Completed depth of well: 25 Ift. Date well was completed: 2/9/5/
Diameter of outside casing or drive pipe:Length:
Diameter of inside casing or liner: Length:
Diameter of Science 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Diameter of Screen: // Length: // Slot size: # 40
Type of Well: Drilled Or Gravel Pack Driven Driven Other
Use of Welling For home (1) To-
Use of Well: For home : For industry : For public supply : Stock :
dethod of Drilling: Cable Tools ☑ Rotary ☐ Rev. Rotary ☐ Jet ☐ Driven ☐
Static Water level in completed well (Did
Static water level in completed well (Distance from ground to water level) /9 ft.
Bailer Test: Hours tested Rate g.p.m. Drawdown ft. (Difference between
rumping Test: Hours tested Rate 217g.p.m. Drawdown 29 ft. level at end of test)
Jeres at end of test)
Signature
Date F

WATER WELL LOG			
FORMATIONS (Color, type of material, hardness, etc.)	From	To	COUNTY Topo M Well 1 Courth Field Acc. w
yellow sand	.0	3/	Map: Map: log thous d loc w/o
brown sticky clay	3/	42	clas e lo ated
ine brown sand	42	63	Sifie cated ficat
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DIVISION OF WATER RESOURCES INDIANA DEPARTMENT OF CONSERVATION 311 WEST WASHINGTON STREET INDIANAPOLIS, INDIANA



WATER WELL RECORD

INFORMATION ON WELL LOCATION

County in which well was drilled: Morgan Civil Township:
Congressional township: Range:
(Fill in as completely as possible) Describe in your own words the well land to completely as possible
Describe in your own words the well location with respect to nearby towns, roads, streets
or distinctive landmarks: 400 South Main Street, Martinsville, Indiana
Name of owner: John Fewell Address: 400 S. Main St., Mart., Ind
Name of Well Drilling Contractor: Paul Amos
Address: R. R. 2 , Box 7, Martinsville, Indiana, 46151
Name of Drilling Equipment Operator:Ed Randolph
INFORMATION ON THE WELL
Completed depth of well: 51 ft. Date well was completed: July 16, 1964
Diameter of outside casing or drive pipe: 5 inch Length: 46 ft.
Diameter of inside casing or liner: Slot (7.5) Diameter of Screen: Cook No 50 floring 71.50
Slot (7.53) Diameter of Screen: Cook No.50 Sength: 71 611 long Slot size:
Type of Well: Drilled X Gravel Pack Driven Other
United the Driven Other
Use of Well: For home For industry For public supply Stock Stock
Used for Laundry Method of Drilling: Cable Tools X Rotary Rev. Rotary Jet Driven
Static water level in completed well (Distance from ground to water level) 15ft.
Bailer Test: Hours tested Rate 20 g.p.m. Drawdown ft. (Difference between
Pumping Test: Hours testedRateg.p.m. Drawdownft. level at end of test)
Signature Acel Chros
Date
FOR WELL LOG SPACE USE REVERSE SIDE OF THIS SHEET

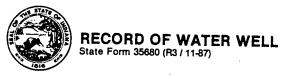
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County where drilled

Civil township

WELL LOCATION

Mali complete record within 30 days to:

INDIANA DEPARTMENT OF NATURAL RESOURCES Division of Water 2475 Directors Row Indianapolis, Indiana 46241 Telephone number (317) 232-4160

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(FIII in completely)	•		

Driving direction to newell location (include county road ames, number, subdivisions lot number with consideration to intersecting, road and trip erigination in the subdivisions to number with consideration to intersecting, road and trip erigination in the subdivisions lot number with consideration to intersecting, road and trip erigination in the subdivisions lot number with consideration to intersecting, road and trip erigination in the subdivisions lot number with consideration to intersecting, road and trip erigination in the subdivisions lot number with consideration to intersecting, road and trip erigination in the subdivisions lot number with consideration to intersecting, road and trip erigination in the subdivisions lot number with consideration to intersecting, road and trip erigination in the subdivisions lot number with consideration to intersecting, road and trip erigination in the subdivisions lot number with consideration to intersecting, road and trip erigination in the subdivisions lot number with consideration to intersecting, road and trip erigination. Name of well construction of the subdivision in the subdivisions lot number with consideration to intersecting, road and trip erigination. Name of well construction of the subdivision intersecting in the subdivision intersecting intersection intersecting intersecting intersecting intersecting intersect	Marth Mart	County where drilled		Civil towns	ship //	Township	Range	Section	
During directions to the well location (include county road names, number, subdivisions to number with consideration to intersecting, read and trip origination to septice to a map on reverse side. **White Cay State** **In State** **Downers** **Downe	Description to the well location (include county road rames, number, subdivisions to number with consideration to intersecting, road and trip origination to a map on reverse along the space for the libration of the space for the space for the libration of the space for the space for the libration of the space for the space for the libration of the space for the space for the libration of the space for the space for the libration of the space for the space for the libration of the space for the space for the libration of the space for the libration of the space for the space for the libration of	Morga	en	Wart	msville		-		
Name of well owner	Name of well owner Name of well owner Name of well owner Name of building contractor Name of different and number, city, states Address (Street and number, city, states) Name of different and number, city, states Name of states and number, city,	Driving directions to	the well location	on (include county ros	ad names, number, subd	visions lot number with consi	deration to intersecting	C road and trip or	igingtion th
Name of well owner	Name of well owner	is space for a map	on reverse side.	11.12	0 / <1			y, road and trip off	gination the
Name of well owner Name of well owner Name of well owner Address (Street and number, city, state) North Associated to the state of	Name of well owner Name of well owner Very feet of the state of the					-·· •			
Name of well owner Name of well owner Address (Street and number, city, state) 10 5 Morten Ave, Murtinsville Name of building contractor Address (Street and number, city, state) 10 5 Morten Ave, Murtinsville Name of duilding contractor Address (Street and number, city, state) 10 5 Morten Ave, Murtinsville Name of drilling contractor Name of drilling c	Name of well owner Name of well owner Very test of the contractor of the contracto		16	os mout	en Ave.				
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										location: NW of store	employee	well yer, field by	material	LL LOG	(continued from front side)	By Date Location accepted w l o verification/by	By Date 5-24-93 Courthouse tocation	Martino	Mongan	County
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w.		:	-	TOMMENTS MC	10	THE NORTH	on other prof	morty on beneather the differ	Here the we	war war		z	(Locate with reference to highways, intersecting county roads and distinctive landmarks.)			Aquifer elevation	Ft. N of St. Bedrock elevation Lot number	602-5+	NE " NE	FOR ADMINISTRATIVE USE ONLY 01-01 15152 (well driller does not fill out)



RECORD OF WATER WELL State Form 35680 (R3 / 11-87)

Mail complete record within 30 days to:

INDIANA DEPARTMENT OF NATURAL RESOURCES
Division of Water
2475 Directors Row
Indianapolis, Indiana 46241
Telephone number (317) 232-4160

(Fill in completely)		<u>:</u>					
	_		WELL L	OCATION			
County where drilled		Civil town	nship	Township	Range	Section	
MORGAN		WAS	MOTANIHI				
Driving directions to t	the well location (visions lot number with con	sideration to intersecting, ro	ad and trip origi	ination there
is space for a map of	n reverse side.			•			
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1.5			OWNER - C	ONTRACTOR			
Name of well owner	a Arey	,		<u>-</u>	·	Telephone N	Number
JOHNSON	CCCC	, V				()	
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i and or conting cont							
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Una at matte	CONSTRUC	TION DETAILS			WELL LOG		·
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10		13,	<u>う</u>				<u> </u>
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	_			<u> </u>	·		<u> </u>
Type of pump	Shallow-well j	et					ĺ
Submersible	☐ Deep-well jet	Other (sp.	ecify):				
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Check one		Test rate		<u>'</u>	<u> </u>		
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GROUTING IN	FORMATION	WELL	ABANDONMENT				!
Grout material	Depth of grout	Seating materia	al Depth filled				
	From To		From To	· ·		_ [<u> </u>
Method of installation	Number of bags	Method of Insti	alla- Number of bags	1			
NIA	used	tion	used	(Additional shape for	well log on reverse side)	:	
I hereby swear or affir	rm under the near	alties for perium	that Signature of owner	of authorized representativ	e \	Date /	
the information subr	mitted herewith is	s to the best of	my / / / / /	11/1/11/11	(N)	12/2	2/9,
knowledge and belie	t, true, accurate a	ina complete.					· / <i>/</i> /

FOR ADMINISTRATIVE USE ONLY 01-01 15154 (well drillight does not fill out)	3 " MS	FI. W of EL $\frac{1}{1000}$ $\frac{1}{1000}$ $\frac{1}{1000}$ $\frac{1}{10000}$ $\frac{1}{100000}$ Subdivision name		FI. E of WL	FI. S of NL Aquifer elevation 591 ()		SKETCH SHOWING LOCATION (Locate with reference to highways, intersecting county roads and distinctive landmarks.)					75/3750	LITTEN NORTH -736 3 10	FAST SYREST	**COMMENTS MC 52/		Thu?	The San Sa		S
FOR AD (well) / Ra			2500	0521	1	FROM TO Feet Feet		· · · · · · · · · · · · · · · · · · ·	-		. 6							-	
	County Waga Township	Topo map With way	Field located (2.7 Date 5-24-93	Courthouse location Date	Location accepted w / o verification by	(continued from front side)	WELL LOG Formations: 13pe of material	(well verified by construction)	worker, wells were ding,	*	New gas station	being bwilt new rells drilled	Tr.21/28/21/48/51#			·				

7-2/2 no Fy 36

DIVISION OF WATER DEPARTMENT OF NATURAL RESOURCES, STATE OF INDIANA

STATE OFFICE BUILDING INDIANAPOLIS, INDIANA 46204

Telephone 633-5267 Area Code 317

WATER WELL RECORD
WELL LOCATION (Fill in completely - Refer to instruction sheet)
County in which well was drilled Morgan Civil Township Washington
Driving directions to the well location: Include County Road Names, Numbers, Subdivision Name, Vot number, distinctive landmarks, etc.
Take 67 to Martinsville Junction 39, Turn left.
Go across R.R. tracks. Turn left at Hook's Drugs.
1st. Street on right corner lot with rock garden
NAME OF WELL OWNER and/or BUILDING CONTRACTOR
Well Owner Leroy Mathana Address 409 W. Summer
Building Contractor Address
Name of Well Drilling Contractor: Ed Randolph Well Drilling
Address P. a.Box 242 Paragon Findiana, 46/66
Name of Drilling Equipment Operator: Ed Randolph
WELL INFORMATION
Depth of well: 40 Date well was completed: 3-14-29
Diameter of casing or drive pipe: 6 // Total Length: 37 feet
Diameter of liner (if used): Total Length:
Diameter of Screen:
Type of Well: Drilled Gravel Pack Driven Other
Use of Well: For Home For Industry For Public Supply Stock
Method of Drilling: Cable Tools Rotary Rev. Rotary Jet Bucket Rig
Static water level in completed well (Distance from ground to water level)
Bailer Test: Hours Tested 30 g.p.m. Drawdown 10 ft. (Drawdown is the difference
Pumping Test: Hours Tested Rate g.p.m Drawdown ft. between static level and water level at end of test)
Signature Edmund & Randupk
$D_{ate} = 3 - 14 - 39$

WATER WELL LO	G 		·	
FORMATIONS (Color, type of material, hardness, etc.)	. From	То	CC To Fig Co	7
Topsoil	0	1	COUNTY MARSIAS Topo Map Marsias Field Located By S Courthouse Location By Location by	X
gellow clay	1	12	ppppp	
gellow sand fine	12	14	Cation ted w	
course sand	19	27	By _ By _	
yellow sand gravel	27	40	ficatio	
			n by	
/ well verified by owner \	-		Date _	
location east 15ft from 1		$-\mathcal{L}$	N Z W	
1 house			24-93	
			RGE. 18 SE OR ALWINISTRATIVE USE ON (Well driller does not fill out) RGE. 18 SE Ft W 73 Ft N C 2000 Ft S o	
			riller d	
			does not	
			Ft W of EL. Ft W of EL. Ft N of SL. 600 Ft S of NL.	
			01-01 SW 4 Ground Depth t Bedrocl	
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UTM NORTH S **COMMENTS			15157 Watton_ id Elevation_ to bedrock_ ck elevation_ er elevation_	
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8 8			Subdivision Name Lot Number	
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Farlow Environmental Engineers, Inc. 8645 Guion Road Suite B Indianapolis, IN 46268 Log of Boring A (19' SE of MW-1) Twigg Corp. Martinsville, Ind. Sheet 1 of 1

Job Number: 7403

Suite B Indianapolis, IN 46268						Twigg		igg Corp.	Job Numbe	Job Number: 7403			
Phone (317) 872-9600 Fax (317) 872-9616 Mart								tinsville, Ind. Elevation:					
Ori	ller: Hasl	kett D rilli	ing					Drilling	Date		Time		
Ori	ll Method	1: 3.25"	iollow St	em Auger				Started	8/08/94	10:47 AM			
Sa	mple Met	hod: Spli	it Spoon					Finished	8/08/94		11:00 AM		
Во	rehole D	lameter:	6" in.	Water	Level:	N/A		Logged By: Sam Niema	n Checke	ed By:			
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descriptio	n				
-	N/A	90	13	1		000	GREY AT	NO WHITE, DRY, POOREY G	RAUEU	<u> </u>		1	
	N/A	90	5	2	1-			MOIST, SILTY SAND (SM)	4			
	N/A	95	3	3	Ė			ROWN AND DARK GRAY, MO	IST, SILTY	-			
•	N/A	95	3	4	2-		SAND (MOIST, SILTY SAND (SM)	/	1 [
					3-]			
•	N/A	70	3 2	5	5-		MEDIUM (SP)	BROWN, MOIST, POORLY G	RADED SAND				
-			-		4-		вотто	OF HOLE AT 4.0 FEET S	SEALED W/	1			
			1		5-		BENTON	ITE UPON COMPLETION					
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Farlow Environmental Engineers, Inc. 8645 Guion Road Suite B Indianapolis, IN 46268 Phone (317) 872-9600 Fax (317) 872-9616

Log of Boring A2 (Offset 1.5' SE of A) Twigg Corp. Martinsville, Ind.

Sheet 1 of 1

Job Number: 7403

Elevation:

Phone (317) 872-9600 Fax (317) 872-9616 Mart							Martins	tinsville, Ind. Elevation:					
Dr	ller: Has	kett Drilli	ng					Drilling		Date		Time	
Dr	il Method	1: 3.25"	lollow St	em Auger				Started	1:	2/12/94		2:00 PM	
Sa	mple Met	hod: Spli	t Spoon					Finished	1:	2/12/94		3:30 P	М
Borehole Diameter: 6" in. Water Level: N/A								ogged By: Derric	k Copsey	Checke	d By:		
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descr	iption				
بيبليينا	N/A N/A N/A N/A	95 95 95 95	11 5 2	1 2 3 4	1-	000	GRAVEL (I DARK BRO' SAND (SM VERY DAR SILTY SAN	K BROWN, MOIST, F	O MEDIUM, S	ILTY IUM,			
سيطيسيلي	N/A N/A	85 90	3 3 4 3	5	3-4-		REDDISH E GRADED S DARK YELI	ILTY SAND (SM) BROWN, MOIST, MED AND WITH SILT (SI OWISH BROWN, MO	DIUM, POORL' P-SM) IST, MEDIUM	_			
سلسط	N/A	80	3	7	5- 6-		POORLY GE	RADED SAND WITH	SILT (SP-S	ім)			111111
	N/A	80	2 3	8	7- - 8-		SAND WITE	IST, MEDIUM, POOF H SILT (SP-SM) F HOLE AT 8.0 FEE					111111
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Log of Boring A3 (offset 2' NW of A) Twigg Corp. Martinsville, Ind.

Sheet 1 of 1

Job Number: 7403

Driller: Haskett Drilling	Drilling	Date	Time
Drill Method: 3.25" Hollow Stem Auger	Started	12/12/94	3:30 PM
Sample Method: Split Spoon	Finished	12/12/94	4:30 PM

Sa	mple Met	hod: Spl	it Spoon					Finished	12/	12/94	4:3	10 PM	
Во	rehole Di	ameter:	6" in.	Water	Level:	N/A		Logged By: Derrick (Copsey	Checked 6	3y:		_
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descript	ion				
E	N/A N/A	95 95	11 5	1 2	1	000	GRADED	U GREY, URY,FINE TO P GRAVEL (GP) VERY DARK BROWN, MO					1
F	N/A	95	2	3	'=		SILTYS	AND (SM)					7
E	N/A	95	1	4	2-		VERY DA	RK BROWN, MOIST, FINE	TO MEDIU	м. /_			4
			3		3-	::::::::::::::::::::::::::::::::::::::	BROWN 1	AND (SM) TO DARK BROWN, MOIST, SILTY SAND (SM)	FINE TO				4
E	N/A	85	3	5	4-		YELLOWI GRADED	SH BROWN, MOIST, MED SAND WITH SILT (SP-S	IUM, POORL	Y /			
	N/A	90	3	6	5		DARK YE POORLY	LLOWISH BROWN, MOIST GRADED SAND WITH SIL	, MEDIUM,				1
E	N/A	80	3	7	6		SAME AS	S ABOVE	-		, ;		1
E					7_								4
	N/A	80	2 3	8	' <u>-</u> 8–		SAND WI	MOIST, MEDIUM, POORLY TH SILT (SP-SM)					1
الإعبيانين الربينانين النبينان بينانين البينان الربينان الربينان الربينان					9- 10- 11- 12- 13- 14- 15- 16- 17- 18-		SAND (8	OF HOLE AT 8.0 FEET I	')				لسيبليه واستراسيا يساييه استاسياسياسياسياسياسيا

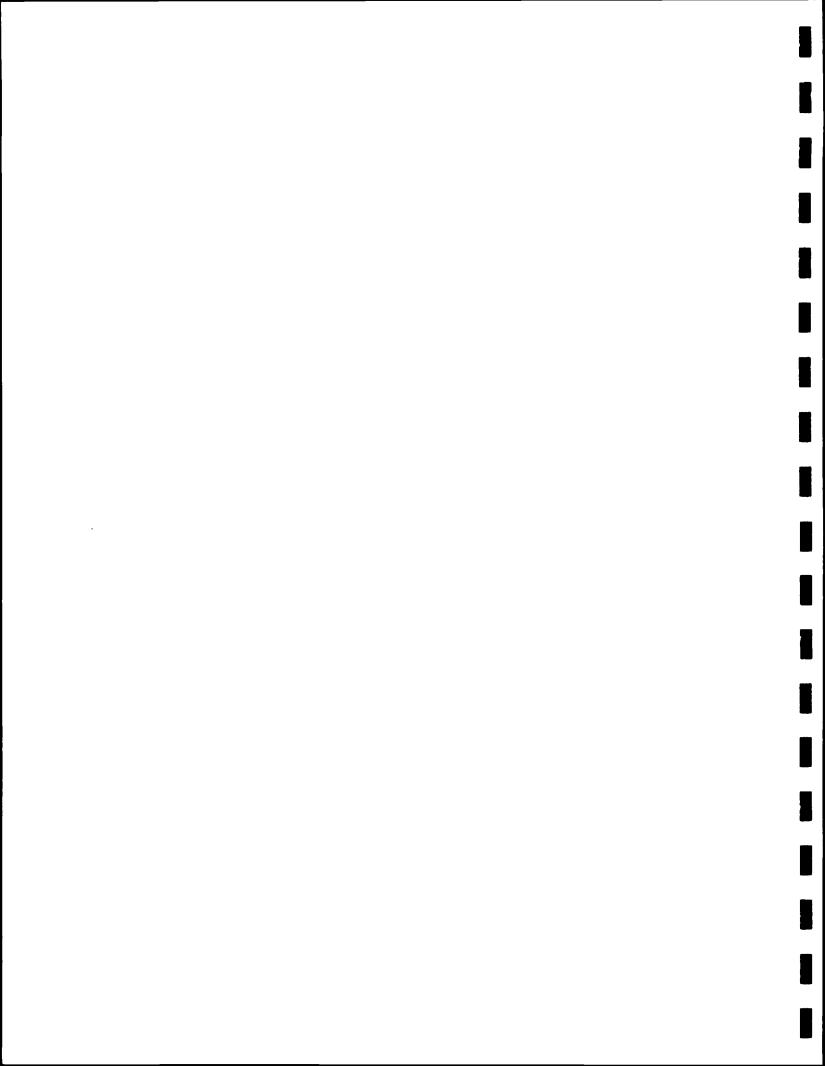
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Log of Boring B (19' SW of MW-1) Twigg Corp. Martinsville, Ind. Sheet 1 of 1

Job Number: 7403

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Driller: Haskett Drilling		Drilling		Date	Time
Drill Method: 3.25" Hollow St	em Auger	Started	8/	08/94	10:30 AM
Sample Method: Split Spoon		Finished	8/	08/94	10:43 AM
Borehole Diameter: 6" in.	Water Level: N/A	Logged By: Sam Niem	an	Checked B	ly:

6- 7- 8- 9- 10- 11- 12- 13- 14- 14-	Sallible M	etilod. op	Spiit Spoon					rinsiled				10.73	
N/A 80 24 1 1 2 1 2 1 3 4 4 5 5 6 6 7 8 9 1 10 11 12 13 14 14 14 14 14 14 14	Borehole	Diameter:	ter: 6" in.	Wate	r Level:	N/A		Logged By: Sam Niema	ın	Checked I	3у:	т т	
N/A 80 11 2 2 1 2 2 3 4 2 3 4 2 3 4 4 4 4 4 4 4 4 4	PID/Syns.*	I	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descriptio	n				
N/A 90 8 3 3 4 2 2 3 3 4 2 3 3 4 3 5 3 4 4 3 5 4 5 3 4 5 5 6 6 7 8 9 1 10 11 12 13 14 14 14 14 14 14 14	_	80	0 24	1	<u>-</u>	V O	LIMESTO	DNE GRAVEL AND SAND, D	RY (SG)	· ·	+	1 1	
N/A 90 8 3 3 4 2 2 3 3 4 2 3 3 4 3 5 4 3 5 4 3 5 4 3 5 4 3 5 4 4 5 5 6 6 7 8 9 1 10 11 12 13 14 14 14 14 14 14 14	N/A			2	1 4		LIMEST	ONE GRAVEL AND SAND, D	DRY (SG)				
N/A 80 4 5 BROWN, MOIST, MEDIUM W/ SOME FINE POORLY GRADED SAND (SP) BOTTOM OF HOLE AT 4.0 FEET SEALED W/ BENTONITE UPON COMPLETION 5		90	0 8	3			BROWN A	AND GRAY, MOIST, SILTY	CLAYEY				ł
N/A 80 4 5	N/A	90	$\overline{}$	4	2 =		SAND (S	SM)				1	ł
6-1 7-1 8-1 9-1 10-1 11-1 12-1 13-1 14-1	F				2-		DARK BF (SM/SC)	ROWN, MOIST, SILTY CLAY	EY SAND	\Box		i l	
6-1 7-1 8-1 9-1 10-1 11-1 12-1 13-1 14-1	-				3-	177177							
6-1 7-1 8-1 9-1 10-1 11-1 12-1 13-1 14-1	N/A	80	0 4	5] =		BROWN,	MOIST, MEDIUM W/ SOME F	FINE POOF	RLY			
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Log of Boring B2 (Offset 3' SE of B) Twigg Corp. Martinsville, Ind. Sheet 1 of 1

Job Number: 7403

Driller: Haskett Drilling	Drilling	Date	Time	
Drill Method: 3.25" Hollow Stem Auger	Started	Started 12/20/94		
Sample Method: Split Spoon	Finished	12/20/94	12:30 PM	
	I a serial Serial Serial Serial			

Sam	pie Met	h od: Spli	t Spoon					Finished	12.	/20/94		12	2:30 PM	1
Bore	ehole Di	ameter:	6" in.	Wate	r Level:	N/A		Logged By: Derrick	Copsey	Checke	d By:		_	
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descrip	otion	·				
	N/A N/A	50 50	5 3	1 2	1-		BROWN, I	DRY, FINE, SILTY SAN S ABOVE	ID (SM)			,		milmilm
	N/A	90	5 3	3	3- 4-		GRADED	SH BROWN, MOIST, ME SAND WITH SILT (SP	DIUM, POORI	LY				باينيال
	N/A	80	3 4	4	5-		SAME AS		_					
	N/A	70	5 4	5	6-		BROWN, I (SM)	HOIST, FINE TO MEDIO	UM, SILTY S	AND				سبلی
	N/A	90	6 4	6	7- 8-		SAND WI	40IST, MEDIUM, POORL TH SILT (SP-SM)						بملينيا
					9- 10- 11- 12- 13- 14- 15- 16- 17- 18-		BOTTOM SAND (E	OF HOLE AT 8.0 FEE'	FORMA 1 10	N				

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Farlow Environmental Engineers, Inc. 8645 Guion Road Suite B Indianapolis, IN 46268

Log of Boring C (27' NE of MW-1) Twigg Corp.

Sheet 1 of 1

Job Number: 7403

		is, IN 46: 0 Fax (3	200 317) 872-96 	16	·	Mart	insville, Ind.	Elevatio	on:		
Driller: Has	kett Drilli	ng					Drilling	Date		Time	
Orili Method	1: 3.25"	lollow Ste	em Auger	·			Started	8/08/94	4	11:04 A	4
Sample Met	thod: Spli	t Spoon					Finished	8/08/94	4	11:18 AM	1
Borehole D	lameter:	6" in.	Water	Level:	N/A		Logged By: Sam Niem	ian Che	cked By:		
PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descripti	ion	-		
N/A N/A N/A	70 75 70 80	8 4 6 3	1 2 3 4	1-	000	GRAVEL BROWN BROWN,	ND WHITE, DRY, PUORLY (GP) , MOIST, SILTY SAND (SI MOIST, SILTY SAND (SM MOIST, SILTY SAND (SM	M)			
N/A	65	3 2	5	3- 4-		BROWN, (SP)	MOIST, MEDIUM POORLY	GRADED SAND			ļ
				5- 6- 7- 8- 10- 11- 12- 13- 14- 15- 16- 17- 18- 19-			M OF HOLE AT 4.0 FEET NITE UPON COMPLETION	SEALEU W/			

Log of Boring C2 (Offset 3' SW of C) Twigg Corp. Martinsville, Ind. Sheet 1 of 1

Job Number: 7403

Elevation:

Driller: Haskett DrillingDrillingDateTimeDrill Method: 3.25" Hollow Stem AugerStarted12/20/9410:30 AMSample Method: Split SpoonFinished12/20/9411:15 AM

	ilbie wer	ilog, opii	t Spoon					rinished		20/94	į	11.13	****
Во	ehole Di	ameter:	6" in.	Wate	r Level: 1	N/A		Logged By: Derrick C	opsey	Checke	d By:		
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Description	on				
ليبينانين البينانينا	N/A N/A N/A	90 80 80 75	5 6 4 5	3	1 2 3 4 1 1 5 1 5 1		SAND WI SAME AS SAME AS	MOIST, MEDIUM, POORLY ITH SILT (SP-SM) G ABOVE G ABOVE	GRADED				
	N/A	90	4 4	5	6-		SAME AS	S ABOVE					
ينتينا بينها بينينا بينيا بينيا ليبينا بينيا بينيا لينينا لينينا لينينا لينيرا بي	N/A	70	6 5	6	7 8 9 10 11 13 14 15 16 17 18		SAND (S	MOIST, MEDIUM, POORLY SP) OF HOLE AT 8.0 FEET F 3'-2') BENTONITE (2'-0')	ORMATIO				

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Farlow Environmental Engineers, Inc. 8645 Guion Road

Log of Boring D (22' NW of MW-1)

Sheet 1 of 1

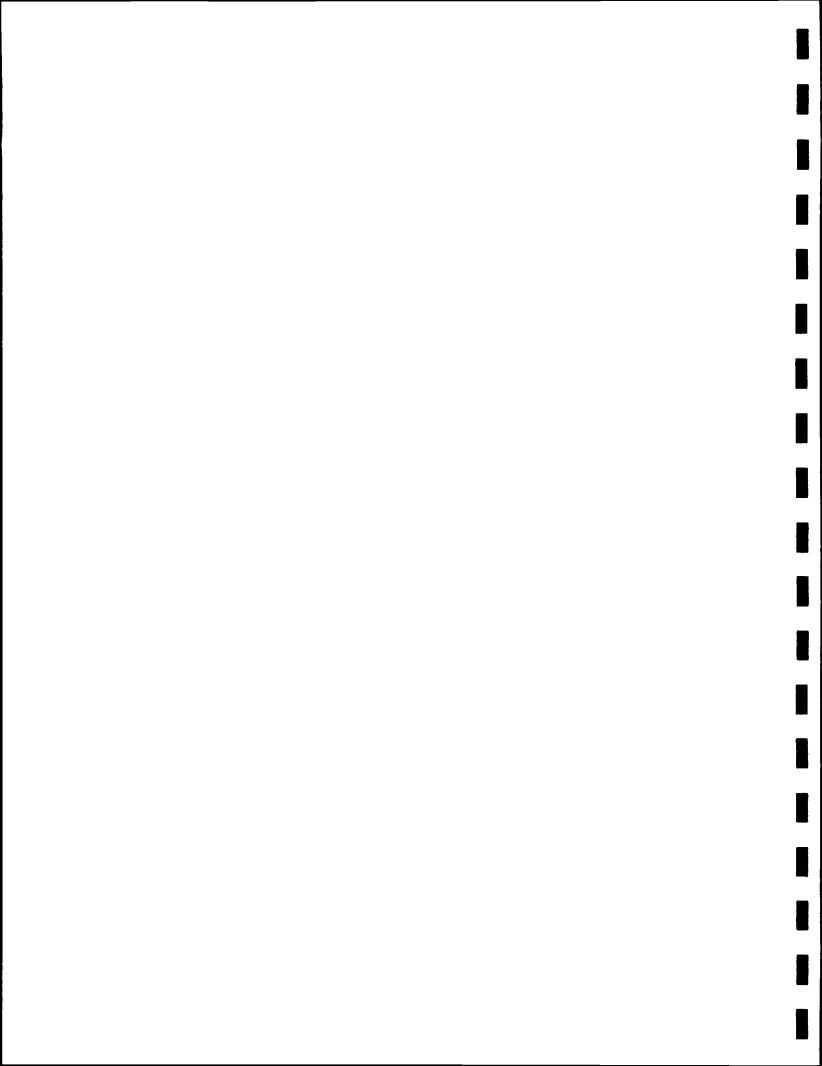
	In	Sui	ite B is, IN 46				Tw	igg Corp.	Job	Number:	7403	
1	Phone (317	872-960	O Fax (317) 872-96	16		Marti	nsville, Ind.	Ele	vation:		
)ri	l ler: Hask	kett Drilli	ng					Drilling	D	ate		Time
Ori	ll Method	: 3.25" H	lollow Ste	em Auger				Started	8/0	8/94		11:20 AM
Sa	mple Met	hod: Spli	t Spoon					Finished	8/0	8/94		11:32 AM
Ю	rehole Di	lameter:	6" in.	Water	Level:	N/A		Logged By: Sam Nien	nan	Checked	Ву:	
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descript	ion			
	N/A	80	16	1		000	GREY AN	O WHITE, DRY, POURLY	GRAUEU		1	
	N/A	90	6	2	1-	000	SAA, CH	HANGING TO BROWN, MOI	ST SILTY			
	N/A	80	5	3	· =		SAND	MOTET ETLITY CAND (C)	<u> </u>	 /		
	N/A	80	2	4	2-	<u> </u>		MOIST, SILTY SAND (SM MOIST, SILTY SAND (SM		-/A		
					2 -		<u> </u>				1	
	N/A	75	3 2	5	3 - 4-		REDDISI SAND W	H BROWN, MOIST, POORLY SILT (SP/SM)	Y GRADED			
					5 6 7 8 10 11 12 13 14		BENTON	OF HOLE AT 4.0 FEET				

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Log of Boring D2 (Offset 3' NE of D) Twigg Corp. Martinsville, Ind.

Sheet 1 of 1

Job Number: 7403

Elevation:

Driller: Haskett DrillingDrillingDateTimeDrill Method: 3.25" Hollow Stem AugerStarted12/20/9410:30 AMSample Method: Split SpoonFinished12/20/9411:15 AM

38	imple Method: Split Spoon				_			rinisnea	12/	20/94		11:15 #	41 ⁷¹
Во	rehole Di	ameter:	6" in.	Wate	r Level:	N/A		Logged By: Derrick C	Copsey	Checke	d By:		
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descripti	on				
					1_								
ΕI	N/A	90	3	1	' =	ĿĿ	BROWN,	MOIST, MEDIUM, POORLY	GRADED	لہ			
Εl	N/A	90	3	2	2-	ĿE		TH SILT (SP-SM) ABOVE		/_			_
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E	N/A	90	5 3	3		-	SAME AS	S ABOVE					
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1	N/A	80	3 4	6]		BROWN, SAND (MOIST, MEDIUM, POORLY	GRADED				-
F			7		8-	1237.33	BOTTOM	OF HOLE AT 8.0 FEET F	FORMATIO	<u>, </u>			-
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Farlow Environmental Engineers, Inc. 8645 Guion Road Suite B Indianapolis, IN 46268

Phone (317) 872-9600 Fax (317) 872-9616

Log of Well MW-1 (former waste storage area) Twigg Corp. Martinsville, Ind.

Sheet 1 of 2

Job Number: 7403

Elevation:

Driller: Haskett DrillingDrillingDateTimeDrill Method: 4.25" HSA, Mud RotaryStarted8/8/9411:38 AMSample Method: Split SpoonFinished8/9/9410:40 AM

Sa	mple Met	hod: Spli	t Spoon					Finished	8/9/94	10:4	MA OI
Во	rehole Di	ameter:	8.5" in.	Wate	r Level:	7-10'	BGS ('98)	Logged By: Sam Niema	enn Checke	ed By:	
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Description	on		pletion : Locking Cap
F						V 0.	GREY AN GRAVEL	ID WHITE, DRY, POOREY G	RADEU		=
Ė				1	1-	E		MOIST, WELL GRADED SAI O SOME FINES (SW-SM)	ND WITH		Concrete =
بيراييييايي					2		TRACE				Bentonite —
بلبيبيليييل	58/ 100*	90	3 3 3 3	2	4 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5 6 5		REDDISH POORLY FINES (H BROWN, FINE AND MEDI GRADED SAND WITH TRA SP-SM)	UM, MOIST, CE TO SOME	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	2" Ø
بيلينينلينيابيي				·	7- 8- 9-	• • ↓•	BROWN A	ND GREY, WET, WELL GRA	ADED SAND		2" Ø
سليبيين	270/ >250*	95	1 1 0 1	3	10-		(SM) MI	TH TRACE FINES			Slotted
ببيبليين					12 13			·		[:]=[:]	Sand — Pack — Filter —
سليسيلييييا	2.4/ N.D.*	100	1 2 6 9	4	15		GREY AN	ID BROWN, MEDIUM AND F GRADED SAND (SP)	INE, WET,		. marijan
ليبييلين	·				17- 18- 19-						
بيبيابيي	0.3/ N.D.*	80	1 2 7 17	5	20-		BROWN, SAND (S	FINE TO COARSE, WET, W SW) WITH SOME GRAVEL	ELL GRADED		

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Log of Well MW-1 (former waste storage area) Twigg Corp. Martinsville, Ind.

Sheet 2 of 2

Job Number: 7403

Elevation:

	Phone (317) 872-9600	J Fax (317) 872-9	616		Mai tilisville, Tila.	Elevation:	
	PIO/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description		Well Completion
ليبيدلينيطينيط					22 23 24				← Bentonite — Seal
متنظيينيانيينيا	0.1/ N.D.*	85	12 14 14 21	6	25- 26-		BROWN, MEDIUM TO COARSE, WET, POOF GRADED SAND (SP) WITH SOME GRAVE	RLY L	
سيبايين السيباييي					27- 28- 29-		·		
يسلسيشلسي	0.3/ N.D.*	45	8 8 12 11	7	30-		BROWN, MEDIUM, WET, WELL GRADED SA (SW)	AND	
handandanahandanahandanahandanahandanahandanah					32 33 34 35 36 37 38 40 41 42 43	Į.	BOTTOM OF HOLE AT 31.0 FEET		

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Bruce Carter Associates, L.L.C. 6630 E. 75th St Suite 300 Indianapolis, IN 46250 Phone (317) 578-4233 Fax (317) 578-4250

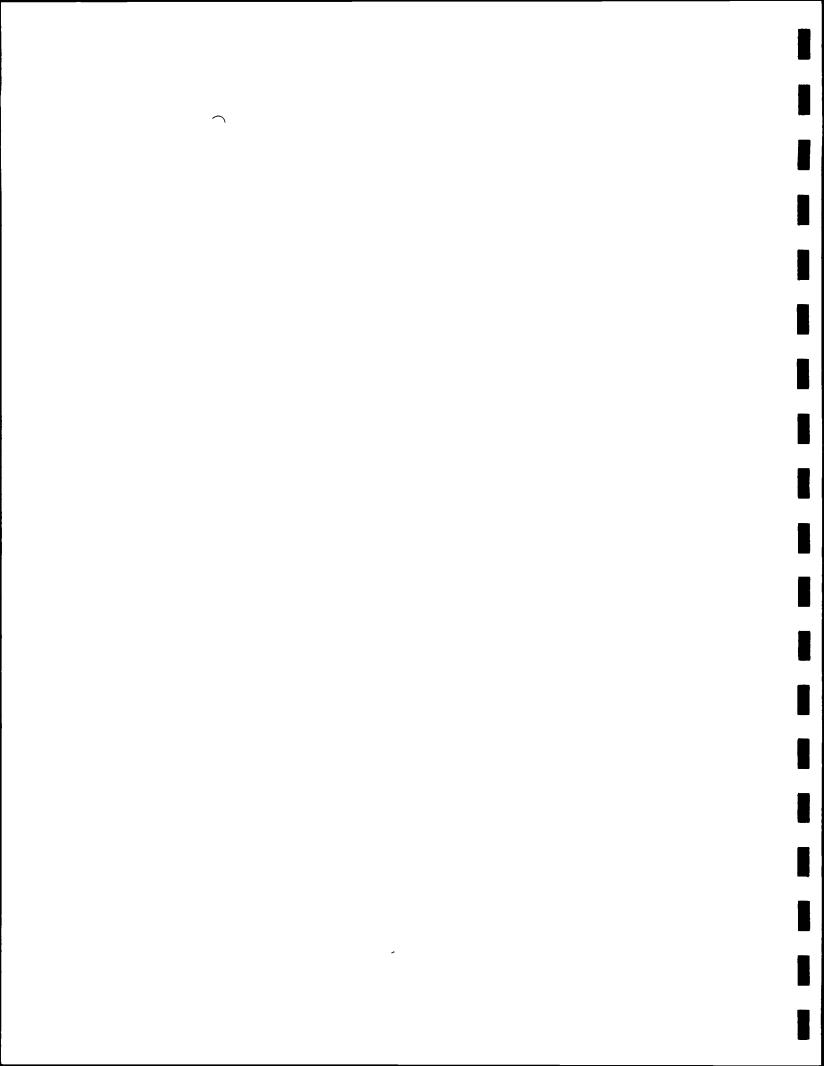
Log of Well MW-1D (offset 5' S of MW-1) Twigg Corp. Martinsville, Ind.

Sheet 1 of 3

Job Number: 7403

Driller: Earth Exploration	Drilling	Date	Time
Drill Method: 4.25" Hollow Stem Auger	Started	2/24/98	8:45 AM
Sample Method: Split Spoon	Finished	2/24/98	3:00 PM
			-

Во	rehole Di	ameter:	8.5" in.	Wate	r Level:	7-10.2	2' BGS ('98) Logged By: JW Kilmer	Checked By:
	PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description	Well Completion Locking Cap
					2 - 4 - 6 - 8 - 10 - 12 - 14 - 16 - 18 - 12 - 24 - 26 - 1		Boring Blank-Drilled to 44'	Concrete Bentonite Seal



Bruce Carter Associates, L.L.C. 6630 E. 75th St Suite 300 Indianapolis, IN 46250 Phone (317) 578-4233 Fax (317) 578-4250 Log of Well MW-1D (offset 5' S of MW-1) Twigg Corp. Martinsville, Ind.

Sheet 2 of 3

Job Number: 7403

PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description	Well Completion
				30- 32- 34- 36- 38- 40- 42-			***************************************
0	100	6 18 13 15	1	44-		Wet, tan, fine to medium, trace course poorly graded SAND (SP)	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
0	100	12 18 22	2	50 52 54		SAA (SP), 6" of tan, fine SILTY SAND (SM)	Formation - Sand -
		26		56- 58-			2" Ø — Sch.40 — Slotted PVC (0.010") —

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Log of Well MW-1D (offset 5' S of MW-1) Twigg Corp. Martinsville, Ind. Sheet 3 of 3

Job Number: 7403

Elevation:

		, 0, 0	, , u, , ,	717, 576 4				Lievation.	
	PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description		Well Completion
					62-				
1 1	0	75	10 16 20 25	3	64- - - 66-		SAA (SP), fine SAND, little fines		
					68-				
					70-				
. 1					72-				
لبيبا	0	58	5 9 13 17	4	74- - 76-		6" SAA (SP) 8" grey SILT (ML), low pla little clay, little to some fine sand	esticity,	
1111					78-	*	•		
	0	100	9 13 15 19	5	80-		SAA (ML)		
- - -					82-		BOTTOM OF HOLE AT 81.0 FEET		- - - -
					84-				- - - - - - -
11				:	86- - 88-				·
1					90-				- - - -
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Farlow Environmental Engineers, Inc. 8645 Guion Road Suite B Indianapolis, IN 46268

Log of Well MW-2 (FB-2) (parking lot E of Twigg - paved over) Twigg Corp.

Sheet 1 of 2

Job Number: 7403 Martinsville, Ind. Phone (317) 872-9600 Fax (317) 872-9616 Eievation: Drilling Driller: Haskett Drilling Date Time Drill Method: 4.25" HSA, Mud Rotary Started 8/10/94 Sample Method: Split Spoon Finished Borehole Diameter: 8.5" in. Water Level: 9 BGS ('94) Logged By: Sam Niemann Checked By: Log Counts PID/Syns.* ŝ Recovery Depth (feet) Materials Description Well Completion Sample Graphic Blow (Locking Сар LIGHT GREY, DRY, WELL GRADED GRAVEL (GW) 70 30 t WITH SAND 70 19 2 9. Concrete SAME AS ABOVE, CHANGING TO BROWN, MEDIUM TO COARSE, MOIST, WELL GRADED 40 14 3 SAND (SW) WITH GRAVEL AT 0.6 FEET 40 7 4 2 BROWN, MEDIUM TO COARSE, MOIST, WELL GRADED SAND (SW) WITH GRAVEL BROWN, MOIST, CLAYEY SAND (SC) WITH ABUNDANT SAND 3 Bentonite 0.1/ Seal 90 3 5 N.D.× REDDISH BROWM, MEDIUM, MOIST, POORLY 4 GRADED SAND (SP) WITH TRACE FINES 5 Sch.40 Blank PVC 6 7 8 BROWN, FINE TO COARSE, WET, WELL GRADED SAND (SW) 2 2 2 2" Ø N.D./ Sch.40 50 6 N.D.× Slotted 10 PVC (0.020") 11. 12 Sand Pack Filter 13. BROWN, FINE TO MEDIUM, WET, WELL GRADED 14-9 11 SAND (SW) 0.2/ N.D.* 90 7 13 15. 16 17 -18 SAME AS ABOVE 19 0.2/ 9 8 90 N.D.* 10 20-]∷. 15

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Log of Well MW-2 (FB-2)
(parking lot E of Twigg - paved over)
Twigg Corp.
Martinsville, Ind.

Sheet 2 of 2

Job Number: 7403

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	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description	Well Completion
سلسيلسيا					22-			< Bentonite Seal
سليبيلي	0.1/ N.D.*	70	16 21 13 13	9	24- 25-		SAME AS ABOVE WITH SOME AREAS OF COARSE SAND, CHANGING TO SILT (ML) WITH ABUNDANT FINE SAND AT 25.0 FEET	
واجتنا والمتناء والمتناء والمتناء والمتناء والمتناء والمتناء والمتناء والمتناء والمتناء والمتناء والمتناء					26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 43 43 43 43 43 43 43 43 43 43 43 43		BOTTOM OF HOLE AT 25.5 FEET	
					44-			

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Farlow Environmental Engineers, Inc. 8645 Guion Road

Log of Boring FB-2B (offset from FB-2)

Sheet 1 of 1

	Ir	Su ndianapo	uion Road ite B lis, IN 46	268			Twig	(from FB-2) gg Corp. Isville, Ind.	<u></u>	ob Number:	74D3		
				317) 872-96	16		Mai till		<u> </u> E	levation: Date	T-		
		kett Drill						Drilling Started		2/21/94		12:40 PM	—
			Hollow Ste	em Auger				Finished	_	2/21/94		2:DD PM	
	<u> </u>		it Spoon	1,1,2,2,2,2	l avale l			Logged By: Derrick (Checked		2.00 1 14	—
BO	renole D	iameter:	6 III.	Mater	Level:	_	!	Logged by. Derrick (CHECKEG	- 		\top
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descript	ion				
,	N/A N/A	90 95	6 8	1 2	1- 2-			DWN, MDIST, FINE, SIL IOIST, FINE TO MEDIUM					
		!			=		(3.17)						
-	N/A	80	3 4	3	=		SAME AS	ABOVE					
-	N/A	75	5 5	4	4		BROWN, M	OIST, VERY FINE SILT	Y SAND	SM)			
	N/A	80	2 2	5	5-		SAME AS	ABOVE					
-	<u> </u>		-		6-					-			
-	N/A	90	2 2	6	7 –		BROWN, M	OIST, MEDIUM, POORLY	GRADED				
-			2		8-			OF HOLE AT 8.0 FEET					
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-					10-								
-					11-								
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Log of Well MW-3 (near SW corner of Twigg bldg) Twigg Corp. Martinsville, Ind.

Sheet 1 of 2

Job Number: 7403

D riller: Haskett Drilling	Drilling	Date	Time
Drill Method: 4.25" HSA, Mud Rotary	Started	8/9/94	11:00 AM
Sample Method: Split Spoon	Finished	8/9/94	2:15 PM
D - 1 - 1 - 1 - 2 - 1 - 1 - 1 - 1 - 1 - 1			

28	mpie Met	hod: Spli	it Spoon					Finished	8/9/94		2:15 PM
Во	rehole Di	ameter:	8.5" in.	Wate	r Level:	8.5-1	2' BGS (1998	Logged By: Sam Niem	ann Chec	ked By:	
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descripti	on		Well Completion Locking Cap
-	N.D.	80	3	1			GRASS A	NU TOPSUIL (DARK BRO	WN, MUIST,	88	¥ 889 -
Ē	N.D.	85	7	2	, =	• • •		CLAY (CL-SC))	11511	<u> </u>	Concrete = 1
إستاستا	0.2	80	6	3	-	• • •	GRADED	MOIST, FINE TO COARSE SAND (SW) WITH SOME (, WELL FINES		
E E	N.D.	90	4	4	2-	• • •	\\ GRADED	FINE TO MEDIUM, MOIST, SAND (SW) WITH FINES	WELL		888 ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ± ±
بليبيات	0.3	100		5	3-		SAME AS BROWN, N SAND (S	MEDIUM, MOIST, POORLY	GRADED	/ - - - -	8entonite — Seal — 2" Ø — 2" Ø — Sch.40 — Blank PVC —
باليسايي					5 6					***************************************	2" Ø
					7 8 1 9					30303030	
ليبييلينينا	1.8/ N.D.*	100	1 1 1 2	6	10-		BROWN, N GRADED	MEDIUM TO COARSE, MOI SAND (SP)	ST, POORLY		2" 0 — Sch.40 — Slotted — PVC — (0.020") =
					12-11						2" 0
⊢ I	0.7	100	2 2 4 7	7	14 - 15 - 16 - 16 - 1		SAME AS	ABOVE	· .	[.]	1
					17 - 18 - 18 -						
linilini	4.2/ N.D.*	80	8 10 9 11	8	19 - 20 -		BROWN, M GRADED	EDIUM TO COARSE, WET SAND (SW) COARSENING	, WELL WITH DEPTH		

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Log of Well MW-3 (near SW corner of Twigg bldg) Twigg Corp. Martinsville, Ind.

Sheet 2 of 2

Job Number: 7403

	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description	Well Completion
المساليسياليسيا					22 23 24			
ابييرابيي	1.0/ N.D.*	90	11 18 23 25	9	25-		BROWN, GREY, MEDIUM TO COARSE, WET, WELL GRADED SAND (SW) WITH SOME GRAVEL	
سيبليساييس					27- 28-	7.00		
ليبييليييا	0.2/ N.D.*	90	9 14 12 13	10	30- 31-		SAME AS ABOVE	
المتعاليين المتعاليين المتعاليين المتعاليين المتعاليين المتعاليين المتعاليين					32 33 34 35 36 37 38 39 40 41 42 43 44		BOTTOM OF HOLE AT 31.0 FEET	

					!

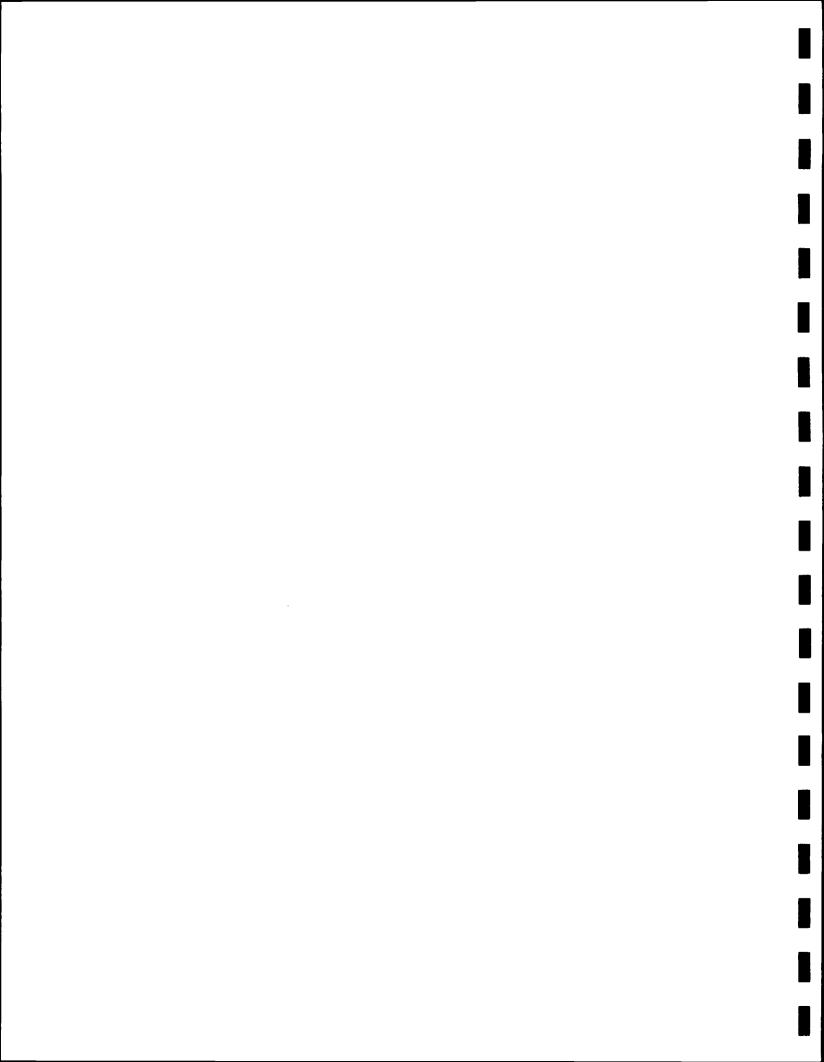
Log of Boring FB-4 (N of Harmon Dr & South St) Twigg Corp. Martinsville, Ind.

Sheet 1 of 2

Job Number: 7403

Driller: Haskett Drilling		Drilling		Date	Time
Drill Method: Mud Rotary		Started	8	3/11/94	9:05 AM
Sample Method: Split Spoon		Finished	8	3/11/94	11:00 AM
Berghele Blometer: 6" in	Water Levels	Logged By: Sam Nier	nann	Checked F	

Во	rehole Di	ameter:	6" in.	Wate	r Level:		Logged By: Sam Niemann Check	ed By:
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description	
-		80	3	1			DARK BROWN, DRY SANDY CLAY (CL)	+ + + + + + + + + +
Εİ		80	5	2	1 =		DARK BROWN, DRY, SC/CL]
ΕI		60	7	3	'=		DARK BROWN, MOIST CLAYEY SAND (SC)	
E		60	11	4	2-		DARK BROWN, MOIST SW/SC	<u> </u>
					3-		·]]
1111		100	6 5	5	4-	1	BROWN, MEDIUM, MOIST, POORLY GRADED SAND WITH TRACE TO SOME FINES (SP-SM)	
	40#/ N.D.*	100	4 6	6	5-	1	SAME AS ABOVE	
lindrahadhadhadhadhadhadhadhadhadhadhadha					6- 7- 8-			
بيليينيلي	72#/ N.D.*	60	2 2 2 3	7	9-		BROWN, MEDIUM WITH TRACE FINE, WET, POORLY GRADED SAND (SP)	
بدليين البيياب					11- 12- 13-			111111111111111111111111111111111111111
	11/ 24*	90	7 9 9 8	8	14- 15-		SAME AS ABOVE	
المساليس المساليس المساليس					16- 17- 18-			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
بيليييليي	23/ 45*	85	7 10 9 13	9	19. 20-		SAME AS ABOVE	
<u> </u>						1		



Farlow Environmental Engineers, Inc. 8645 Guion Road Suite B

Indianapolis, IN 46268 Phone (317) 872-9600 Fax (317) 872-9616 Log of Boring FB-4 (same loc'n as MW-4) Twigg Corp. Martinsville, Ind. Sheet 2 of 2

Job Number: 7403

PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description		
	ж.			22- 23- 24-	9	SAME AS ABOVE		
0.8/ N.D.*	90	10 9 11 13	10	25 26 27 28		·····		
0.4/ N.D.*	40	4 4 3 5	11	29 30 31		SAME AS ABOVE BOTTOM OF HOLE 30.5 FEET		11111111111
0.8/ N.D.*				31 32 33 34 35 36 37 38 39 40 41 42 43		# = PID Reading is suspect. Very slow needle climb rate. Reading should probably be much lower. (Water vapor interference)		

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Log of Well MW-4 (FB-4b) (Offset from FB-4) Twigg Corp. Martinsville, Ind.

Sheet 1 of 3

Job Number: 7403

Elevation:

Driller: Haskett DrillingDrillingDateTimeDrill Method: Holow Stem Auger/Mud RotaryStarted12/13/949:00 AMSample Method: Split SpoonFinished12/14/943:00 PM

Sa	mple Met	hod: Spli	it Spoon					Finished	12,	/14/94	3:00) PM
Во	rehole Di	ameter:	6'' in.	Wate	r Level:	B.5-11	.8' BGS ('98	Logged By: Derrick	Copsey	Checked	Ву:	
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descrip	tion		Well Comp	oletion ocking dap
علىسىشىسا	N/A N/A	90 90	3 2	1 2	1-		(SM) REDDISH	BROWN, MOIST, FINE,	UM, POORLY		71/X V////	Concrete
	N/A N/A	90	3 5 5	3	3-		BROWN, I	SAND WITH SILT (SP- MOIST, FINE TO MEDIU SAND WITH SILT (SP- SABOVE	IM, POORLY		S S S S S S S S S S S S S S S S S S S	Bentonite —
	N/A	90	3 6	5	5- 6-		BROWN, I SAND (S	MOIST, MEDIUM, POORL SP)	Y GRADED		2 S	" Ø Gch.40 Ilank PVC
	N/A	90	3 2	6	7- 8-		REDDISH (SM)	I BROWN, MOIST, MEDI	UM, SILTY S	AND	XXXXXXX	111111
لنبيدابيسليبيداسيطسيطسيطسيطسياسيطلسياليساليساسياس					9- 10- 11- 12- 13- 14- 15- 16- 17- 18- 20-	•						" Ø Gch.40 Glotted VC (0.010")

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Log of Well MW-4 (FB-4b)
(Offset from FB-4)
Twigg Corp.
Martinsville, Ind.

Sheet 2 of 3

Job Number: 7403

Elevation:

	Phone (317	1 672-9600	rax I	317) 672-96	סוס		Matthistine, 11d.	Elevation:	
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description		Well Completion
handandanktinktinktinden.					22- 23- 24- 25- 26- 27-				Sand Pack Filter
	N.D./		4		29 30 31 32 33	l.	BROWN, WET, MEDIUM, POORLY GRADED S	GAND	Sand
	N.D./ N.D./	50	5 10 8 6 8	8	35- 36- 37- 38- 39-		REDDISH BROWN, WET, MEDIUM, POORLY GRADED SAND WITH SILT (SP-SM)		
	N.U.	50	8 8 12 17	9	40- 41- 42- 43- 44-		SAME AS ABOVE		

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Log of Well MW-4 (FB-4b) (Offset from FB-4) Twigg Corp. Martinsville, Ind.

Sheet 3 of 3

Job Number: 7403

	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description	Well Completion
E	N/A	50		9	=	χΈ		
					46-			
Ė					47-			
					48-			
				,	49			
	N.D./-	60	12 11 10	10	50-		BROWN, WET, MEDIUM, POORLY GRADED SAND (SP)	
المراجعة المتعارية المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة المراجعة			10		51-		BOTTOM OF HOLE AT 50.5 FEET. Samples from 39.0 - 50.5 obtained from boring offset 3' east of FB-4b.	
					52-		3' east of FB-4b.	
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Log of Boring FB-5 (parking lot SE of Twigg) Twigg Corp. Martinsville, Ind.

Sheet 1 of 1

Job Number: 7403

Elevation:

Driller: Haskett DrillingDrillingDateTimeDrill Method: Mud RotaryStarted8/10/948:50 AMSample Method: Split SpoonFinished8/10/9410:30 AM

	ameter:	8.5" in.	Wate	Level:		Logged By: Sam Niemann	Checked By:
PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials D escription	
	80 80 90 90	3 6 8 4	3 4	1-1 2-1 3-1		DARK BROWN, FINE TO VERY COARSE, DR WELL GRADED SAND (SW) WITH GRAVEL A FINES SAME AS ABOVE WITH INCREASED FINES BROWN, MOIST SC/CL WITH GRAVEL SAME AS ABOVE REDDISH BROWN, MOIST, CLAYEY SAND (
	100	3	5	4 5 6 7 8 8		WITH SOME SILT	
N.D./ N.D.*	60	2 3 4 3	6	9 10 11 11 12		BROWN, MEDIUM TO COARSE, WET, WELL GRADED SAND (SW) WITH TRACE GRAVEL	
N.D./ N.D.*	90	9 12 12 13	7	13-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	• • •	SAME AS ABOVE, CHANGING TO BROWN, M SILT (ML) WITH SOME SAND AT 15.1 FEET	OIST
				16-1 17-1 18-1	• • •	BROWN, FINE TO VERY COARSE, WET, WEL GRADED SAND (SW) WITH TRACE GRAVEL	L
N.D./ N.D.*	85	8 11 13 12	8	19 - 1 20 - 1		GRADED SAND (SW) WITH TRACE GRAVEL	



Farlow Environmental Engineers, Inc. 8645 Guion Road Suite B Indianapolis. IN 46268 Log of Boring FB-6 (South St 120' SE of MW-1) Twigg Corp. Martinsville, Ind. Sheet 1 of 3

Job Number: 7403

	Īn		ite B lis, IN 46	268			Tw	igg Corp.	Jo	b Number	740	3		
	Phone (317	872-960	0 Fax (3	317) 872-96	16		Marti	nsville, Ind.	EI	evation:				
Dri	il er: Hask	ett Drilli	ng					Drilling		Date			Time	
Dri	II Method	3.25" F	HSA/Mud	Rotary				Started	12	/15/94		9	4A 00:6	1
Sa	mple Met	hod: Spli	it Spoon				_	Finished	12	/16/94		1	:00 PM	l
Во	rehole Di	ameter:	6" in.	Water	Level:	N/A		Logged By: Derrick C	opsey	Checke	d By:			
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Description	on					
Ē	N/A	N/A	N/A	1			ASPHAL							
E	N/A N/A	80 70	11 12	3	1-	12.00	BROWN, GRADED	DRY, FINE TO COARSE, P SAND (SP)	OORLY					-
Ė	N/A	80	19	- 4	2	7	BROWN,	MOIST, FINE, POORLY GR	ADED SA	VD /				:
F					2			TH TRACE GRAVEL S ABOVE	<u> </u>					
E.			- 6		3-	1								-
Ē	N/A	90	6 3	5	4-			MOIST, FINE POORLY GRA LT (SP-SM)	ADED SAN	ID				<u> </u>
F	9.2/ N.D.	90	2 3	6	-		SAME A	SABOVE						
E	N/A	90	9	7	5-	E	SAME A	S ABOVE						
F			10		6-									=
E					7				_					<u> </u>
ŧ	N/A	90	4 3	8	′ :		BROWN, (SM)	MOIST, FINE TO MEDIUM,	SILTY S	AND				
Ē					8-									
E					9-] =
ŧ	10.0/	90	3 2	9	=		SAME A	S ABOVE						
Ē	N.D.	90	3	•	10-] TOT								-
E					11-									=
Ė								•						
F					12-									-
E					13-	1								-
ŧ					=									
مليييايي					14-	7676		WET, MEDIUM, POORLY GR	RADED SA	ND				
Ē	13.0/ N.D.	90	6	10	15-		(SP)							=
E			7		:									:
F					16-	1								-
F					17 -	}								
E					17 -	1								
E					18-	1								-
Ė					19-									
F	22.0/		9		18-		SAME A	S ABOVE						
E	22.0/	90	9 12	11	20-									-
F	<u> </u>				:									

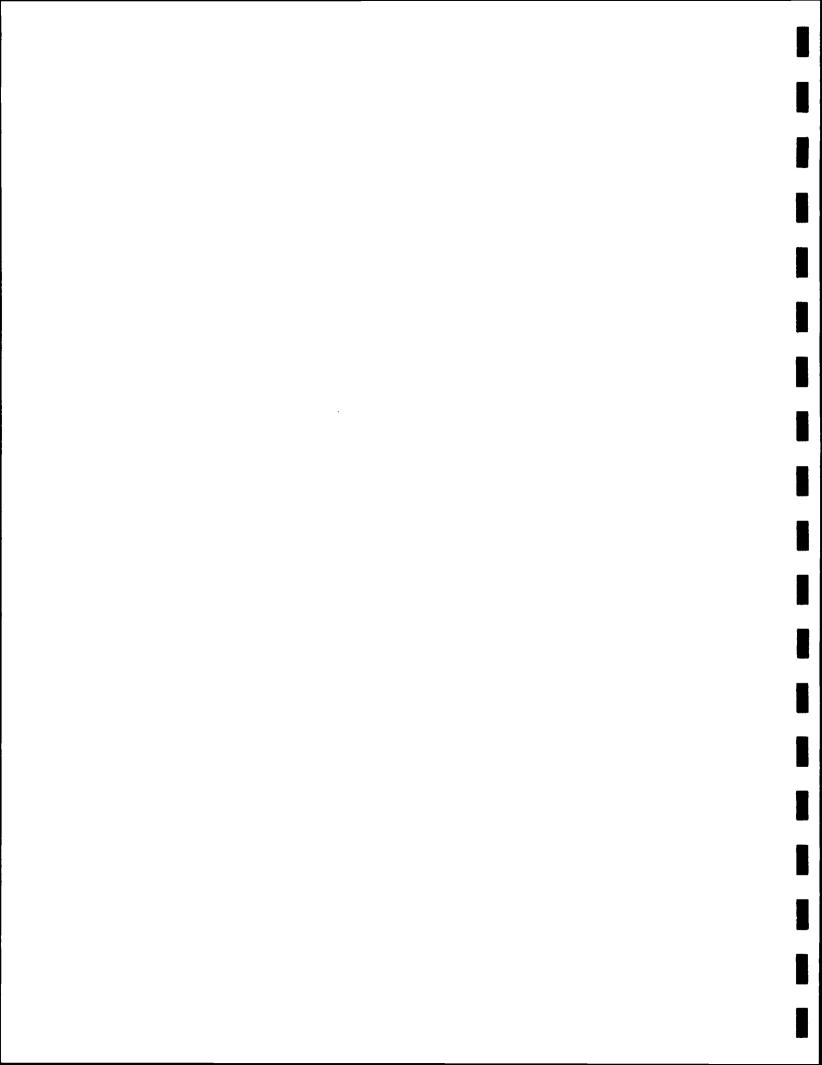
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Log of Boring FB-6: (South St 120' SE of MW-1) Twigg Corp. Martinsville, Ind.

Sheet 2 of 3

Job Number: 7403

	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description		
بيناميمانيينا					22-		· · · · · · · · · · · · · · · · · · ·		-
بالمسيلة	28.0/ 2.0	90	8 9 9	12	24-		SAME AS ABOVE		-
وباروور المورواور				-	26- 27- 28-				-
علىسيلس	10.0/ N.D.	80	5 5 7	13	29- 30-		SAME AS ABOVE		-
					31- 32- 33-				-
والموسط	N.D./ N.D.	80	2 2 11	14	34		SAME AS ABOVE		-
عدد مالينييرا مصياليي					36 37 38				-
	N.D./ N.D.	75	5 13 17	15	40-		SAME AS ABOVE		-
ومروا والمروا والمروا					41-42-43-				-
	N.D./ N.D.	70	8 8 9	16	44		SAME AS ABOVE		



Log of Boring FB-6. (South St 120' SE of MW-1) Twigg Corp. Martinsville, Ind.

Sheet 3 of 3

Job Number: 7403

N.D./- 60 17		PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description				
65 65 67 67	Ē		70		16		76776					1
65-1 66-1 67-1	بياييونا بيبيلييناء			8		47-		SAME AS ABOVE				
65-1 66-1 67-1	Ė	N.D./-	60	11 11	17	50-						=
65 65 67 67						51-		BOTTOM OF HOLE AT 50.5 FEET				=======================================
65 65 67 67	E					52-					-	1
65 65 67 67						53-						<u>-</u>
65 65 67 67	F					54				:		<u> </u>
65 65 67 67					-	55-						1
65 65 67 67	E					56-			:			1 1
65 65 67 67						57-	1	•				1 1 1 1 1
65 65 67 67	<u> </u>					58-						
65 65 67 67	E					59-						<u>-</u>
65 65 67 67	-] -		·		:	-	<u>-</u>
65 65 67 67						61-						1
65 65 67 67						-	1				-	1
65 65 67 67						63						1
66-1 67-1						-	1					1
	-			<u>.</u> !		1 -	4					<u>-</u>
F]				66-						1 1 1
<u>[- 68-</u>]						-						1 1
						68					-	1 1

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Log of Boring FB-7 (in field W of Twigg) Twigg Corp. Martinsville, Ind. Sheet 1 of 2

Job Number: 7403

Elevation:

Driller: Haskett Drilling Date Time

Drill Method: 3.25" HSA/Mud Rotary Started 12/20/94 2:30 PM

Sample Method: Split Spoon Finished 12/21/11:00 AM 11:00 PM

Во	rehole Di	ameter:	6" in.	Wate	r Level: 1	N/A		Logged By: Derrick C	opsey	Checked By:	
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descripti	on		
بينابيبايييا	N/A N/A N/A	80 80 70 70	11 10 11 8	1 2 3 4	1-	000	SAND (S WHITE TO POORLY (BROWN, [(SM)	D GREY, DRY, FINE TO M GRADED GRAVEL WITH S DRY, FINE TO MEDIUM,SI	EDIUM,		
ليبيار	N/A	90	4 5	5	3 - 4 -		BROWN, [DRY, MEDIUM, POORLY GF	RADED SAN		-
1	N.D.	90	4 4	6	5-	E	SAME AS				_
بيليينا	N/A	100	4 4	7	6		BROWN, N	OIST, FINE, SILTY SAN	D (SM)		-
برابيبايي	N/A	90	6 8	8	7 - 8 -		BROWN, M GRADED	MOIST, FINE TO MEDIUM SAND (SP)	, POORLY		-
بيلييياي	N.D./ N/A	70	5 5 3	9	9-		SAME AS	ABOVE			-
بينايين اليينايين					11- 12- 13-	1					-
	2.20/ N/A	80	7 8 7	10	15-		BROWN, I GRADED	NET, MEDIUM TO COARSE SAND (SP)	E, POORLY		-
					16- 17- 18-						
	0.20/ N/A	80	6 13 14	11	20		SAME AS	S ABOVE			-

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Log of Boring FB-7 (in field W of Twigg) Twigg Corp. Martinsville, Ind. Sheet 2 of 2

Job Number: 7403

Elevation:

	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description			
علىبيهلييييل					22-					Tuntuntu
	N.D./ N/A	40	8 8 9	12	24- 25-		BROWN, WET, MEDIUM, POORLY GRADED SAND (SP)	<u> </u> 		
طيسيابي					26- 27-		·			ببلييييان
استيابيا					28- 29-		DARY CREY DRY VERY FINE TO FINE SILTY	-		
	N.D./ N/A	60	11 10 12	13	30-		DARK GREY, DRY, VERY FINE TO FINE, SILTY SAND (SM) BROWN, WET, MEDIUM TO COARSE, POORLY GRADED SAND WITH GRAVEL (SP)			
عييدلينيدلين					31- 32- 33-	Į				باستياسيا
	N.D./ N.D.	50	2 2 11	15	35-		BROWN, WET, FINE TO MEDIUM, POORLY GRADED SAND (SP)			
					36- 37- 38- 39- 40- 41- 42- 43- 44-		BOTTOM OF HOLE AT 35.5 FEET			

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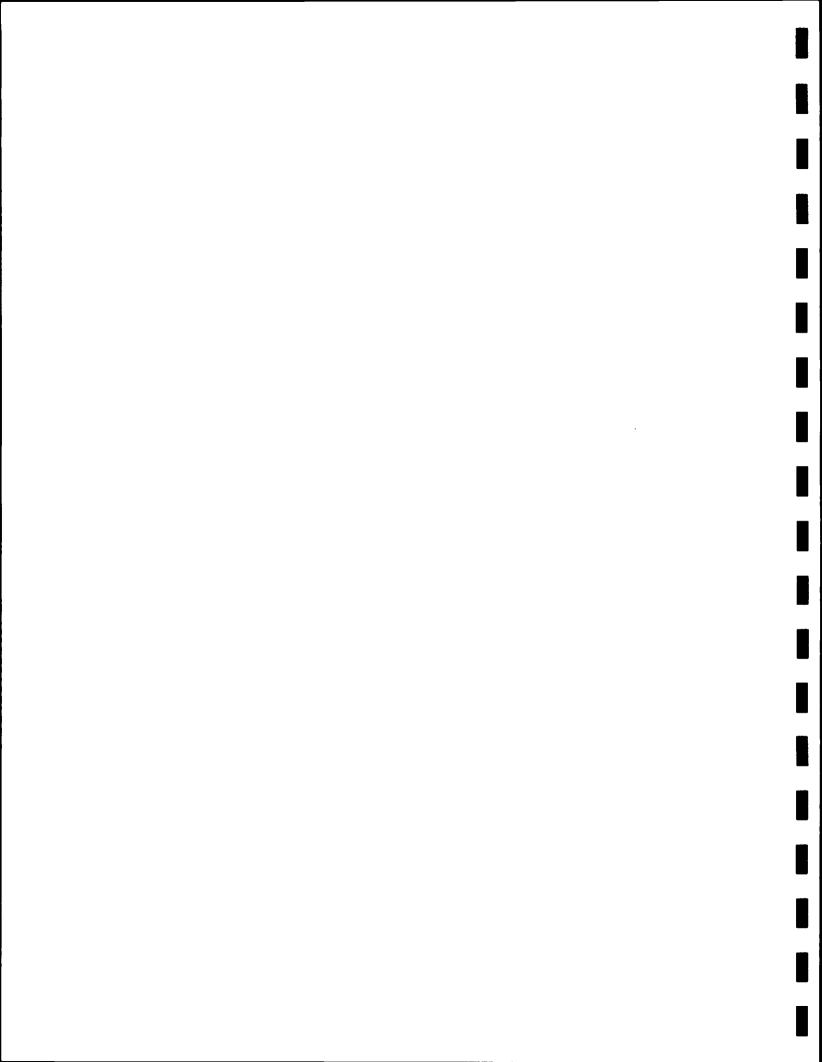
Farlow Environmental Engineers, Inc. 8645 Guion Road Suite B Indianapolis, IN 46268

Log of Boring FB-8 (in South St W of Harmon) Twigg Corp. Martinsville, Ind.

Sheet 1 of 3

Job Number: 7403

		lis, IN 46 00 Fax (:	3268 317) 672-961	6		Marti	nsville, Ind.	EI	evation:			
ill er: Hasi	kett Drill	ing					Drilling	1	Date		Time	
ill Method	1: 3.25" H	DuM\ AZH	1 Rotary				Started	12.	/19/94		10:00 A	M
ample Met	hod: Spl	it Spoon					Finished	12.	/19/94		4:30 P	М
orehole D	iameter:	6" in.	Water	Level:	N/A		Logged By: Derrick	Copsey	Checked	d By:		
PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descrip	tion				
	80	11	1	-		ASPHAL						
N/A N/A	80 70	10	3	1-	2		T AND SUB-BASE	ND (CN)				
N/A	70	8	4	_ =			DRY, MEDIUM, SILTY SA S ABOVE	IND (SM)				
147.5				2-								
N/A	90	4 5	5	3-		SAME A	S ABOVE					
0.0/ N/A.	90	4 4	6	4- 5-		BROWN, WITH SI	DRY, MEDIUM, POORLY (LT (SP-SM)	RADED, SA	ND			
N/A	100	4 4	7	Ξ		BROWN,	MOIST, MEDIUM, SILTY	SAND (SM)				
				6-								
N/A	90	6 8	8	/ - 8-	200	SAME A	6 ABOVE					
0.0/ N/A	70	5 5 3	9	9-		SAME A	S ABOVE					
				11- 12- 13-			·					
2.2/ N/A	80	7 8 7	10	14- 15-		BROWN, GRAVEL	WET, WELL GRADED SAN (SW)	ND WITH				
				16- 17- 18-								
0.2/ N/A	80	6 13 14	11	19- 20-		BROWN, GRADED	WET, FINE TO MEDIUM, SAND (SP)	POORLY				
		"-		=	14.7							

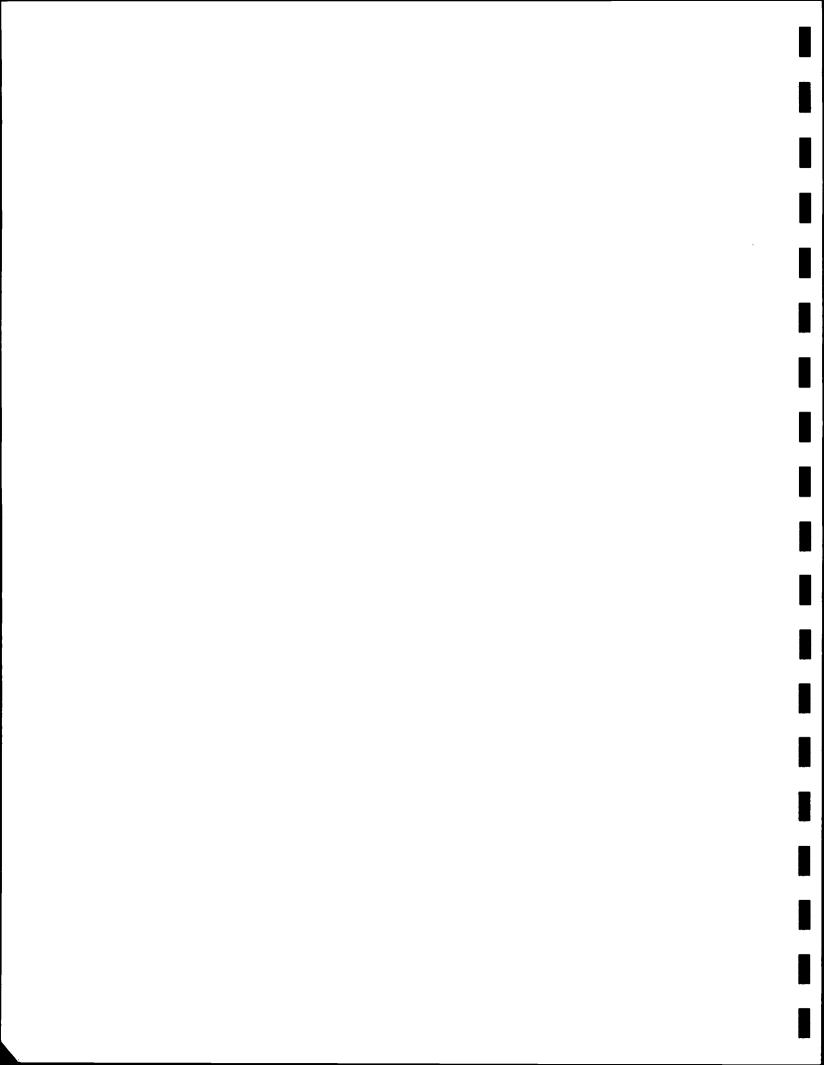


Log of Boring FB-8 (in South St W of Harmon) Twigg Corp. Martinsville, Ind.

Sheet 2 of 3

Job Number: 7403

	Phone (317) 6/2-8000) Fax	(317) 872-96			Hai titisvinc, 11id.	Elevation:	
	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description		
ابييابييا					22-				
	N.D./ N/A	40	8 8 9	12	24- 25-		SAME AS ABOVE		
عيطيييا			9		26				
بيليييلي					27 - 28 -				
Landanaha	0.0/ N/A	40	11 10 12	13	29- 30-		SAME AS ABOVE		
					31- 32-	1			
ليسياس					33- 34-	1		0.000	
استطيسانسا	0.0	50	12 13 15	15	35-	لتتنظ	BROWN, WET, MEDIUM, POORLY GRADED (SP)	SANU	
					37-				
					38- 39-	7676	SAME AS ABOVE		
السيالية	0.0	60	6 5 9	16	40- 41-				
					42- 43-				
بيبلييرا	0.0	70	5 8 12	17	44-		SAME AS ABOVE		

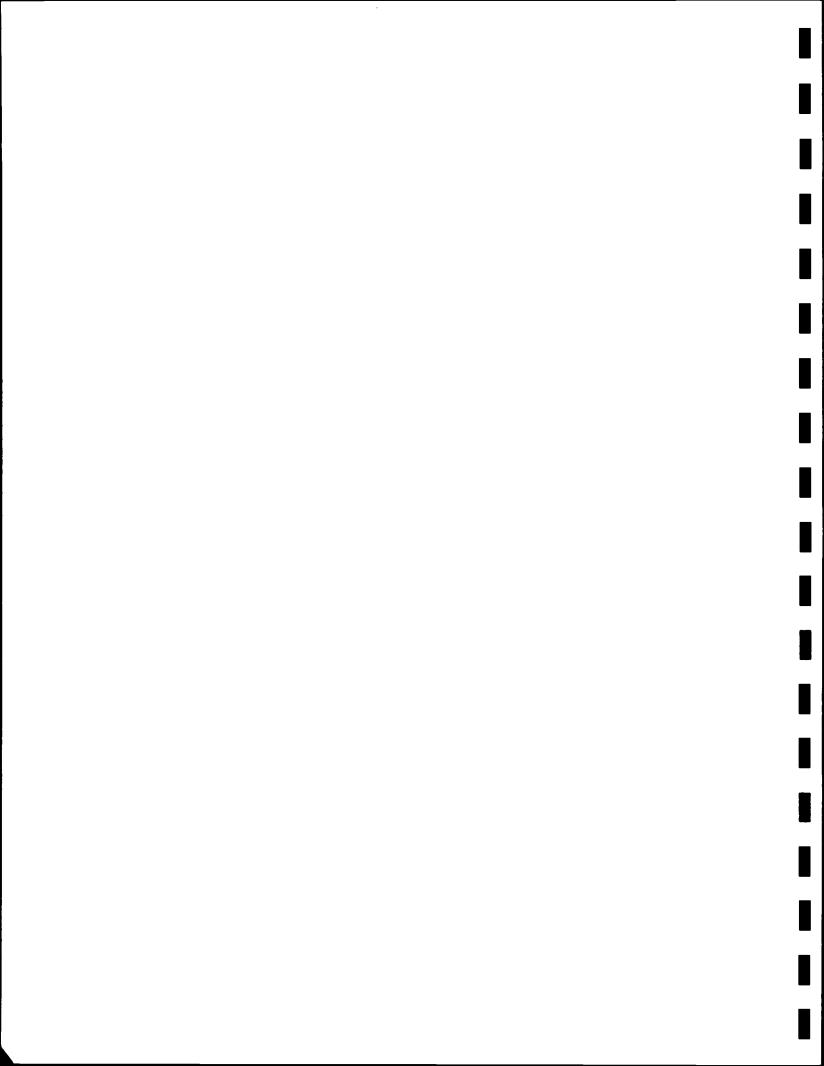


Log of Boring FB-8 (in South St W of Harmon) Twigg Corp. Martinsville, Ind.

Sheet 3 of 3

Job Number: 7403

	PID/Syns.*	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description				
	0.0	70		17	46-			1			1 1 1
بيبابيبابيبا					48-						استاستاسنا
بليينا	0.0	40	689	18	50-		BROWN, WET, FINE TO MEDIUM, POORLY GRADED SAND (SP)				111
					51-		Bottom Of Hole = 50.5'. Formation sand = 50.5 - 5' Bentonite = 5' - 1' Concrete = 1' - 0'				
لبيبيا					52- 53-						بلسيا
		:			54						بيبان
					55						بيليين
					56- 57-	,					Lunt
			:		58-	1	•				1
					59		-				1
التنبيا					60- 61-						
بيليين					62					i	
المتليب					63						1
ليبييل					61- 62- 63- 64- 65- 66-						
سلييي					66-						1
سيليب					67- 68-						1
		_			68						1



Bruce Carter Associates, L.L.C. 6630 E. 75th St Suite 300 Indianapolis, IN 46250

Log of Well MW-5 (SW corner of South St & Sycamore) Twigg Corp. Martinsville, Ind.

Sheet 1 of 2

Job Number: 7403

2" Ø Sch.40 Blank PVC

1		lis, IN 462	250			Twi	igg Corp.	300	Number:	7403
Phone (31)	7) 578-423	3 Fax (3	230 17) 578-425	50		Marti	tinsville, Ind. Elevation:			
oriller: SES	3						Drilling	Da	ite	Time
Irlii Metho	d: 4.25" H	Hollow Ste	em Auger		_	_	Started	9/29	9/97	3:00 PM
ample Me	thod: Spi	it Spoon					Finished	9/29	9/97	7:00 PM
orehole C	lameter:	8.5" in.	Water	Level:	9.5-13.	4' BGS ('98	Logged By: DR Farlow	, (Checked	By: JW Kilmer
PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descriptio	on		Well Completion Locking Cap
				2- 4- 6- 8-					33	Bentonite Seal 2" Ø Sch.40 Blank PVC
	50	1 2 2 1	1	10-		Moist, vo (ML) cha (SM)	ery dark Brown (2/2) SAI anging to well graded SIL	NDY SILT TY SAND		XXXXXXX
				12-	1	·				XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
				14— - - 16—						
	100	7 4 4 4	2	18-	• • •	Wet, brow trace gr	wn (5/3) well graded SAN avel & trace fines	ND (SW) w/		Formation
				22-						Formation Sand
				24-						

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Bruce Carter Associates, L.L.C. 6630 E. 75th St Suite 300 Indianapolis, IN 46250 Phone (317) 578-4233 Fax (317) 578-4250

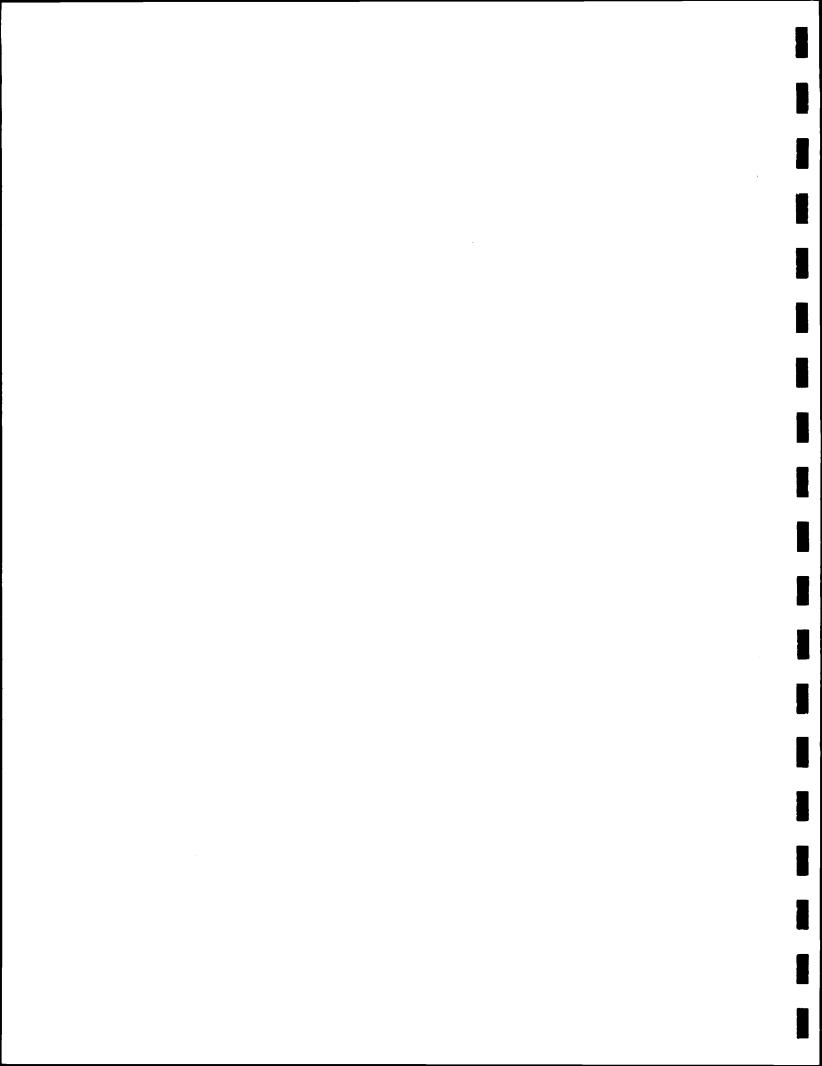
Log of Well MW-5 (SW corner of South St & Sycamore) Twigg Corp. Martinsville, Ind.

Sheet 2 of 2

Job Number: 7403

Elevation:

1 '	Phone (317)) 578-4233	Fax (3	317) 578-4	250		Mar (1134111C, 1110.	Elevation:
	PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description	Well Completion
	PID/S	100 Recove	SET SET SET SET SET SET SET SET SET SET	эрашь	30- 30- 32- 34- 36- 38- 40- 42- 44- 46- 50- 52- 54-	Graphic	Brown (5/3) fine to medium poorly grade SAND (SP) w/ trace fines BOTTOM OF HOLE AT 40.0 FEET	Formation Sand 2" Ø Sch.40 Slotted PVC (0.010")
					56- 58-			-



Bruce Carter Associates, L.L.C. 6630 E. 75th St Suite 300 Indianapolis, IN 46250

Log of Well MW-6 (in Victory Park) Twigg Corp. Martinsville, Ind. Sheet 1 of 3

Job Number: 7403

Indianapolis, IN 46250							Tw	ngg corp		per: 7403	
Phone (317) 578-4233 Fax (317) 578-4250 Marti							Marti ————	insville, Ind. Elevation			
Drille	er: SES							Drilling	Date	Time	
Drill	Drill Method: 4.25" Hollow Stem Auger							Started	9/30/97	8:00 AM	
Sample Method: Split Spoon							<u> </u>	Finished	9/30/97	5:00 PM	
Borehole Diameter: 8.5" in. Water Level: 10-14' BGS ('98)							BGS ('98)	Logged By: DR Farlo	w Checke	ed By: JW Kilmer	
	PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descripti	on .	Well Completion Locking Cap	
					2- 4- 6-					Concrete	
		60	2 7 7 6	1	8- 10- 12-	1	Dark ye (SP), (k near sur	ellowish brown poorly gra loist sandy SILTY CLAY face)	ded fine SAND on augers		
			2		14- 16- 18-	3752762	Wet dan	k arevish brown (4/2) p	oorly graded		
		80	2666	2	20-		wet, dar fine & m trace gr	k greyish brown (4/2) p edium SAND (SP), trace avel, trace fines	course sand,	Bentonite Seal - 2" Ø Sch.40 Blank PVC	

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Bruce Carter Associates, L.L.C. 6630 E. 75th St Log of Well MW-6 (in Victory Park) Sheet 2 of 3 Suite 300 Job Number: 7403 Twigg Corp. Indianapolis, IN 46250 Martinsville, Ind. Phone (317) 578-4233 Fax (317) 578-4250 Elevation: Counts Graphic Log ŝ PID/Sens. Well Completion Recovery Depth (feet) Materials Description Sample ! 30 $\overline{\omega}$ 15" SAA (SP), 5" clay & sand (SC-CL), dark greyish brown (4/2), wet 8 13 3 80 12 11 30 32 Formation Sand 34 36 Sch.40 Slotted PVC (0.010") 38 5 12 18 SAA (SP) 4 40 42-Wet, dark greyish brown (4/2), Well graded SAND (SW), grading to well graded SAND & GRAVEL (SG), trace fines 5 6 8 44-5 50 10 46 48 50 52-SAA (SW), little fine gravel, trace fines 8 16 54 6 80 24 23 56-58 SAA (SW), no gravel 11 14 7 100 20

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Sheet 3 of 3 Bruce Carter Associates, L.L.C. 6630 E. 75th St Log of Well MW-8 (in Victory Park) Job Number: 7403 Suite 300 Twigg Corp. Indianapolis, IN 46250 Phone (317) 578-4233 Fax (317) 578-4250 Martinsville, Ind. Elevation: Graphic Log **Blow Counts** Sample No. PID/Sens. Recovery Well Completion Depth (feet) Materials Description 62-10 25 32 34 SAA (SW), little fines 64-70 8 BOTTOM OF HOLE AT 65.0 FEET (NOTE: Samples from 43' to 65' were zero recovery in MW-6. Recorded lithology is from offset boring drilled on 10/2/97 and grouted to sfc upon completion.) 66-68 70 72 74 76 78 80 82 84 86 88-90

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Bruce Carter Associates, L.L.C.
6630 E. 75th St
Suite 300
Indianapolis, IN 46250

Log of Well MW-6 Alt (boring offset 10' W of MW-6) Twigg Corp. Martinsville, Ind.

Sheet 1 of 4

Job Number: 7403

Pho	I n (317) one	dianapoi : 578-423	is, IN 462 3 Fax (31	(50 7) 578-425	0		Mart	insville, Ind.	El	Elevation:	
Drille	er: Earti	h Explor	ation					Drilling	1	Date	Time
) Drill	Method	4.25" F	lollow Ste	m Auger				Started	2/	23/98	9:00 AM
Sam	ple Metl	hod: Spli	t Spoon					Finished	2/	23/98	3:00 PM
Borehole Diameter: 8.5" in. Water Level: N/A								Logged By: JW Kilmer		Checked	Ву:
	PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials D escripti	on		Well Completion
					2-		BLANK	DRILLED TO 74.5 FEET			
					4-			·			
					6-						
					8-						
					10-						
					12- - - 14-	Į					
					16-						
					18-						
					20-						Bentoni Seal
					22-						

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Log of Well MW-6 Alt (boring offset 10' W of MW-6) Twigg Corp. Martinsville, Ind.

Sheet 2 of 4

Job Number: 7403

	PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description	Well Completion
	PID/Sen	Recovery	BIOW COU	Sample N	30 32 34 36 38 40 42 44 46 50 52 54 56 58 58 58 58 58 58 58 58 58 58 58 58 58	Graphic I	Materials Description	Well Completion
-					-			

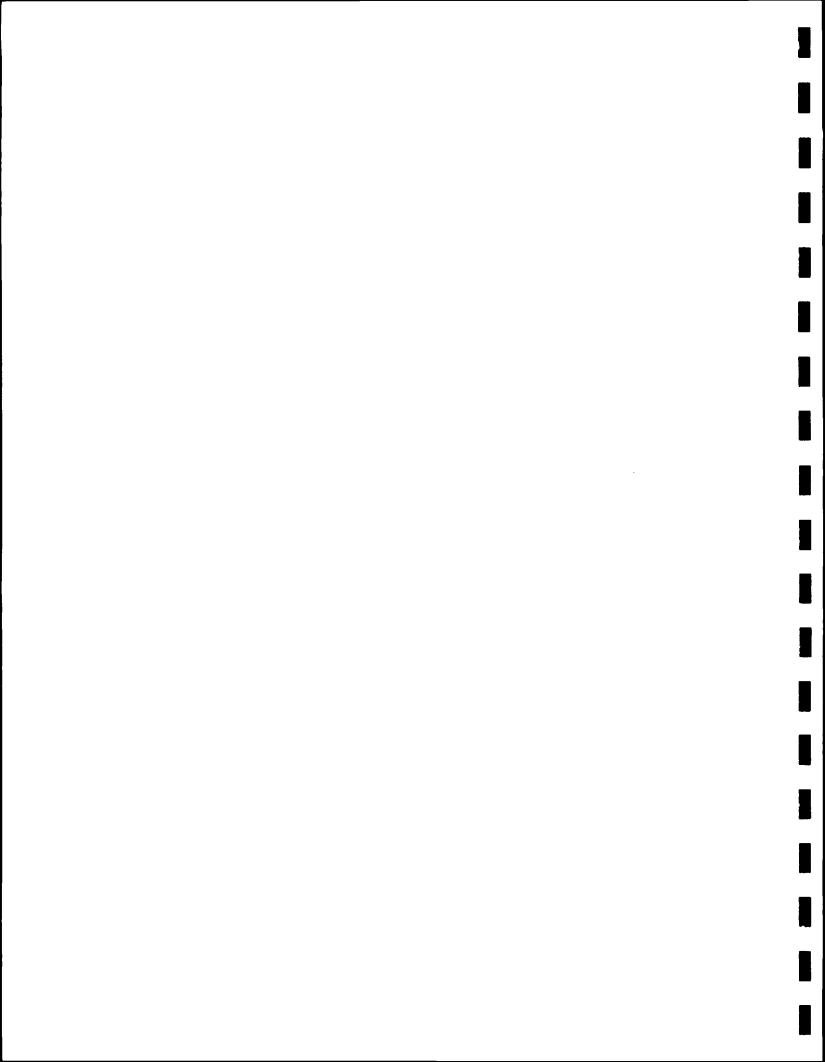
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Log of Well MW-6 Alt (boring offset 10' W of MW-6) Twigg Corp. Martinsville, Ind.

Sheet 3 of 4

Job Number: 7403

Phone (317) 578-4233	Fax (3	317) 578-4:	250		Martinsville, Ind.	Elevation:			
PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description		Well Completion		
				62- 64- 66- 68-						
	38	6 11 16 20	1	70- 72- 74- 76-		Wet, tan, well graded SAND & GRAVEL trace fines	(SG),			
				78- 80- 82- 84-		·				
	75	9 13 27 32	2		0000	SAA (SG), grey speckled		Bentonite — Seal		



Log of Well MW-6 Alt (boring offset 10' W of MW-6) Twigg Corp. Martinsville, Ind.

Sheet 4 of 4

Job Number: 7403

100 100	F	hone (317)	578-4233	Fax (3	317) 578-4	250		Martinsville, Ind.	Elevation:		
100 30 30 30 30 30 30 30		PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description		Well Completion	
3" brown sand, 8" grey hard clay (CL), 1" shale. 102- 104- 106- 108- 112- 114- 116-				19 25 30 36	3	96-		SAA (SG)			
104- 106- 108- 110- 112- 114- 116-		•	50		4	100-		shale.	1"		
						104- 106- 108- 110- 112- 114- 116-		Bottom of the Hole = 101.5 feet			

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Log of Well MW-7 (Sycamore St, N of Victory Park) Twigg Corp. Martinsville, Ind.

Sheet 1 of 2

Job Number: 7403

Driller: SES	Drilling	Date	Time
Drill Method: 4.25" Hollow Stem Auger	Started	10/1/97	2:40 PM
Sample Method: Split Spoon	Finished	10/1/97	7:00 PM

Sa	mple Met	hod: Spli	t Spoon					Fini	shed	10/	/1/97		7:00 PM
Во	rehole Di	ameter:	8.5" in.	Wate	r Level: 1	13-17.	2' BGS ('98)	Logged B	y: DR Farlov	7	Checke	d By: JW	Kilmer
	PI□/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materia	ls Descripti	on		₩ell	Completion Locking Cap
					2- 4- 6- 8-								Concrete Bentonite - Seal - 2" Ø - Sch.40 - Blank PVC -
		50	1 2 2 2 2	1	10-		Brown S dark yel SAND (S	ILT & SAND lowish brown SP)	(ML-SM) to (4/6) poorly	9', then Moi y graded fi	ist ne	XXXXXXXX	
					12- 14- 16- 18-	[hloé d'arl	v gravish br	- (4/2) wa	ll graded			
-		100	1 2 2 5	2	20-		SAND (S fines	c grayish bro SW) w/ trace	own (4/2) we to little grav	ii graded vel, trace		XXXX	1 1
					22- 22- 24- 26-					·		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	2" 0 Sch.40 Blank PVC

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Log of Well MW-7 (Sycamore St, N of Victory Park) Twigg Corp. Martinsville, Ind.

Sheet 2 of 2

Job Number: 7403

PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description	Well Completion
3	100	4 2 1 3	3	30- 30- 32-		SAA (SW), w/ some gravel @ 30'	Formation
				34-			2" Ø
	50	4 10 20 16	4	40- 42- 44- 46- 48-	1	Wet dark grayish brown (4/2) poorly graded fine & medium SAND (SP), w/ little course sand BOTTOM OF HOLE AT 40.0 FEET	
				50- 52- 54- 56- 58-			

Log of Well MW-8 (South St & Main St) Twigg Corp. Martinsville, Ind.

Sheet 1 of 2

Elevation:

Job Number: 7403

Driller: SESDrillingDateTimeDrill Method: 4.25" Hollow Stem AugerStarted10/1/977:30 AMSample Method: Split SpoonFinished10/1/971:00 PM

Sample Method: Split Spoon							Finished	10/1/97	1:00 PM	
Borehole Diameter: 8.5" in. Water Level: 11.6-16' BGS ('98)							Logged By: DR Farl	ow Check	ed By: JW Kilmer	
	PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Descrip	tion	Well Completion Locking
		50	1 2 2 2 2	1	2- 4- 6- 10-		Moist br dark bro trace fir	own SILTY SAND (SM) wn (3/3) well graded S es & trace gravel	changing to AND (SW) w/	Cap Concrete
		80	3 2 1 2	2	14- 16- 18- 20- 22- 24-		Wet hard trace gr (1/4") no	d brown (4/2) well grad avel, trace fines. Two oted at 19–20'.	ed SAND (SW), silt lenses	2" Ø Sch.40 Blank PVC

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Log of Well MW-8 (South St & Main St) Twigg Corp. Martinsville, Ind.

Sheet 2 of 2

Job Number: 7403

٠.	none (317)	578-4233	rax (011) 010-4.	250			Elevation:
	PID/Sens.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log	Materials Description	Well Completion
		70	8 9 10 8	3	30-		SAA (SW)	(SP)
	:				32-			
					34-			
					- -			
-				:	36-			2" Ø - Sch.40 - Blank PVC -
- -		75	12 16 18 17	4	38- - 40-		Wet poorly graded fine to medium SAND w/ little course sand, trace fines and tr gravel grading to dark brown (5/3) well graded SAND (SW) at 40'.	(SP) ace
-					42-			
-		80	14 23 19 14	5	44-	v a	SAA (SW) to 44'. Dark brown (5/3) we graded SAND & GRAVEL (SG), trace fin 44'.	Formation Sand
-					46-			2" Ø - Sch.40 - Slotted
-			10 23 20		48-	V Q	SAA (SG)	PVC (0.010°)
-	0/0	80	20 18	6	50-	0 0		
-					52-			
-	0/0	90	10 23 38 26	7	54-	• • •	SAA w/ little gravel (SW)	
-					56-			-
	0/0	90	10 24 31 38	8	58– - -		SAA (SW)	

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Log of Well MW-9 (parking lot east of Twigg) Twigg Corp. Martinsville, Ind.

Sheet 1 of 1

Job Number: 7403

Driller: Earth Exploration	Drilling	Date	Time
Drill Method: 4.25" HSA	Started	2/23/98	3:30 PM
Sample Method: Split Spoon	Finished	2/23/98	6:00 PM

20	mple met	TIOU. JPI	it apoon					rinished	2/23/80		.00 rM
Во	rehole D	iameter:	8.5" in.	Wate	r Level:	6.5-9	.6' BGS ('98	Logged By: JW Kilmer	Check	ed By:	
	PIO/Syns.	Recovery %	Blow Counts	Sample No.	Depth (feet)	Graphic Log		Materials Description	on	Well Co	mpletion - Locking Cap
_							Asphalt	and gravel base			
· - - - ;					2-		Blank o to 6-9 graded	drilled. Auger cutting SILT feet follow by fine-medium SAND (SP).	Y SAND (SM) poorly		< Concrete
					4-			• .			– Bentonite Seal – 2" Ø
-	,	1			6-					XXXXXX	Sch.40 Blank PVC
- -					8-					X	
_					10-						
-					12-	ţ				\ \frac{1}{2} \cdot \frac{1}{2	- 2" Ø Sch.40 Slotted PVC (0.010")
					14- 16-			•			•
_					10-						
-		:			18-						– Sand Pack Filter
-			:		20-		Bottom	of the Hole = 20.0 feet.			
-					22-						
-					24-						
-					26-						
-					- -						

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EACH LIY/SITE NAME TWIGG	well I.D. 1W-15 P.N. 740
1. WATER LEVEL MEASUREMENTS (before purging)	
Date Time Method (check one) steel	(3500.17)
Reference Point (check one) top of well casing top of protes. Depth to water from reference point b. Height of reference point above ground surface c. Depth to water from ground surface (a-b)	ective casing Units (check one) 🗌 feet 🗎 meters
2. PURGING	
Date 9/9/98 Time 1/:45 Equipment (bailer or pump ty	ype) <u>Electric submersible</u>
Inside diameter of wellinches	11
3-well volumes = (feet) - (feet) X total depth of total to water convers from ground factors ground (c above)	•
*conversion factors: for a 2-inch well = 0.5 -or- for a 4-i	inch well = 2.0 (rounded up to the mearest tenth)
Amount actually purged /2 gallons Well	pumped dry? Dyes X no
3. SAMPLING Date 9/9/8 Time 12:00 Equipment (bailer or pump Component materials (e.g., toflan)	type) bailer material) tubing, pump parts, bailer material) tubing, pump parts, bailer material)
1 500 MI MWIS DUPLICATE	amples to be filtered (specifty container type, .g., glass polyethylene, etc.)
A CICLO NELCHICUENTE	
4. FIELD MEASUREMENTS Temperature°C	Conductivity
)	4544
5. SAMPLE PREPARATION in -line Date 9/9/98 _ Time 12:00 Filtering Method field fill	ten Preservation Completed
5. SAMPLE PREPARATION 14 - 1:nG Date 9/9/98 Time 12:00 Filtering Method field 1.1	Sampler Preparer's Name J.W. Kilmen
5. SAMPLE PREPARATION Date 9/9/98 Time 12:00 Filtering Method field fill 12:15 MW/S DUPL 6. COMMENTS AND OBSERVATIONS (notes concerning well, samples	Sampler Preparer's Name J.W. Kilmen s, procedures, etc.)
5. SAMPLE PREPARATION 14 - 1:nG Date 9/9/98 Time 12:00 Filtering Method field 1.1	Sampler Preparer's Name J.W. Kilmen s, procedures, etc.)

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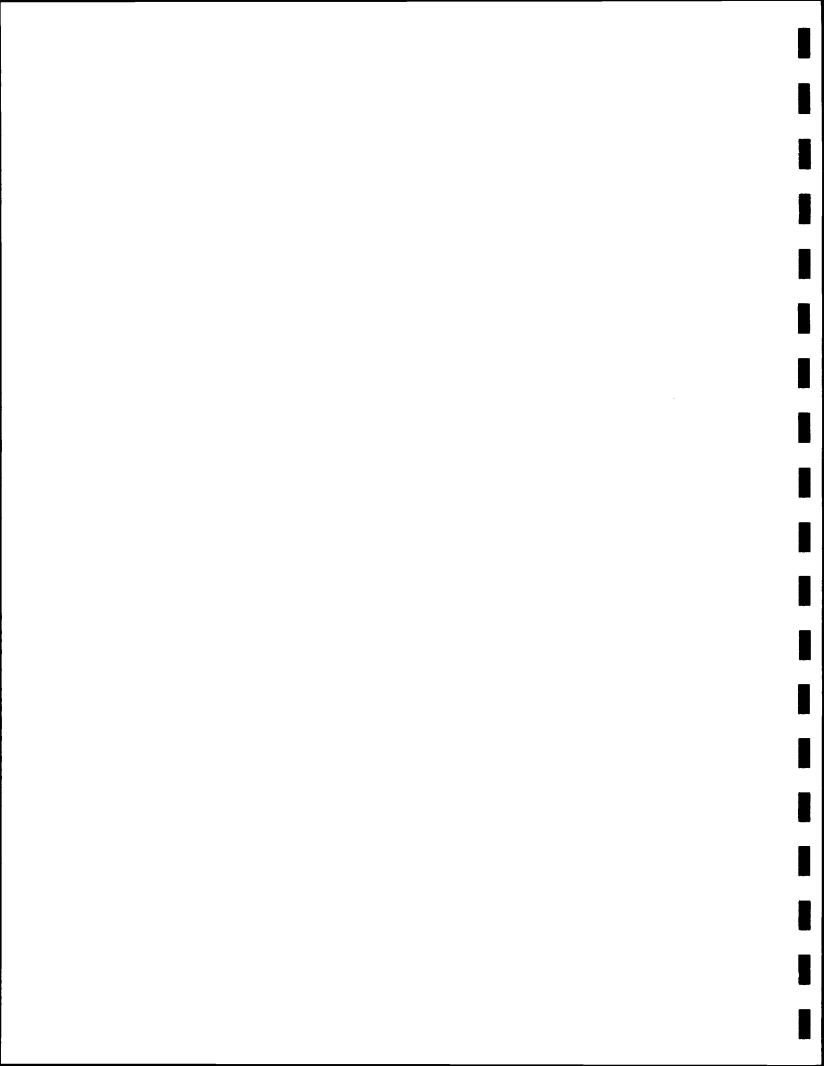
FACILITY/SITE NAME_TWIGO	well 1.D. MW-1D P.N. 740-3
1. WATER LEVEL HEASUREHENTS (before purging)	
Date Time Method (check one)	steel tape 🛘 electric meter 🗖 well sounder 🗖 other (specify)
Reference Point (check one) \(\Boxed{\text{lop of well casing }} \Boxed{\text{top of sell casing }} \Boxed{\text{top of sell casing }} \(\boxed{\text{top of sell casing }} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }} \Boxed{\text{lop of sell casing }} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }}} \Boxed{\text{lop of sell casing }}} \	
2. PURGING Date 9/9/98 Time 0:45 Equipment (bailer or p	exmp type) electric submersible
Inside diameter of wellinches 3-well volumes = (60 feet) - (60 feet) x total depth of total to water	
*conversion factors: for a 2-inch well = 0.5or- for	a 4-inch well = 2.0 (rounded up to the nearest tenth)
Amount actually purged 30 gallons	Well pumped dry? ☐ yes 反 no
Date 9/9/98 Time //:/ 5 Equipment (bailer or Component materials tellow	pump type) bailer material) (e.g, tubing,pump parts, bailer material)
List containers filled in the field: (a) Unfiltered Samples (specify parameters) 4 x 40ml VOA 2 x 40 ml VOA DUBLICATE)	(b) Samples to be filtered (specifty container type, e.g., glass polyethylene, etc.) Sampler's Name & Wilmer
4. FIELD MEASUREMENTS	
Temperature°C pH · 4 Replic · if a haz · waste si	ardous
Meter Type Time Completed	
5.SAMPLE PREPARATION	
Date Time Filtering Method	Preservation Completed
	. Sampler Preparer's Name
6. COMMENTS AND OBSERVATIONS (notes concerning well, s Fomped til water cleo	• •
Ly of mon a long	Collected reloves andle



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FACILITY/SITE NAME	TWI	6a		_ Well I.D. <u>MW</u> -	1DP.N. 7403
1. WATER LEVEL HEASU	REMENTS (befor	e purging)			
Date	Time	Method (check one)	steel tape 🗌 el	ectric meter 🗌 well s	ounder 🛘 other (specify)
Reference Point (che a. Depth to water fr b. Weight of referen c. Depth to water fr	om reference p nce point above	oint ground surface	<u> </u>	ing Units (check one	e) 🗌 feet 🗆 meters
2. PURGING Date 7/23/98 1	Time /2:45	quipment (bailer or	pump type)	Flecture Sud.	nersible
Inside diameter of b	rellinche	es.		_	
y	stat depth of	total to water from ground (c above)	conversion factor*	gallons	·
*conversion factors:	for a 2-inch	well = 0.5 -or- f	or a 4-inch well	= 2.0 (rounded up to	the nearest tenth)
Amount actually pur	ged 25 gal	lons	Well pumped d	ry? 🗆 yes 💆 no	
3. SAMPLING Date 7/23/98	Time /:30	Equipment (bailer of Component material	or pump type) ls (e.g, tubing,	Telbo bailer mat	cefial)
List containers fil (a) Unfiltered Samp 3x 40m/	les (specify p		(b) Samples to	be filtered (specift s polyethylene, etc.)	y container type,
		_			
		_	Sampler's	N ame	
4. FIELD MEASUREHEN	its				
Temperature	<u>, c</u>	pH · 4 Repli · if a ha · waste s	zardous	anductivity	
	Heter Ty Time Complet	/peed			
5. SAMPLE PREPARATIO	н н				
Date	Time	Filtering Method		☐ Preservation Comp	leted
			. Sampler P	reparer's Name	
6.COMMENTS AND OBS	ERVATIONS (not	es concerning well,	samples, procedu	res, etc.)	
P	01.1	C/0	a codino	nt in 50 m	/-



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INDIANA 46250

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FACILITY/SITE NAME_	Twigg	<u>, </u>	W	ell 1.d. W-5	P.N
1. WATER LEVEL MEASS Date $6/25/98$	JREMENTS (befo	re purging) 5: <i>30</i> Method (check one) 🗆 ste	el tape 🗌 elect	ric meter□ well sour	nder 🗌 other (specify)
a. Depth to water f	rom reference nce point abov	e ground surface	rotective casing — — —	Units (check one)	feet 🗆 meters
2. PURGING Date 6/25/98	Time 3:30	Equipment (bailer or pump	type) Pu	mø	
Inside diameter of					
3-well volumes = (_t	feet)	- (feet) x total to water conve from ground fact (c above)	=	lons .	
*conversion factors	: for a 2-inch	well = 0.5 -or- for a	4-inch well = 2	.0 (rounded up to the	nearest tenth)
Amount actually pur	-ged_ <u>20_</u> ga1	llons . We	ell pumped dry?	yes 🛮 no	
3. SAMPLING				· •	
Date 4:80	Time	_ Equipment (bailer or pu Component materials (e	mp type)	parts, bailer materi	al)
List containers fi (a) Unfiltered Sam 3 VOA		parameters) (b)	Samples to be e.g., glass po	filtered (specifty o	container type,
		_		- -	
		_	Sampler's Name		
4. FIELD MEASUREHE	TS STK				
Temperature	_*c	pH · 4 Replicates · if a hazards · waste site		ctivity	
	Meter Time Comple	Type	-		
5.SAMPLE PREPARAT	ION				
Date		Filtering Method		Preservation Complet	ed
			Sampler Prepa	rer's Name	
6.CCHMENTS AND OB	SERVATIONS (no	tes concerning well, samp	les, procedures	, etc.)	

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FACILITY/SITE NAME	<u> Tw. 90</u>	7		Well I.D. MW-7	_ P.N
1. WATER LEVEL MEA	SUREMENTS (before	purging)			
' / /			teel tape 🗌 el	ectric meter 🗆 well sour	nder 🛘 other (specify)
a. Depth to Water	from reference po ence point above	ground surface		ing Units (check one)[feet 🗌 meters
2. PURGING Date 6/25/98	Time 4:15 E	quipment (bailer or p	ump type)		
Inside diameter of	f wellinches	s			
3-well volumes =	Mett II Ou	(feet) X total to water cor from ground fa (c above)	$= \frac{1}{6} \sum_{n \in \mathbb{N}} \frac{1}{n}$ actor*	gallons	·
*conversion facto	rs: for a 2-inch t	well = 0.5 -or- for	a 4-inch well:	= 2.0 (rounded up to the	e nearest tenth)
Amount actually p	urged_20_gall	ons	Well pumped dr	y? 🛘 yes 🖪 no	
3. SAMPLING Date 6/25/98	7 Time 4:58	Equipment (bailer or Component materials	pump type) (e.g, tubing,p	ump parts, bailer mater	ial)
(a) Unfiltered Sa	filled in the fiel amples (specify pa	d: rameters) (b) Samples to e.g., glass	be filtered (specifty of polyethylene, etc.)	container type, — —
		-	Sampler's N	апе	
4. FIELD MEASURE	HENTS				
Temperature	•c	pH · 4 Replica · if a haza · waste sit	rdous	nductivity	
	Meter Ty Time Complete	peed			
5.SAMPLE PREPARA	TION				
Date	Time F	iltering Method		☐ Preservation Complet	
			. Sampler Pr	eparer's Name	
6.COMMENTS AND C	DBSERVATIONS (note	es concerning Well, sa	mples, procedu	res, etc.)	

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FACILITY/SITE NAME	Twigg			well 1.D. <u>MW</u> -	<u>-/D</u> p.n
1. WATER LEVEL MEASU					
		Method (check one) 🗆 ste	el tape 🗆 ele	ctric meter 🗆 well s	ounder 🛘 other (specify)
Reference Point (che a. Depth to water fr b. Weight of referer c. Depth to water fr	om reference p nce point above	ground surface	rotective casi _8 _ _ _	ng Units (check one) [] feet [] meters
2. PURGING					
Date	rime_ <u>5:17</u> E	quipment (bailer or pum	р type)		
Inside diameter of i	wellinche	es	a	_	
• • • • • • • • • • • • • • • • • • •	otal depth of well from ground	from ground fact (c above)	tor*		
*conversion factors	: for a 2-inch	well = 0.5 -or- for a	4-inch well =	2.0 (rounded up to	the nearest tenth)
Amount actually pur	ged_ <i>30</i> gal1	lons W	ell pumped dr	y? yes no	
3. SAMPLING Date 6/25/98	Time_5; 40	Equipment (bailer or p. Component materials (mp type) e.g, tubing,p	ump parts, bailer mat	erial)
List containers fil (a) Unfiltered Samp	led in the fie bles (specify p	ld: arameters) (b)) Samples to e.g., glass	be filtered (specift polyethylene, etc.)	y container type,
		_ _			
· · · · · · · · · · · · · · · · · · ·		_ _			
			Sampler's N	ane	
4. FIELD MEASUREHE	NTS				
Temperature	_*c	pH 4 Replicate if a hazard waste site		nductivity	
		ype			
5.SAMPLE PREPARATI	OH			·	
Date	Time	Filtering Meth∞d		☐ Preservation Comp	leted
			Sampler Pr	eparer's Name	
6.CCHMENTS AND OBS	SERVATIONS (not	es concerning well, same	ples, procedu	es, etc.)	



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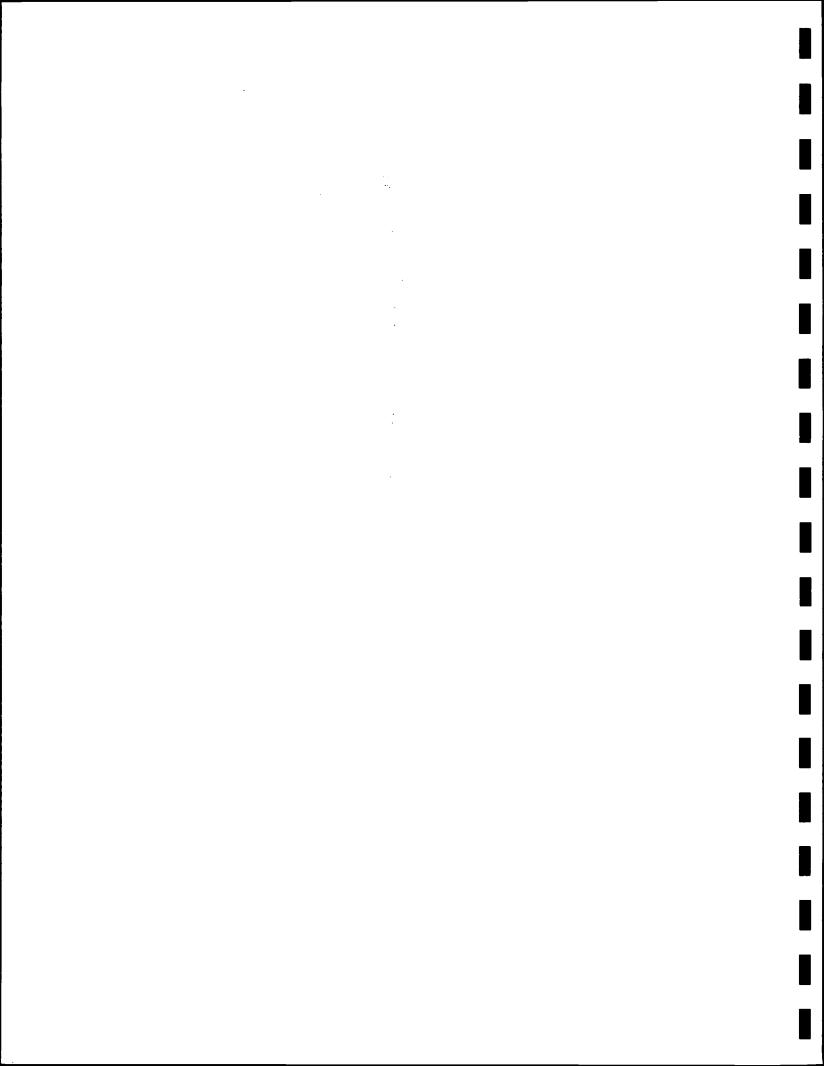
ACILITY/SITE NAME	Well I.D. MW-9 P.N
. WATER LEVEL MEASUREMENTS (before purging)	
ate $\frac{5.59}{100}$ Time $\frac{6/25/98}{100}$ Method (check one) \square stee	l tape □ electric meter □ well sounder □ other (specify)
eference Point (check one) top of well casing top of pro . Depth to water from reference point . Neight of reference point above ground surface . Depth to water from ground surface (a-b)	tective casing Units (check one) 🗌 feet 🗎 meters
PURGING Time 6.00 Equipment (bailer or pump	type)
Inside diameter of wellinches	
G-well volumes = (feet) - (feet) X total depth of total to water conver well from from ground facto ground (c above)	= 5,7 gallons rsion r*
*conversion factors: for a 2-inch well = 0.5 -or- for a 4	-inch well = 2.0 (rounded up to the nearest tenth)
	ll pumped dry? □yes □no
3. SAMPLING	
Date 6/25/98 Time 6:15 Equipment (bailer or pum Component materials (e.	g, tubing,pump parts, bailer material)
List containers filled in the field: (a) Unfiltered Samples (specify parameters) (b)	Samples to be filtered (specifty container type, e.g., glass polyethylene, etc.)
	Sampler's Name
4. FIELD MEASUREMENTS	
TemperatureC pH · 4 Replicates if a hazardo	Conductivity
Meter Type	· · · · · · · · · · · · · · · · · · ·
5.SAMPLE PREPARATION	
Date Time Filtering Method	Preservation Completed
•	
•	Sampler Preparer's Name

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FACILITY/SITE NAME	Vell I.D. MW-8	P.N
1. WATER LEVEL MEASUREMENTS (before purging)		
Date 6:45 Time 6/25/98 Method (check one) steel tape]electric meter□well sounde	r 🗌 other (specify)
Reference Point (check one) top of well casing top of protective a. Depth to water from reference point b. Height of reference point above ground surface c. Depth to water from ground surface (a-b)	casing Units (check one) 🗆 f	eet 🗆 meters
2. PURGING		
Date 6545 Time 6/25/98 Equipment (bailer or pump type)_		
Inside diameter of wellinches		
3-well volumes = (feet) - (feet) x = // total depth of total to water conversion well from from ground factor* ground (c above)	<u>S</u> gallons	
*conversion factors: for a 2-inch well = 0.5 -or- for a 4-inch we	ell = 2.0 (rounded up to the n	earest tenth)
Amount actually purgedgallons Well pumper	d dry?	
Date 6/25/98 Time 7:05 Equipment (bailer or pump type) Component materials (e.g, tubin List containers filled in the field: (a) Unfiltered Samples (specify parameters) (b) Samples e.g., 91	ng,pump parts, bailer material to be filtered (specifty con lass polyethylene, etc.)	
Sampler	's Name	
4. FIELD MEASUREMENTS		
TemperatureC pH · 4 Replicates if a hazardous waste site	Conductivity	
Meter Type	·	<u> </u>
5.SAMPLE PREPARATION Date Filtering Method	☐ Preservation Completed	÷
·	· Preparer's Name	
6.COMMENTS AND OBSERVATIONS (notes concerning well, samples, proc		





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FACILITY/SITE NAME	well I.D. MW-6 P.N
. WATER LEYEL, MEASUREMENTS (before purging)	
Date 625/98 Time 7:20 Method (check one)	steel tape electric meter well sounder other (specify)
Reference Point (check one) \(\Boxed{\operation}\) top of well casing \(\Boxed{\operation}\) top o a. Depth to water from reference point b. Neight of reference point above ground surface \(\boxed{\operation}\). Depth to water from ground surface (a-b)	
2. PURGING /	
Date 6/25/98 Time 7:25 Equipment (bailer or	ритр type)
Inside diameter of wellinches	
3-well volumes = (feet) - (feet) x _ total depth of total to water c well from from ground ground (c above)	= [/1.5gallons conversion factor*
*conversion factors: for a 2-inch well = 0.5 -or- fo	r a 4-inch well = 2.0 (rounded up to the nearest tenth)
Amount actually purgedgallons	Well pumped dry? yes no
3. SAMPLING 6/25/98 Time Equipment (bailer of Component material	r pump type)s (e.g, tubing,pump parts, bailer material)
List containers filled in the field: (a) Unfiltered Samples (specify parameters)	(b) Samples to be filtered (specifty container type, e.g., glass polyethylene, etc.)
	Sampler's Name
4. FIELD MEASUREMENTS	
TemperatureC PH 4 Replication if a harmonic waste s	zardous
	
Meter TypeTime Completed	
5.SAMPLE PREPARATION	
DateTimeFiltering Method	Preservation Completed
	. Sampler Preparer's Name
· · · · · · · · · · · · · · · · · · ·	enales procedures etc.)

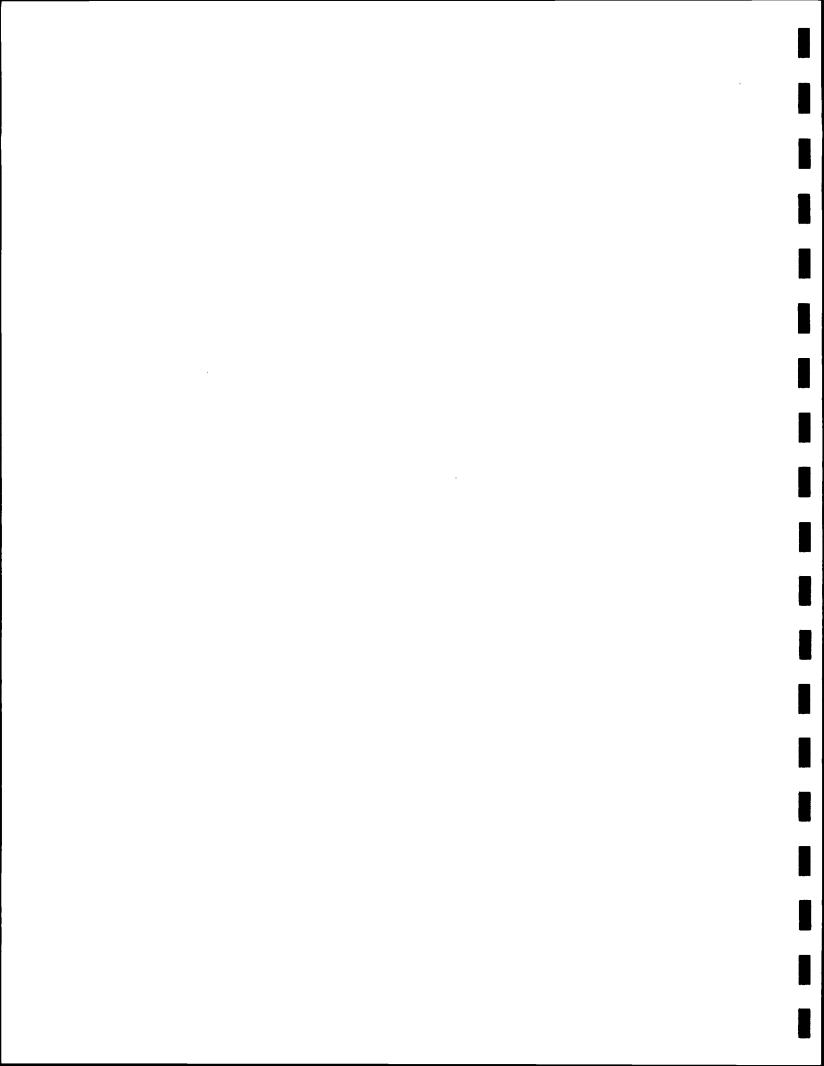




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•		Well I.D. MW-3 P.N
FACILITY/SITE NAME	T Wigg	RELL 1.D.[
, ,	REHENTS (before purging)	
Date 6/26/98	Time 1:00 Method (check one) st	eel tape 🗌 electric meter 🗍 well sounder 🗍 other (specify)
a. Depth to water fr	ck one) top of well casing top of prom reference point case point above ground surface com ground surface (a-b)	rotective casing Units (check one) 🗌 feet 🗆 meters
2. PURGING		Por Va
Date 6/26/98	Time 1:03 Equipment (bailer or pur	p type)
inside diameter of i	well inches	
) (ground (c above)	tor*
*conversion factors		4-inch well = 2.0 (rounded up to the nearest tenth)
Amount actually pur	ged_3_gallons	lell pumped dry? Dyes Dno
3. SAMPLING Date 2:15	Time 6/26/18 quipment (bailer or procedure) Component materials (ump type)e.g, tubing,pump parts, bailer material)
List containers fil (a) Unfiltered Samp	led in the field: (bles (specify parameters) (b) Samples to be filtered (specifty container type, e.g., glass polyethylene, etc.)
· · · · · · · · · · · · · · · · · · ·		
		Sampler's Name
4. FIELD MEASUREME	NTS	
Temperature	_°C	dous
-	<u> </u>	
	Meter Type	
5. SAMPLE PREPARATI	ОН	
Date	Time Filtering Method	Preservation Completed
		Sampler Preparer's Name
6.COMMENTS AND OBS	SERVATIONS (notes concerning well, same	ples, procedures, etc.)





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ACILITY/SITE NAME	T	199		Well I.D. MW-1S	_ P.N
. WATER LEVEL HEA	ASUREMENTS (bei	ore purging)			
ate <u>3:15</u>	_ Time 6/26/	2 Hethod (check one) []steel tape□e	lectric meter□well sour	der Dother (specify)
. Depth to water	from reference rence point abo	point ove ground surface		sing Units (check one)	feet 🗆 meters
PURGING					
ate 3125	_ Time 6/26/9	Equipment (bailer or	pump type)		
nside diameter o	of wellin	ches			
3-well volumes ≖	Sett II all) - (feet) X f total to water from ground (c above)	= 4.5 conversion factor*	gallons	
conversion facto	ors: for a 2-in	ch well = 0.5 -or- f	or a 4-inch well	= 2.0 (rounded up to the	nearest tenth
Amount actually p				dry? yes no	
Date 3:30 List containers (a) Unfiltered S	filled in the		(b) Samples to	pump parts, bailer materi b be filtered (specifty of s polyethylene, etc.)	
	<u> </u>		Sampler's	Name	
	202070				
4. FIELD MEASURE		pH 4 Repli if a ha waste s	izardous	onductivity	
				·	
5 CAMPLE DOEDAD	ATION			·	
5. SAMPLE PREPARA					
	Time	Filtering Method		Preservation Complet	

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FACILITY/SITE NAME_	Tw	199	Well I.D. MW-4 P.N
1. WATER LEVEL MEAS	SUREMENTS (befo	re purging)	
. , ,			el tape 🗌 electric meter 🗎 well sounder 🗖 other (specify)
a. Depth to water f	from reference ence point abov	point e ground surface	rotective casing Units (check one) 🗌 feet 🗎 meter — — —
2. PURGING			
Date 6/26/98	Time 425	Equipment (bailer or pump	p type)
Inside diameter of	wellinch	es	
	ground	- (feet) x total to water conve from ground factor (c above)	•
*conversion factor:	s: for a 2-inch	well = 0.5 -or- for a	4-inch well = 2.0 (rounded up to the nearest ten
Amount actually pu			ell pumped dry? 🗆 yes 🗆 no
Date 6/2/98 List containers fi (a) Unfiltered Sam	illed in the fi	eld: !	mp type)e.g, tubing,pump parts, bailer material) Samples to be filtered (specifty container type.g., glass polyethylene, etc.)
		_	Sampler's Name
4. FIELD MEASUREHE	ENTS		
Temperature	*c	pH4 Replicatesif a hazardowaste site	s Conductivity
		уре ted	
5. SAMPLE PREPARAT	ION		· · · · · · · · · · · · · · · · · · ·
Date	Time	Filtering Method	
		•	Sampler Preparer's Name
7	PERMITIONS (ma	tos concerning Well samo	les procedures, etc.)

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FACILITY/SITE NAME	TWIGG		Well I.D. <u>MW-8</u>	9 p.n. 7403
1. WATER LEVEL MEA	SUREMENTS (bef	ore purging)		
Date <u>5/22</u>	_ Time <u>#089</u>	√Method (check one) ☐ stee	el tape delectric meter 🗆 well	\
Reference Point (c a. Depth to water b. Height of refer c. Depth to water	theck one) X to from reference rence point about from ground st	e point $\frac{12.69}{37/4}$	otective casing Units (check or	ve)∭Tfeet□meters
2. PURGING Date 5/22/6	8 Time 2:45	Equipment (bailer or pump	type) electric submi	eirs, bly
Inside diameter o	f wellin	ches		
	ground	f total to water converse from ground facts (c above)	•	
*conversion facto	rs: for a 2-in	ch well = 0.5 -or- for a	4-inch well = 2.0 (rounded up to	the nearest tenth)
Amount actually p			ell pumped dry? 🛘 yes 💢 no	
3. SAMPLING				
	Time <u>- 3:(5</u>	Equipment (bailer or pur Component materials (e	np type) <u>bailer</u> .g, tubing,pump parts, bailer ma	iterial)
List containers to (a) Unfiltered St	amples (specify	field: (b) parameters) (b)	Samples to be filtered (specif e.g., glass polyethylene, etc.	ty container type,
		<u>—</u>		
			Sampler's Name John W. A.	Elmen
4. FIELD MEASURE	HENTS		,	
Temperature	•c	pH • 4 Replicates if a hazard waste site	Conductivity	
		Type		
5. SAMPLE PREPARA	ATION			
Date	Time	Filtering Method	Preservation Com	pleted
		•	Sampler Preparer's Name	
ל בנאאבחבל זחט ו	ORSERVATIONS (notes concerning well, samp	les, procedures, etc.)	
		ear ddy + town	•	



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	Vell I.D. MW #18 P.N. 740
. WATER LEVEL MEASUREMENTS (before purging)	
hate $3/26$ Time $2/90$ Nethod (check one) \Box s	steel tape Relectric meter D well sounder D other (specify)
Reference Point (check one) top of well casing top of a. Depth to water from reference point b. Height of reference point above ground surface c. Depth to water from ground surface (a-b)	protective casing Units (check one) 反 feet ☐ meters
2. PURGING $z:45$ Date $5/27$ Time $3:00$ Equipment (bailer or particular)	ump type) electric submersible.
Inside diameter of well 2 inches	
well from from ground fa ground (c above)	actor*
*conversion factors: for a 2-inch well = 0.5 -or- for	
Amount actually purged 15 gallons	Well pumped dry? ☐ yes ☒ no
3. SAMPLING	
Date 3/27 Time 3100 Equipment (bailer or Component materials	pump type) <u>electvic Formers</u> (e.g., tubing, pump parts, bailer material) coupe Poly tubing
List containers filled in the field: (a) Unfiltered Samples (specify parameters) 3, VOA w/HCL 3 / liter an bev 8/05/ 1 900 14 plastic **	(b) Samples to be filtered (specifty container type, e.g., glass polyethylene, etc.)
	Sampler's Name J. K. Jucy V Konman
4. FIELD MEASUREMENTS	
Temperature 56.7c pH_ · _ 4 Replica if a haza waste sit	ardous
Meter Type <u>Hydac</u> Time Completed <u>3:00</u>	
5. SAMPLE PREPARATION	
Date 3/27 Time 3:10 Filtering Method 45	4/11 Preservation Completed
Nouton field filtration Kit	. Sampler Preparer's Name John Kilmein/K





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FACILITY/SITE NAME Twigg	Manufacting Ma	wtinsville Well 1.0. MW	#5 P.N
. WATER LEVEL HEASUREMENTS (bef	ore purging)		
Date 3/27/98 Time 5:00	Hethod (check one) 🗆 ste		• •
Reference Point (check one) top a. Depth to water from reference b. Height of reference point abo c. Depth to water from ground su	ve ground surface	otective casing Units (check — — —	cone) ☐ feet ☐ meters
2. PURGING Date 3/27/98 Time 8:15	Equipment (bailer or pump	type)Electric	Submerible
Inside diameter of wellinc 3-well volumes = (feet; total depth or well from ground	(c above)		
*conversion factors: for a 2-inc	ch well = 0.5 -or- for a	4-inch well = 2.0 (rounded up	to the nearest tenth
Amount actually purged 15 g	allons · · · · · · · · · · · · · · · · · · ·	ell pumped dry? . yes 🗷 no	
3. SAMPLING Date 3/27/98 Time 8:20	Equipment (bailer or pu Component materials (e Stain less	mp type) <u>Electric</u> S e.g., tubing.pump parts, bailen Mastic Nump	- material)
List containers filled in the f (a) Unfiltered Samples (specify	parameters) (b)	Samples to be filtered (spee.g., glass polyethylene, e	cifty container type, tc.)
Myro 3x yonh	<u>/////</u>	[dyetherlene]	ubias_
		Sampler's Name	
4. FIELD MEASUREMENTS			
Temperature_58.5°c	pH · 4 Replicate · if a hazard · waste site		668 687 705 706
Meter Time Comp	Type Hydac	· · · · · · · · · · · · · · · · · · ·	
5. SAMPLE PREPARATION			
Date Time	Filtering Method	Preservation	Completed
		Sampler Preparer's Name	
6.COMMENTS AND OBSERVATIONS (F	notes concerning well, samp	oles, procedures, etc.)	

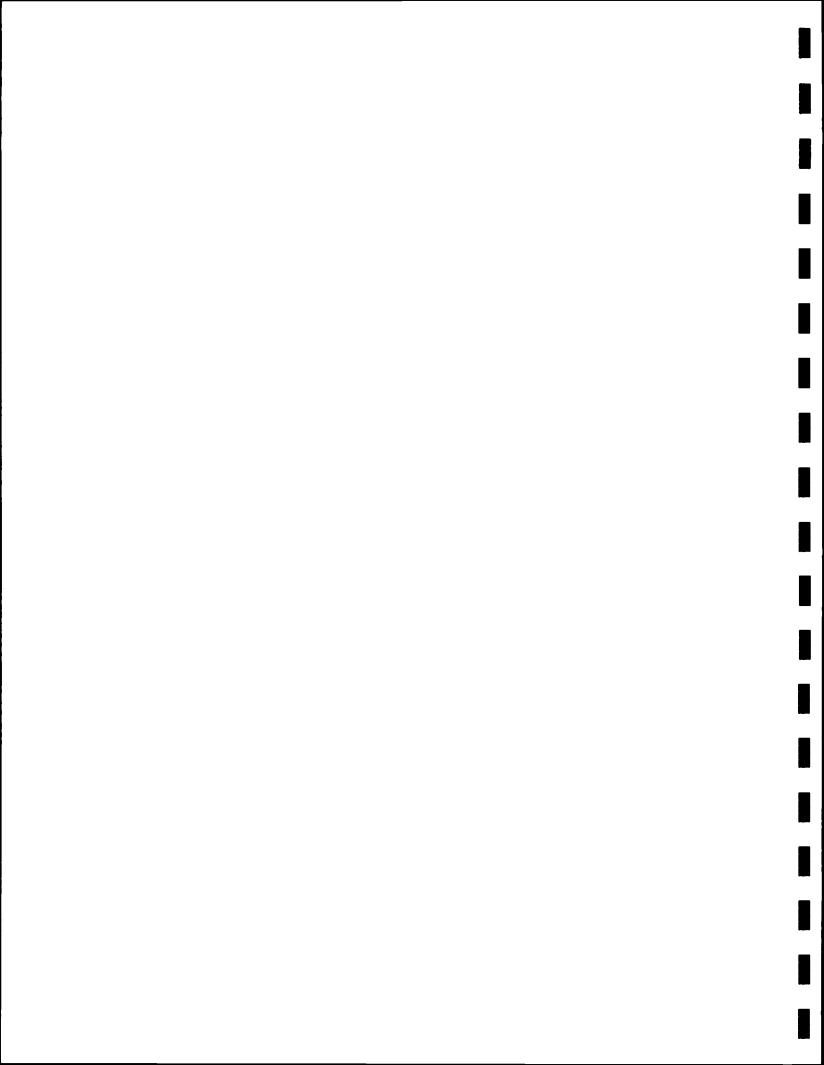
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	M1#9
FACILITY/SITE NAME Twigg (Martinsville)	Well I.D. MW#9 P.N
1. WATER LEVEL MEASUREMENTS (before purging)	·
Date 3/86/98 Time 5:50 Method (check one) steel 1	
Reference Point (check one) top of well casing top of protes a. Depth to water from reference point b. Height of reference point above ground surface c. Depth to water from ground surface (a-b)	ctive casing Units (check one) ☐ feet ☐ meters
2. PURGING	
Date 3/27/98 Time 9:00 ConEquipment (bailer or pump ty	pe)
Inside diameter of well \bigcirc inches 3-well volumes = $(\bigcirc$ feet) - $(\bigcirc$ feet) x \bigcirc feet) x \bigcirc form ground factor* ground (c above)	
*conversion factors: for a 2-inch well = 0.5 -or- for a 4-i	nch well = 2.0 (rounded up to the nearest tenth)
"Amount" actually purged "6 " gallons 10 100 00 00 00 00 00 00 00 00 00 00 00	pumped dr.y?yes. @.no
3. SAMPLING	
Date 3/27/98 Time 9:00am Equipment (bailer or pump Component materials (e.g. Stainless)	type) <u>Submesible electric</u> tubing, pump parts, bailer material) Olastic pump
List containers filled in the field: (a) Unfiltered Samples (specify parameters) 3 X 40 mL VOA fottes with teflor lined Septa.	riples to be filtered (specifty container type, g., glass polyethylene, etc.) NA Polyethylene dube
	empler's Name
4. FIELD MEASUREMENTS	
Temperature 58.5°¢F pH 4 Replicates if a hazardous waste site	Conductivity
Meter Type Hydac 9:15	
5.SAMPLE PREPARATION	
Date Time Filtering Method	Preservation Completed
•	ampler Preparer's Wame
6.COMMENTS AND OBSERVATIONS (notes concerning well, samples	, procedures, etc.)
Silty Samples (cloud	`
Dilly milker Com	11

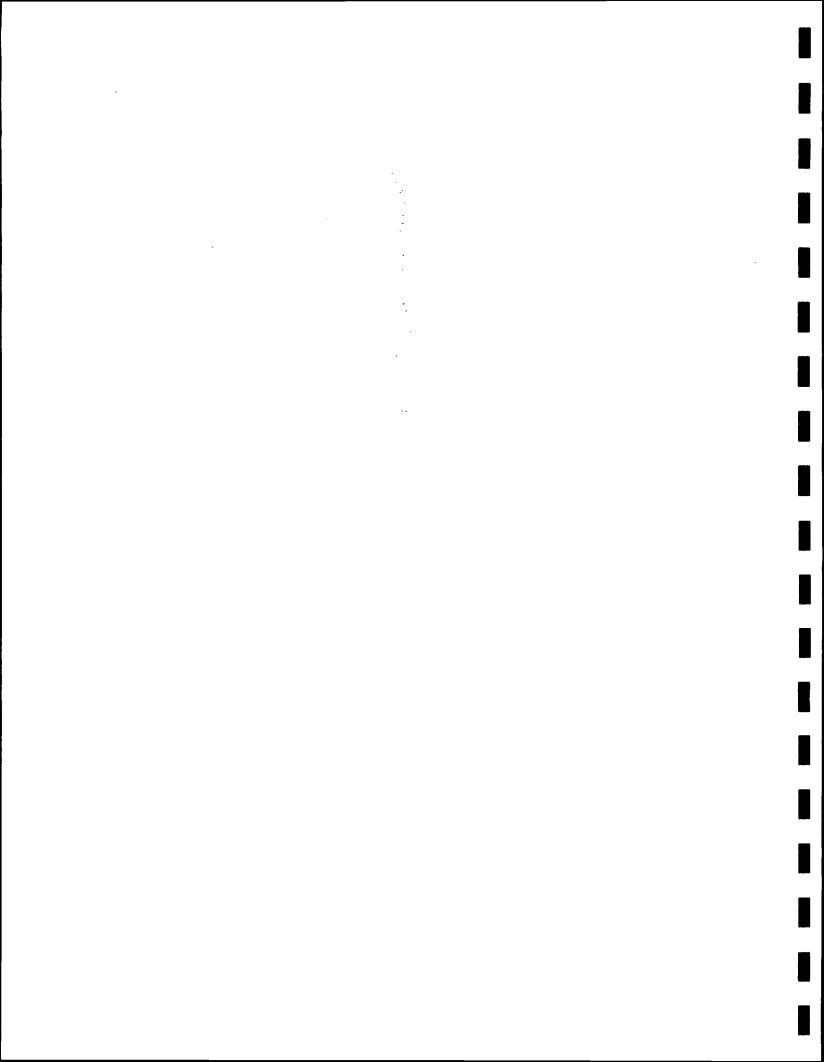




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FACILITY/SITE NAME Twigg	Many facturing (Mart	instille Well I.D. MW# ID P.N.
1. WATER LEVEL MEASUREMENTS (be	fore purging)	
Date 3/27/98 Time 10:0	20 An Method (check one) ☐ stee	el tape 🕏 electric meter 🗌 well sounder 🗎 other (specify)
Reference Point (check one) to to a. Depth to water from reference b. Height of reference point abc. Depth to water from ground s	ove ground surface	otective casing Units (check one) feet meters
2. PURGING Date 3/27/98 Time 10:00	Amequipment (bailer or pump	o type) Electric Submusible Pamp
	h	
3-well volumes = (O fee total depth well from ground	t) - (10.25 feet) x of total to water converse from ground factor (c above)	·
*conversion factors: for a 2-i	nch well = 0.5 -or- for a	4-inch well = 2.0 (rounded up to the nearest tenth)
Amount actually purged 25		ell pumped dry? 🛘 yes 🔞 no
3. SAMPLING Date 3/27/98 Time 10:15	An Equipment (bailer or pur Component materials (e	mp type) <u>Electric Subsersithe Pump</u> e.g., twoing, pump parts, bailer material) I Plastic Polyethylem tubing
List containers filled in the (a) Unfiltered Samples (specifical)	field: fy parameters) (b)	samples to be filtered (specifty container type, e.g., glass polyethylene, etc.) HCL Adoled Br. Lah
		Sampler's Name John Kilmer / 5eft Korman
4. FIELD MEASUREMENTS		
Temperature <u>58.5</u> • F	pH · 4 Replicates · if a hazard · waste site	es Conductivity 600 Bous 687 690 688
Mete Time Com	er Type Hydac pleted 10:30	·
5. SAMPLE PREPARATION		
DateTime	Filtering Method	Preservation Completed
		Sampler Preparer's Name
6.CCMMENTS AND OBSERVATIONS	(notes concerning well, samp	ples, procedures, etc.)





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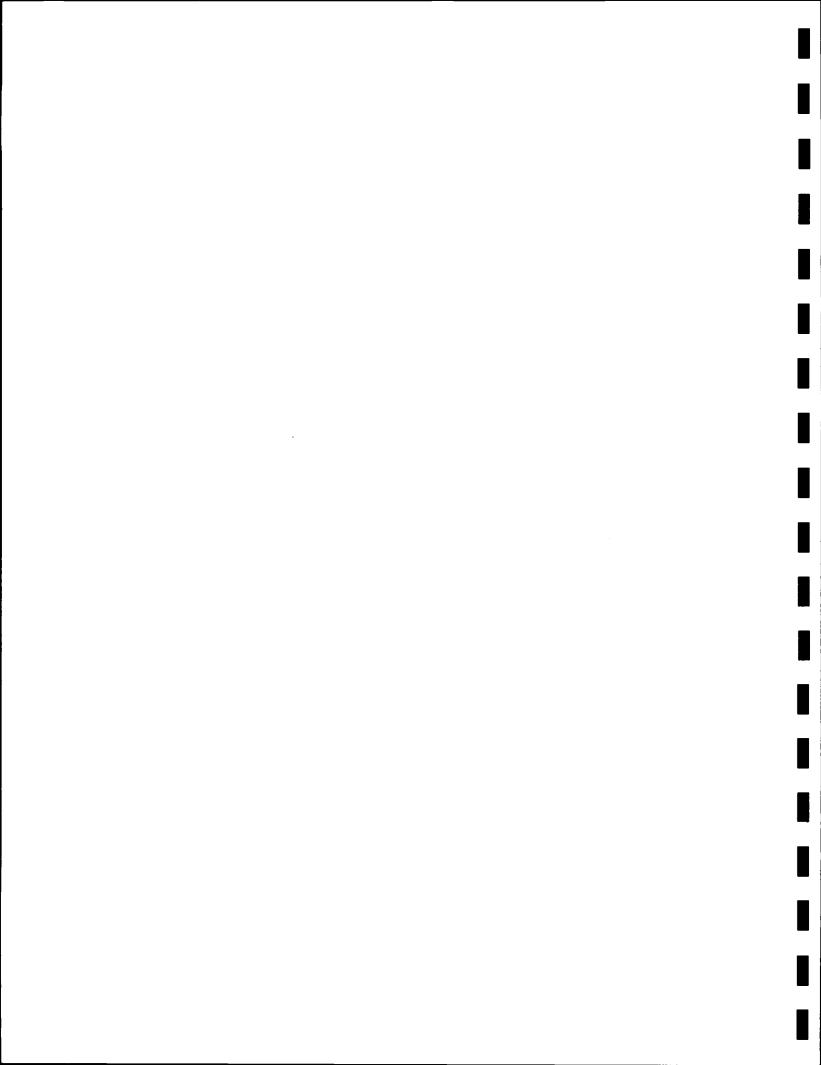
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FACILITY/SITE WAM	E Twigg	Many facturing (MC	intinsaille) we	11 1.0. MW# 1]	P.N
1. WATER LEVEL HE	ASUREHENTS (bef	ore purging)			
Date 3/27/98	8 Time <u> </u>	$0 \frac{An}{1}$ Method (check one) $0 \frac{1}{2}$	steel tape B electr	ic meter 🗌 well soun	der 🗌 other (specify)
 Denth to Water 	r from reference erence point abo	ve ground surface	protective casing	Units (check one)	feet 🗌 meters
2. PURGING	' wood	Equipment (bailer or p	um type) Elect	Toje Submersible	Pamp
Date	Time	Ednibueur (parren or b	dip ()p=1	···	
Inside diameter	of wellin 60 feet) - (10.25feet) x _	.5 = 24.5 gal	lons	
J Act to and	total depth o well from ground	f total to water co from ground f (c above)	nversion actor*	•	
	•	ch well = 0.5 -or- for	- Asiach wall = 2.	0 (rounded up to the	nearest tenth)
Amount actually	purgedg	allons	Well pumped dry?	Liyes Beino	
3. SAMPLING Date 3/27/98	Time <u>/0:15</u> /	9m Equipment (bailer or Component materials ShainL	pump type) Ele (e.g., tubing, pump SS/Plastic Poli	parts, bailer materi yethylen tukin	Pump (al)
List containers (a) Unfiltered	filled in the	field: / parameters)	(b) Samples to be	filtered (specifty of lyethylene, etc.) bled By Lab	
					_
	<u> </u>		Sampler's Name	John Milmer/	Seft Korman
4. FIELD HEASUR	EMENTS				
Temperature_50	<u>5.5</u> ∙ F	pH • 4 Replication	ardous	687 690 688	
·	Heter Time Comp	Type Hydac leted 10:30	· 		
5. SAMPLE PREPAR	RATION	_		•	
Date	Time	Filtering Method		Preservation Complet	:ed
		,	. Sampler Prepa	rer's Name	



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FACILITY/SITE NAME_	Twigg	(Martinsville)		Well I.D. # \$ MW	P.N
1. WATER LEVEL MEAS					
		Method (check one) ☐ st	eel tape 🛭 ele	ectric meter 🗌 well sou	nder 🗌 other (specify)
a. Deoth to Water f	rom reference ince point abov	re ground surface	orotective casi 	ng Units (check one)	☐ feet ☐ meters
2. PURGING Date 3/27/98	Time :00	Equipment (bailer or pun	np type)E	lecteic Submusible	Punip
Incide diameter of	well incl	hes			
	ground	- (<u>15.80</u> feet) x <u>red</u> total to water conv from ground fact (c above)	•		
*conversion factor	s: for a 2-inc	h well = 0.5 -or- for a	4-inch well =	= 2.0 (rounded up to th	e nearest tenth)
Amount actually pu				y? 🛘 yes 🔞 no	
3. SAMPLING Date $\frac{3}{27}/98$	Time_ 11:00	_ Equipment (bailer or p Component materials (Stolals)	xump type) (e.g. tubing.pu o/ Plasfic_	Electric subm mp parts, bailer mater Pump	versible Rump ial)
List containers fi (a) Unfiltered Sam 3 X 40	lled in the fi ples (specify	eld: [parameters) (b	o) Samples to e.g., glass	be filtered (specifty polyethylene, etc.) Polyethylene To	
			Sampler's X	ame	Jeff Kormus
4. FIELD MEASUREH		pH· 4 Replicat · if a hazar · waste site	dous	639 643 644	,
	Meter Time Compl	Type Hydac		640	
5.SAMPLE PREPARAT	TON				
.Date	Time	Filtering Method		Preservation Comple	
	·	·		eparer's Name	
6.COMMENTS AND OF	SERVATIONS (IN	otes concerning well, sam	npies, procedu	es, etc./	

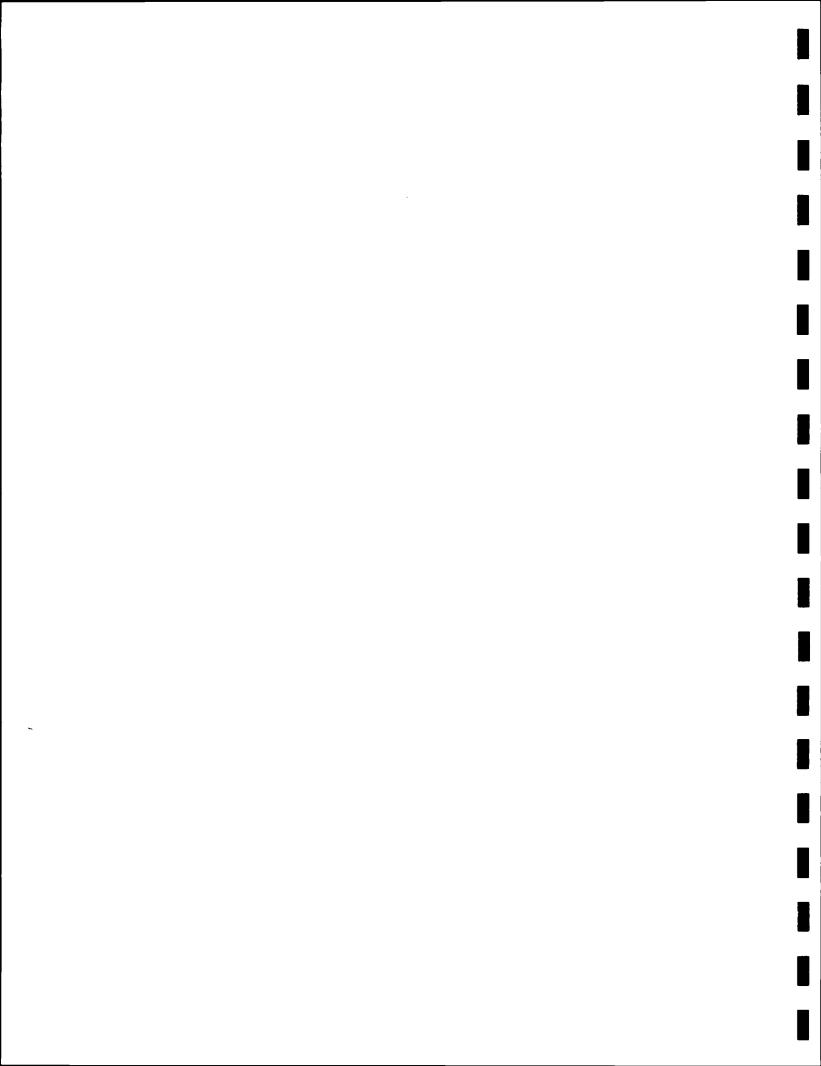




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ACILITY/SITE NAME_	<u>lwigg</u>	Mortinsville		Well I.D.	11.00	P.N
. WATER LEVEL HEAS	UREMENTS (befo	ore purging)				
		_ Method (check one)	steel tape 🖫 (electric meter	r□well sound	der 🗌 other (specify)
. Deoth to water f	rom reference nce point abo	ve ground surface	f protective ca	asing Units	(check one)	feet 🗌 meters
2. PURGING Date 3/27/98	Time_11:30	Equipment (bailer or	pump type)	Electric	Subnesil	de lump
Inside diameter of	wellinc	hes				
	well from ground	(c above)				
*conversion factor	s: for a 2-inc	h well = 0.5 -or- fo	r a 4-inch wel	l = 2.0 (roun	ded up to the	nearest tenth)
				dry? 🛘 yes		
Amount actually pu	rged <u> 15</u> 98	allons	Well pumped	<u> </u>		
3. SAMPLING						
3. SAMPLING		Equipment (bailer of Component material		Electric ,pump parts,		sk al)
3. SAMPLING Date 3/27/98 List containers fi (a) Unfiltered Sam	Time 11:30	Equipment (bailer of Component material Stainless /	r pump type)_ s (e.g. tubing 'plastic_ Pum (b) Samples t	Electric , pump parts,	Submusite bailer materi	ontainer type,
List containers fi (a) Unfiltered Sam	Time: 11:30	Equipment (bailer of Component material Stainless /	r pump type)_ s (e.g. tubing 'plastic_ Pum (b) Samples t	Electric pump parts, po to be filtered ss polyethyle	Submusite bailer materi	
3. SAMPLING Date 3/27/98 List containers fi (a) Unfiltered Sam	Time 11:30	Equipment (bailer of Component material Stainless /	r pump type)_s (e.g. tubing plash, lum (b) Samples te.g., gla	Electric, pump parts, pomp par	Submusite bailer material despectiffy come, etc.)	ontainer type,
3. SAMPLING Date 3/27/98 List containers fi (a) Unfiltered Sam	Time 11:30	Equipment (bailer of Component material Stainless /	r pump type)_s (e.g. tubing plash, lum (b) Samples te.g., gla	Electric, pump parts, pomp par	Submusite bailer material despectiffy come, etc.)	
3. SAMPLING Date 3/27/98 List containers fi (a) Unfiltered Sam	Time: 11:30 lled in the f ples (specify	Equipment (bailer of Component material Stainless /	r pump type)_s (e.g. tubing plash, lum (b) Samples te.g., gla	Electric, pump parts, pomp par	Submisited (specifty come, etc.) I having the Kilme	ontainer type,
3. SAMPLING Date 3/27/98 List containers fi (a) Unfiltered Sam 3 40 ml	Time: 11:30 lled in the f ples (specify VOA	PH 4 Replic	r pump type)s (e.g, tubing flash, fundament) flash, fundament flash, fundament flash, glash	Electric, pump parts, pomp par	Submisited (specifty come, etc.) who kilms 58 53: 53:	ontainer type,
3. SAMPLING Date 3/27/98 List containers fi (a) Unfiltered Sam 3 40 ml	Time: 11:30 lled in the f ples (specify VOA	Equipment (bailer of Component material Stain LSS) ield: parameters) pH4 Replic	r pump type)s (e.g, tubing flash, fundament) flash, fundament flash, fundament flash, glash	Electric, pump parts, ip to be filtered as polyethyle Pily ethylen as Name Jo	Subnusite bailer material (specifty cone, etc.) Hubing hn Kilny	ontainer type,
Date 3/27/98 List containers fi (a) Unfiltered Sam 3 40 ml	lled in the f ples (specify VOA	PH 4 Replic	r pump type)_s (e.g., tubing flashic flum (b) Samples te.g., gla Sampler's cates zardous ite	Electric, pump parts, ip to be filtered as polyethyle Pily ethylen as Name Jo	Submisited (specifty come, etc.) who kilms 58 53: 53:	ontainer type,
3. SAMPLING Date 3/27/98 List containers fi (a) Unfiltered Sam 3 40 ml	lled in the f ples (specify VOA ENTS Meter Time Compl	PH 4 Replication if a haz	r pump type)_s (e.g., tubing flashic flum (b) Samples te.g., gla Sampler's cates zardous ite	Electric, pump parts, ip to be filtered as polyethyle Pily ethylen as Name Jo	Submisited (specifty come, etc.) who kilms 58 53: 53:	ontainer type,
3. SAMPLING Date 3/27/98 List containers fi (a) Unfiltered Sam 3 40 ml 4. FIELD MEASUREME Temperature 60.0	lled in the f ples (specify VOA ENTS *F Meter Time Compl	PH 4 Replication if a haz	r pump type)_s (e.g., tubing flashic flum (b) Samples te.g., gla Sampler's cates zardous ite	Electric, pump parts, ip o be filtered ss polyethyles Polyethyles Name Jo	Submisited (specifty come, etc.) who kilms 58 53: 53:	ontainer type,





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FACILITY/SITE NAME	Twigg	Martinsville	We	ell 1.0. MW #4	P.N
1. WATER LEVEL HEASU					
		Method (check one) 🗆 st	eel tape 🏿 electr	ic meter 🗌 well sour	nder 🗌 other (specify)
a Depth to Water fr	rom reference ; nce point abov	e ground surface	rotective casing 	Units (check one)[feet meters
2. PURGING					•
Date 3/27/98	Time 1:38	Equipment (bailer or pur	p type) <u>Elec</u>	tric Submusible	Pump
•					
7-vall volumes = (30. feet)	es - (<u> .6 </u> feet) x total to water conv	5 =gal	lons	
to					
	well from ground	from ground fac (c above)	tor*		
`	_	•		بطو موسد البار	- mostost tenth)
*conversion factors	: for a 2-inch	well = 0.5 -or- for a			e fleatest tentilly
Amount actually pur	ged 12 gal	llons	iell pumped dry?	yes Ino	
3. SAMPLING				,	
Date 3/27/98	Time <u> 145</u>	Equipment (bailer or p Component materials (Stanks	ump type)E e.g. tubing.pump / Plastic	parts, bailer mater	ial)
List containers fil (a) Unfiltered Samp	lled in the fi bles (specify :	eld: parameters) (b) Samples to be	filtered (specifty (container type,
3 × 40 al VOA	4	_			
		_	9Fol	yetylene Jukai	2
					-
			Sampler's Name	John Kilner	Self Korman
4. FIELD MEASUREME	NTS				
Temperature 57,	7. =	pH · 4 Replicate	e Conduc	tivity 455	
Temperature ~ **	<u>'</u> (F	if a hazard		465	
		· waste site		467	
		<u> </u>			
	Meter 1	Type Hydac	<u> </u>		
	Time Comple	ted			
5.SAMPLE PREPARATI	ON				
	~:	Eiltoning Wathod		Preservation Complet	t ed
uate	_ 11me	Filtering Method			
			Sampler Prepa	rer's Name	
6.COMMENTS AND OBS	SERVATIONS (no	tes concerning well, sam	ples, procedures,	etc.)	

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ENVIRONMENTAL CONSULTANTS

AIR • WATER • SOLID WASTE • OSHA • REMEDIATION SERVICES

FACILITY/SITE NAME TWIGG (MARTINGUILLE) WELL I.D. MW-7 P.N. 7403
1. WATER LEVEL MEASUREMENTS (before purging)
Date 3/26 Time 8:559 Method (check one) steel tape electric meter well sounder other (specify)
Reference Point (check one) top of well casing top of protective casing Units (check one) feet meters a. Depth to water from reference point b. Height of reference point above ground surface c. Depth to water from ground surface (a-b)
2. PURGING/
Date 3/46 Time 6:15 Equipment (bailer or pump type) electric submensible
Inside diameter of well 2 inches
3-well volumes = (40 feet) - (17,5 feet) x 5 = 1125 gallons total depth of total to water conversion well from from ground factor* ground (c above)
*conversion factors: for a 2-inch well = 0.5 -or- for a 4-inch well = 2.0 (rounded up to the nearest tenth)
Amount actually purged 25 gallons Well pumped dry? Tyes Ano
Date 5/7-(e Time 6:45 Equipment (bailer or pump type) electric sob mensible Component materials (e.g., tubing, pump parts, bailer material) stainless plastic pump polyethy en tobin
List containers filled in the field: (a) Unfiltered Samples (specify parameters) 3 x 40 ml VOR E.g., glass polyethylene, etc.) HC1 oddex by interest (specify container type, e.g., glass polyethylene, etc.) Sampler's Name J K. I mev J, Kov may,
Sampler's Name V. K. IMEV V. (280 PCQV)
4. FIELD MEASUREMENTS TemperatureC pH4 Replicates Conductivity 625 if a hazardous 625 waste site 527
Meter Type #xdac Time Completed 6:45
5. SAMPLE PREPARATION
Date Time Filtering Method Preservation Completed
. Sampler Preparer's Name
6.COMMENTS AND OBSERVATIONS (notes concerning well, samples, procedures, etc.)
Pumped 'til clear



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FACILITY/SITE NAME TW	166	Well 1.0. MW-3 P.N. 7403
1. WATER LEVEL HEASUREMENTS (before purging)	
Date Time	Nethod (check one) 🗆 s	iteel tape 🗌 electric meter 🗌 well sounder 🗌 other (specify)
Reference Point (check one) a. Depth to water from refere b. Height of reference point c. Depth to water from ground	above ground surface	protective casing Units (check one) feet meters
2. PURGING Date 4/8/98 Time 12:3	60 ;30 Equipment (bailer or pu	ump type) teflon bailer w/ teflon coeted
Inside diameter of well 2	_inches	
3-well volumes = (16,7 f total dept well from ground	eet) - ($\frac{9.5}{\text{nversion}} = \frac{2.5}{\text{gallons}}$
*conversion factors: for a 2	-inch well = 0.5 -or- for	a 4-inch well = 2.0 (rounded up to the nearest tenth)
Amount actually purged 1.5	gallons	Well pumped dry? Ayes ono 36/mes
3. SAMPLING, Date 4/8/98 Time Z:	95 Equipment (bailer or) Component materials + effor	pump type) beflow beiler (e.g., tubing, pump parts, bailer material)
List containers filled in the (a) Unfiltered Samples (specific or specific or	ne field: cify parameters) (HCI Preservative	Samples to be filtered (specifty container type, e.g., glass polyethylene, etc.) Sampler's Name
4. FIELD MEASUREMENTS		
Temperature°C	pH· 4 Replicate if a hazar	rdous
. Me Time C	eter Type	
5. SAMPLE PREPARATION		
Date Time	Filtering Method	Preservation Completed
		. Sampler Preparer's Name
6.COMMENTS AND OBSERVATIONS	s (notes concerning well, sa	amples, procedures, etc.)
	Sample clear	• •





ENVIRONMENTAL CONSULTANTS

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July 20, 1998

Resident

Dear Sir/Madam:

Bruce Carter Associates, L.L.C. (BCA) is performing a groundwater survey in your neighborhood at the request of Twigg Corporation and in cooperation with the Indiana Department of Environmental Management (IDEM). According to Martinsville Water Department records, your household water is supplied by the City. However, some homeowners also maintain a private well on their property. If you have a private well on your property, we would like to collect a water sample from it. There will be no cost to you and a copy of the results will be provided free-of-charge. A representative of BCA will be in your neighborhood within a few days to collect samples. Please contact me immediately (317) 578-4233 if you have a private well and to let us know if we may collect a sample.

Very truly yours, Bruce Carter Associates, L.L.C.

ohn W. Kilmer

John W. Kilmer Senior Engineer

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ENVIRONMENTAL CONSULTANTS

AIR • WATER • SOLID WASTE • OSHA • REMEDIATION SERVICES

August 6, 1998

Ed Sheets 1139 Marilyn Street Martinsville, IN. 46151

RE: Water Well Sample

Dear Mr. Sheets:

With your permission, on July 28, 1998 a sample of water was obtained from the faucet on the south side of your house. You indicated that the faucet is connected to a private well in your garage. The laboratory report is attached

The results indicate that no chlorinated solvents are present in the well water. None-the-less, as a precaution the well water should not be used for drinking water. Please call me at 317-578-4233 if you have any questions.

Very truly yours
Bruce Carter Associates, L.L.C.

John W. Kilmer Senior Engineer

attachment

cc: Ralph Heifner, TWIGG

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ENVIRONMENTAL CONSULTANTS

AIR • WATER • SOLID WASTE • OSHA • REMEDIATION SERVICES

August 6, 1998

Maurice Curtis 1060 South Ohio Street Martinsville, IN. 46151

RE: Water Well Sample

Dear Mr. Curtis:

With your permission on July 28, 1998 a sample of water was obtained from the external faucet on the south side your house. In a previous conversation you indicated that the faucet is connected to a private well in your basement. The laboratory report is attached.

The results indicate that chlorinated solvents are present in the water above the Maximum Contaminant Levels (MCLs) allowed for drinking water by the U.S. Environmental Protection Agency (EPA) and the Indiana Department of Environmental Management (IDEM). The water from your well should not be used for drinking, cooking or showers, but may safely be used for watering plants or washing the car. City water should be used for drinking and other domestic use.

Please call me at 317 - 578-4233 if you have any questions.

Very truly yours

Bruce Carter Associates, L.L.C.

John W. Kilmer Senior Engineer

attachment

cc: Ralph Heifner, TWIGG

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Indianapolis Division 6964 Hillsdale Ct. Indianapolis, IN 46250

Tel: (317) 842-4261 Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. John Kilmer
BRUCE CARTER ASSOCIATES
6330 E. 75th St.
Suite 300
Indianapolis, IN 46250

08/03/1998

NET Job Number: 9

98.05167

Page 1 of 3

Enclosed are the Analytical Results for the following samples submitted to NET, Inc. Indianapolis Division for analysis:

Project Description: TWIGG CORP.

 Sample Number
 Date Taken
 Date Received

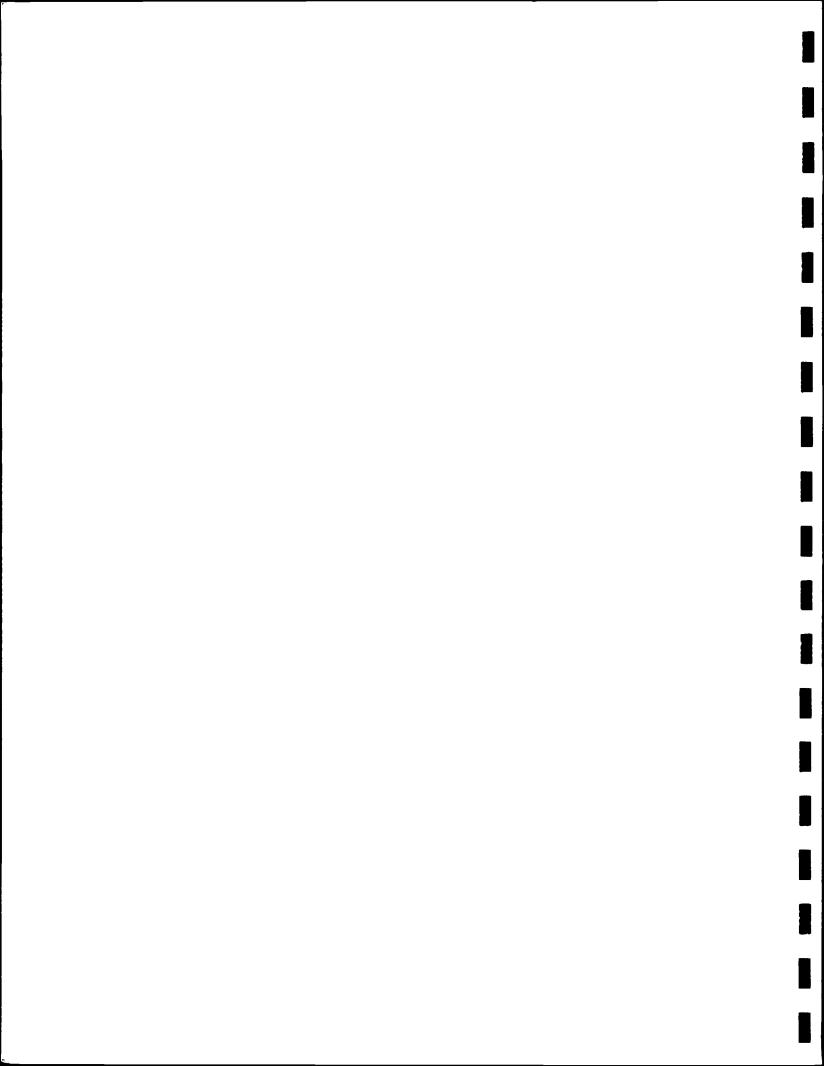
 214055
 1060 S OHIO
 07/28/1998
 07/28/1998

 07/28/1998
 07/28/1998
 07/28/1998

National Environmental Testing, Inc. certifies that the analytical results contained herein apply only to the specific samples analyzed.

Reproduction of this analytical report is permitted only in its entirety.

Project Representative





Indianapolis Division 6964 Hillsdale Ct. Indianapolis, IN 46250

Tel: (317) 842-4261 Fax: (317) 842-4286

ANALYTICAL REPORT

Mr. John Kilmer BRUCE CARTER ASSOCIATES 6330 E. 75th St.

Suite 300 Indianapolis, IN 46250

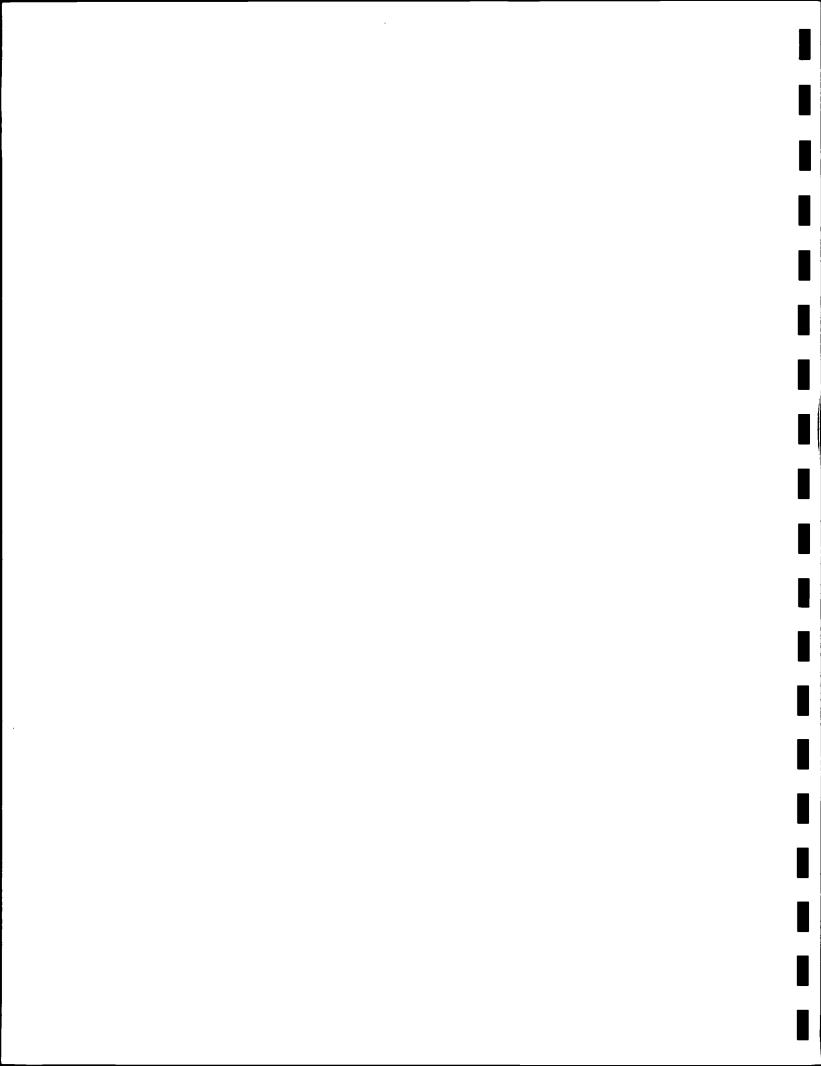
Date Received: 07/28/1998
Job Description: TWIGG CORP.

08/03/1998

Job No.: 98.05167

Page 2 of 3

	•						
Sample Numbe	er / Sample I.D.			Sample Date/	Analyst &		Reporting
Parameters	<u> </u>	Result	Flag	Units	<u>Date Analyzed</u>	Method	_Limit_
214055	1060 S OHIO		C	07/28/1998	•		
VOLTTILES-	8260 (AQ)				· /	•	
1,1-Dichlo	roethane	17.		ug/L	tjg / 08/01/1998	SW 8260B	<5.0
1,1-Dichlo	roethene	30.		ug/L	tjg / 08/01/1998	SW 8260B	<5.0
cis-1,2-Di	chloroethene	210.		ug/L	tjg / 08/01/1998	SW 8260B	<5.0
trans-1,2-	Dichloroethene	<5.0		ug/L	tjg / 08/01/1998	SW 8260B	<5.0
Tetrachlor	oethene	<5.0		ug/L	tjg / 08/01/1998	SW 8260B	<5.0
1,1,1-Tric	hloroethane	160.	dlx5	ug/L	tjg / 08/03/1998	SW 8260B	<5.0
Trichloroe	thene	41.	t	′ nā∖r	tjg / 08/01/1998	SW 8260B	<5.0
SURR: Tolu	ene-d8	96.		88-110%	tjg / 08/01/1998	SW 8260B	
SURR: Dibr	omofluoromethane	109.		86-118%	tjg / 08/01/1998	SW 8260B	
SURR: 4-Br	omofluorobenzene	95.		86-115%	tjg / 08/01/1998	SW 8260B	





Indianapolis Division 6964 Hillsdale Ct. Indianapolis, IN 46250

Tel: (317) 842-4261 Fax: (317) 842-4286

KEY TO ABBREVIATIONS

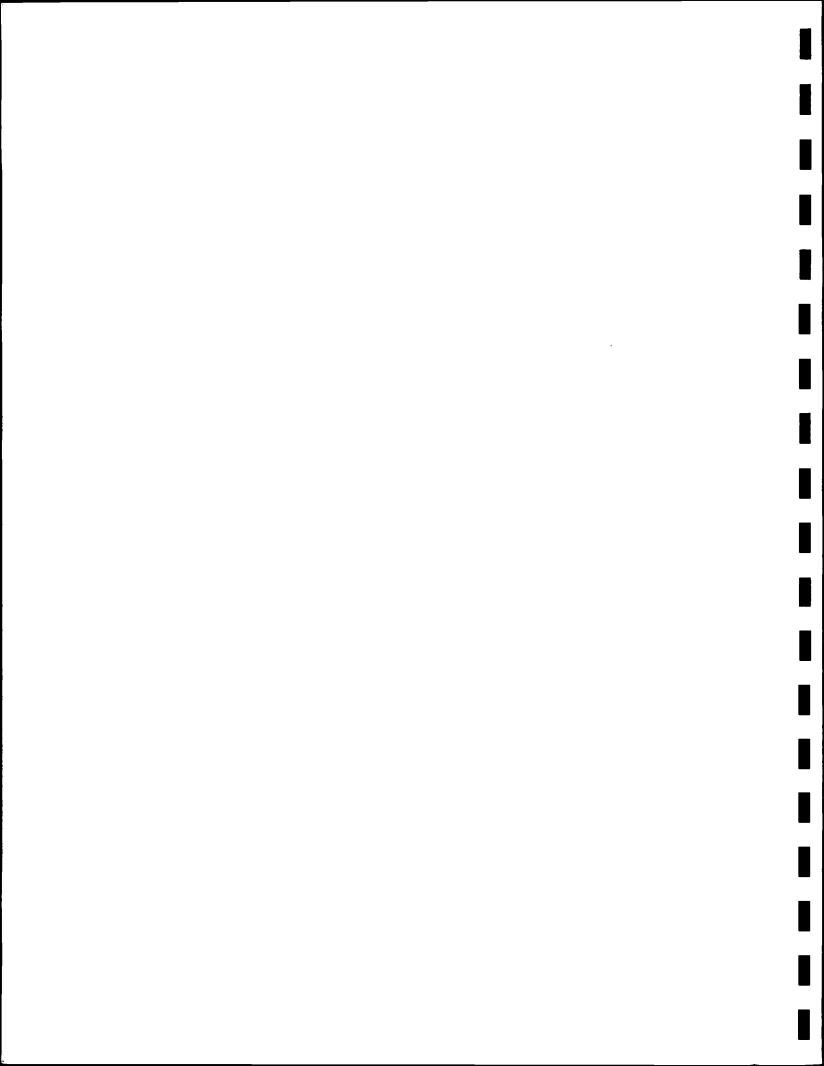
	KEY TO ABBREVIATIONS
<	Less than; when appearing in the results column indicates the analyte was not detected at or above the reported value.
mg/L	Concentration in units of milligrams of analyte per Liter of sample. Measurement used for aqueous samples. Can also be expressed as parts per million (ppm).
ug/L	Concentration in units of micrograms of analyte per Liter of sample. Measurement used for aqueous samples. Can also be expressed as parts per billion (ppb).
mg/kg	Concentration in units of milligrams of analyte per kilogram of sample. Measurement used for non-aqueous samples. Can also be expressed as parts per million (ppm).
ug/kg 	Concentration in units of micrograms of analyte per kilogram of sample. Measurement used for non-aqueous samples. Can also be expressed as parts per billion (ppb).
a	Indicates the sample concentration was quantitated using a diesel fuel standard.
þ	Indicates the analyte of interest was also found in the method blank.
c .	Samples resembles unknown Hydrocarbon.
d1	Indicates the analyte has elevated reporting limit due to high concentration.
d2	Indicates the analyte has elevated reporting limit due to matrix.
e	Indicates the reported concentration is estimated.
f '	Indicates the sample concentration was quantitated using a fuel oil standard.
g	Indicates the sample concentration was quantitated using a gasoline standard.
h	Indicates the sample was analyzed past holding time.
i	Indicates the sample spike concentration was insufficient, due to high analyte concentration in the sample.
j	Indicates the reported concentration is below the Reporting Limit.
k	Indicates the sample concentration was quantitated using a kerosene standard.
1	Indicates an MS/MSD was not analyzed due to insufficient sample. An LCS duplicate has been provided.
m ·	Indicates the sample concentration was quantitated using a mineral spirits standard.
0	Indicates the sample concentration was quantitated using a motor oil standard.
p	Indicates the sample was post spiked due to sample matrix.
q	Indicates MS/MSD exceeded control limits. All other QCIs were in control.
r	Indicates the sample was received past holding time.
s	Indicates the sample concentration was quantitated using a stoddard solvent standard.
u ·	Indicates the sample was received improperly preserved and/or contained.
uj	Indicates the result is under the reporting limit and considered an estimated concentration.
TCLP	Indicates the Toxicity Characteristic Leaching Procedure was performed for this analysis.
ICP GFAA	Indicates the analysis was performed using Inductively Coupled Plasma Spectroscopy. Indicates the analysis was performed using Graphite Furnace Atomic Absorption Spectroscopy.
*	Percent; To convert ppm to %, divide the result by 10,000. To convert % to ppm, multiply the result by 10,000.

Reporting limits are elevated due to insufficient sample submitted by client.

Dry Weight

When indicated, the results are reported on a dry weight basis. The contribution of the

moisture content in the sample is subtracted when calculating the concentration of the analyte.



6330 EAST 75TH STREET SUITE 300 INDIANAPOLIS, INDIANA 46250

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