The electronic version of this file/report should have the file name:

Type of document.Spill Number.Year-Month.File *Year-Year* or Report name.pdf

letter.____________.______-_____.File spillfile ___.pdf

report.hw907020 . 2000 -09-21. SUPPLEMENTAL .pdf
REMEDIAL INVESTIGATION

Project Site numbers will be proceeded by the following:

Municipal Brownfields - b
Superfund - hw
Spills - sp
ERP - e
VCP - v
BCP - c

non-releasable - put .nf.pdf
Example: letter.sp9875693.1998-01.Filespillfile.nf.pdf

SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT/FOCUSED FEASIBILITY STUDY

Former Dowcraft Corporation
Falconer, New York

Site Code #907020

PRINTED ON:

SEPTEMBER 21, 2000

See new

6/2000

report.

SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT/FOCUSED FEASIBILITY STUDY

907020

Former Dowcraft Corporation
Falconer, New York

Site Code #907020

Project #5020 (10)

SUPPLEMENTAL REMEDIAL INVESTIGATION REPORT/FOCUSED FEASIBILITY STUDY

Former Dowcraft Corporation
Falconer, New York

Site Code #907020

RECEIVED
SEP 2[illegible] 2000
NYSDEC REG. 9
FOIL
__REL __UNREL

Prepared By:
Conestoga-Rovers & Associates

2055 Niagara Falls Boulevard
Niagara Falls, New York 14304

Office: (716) 297-6150
Fax: (716) 297-2265

SEPTEMBER 2000
REF. NO. 5020 (10)
This report is printed on recycled paper.

CERTIFICATION

I, Richard J. Snyder, a Registered Professional Engineer in the State of New York, certify that the Feasibility Study presented in Section 10.0 of the report entitled "Supplemental Remedial Investigation Report/Focused Feasibility Study, Former Dowcraft Corporation, Falconer, New York", was performed in accordance with the Order on Consent, Index No. B9-500-96-08.

Richard J. Snyder, P.E.

RICHARD J. SNYDER
No. 66242

9/20/00
Date

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

LIST OF FIGURES
(Following Report)

LIST OF TABLES
(Following Report)

LIST OF TABLES
(Following Report)

LIST OF APPENDICES
(Following Report)

1.0 INTRODUCTION

The Dowcraft Corporation Facility (Dowcraft) on South Dow Street in Falconer, New York (Facility) was the subject of environmental investigations in the early 1990s. The results of the investigations were presented in August 1991 in the report entitled "Environmental Investigation - Dowcraft Corporation" and the April 1993 report entitled "Remediation Plan for the Dowcraft Corporation Site". Both reports were prepared by Empire Soils Investigations, Inc. (ESI). The investigations identified the presence of trichloroethene (TCE) in groundwater beneath the Site. As a follow up to this finding, in 1994 Dowcraft proceeded with an Interim Remedial Measure (IRM) consisting of a pump and treat system to address the TCE presence.

Subsequent to the completion of the Site investigation and IRM, the New York State Department of Environmental Conservation (NYSDEC) requested that Dowcraft collect additional investigative data to meet the substantive requirements of a Remedial Investigation/Feasibility Study (RI/FS). The "Supplemental RI/FS Documentation Work Plan" was subsequently developed and was approved by NYSDEC on July 2, 1999. The additional investigative activities associated with the supplemental data collection program began in May 1998, prior to the approval of the Work Plan, and were completed June 9, 2000.

Concurrently with the development of the Work Plan and completion of Site investigative activities, Dowcraft and the NYSDEC negotiated an Order on Consent. The Order on Consent was completed and signed March 15, 2000.

1.1 PURPOSE OF THIS REPORT

The purpose of this report is to summarize the Site background and various investigative activities, characterize the Site, identify potential sources of contamination, and evaluate the potential for Site-related contaminants to impact human and environmental receptors.

The information presented in the ESI reports and the results of the supplemental investigation have been compiled and are presented in this report. The contents of the ESI reports were used as the basis of this report and were supplemented as necessary to address the deficiencies identified by NYSDEC, namely:

i) Identification of Chemicals of Concern (COCs);

ii) Identification of Current Conditions and Areal and Vertical Extents of Contamination in Groundwater and Soil;

iii) Identification of Groundwater Quality at Depth;

iv) Identification of Site Impact on Surface Water and Sediment Quality;

v) Potential for Groundwater Flow Beneath the Chadakoin River;

vi) Review of Potential Preferential Pathways of Groundwater Migration;

vii) Evaluation of Potential Sources of Contamination;

viii) Provision of Data on the Operating IRM; and

ix) Regional Information on Groundwater.

1.2 REPORT ORGANIZATION

This Supplemental Remedial Investigation Report/Focussed Feasibility Study is organized as follows:

- Section 1 - Introduction: The project background, purpose of this report, and report organization are described in Section 1;
- Section 2 - Site Description/Historical Review: Descriptions of the Site location, layout, and specific physical features are presented in Section 2;
- Section 3 - Regional Groundwater: A brief description of the regional aquifer and wells in the vicinity of the Site is presented in Section 3;
- Section 4 - Regulatory Agency Information: The regulatory agency information (i.e., permits, underground storage tanks [USTs], etc.) obtained during the initial Site investigation is presented in Section 4;
- Section 5 - Field Activities: Descriptions of the field activities associated with the Site investigations are presented in Section 5;
- Section 6 - Site Geology and Hydrogeology: The characterization of the Site geology and hydrogeology are presented in Section 6;
- Section 7 - Analytical Test Results: The analytical data collected during the Site investigations are presented in Section 7. Descriptions of the extent of presence of the COCs in each environmental media investigated are also presented in Section 7;
- Section 8 - Summary of Contamination: A summary of the nature and extent of chemical presence at the Site is presented in Section 8;

- Section 9 - Interim Remedial Measures: Descriptions of the IRMs implemented at the Site and the effectiveness of each are presented in Section 9;
- Section 10 - Feasibility Study: The Site Feasibility Study is presented in Section 10; and
- Section 11 - Conclusions and Recommendations: Conclusions regarding the nature and extent of COCs present at the Site and an overview of the recommended remedial action are presented in Section 11.

2.0 SITE DESCRIPTION/HISTORICAL REVIEW

The following presents the Site description and historical review prepared by ESI and updated to reflect the current inactive status of the Facility.

2.1 PROPERTY LOCATION

The Dowcraft property is located at 65 South Dow Street, Falconer, New York. The location of the Site is shown on Figure 2.1. Based on the Chautauqua County tax maps, the Dowcraft property covered approximately 2.2 acres. The section, block, and lot number which identifies the property is 104-12-2.

The Dowcraft property is bounded to the north and east by the Jamestown Container Corporation (JCC) property and to the south by property formerly owned by Conrail Railroad. Norfolk Southern Railroad assumed control of this rail line June 1, 1999. South Dow Street is directly west of the property with Niagara Mohawk property located across South Dow Street to the west. The Site investigation included work conducted on the JCC property and in the Chadakoin River which borders the JCC property on the north. A Site Plan is shown on Figure 2.2.

The Dowcraft and JCC properties are referred to collectively in this report as "the Site". The Site occupies approximately 18 acres.

2.2 HISTORY

Information on the Site history was obtained from the Chautauqua County Department of Planning and Development, Chautauqua County Clerk's Office, Town of Ellicott Historian, historical aerial photographs, and inspection of available historical maps.

The Town of Ellicott Historian, Chautauqua County Department of Planning and Development, and Chautauqua County Clerk's Office informed ESI that the subject property was vacant until the late 1890s. According to Ms. Chris Lyon, the Town of Ellicott Historian, the first form of development on the subject property was a woolen mill. Ms. Lyon could not specify an exact year; however, she did indicate that the mill opened in the early 1900s. Potential environmental concerns associated with woolen mills include contamination from alkaline solutions, acids, solvents, oils, and chromium. In 1939, the woolen mill was reportedly converted to a factory which manufactured steel partitions. The former woolen mill was owned by the Odsonia Corporation in 1939. A second deed was recorded in 1962; however, no change in ownership occurred. In 1986 the deed was transferred to Dowcraft Corporation. The manufacture of steel partitions for offices and the telecommunications industry continued until the Facility was closed in 1999. The property on which the Facility was located is still owned by Dowcraft; however, a sale is pending and the majority of the Facility building has been demolished.

The Town of Ellicott Assessor's Office reported to ESI that the original Facility building was built in the period between 1890 and 1900. Construction of additions occurred in 1943, 1948, 1964, 1967, 1978, and 1984. The Facility additions, years of construction, and historic operations are shown on Figure 2.2.

A review of historic aerial photographs (1948, 1956, 1961, 1971, 1977, 1983, 1989) from the Chautauqua County Department of Planning and Development generally substantiates the above information.

Research into past operating practices at the Dowcraft and adjacent facilities was conducted by Dowcraft Corporation personnel concurrently with the Phase II Environmental Site Assessment (ESA). The information gathered was limited to discussions with past and present employees and a drawing of the subject property from the 1940s. Dowcraft Corporation management conducted an interview with a former employee, Mr. Robert C. Johnson, in an effort to learn more about past practices at the Dowcraft plant. Mr. Johnson worked at the subject property from 1935 to 1941 and from 1946 to 1981. Mr. Johnson informed Dowcraft that a TCE vapor degreaser was installed in 1948 when the boiler room was moved. Virgin TCE and TCE sludge were stored in the area of the 1978 addition. Mr. Johnson could not recall any spills of TCE product or sludge during his employment at the plant. A septic tank was also reported to be located in the area of the 1978 addition.

The adjacent property presently occupied by JCC was formerly occupied by companies named "Chemetal" and "Poirier & McLane". The areas in which these companies operated are shown on Figure 2.3. The date of the drawing shown on Figure 2.3 is unknown; however, a comparison of this figure to the Site Plan shown on Figure 2.2 suggests that it was prepared prior to the construction of the "1946 addition". Other information reported by ESI indicates that the JCC plant was constructed around the turn of the century. JCC manufactures cardboard boxes and related paper packaging products.

ESI contacted the Chautauqua County Tax Assessor's office regarding any records on a former business under the name of Chemetal. There was no record of a company under the Chemetal name according to the Tax Assessor; however, businesses were not required to register during that period. Mr. Johnson indicated the Chemetal Company produced metal caskets during World War II. This information is significant in that most metal fabrication businesses during that period used TCE vapor degreaser units as part of the manufacturing operations. Therefore, the potential for TCE contamination from the Jamestown Container property (former Chemetal property) exists.

Mr. Charles Jewell of ESI also interviewed a current Dowcraft employee regarding former disposal practices of the JCC plant. The information gathered from the interview indicated that there was periodic dumping of aqueous waste in the access road between the two plants some time ago. The doorway where the alleged wastewater disposal had been observed has been bricked up since that time. The significance of the observed disposal from the JCC property is that the former doorway is within the limit of the TCE plume and in very close proximity to groundwater monitoring well ESI-2 in which TCE has been detected at concentrations up to 3,100 micrograms per liter (µg/L).

2.3 PHYSICAL LAYOUT

The Dowcraft property contained a metal fabrication plant with associated office and parking areas.

The topography of the Site slopes slightly from south southwest to north northeast. Ground surface elevations surveyed in May and June 2000 show that the difference in elevation across the Site is approximately 3.4 feet, from 1266.4 at monitoring well ESI-9 to approximately 1263.0 at the southeast corner of the JCC building. The Chadakoin River is the nearest major natural water body with the southern banks of the river located on the northern edge of the Site.

The tracks on the railroad property to the south lie on a slag-covered easement which is approximately 5 feet higher than the Dowcraft property.

2.4 SITE RECONNAISSANCE

The following presents a description of the Facility as observed by ESI in 1990. With the exception of the 1963 addition (see Figure 2.2), the Facility was demolished in the fall of

1999 and all concrete floors were removed. The area of demolition was temporarily covered with gravel and, with the exception of the property adjacent to the alley which is used as a driveway, is presently not used.

2.4.1 GENERAL

A Site walkover was conducted on September 12, 1990, by an ESI Environmental Engineer and Senior Environmental Engineer. An ESI Environmental Engineer returned for second and third visits on September 20 and October 2, 1990, to obtain additional information. The purposes of the visits were to: a) observe current conditions at the Facility pertaining to potential environmental concerns; b) observe the uses of the adjacent properties; and c) confirm information gathered during the historical search.

Representative photographs of specific operating areas were presented in the ESI report and, for reference purposes, are copied in Appendix A. Mr. Walter Barker and Mr. Charles Jewell, representing the Dowcraft Corporation, accompanied the ESI staff during the Site visits. Mr. Barker and Mr. Jewell provided information on the physical operation of the plant and manufacturing processes.

At the time of the reconnaissance, the Facility building consisted of a number of additions constructed at different times as indicated on the plant floor plans of the first and second floors shown on Drawing Nos. 3, 4, and 5 contained in Appendix B. The plant additions were interconnected and had poured concrete floors on the first floor. The original building and 1943 and 1948 additions consisted of brick walls and wooden joists. The later additions (1964, 1966, 1967, 1978, and 1984) were constructed with cinder block walls and steel beam supports. Roofing materials were not inspected as part of the Phase I ESA.

2.4.2 PLANT EXTERIOR

The Dowcraft property contained the Dowcraft Corporation manufacturing plant and offices with an asphaltic concrete parking lot and access road leading to the rear of the building. Grass-type vegetation (weeds) was present along the south side of the plant and parking lot. Eight large empty bin type structures were also observed along the south side of the building directly adjacent to the railroad property. An abandoned section of track apparently provided access to the bins from the railroad. These bins were probably used for bulk storage of coal or other bulk materials the plant may have historically used. A solid waste trash compactor was located directly north of the 1984 addition. Waste and recyclable material storage areas were also noted to be present during the Site walkover and are discussed in Section 2.4.5.

2.4.3 ASBESTOS

The interior of the plant was inspected to determine the potential for presence of friable asbestos-containing thermal insulation. Suspected asbestos thermal insulation was observed in the 1966 expansion area. In total, there was approximately 100 linear feet of suspected asbestos insulation in this portion of the plant. The asbestos was subsequently removed in accordance with the applicable State and Federal regulations.

2.4.4 LEAD PAINT

ESI noted that painted surfaces within the building may have contained lead-based paint. Sampling or testing of paint for lead was not performed.

2.4.5 WASTE AND RECYCLABLE MATERIAL STORAGE

A number of areas used for waste and recyclable material storage were observed during the Site walkovers. The recyclable materials consisted of various types of metal used during the manufacturing and finishing of Dowcraft products. Small metal particles were collected using cyclone particle collectors (refer to photograph No. 1 in Appendix A). Medium sized metal scraps generated during fabrication were stored with small metal particles on the north side (exterior) of the building in 55-gallon drums (refer to photograph No. 2). Larger scrap metal pieces generated in the metal shop were stored in three dumpsters located outside the southwest corner of the building (refer to photograph No. 3).

A phosphatizer was used for cleaning and etching metal during the manufacturing process. Phosphatizer sludge was generated, periodically removed, and stored in 55-gallon drums in the phosphatizer room prior to disposal. Dowcraft personnel reported that approximately four 55-gallon drums of phosphatizer sludge were disposed of annually. This sludge was tested by Dowcraft and reportedly found to be non-hazardous.

A below-grade TCE vapor degreaser (degreaser pit) was located in the southeast corner of the first floor of the original building (refer to photograph No. 7). At the time of the walkovers (1990), the spent TCE sludge bottoms were typically pumped into a 55-gallon drum and stored in the vicinity of the degreaser pit (refer to photograph No. 8). According to Dowcraft, the spent TCE sludge was then transported off-Site for proper disposal. A roof vent was observed above the vapor degreaser unit which served as an exhaust system for TCE vapors. A sump was located beneath the vapor degreaser. No water was observed in the degreaser pit during the Site visit. Dowcraft reported to ESI that the degreaser pit was sealed with cement.

2.4.6 CHEMICALS USED WITHIN THE PLANT

Due to the type of manufacturing process utilized at the Dowcraft plant, a large number of chemicals were stored within the plant. The mixing room located on the second floor of the 1966 addition is where the majority of chemicals were stored. A significant portion of the mixing room floor space was used for storage of 1, 5, and 55-gallon containers of paint and paint-related solvents (refer to photograph No. 9). At the time of the Site reconnaissance, a system was in place to ground the open 55-gallon drums and reduce static electricity buildup. This system was subsequently removed. Precautions for fire and explosion hazards such as explosion-proof wiring, an exhaust fan, and a scupper floor drain (refer to photograph No. 10) were also apparent in the mixing room.

Two exterior trailers located on the north side of the building were utilized for bulk storage of 55-gallon drums of paint, adhesives, gum cleaner, and reducer used in the manufacturing processes (refer to photograph No. 11). The trailers were vented with wind driven turbines.

Chemicals used for the boiler or compressor were observed in the boiler room. Phosphatizer chemical storage was located adjacent to the phosphatizer in the same room. Seven 55-gallon drums of TCE were observed in the same vicinity as the vapor degreaser (refer to photograph No. 8). Paint and adhesive storage was also noted to be present in the areas used for painting. Adhesive storage was observed in the assembly regions of the second and third floors (refer to photograph No. 12). Several other chemicals were stored in the plant; however, a detailed itemization of all the chemicals present was beyond the scope of the ESI assessment. NYSDEC files reported annual consumption of toluene, xylene, and TCE to be 16109, 36582, and 40656 pounds, respectively.

2.4.7 DRAINAGE SYSTEMS AND DISCHARGE LOCATIONS

The Facility had four discharge locations associated with the manufacturing operations and stormwater removal. The sanitary collection system was designed to store the sanitary wastewater in a tank near the west end of the building. Periodically, the sanitary wastewater was pumped into the sanitary sewer system. Both the Jamestown and Falconer utilities departments were contacted in January 2000 to request copies of drawings showing public utilities which cross the Site. The only drawing obtained was dated September 19, 1974. This drawing showed a proposed sanitary sewer which was to service the Facility from South Dow Street. Conestoga-Rovers & Associates (CRA) was informed that the sanitary sewer was installed as proposed. The invert elevation of the sewer at the on-Site manhole is shown on the drawing as 1260.575 feet National Geodetic Vertical Datum (NGVD). This is approximately 6.6 feet below ground surface (BGS) and approximately 4 feet above the water table surface. The depth of the sanitary sewer relative to the ground surface and groundwater elevations is shown on Figure 6.2. Field activities performed during the Facility demolition and subsequent construction in late 1999 and early 2000 confirmed that the sewer was installed approximately along the alignment shown on the drawing and on Figure 2.2.

The plant process water and storm water were discharged to the Chadakoin River and five drywells located in and around the plant. At the time of the ESI inspection, two drywells had reportedly been abandoned. At that time, plant and stormwaters were discharged into the Chadakoin River (Outfall 002) and to drywells 004, 005, and 007. The locations of Outfall 002 and the three existing drywells are shown on Figure 5.1. Company-provided listings of outfalls, daily discharge volumes, and composition of discharge water are presented in Table 2.1 and Figure 2.4.

Outfall 002 is a pipe which traverses under the JCC plant and discharges into the Chadakoin River. At the time of the ESI inspection, the scupper drain, located at the doorway to the mixing room, drained to the mixing room roof drains which were tied in to drywell 004. The scupper drain was subsequently rerouted to a closed piping system to eliminate the potential for a spill to reach the drywell. Mr. Barker indicated to ESI that the majority of roof drains were plumbed into Outfall 002. This drainage pattern was verified by NYSDEC files.

Drywells 004 and 005 were located directly outside the north wall of the phosphatizer room and inside the phosphatizer room, respectively (refer to photograph No. 15). Drywell 007 was not located during the Site walkover but was reportedly near the north end of the metal shop. Drywell 007 was uncovered during the facility demolition in November 1999.

2.4.8 UNDERGROUND STORAGE TANKS

One UST with pump and nozzle was reported to be located approximately 100-feet east of the Dowcraft property on the JCC property (refer to photograph No. 13). The locations of the tank and former fuel pump are shown on Figure 2.2. The fill pipe to the UST was observed to be painted yellow. According to regulations pertaining to USTs, yellow markings on the fill pipe indicate diesel fuel storage. The condition of the tank (if present) could not be determined during the site visit. Information provided by the NYSDEC regarding a petroleum bulk storage tank registered on the JCC property directly east of the subject property is shown below:

PBS#:	004324
Application Received:	3/10/86
Registration Date:	5/23/86
Facility Status:	Active
Name:	Jamestown Container Corporation
Address:	14 Dening Drive, Falconer, New York 14733

The condition of the UST was not determined as part of the scope of services; however, any underground spills or leaks detected by the NYSDEC would have been made known to ESI through the Freedom of Information Act. According to Dowcraft Corporation personnel, the UST was removed in approximately 1991. No other USTs were identified by ESI.

In 1999, during the Facility demolition program, an apparent fill pipe was uncovered at the west end of the original building, near drywell 007. At that time, the demolition contractor reported that he had been informed by Dowcraft personnel that this was the location of a 1,500-gallon UST. Neither the former use or status of the tank was known by the personnel providing the description; however, the location is apparently in the vicinity of the "sanitary sewer wet well" shown on Figure 2.2 and described in Section 2.4.7.

2.4.9 ELECTRIC TRANSFORMERS

Two pole-mounted electric transformers were observed on the JCC property near the northwest corner of the Site (refer to photograph No. 14). Although the transformers appeared to be rather old, no leakage from the casing was apparent. One dry electric transformer was also located just outside the west end of the Dowcraft plant. Dry transformers do not contain polychlorinated biphenyl (PCB) oils. At the time of the ESI inspection, the Niagara Mohawk property located directly west of the Site (across South Dow Street) was apparently being used to store transformers.

2.4.10 BELOW GRADE PITS

In November 1999, during the facility demolition and Site regrading, three pits were uncovered adjacent to the degreaser pit described in Section 2.4.5. These pits were beneath the floor slab of the original building and their presence was unknown to Dowcraft.

Two of the pits were located east of the degreaser pit. Each of these pits were approximately 4 feet by 7 feet by 4 feet deep and were constructed of brick. One pit, approximately 2.5 feet by 14.5 feet by 4 feet deep, was located north of the degreaser pit. This pit was either of concrete construction or was lined with concrete. The walls between pits and the perimeter wall were all approximately 1-foot thick and were either brick or concrete. The layout of the pits is shown on Figure 2.5.

2.4.11 UTILITY BEDDING MATERIALS

In May 2000, as part of the Supplemental Remedial Investigation (SRI), a test trench was excavated adjacent to Outfall 002. The purpose of the excavation was to determine the characteristics of the bedding materials and evaluate whether utility installations would act as preferential pathways for contaminant migration.

The bedding materials encountered in the test trench were consistent with the surrounding soils, sand gravel with some silt. The test trench exposed the outfall pipe and there was no evidence of odor or staining in the soils at the bottom of the excavation. Photoionization detector (PID) readings were equal to background. The invert of the outfall at the test trench was approximately 4.5 feet BGS, or approximately 5 feet above the water table surface.

3.0 REGIONAL HYDROLOGY

The primary source of information regarding regional groundwater is the publication entitled "Ground Water Resources of the Jamestown Area, New York with Emphasis on the Hydrology of the Major Stream Valleys" (1966). This publication was prepared by the United States Geologic Survey (USGS) in cooperation with the City of Jamestown and the New York Water Resources Commission.

3.1 REGIONAL SURFACE WATER AND DRAINAGE

The Chadakoin River flows northeast from Chautauqua Lake and joins Cassadaga Creek approximately 1.5 miles northeast of the Site. The water then flows southeast to Conewango Creek. Cross-section A-A' on Figure 3.2 represents a north-south section crossing the Cassadaga Creek valley near the junction of Cassadaga Creek and the Chadakoin River.

Review of the regional topography shown on Figure 2.1 and the USGS report shows that regionally the discharge point for shallow groundwater is the Chadakoin River. **[NEED TO RESEARCH FURTHER AND EXPAND.]**

The southern end (right-hand side) of cross-section B-B' on Figure 3.2 illustrates the cross-section across the Chadakoin River near the Site.

The cross-sections show that the soils consist of sand and sand and gravel interbedded with silt and clay.

3.2 REGIONAL GROUNDWATER

The availability of groundwater in the Cassadaga Creek/Chadakoin River Valley is dependent upon the areal extent of the permeable materials, their stratigraphic relationships, and the relative location of groundwater recharge and discharge zones. The topography and surface water drainage determine to a large extent the direction of groundwater movement through these permeable sediments (Crain 1966). The topography of the Chadakoin River Valley in the vicinity of the Site ranges from approximately 1,500 feet above mean sea level (AMSL) in the uplands to approximately 1,260 feet AMSL on the valley floor. The Chadakoin River, the main surface water body in the study area, occurs at an elevation of approximately 1,250 feet AMSL.

Unconsolidated sands and gravel deposits form aquifers within the Conewango Creek and Cassadaga Creek valleys that are used for water supply. The Jamestown Aquifer, located within the Cassadaga Valley, is the most important source of groundwater in the area (Crain 1966). The extent of the Jamestown Aquifer and the location on the Site are shown on Figure 3.1. The Jamestown Aquifer is close to the surface to the south and dips to greater depths to the north (Crain 1966). In the vicinity of the Site, the top of the Jamestown Aquifer is located approximately 95 feet BGS or at an elevation of approximately 1,170 feet AMSL (see Figure 3.1). The aquifer in the valley floor consists of sand and gravel deposits averaging 20 feet in thickness. The Jamestown Aquifer is overlain by silt and clay-textured glacial lake deposits and is underlain by glacial till. The overlying silts and clays range in thickness from 80 to 140 feet thick and the underlying glacial till is approximately 120 feet thick.

The Jamestown Aquifer is confined in the valley floor and is unconfined in the upland areas. In general, the saturated thickness in the upland (unconfined) areas is in excess of 20 feet and reduces to a 20-foot thickness in the confined (valley floor) areas (Crain 1966). On a regional basis, groundwater flow in the Jamestown Aquifer is from the upland areas to the major rivers and creeks located in the valley floor (Crain 1966). Therefore, the major groundwater discharge area in the vicinity of the Site is the Chadakoin River. Groundwater flow will occur from the upland areas (located some 250 feet above the valley floor) to the valley with discharge occurring in the Chadakoin River. In this type of steep hydrogeologic setting, underflow of the river will not occur.

The USGS report identifies 23 wells and test holes within an approximate 1-mile radius of the Site. The relevant data for 19 of the wells/test holes are presented in Table 3.1. Available stratigraphic logs are presented in Appendix C. Examination of this data shows that the closest water supply well is the Jamestown well field, located approximately 1.25 miles north of the Site.

4.0 REGULATORY AGENCY INFORMATION

Information requests were submitted by ESI to the NYSDEC Region 9 Office, the United States Environmental Protection Agency (USEPA) Region II Office, the Chautauqua County Department of Health, and the New York State Department of Labor to determine if past activities on the subject property or adjacent parcels have caused any known environmental concerns. None of the above-mentioned departments had indicated the subject property was on record for environmental concerns. Copies of the written responses received from the agencies are presented in Appendix D.

Information provided by NYSDEC in September 2000 indicated that there were four sites (one Class 2 and three Class 4) within 1 mile of the Facility which are included in the NYSDEC Registry of Inactive Hazardous Waste Disposal Sites.

ESI reviewed the NYSDEC Region 9 files to determine if there were any records regarding waste disposal activities, oil or chemical spills, USTs, or bulk storage tanks on the Site. There was no record of waste disposal activities or spills on file. The information obtained regarding USTs was presented previously in Section 2.4.8.

There are no NYSDEC or USEPA registered wetlands located within a one-half mile radius of the subject site, which is on a Zone C floodplain. A Zone C floodplain is defined as an area of minimal flooding. Wetland and floodplain information was obtained from the Chautauqua County Department of Planning and Development, community panel number 3601380001B that went into effect on January 5, 1978. Review of the U.S. Fish & Wildlife Survey (USFWS) National Wetlands Inventory in May 2000 showed the Site and all surrounding lands to be "upland".

The Dowcraft Corporation was required by the NYSDEC to obtain a State Pollution Discharge Elimination System (SPDES) permit to legally discharge plant water. The SPDES permit number for the Dowcraft plant was NY-0030210. Compliance with the 002 SPDES permit included a sampling program to evaluate the discharge water quality. Table 4.1 presents a summary of the analytical testing that was conducted on samples obtained from each outfall location.

Should indicate that the outfalls are numbered as dry wells in the figure 5.1. + Table 4.1

8/23/99 Deleted
R. ~~[illegible]~~ Sweeney

NYSDEC personnel conducted an inspection of the Facility on March 28, 1988. As part of this inspection a formal request to reroute the phosphatizer process water to the Jamestown publicly operated treatment works (POTW) was issued by the NYSDEC on March 29, 1990. The NYSDEC reported the requested modification was implemented and, at the time of the ESI assessment, phosphatizer rinse water was the only discharge

004 Boiler Blowdown

005 Plat
007 Cooling water

location?

from the phosphatizer to Outfall 005. Dowcraft reported that after September 1991 the phosphatizer rinse water was recycled back into the phosphatizer eliminating the flow to Outfall 005.

5.0 FIELD ACTIVITIES

Since 1990 various field activities including soil sampling, groundwater monitoring well installation, and sampling of surface water and sediment have been conducted. The field activities were conducted by ESI, CRA, and Dowcraft personnel under various investigative and monitoring programs and were performed as described in the following subsections.

Historic information regarding Facility activities and previous analytical test results were utilized in selecting the analytical parameters for the various Site investigations. A summary of the samples collected and analyses performed during the field activities is presented in Table 5.1. The sample locations are shown on Figure 5.1. Complete discussions of the results of the field activities are presented in Sections 6 and 7.

5.1 SURFACE SOIL SAMPLING

In November 1990, ESI collected surface soil samples from three locations on the exterior of the Facility. The soil samples were collected from the liquid waste storage area, empty drum storage area, and the recyclable metals storage area. The soil sampling locations were determined based on current property use and on potential areas of past use. The surface soil sample locations are shown on Figure 5.1. The purpose of this sampling and analysis was to determine if surface contamination was present in these areas.

The surface soil samples were collected by an ESI Environmental Engineer. Surface soil samples were collected from the interval between 0 and 6 inches BGS using a stainless steel precleaned trowel. The sampled soils were placed into two 40-milliliter (ml) amber glass vials with septa (filled to capacity) and one 500 ml amber glass jar. Chain of Custody forms were completed with the required sample location and analyses requested. The samples were then packaged, cooled, and sent to the laboratory for analysis. All sampling tools were decontaminated between sampling locations. The surface soil samples were analyzed for USEPA Target Compound List (TCL) volatiles, priority pollutant metals, and pH.

In November 1999, during the Facility demolition, surface soils immediately underlying the concrete floor(s) were screened in place as the concrete was removed. Screening was performed using a PID. With the exception of the 1963 and 1984 additions, which were not demolished, the entire area formerly covered with building(s) was screened on an approximate 10-foot by 10-foot grid.

5.2 SUBSURFACE EXPLORATION

5.2.1 GENERAL

Subsurface investigations at the Site have consisted of borehole and monitoring well installations, sampling of soils from the bottoms of the drywells, and screening and/or sampling of soils from test pits and other excavations. The following subsections present descriptions of the subsurface investigation field activities.

Logs of the subsurface installations are contained in Appendix E.

5.2.2 BOREHOLES AND WELLS

ESI advanced 16 test borings (ESI-1 through ESI-13, PW-1, and PW-2) to determine subsurface conditions and to facilitate the installation of groundwater monitoring/pumping wells. Groundwater monitoring wells ESI-1 through ESI-5 (excluding ESI-2D) were located to generalize groundwater quality downgradient of the Facility and associated drywells. Monitoring wells ESI-8 and ESI-9 were located upgradient of the potential source areas of volatile organic compounds (VOCs) to groundwater. The location of monitoring wells ESI-6, ESI-7, and ESI-10 through ESI-13 were selected to better define the lateral extent of the VOC presence. The location and depth of the screened interval for monitoring well ESI-2D was chosen to evaluate whether groundwater contamination had migrated downward from the upper sand and gravel through the silt/clay lens to the lower sand and gravel. Pumping wells PW-1 and PW-2 were located within the groundwater contaminant plume to facilitate an aquifer pumping test and to maximize remediation efforts. Both pumping wells PW-1 and PW-2 were screened from the bottom of the well to above the observed static water level.

Test borings ESI-1 through ESI-13 were advanced using 4.25-inch inside diameter (ID) hollow stem augers to allow installation of 2-inch ID polyvinyl chloride (PVC) groundwater monitoring wells. Test borings PW-1 and PW-2 were advanced using 8.25-inch ID hollow stem augers for installation of 6-inch ID stainless steel pumping wells.

Representative soil samples of the overburden were obtained by driving a standard 2-inch outside diameter (OD) split-spoon sampler into the undisturbed material below the auger casing with a 140-pound hammer falling freely a distance of 30 inches (American Society of Testing Materials [ASTM] Method D-1586). The number of blows required to drive the split-spoon each 6-inch interval was recorded. Standard Penetration Tests (SPT) conforming to ASTM D-1586 were completed as noted on the subsurface logs. Soil samples were recovered from each sampling interval. The required depth of each test boring was determined in the field by an ESI geologist based on subsurface conditions and groundwater encountered during drilling operations.

Monitoring well ESI-13 was inadvertently destroyed and was replaced with monitoring well ESI-13R in April 1998. Borehole and monitoring well installation procedures were the same as those used for the initial well installation.

Purge well PW-3 was installed within the limit of the degreaser pit in October 1993. The well was screened in the lowermost 15 feet of the sand and gravel unit. The well sandpack extended from the water table surface to the bottom of the borehole, approximately 10 to 42 feet BGS. Well PW-3 was constructed of 4-inch diameter stainless steel screen and riser. PW-3 was severely damaged when the facility was razed. Replacement well PW-3R was installed in May 2000. PW-3R was installed in the same manner as PW-3 and is located 5 feet northeast of the original installation. The stratigraphic and instrumentation log for PW-3R is contained in Appendix E.

In April 2000, NYSDEC requested that an additional well, ESI-14 be installed at the eastern end of the Site to complete the definition of the groundwater plume in that direction. Monitoring well ESI-14 was installed and developed in May 2000.

The test boring, monitoring well, and purge well locations are shown on Figure ~~2.2~~ 5.1. A summary of well installation details is presented in Table 5.2. Following completion of the May 2000 well installation program, all Site monitoring and purge wells were surveyed for both horizontal and vertical position. A copy of the survey data is presented in Appendix F.

5.2.3 DRYWELL SAMPLING

In February 1991, soil samples were collected by ESI from drywells 004 and 005 to determine whether chemicals were present in the soil at the bottom of the drywells and to evaluate the potential for the drywells to be sources of chemicals to Site groundwater. Drywell 004 is located on the exterior of the manufacturing building. There was no free standing water present in drywell 004 at the time of sampling. A decontaminated hand auger was used to acquire the sample from drywell 004. The soil samples were collected from soils between the surface of soils in the drywell and 6 inches below the surface. The soil samples were analyzed for VOCs.

At the time of sampling, drywell 005 was receiving rinse water from the adjacent phosphatizer and non-contact cooling water from the main boiler. There was several feet of standing water in drywell 005. The permeability of drywell 005 was lower than expected since the incoming flow of water was low and standing water was apparent. A decontaminated pipe was used to collect the soil sample from drywell 005.

To complete the characterization of the soils beneath the drywells, a soil sample was collected from drywell 007 on January 3, 2000. At that time the Facility demolition was complete and the building floor slabs had been removed. During the demolition activities, soil, gravel, and debris had fallen into the drywell. The sample from drywell 007 was collected using a precleaned bucket auger. The upper 2 feet of sediment in drywell 007 consisted of coarse gravel which had fallen into the drywell during the demolition activities. Fine to medium gravel believed to be the native soil was present beneath the coarse gravel. A sample collected from the upper 0.5-foot of the fine to medium gravel was collected and submitted for VOC analyses.

The locations of the drywells are shown on Figure ~~2.2~~ 5.1.

5.2.4 SUBSURFACE ANALYTICAL SOIL SAMPLING

In November 1999, during the facility demolition, test pits were dug in the vicinity of the degreaser pit as shown on Figure 2.5. One soil sample was collected from each test pit. Test pit logs are presented in Appendix E.

Also in November 1999, one soil sample was collected from the footing excavation for new walls which were to be constructed on the north and west sides of the 1963 addition. The location from which this sample was collected is also shown on Figure 2.5.

The test pits and footing trench were excavated using a backhoe. The test pit and footing trench soil samples were selected with the concurrence of the NYSDEC Site Representative based upon PID readings and location/depth. Test pit soil samples were collected from either the soils at the water table surface or from the soils which exhibited the highest PID readings. In the footing trench, the analytical sample consisted of composited soil from the northwest corner of the excavation, the area of the excavation closest to the degreaser pit.

The test pit samples were collected directly from the backhoe bucket or spoils pile using a dedicated, sterile, polystyrene scoop. Exposed soils were first scraped away and underlying soils were selected for the analytical samples. No soils which had contacted the backhoe bucket were included in the analytical samples.

The sample from the footing excavation was collected directly from the bottom and side of the excavation in the area selected. A dedicated disposable polystyrene scoop was also used for the collection of this sample.

Each sample was labeled, logged, and stored on ice in a sample cooler immediately following collection. Samples were later shipped via overnight courier to the analytical laboratory.

5.2.5 UTILITY EXCAVATIONS

In December 1999 and January 2000, following the completion of the demolition activities, excavations were made for the installation of underground utilities. As the excavations progressed, the excavated soil was screened using a PID. These excavations were made in addition to the utility bedding investigation described in Section 2.4.11.

The locations of the utility excavations are shown on Figure 5.1.

5.3 WELL DEVELOPMENT AND GROUNDWATER SAMPLING

5.3.1 WELL DEVELOPMENT

Development of monitoring wells ESI-1 through ESI-13 was accomplished by pumping groundwater from the well with either a guzzler pump or a peristaltic pump with dedicated tubing. A minimum of 10 water well volumes were evacuated from each well unless the well went dry during development. Monitoring wells ESI-1, ESI-5, ESI-6, and ESI-9 went dry during development. These wells were allowed to recharge and pumped dry a second time to achieve the desired level of development prior to sampling.

Field measurements of pH, temperature, and specific conductivity were obtained during well development to determine whether representative groundwater had entered the well. Representative groundwater was assumed to have been obtained when the field measurements stabilized (variation of less than 10 percent over successive well volumes).

Following installation, replacement well ESI-13R was developed using a bottom loading stainless steel bailer. The well was developed by hand-bailing 10 well volumes (13 gallons) of standing water. The initial water quality was cloudy, brown, and turbid with much sediment. The development water had no noticeable odor and no sheen was present. The final water quality was the same as the initial water quality with less turbidity. No field measurements were taken during the development of the replacement well.

In April 1998, prior to beginning a sampling round, monitoring well ESI-2D was pre-purged. It was believed that there may have been cross-contamination between depths during the installation of this monitoring well. Therefore, the pre-purging was performed to remove stagnant water which may have been carried to the deeper, monitored interval of the well from shallow contaminated depths. The well was purged of five volumes (30 gallons) of water. The initial water quality was cloudy, gray, very turbid with much sediment. The purge water had no noticeable odor and no sheen was present. The final water quality was the same as the initial water quality but slightly less turbid.

The top of the riser pipe of monitoring well ESI-3 was broken at an unknown time prior to May 1997. The well is a below grade, flush-mounted installation located in an alleyway and, due to the lack of a tight seal in the protective casing or riser pipe, the well filled with sediment. In December 1999, prior to beginning the groundwater sampling round, well ESI-3 was cleared of sediment and redeveloped. The rehabilitation of this well was accomplished by loosening and, to the extent possible, removing the sediment in the well using a small diameter bucket auger. In addition, potable water was added to the well and the well was surged and pumped using a centrifugal (trash) pump with well-dedicated discharge tubing. On December 1, 1999 approximately 18 gallons of potable water were added to the well and 25 gallons of water were removed. On December 20, 1999, an additional 20 gallons of water were removed from the well before purging for sampling began. Upon completion of the well rehabilitation and redevelopment, the water was clear and colorless with no sediment.

Monitoring well ESI-14 and purge well PW-3R were developed following their installation in May 2000.

Well development logs are presented in Appendix G.

5.3.2 GROUNDWATER SAMPLING

ESI obtained groundwater samples from 14 monitoring wells (ESI-1 through ESI-13) after completion of the development/purging described in Section 5.3.1. Samples from these monitoring wells were collected using precleaned stainless steel or PVC bailers.

Groundwater samples were also collected by ESI from pumping wells PW-1 and PW-2 during aquifer pumping tests. Pumping wells PW-1 and PW-2 were not developed according to the procedures discussed above; however, a minimum of five volumes of standing water were pumped from each well as part of the aquifer pumping test prior to collecting groundwater samples. Samples from the pumping wells were obtained from a sample port in the pumping apparatus.

On May 19, 1997, three groundwater monitoring wells (ESI-2, ESI-7, and ESI-11) were sampled to acquire analytical data for the verification of the COCs for the Supplemental RI/FS (SRI/FS). A minimum of 10 gallons, or approximately 10 well volumes, were purged from each well prior to sampling. Well purging and sample collection logs are presented in Appendix H.

Selected accessible existing monitoring and pumping wells were sampled on December 2-3, 1999. Two wells which were to be included in this program, PW-3 and ESI-9, were not sampled in December 1999. Well PW-3 was damaged during the Facility demolition and was filled with sand and gravel which prevented the installation of any pumping or bailing equipment. Well PW-3 was replaced with PW-3R in May 2000 and the replacement well was sampled. Monitoring well ESI-9 could not be located during the December 1999 sampling event but was located in the spring and sampled in May 2000. Monitoring well ESI-14 was also sampled in May 2000. The groundwater samples collected in 1999 and 2000 were obtained in accordance with the procedures contained in the document "Standard Operating Procedures - Sample Collection, Dowcraft Corporation" dated May 1999. Well purging and sample collection logs are contained in Appendix H.

A summary of the groundwater sample collection and analyses performed to date is presented in Table 5.1.

5.4 SOIL GAS AND ORGANIC VAPOR

Soil gas and vapors have been surveyed on several occasions to gather data to assist in the identification of potential chemical source areas and to identify impacted soils. The following subsections describe the soil gas and vapor screening programs conducted during the Site investigations.

5.4.1 SOIL GAS SURVEY

soil gas results (over)

ESI performed a soil gas survey at the Site between April 15 and 17, 1992. C.T. Male Associates, P.C. of Latham, New York, was retained by ESI to complete purging, sampling, and analysis of the soil gas samples. The purpose of the soil gas survey was to preliminarily determine if the source of the VOCs detected in Site groundwater was predominantly in the unsaturated soils.

A total of 29 soil gas measurement points were sampled at depths ranging from 2 feet to 6 feet BGS. Soil gas sample points were advanced by driving and retrieving a solid steel rod to the required depths. One-half inch PVC soil gas sample pipes were inserted in the hole at each location. The pipes were installed to depths approximately 1-foot above the bottom of the soil gas probe hole. The soil gas hole was then reamed to the specified sample depth with a ream rod which fits inside the PVC pipe. The annulus around each soil gas pipe at the ground surface was sealed with a bentonite paste mix to reduce the possible migration of soil vapors around the outside of the PVC pipes. Each of the pipes were capped with a PVC cap to avoid venting of the soil prior to sample collection. The analysis of the soil gas was completed with a portable gas chromatograph (GC). The locations of the soil gas samples are shown on Figure 5.2.

6 Points had TCE at range of 3.3 to 6.9 ppb in vadose zone.
1 point had Toluene @ 0.6 ppb

Soil Gas Survey

Location #	
1	ND
2	ND
3	6.9 ppb
4	4.26
5	ND
6	ND
7	ND
8	ND
9	ND
10	ND
11	4.139
12	ND
13	ND
14	3.3
15	ND
16	ND
17	4.45
18	4.86
19	ND
20	ND
21	ND
22	ND
23	ND
24	ND
25	ND
26	ND
27	ND
28	ND
29	ND

5.4.2 SCREENING MEASUREMENTS IN SOIL

Recovered soil samples from the test borings and spoils from test pits and trenches were screened using a PID with a 10.2 electron volt (ev) lamp to determine the potential presence of VOCs. Ambient (background). organic vapor concentrations were measured prior to sample screening. The PID measurements (reported in parts per million [ppm]) were used to generally characterize the potential for presence of VOCs and to select samples for analytical testing.

5.5 PHYSICAL TESTING

ESI collected four soil samples from test borings PW-1 and PW-2 (two from each boring) for grain size analysis. Samples were retained from the non-cohesive and cohesive native soil units for mechanical testing to estimate permeability characteristics, based on grain size, for each soil type.

Additional samples for grain size determination were collected from boreholes BH-15 and BH-16 during the SRI.

In addition, a test trench was excavated along Outfall 002 to evaluate the characteristics of the bedding material around the outfalls.

5.6 HYDRAULIC MONITORING

Groundwater levels in the existing monitoring wells and Chadakoin River were measured on seven occasions between 1990 and July 1, 2000.

5.7 AQUIFER PUMPING TEST

ESI completed an aquifer pumping test at the Site on February 9, 10, and 11, 1993 to assess the hydraulic characteristics of the overburden soils. The purpose of evaluating the aquifer hydraulic characteristics was to determine the pumping rates for subsequent remediation (groundwater pumping and treatment).

ESI installed two pumping wells (PW-1 and PW-2) to facilitate completion of the aquifer pumping test and for future groundwater remediation. The locations of the pumping wells were within the groundwater contaminant plume and were selected to optimize future remediation efforts based on the location of existing buildings, utilities, and the area of the highest concentrations of groundwater contamination.

PW-1 and PW-2 were installed to pump groundwater from the upper sand and gravel soils. Both wells were screened with stainless steel well screens from the bottom of the sand and gravel to above the observed static water level.

5.7.1 PUMPING TEST SETUP

A downhole pump purchased from General Pump Manufacturing was used for pumping groundwater during the aquifer pumping test. The pump was capable of pumping 35 gallons per minute (GPM) at 40 feet BGS and was powered by a 220 volt power source (supplied by Dowcraft). The groundwater was pumped through 1-inch diameter plastic pipe from the bottom of the well to an activated carbon treatment system on the ground surface. A 6-foot section of steel pipe located between the pump and carbon treatment system contained an in-line flow meter, a valve to control the pumping rate, and a PVC sample port.

The activated carbon treatment system manufactured by Carbtrol Corporation consisted of three 55-gallon drums of activated carbon, connected in parallel, and the required manifolds and piping for the influent and effluent to the carbon drums. The effluent from the carbon treatment system was discharged through a 1-inch diameter plastic pipe plumbed into the sanitary sewer. ESI requested and received formal authorization from the City of Jamestown Department of Public Works to discharge the treated groundwater generated during the aquifer pumping test to the sanitary sewer system.

ESI collected one effluent sample from the carbon treatment system at the end of the pumping test for TCL VOC analysis (USEPA Method 624) to determine whether breakthrough of the carbon had occurred during the test. The results of the testing showed that there were no VOCs present above the method detection limits.

5.7.2 PUMPING TEST PROCEDURES

The aquifer pumping test consisted of step drawdown tests in pumping wells PW-1 and PW-2 and a 24-hour long-term pumping test in pumping well PW-2. The step drawdown tests were completed on February 9 and 10, 1993. The 24-hour pumping test was completed February 10 and 11, 1993.

A preliminary 1 hour test was completed on February 9 to check pump operation, flow rates, and reaction of the activated carbon treatment system to the influent water pressure. It was determined after the preliminary test that the pumping test apparatus was hydraulically sound and the carbon treatment system responded well to the influent water pressure. In addition, the valve designed to control the pumping rate was roughly calibrated.

The entire step drawdown test at pumping well PW-1 lasted 98 minutes and was stepped at the following rates: 5 GPM, 8 GPM, 10 GPM, 12 GPM, and 14 GPM over the length of the test. Water levels in both pumping wells PW-1 and PW-2 were monitored with electronic water level indicators. Readings were recorded at ½-minute intervals during the first 5 minutes after increasing each pumping rate. After 5 minutes of pumping at the increased rate, the water level measurements were taken at 1 to 2-minute intervals. A two man crew was continuously assigned to measuring groundwater levels in the 14 monitoring wells and the Chadakoin River during the step drawdown tests.

The same procedures were used for the step drawdown test at pumping well PW-2 on February 10. This step drawdown test was longer in duration (148 minutes) due to the well producing larger quantities of groundwater than pumping well PW-1. The pumping rates were 5 GPM, 8 GPM, 10 GPM, 12 GPM, 14 GPM, 16 GPM, 18 GPM, 20 GPM, 22 GPM, and 24 GPM.

For the 24-hour pumping test, well PW-2 was pumped at a constant rate of 20 GPM. Water levels in wells ESI-2, ESI-2D, ESI-3, ESI-6, and PW-1 were measured at 2-minute intervals for the first 30 minutes of the test, 5 minute intervals from 30 minutes to 1 hour, 10-minute intervals from 1 hour to 2 hours, and once an hour thereafter. Water levels were measured in the pumping well (PW-2) at closer intervals during the initial 20 minutes of the test and the same intervals as above after 20 minutes. Water levels in monitoring wells ESI-1, ESI-7, ESI-10, ESI-11, ESI-12, and ESI-13 were read at 5-minute intervals over the first hour, 10-minute intervals over the second hour, and once an hour for the remainder of the test. Water levels in well ESI-8 and ESI-9 were monitored beginning at approximately 30 minutes after pumping had begun at 20-minute intervals for the first 90 minutes and every hour thereafter. Immediately after shutting off the pump, water levels were monitored at approximately the same interval sequence for 4 hours during the recovery portion of the test.

6.0 SITE GEOLOGY AND HYDROGEOLOGY

6.1 GEOLOGY

The characterization of site geology is limited to the upper soil units, those in which chemicals are present in groundwater or which are immediately underlying the contaminated interval. The overburden units identified at the Site consist of:

i) fill;
ii) sand and gravel; and
iii) silt/clay.

The information used in this characterization has been obtained through the drilling of boreholes and installation of test pits with associated physical testing. A summary of Site stratigraphy is presented in Table 6.1. Cross-sections illustrating the overburden stratigraphy at the Site are presented on Figures 6.2 and 6.3. Cross-section locations are shown on Figure 6.1.

6.1.1 FILL

2-14'
Avg 8'

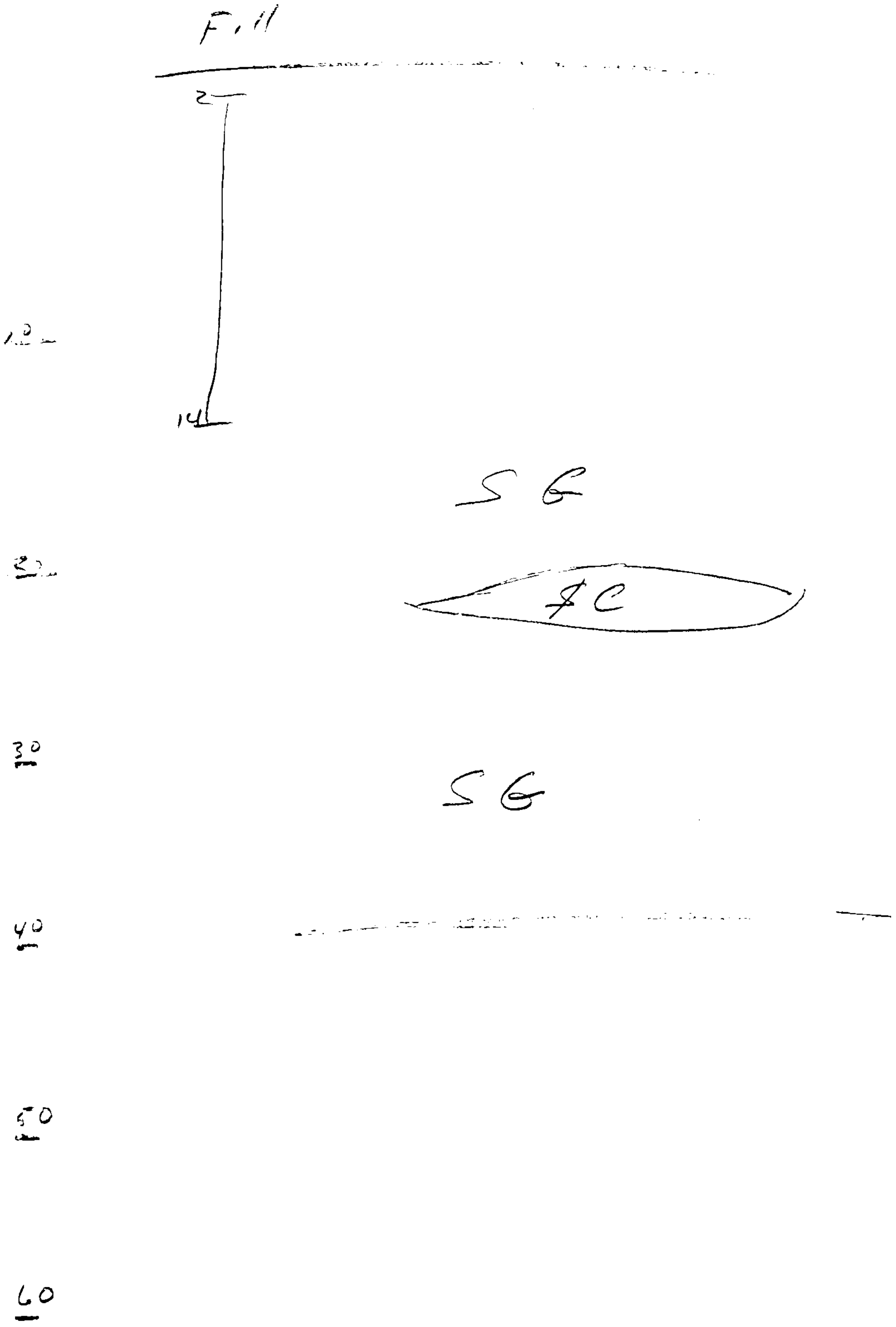
Fill was encountered in all boreholes at thicknesses ranging from 2 to greater than 14 feet. The average thickness of fill is approximately 8 feet. The material observed within the fill consisted of cinders, sand, silt, gravel, brick, concrete, coal, slag, and metal. A 1.0-foot interval of concrete was encountered between 4.5 and 5.5 feet in test borings ESI-2, ESI-3, and ESI-5 indicating a railroad track was formerly present in the access road along the north side of the former Dowcraft plant.

6.1.2 SAND AND GRAVEL

30-39'
Avg 35'

The native soils underlying the fill consist of silty sand, and sand and gravel. The sand and gravel unit was penetrated in 10 borings. In three of the 10 borings, an upper and lower sand and gravel separated by a lens of silt/clay approximately 8 feet thick were encountered. Only one other boring, PW-3R, extended deep enough to have encountered this silt/clay lens if it was present; however, the silt/clay was absent at this location. Based on the stratigraphy of the borings which extended to the lowermost silt/clay confining layer, the overall sand and gravel unit (including the silt/clay lens,

OVER


Fill
2
10
14
SG
20
SC
30
SG
40
50
60

where present) ranges in thickness from 30 to 39 feet with an average thickness of approximately 35 feet.

Samples from the sand and gravel unit were collected from boreholes PW-1, PW-2, BH-15, and BH-16 for grain size determinations. A summary of the testing results is presented in Table 6.2. The testing laboratory reports are contained in Appendix I.

The hydraulic conductivity of the sand and gravel has been estimated using the grain size distribution curves presented in Appendix I and the Hazen method. Based on these estimates, the hydraulic conductivity of the sand/gravel unit ranges from 1.3 x 10^{-4} to 2.2 x 10^{-4} centimeters per second (cm/sec) with a geometric mean of 1.6 x 10^{-4} cm/sec.

6.1.3 SILT/CLAY

A silt/clay unit underlies the sand and gravel at the Site. As described in Section 6.1.2, a silt/clay ~~bed~~ lens ranging in thickness from 7.5 to 8 feet was encountered at approximately 20 feet BGS in three of the borings installed at the Site. The depth to the lower silt/clay underlying the sand and gravel unit ranges from 30 to 39 feet BGS. The lower silt/clay unit was not fully penetrated in any boring; however, based on the regional geology and depth to the top of the Jamestown Aquifer, it is estimated to be 60 feet in thickness. 1 Samples from the silt/clay unit were collected from boreholes PW-1, PW-2, BH-15, and BH-16 for grain size determination. A summary of the testing results is presented in Table 6.2. The testing laboratory reports are contained in Appendix I.

Based upon the grain size analyses and reference literature, the hydraulic conductivity of the silt/clay unit is estimated range from 7.0 x 10^{-7} to 1.0 x 10^{-8} cm/sec. The Hazen method was used to estimated the hydraulic conductivity of the silt/clay soils in BH-16 7 but, due to the very fine nature of the soils in the samples, could not be used for the samples from PW-1 or PW-2. Therefore, the hydraulic conductivities for these samples are estimated as ranges based on published reference values. Due to the estimated thickness of the silt/clay unit and its low hydraulic conductivity, it is believed that the silt/clay unit acts as an aquitard preventing the migration of chemicals in groundwater to the deeper unit. The function of the silt/clay as an aquitard has been confirmed by the analytical data which show the absence of chemical concentrations in monitoring well ESI-2D which is installed in the sand and gravel below the upper silt/clay lens.

Further evidence of the confining characteristics of the silt/clay is provided by the comparative water level elevations between monitoring wells ESI-2 screened in the sand

and gravel above the silt/clay bed and ESI-2D screened below the silt/clay bed. With one exception, December 1999, the water level elevations in monitoring well ESI-2D in all monitoring events were higher than the elevations in ESI-2 (see Table 6.3). This demonstrates an upward vertical hydraulic gradient created by the presence of the silt/clay bed. This upward hydraulic gradient also prevents the flow of COCs in groundwater into the lower zones.

6.2 HYDROGEOLOGY

The groundwater level elevation data collected during the hydraulic monitoring events is presented in Table 6.3. Water level elevations reported prior to December 1999 were referenced to an arbitrary Site reference elevation of 100. All wells were surveyed in May 2000 and top of casing elevations in feet above NGVD were determined for each well. The data reported prior to December 1999 have been converted to NGVD elevations. Groundwater contour maps for the sand and gravel unit have been prepared using the data from February 1993, December 1999, and June 2000. The contour maps are presented on Figures 6.4 through 6.6.

Review of the contours shown on Figures 6.4 through 6.6 shows that the direction of groundwater flow in the upper sand and gravel unit is from the south-southwest to the north-northeast with an average horizontal gradient of approximately 0.005 feet/foot.

Using the hydraulic conductivity of 1.6×10^{-4} cm/sec estimated in Section 6.1.2, a gradient of 0.005 feet/foot and a porosity of 0.3, the groundwater flow velocity in the sand and gravel is approximately 2.7 feet per year calculated as follows:

$$V = \frac{Ki}{n_e}$$

Where:

K = hydraulic conductivity in cm/sec
i = hydraulic gradient
n_e = effective porosity
V = flow velocity.

The hydraulic monitoring data show an average upward vertical hydraulic gradient between wells ESI-2 and ESI-2D of 0.01 feet/foot.

Pumping Test
2/9-11/93

6.3 AQUIFER TESTING RESULTS

6.3.1 STEP DRAWDOWN TESTS

The primary purpose for completing the step tests on each of the two pumping wells (PW-1 and PW-2) was to determine the maximum sustainable pumping rates for the 24-hour pumping test, and eventually for groundwater remediation. Since data from the 24-hour aquifer test was available for determining hydraulic parameters, the step test data are simply plotted on a linear graph to determine a visual representation of the step test responses.

The step test on PW-1 showed the maximum pumping rate obtainable before the water levels were lowered to the pump intake to be 12 GPM (drawdown of 11.82 feet). The maximum drawdown in the observation wells as a result of the PW-1 step test was 0.14 feet in PW-2 (see Table A in Appendix J).

The maximum obtainable pumping rate in PW-2 was 24 GPM. Well PW-2 was pumped for 10 to 20 minutes at pumping rates from 5 to 24 GPM increasing in 2 GPM intervals. The maximum drawdown in the pumping well was 15.15 feet at 24 GPM. The maximum resultant drawdown in the observation wells during the PW-2 step test was 0.29 feet in PW-1 (refer to Table A in Appendix J). It was decided to complete the 24-hour aquifer test by pumping PW-2 because of the larger drawdown available and higher sustainable pump rates in this well.

6.3.2 24-HOUR PUMPING TEST ON PW-2

The 24-hour pumping test was completed after water levels had recovered to 90 percent of the pre-step test levels. Table B (Appendix J) summarizes the static water levels before testing began (before the test, BT) and immediately prior to the 24-hour test (initial, INIT).

For 24 hours, PW-2 was pumped at a constant rate of 20 GPM. The pumping well drew down 11 feet during the first 10 minutes of pumping, reaching a final maximum drawdown of 11.62 feet by the end of the 24-hour test (refer to plot XI in Appendix J). The water level in the pumping well fluctuated significantly for the next 100 minutes, possibly due to turbulent flow within the well. Table C (Appendix J) summarizes the maximum drawdown in each of the 15 observation wells and the water level fluctuations in the nearby Chadakoin River. The wells in Table C (Appendix J) are listed in order of maximum to minimum final drawdown.

The largest drawdown response occurred at PW-1. PW-1 drew down 0.42 feet after 24 hours of pumping PW-2. (This compares to the 0.29 feet after the 148 minute step test on PW-2.) PW-2 also had the largest response to pumping of PW-1, drawing down 0.14 feet during the 98 minute step test. Other monitoring wells located closer to the pumping well exhibited less drawdown than PW-1 (i.e., ESI-6 is only 8 feet from PW-2, yet it drew down only 0.28 feet, whereas PW-1, 52 feet from PW-2, drew down 0.42 feet). These differences in drawdown are most likely the result of the differences in screened depths between the wells. While they overlap slightly with ESI-6, PW-1 and PW-2 are screened across longer and deeper intervals than ESI-6. The nature of the materials in which they are screened may also be partially the reason for the difference. ESI-6 is screened in the fill materials while PW-1 and PW-2 are screened in the sand and gravel.

The step test on PW-1 also indicates the aquifer in the vicinity of PW-1 is tighter than it is near PW-2. A tighter aquifer will also experience greater drawdown than a more permeable aquifer.

?
PW-2

There is some hydraulic connection between the screened zone in the deep well (ESI-2D) and the screened zone in the pumping well (PW-1). 2 The deeper well, ESI-2D, drew down 0.13 feet when PW-2 was pumped for 24 hours. This is less drawdown than observed in nearby shallow well ESI-2 (drawdown of 0.21 feet). The upward gradient observed between ESI-2D and ESI-2 was maintained during the pumping test (0.4 feet). Given the presence and hydraulic conductivity of the silt/clay bed between wells ESI-2 and ESI-2D, it is surprising that a hydraulic response in ESI-2D occurred. It can only be concluded that the seal of monitoring well ESI-2D is not perfect and, therefore, there is come connection between the intervals through the borehole used for well installation. This also explains the presence of chemicals in the samples from ESI-2D prior to its redevelopment. Following redevelopment, no COCs were detected in the well samples demonstrating the confining characteristics of the silt/clay bed.

The effect on the water table elevation and the resultant capture zone from pumping PW-2 alone at 20 GPM for 24 hours can be seen in the Observed Groundwater Capture Zone Map presented as Drawing No. 7 in Appendix J (data in Table C of Appendix J). Most of the wells were still drawing down slightly after 24 hours of pumping. As will be more extensively discussed in Section 6.3.3, the effects of delayed gravity drainage were observed in many of the wells for an extended period after the completion of the

Where is it.

tests and additional drawdown may be expected in the observation wells before they return to a Theissian type response.

6.3.3 DATA ANALYSIS

Data from the four wells with the highest drawdowns were analyzed using a variety of techniques to generate estimates of the hydraulic parameters of the aquifer. The drawdown data were used rather than the recovery data because of the longer observation period for the drawdown data. Barometric pressure was measured but no corrections to observed water levels were made because the unconfined nature of the aquifer makes barometric effects negligible. The area of drawdown did not extend to the Chadakoin River, therefore, no recharge boundaries from this potential lateral source are believed to have influenced the data.

Although the total observed drawdowns in the observation wells were not large, the log-log response curves do have the typical shape of drawdown in unconfined aquifers. Withdrawal of water from an unconfirmed aquifer occurs in three phases. Initially, water is released from storage due to expansion of the water and compaction of the aquifer just as occurs in a confined aquifer (Theissian type response). Then, as the cone-of-depression develops, water is supplied through gravity drainage of the aquifer by both vertical and horizontal flow. The curve flattens (drawdown slows down) in this interval because extra water is available through drainage. Finally, when the piezometric head and water table elevations within the drawdown cone coincide, flow is generally horizontal again and the data will again follow a Theis curve response. Neuman has developed a set of type curves for use in determining hydraulic parameters from unconfined aquifers.

Finally, Neuman type curve matches were made and hydraulic parameters calculated on two of the wells. Both an early elastic response match (ua) and a delayed response curve (ub) match were made. Beta ($b\text{-}r^2/b^2$) was calculated using an aquifer thickness of 20 feet (as in the Jacob calculations) and the observed distance from the pumping well. The hydraulic conductivity from these curve matches were calculated at 2×10^{-3} and 1.1×10^{-2} cm/sec, somewhat lower than the values calculated by the Jacob technique as would be expected under dewatering conditions. The parameters derived from these type curves should be the most "accurate" since more of the equation assumptions match the true aquifer characteristics.

The PW-1 step test demonstrated that conductivity is variable across the Site since PW-1 could only be pumped at half the pumping rate obtainable in PW-2, even though they are only 52 feet apart. From the combined pumping test results it was concluded that the water table aquifer at the Site has a hydraulic conductivity on the order of 1 x 10^{-3} to 1 x 10^{-2} cm/sec. The hydraulic conductivity estimates from the grain size analyses show a geometric mean hydraulic conductivity of 1.6 x 10^{-4} cm/sec.

[illegible]

6.3.4 GROUNDWATER QUALITY DURING PUMPING TEST

Groundwater samples for analytical testing were collected from the pumping wells during the aquifer pumping test. The purpose for evaluating the groundwater quality during pumping was to assess the dynamic concentrations of the contaminants of interest. The groundwater samples were collected from a PVC sample port located on the influent piping to the activated carbon treatment system. Each sample was analyzed for TCL VOCs, aluminum (total and soluble), iron (total and soluble), and manganese (total and soluble). The VOCs and metals were analyzed according to USEPA Methods 624 and 200.7, respectively. Table 6.4 presents the analytical results for samples collected during the aquifer pumping test.

The total concentrations of iron and manganese were higher than the NYSDEC groundwater (Class GA) standard of 0.3 milligrams per liter (mg/L). Total aluminum was also present at concentrations higher than typical groundwater concentrations. However, the dissolved concentrations of iron were well below the groundwater standard. The dissolved aluminum concentrations were at or near detection levels. The comparison between total and dissolved concentrations of aluminum and iron further supports the contribution of turbidity to the elevated total metals results. The dissolved manganese concentrations were very close to the total manganese concentrations. Dissolved manganese concentrations ranged between 0.831 mg/L and 2.240 mg/L.

VOCs present in the samples collected from the pumping wells consisted of TCE, 1,2-dichloroethene (DCE), tetrachloroethene (PCE), 1,1,1-trichloroethane (TCA), and vinyl chloride. As expected, the concentration of TCE was significantly higher than the concentrations of the other detectable VOCs.

The total VOC concentration in pumping well PW-1 increased approximately 36 percent during the step drawdown test. Total VOC concentrations increased from 6,080 µg/L to 8,260 µg/L after about 2 hours of pumping (the pumping rate ranged from 5 GPM to 12 GPM). The increase in VOC concentration may have been due to migration of contaminated groundwater with a higher concentration of VOCs from the vicinity of pumping well PW-2. The total VOCs present in samples collected from pumping well PW-2 decreased from 22,515 µg/L to 19,259 µg/L over approximately 28 hours of pumping groundwater at 20 GPM. The reduction of approximately 15 percent total VOCs was likely due to the flushing effect induced during long-term groundwater pumping.

6.3.5 SUMMARY OF AQUIFER TESTING RESULTS

The cone of depression in the natural water table created by pumping PW-2 alone for only 24 hours generated a significant capture radius (refer to Drawing No. 7 in Appendix J) within the impacted area. Most significantly, despite the lack of hydraulic response in ESI-6, contamination from ESI-6 was readily captured by pumping PW-2.

The results of all three pumping tests (step tests pumping PW-1/PW-2, and the 24-hour test pumping PW-2) show that there is a good hydraulic connection between the pumping wells and the sand and gravel unit between approximately 15 and 25 feet BGS. This was apparent since the largest response to pumping PW-2 was in PW-1 which is screened deeper within the coarse aquifer relative to the other monitoring wells. Therefore, pumping PW-1 and/or PW-2 captures contamination present at these depths.

The maximum observed drawdowns in observation wells at the end of the 24-hour test are most likely not the maximum equilibrium drawdowns which will result with sustained pumping over much longer remediation times. The type curves suggest the nearest wells were just beginning to draw down again after having dewatered the cone of depression, when most flow again comes from the horizontal direction and data follows a more Theissian type response curve. This suggests that the capture zone from pumping PW-2 at 20 GPM for much longer periods of time may be slightly larger than shown on Drawing No. 7 in Appendix J.

7.0 ANALYTICAL TEST RESULTS

Samples of environmental media including soil vapor, soil, surface water, sediment, and groundwater have been collected and analyzed during various investigative and monitoring programs conducted at the Site. The following subsections present discussions of the analytical results. A sampling and analysis summary is contained in Table 5.1. Analytical laboratory data reports and analytical data assessment reports are contained in Appendix K.

7.1 SOIL GAS AND ORGANIC VAPOR

7.1.1 SOIL GAS SURVEY

The soil gas survey performed in 1992 was completed to preliminarily determine if the source of the detected VOC contamination is predominantly in the unsaturated zone. Groundwater was measured to be approximately 7 feet to 10 feet BGS. Rational selection of an appropriate remediation alternative can be based on whether the source areas of contamination are present in the saturated soils (groundwater) or unsaturated (vadose zone) soils.

Compounds detected during the soil gas survey included TCE and toluene. None of the other target compounds for which the GC was calibrated (trans-1,2-DCE, cis-1,2-DCE, benzene, and PCE) were detected. TCE was detected in soil gas points SG-3, SG-4, SG-11, SG-14, SG-17, and SG-18 at concentrations ranging from 3.298 parts per billion (ppb) to 6.904 ppb. Toluene was also present in soil gas sample SG-12 at a concentration of 0.6013 ppb. The presence of TCE and toluene at these concentrations indicates these compounds are not appreciably present in the unsaturated subsurface soils above the groundwater. However, it should be noted that the soil gas locations which were above the method detection limit were downgradient from the former TCE vapor degreaser.

The complete soil gas survey report is contained in Appendix L.

7.1.2 SOIL VAPOR SCREENING

Soil vapor screening through both headspace analyses and soil screening has been conducted during various Site activities to gather data to be used in the evaluation of the presence of potential sources of chemicals to groundwater and to plan soil sampling and analyses activities. In all cases, the soil vapor screening was performed using a PID.

Recovered soil samples from the borings for monitoring wells ESI-1 through ESI-12, PW-1, and PW-2 were scanned by an ESI geologist to determine the presence of volatile organic contaminants. Ambient "background" organic vapor measurements were taken prior to sample screening. The range of the headspace readings was from background to 70 ppm. The highest readings (8 to 70 ppm) were obtained from the samples collected at PW-2. The only other locations where readings greater than 5 ppm were obtained were ESI-2D (5 to 10 ppm between 16 and 22 feet BGS), ESI-6 (6.6 to 7.1 ppm between 10 and 14 feet BGS), and ESI-10 (5.5 ppm at 10 to 12 feet BGS). Table 7.1 summarizes the organic vapor measurements taken in the headspace of the sample jars of the soil samples collected during the test boring procedures.

As described previously, during the demolition program PID readings were taken of the surface soils following the removal of the concrete floor(s), in the test pits installed in the vicinity of the degreaser pit, and in the on-site utility excavations. At the same time, Site background concentrations were measured and recorded. The range of readings in the surface soils beneath the concrete floor slab was from background to 2 ppm above background. In the unsaturated, or vadose zone, soils in the test pits installed around the degreaser pit the maximum PID reading was 24 ppm. Below the water table surface in the test pits near the degreaser pit the readings ranged from 1.2 to 200 ppm and in the footing excavation and new sewer excavation readings ranged from background to 0.8 ppm. The readings from the test pits and excavations are presented with the borehole data in Table 7.1.

7.1.3 CONCLUSIONS

The soil vapor and soil gas data demonstrate that there is only a minimal presence of VOCs in vadose zone soils and that the high vapor readings are limited in presence to the saturated zone in the vicinity of the degreaser pit. These data show that soils are not of concern at the Site.

7.2 SOILS ANALYSES

As described in Section 5, surface and subsurface soil samples were collected and analyzed during the Site investigations. The results of the soils analyses are described in the following subsections.

7.2.1 SURFACE SOIL SAMPLES

Surface soil samples SS-1, SS-2, and SS-3 were obtained from soils below the spent paint thinner storage area, the empty drum storage area, and the recyclable metals storage area, respectively. These samples were analyzed for TCL VOCs, Target Analyte List (TAL) metals, and pH. No VOCs were detected in any of these surface soil samples. A summary of the concentrations of the metals detected in the surface soil samples is presented in Table 7.2. Also presented in Table 7.2 are the New York State Recommended Soil Cleanup Objectives (Technical and Administrative Guidance Memoranda [TAGM] 4046, dated January 24, 1994) and the Eastern USA Background concentrations which are also listed in TAGM 4046. The locations from which the surface soil samples were collected are shown on Figure 5.1.

All three surface soil samples exhibited concentrations of chromium, copper, and zinc which were higher than both the cleanup objective and the regional background concentrations cited in TAGM 4046. The concentrations of nickel in the samples from the spent paint thinner storage area (SS-1) and recyclable metals storage area (SS-3) also exceeded the regional background concentration.

The presence of these metals in concentrations above the published background levels can be attributed to the historical industrial use of the Site. Since the surface soil investigation was performed, the areas from which these samples were collected have been covered with gravel or pavement. There is no surface exposure of these soils. Groundwater analyses have demonstrated that these metals are not COCs in Site groundwater (see Section 7.3.1). Therefore, there is no concern due to the presence of elevated concentrations of these metals in Site soils.

The pH of the surface soil samples ranged from 6.48 (SS-1) to 7.59 (SS-3). This range of pH is typical of soils.

7.2.2 DRYWELL SOIL SAMPLES

Soil samples were collected from the bottoms of drywells 004 and 005 on February 20, 1991. Drywell 007 was sampled on January 3, 2000. The drywell soil samples were analyzed for TCL VOCs to determine if these drywells were source(s) of the TCE and 1,2-DCE in the groundwater. The concentrations of the compounds detected in the drywell soil samples are presented in Table 7.3. Also presented in Table 7.3 are the TAGM 4046 Soil Cleanup Objectives for these compounds. The locations of the drywells are shown on Figure 2.2.

The sample obtained from drywell 005 was found to contain 440 micrograms per kilogram (μg/kg) of 1,2-DCE and 310 μg/kg of TCE. The sample collected from drywell 004 was found to contain 120 μg/kg of TCE. No VOCs were detected in the sample from drywell 007.

The concentration of 1,2-DCE in drywell 005 (440 μg/kg) exceeds the NYSDEC Recommended Cleanup Objective of 300 μg/kg. This exceedance of the recommended cleanup objective is not of a magnitude which suggests that drywell 005 is or was the primary source of VOCs to Site groundwater.

7.2.3 SUBSURFACE SOIL

Subsurface soil samples were collected in November 1999 from test pits TP-1 through TP-5 and from the northwest corner of the footing excavation outside the 1963 Addition. The soil samples from the test pits were collected at depths immediately above or across the water table surface. The sample from the footing excavation was of unsaturated soils. The locations from which the subsurface soil samples were collected are in the immediate vicinity of the degreaser pit and are shown on Figure 2.5.

Table 7.4 presents a summary of the concentrations of the compounds detected in the subsurface soil samples and the Recommended Soil Cleanup Objectives for those compounds.

Only two VOCs, cis-1,2-DCE and TCE, were detected in the subsurface soil samples and the concentrations did not exceed the soil cleanup objectives.

7.2.4 CONCLUSIONS

1,2-DCE was detected in the sample of soil from the bottom of drywell 005 at a concentration (440 µg/kg) which exceeded the NYSDEC Recommended Cleanup Objective of 300 µg/L. The exceedance(s) of the standard(s) in soil is limited to this one compound in this one sample and is not of a magnitude which suggests that the drywell was the source of VOCs in Site groundwater.

No VOCs were detected in any of the surface soil samples or in the unsaturated subsurface soils at concentrations which exceeded the NYSDEC Recommended Cleanup Objectives. These data confirm the conclusion drawn from the soil gas and soil vapor data that the presence of VOCs in unsaturated soils at the Site is minimal (see Section 7.1.3).

The concentrations of the VOCs detected in the saturated subsurface soils also did not exceed the NYSDEC Recommended Cleanup Objectives. Therefore, no source of VOCs to groundwater is present in these subsurface soils.

7.3 GROUNDWATER

During the five rounds of groundwater sampling performed during the Site investigations, samples have been collected and analyzed from each Site monitoring and purge well on at least one occasion. A summary of the sampling and analysis events is presented in Table 5.1. The locations of the Site wells are shown on Figure 5.1.

The samples collected have been analyzed for TCL VOCs, semi-volatile organic compounds (SVOCs), PCBs, TAL metals, and/or general parameters. Discussions of the groundwater analytical data and extent of groundwater contamination are presented in the following subsections.

only 4 of 22 site monitoring well/purge wells were done for SVOC's

7.3.1 DEVELOPMENT OF COMPOUNDS OF CONCERN

Table 5.1
2
7
11
13/13R

Analyses of groundwater samples collected in 1990, 1992, and 1997 included VOCs, SVOCs, PCBs, total petroleum hydrocarbons (TPHs), and metals. Summaries of these data are presented on Tables 7.5 and 7.6. Also presented in Tables 7.5 and 7.6 are the current New York State (NYS) standards for Class GA groundwater. Class GA is the highest classification of groundwater and represents groundwater suitable as a potable water source.

Complete analytical data reports are contained in Appendix K.

7.3.1.1 INORGANIC PARAMETERS

A summary of the metals detected in the groundwater samples collected for the development of the COC list is presented in Table 7.5. A comparison of the data in Table 7.5 to the NYSDEC Groundwater Quality Standards shows that only four of the TAL metals (iron, lead, manganese, and sodium) were detected at concentrations which exceeded the standards for Class GA groundwater. A statistical summary of the concentrations of the metals detected is presented below:

Analyte	*Number of Analyses*	*Number of Detections*	*Maximum Concentration (μg/L)*	*Average Detected Concentration (μg/L)*	*Number of Exceedances*	Std.
Iron	17	17	18,600	5,100	16	3000
Lead	22	15	60	22	5	25
Manganese	17	17	4,430	710	9	300
Sodium	17	17	45,700	26,635	14	20,000

Iron was detected at concentrations which exceed the groundwater standard of 300 μg/L in all wells except ESI-4. The concentration of iron in monitoring well ESI-2D, which has not been impacted by Facility activities, also exceeded the standard.

The samples from only four monitoring wells, ESI-2, ESI-3, ESI-4, and ESI-5, exhibited concentrations of lead which exceeded the standard of 25 μg/L. The average of the detected concentrations, 22 μg/L, is below the standard.

Manganese was present in concentrations which exceeded the standard of 300 μg/L in eight of the monitoring wells sampled. As described for iron, the concentration of manganese in well ESI-2D, which has not been impacted by site activities, also exceeded the standard. Manganese is a ubiquitous metal which is naturally present at concentrations which exceed applicable standards at many sites. The presence of manganese at the Site is not a direct result of Facility operations.

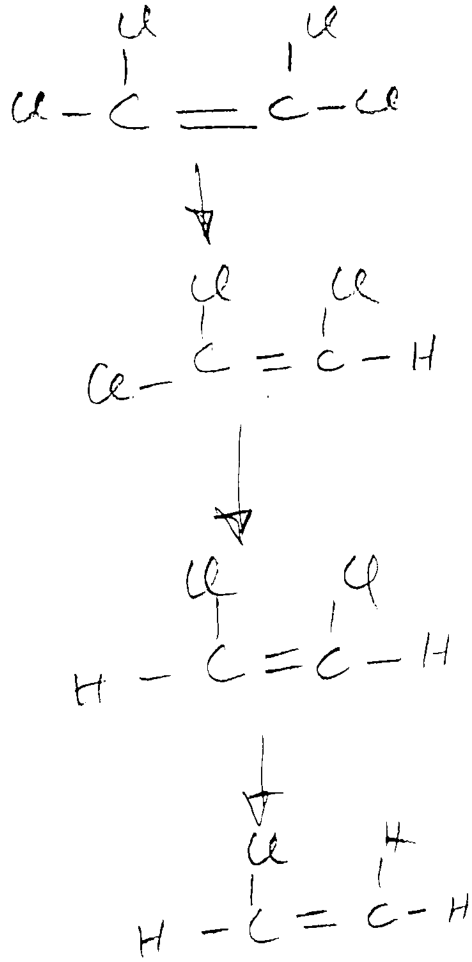
Sodium was present in all monitoring wells sampled except ESI-5. The average concentration of sodium, 26,635 µg/L, is only slightly higher than the standard of 20,000 µg/L. As described for manganese, sodium is a ubiquitous compound present in all soils. The presence of sodium at these concentrations at the Site is not related to Facility operations.

All metals analyses were for total concentrations. The total concentrations of metals in groundwater samples are greatly influenced by the presence of sediment in the sample. Since the occurrences of elevated concentrations of metals in the samples is generally widespread and present at all depths it is most likely that the concentrations detected are reflective of an influence of sediment in the sample and not of Facility operations on groundwater quality. Therefore, metals are not COCs for the Site.

7.3.1.2 ORGANIC PARAMETERS

In addition to the metals analyses described in Section 7.3.1.1, groundwater samples for development of the COCs were analyzed for VOCs, SVOCs, TPHs, and PCBs. A summary of the organic compounds detected is presented in Table 7.6. The only organic chemical compounds detected in Site groundwater were PCE, TCE, 1,2-DCE, vinyl chloride, 1,1,1-TCA, 1,1-dichloroethane (1,1-DCA), and bis(2-ethylhexyl) phthalate. These were the compounds which were evaluated for inclusion on the list of COCs. A statistical summary of the concentrations of the organic chemicals detected is presented below:

Analyte	*Number of Analyses*	*Number of Detections*	*Maximum Concentration (µg/L)*	*Average Detected Concentration (µg/L)*	*Number of Exceedances*
Trichloroethene	23	17	7W3 320,000 ~~14,000~~	2,135	16
1,2-Dichloroethene	23	11	1,900	563	11
Vinyl chloride	23	4	160	28	4
Tetrachloroethene	23	3	17	18 How	2
1,1,1-Trichloroethane	23	2	51	28	1
1,1-Dichloroethane	23	2	12	10	2
bis(2-Ethylhexyl) phthalate	3	1	9.1	9.1	1

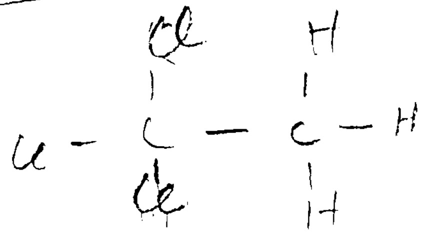


Tetrachloroethene

Trichloroethene (TCE)

DCE

Vinyl chloride



1,1,1 —
Trichloroethane

TCE, 1,2-DCE, and vinyl chloride were detected in the most samples and at the highest concentrations. Nearly all detected concentrations of these compounds exceeded the groundwater standards. PCE was detected in two wells, ESI-6 and ESI-13; however, only the concentrations in ESI-6 (13 and 17 µg/L) exceeded the groundwater standard of 5 µg/L. TCE was handled and used in the degreaser pit and the highest concentrations of TCE have been detected in the wells closest to the degreaser pit. Therefore, the presence of TCE and its degradation products, 1,2-DCE and vinyl chloride, is a result of historic Facility operations.

1,1,1-TCA, 1,1-DCA , and PCE were each only detected in two monitoring wells, ESI-6 and ESI-13. The concentration of 1,1,1-TCA exceeded the groundwater standard only in ESI-13, the concentrations of 1,1-DCA (8.7 and 12 µg/L) exceeded the groundwater standards in both wells, and the concentration of PCE exceeded the groundwater standard only in ESI-6. While there were detected concentrations of these compounds which exceeded the groundwater standards in these wells at the Site the inclusion of these parameters on the COC list with the primary contaminants described above is not necessary to define the extent of chemical presence in groundwater at the Site or its impact on the environment. Therefore, 1,1,1-TCA, 1,1-DCA, and PCE are not COCs for the Site.

Bis(2-ethylhexyl) phthalate was detected at a low concentration (9.1 µg/L) in one sample. This concentration only slightly exceeds the groundwater standard and the presence of this compound is not related to historic Facility operations. Therefore, bis(2-ethylhexyl) phthalate is not a COC for the Site.

7.3.1.3 SUMMARY

The COCs for the Site are:

i) TCE;
ii) 1,2-DCE; and
iii) vinyl chloride.

While all analytical data are contained in Appendix K, the following discussions focus on the COCs.

7.3.2 NATURE AND EXTENT OF CONTAMINATION

A summary of the concentrations of the COCs in Site groundwater is presented in Table 7.6 ~~7.7.~~ Also presented in Table 7.7 the current NYS standards for Class GA groundwater.

Each of the COCs has been detected on at least one occasion in all wells except ESI-4, -5, -8, -9, and -14. The current (1999/2000) ranges of COC concentration, numbers of detections, and numbers of samples analyzed are:

	Range of Concentration (µg/L)	*Number of Analyses*	*Number of Detections*
1,2-DCE	ND$_5$ to 1600J	18	9
TCE	ND$_5$ to 62,500	18	9
Vinyl chloride	ND$_{10}$ to 43	18	2

Note:
J Value is estimated.

The highest concentrations of DCE and TCE are present in the center of the plume in extraction wells PW-1, PW-2, and PW-3R. The estimated current limits of the presence of concentrations of TCE and DCE which exceed the NYS standards are shown on Figures 7.1 and 7.2, respectively. The current concentrations of vinyl chloride are presented on Figure 7.3. Due to the elevated detection limits for the groundwater sample locations within the plume, the limit of vinyl chloride presence above its standard of 2 µg/L is not shown on Figure 7.3; however, the central portion of the plume is surrounded by wells in which vinyl chloride was not detected above 10 µg/L. The absence of vinyl chloride in the perimeter samples demonstrates that its presence does not extend beyond the limit of the presence of the other COCs. In fact, the limit of the presence of vinyl chloride above its standard is expected to be areally less extensive that the other COCs. The analytical data presented on the figures show that the areal extent of presence of the COCs is completely defined.

wrong — it does
look at Fig 7.3

TCE is present at the highest concentration in PW-3R within the former degreaser pit. Lessor concentrations of TCE are present in the monitoring wells located downgradient of the degreaser pit and TCE has not been detected in any groundwater sample collected upgradient of the degreaser pit. This pattern of TCE presence in groundwater combined with the very low concentrations in organic vapors and Site soils is consistent with the identification of the degreaser pit as the primary source of TCE in Site groundwater.

possible src up-gradient at ESI-4. need add. MW up-grad.

The area of the groundwater COC plume is defined by the estimated limit of the presence of TCE at concentrations greater than 5 μg/L and occupies a maximum area of approximately 42,000 square feet (circle of an approximate radius of 115 feet).

As described in Section 5.3.1, the presence of TCE in the sample collected from ESI-2D in April 1992 was believed to have been an artifact carried to the deeper monitoring interval during the installation of the borehole in which ESI-2D was installed. Monitoring well ESI-2D was redeveloped in 1998 and additionally in 1999. No COCs were detected in the sample collected from well ESI-2D after its redevelopment in 1999. Therefore, the vertical extent of COC presence has been demonstrated to be limited to the sand and gravel unit above the silt/clay soils and the silt/clay is working as an effective barrier to the downward migration of COCs as is indicated by its low hydraulic conductivity (10^{-7} to 10^{-8} cm/sec).

7.4 SURFACE WATER AND SEDIMENT

In May and June 2000, surface water and sediment samples were collected from the three locations designated in the SRI/FS Documentation Work Plan:

i) upstream of Outfall 002 (location 1);

ii) at the discharge point of Outfall 002 (location 2); and

iii) downstream of Outfall 002 (location 3).

A surface water sample (location 2A) was also collected at downstream location 2A, approximately 60 feet downstream of Outfall 002. At the time of sample collection the water level in the river was quite high and there was difficulty in locating the outfall. A pipe located higher up the bank along an alignment with location 2A was identified by JCC personnel as Outfall 002; therefore samples were collected there. It was later determined that Outfall 002 was located to the north and additional samples were collected from the proper location.

A sample of the Outfall 002 discharge water was also collected in May 1992. All surface water and sediment samples were analyzed for TCL VOCs.

The locations of the surface water and sediment samples are shown on Figure 5.1.

The only potential source of COCs to surface water and sediment in the Chadakoin River adjacent to the Site is Site groundwater. No COCs were detected in any of the surface water or sediment samples. Therefore, the presence of COCs in Site groundwater has not impacted the quality of surface water or sediment in the Chadakoin River.

The absence of COCs in the discharge from Outfall 002 demonstrates that neither groundwater nor residual sediment in the outfall are continuing sources of COCs to the river. Considering the location of the outfall outside the groundwater plume and the absence of COCs in site soils and vapors, COCs were not expected in the outfall samples. These data further confirm that the degreaser pit was the only significant source of COCs to groundwater.

The NYSDEC Division of Fish and Wildlife requires that sediment containing chemical compounds be evaluated in accordance with the "Technical Guidance for Screening Contaminated Sediments" to determine their potential to cause harmful impacts to marine and aquatic ecosystems. Since no COCs were detected in the sediments there is no potential for harmful impact and the evaluation is not necessary.

8.0 SUMMARY OF CONTAMINATION

The sampling and analytical testing at the Site has been directed at environmental media and chemicals that could reasonably be expected to be present due to known historic operations at the Facility.

The soil vapor and soil gas analytical data demonstrated that there was only minimal presence of VOCs in vadose zone soils and that the highest potential was in the vicinity of the degreaser pit. These conclusions were confirmed by the soils analytical data. Therefore, soils are not a media of concern at the Site.

Comprehensive analyses of groundwater samples were performed to determine the COCs. The results of these analyses were evaluated and a list of COCs was developed. The groundwater COCs are:

i) TCE;

ii) 1,2-DCE; and

iii) vinyl chloride.

The results of the groundwater investigations have identified the degreaser pit as the primary source of COCs to Site groundwater. The presence of COCs in groundwater at concentrations which exceed their respective NYSDEC criteria has been defined in both the horizontal and vertical planes. The chemical plume is located in the approximate center of the Site primarily hydraulically downgradient of the degreaser pit.

Discharge of Site waters to the Chadakoin River has not affected either surface water or sediment quality.

9.0 INTERIM REMEDIAL MEASURES

Based upon the studies performed at the Site over the years, it has been readily apparent that the elevated COC presence in groundwater needed to be addressed. In order to resolve the COC presence, two IRMs have been implemented over the past 7 years. The IRMs implemented are:

i) groundwater extraction with on-Site treatment and discharge of treated water to the POTW, 1994-1999; and

ii) in situ physical/chemical treatment of groundwater through chemical oxidation, 2000.

The IRMs are briefly discussed in the following subsections.

9.1 GROUNDWATER EXTRACTION, TREATMENT, AND DISCHARGE

Groundwater extraction and treatment systems were installed at the Site and began operating in November 1994.

The operating groundwater extraction system consisted of two extraction wells (PW-2 and PW-3) screened in the sand and gravel unit. Until shut down during the Facility demolition in 1999, these wells were operated throughout the hours that the Facility was manned for manufacturing purposes; approximately 8 hours per day, 5 days per week (except holidays).

The operation of extraction well PW-2 was selected based upon the results of aquifer pumping tests performed in February 1993. These pumping tests demonstrated that PW-2 had a superior cone of influence capability over that of PW-1 (see Sections 5.6 and 6.3) and was located in an area of higher TCE presence than PW-1. Extraction well PW-3 was installed in 1993 directly through the former degreaser pit and was operated to achieve source control and removal.

Extracted groundwater was pumped into a holding tank and treated in an on-site air stripper prior to discharge to the City of Jamestown POTW. The design capacity of the on-site air stripper was 50 GPM.

PW-2 is approximately located in the center of the Site, within the limit of the groundwater COC plume. PW-3/3R is located within the chemical source area, the degreaser pit. The combined pumping rate from the extraction wells was approximately 17 GPM; 14 GPM from PW-2 and 3 GPM from PW-3. In 1997 it was estimated that the extraction system removed 544 pounds of COCs per year. Based upon that estimate, approximately 2,700 pounds of COCs were removed from the sand and gravel unit during the operating years of the extraction system.

A comparison of the limits of the presence of TCE in Site groundwater before extraction to the current limit is shown on Figure 9.1. Evaluation of the data on the figure shows that the operation of the groundwater extraction system was effective in reducing the downgradient extent of the groundwater TCE plume. Throughout the years of operation, the extraction system was able to create a reasonable cone of influence over the entire areal extent of the TCE plume thereby preventing the off-site migration of the plume into the River. Even though the system only operated intermittently, the gradient reversal achieved during the daily operating hours would have been expected to easily offset the natural unencumbered gradient while the system was off. The net result being that the TCE plume was essentially arrested throughout the operating years of the pump and treat IRM and a substantial volume of the COC presence was removed from the groundwater environment. This is confirmed by the analytical data which demonstrate a substantial reduction in the presence of TCE over the operating period of the IRM. Comparison of the current concentrations of TCE in groundwater samples collected from the sand and gravel unit to the concentrations in 1992-1993 shows:

not a
max., or
optimum cone
of influence.

	1992/1993	*1999/2000*
Maximum concentration, µg/L	320,000	62,500
Number of Analyses	17	17
Number of Detections	13	8

Ten sand and gravel unit monitoring wells which exhibited detectable concentrations of TCE in 1992/1993 were also sampled in 1999/2000. Reductions in the concentration of TCE ranging from 42 to nearly 100 percent occurred in eight of these wells. Increases in concentration were observed in two wells: ESI-7, 50 µg/L in 1992/1993 to 79 µg/L in 1999/2000; and ESI-13/13R, 21 µg/L in 1992-1993 to 63 µg/L in 1999/2000.

9.2 IN SITU CHEMICAL OXIDATION

In May 2000, Dowcraft requested and the NYSDEC approved an additional IRM for the Site which consisted of the application of potassium permanganate ($KMnO_4$) solution for in situ chemical oxidation of the COCs. This program was to fill the time void while the pump and treat system was down due to demolition of the Facility. The use of $KMnO_4$ has been demonstrated to be very effective in destroying VOCs in laboratory studies.

The in situ treatment program introduced $KMnO_4$ into the primary area of COC presence. The intent was to allow the $KMnO_4$ to come into contact with as much of the groundwater chemical plume as possible. To accomplish this, a solution of 3.7 percent $KMnO_4$ in potable water was injected into the area of the former degreaser pit and the area hydraulically downgradient of the degreaser pit. Groundwater quality monitoring was performed following the application of the permanganate solution to determine the effectiveness of the treatment.

Memoranda presenting a detailed description of the injection program and the preliminary analytical data were prepared and submitted to NYSDEC on July 3, 2000, and September 1(?), 2000, respectively. Copies of these memoranda are contained in Appendix M and are summarized in the following paragraphs.

5/16 - 20/2000

Approximately 16,200 gallons of 3.7 percent $KMnO_4$ solution, or 5,280 pounds $KMnO_4$, were pumped into three wells, five boreholes, and a test trench located in the approximate center of the TCE plume. The locations of the injection points are shown on Figure 9.2.

Subsequent monitoring demonstrated that, with the exception of PW-2, the $KMnO_4$ had been completely consumed within 1 month of being injected. Groundwater samples for VOC analyses were collected from the extraction and monitoring wells within the TCE plume approximately 2 weeks following the determination that the $KMnO_4$ had been essentially consumed.

9.2.1 EVALUATION OF TREATMENT EFFECTIVENESS

The reaction of $KMnO_4$ with TCE results in the cleavage of the TCE carbon-carbon double bond to yield carbon dioxide (CO_2). Manganese dioxide (MnO_2), potassium chloride (KCl) and hydrochloric acid (HCl) are produced in accordance with the following equation:

$C_2Cl_3H + 2KMnO_4 \dashrightarrow CO_2 + 2MnO_2 + 2KCl + HCl$

Stoichiometrically, 0.81 pounds of chloride are produced per pound of TCE oxidized. Therefore, chloride monitoring is considered a useful tool for the assessment of treatment effectiveness. Knowledge of the increase in chloride mass after $KMnO_4$ treatment can be used to determine the extent of TCE oxidation. Typically, a rapid increase in chloride is observed within the first 2 weeks after treatment. This increased chloride concentration then gradually decreases to background levels as it is diluted by dispersion in the groundwater.

was this seen

The chloride ion concentrations measured at the Site before treatment (December 2, 1999) and 1 week following treatment (June 1, 2000) are summarized below:

Sampling Point #	*Chloride Concentration (mg/L)*		
	Before Treatment	*After Treatment*	*Change*
ESI-2	67.3	85	17.95
ESI-3	NM 67.3	80	12.95
ESI-6	NM 67.3	95	27.95
ESI-10	NM 67.3	75	7.95
ESI-11	NM 67.3	90	22.95
ESI-12	NM 67.3	80	12.95
PW-2	66.8	NM	NM

? How obtained

NM Not measured.

Based on the data provided above, the average concentration of chloride in the COC plume before treatment was 67.05 mg/L and the average increase in chloride concentration as a result of the oxidation of TCE by $KMnO_4$ was 17.11 mg/L. The average increase in chloride concentration was used to estimate the total mass of chloride in the plume by multiplying the volume of the plume in liters by the chloride concentration:

Mass of Chloride = 4,400,000 g x 3.785 L/g x 17.11 mg/L
= 284.95 10^6 mg
= 284.94 kg
= 627 pounds

Using the 0.81 pounds of chloride per pound of TCE conversion factor described previously, 627 pounds of chloride can be converted to 774 pounds of TCE oxidized. Therefore, the increase in chloride concentration demonstrates that 774 pounds of TCE were oxidized through the application of $KMnO_4$.

Due to the non-discriminating oxidizing nature of $KMnO_4$ and its ability to react with a wide range of chemicals, an excess of $KMnO_4$ is always required to oxidize site-specific contaminants. The theoretical ratio of $KMnO_4$ consumed to TCE oxidized is 2.4:1. The excess $KMnO_4$ required to react with the other oxidizable species present is typically expected to be 6 to 10 times the amount that would theoretically be required. Based upon the amount of $KMnO_4$ injected (5,280 pounds) and the estimated volume of TCE treated (774 pounds), the $KMnO_4$ was consumed at a ratio of 6.8:1 ($KMnO_4$:TCE).

Based on this, the amount of $KMnO_4$ used at the Site was well within the expected range and the $KmnO_4$ was efficiently utilized.

The concentrations of the COCs detected in the Additional IRM monitoring points before and after the in situ treatment are presented in Table 9.1.

The concentrations of TCE in injection points PW-1, PW-2, and PW-3, and monitoring well ESI-6 either decreased or remained essentially unchanged following treatment. The concentrations of TCE in downgradient monitoring wells ESI-2, -3, -10, -11, and -12, increased between December 1999 (the last pretreatment monitoring event) and July 2000 following treatment. The increases in TCE concentration are expected to be a consequence of groundwater movement and the migration of residual TCE after the pumping system was turned off and hydraulic containment was lost. As shown by the COC analytical data presented in Table 9.1, with the exception of ESI-1, the concentrations of TCE in the downgradient monitoring wells following treatment are 17 to 96 percent lower than the concentrations reported in 1992/1993, prior to startup of the extraction system.

10.0 FEASIBILITY STUDY

Based upon the Site investigation data, the only media of concern at the Site is groundwater in the sand and gravel unit. The data and discussions presented previously in this report demonstrate that there is no continuing source of chemical release from Site soils to groundwater. The remainder of this report presents the results of the Feasibility Study performed to evaluate remedial technology alternatives to address the COC presence in the Site groundwater.

10.1 POTENTIAL STANDARDS, CRITERIA, AND GUIDELINES

10.1.1 TYPES AND APPLICABILITY

Applicable or relevant and appropriate New York State Standards, Criteria, and Guidelines (SCGs) are used to develop remedial action objectives (RAOs) and to scope and formulate remedial action technologies and alternatives. SCGs may also include Federal Applicable or Relevant and Appropriate Requirements (ARARs) or standards if they are more stringent than State standards. SCGs are categorized as:

i) chemical-specific requirements that define acceptable exposure levels and may, therefore, be used in establishing preliminary remediation goals;

ii) location-specific requirements that may set restrictions on activities without specific locations, such as floodplains or wetlands; and

iii) action-specific requirements which may set controls or restrictions for particular treatment and disposal activities related to the management of hazardous wastes.

Potential SCGs are listed in Table 10.1 and are described in the following subsections.

10.1.1.1 CHEMICAL-SPECIFIC SCGs

Chemical-specific SCGs define health- or risk-based concentration limits in various environmental media for hazardous substances and contaminants. Concentration limits provide protective cleanup levels or may be used as a basis for estimating appropriate cleanup levels for the COCs in the designated media. Chemical-specific SCGs may be used to determine treatment system discharge requirements or disposal restrictions for remedial activities and/or to assess the effectiveness or suitability of a remedial alternative. Chemical-specific SCGs are generally promulgated standards or other ARARs. Applicable or relevant and appropriate guidance values may be appropriate where a promulgated standard for a particular substance is not available.

The chemical-specific SCGs for the COCs in groundwater are presented in Table 10.~~2~~1.

10.1.1.2 LOCATION-SPECIFIC SCGs

missing from Report

Potential location-specific SCGs are requirements that set restrictions on activities depending on the physical and environmental characteristics of the Site or its immediate surroundings. The Site is bounded on the north by the Chadakoin River.

The location-specific SCGs for the Site are presented in Table 10.1.

10.1.1.3 ACTION-SPECIFIC SCGs

Action-specific SCGs are determined by the particular remedial activities that are selected for the Site cleanup. Action-specific requirements establish controls or restrictions on the design, implementation, and performance of remedial activities. Following the development of the remedial alternatives, action-specific SCGs that specify performance levels, actions, technologies, or specific levels for discharged or residual chemicals provide a means for assessing the feasibility and effectiveness of the remedial activities.

The action-specific SCGs which may be applicable to potential Site remedial technologies are presented in Table 10.1.

10.2 REMEDIAL ACTION GOALS AND OBJECTIVES

10.2.1 REMEDIAL ACTION GOALS

The primary goals of any remedial action are that it be protective of human health and the environment, that it maintains protection over time, and that it minimizes untreated waste (National Oil and Hazardous Substances Contingency Plan [NCP]).

In accordance with the provisions of the Order, the remedy selection process will be performed in a manner consistent with the NYSDEC approved SRI/FS Documentation Work Plan, the USEPA guidance document "Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA" dated October 1988 (USEPA Guidance), NYSDEC "TAGM HWR-90-4030: Selection of Remedial Actions at Inactive Hazardous Waste Sites" dated May 15, 1990 (NYSDEC TAGM), and any other appropriate USEPA and Department technical and administrative documents.

10.2.2 REMEDIAL ACTION OBJECTIVES

The USEPA Guidance states "*Remedial action objectives consist of medium-specific or operable-unit specific goals for protecting human health and the environment. The objectives should be as specific as possible but not so specific that the range of alternatives that can be developed is unduly limited*". RAOs established for the protection of human health and the environment should specify:

i) the contaminants and media of concern;

ii) the exposure routes and receptors; and

iii) an acceptable contaminant level or range of levels for each exposure route.

The results of the Site investigations indicate that neither air, soil, surface water, or sediment warrant remedial action as the concentrations of COCs in these media do not exceed relevant action levels. Therefore, the remedial actions evaluated for the Site only address groundwater impacted by COCs. In addition, where applicable, evaluation of remedial alternatives will consider the potential effect on concentrations of COCs in the ambient air.

Based on the results of the Site investigations, the following RAOs have been established:

i) to prevent exposure of human receptors to contaminated groundwater in the sand and gravel unit;

ii) to prevent or mitigate, to the maximum extent practicable, COC migration via groundwater so that releases from the sand and gravel unit to the Chadakoin River do not exceed potentially applicable SCGs;

iii) to prevent or mitigate, to the maximum extent practicable, the migration of contaminated groundwater to off-Site areas;

iv) to restore on-Site contaminated groundwater in the sand and gravel unit to the maximum extent practicable, for future use consistent with the intended land use and to contaminant concentrations that will not result in exceedances of potential or applicable SCGs;

v) to monitor the groundwater in a manner to verify the effectiveness of the remedial actions; and

vi) to minimize future Site restrictions, to the maximum extent practicable, in order to allow for potential unimpeded future use of the Site.

10.3 GENERAL RESPONSE ACTIONS AND IDENTIFICATION OF REMEDIAL TECHNOLOGIES

10.3.1 GENERAL

General response actions are medium-specific remedial approaches which encompass those actions that will satisfy the RAOs. General response actions may include treatment, containment, excavation, extraction, disposal, institutional controls, or a combination of these, if required, to address varied Site environmental problems and to be effective in meeting all of the RAOs. The general response actions evaluated for the Site are described in the following subsections. The specific remedial technologies considered for the general response actions are also listed in the following subsections. A summary of the general response actions and remedial technologies is presented in Table 10.3.

10.3.2 NO FURTHER ACTION

The No Further Action response is primarily used as a basis for comparison with other alternatives. Under the No Further Action response, no additional measures are taken to improve environmental conditions at the Site; however, monitoring may continue to be conducted, as appropriate. This response action will not reduce the volume, mobility, or toxicity of the hazardous constituents of the Site media beyond the reduction which has been realized through the implementation of the IRMs.

10.3.3 INSTITUTIONAL CONTROLS AND MONITORING

Similarly to No Further Action, the Institutional Controls and Monitoring response will not reduce the toxicity, mobility, or volume of hazardous Site constituents beyond the reduction which has been realized through the implementation of the IRMs, but can reduce the potential of human and wildlife exposure to those constituents. Other response actions may be combined with a long-term monitoring program to track contaminant migration and transport, and initiation of institutional controls to restrict or limit the use of the Site or the contaminated media.

10.3.4 CONTAINMENT TECHNOLOGIES

The containment response does not reduce the volume or toxicity of the contaminants in the Site media. The purpose of this response is to reduce contaminant mobility, and in doing so, minimize exposure and reduce potential hazards at the Site. Periodic monitoring is necessary following implementation of the containment response to determine its effectiveness and evaluate the need for further action.

Groundwater containment technologies applicable to the Site include construction of subsurface physical or hydraulic barriers to control groundwater migration.

10.3.5 COLLECTION TECHNOLOGIES

The collection response is not intended to reduce the volume of the collected contaminated media. Use of collection technologies, however, reduces the mobility and toxicity of Site contaminants by removal and disposition at a secure location. The collection technologies provide no treatment of contaminated media but may be used in conjunction with a disposal and/or treatment option to meet the Site-specific goals and objectives.

The groundwater collection technologies identified as potentially applicable to the Site consist of horizontal subsurface collection drains (trenches) and extraction wells. Collection drains are generally most effective at shallow depths and in highly permeable soils, and when a low permeability confining lower layer of soil exists. Under these conditions, a collection drain would be installed at the surface of the confining layer where the most effective hydraulic influence could be created. Extraction wells are often used in deeper applications or when the size of the chemical plume is small enough to be addressed by localized extraction points.

10.3.6 TREATMENT TECHNOLOGIES

The purpose of a treatment technology, when used alone or in conjunction with a collection technology, is to reduce the volume, toxicity, and/or mobility of Site contaminants. Remedial treatment technologies include biological, physical, chemical, and thermal processes or some combination of those processes (e.g., physical/thermal treatment).

Two treatment scenarios are potentially applicable to the Site remedial action:

i) treatment of collected groundwater; and

ii) in situ treatment of groundwater containing COCs.

The groundwater treatment technologies potentially applicable to the Site include activated carbon, air stripping, chemical oxidation, air sparging, steam sparging, and biodegradation.

10.3.7 DISPOSAL

Disposal technologies involve off-Site or on-Site disposal of contaminated media or products of treatment processes. Disposal technologies do not usually involve reduction of contaminant volume or toxicity, but are primarily intended to reduce contaminant mobility.

Disposal options include off-site disposal of treatment residuals or untreated groundwater at a permitted treatment, storage, disposal facility (TSDF) and on-Site treatment of groundwater with discharge or injection of treated water. Off-Site disposal options normally involve transportation of the waste to the TSDF.

10.4 SCREENING OF REMEDIAL TECHNOLOGIES

10.4.1 GENERAL

This section presents the screening of the remedial technologies assembled in Section 10.3. The technologies and process options screened represent those which reasonably may be expected to achieve the RAOs.

10.4.2 SCREENING OF REMEDIAL TECHNOLOGIES AND PROCESS OPTIONS

Remedial technologies and process options are the detailed components of general response actions and may be grouped together as remedial alternatives. Potentially applicable remedial technologies and process options for each of the general response actions identified in Section 10.3 are presented in Table 10.~~2~~3. Table 10.~~2~~3 also contains a brief description of each process option.

The approved SRI/FS Documentation Work Plan specifies that the following remedial technologies be considered:

i) source control (excavation, pumping, in situ treatment);
ii) thermal destruction;
iii) hydraulic containment;
iv) air sparging;
v) in situ biodegradation; and
vi) in situ chemical oxidation.

The excavation alternative is applicable to soil treatment. The results of the Site investigations have shown that soil is not a media of concern. Therefore, this technology need not be evaluated.

The screening of remedial technologies and process options is designed to evaluate the remedial technologies and process options to determine their applicability to the Site and eliminate those technologies that technically cannot be implemented. The results of the screening of remedial technologies and process options are shown in Table 10.3.

Based upon the evaluation performed, the following technologies are retained for further consideration:

i) slurry barrier wall;
ii) sheet pile barrier wall;
iii) vibrated beam barrier wall;
iv) extraction wells;
v) groundwater injection/extraction well network;
vi) air stripping treatment of collected groundwater;
vii) in situ air sparging; and
viii) in situ chemical oxidation.

The administrative and monitoring actions, No Further Action and Institutional Controls and Monitoring, are also retained.

10.5 DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES

The remedial technologies and process options which were retained following the initial screening described in Section 10.4 have been assembled into the following set of groundwater remedial alternatives:

i) No Further Action;
ii) Institutional Controls and Monitoring;
iii) Containment, Collection, and On-Site Treatment; and
iv) In Situ Treatment.

Sufficient information was gathered to allow for the screening of the alternatives based on two screening criteria: effectiveness and implementability. Consistent with NYSDEC TAGM cost was not considered in this preliminary screening step. The screening criteria are defined as follows:

Effectiveness: Effectiveness addresses the ability for an alternative to satisfy RAOs and contribute substantially to the protection of public health, welfare, and the environment. For the Site, this means alternatives which remediate groundwater containing COCs to the maximum extent practicable. The ability of an alternative to accomplish short- and long-term effectiveness and a reduction in toxicity, mobility, and volume of contaminants is evaluated. Each alternative was rated in its ability to meet SCGs and the RAOs.

Implementability: Implementability addresses the ability for an alternative to be constructed in a reasonable time frame using accepted technologies. The technical feasibility to construct and reliably operate a remedy was evaluated, and each alternative was rated as either readily implemented, implemented with moderate concerns addressed, or difficult to implement.

The screening of the identified remedial alternatives and the associated process (treatment) options are described in the following subsections and summarized in Tables 10.5 and 10.6.

10.5.1 NO FURTHER ACTION

Under the No Further Action alternative, no additional remedial measures will be implemented.

Effectiveness: With the No Further Action alternative, no additional remedial actions beyond the implementation of the IRMs will be performed. This alternative relies on natural attenuation and degradation for further reduction in the mobility, toxicity, or volume of the COCs. Natural degradation is the tendency of chemicals to reduce through physical, chemical, and biological processes in the natural environment. Attenuation is the tendency of a chemical to bind to in situ soil particles or organic matter resulting in a reduction of the chemical's mobility. Attenuation also includes naturally occurring degradation due to in situ biological activity and other hydraulic influences such as dilution and dispersion. In the case of the Site, sufficient attenuation is occurring such that the COCs are not present in detectable concentrations in the downgradient receiving water body (Chadakoin River). Therefore, the No Further Action alternative will achieve the RAO of the prevention or mitigation of releases of groundwater to the Chadakoin River which would exceed potentially applicable SCGs.

The No Further Action alternative will not achieve all of the RAOs established for the Site.

Implementability: The No Further Action alternative is implementable as well as technically and administratively feasible.

Summary: The No Further Action alternative will not meet all of the RAOs or the remedial action goals. This alternative is, however, technically and administratively feasible and implementable.

The NCP requires that this alternative be retained and developed during the detailed analysis.

10.5.2 INSTITUTIONAL CONTROLS AND MONITORING

Institutional controls would limit the use of Site groundwater. Institutional controls may involve deed restrictions, well permitting requirements, access restrictions, and/or zoning controls, and would mitigate the potential risk to human health by restricting the potential exposure pathways.

Use of the deed restriction involves placing a notation on the property deed which makes the current and any prospective property owner aware of the property's history and restricted land uses. The deed restriction may further place a limitation on future development and groundwater use. This would prevent or mitigate the potential of exposure to on-Site groundwater containing COCs.

Access restrictions can be used to limit human exposure to media which potentially contains COCs. At the Site, however, the impacted media (groundwater) is below the ground surface and direct contact in a routine scenario is not possible.

Zoning controls could be used to restrict land development or groundwater withdrawals by potential groundwater users.

Well permitting requirements may control the installation of water supply in the vicinity of the Site by requiring the potential well owners to file an application to install a well.

Groundwater monitoring is a component of this alternative. Groundwater monitoring would be performed using the existing well network. Results of the monitoring program would be used to evaluate the movement of COCs in the groundwater. A monitoring plan would be developed to establish the procedures and protocols for groundwater sampling and analysis. The analytical data would be used to evaluate the migration of the COCs and also to monitor background groundwater quality. Although groundwater monitoring would not reduce the present risk levels, it would provide:

i) an early warning for the migration of COCs from the Site; and

ii) a better understanding and evaluation of the natural attenuation mechanisms in effect.

Effectiveness: Institutional controls and groundwater monitoring would not reduce the mobility, toxicity, or volume of the COCs in groundwater at the Site. However, institutional controls would be effective in reducing future risk to human health by restricting the number of exposure pathways to groundwater containing COCs, provided respective controls are maintained. Groundwater monitoring would be effective in preventing public risk by tracking the migration of COCs from the Site as well as documenting reduction due to natural attenuation effects.

This alternative partially complies with the remedial action goals by being protective of human health; however, it may not be fully protective of the environment and does not minimize the volume of untreated COCs.

Implementability: Established procedures and mechanisms already exist to implement institutional controls over the short-term, and these means are sustainable over the proposed long-term (e.g., a minimum of 30 years). Institutional controls relating to groundwater use (deed notices, restrictive covenants, well permitting, and zoning controls) are administratively feasible. In fact, restrictive covenants for the Dowcraft property have already been filed. Zoning controls and well permitting can only be implemented by governmental authorities.

A sufficient well network exists at the Site to implement a monitoring program. Standard procedures and protocols for monitoring and testing of Site groundwater are available.

Summary: Institutional controls are implementable at the Site and are effective in reducing the potential human health risk. A groundwater monitoring program would be effective in identifying potential incremental future risk due to the Site and also effective in documenting the reduction of COCs due to natural attenuation effects.

The Institutional Controls and Monitoring alternative alone would not meet all of the RAOs identified for the Site. However, the most appropriate remedial alternative for the Site may include this alternative as a secondary component. This alternative will be carried through for detailed analysis in Section 10.6.2.

10.5.3 CONTAINMENT, COLLECTION, AND ON-SITE TREATMENT

As identified in Section 10.4, three groundwater containment and collection remedial alternatives have been retained for screening. These alternatives are:

i) physical containment (barrier walls);

ii) hydraulic containment (groundwater extraction possibly combined with injection); and

iii) groundwater collection using extraction wells.

The hydraulic containment and collection technologies would need to be implemented in conjunction with a groundwater treatment system to address the extracted groundwater containing COCs. Treated extracted groundwater would be discharged to the Jamestown Public Utilities POTW or reinjected into the sand and gravel unit.

The effectiveness and implementability of groundwater containment and collection alternatives at the Site are effected by:

i) stage elevations in the Chadakoin River; and

ii) restricted access between the northern limit of the groundwater COC plume and the bank of the Chadakoin River.

The impact of these factors has been considered in the screenings presented in the following subsections.

Based on the current concentration of TCE in the vicinity of the degreaser pit (62,500 µg/L in PW-3), it has been assumed that all of the containment/collection alternatives would be in place for 30 years.

10.5.3.1 HYDRAULIC CONTAINMENT AND COLLECTION

Hydraulic containment and groundwater collection would be accomplished through:

i) operation of an extraction well system; or

ii) operation of extraction and injection well systems.

Extraction wells have been demonstrated to achieve and maintain hydraulic containment of the COC plume at the Site. Extraction wells are less costly to install than a collection trench system; therefore, since comparable collection and containment can be achieved with extraction wells, the installation and operation of a collection trench has not been considered further.

10.5.3.1.1 EXTRACTION WELL SYSTEM

The extraction well system would consist of the existing purge wells, PW-1, PW-2, and PW-3R. As described in Section 5.2.2, the purge wells are located within the groundwater COC plume and are screened in the sand and gravel unit at depths ranging from 22 to 42 feet BGS.

Wells PW-1 and/or PW-2 would be operated to achieve and maintain hydraulic containment and minimize the potential for further migration of the groundwater within the plume. Well PW-3R, which is located within the limit of the former TCE vapor degreaser pit, would be operated to achieve source control and removal.

Wells PW-2 and PW-3R would be equipped with electric submersible pumps and the pump discharge would be connected to a 2-inch diameter header pipe buried below the frost line (approximately 4 feet BGS). what about PW-1 ?

Since the decommissioning and demolition of the facility, there is no routine presence of Dowcraft personnel. Therefore, an automated control system would be required for proper operation of the extraction wells. This control system would include level control alarms, automatic on/off switches, and flow totalizer(s).

It is estimated that the extraction well system would pump at an approximate flow rate of 20 to 50 GPM.

Effectiveness: The operation of the groundwater extraction well IRM has demonstrated that the operation of the extraction well system will provide both hydraulic containment and recovery of COCs in groundwater. The maintenance of the hydraulic containment system would reduce the mobility of the COCs in the sand and gravel unit beneath the Site by capturing the impacted groundwater flow prior to discharge to the Chadakoin River.

The existing groundwater extraction wells are located within the area of the plume in which the highest concentrations of COCs are present. Therefore, operation of these wells will reduce the volume of COCs present. However, the extraction well system will not fully remediate the impacted groundwater in a short time frame. Over the 5 years the extraction wells were operated, approximately 10.5 million gallons of groundwater or 2.5 pore volumes of water within the plume were removed. Despite the volume of water removed, significant concentrations of COCs remain in the center of the plume.

When implemented in conjunction with a groundwater treatment system, a volume and toxicity reduction of the COCs would be achieved as COCs are removed and concentrated or destroyed in the treatment process.

This technology would address some of the RAOs. Specifically, this alternative would prevent or mitigate, to the extent practicable, COC migration via groundwater. This technology may also be able to achieve the RAO of restoring the contaminated groundwater in the sand and gravel unit to the groundwater SCGs; however, as stated previously, this would require a long timeframe to achieve.

Implementability: The mobility of groundwater in the sand and gravel unit can be reduced through the use of an extraction well system. This alternative is technically and administratively feasible. This technology is routinely used as a groundwater remedial technology. Conventional techniques, materials, and equipment are available for the implementation of this option.

If necessary, additional extraction wells could be added after the system has been installed and operated with little modification to the original system.

Summary: A groundwater extraction well system could adequately control the migration of COCs from the Site and satisfy this RAO. The effectiveness of the extraction well system would need to be monitored and evaluated. If necessary, the system and/or its operation could be modified to satisfy the RAO of containment of the groundwater COC plume. Conventional techniques, materials, and equipment are available for the implementation of this technology.

The extraction well alternative will be retained for detailed analysis in this FS.

10.5.3.1.2 GROUNDWATER EXTRACTION AND INJECTION WELL SYSTEMS

The extraction well system design and operation would be as described in Section 10.5.3.1.1. The purpose of the injection well system is to maintain the groundwater elevation at the northern perimeter of the groundwater COC plume at a higher elevation than the groundwater elevation in the extraction wells and the surface elevation of the River. These hydraulic conditions are intended to create a groundwater flow divide between the groundwater COC plume and the River. This flow divide could be maintained at all times to ensure hydraulic containment. The water for injection will be treated extracted groundwater.

The results of the aquifer pumping tests demonstrated that the cone of influence around each extraction well is greater than 50 feet (see Section 6.3). Similar influence would be expected for injection wells. Therefore, injection wells would be installed approximately 100 feet apart to have overlapping cones of influence and thus create a continuous downgradient hydraulic barrier preventing contaminated groundwater from leaving the Site.

The heads of the injection wells would be connected to a 2-inch diameter header buried approximately 4 feet BGS. Water would be gravity fed either directly from the treatment system or from a holding tank. The injection into each well would be regulated through a system of level controls and actuated valves. The injection volume would have to be controlled to ensure that too much water is not injected as this could reverse the natural gradient in the area and reverse the direction of flow of the COCs.

The numbers of extraction and injection wells required is estimated at 2 and 2, respectively. The total extraction rate required to provide hydraulic containment is estimated to be 20 to 50 GPM. The total injection rate is estimated to be 10 to 20 GPM.

The groundwater extraction and injection well network would be implemented in conjunction with an on-Site groundwater treatment system. Treated groundwater would be used for reinjection to achieve the desired hydraulic gradients.

Effectiveness: The groundwater extraction and injection well systems alternative would be effective at providing hydraulic containment of groundwater beneath the Site and would thereby reduce the mobility of the COCs in groundwater. This alternative would also mitigate, to the maximum extent possible, the risk of off-Site exposure to groundwater potentially containing COCs and would be protective of human health and the environment.

The groundwater extraction and injection well systems alternative would not substantially enhance the restoration of groundwater quality beyond that which would be achieved with the extraction well system alone as described in Section 10.5.3.1.

This technology would address some of the RAOs. Specifically, this alternative would prevent or mitigate, to the extent practicable, COC migration via groundwater to the River or the off-Site sand and gravel unit. This technology may also be able to achieve the RAO of restoring the contaminated groundwater in the sand and gravel unit to the groundwater SCGs; however, as stated previously, this would require a long timeframe to achieve.

Implementability: An extraction and injection well network is a technically and administratively feasible alternative to address the groundwater containing COCs beneath the Site. Additionally, extraction and injection networks have been proven to be appropriate and implementable at a number of Sites requiring groundwater remediation.

The injection well system would be located in whole or part within the building containing JCC operations. This would require access permission from the property owner for installation and operation and maintenance. Activities and physical features associated with the injection system may interfere with JCC operations.

The extraction and injection well systems alternative would require significant operational considerations to maintain the appropriate relationships between extraction rates, injection rates, and the elevation of the hydraulic barrier. Since a complex control system would be required to maintain a hydraulic balance, this alternative will be slightly more difficult than others to operate and maintain in the long-term.

A constant supply of treated groundwater for reinjection is necessary to maintain the hydrogeologic conditions required for this alternative to be effective. Permits are required to re-inject water into the groundwater regime.

Conventional equipment, materials, and techniques are available for the implementation of this alternative.

Summary: An extraction and injection well system would be effective at maintaining hydraulic containment of the groundwater containing COCs beneath the Site. Treated groundwater would be required for use at the injection wells; therefore, this alternative would require either treated groundwater storage or concurrent groundwater extraction and treatment. Permits to re-inject treated groundwater are required. Since complicated hydraulic controls are required for this alternative to be effective, the long-term operation and maintenance of the extraction and injection well network may be difficult.

Activities and physical features associated with the injection well network could interfere with JCC operations.

Conventional construction techniques, materials, and equipment are available for the implementation of this technology.

This alternative will not be considered further in this FS because the injection well network would not substantially enhance the achievement of the RAOs beyond that which can be realized through the optimized operation of a groundwater extraction well system or through the implementation of an alternative involving physical containment and groundwater collection. In addition, the injection wells result in potential difficulties in the long-term operation and maintenance of the system and potential interference with JCC operations.

10.5.3.2 PHYSICAL CONTAINMENT AND COLLECTION

Physical containment and groundwater collection would be accomplished through installation of a barrier wall and operation of groundwater extraction wells.

A barrier wall could be constructed to act as a vertical barrier to control horizontal groundwater migration away from the COC source area. There are various types of low permeability barrier walls which could be installed including:

i) a slurry wall installed by excavating a trench and placing a low permeability backfill mixture;
ii) a sheetpile wall driven into the ground; and
iii) a grout curtain or slurry wall installed by the vibratory beam method.

The slurry wall would consist of the placement of a low permeability backfill mixture (hydraulic conductivity on the order of 10^{-7} cm/sec) into an excavated trench to form a cut-off wall which would isolate the area of concern. The slurry wall would be approximately 2 to 3 feet thick, and would be keyed into the underlying silt/clay unit. Typically, a low permeability additive, such as bentonite is mixed with water to form a homogeneous material (slurry) with the desired hydraulic properties. This slurry should be designed to be of sufficient density to support the trench walls during placement of the lower permeability backfill mixture. The backfill mixture is typically a low permeability soil mixed with bentonite to further reduce the permeability of the final mix. The hydraulic conductivity of the slurry wall would be low enough to significantly reduce the flow of groundwater through the barrier wall.

Sheetpile barrier walls are constructed by driving sections of steel sheetpiling permanently into the ground. Each section of sheetpiling is interlocked at its edges before driving. A sheetpile barrier wall does not involve excavation of subsurface soils. Therefore, there are no considerations for handling and disposal of excavated subsurface soils as is the case with slurry walls.

Vibrated beam slurry walls are constructed by vibrating a steel I-beam into the ground to the desired depth and, as the beam is withdrawn, injecting a low permeability cement-bentonite mixture under pressure into the resulting void. This process is repeated along the alignment of the wall with each beam injection overlapping the previously completed section. The thickness of the wall will vary based on the permeability of the subsurface material. The vibrated beam slurry wall does not involve the excavation of subsurface soils, and therefore, does not require considerations for the handling or disposal of excavated soils.

The operation of one or more of the existing extraction wells would be required to extract groundwater from the source area and to insure an inward gradient back through the barrier wall. The number of extraction wells required to help maintain hydraulic control and prevent groundwater containing COCs from mounding behind the wall and possibly overflowing the top would be based on the well capacity and the hydraulic conditions where the wells are needed.

In order to monitor water levels along the alignment of the barrier wall, water level sensors and recorders would be installed in wells or piezometers located along the wall. The sensors would activate automatic on/off switches for operation of the extraction wells.

Other construction and operation features for the extraction wells and treatment system would be the same as described for the extraction well system in Section 10.5.3.1.1.

Effectiveness: The installation of a barrier wall in conjunction with groundwater extraction wells would effectively contain groundwater contaminated with COCs and, therefore, reduce the mobility of the COCs in the sand and gravel unit beneath the Site. Depending upon the alignment of the barrier wall, groundwater containing minor amounts of COCs may remain downgradient of the wall. This groundwater would neither be remediated nor contained and would continue to migrate toward and discharge into the River. This is not expected to result in any exceedances of surface water SCGs for the uncontrolled discharge presently occurring has not resulted in any surface water exceedances.

For slurry walls, chemical compatibility tests would be required during predesign activities to ensure that the COCs do not adversely react with the slurry or grout. Routine monitoring and maintenance of the barrier wall would be required to maintain the effectiveness of the wall.

Volume reduction of the COCs would be achieved with this alternative through the operation of the extraction well(s) and over the long-term, the toxicity of the COCs would be reduced as a result of natural attenuation mechanisms; however, the barrier wall and extraction well alternative would not substantially enhance the restoration of groundwater quality beyond that which would be achieved with the extraction well system alone as described in Section 10.5.3.1.1.

There is potential for short-term exposure of workers to potentially contaminated material during construction of a slurry wall which involves excavation since soils saturated with groundwater containing COCs could be excavated and brought to the surface. These short-term exposures would be significantly less in the construction of a barrier wall which does not require excavation (i.e., sheetpile wall or vibrated beam wall).

This alternative would also address the RAOs which would be addressed by the extraction system alone.

Implementability: Slurry wall systems can be readily implemented using conventional construction technologies and equipment. The installation method for the Site would involve simultaneous operations in which soil is excavated from the trench alignment, while the excavated or imported material is mixed with bentonite and water (in an open pit, cement mixer, or batch plant) to create a backfill mix with the desired hydraulic properties. As soil is excavated from the trench, around the area to be isolated, it would be replaced by the slurry which would then support the sidewalls of the trench. Trenching would continue through the slurry until the barrier wall was complete. Water would be lost into the groundwater flow regime during trenching and backfill; therefore, dewatering would generally not be required.

Because excavation within the plume limit may be required for the construction of a slurry wall, VOCs may be released to the ambient air.

Sheetpile walls are constructed using standard pile driving equipment. Vibrated beam walls are constructed using standard vibratory pile drive-extractor and pressure grouting equipment. Both the sheetpile wall and the vibrated beam wall can be installed to depths of 100 feet or greater in unconsolidated deposits free of boulders. The Site conditions (approximately 30 feet of sand and gravel underlain by silt/clay) may be suitable for the sheetpile or vibrated beam walls. Since the installation of the sheetpile and vibrated beam walls do not involve the excavation of soil, there are no considerations required for the release of organic vapors.

Construction of any of the barrier walls along the northern limit of the groundwater COC plume may be difficult because of the presence of the JCC building and the limited available work area outside the building. If it is necessary to move the barrier wall to an alignment within the limit of the plume, loss of downgradient impacted groundwater would occur. Due to the proximity of the JCC building and the center of the COC plume, it is doubtful that an effective slurry wall could be built on Site. The use of sheet piles and vibrating beam walls are likely possible but still would have to be further evaluated due to structural concerns over vibrations.

Summary: A barrier wall and extraction well system would be effective in reducing the mobility of COCs beneath the Site.

Conventional technology and equipment are available for the implementation of this technology. Because of limited access, installation of a barrier wall and operation and maintenance of extraction wells for hydraulic control may be difficult.

This alternative will not be considered further in this FS primarily because the barrier wall alternative would not significantly enhance the achievement of the RAOs beyond that which can be realized through the optimized operation of a groundwater extraction well system alone. In addition, there exists the likelihood that the barrier wall would be installed within the central area of the plume resulting in loss of groundwater containing COCs downgradient of the barrier. Potential conflicts between the building structure and the wall installation are also a factor in the elimination of this alternative.

10.5.4 GROUNDWATER TREATMENT

Air stripping is the groundwater treatment technology retained to address the COCs in extracted groundwater. Air stripping is a physical process which transfers VOCs from water to air. Extracted groundwater containing VOCs is passed over a bed of packing material or separation trays while a stream of air is forced counter-current to the flow of water. The packing material, or separation trays are used to maximize the contact surface area between the air and water streams. Organic compounds which are transferred to the air stream can be discharged directly to the atmosphere or treated prior to discharge.

A pretreatment system for removal of iron and manganese and solids may be required as part of the air stripping alternative but was not needed for the IRM.

Effectiveness: Air stripping is effective in reducing the concentrations of the COCs in the extracted groundwater. TCE, the compound of primary concern at the Site, is readily treatable using this technology. Air stripping will reduce the volume of COCs in the extracted groundwater.

Air emissions from the stripper have already been shown to meet the SCG following carbon treatment.

This treatment technology is protective of human health and the environment and would comply with the SCGs for treated water and air discharges.

Implementability: The air stripper which was used during the groundwater extraction IRM would also be used in the groundwater extraction and treatment remedial alternative. This stripper has a design capacity of approximately 50 GPM and has been previously permitted for operation with treatment of this waste stream.

A new protective shelter would need to be constructed to house the air stripper and associated controls. Adequate space exists in the immediate vicinity of the treatment area to accommodate this building.

During the operation of the groundwater extraction IRM, the effluent discharge from the air stripper was permitted for discharge to the Jamestown Public Utilities POTW. It is assumed that this permit is either still in effect or that it could be renewed for continuing discharge from the air stripper.

Vapor phase treatment may still be required to meet the SCGs for concentrations of COCs in air emissions. New air permitting will also likely be required since the operation of the air stripper for the groundwater extraction IRM was permitted with the other plant process emissions.

Summary: Air stripping has been demonstrated to be effective in reducing the concentrations of COCs in extracted groundwater at the Site.

New or existing permits for air emissions and effluent discharge would be required or may require renewal.

Treatment system solid wastes (i.e., spent carbon) would require off-Site disposal.

10.5.5 IN SITU TREATMENT

The in situ treatment technologies retained for screening are:

i) chemical oxidation;
ii) air sparging; and
iii) thermal treatment.

10.5.5.1 CHEMICAL OXIDATION

Chemical oxidation can destroy an extensive variety of organic constituents in groundwater. In situ chemical oxidation is an innovative technology based on the delivery of a suitable oxidizing agent to impacted groundwater in order to destroy or detoxify the chemical constituents by converting them to innocuous and harmless compounds. Chemical oxidation by $KMnO_4$ has been applied at the Site as an Additional IRM. $KMnO_4$ was selected as the chemical oxidant of choice for the Additional IRM because of its ease of installation and handling compared to other oxidants (e.g., peroxide).

$KMnO_4$ is a strong oxidizing agent that reacts readily with many organic compounds including the COCs. The effectiveness of $KMnO_4$ for the oxidation of organic chemicals in environmental media has been demonstrated at the laboratory and pilot scale levels. $KMnO_4$ is a stable reagent also used in drinking water treatment. It is commercially available and easy to handle in both solid and aqueous forms.

For application at the Site, an aqueous solution of approximately 4 percent by weight $KMnO_4$ was injected into the primary area of COC presence through existing wells, additional boreholes, and a trench excavated in the area of the former TCE vapor degreaser pit.

Effectiveness: The monitoring data collected from the Additional IRM have demonstrated that chemical oxidation with $KMnO_4$ is effective in reducing the volume and toxicity of the COCs and, with additional applications, will achieve the RAO of restoration of the Site groundwater.

Chemical oxidation will address all of the RAOs associated with migration of groundwater impacted by COCs. By destroying the COCs in place, the groundwater is restored in an expeditious manner and migration will not be an issue.

Implementability: Through the performance of the Additional IRM, it has been demonstrated that chemical oxidation is technically and administratively feasible.

Summary: Chemical oxidation using $KMnO_4$ has been demonstrated to reduce the volume and toxicity of the COCs in Site groundwater and, therefore, will be retained for detailed analysis in this FS.

10.5.5.2 AIR SPARGING

Air sparging is an in situ technology whereby air is injected (sparged) into impacted groundwater to "strip" VOCs from the water. As the sparged air travels up through the water, mass transfer of VOCs from the liquid to the vapor phase occurs and the VOCs are carried into the vadose zone where they can be collected and treated, if necessary. Air sparging would require a soil vapor extraction (SVE) system installed in the vadose zone to be operated concurrently to remove the vapor phase constituents. The extracted vapors could require carbon treatment. Air permits may also be required.

Air sparging can also enhance aerobic biodegradation of the COCs through the addition of oxygen to the groundwater.

Air sparging is most effective in removing organic compounds from groundwater if the compounds possess the following characteristics: low solubility in water, high vapor pressure, high Henry's Law constant, low boiling point, and low molecular weight; and the Site conditions include homogenous high permeability soils with low organic carbon content. The Site COCs and sand and gravel unit present appropriate conditions for air sparging.

The installation of an air sparging system at the Site would involve, at a minimum, the installation of a below grade delivery system for compressed air into the sparge points. It may be possible to use existing wells or the Additional IRM injection points as the sparge points. Air would be supplied by an on-Site air compressor which will require power and shelter. Since the Site is unattended, an automated control system would be required for operation. This control system would include, at a minimum, automatic off switches on the compressor to protect against overheating.

Effectiveness: Pilot scale studies would be required to fully evaluate the effectiveness of this technology at the Site; however, it is expected that in situ air sparging would be effective in reducing the concentrations of the COCs in the sand and gravel unit.

Air sparging will address all of the RAOs associated with migration of groundwater impacted by COCs. By destroying the COCs in place, the groundwater is restored in an expeditious manner and migration will not be an issue.

Distribution and, therefore, capture of the vapor phase may be affected by lithological and operational control of air flow. Diffusion of contaminants into channels can be slow and performance can be difficult to measure or interpret. However, the treatment area at the Site is relatively small and the upper sand and gravel fairly homogeneous; therefore, control of air dispersion and proper monitoring should be attainable.

Implementability: The restoration of the Site groundwater would be enhanced by an air sparging system. Air sparging is technically and administratively feasible. This technology is becoming more common as a remedial technology. Conventional techniques, materials, and equipment are available for the implementation of this option.

If an accompanying SVE system is installed, air permits may be required.

? Summary: Air sparging could meet the RAOs. Evaluation of the effectiveness of the air sparging system could be problematic due to the unpredictable nature of air flow in the vadose zone. Conventional techniques, materials, and equipment are available for the implementation of this technology.

Due to its demonstrated effectiveness, at other sites, air sparging will be retained for detailed analysis in this FS.

10.5.5.3 THERMAL TREATMENT (STEAM SPARGING)

Steam sparging is performed in the same manner as air sparging except that steam rather than ambient air is injected into the treatment area. The transfer of heat rather than ambient temperature air improves contaminant transport and removal mechanisms such as gas advection, chemical partitioning to the vapor phase, gas phase contaminant diffusion, and chemical or biological transformation.

The details of the steam sparging system are the same as for air sparging except that additional equipment would be required for the production of steam for injection.

Effectiveness: Thermal enhancement of air sparging by the injection of steam instead of ambient air could increase the effectiveness of the air sparging system described in Section 10.5.5.2. As with air sparging, pilot scale studies would be required to fully evaluate the effectiveness of this technology at the Site. Steam sparging would achieve the RAOs.

The use of steam may improve vapor distribution and diffusions over that achieved with air sparging but the improvement is expected to be minimal.

Implementability: The restoration of the Site groundwater would be enhanced by a steam sparging system. Steam sparging is technically and administratively feasible. Several full-scale applications of steam sparging have been made in recent years and commercial systems are available.

Summary: Steam sparging will meet the RAOs.

Conventional techniques, materials, and equipment are available for implementation of this alternative. Steam sparging would not be substantially more effective than air sparging and chemical oxidation has been demonstrated at the Site to be effective in treating the COCs in situ. Therefore, steam sparging will not be retained for detailed analysis.

10.5.6 RETAINED REMEDIAL ALTERNATIVES

The screening of the remedial alternatives performed in Section 10.5 using the established criteria of effectiveness and implementability has resulted in the development of the following remedial alternatives for detailed review:

i) Alternative 1: No Further Action;
ii) Alternative 2: Institutional Controls and Monitoring;
iii) Alternative 3: Extraction Well System with On-Site Groundwater Treatment;
iv) Alternative 4: In Situ Chemical Oxidation with Potassium Permanganate; and
v) Alternative 5: In Situ Air Sparging.

Alternatives 3 and 4 would also involve implementation of institutional controls and groundwater monitoring.

These five alternatives are analyzed in detail in Section 10.6 using the evaluation criteria established in the NCP and guidance documents.

10.6 DETAILED ANALYSIS OF RETAINED REMEDIAL ALTERNATIVES

Five remedial alternatives were developed in Section 10.5.6 for possible application at the Site. These five alternatives are subject to a detailed analysis using the nine evaluation criteria developed by USEPA as presented in the USEPA Guidance. The nine evaluation criteria are as follows:

i) overall protection of human health and the environment;
ii) compliance with ARARs/SCGs;
iii) long-term effectiveness and permanence;
iv) reduction of toxicity, mobility or volume;
v) short-term effectiveness;

vi) implementability;
vii) cost;
viii) State acceptance; and
ix) community acceptance.

The evaluation criteria of State acceptance and community acceptance cannot be evaluated at the feasibility study stage because they are based upon agency and public comments regarding the FS report. Consequently, no further discussion of these two criteria is provided.

The remaining seven evaluation criteria are divided into two primary groups, namely threshold criteria and balancing criteria.

The threshold criteria include overall protection of human health and the environment, and compliance with applicable SCGs. With the exception of the No Further Action alternative, all remedial alternatives must meet the threshold criteria to be eligible for further consideration.

The remaining five evaluation criteria are considered the balancing criteria. Each of the remedial alternatives is assessed and analyzed on a comparative basis using these evaluation criteria. Ultimately, a remedial action plan is proposed that incorporates the alternative which provides the best solution with respect to the balancing criteria.

The detailed analysis of alternatives has been performed in a manner consistent with the NYSDEC TAGM and USEPA Guidance.

10.6.1 ALTERNATIVE 1 - NO FURTHER ACTION

10.6.1.1 DESCRIPTION

The No Further Action alternative (Alternative 1) provides no active remedial measures to improve the environmental conditions at the Site. Natural attenuation and biodegradation would reduce COC concentrations in groundwater (see Section 10.5.1). No remedial actions would be conducted.

10.6.1.2 ASSESSMENT

Overall Protection of Human Health and the Environment: Because no additional remedial measures are implemented with Alternative 1, the potential future risk to human health and the environment would not be reduced beyond that which will be achieved through natural attenuation.

Alternative 1 will not be protective of human health and the environment in the future if Site groundwater in the sand and gravel unit is used as a water supply source or if the future land use of the Site is not controlled. This alternative will not achieve the RAOs.

Compliance with SCGs: Alternative 1 will not achieve the chemical-specific SCGs which apply to groundwater. Since no remedial action would be implemented, no action-specific SCGs apply to Alternative 1.

Alternative 1 satisfies the location-specific SCGs. Potential location-specific SCGs for Alternative 1 are: 6 NYCRR Part 608.

Reduction of Toxicity, Mobility or Volume: Alternative 1 provides no active reduction of toxicity, mobility or volume of the COCs. However, over the long-term, the volume and toxicity of COCs in groundwater will be reduced by natural attenuation and degradation processes.

Short-Term Effectiveness: Alternative 1 requires no remedial actions; therefore, there would be no additional short-term risks posed to the community, the workers, or the environment as a result of the implementation of this alternative.

Long-Term Effectiveness and Permanence: Because this alternative would not result in any further remedial actions, the residual risks would not be reduced beyond that which will be achieved through natural attenuation. RAOs would not be met by Alternative 1, and a permanent remedy would not be provided.

Implementability: Because there are no remedial actions being undertaken, the implementability criterion is not applicable.

Cost: Because there are no remedial actions being undertaken, there are no costs associated with Alternative 1.

10.6.2 ALTERNATIVE 2 - INSTITUTIONAL CONTROLS AND MONITORING

10.6.2.1 DESCRIPTION

Alternative 2, Institutional Controls and Monitoring, includes the implementation of institutional controls to restrict exposure to contaminated groundwater and monitoring of the Site groundwater.

Under this alternative, a Deed Restriction or Record Notice would be added as an addendum to an existing deed for the Site. The deed restriction would inform the property owner of the Site history and restricted land use/groundwater use on the property and require the owner to obtain regulatory approvals before the installation of wells or performance of subsurface construction activities below the water table. Any future conveyance of the property would be subject to these restrictions. The restriction or restrictive covenants must be drafted in accordance with applicable and relevant State and municipal legal codes to be enforceable.

In view of these institutional controls, zoning and well permitting are believed to be unnecessary at the Site.

Long-term groundwater monitoring would be performed to evaluate the effectiveness of natural attenuation and biodegradation in reducing the concentrations, and thereby the toxicity and volume, of the COCs. For evaluation purposes, it has been assumed that the groundwater monitoring network, will consist of 15 wells including one background monitoring well. A sampling frequency of semi-annually for years 1 through 5 and annually for years 6 through 30 has been assumed. All collected groundwater samples will be analyzed for the COCs.

Groundwater monitoring would also include measurement and evaluation of water table and surface water elevations to track groundwater flow patterns.

10.6.2.2 ASSESSMENT

Overall Protection of Human Health and the Environment: Effective deed restrictions and monitoring would be protective of human health by preventing potential exposure to contaminated groundwater. The potential future risk to the environment using

Alternative 2 would not be reduced beyond that which will be achieved through natural attenuation.

Therefore, Alternative 2 would achieve some of the RAOs if the following controls are enacted:

i) property deed restrictions maintained and enforced over the long-term to control potential exposure to contaminated groundwater; and

ii) an effective groundwater monitoring program.

Compliance with SCGs: Alternative 2 will not achieve the chemical-specific SCGs which apply to groundwater.

Since no remedial action would be implemented, no action-specific SCGs apply to Alternative 2.

Alternative 2 satisfies the location-specific SCGs. Potential location-specific SCGs for Alternative 2 are: 6 NYCRR Part 608.

Reduction of Toxicity, Mobility or Volume: Alternative 2 provides no active reduction of toxicity, mobility, or volume of the COCs. However, over the long-term, the volume and toxicity of COCs in groundwater will be reduced by natural attenuation and degradation processes.

Short-Term Effectiveness: Alternative 2 requires no remedial actions. Therefore, there will be no additional short-term risks posed to the community, the workers, or the environment as a result of the implementation of this alternative.

Long-Term Effectiveness and Permanence: The institutional controls to be established for Alternative 2 would make this alternative effective in the long-term. Groundwater monitoring would be used to assess the natural attenuation processes in the groundwater and subsequently evaluate the potential risk of exposure to contaminated groundwater over time. Over the long-term, the incremental risk attributable to the Site would be reduced as a result of natural attenuation processes in the groundwater. For institutional controls to be effective in the long-term, they must be enforced.

Implementability: Alternative 2 is readily implementable at the Site.

Cost: The 30-year present worth cost for Alternative 2, given a semi-annual sampling frequency for years 0 through 5 and an annual sampling frequency for years 6 through 30 is $131,000. The cost summary is presented in Table 10.8, and the detailed breakdown of costs is presented in Appendix N. The costs of this alternative are associated with long-term monitoring and reporting, monitoring well maintenance, and implementation of deed restrictions.

10.6.3 ALTERNATIVE 3 - EXTRACTION WELL SYSTEM WITH ON-SITE GROUNDWATER TREATMENT

10.6.3.1 DESCRIPTION

Alternative 3 includes:

i) institutional controls and monitoring;

ii) extraction well system;

iii) groundwater treatment by air stripping; and

iv) discharge of treated water to POTW.

The extraction well system will be designed to contain and recover contaminated groundwater from the sand and gravel unit. The system will consist of the extraction wells utilized for the IRM and described in Sections 9.1 and 10.5.3.1.1 of this report.

Alternative 3 will include the same water quality and hydraulic monitoring program designed for Alternative 2. The monitoring data will be evaluated to ensure that the extraction well system can effectively achieve the RAOs. This monitoring program will include the collection and analyses of groundwater samples, the measurement of water levels in monitoring and extraction wells and in the Chadakoin River, and periodic reporting and evaluation of the system effectiveness. The extraction well system will be evaluated by the following criteria:

i) the maintenance of an inward hydraulic gradient in the area exhibiting elevated COC concentrations; and

ii) a decrease in the concentration of the COCs in the groundwater within the plume.

Hyd. containment
should be established
w/in 6 mo?

During the first 5 years of operation of the extraction well system, the effectiveness of the system will be evaluated annually and extraction wells may be added as appropriate to achieve hydraulic containment. After the collection of a maximum of 5 years of monitoring and operating data, an evaluation will be performed to determine if the extraction system can achieve the groundwater RAOs. If it is determined that the system cannot meet the groundwater RAOs, then a contingent alternative may be considered.

Potential human exposure to contaminated groundwater during operation of the collection/treatment system would be controlled by implementing institutional controls. This alternative would require the institutional controls to be maintained until the RAOs have been achieved.

10.6.3.2 ASSESSMENT

Overall Protection of Human Health and the Environment: Alternative 3 would be protective of human health through the hydraulic containment, collection and treatment of contaminated groundwater and through institutional controls.

Alternative 3 would be protective of the environment by mitigating the future potential transport of COCs to off-Site groundwater and the Chadakoin River.

Compliance with SCGs: Groundwater chemical-specific SCGs would be achieved and surface water SCGs maintained by Alternative 3.

The action-specific SCGs which potentially apply to Alternative 3 are:

i) ECL Articles 10, 27, and 70;
ii) NYS Air Guide;
iii) 6 NYCRR Part 364;
iv) 6 NYCRR Part 370 series;
v) 6 NYCRR Part 483 and 484; and
vi) 6 NYCRR Part 182.

The location-specific SCG which may apply to Alternative 3 is 6 NYCRR Part 608.

Reduction of Toxicity, Mobility and Volume: Alternative 3 would result in the active reduction of toxicity, mobility, and volume of COCs associated with the groundwater in the sand and gravel unit:

i) toxicity of the COCs would be reduced through treatment of extracted groundwater;

ii) mobility would be reduced through the maintenance of the hydraulic containment provided by the operation of the extraction wells; and

iii) the volume of contaminated groundwater would be reduced by the collection achieved through the operation of the extraction system.

Short-Term Effectiveness: The extraction wells required for Alternative 3 are already installed; therefore there will be no construction activities associated with the implementation of Alternative 3 which would need to be performed in the saturated zone and no additional short-term risks posed to the community, the workers, or the environment.

Long-Term Effectiveness and Permanence: The extraction well system would provide long-term hydraulic containment of potentially contaminated groundwater in the sand and gravel unit. Groundwater treatment through air stripping would effectively and permanently remove COCs from the extracted groundwater.

The groundwater monitoring program included in this alternative would provide adequate controls to determine the effectiveness of containment and achievement of the RAOs.

Long-term effectiveness would also be ensured by maintenance of the groundwater remediation system.

Implementability: The extraction well system is a common technology frequently used in groundwater remediation. As such, the extraction well system can be implemented with demonstrated, available construction materials and techniques.

If it is determined that the initially installed extraction wells cannot achieve or maintain hydraulic containment, additional wells could be added.

The groundwater treatment system would require an evaluation of the condition of the existing air stripping equipment before reinstallation. A predesign study will be performed to determine the need for pre-treatment in a long-term operating scenario. Alternative 3 could be completed within 2 to 3 months of its selection as the preferred remedial alternative and is assumed to be operated for a period of 30 years.

Cost: The total estimated cost to implement Alternative 3 is summarized in Table 10.9. A detailed breakdown of the costs is presented in Appendix N. The estimated capital costs are approximately $93,000 and the operation and maintenance costs are estimated to be $518,000 The total implementation cost, including indirect costs and contingencies, is estimated to be $611,000, assuming an operational life of 30 years.

10.6.4 ALTERNATIVE 4 - IN SITU CHEMICAL OXIDATION

10.6.4.1 DESCRIPTION

include hydraulic control and/or further downgradient monitoring to determine leading edge of the plume.

Alternative 4 includes:

i) in situ groundwater treatment by chemical oxidation;
ii) short-term monitoring to verify the effectiveness of the treatment; and
iii) institutional controls.

In situ chemical oxidation of the COCs in groundwater using $KMnO_4$ was performed in May 2000 as an Additional IRM. The details of the Additional IRM are presented in Section 9.2. Alternative 4 would consist of the continuation of the Additional IRM and the enforcement of institutional controls until the RAOs have been achieved.

Based upon the monitoring results collected following the Additional IRM (see Table 9.1), it is estimated that the remaining chemical mass within the COC plume is 4,000 pounds. Assuming that 6.5 pounds of $KMnO_4$ are required to oxidize 1 pound of COCs, approximately 26,000 pounds of $KMnO_4$ will be required to oxidize the estimated remaining chemical mass. This $KMnO_4$ would be injected into the COC plume in an approximate 4 percent aqueous solution.

In Alternative 4, the $KMnO_4$ would be injected into the COC plume in a manner similar to that used during the Additional IRM.

The injection of the $KMnO_4$ solution would be performed in at least two events with groundwater monitoring conducted between events to verify the remaining chemical mass, reevaluate the estimates of $KMnO_4$ required to complete the restoration of the groundwater, and modify the injection scenario, if necessary.

Groundwater monitoring would be performed during the implementation of the in situ treatment program and for 1 year following its completion. The monitoring program would consist of the qtr semi-annual collection of samples from eight wells within and downgradient of the COC plume which were monitored during the IRM. The monitoring would be performed to evaluate the effectiveness of the treatment and confirm that the groundwater was permanently restored to acceptable quality. Groundwater monitoring would also include measurement and evaluation of water table and surface water elevations to track groundwater flow patterns.

10.6.4.2 ASSESSMENT

Overall Protection of Human Health and the Environment: Alternative 4 would be protective of human health through the treatment of contaminated groundwater to acceptable levels. During the treatment process the existing restrictive covenants would provide the institutional controls necessary to prevent the exposure of humans to the contaminated groundwater until the RAOs are achieved.

Alternative 4 would be protective of the environment by mitigating the future potential transport of COCs to off-Site groundwater and the Chadakoin River.

Compliance with SCGs: Groundwater chemical-specific SCGs would be achieved and surface water SCGs maintained by Alternative 4.

The action-specific SCGs which have potential to apply to Alternative 4 are:

i) ECL Article 17;
ii) ECL Article 70; and
iii) NYS Technical Manual "Contained In" Criteria for Environmental Media.

Alternative 4 would meet the location-specific SCGs.

Reduction of Toxicity, Mobility and Volume: Alternative 4 would result in active reduction in the toxicity of COCs within the limit of the plume. This alternative would not affect the mobility or volume of groundwater within the plume; however, once the chemical-specific SCGs have been achieved, neither the mobility nor volume of the restored groundwater will be of concern.

Short-Term Effectiveness: The majority of the injection points for Alternative 4 have already been installed; however, additional injection points in the immediate vicinity of the degreaser pit may be required. Previous site activities have demonstrated that the drilling and installation of injection points and wells does not present a hazard to the community or the environment. Short-term hazards to workers can be mitigated through proper work and health and safety procedures. Mixing and pumping mechanisms would be present on the ground surface during the treatment process; however, all chemicals and solutions would be containerized and no additional short-term risks would be posed to the community, the workers, or the environment.

Long-Term Effectiveness and Permanence: The in situ oxidation of COCs within the groundwater plume would provide a long-term remedy through the destruction of the COCs and restoration of the groundwater to acceptable quality. Once the chemical specific SCGs are achieved in the source area (the vicinity of the degreaser pit), there is no potential for recurring presence of COCs in on-Site groundwater.

The oxidation of chemicals by $KMnO_4$ is essentially immediate upon contact. Therefore, Alternative 4 is expected to achieve the chemical-specific SCGs in a significantly shorter time than Alternatives 3 (Groundwater Containment and Collection) or 5 (In Situ Air Sparging). It is assumed that the achievement of the chemical-specific SCGs would be accomplished within 1 year of the commencement of treatment and that the monitoring program would be completed 1 year following the completion of treatment, a total project duration of 2 years.

Implementability: The performance of the Additional IRM has demonstrated that Alternative 4 is very implementable. All tasks required to implement the alternative utilize standard procedures and materials.

Cost: The total estimated cost to implement Alternative 4 is summarized in Table 10.10. A detailed breakdown of the costs is presented in Appendix N. The estimated capital costs are approximately $116,000 and the operation and maintenance costs, which consist solely of monitoring, are estimated to be $23,000. The total implementation cost, including indirect costs and contingencies, is estimated to be $139,000 assuming that the implementation of the alternative is completed within 2 years.

10.6.5 ALTERNATIVE 5 - IN SITU AIR SPARGING

10.6.5.1 DESCRIPTION

Alternative 5 includes:

i) in situ groundwater treatment by air sparging;

ii) short-term monitoring to verify the effectiveness of treatment; and

iii) institutional controls.

iv) Should include SVE

In Alternative 5, the injection of air into the groundwater COC plume will volatize the COCs, thereby removing them from the groundwater. Air will be injected through sparge points. Sparge points would be spaced approximately 30 feet on center throughout the source area. Sparge points would be constructed such that air is diffused at the bottom of the sand/gravel unit so that air flows upward through the entire COC plume.

A SVE system may be required to remove the stripped VOCs from the vadose zone vapors. The necessity of an SVE system with in situ air sparging will be determined during the predesign phase of the air sparging project.

Groundwater monitoring would be performed during the implementation of the in situ treatment program and for 2 years following its completion. The monitoring program would consist of the semi-annual collection of samples from eight wells within and downgradient of the COC plume to evaluate the effectiveness of the treatment and confirm that the groundwater was permanently restored to acceptable quality. Groundwater monitoring would also include measurement and evaluation of water table and surface water elevation to track groundwater flow patterns.

10.6.5.2 ASSESSMENT

Overall Protection of Human Health and the Environment: Alternative 5 would be protective of human health through the treatment of contaminated groundwater to acceptable levels. During the treatment process the existing restrictive covenants would provide the institutional controls necessary to prevent the exposure of humans to the contaminated groundwater until the RAOs are achieved.

Alternative 5 would be protective of the environment by mitigating the future potential transport of COCs to off-Site groundwater and the Chadakoin River.

Compliance with SCGs: Groundwater chemical-specific SCGs would be achieved and surface water SCGs maintained by Alternative 5.

The action-specific SCGs which have potential to apply to Alternative 5 are:

i) ECL Article 17;
ii) ECL Article 19;
iii) ECL Article 70; and
iv) NYS Technical Manual "Contained In" Criteria for Environmental Media.

Alternative 5 would meet the location-specific SCGs.

Reduction of Toxicity, Mobility and Volume: Alternative 5 would result in active reduction in the toxicity of COCs within the limit of the plume. This alternative would not affect the mobility or volume of groundwater within the plume; however, once the chemical-specific SCGs have been achieved, neither the mobility nor volume of the restored groundwater will be of concern.

Short-Term Effectiveness: Sparge points would be installed using standard drilling techniques. Previous site activities have demonstrated that the drilling activities do not present a hazard to the community or the environment. Short-term hazards to workers can be mitigated through proper work and health and safety procedures. No potentially hazardous materials would be utilized in the implementation of this alternative; therefore, no additional short-term risks would be posed to the community, the workers, or the environment.

Long-Term Effectiveness and Permanence: The in situ treatment of COCs within the groundwater plume through air sparging would provide a long-term remedy through the destruction of the COCs and restoration of the groundwater to acceptable quality. Once the chemical specific SCGs are achieved in the source area (the vicinity of the degreaser pit), there is no potential for recurring presence of COCs in on-Site groundwater.

Alternative 5 is expected to achieve the chemical-specific SCGs in a shorter time than Alternatives 3 (groundwater containment and collection) or 5 (In Situ Air Sparging). It is assumed that the achievement of the chemical-specific SCGs would be accomplished within 5 years of the commencement of treatment and that the monitoring program would be completed 2 years following the completion of treatment, a total project duration of 7 years.

Implementability: In situ air sparging is a common in situ treatment technique. All tasks required to implement the alternative utilize standard procedures and materials.

Cost: The total estimated cost to implement Alternative 5 is summarized in Table 10.11. A detailed breakdown of the costs is presented in Appendix N. The estimated capital costs are approximately $67,000 and the operation and maintenance costs, which consist primarily of maintenance of the air compressor and sparge points and monitoring, are estimated to be $198,000. The total implementation cost, including indirect costs and contingencies, is estimated to be $265,000 assuming that the implementation of the alternative is completed within 7 years.

10.7 COMPARATIVE ANALYSIS OF REMEDIAL ALTERNATIVES

The purpose of the comparative analysis is to identify the relative advantages and disadvantages of each alternative which was evaluated in detail in the previous section. The detailed evaluation presented in Section 10.6 evaluated each remedial alternative independently without any consideration for the other alternatives. The comparison of remedial alternatives in this section will evaluate the relative performance of each alternative with respect to the detailed evaluation criteria: overall protection of human health and the environment, compliance with SCGs, short-term effectiveness, long-term effectiveness and permanence, reduction of toxicity mobility and volume, implementability, and cost.

Discussions of the relative advantages and disadvantages of the alternatives are presented in the following subsections. Table 10.12 presents a ranking of each alternative.

10.7.1 OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

Alternative 1, No Further Action, provides no protection to human health or the environment beyond that which will be achieved through natural attenuation of the COCs.

Alternative 2, Institutional Controls and Monitoring, will provide a measure of protection of human health through the prevention of the use of contaminated groundwater at the Site. Additional protection will be provided through groundwater monitoring which will track changes in COC concentration and extent. Alternatives 1 and 2 provide the same level of protection of the environment.

Alternative 3, Collection, Containment, and Treatment, will be protective of human health and the environment through the enforcement of institutional controls and containment of the COC plume until the chemical-specific SCGs have been achieved.

Alternative 4, In Situ Chemical Oxidation, provides the highest level of protection to human health and the environment in the shortest time frame. While the treatment is underway, protection of human health will be provided through the enforcement of institutional controls. Once the treatment is complete and groundwater quality meets the chemical-specific SCGs there will be no potential risk to human health or the environment from on-Site groundwater.

Alternative 5, In Situ Air Sparging, provides a high level of protection to human health and the environment in a relatively short timeframe. While the treatment is underway, protection of human health will be provided through the enforcement of institutional controls. Once the treatment is complete and groundwater quality meets the chemical-specific SCGs there will be no potential risk to human health or the environment from on-Site groundwater .

10.7.2 COMPLIANCE WITH SCGs

Neither Alternative 1 or 2 will comply with the chemical-specific SCGs.

Alternative 3 will comply with the chemical-specific SCGs over time. This compliance will be achieved through the collection of groundwater containing COCs with subsequent treatment of the collected water. As demonstrated through the operation of the groundwater extraction system IRM, the attainment of SCGs through groundwater collection and treatment is expected to take a considerable length of time.

Alternative 4 will comply with the chemical-specific SCGs in the shortest time frame. The effective treatment of the COCs in situ will restore groundwater within the treatment area to quality which meets the applicable standards.

All alternatives will comply with applicable action- and location-specific SCGs, however, treatment of air emissions from the air stripper in Alternative 3 or SVE system if required in Alternative 5 may be required to comply with air regulations.

10.7.3 REDUCTION OF TOXICITY, MOBILITY AND VOLUME

Neither of Alternatives 1 or 2 will reduce the toxicity, mobility or volume of the COCs in groundwater beyond that which will be achieved through natural attenuation.

Alternative 3 would reduce the mobility of the COCs through the maintenance of hydraulic containment. Alternative 3 will reduce the toxicity and volume of COCs through the treatment of extracted groundwater. The extraction of groundwater from the source area (the vicinity of the degreaser pit) will accelerate the reduction in toxicity and volume by removing groundwater with the highest concentrations of COCs.

Alternatives 4 and 5 will permanently destroy the COCs and thereby eliminate toxicity and volume. Through the application of treatment at the plume boundary, mobility of the COC plume will also controlled.

10.7.4 SHORT-TERM EFFECTIVENESS

No risk to the community, workers, or the environment would be presented by the implementation of Alternatives 1 or 2.

Low potential risk would be associated with Alternatives 4 and 5, primarily during the installation of additional injection or sparge points, if required. The points would be installed using standard drilling techniques which have been demonstrated to present little or no risk.

While still low, the highest risk to community, workers, or the environment would be presented by Alternative 3. This risk would be due to the potential for spills or leaks of contaminated groundwater in forcemains or in the treatment system. Proper operating and maintenance procedures will minimize these potential risks.

10.7.5 LONG-TERM EFFECTIVENESS AND PERMANENCE

The long-term effectiveness and permanence of Alternatives 1 and 2 are minimal.

Alternatives 3, 4, and 5 would provide effectiveness and permanence in the prevention of migration of contaminated groundwater through the collection/and or treatment of the water. The RAOs would be achieved by all alternatives; however, Alternative 4 would achieve its effectiveness in the shortest period of time.

10.7.6 IMPLEMENTABILITY

All alternatives are implementable. Alternative 1 would be the most easily implemented since there would be no on-Site work involved. Alternative 2 would be similar to Alternative 1 except that on-Site monitoring wells would need to be maintained and could limit future use of the areas in which they are located.

Alternative 4 would be slightly more difficult to implement than Alternative 1. Temporary on-Site appurtenances (hold tanks, etc) would be required while the treatment is underway. Monitoring wells would only be required until the treatment has been demonstrated to be effective which, for this Feasibility Study, has been assumed to be 3 years.

Alternative 5 would be more difficult to implement than Alternative 4. Air distribution and possibly vapor extraction systems would be required to be installed below grade. Above grade equipment (i.e., air compressor and controls) would be required while treatment is underway. Monitoring wells would only be required until the treatment has been demonstrated to have been effective which, for this Feasibility Study, has been assumed to be 7 years (5 years of treatment and two subsequent years of monitoring).

Of the alternatives considered, Alternative 3 is the most difficult to implement. Underground services would be required for the operation of the extraction wells, an on-Site shelter would be required for housing of the treatment system and system controls, and monitoring and extraction wells would need to be present and maintained until the applicable standards have been achieved which, for this Feasibility Study, has been assumed to be 30 years. The presence of these features above and below grade may interfere with future Site use.

10.7.7 COST

The cost associated with the implementation of the remedial alternatives is lowest for Alternative 1, No Further Action ($0) and increases successively for Alternatives 2, 4, 5, and 3. The net present worth costs for Alternatives 2, 4, 5, and 3 are $131,000, $139,000, $265,000, and $611,000, respectively. The costs of Alternatives 4 and 5 are dependent upon the effectiveness of the treatment. If the treatment required in Alternative 4 doubled, the cost of Alternative 4 would increase from $139,000 to $265,000 (net present worth). The addition of an SVE system to Alternative 5 could increase the cost from $265,000 to $400,000 due primarily to carbon consumption and regeneration.

11.0 CONCLUSIONS AND RECOMMENDATIONS

The investigations conducted at the Site have identified TCE in groundwater as the only environmental concern. TCE and its degradation products are present in Site groundwater at concentrations which exceed the NYSDEC Class GA groundwater standards. The extent of the TCE plume has not increased over time nor has it impacted surface water in the Chadakoin River. At the present time there are no pathways for exposure to Site groundwater; therefore, there is relatively low risk posed to human health or the environment due to the presence of TCE. Nonetheless, the presence of TCE in Site groundwater at the concentrations at which it is present should be eliminated.

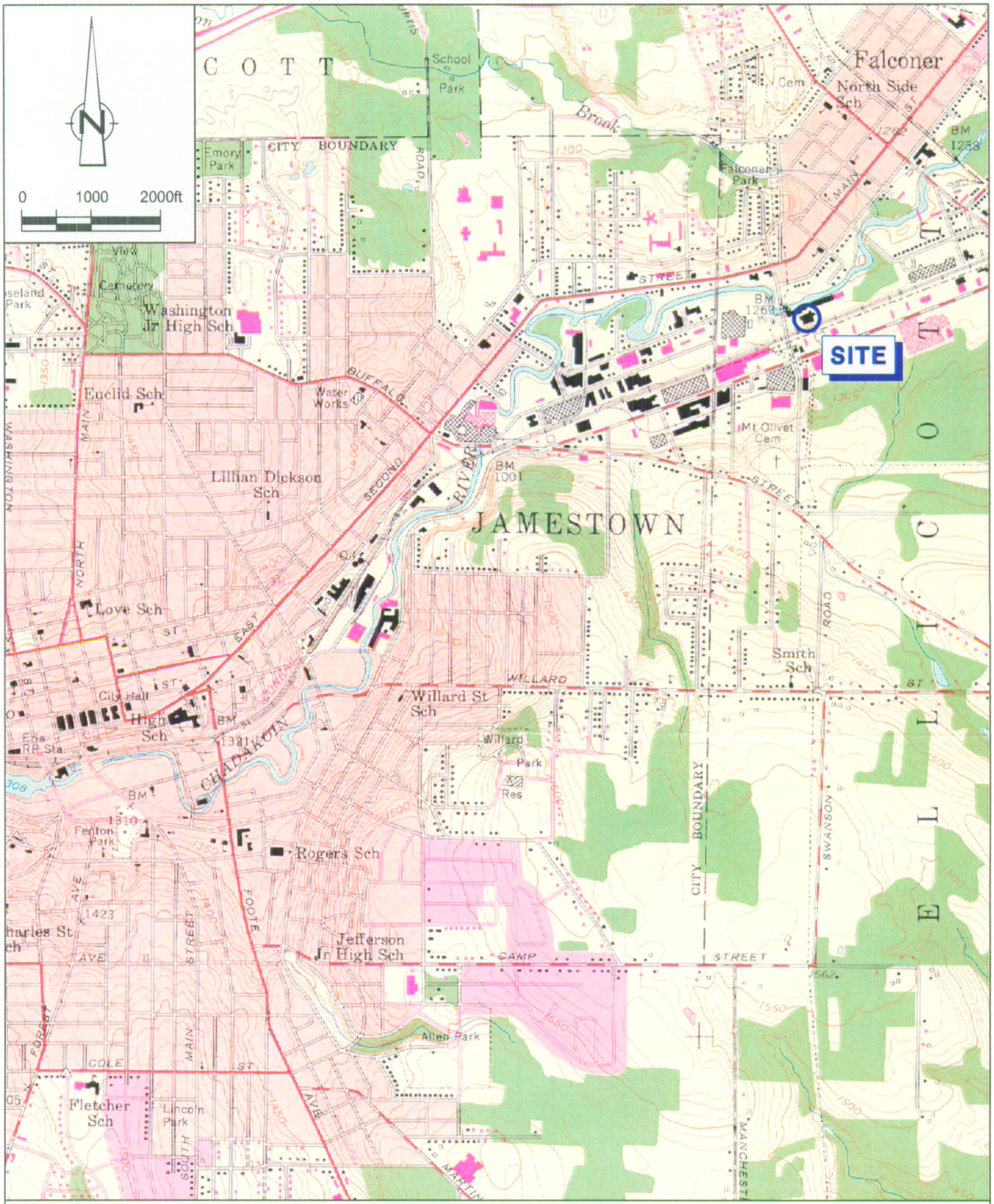
Two IRMs have been implemented at the Site; the operation of a groundwater extraction system for 5 years; and in situ chemical oxidation of TCE using $KMnO_4$. Both of these IRMs have been demonstrated to have impacted the TCE groundwater plume. The groundwater extraction system was effective primarily in containing the plume and the in situ chemical oxidation was effective in destroying TCE.

The performance of the FS has shown that there are two remedial alternatives which will permanently destroy the TCE in groundwater in a cost-effective manner; in situ air sparging and chemical oxidation. In situ chemical oxidation has already been demonstrated to be implementable and effective at the Site; therefore, Dowcraft recommends that an additional application of $KMnO_4$ be made as a continuation of the Additional IRM before a final remedial action for the Site is chosen. Depending upon the availability of $KMnO_4$, an additional application of $KMnO_4$ could be completed within 1 month of approval and an evaluation of the effectiveness of the additional treatment could be available within 6 weeks of treatment.

LIST OF REFERENCES

- "Environmental Investigation, Dowcraft Corporation, Falconer, New York", prepared by Empire Soils Investigations, Inc., August 1991.
- "Remedial Plan for the Dowcraft Corporation Site, 65 South Dow Street, Falconer, New York", prepared by Empire Soils Investigations, Inc., April 1993.
- Crain, Leslie, J., "Ground-Water Resources of the Jamestown Area, New York with Emphasis on the Hydrology of the Major Stream Valleys", State of New York Conservation Department Water Resources Commission, Bulletin 58, 1966.
- "Supplemental RI/FS Documentation Work Plan, Dowcraft Corporation", prepared by Conestoga-Rovers & Associates, May 1999.
- "Additional IRM Work Plan, Former Dowcraft Facility, Falconer, New York", prepared by Conestoga-Rovers & Associates, April 2000.
- "Technical Guidance for Screening Contaminated Sediments", New York State Department of Environmental Conservation, January 1999.
- "Division Technical and Administrative Guidance Memorandum: Determination of Soil Cleanup Objectives & Cleanup Levels", NYSDEC, HWR-94-4046, January 24, 1994.
- 6 NYCRR, Chapter X, Part 703, "Surface Water & Groundwater Quality Standards & Groundwater Effluent Limitations", Amended August 1999.
- "Technical and Administrative Guidance Memorandum for the Selection of Remedial Actions at Inactive Hazardous Waste Sites", NYSDEC HWR-90-4030, May 15, 1990.
- "Monthly Progress Report, Supplemental Remedial Investigation/Feasibility Study, Dowcraft Corporation, Site Code #907020, June 1, 2000 through June 30, 2000", dated July 3, 2000.
- Fetter, C.W., Applied Hydrogeology, Second Edition, Merrill Publishing Company, 1988.
- Newman, S.P., "Water Resources Research", 11[1975]:329-42

FIGURES



SOURCE:

USGS JAMESTOWN, NEW YORK
QUADRANGLE, PHOTOREVISED 1979.

figure 2.1

SITE LOCATION MAP
DOWCRAFT CORPORATION
Falconer, New York

CRA

05020-00(010)GN-NF001 AUG 21/2000

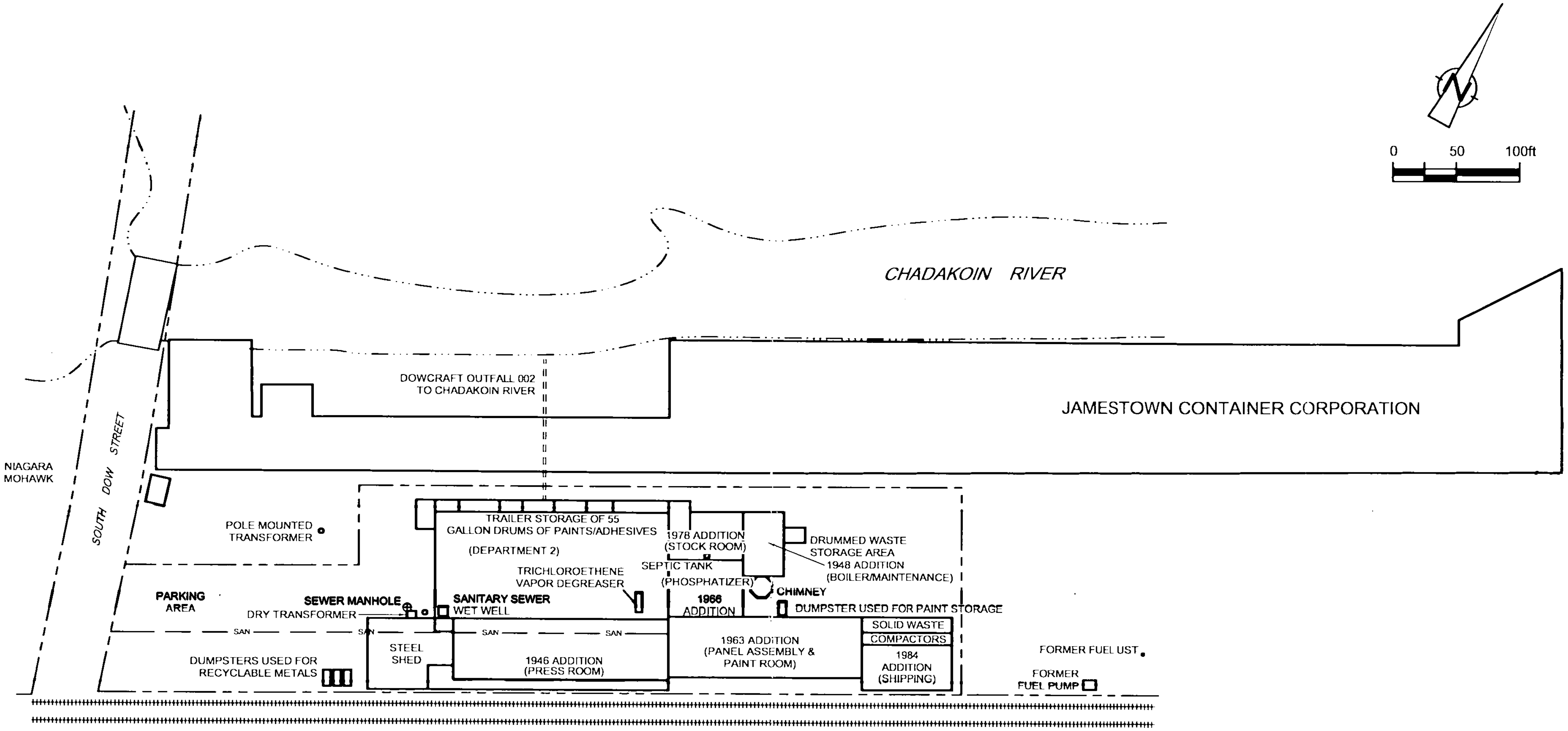


figure 2.2

SITE PLAN AND HISTORIC OPERATIONS
DOWCRAFT CORPORATION
Falconer, New York

CRA

05020-00(010)GN-NF002 SEP 21/2000

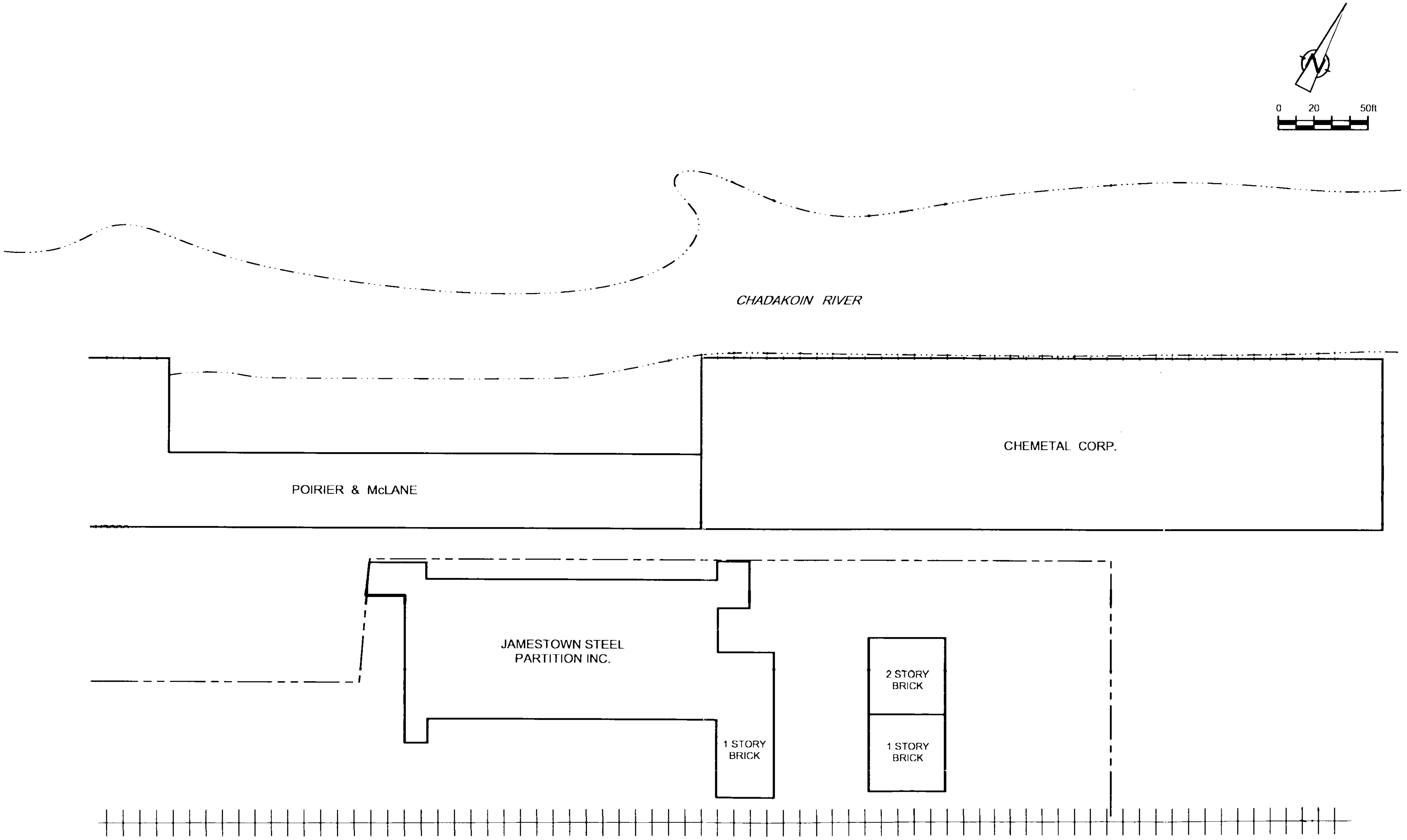


figure 2.3

HISTORIC OCCUPANCY
JAMESTOWN STEEL PARTITION PLANT
DOWCRAFT CORPORATION
Falconer, New York

CRA

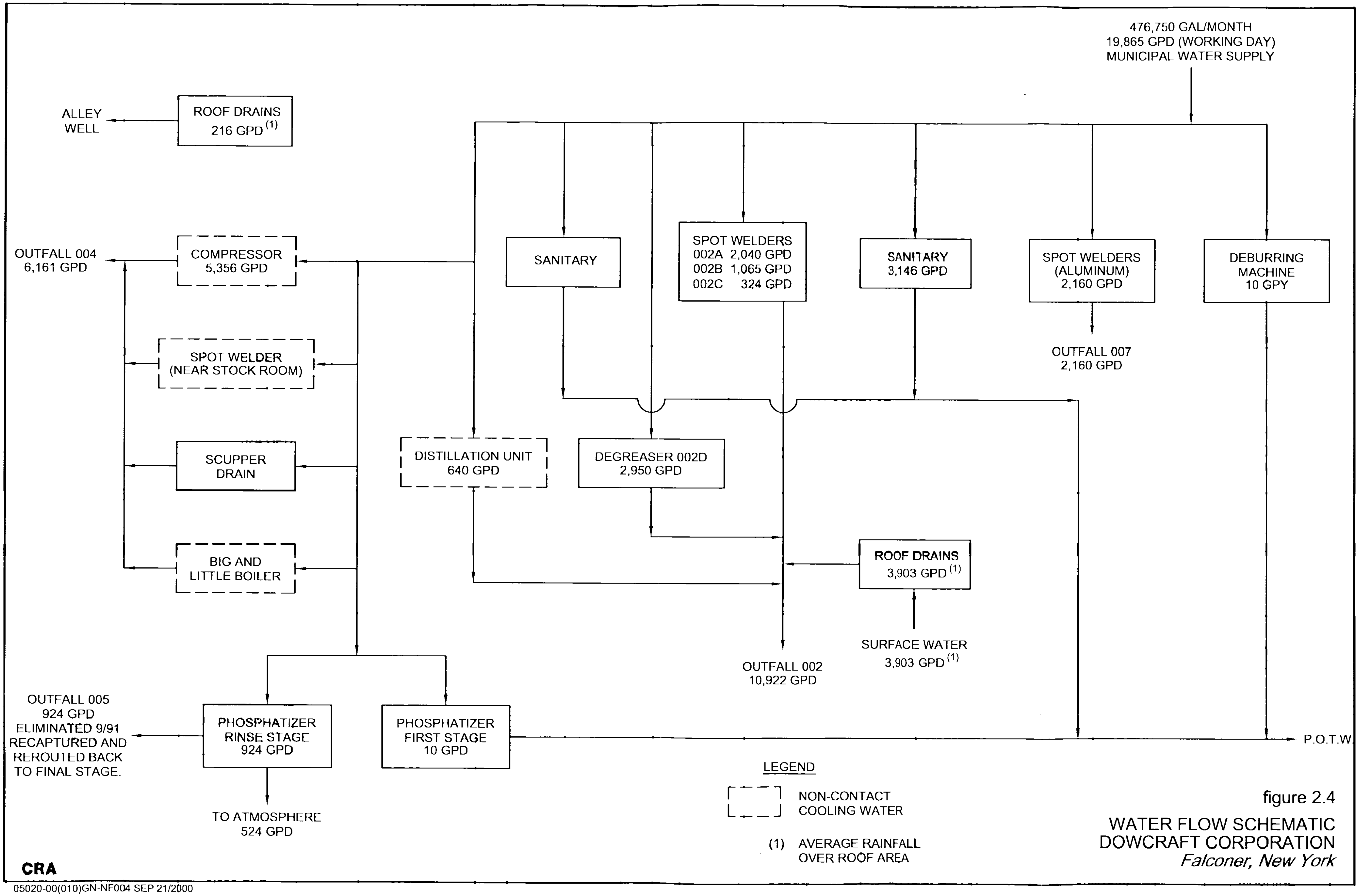


figure 2.4

WATER FLOW SCHEMATIC
DOWCRAFT CORPORATION
Falconer, New York

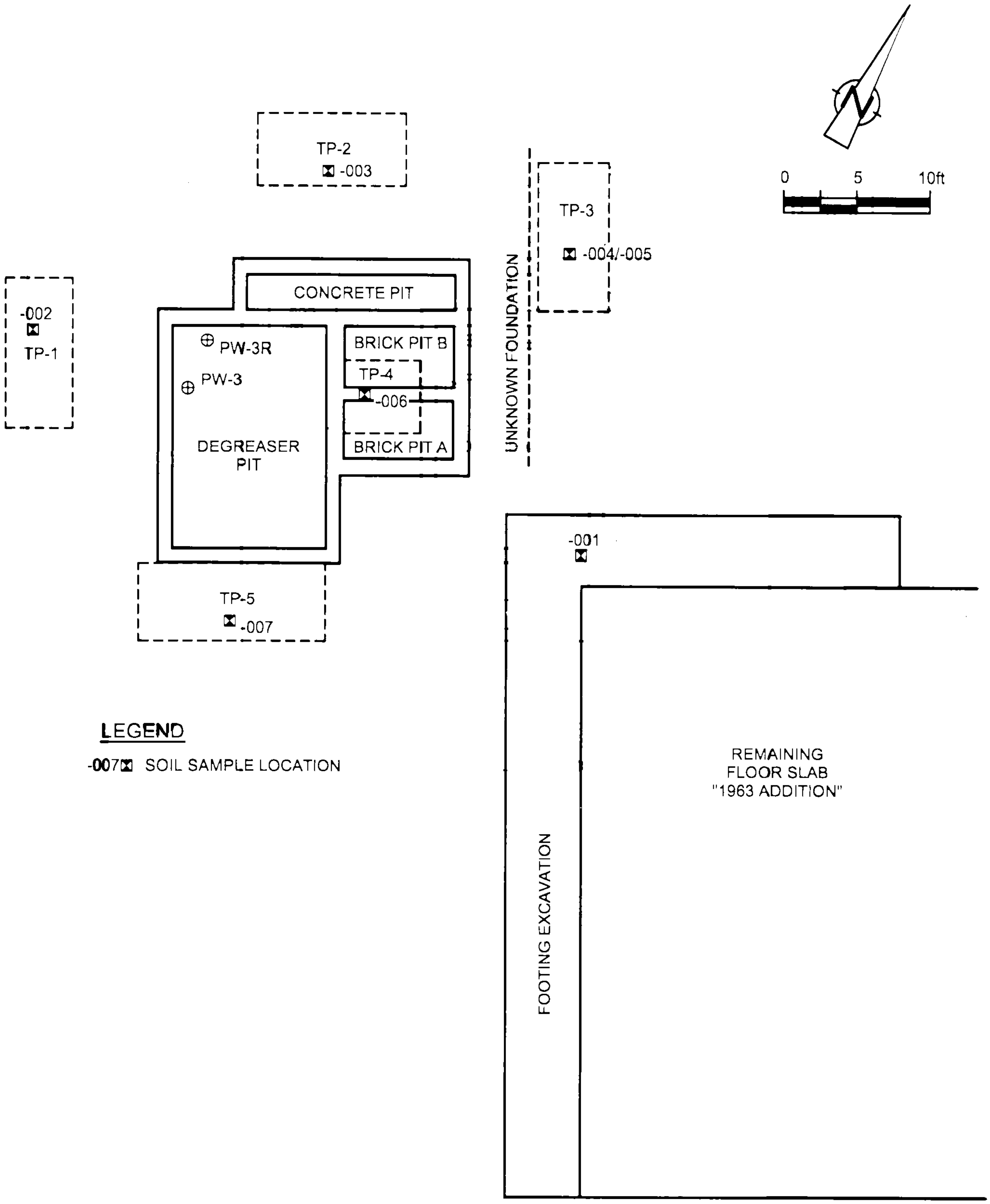
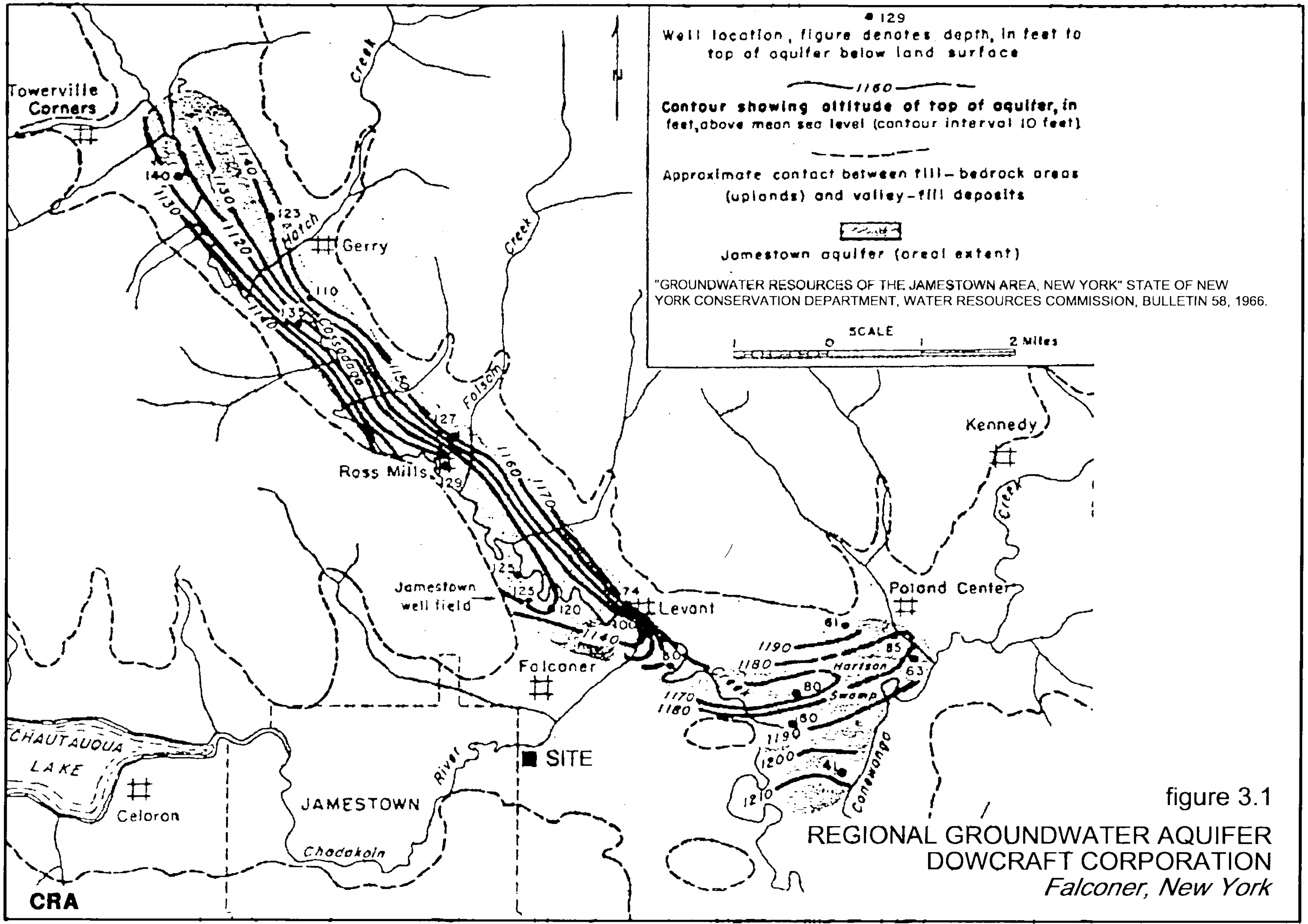


figure 2.5

LOCATIONS OF BELOW GRADE
PITS AND TEST PITS
DOWCRAFT CORPORATION
Falconer, New York

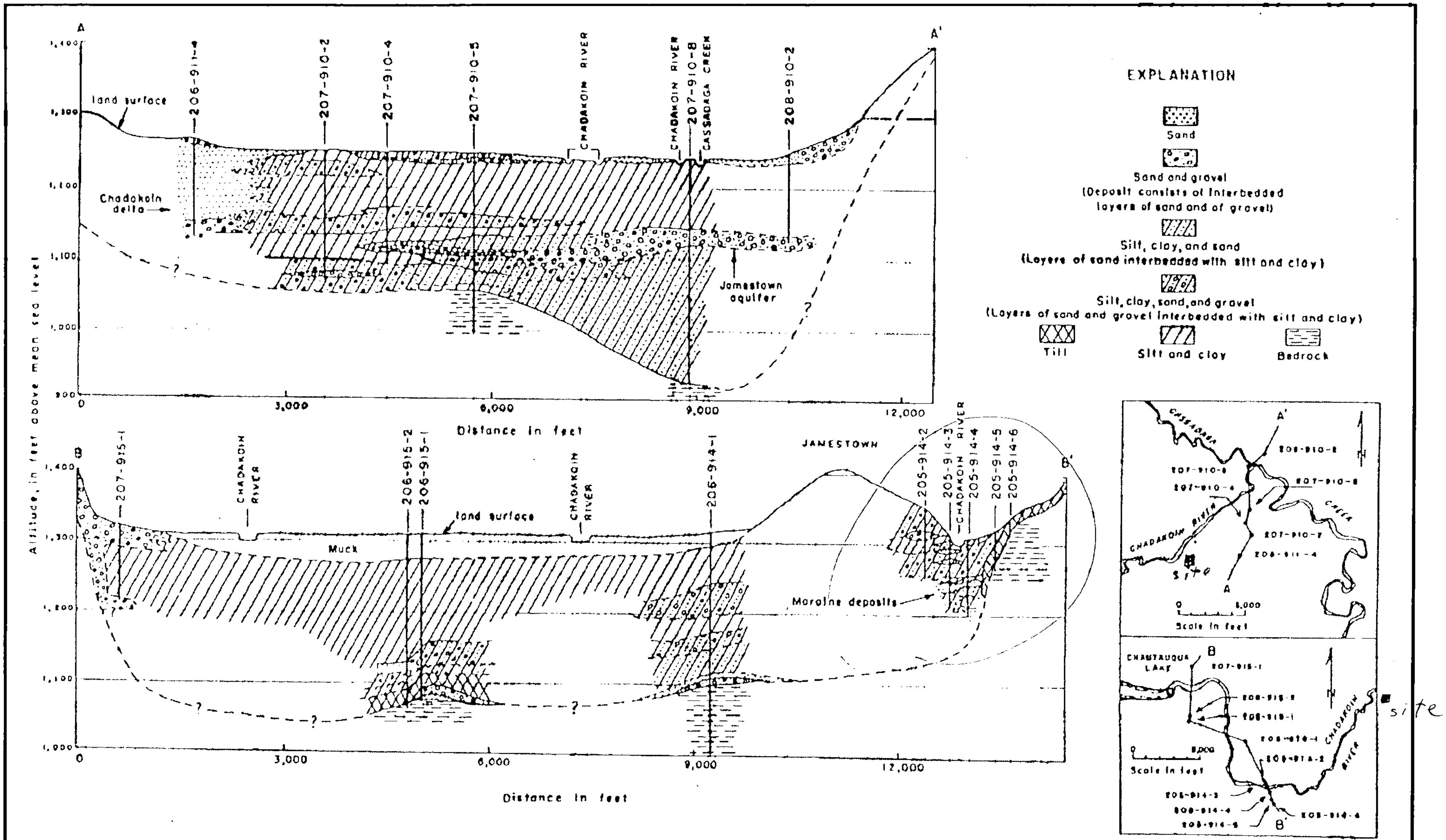
CRA



"GROUNDWATER RESOURCES OF THE JAMESTOWN AREA, NEW YORK" STATE OF NEW YORK CONSERVATION DEPARTMENT, WATER RESOURCES COMMISSION, BULLETIN 58, 1966.

figure 3.1

REGIONAL GROUNDWATER AQUIFER
DOWCRAFT CORPORATION
Falconer, New York



"GROUNDWATER RESOURCES OF THE JAMESTOWN AREA, NEW YORK" STATE OF NEW YORK CONSERVATION DEPARTMENT, WATER RESOURCES COMMISSION, BULLETIN 58, 1966.

figure 3.2

REGIONAL GEOLOGIC CROSS-SECTIONS
DOWCRAFT CORPORATION
Falconer, New York

CRA

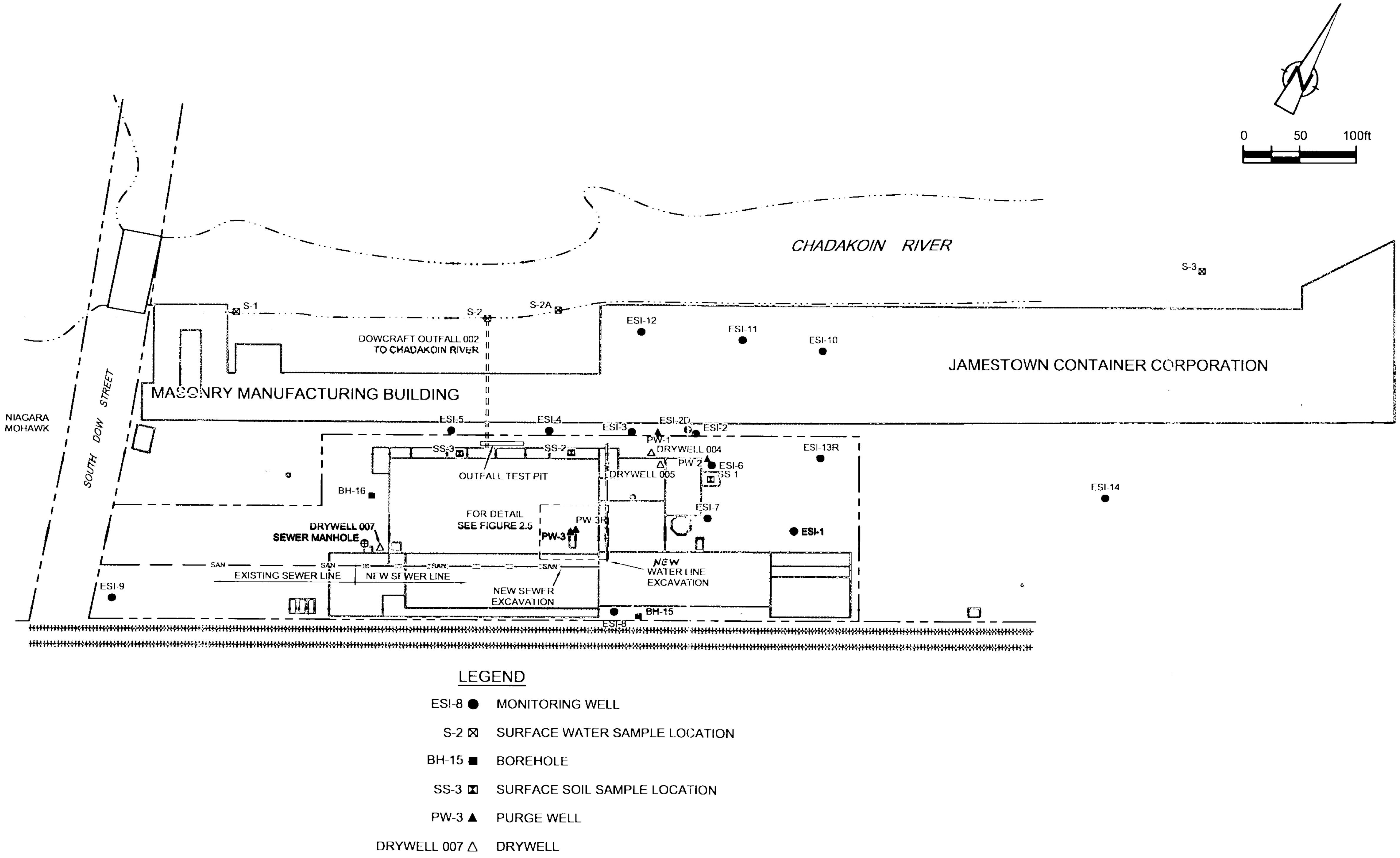


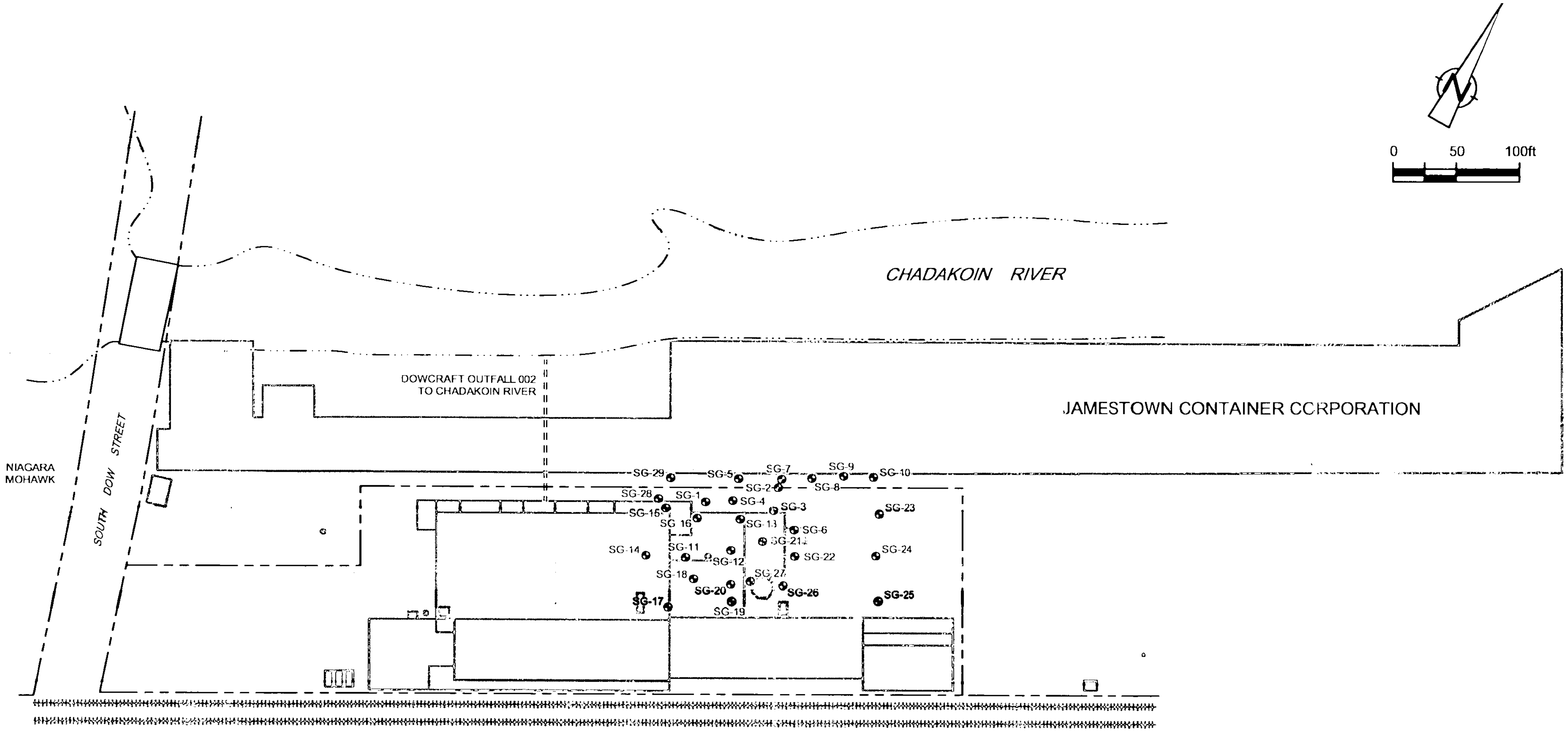
figure 5.1

SAMPLE LOCATIONS
DOWCRAFT CORPORATION
Falconer, New York

CRA

05020-00(010)GN-NF020 SEP 21/2000

SAMPLE LOCATIONS



LEGEND

SG-14 ⊕ SOIL GAS SAMPLE LOCATION

figure 5.2

SOIL GAS SAMPLE LOCATIONS
DOWCRAFT CORPORATION
Falconer, New York

CRA

05020-00(010)GN-NF021 SEP 21/2000

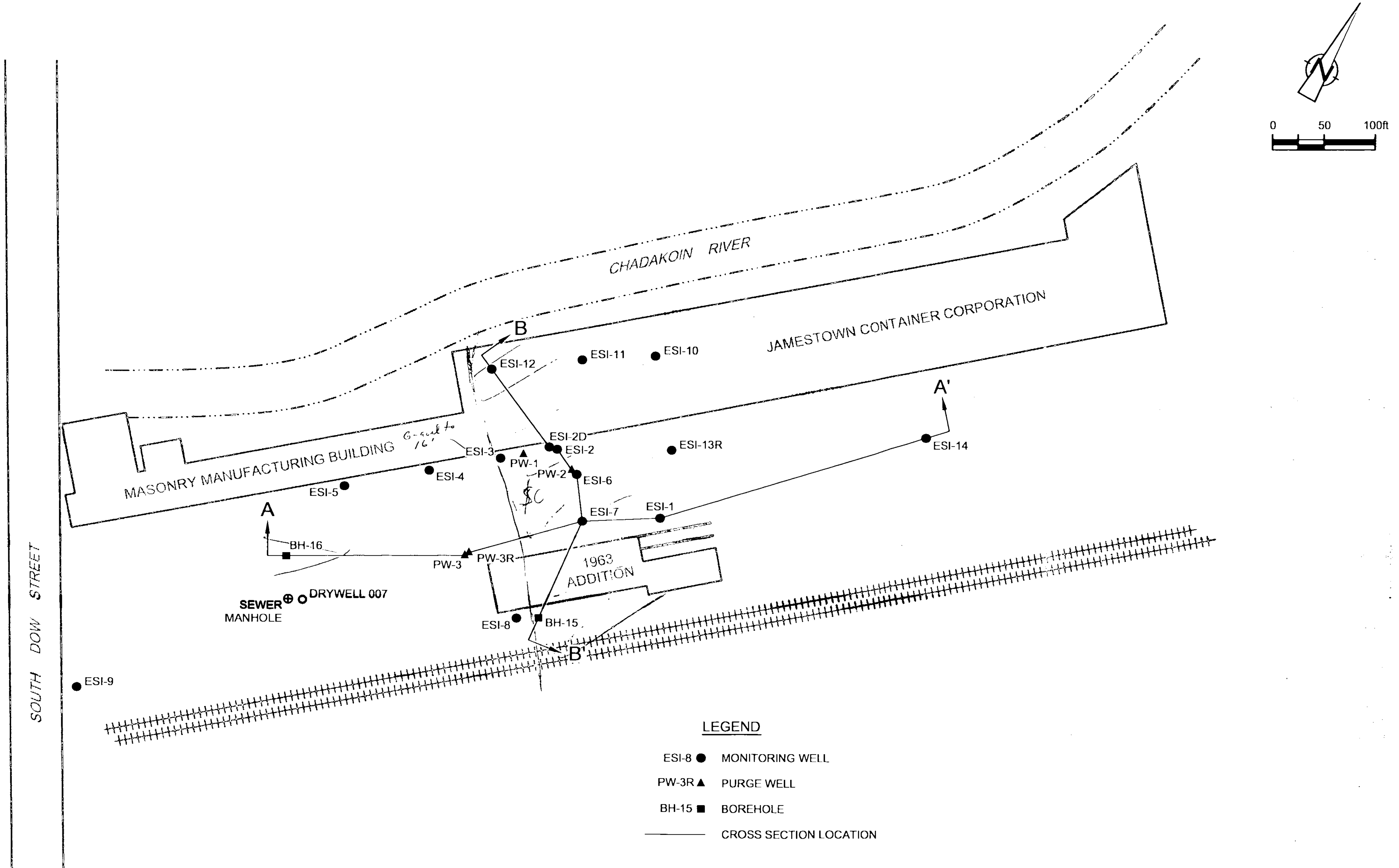


figure 6.1

GEOLOGIC CROSS SECTION KEY MAP
DOWCRAFT CORPORATION
Falconer, New York

CRA

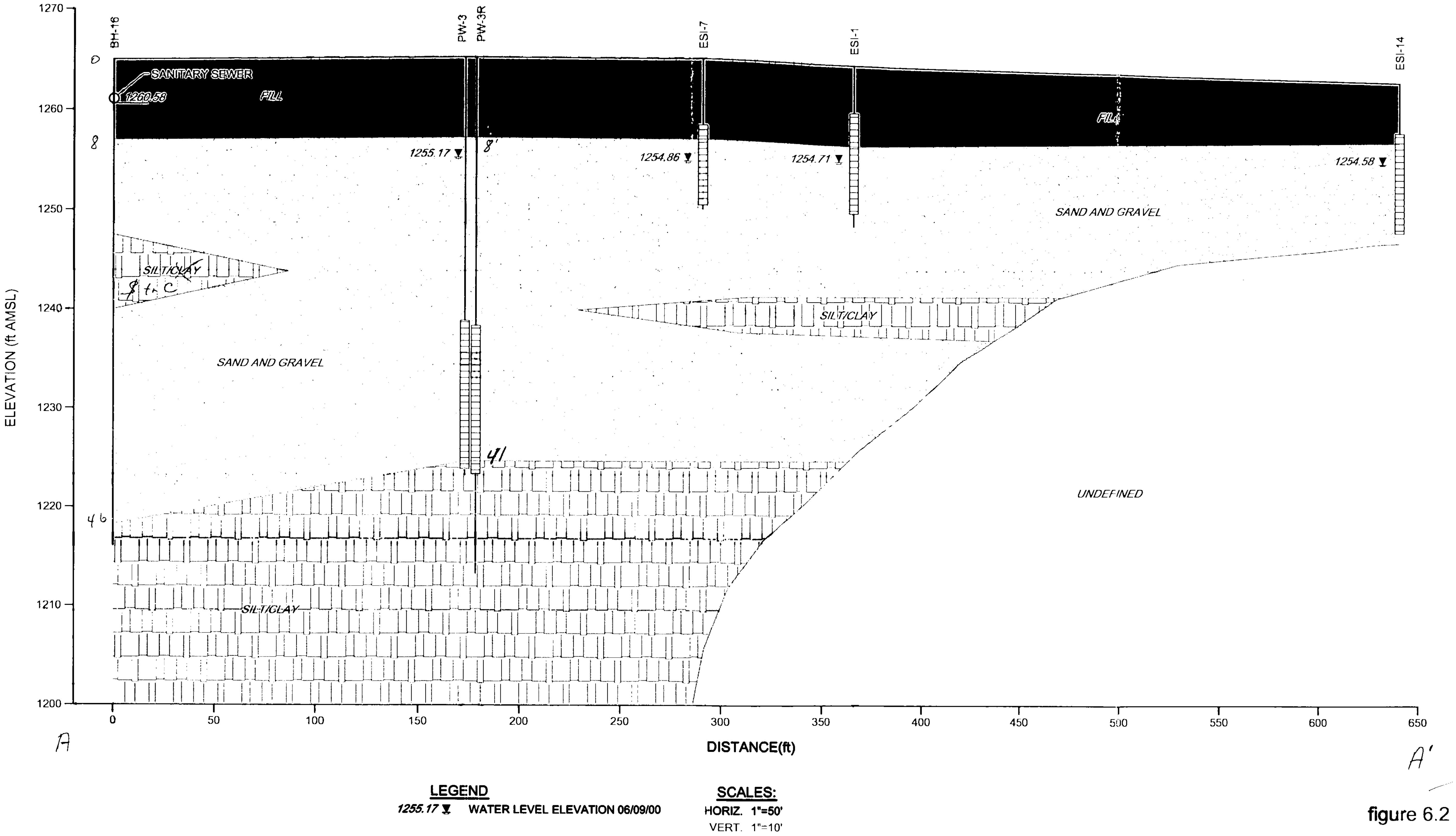
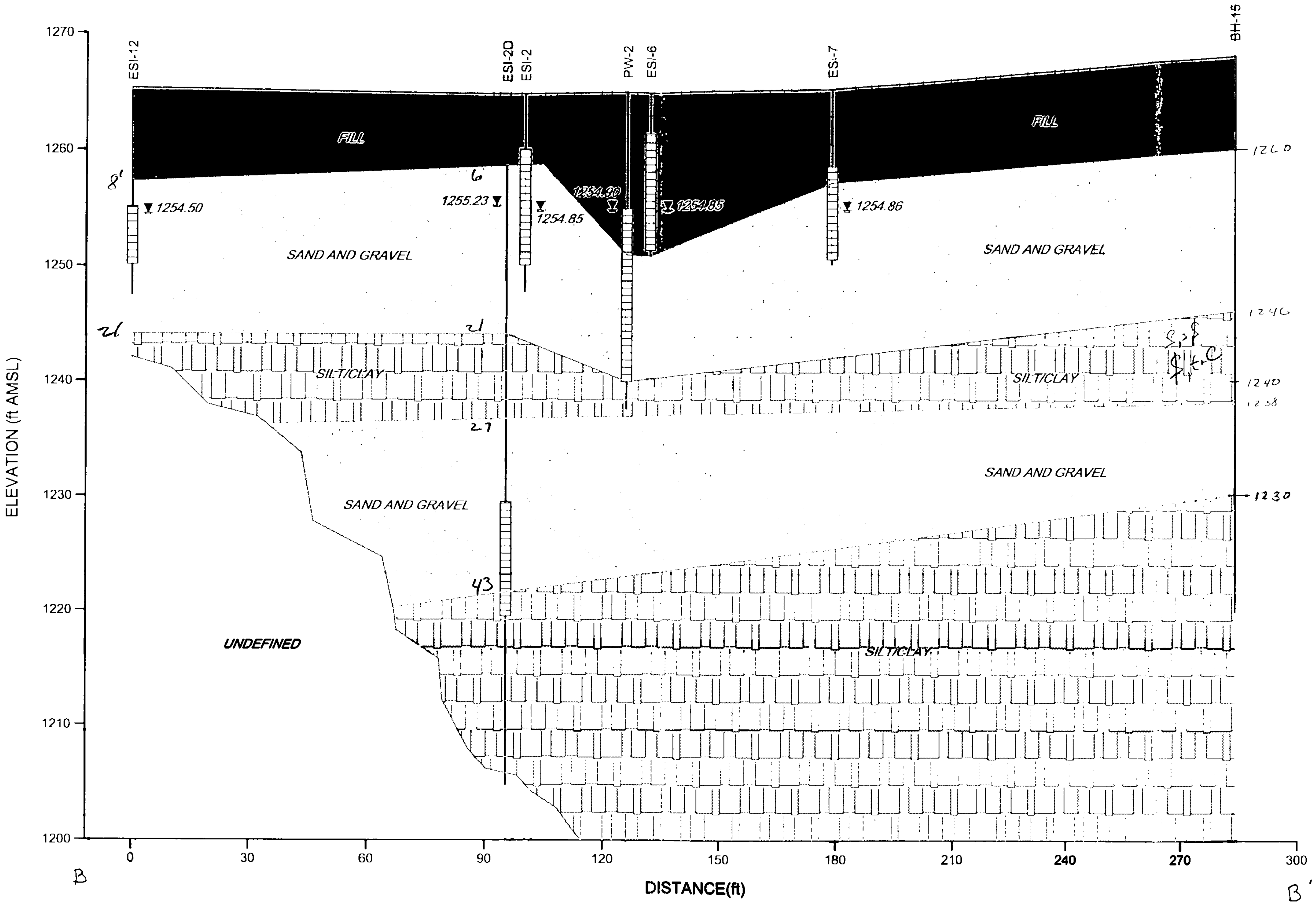


figure 6.2

GEOLOGIC CROSS SECTION A-A'
DOWCRAFT CORPORATION
Falconer, New York

CRA

05020-00(010)GN-NF010 SEP 21/2000



LEGEND

1255.17 ▼ WATER LEVEL ELEVATION 06/09/00

SCALES:

HORIZ. 1"=30'

VERT. 1"=10'

figure 6.3

GEOLOGIC CROSS SECTION B-B'
DOWCRAFT CORPORATION
Falconer, New York

CRA

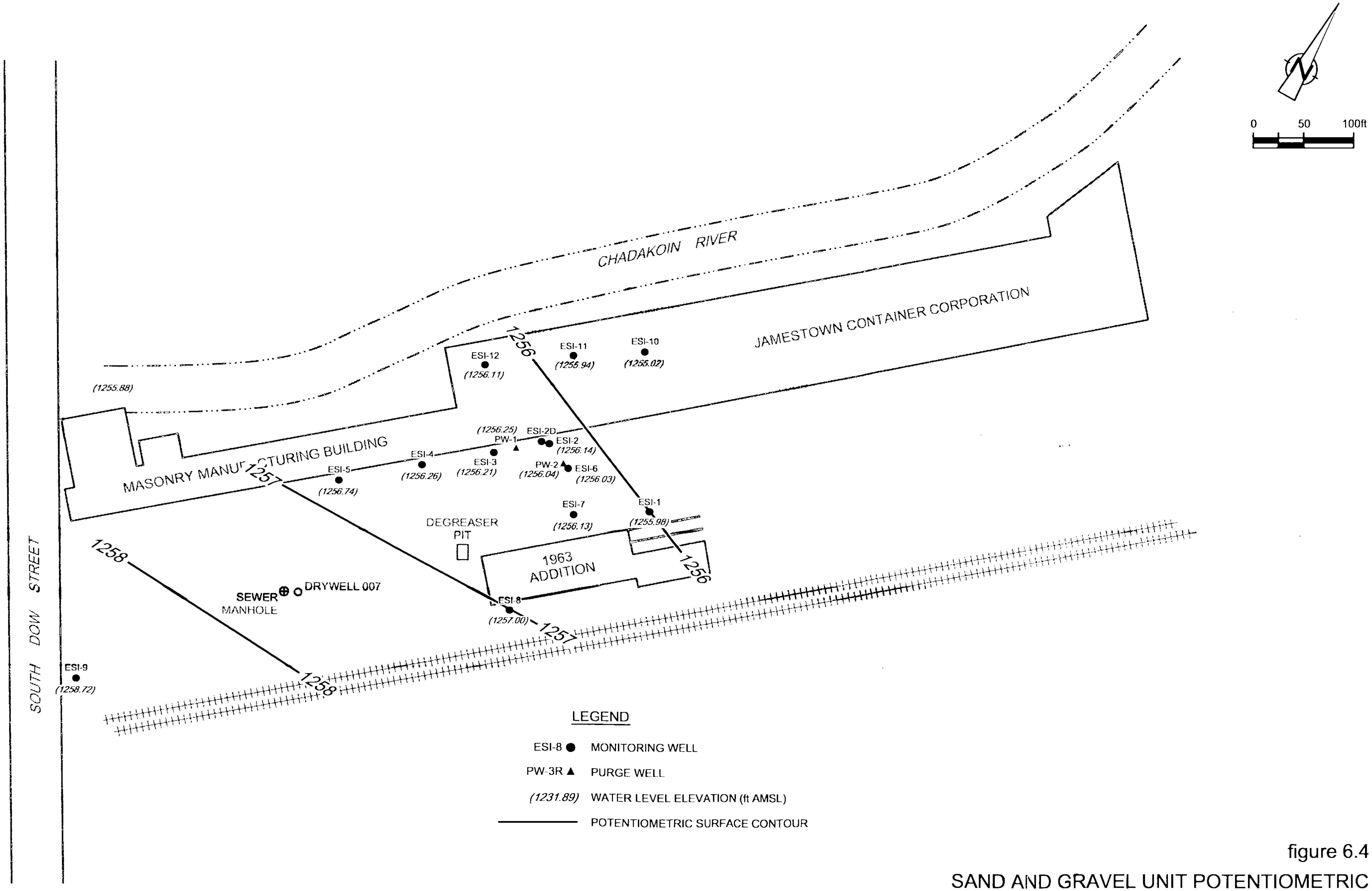


figure 6.4

SAND AND GRAVEL UNIT POTENTIOMETRIC
SURFACE CONTOURS - FEBRUARY 1993
DOWCRAFT CORPORATION
Falconer, New York

CRA

05020-00(010)GN-NF012 SEP 21/2000

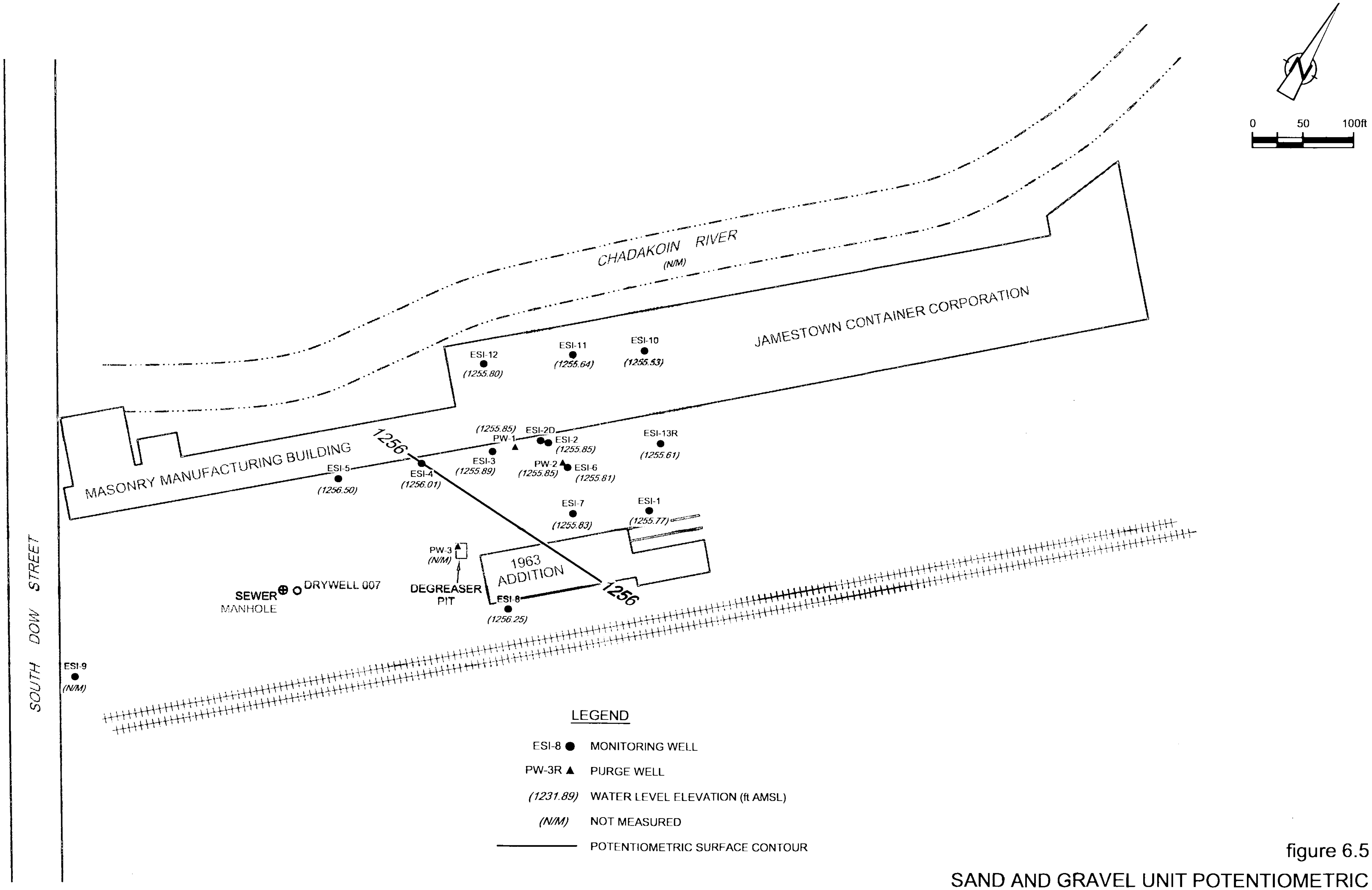


figure 6.5

SAND AND GRAVEL UNIT POTENTIOMETRIC
SURFACE CONTOURS - DECEMBER 1999
DOWCRAFT CORPORATION
Falconer, New York

CRA

05020-00(010)GN-NF013 SEP 21/2000

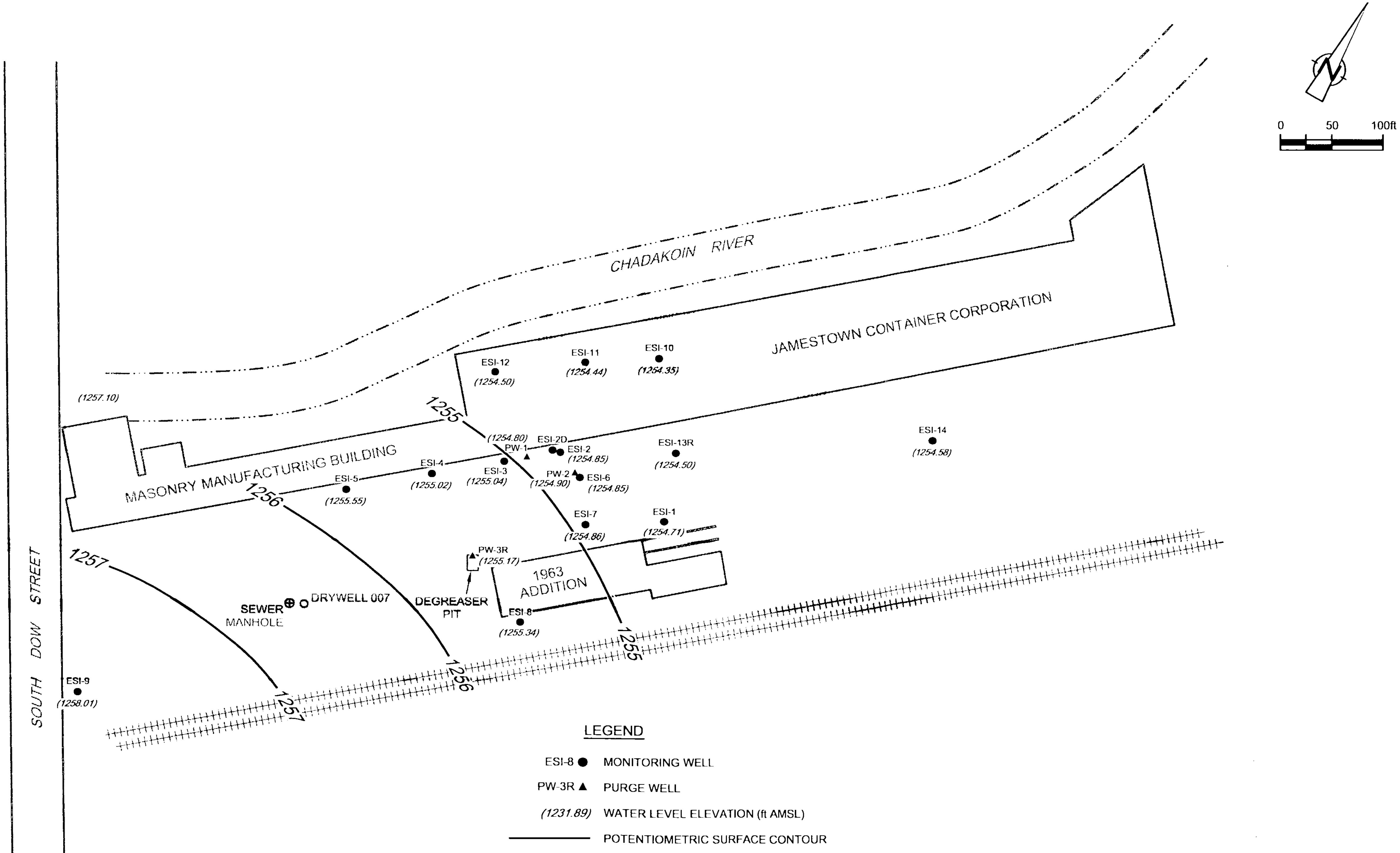


figure 6.6

SAND AND GRAVEL UNIT POTENTIOMETRIC
SURFACE CONTOURS - JUNE 2000
DOWCRAFT CORPORATION
Falconer, New York

CRA

05020-00(010)GN-NF014 SEP 21/2000

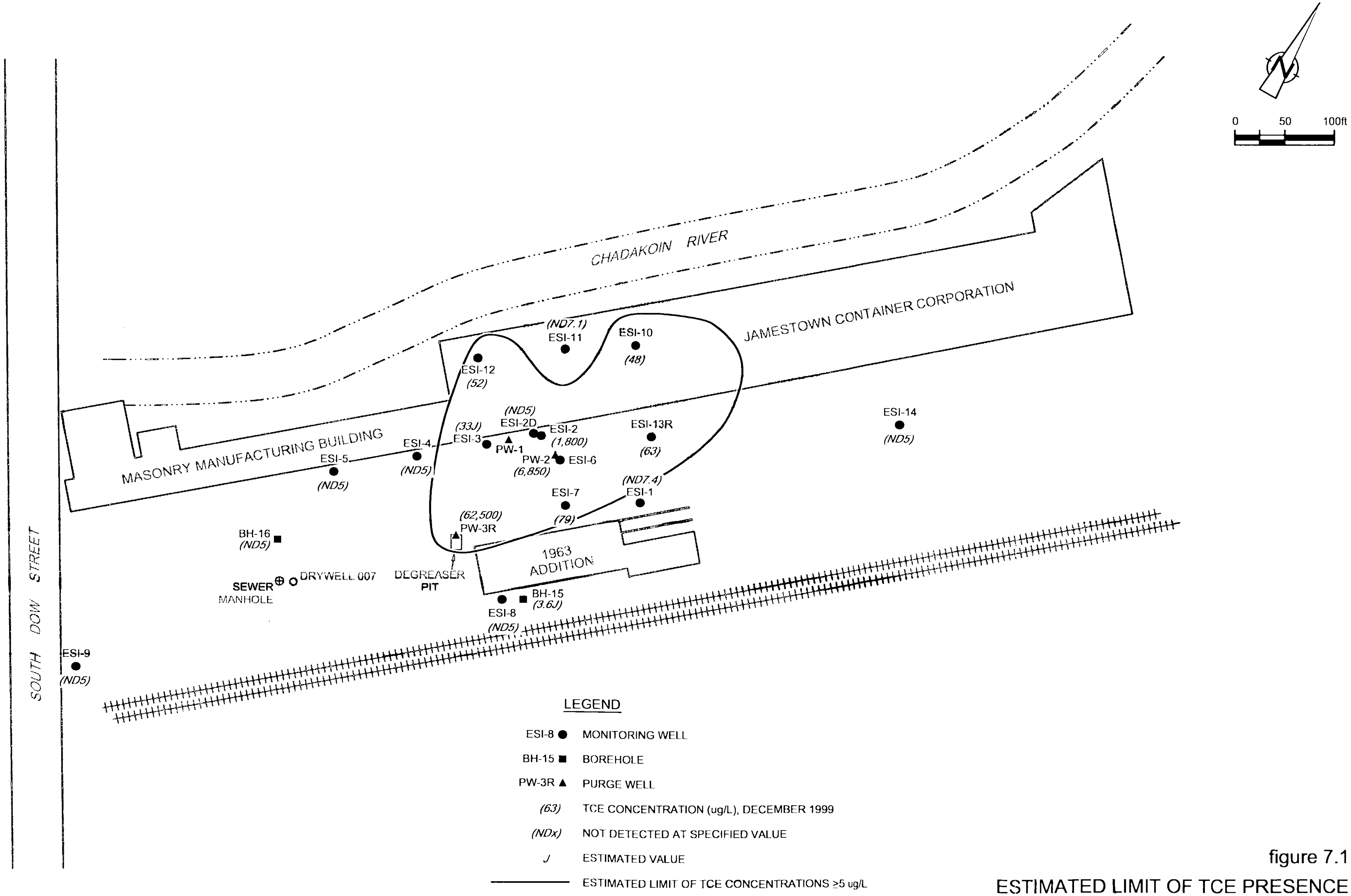


figure 7.1

ESTIMATED LIMIT OF TCE PRESENCE
DOWCRAFT CORPORATION
Falconer, New York

CRA

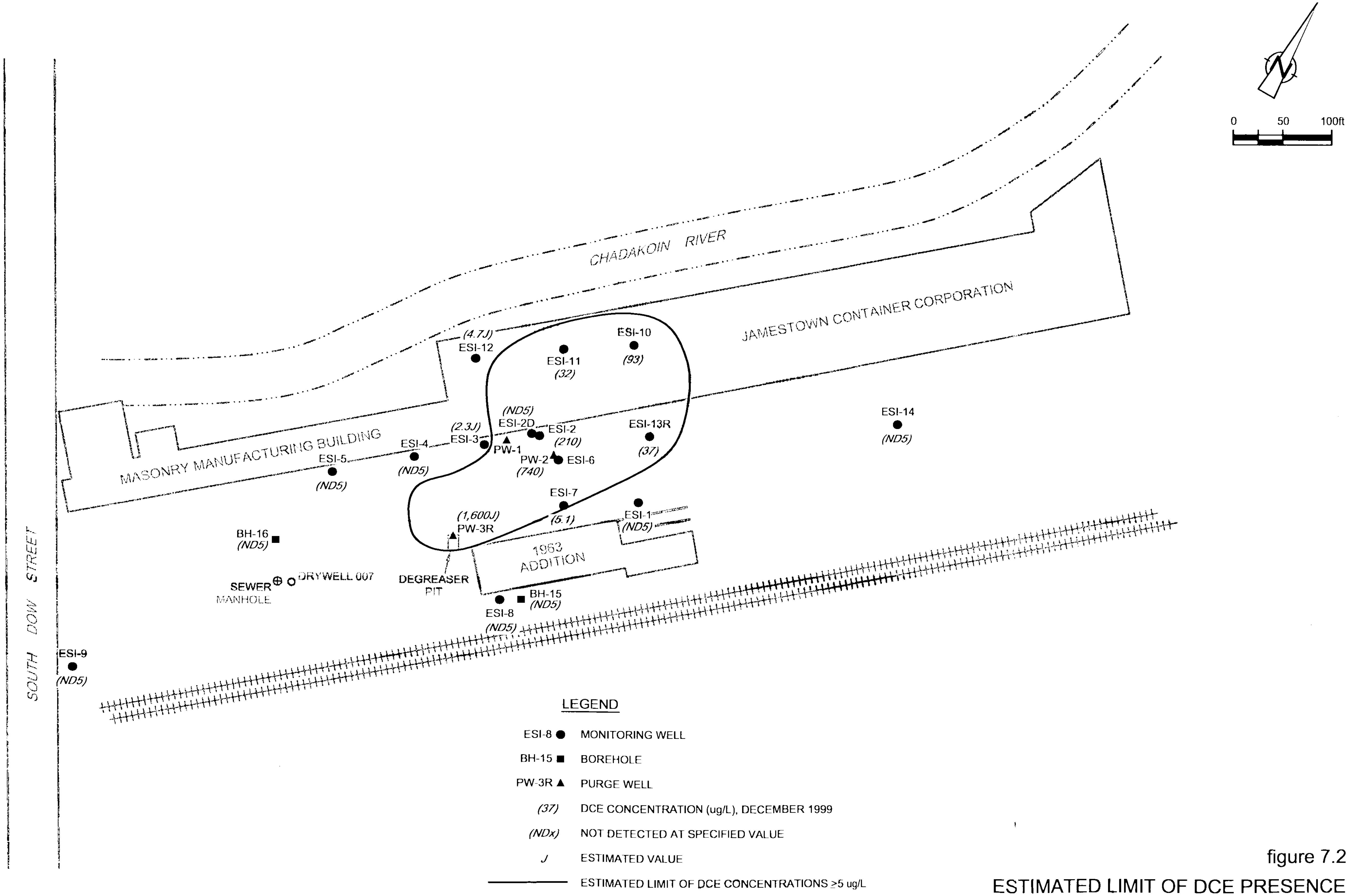


figure 7.2

ESTIMATED LIMIT OF DCE PRESENCE
DOWCRAFT CORPORATION
Falconer, New York

CRA

05020-00(010)GN-NF016 SEP 21/2000

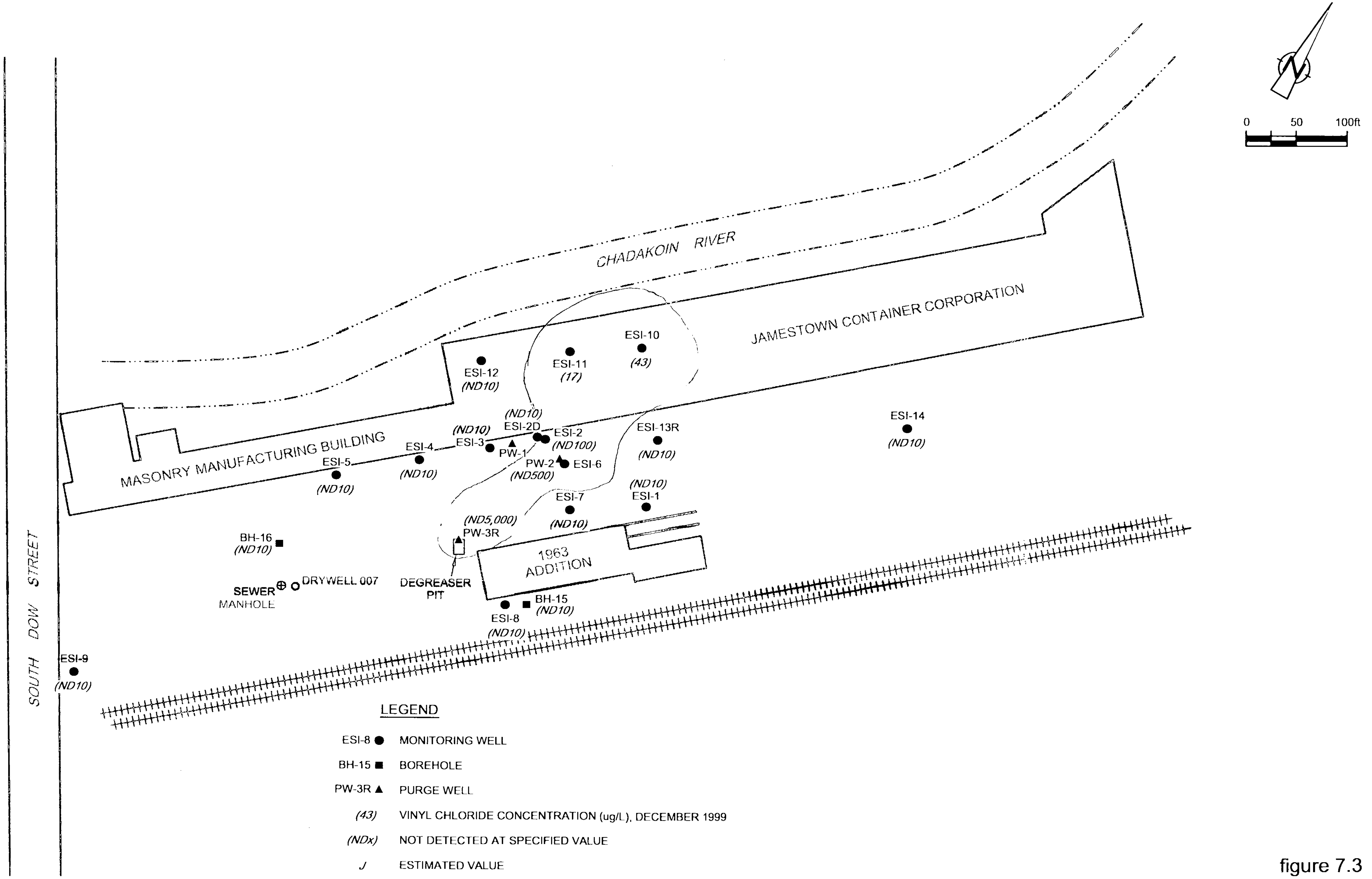


figure 7.3

VINYL CHLORIDE CONCENTRATIONS
DOWCRAFT CORPORATION
Falconer, New York

CRA

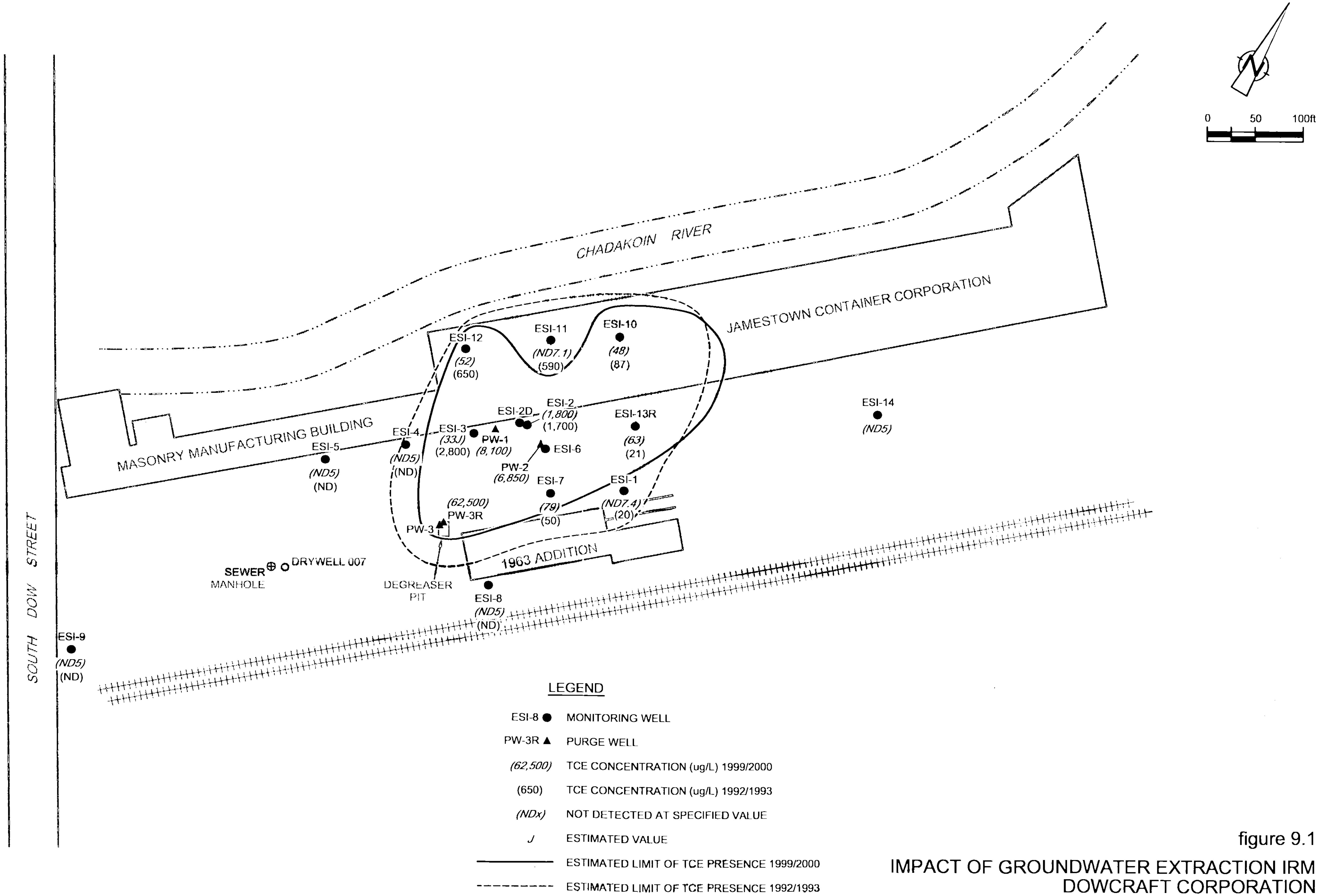


figure 9.1

IMPACT OF GROUNDWATER EXTRACTION IRM
DOWCRAFT CORPORATION
Falconer, New York

CRA

05020-00(010)GN-NF018 SEP 21/2000

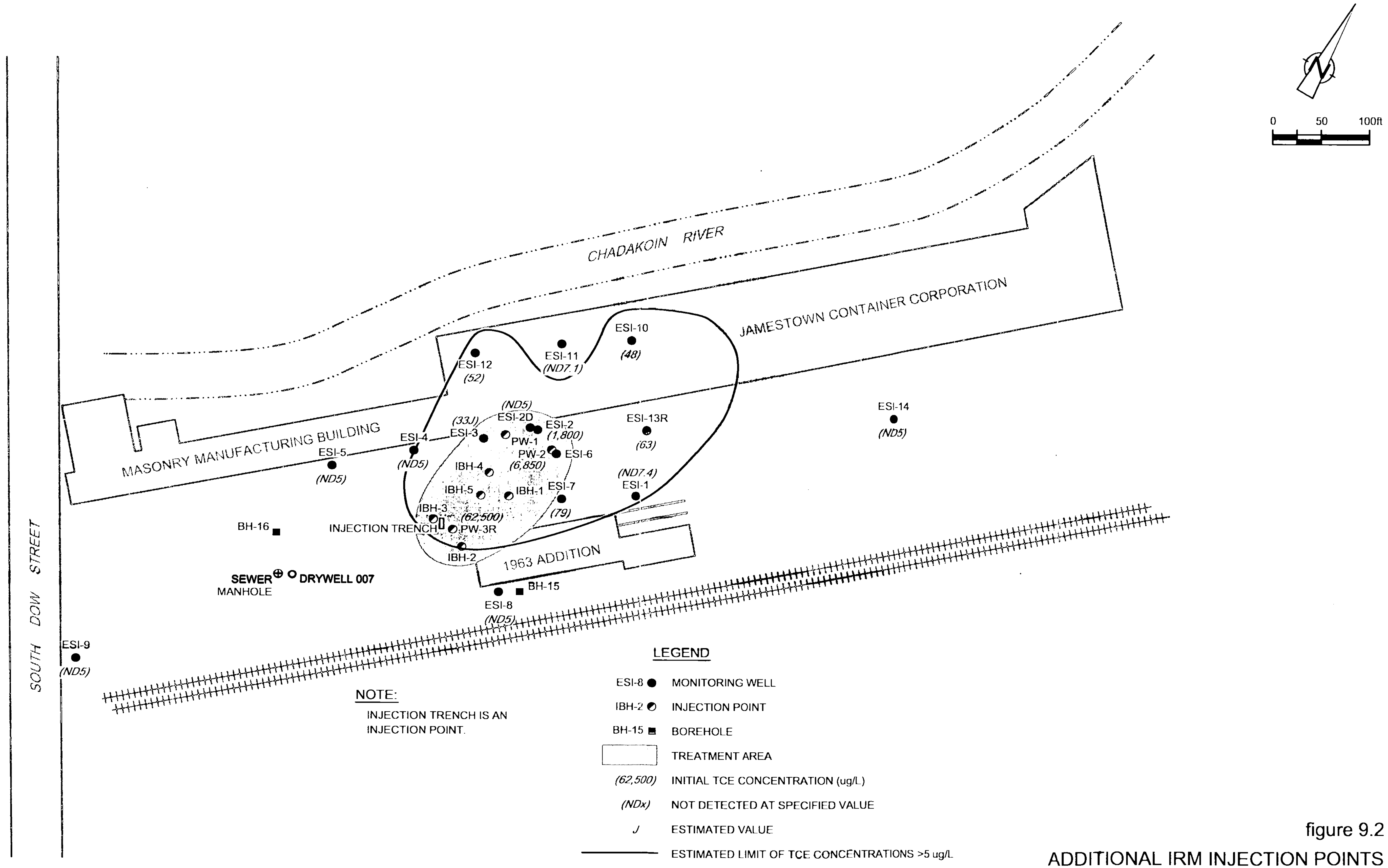


figure 9.2

ADDITIONAL IRM INJECTION POINTS
AND TREATMENT AREA
DOWCRAFT CORPORATION
Falconer, New York

CRA

TABLES

TABLE 2.1

1991 SUMMARY OF PLANT WATER DISCHARGE
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Outfall	*Daily Volume (Gallons)*	*Composition*
002 (River)	3,903	Stormwater runoff
	2,950	Vapor degreaser non-contact cooling water
	3,429	Spot welder non-contact cooling water
	640	Distillation Unit
004 (Drywell)	5,356	Compressor non-contact cooling water
	720	Spot welder non-contact cooling water
	85	Boiler water, scupper drain
005 (Drywell)	924	Rinse water from phosphatizer*
007 (Drywell)	2,160	Spot welder non-contact cooling water

* Later recycled back into the phosophatizer.

TABLE 3.1

DETAILS ON SELECTED PRIVATE WELLS
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Well Number	*Owner or Occupant*	*Year Completed*	*Depth (Ft.)*	*Waterbearing Materials*	*Elevation (Ft. AMSL)*	*Depth to Water (Ft.)*
206-911- 1	Flickenger Cold Storage Co.	-	45	Sand and Gravel	1265	-
206-911- 2	Falconer Plate Glass Co.	1947	84	Gravel	1265	-
206-911- 3	Falconer Plate Glass Co.	1957	84	Gravel	1265	-
206-911- 4	Falconer Furniture Co.	1945	145	Sand and Gravel	1256	14.3
206-911- 5	National Worsted Mills	1944	42	Gravel	1260	-
206-911- 6	National Worsted Mills	1950	42	Gravel	1255	12.2
206-911- 7	National Worsted Mills	1950	42	Gravel	1255	11.9
206-912- 1	Jamestown Mallable Iron Corp.	1950	45	Gravel	1260	9
206-912- 2	Jamestown Mallable Iron Corp.	1950	50	Gravel	1260	18.6
206-912- 3	Jamestown Mallable Iron Corp.	1950	34	Gravel	1260	17
206-912- 4	Jamestown Mallable Iron Corp.	1950	35	Gravel	1260	14.1
206-912- 5	Royal Metals Mfg. Co.	1951	48	Sand and Gravel	1280	15
206-912- 6	Jamestown Sterling Corp.	-	33	Sand and Gravel	1275	13
206-912- 7	Lake County Furniture Corp.	-	35	Sand and Gravel	1275	12
206-912- 8	W. Rowan Ready Mix Concrete Co.	1955	22	Sand and Gravel	1275	-
206-912- 9	W. Rowan Ready Mix Concrete Co.	-	26	Sand and Gravel	1275	10
206-912- 10	Niagara Mohawk Corp.	-	25	Sand and Gravel	1260	-
207-911- 2	Amercian Manufacturing Co.	-	10	Sand and Gravel	1255	-
207-912- 1	T. Pugh	1960	113	Sand and Gravel	1350	83

Notes:

Ownership as reported in 1966.

-	No information.
AMSL	Above Mean Sea Level.
Ft.	Feet.

Source: Groundwater Resources of the Jamestown Area, New York, State of New York Conservation Department Water Resources Commission, Bulletin 58, 1966.

TABLE 4.1

SUMMARY OF HISTORIC SPDES MONITORING
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

	Outfall			
Parameter	*002*	*004*	*005*	*007*
Temperature	X			
Flowrate	X	X	X	X
pH	X	X	X	X
Oil and Grease	X			
Fluoride		X	X	X
Iron		X	X	X

Note:
SPDES State Pollutant Discharge Elimination System.

TABLE 5.1

SAMPLING AND ANALYSIS SUMMARY
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Matrix	*Location*	*Collection Date*	*Analytical Parameters*
Groundwater	ESI-1	11/14/90	TCL VOCs, PP Metals
		04/16/92	TCL VOCs, TAL Metals
		12/03/99	TCL VOCs
	ESI-2	11/13/90	TCL VOCs, PP Metals
		03/09/92	TCL VOCs
		04/16/92	TCL VOCs, TAL Metals
		05/19/97	TCL SVOCs, PCBs, TAL Metals
		12/02/99	TCL VOCs, Iron, Nitrate, Chloride, Sulfate, Hydrogen, Methane
	ESI-2D	04/16/92	TCL VOCs, TAL Metals
		12/03/99	TCL VOCs
	ESI-3	11/13/90	TCL VOCs, PP Metals
		04/16/92	TCL VOCs, TAL Metals
		12/02/99	TCL VOCs
	ESI-4	11/13/90	TCL VOCs, PP Metals
		04/16/92	TCL VOCs, TAL Metals
		12/02/99	TCL VOCs
	ESI-5	11/13/90	TCL VOCs, PP Metals
		04/16/92	TCL VOCs, TAL Metals
		12/02/99	TCL VOCs
	ESI-A/ESI-6	01/02/91	TCL VOCs, TPH
		04/16/92	TCL VOCs, TAL Metals
		02/10/93	TCL VOCs
	ESI-B/ESI-7	01/02/91	TCL VOCs, TPH
		04/16/92	TCL VOCs, TAL Metals
		05/19/97	TCL SVOCs, PCBs, TAL Metals
		12/03/99	TCL VOCs
	ESI-8	04/16/92	TCL VOCs, TAL Metals
		12/03/99	TCL VOCs
	ESI-9	04/16/92	TCL VOCs, TAL Metals
		02/11/93	Total and Dissolved Aluminum, Manganese, Iron
		05/09/00	TCL VOCs
	ESI-10	04/16/92	TCL VOCs, TAL Metals
		12/03/99	TCL VOCs
	ESI-11	04/06/92	TCL VOCs, TAL Metals
		05/19/97	TCL SVOCs, PCBs, TAL Metals
		12/03/99	TCL VOCs
	ESI-12	04/16/92	TCL VOCs, TAL Metals
		12/03/99	TCL VOCs
	ESI-13/13R	04/16/92	TCL VOCs, TAL Metals
		05/19/97	TCL SVOCs, PCBs, TAL Metals
		12/03/99	TCL VOCs
	ESI-14	05/12/00	TCL VOCs
	PW-1	02/09/93	Total and Dissolved Aluminum, Manganese, Iron, TCL VOCs
	PW-2	02/10/93	Total and Dissolved Aluminum, Manganese, Iron, TCL VOCs
		12/02/99	TCL VOCs, Iron, Nitrate, Chloride, Sulfate, Hydrogen, Methane
	PW-3	11/05/93	TCL VOCs
	PW-3R	05/15/00	TCL VOCs
	BH-15	05/09/00	TCL VOCs
	BH-16	05/11/00	TCL VOCs

See Table 2.7.5

TABLE 5.1

SAMPLING AND ANALYSIS SUMMARY
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Matrix	*Location*	*Collection Date*	*Analytical Parameters*
Surface Soil	SS-1	11/14/90	TCL VOCs, TAL Metals, pH
	SS-2	11/14/90	TCL VOCs, TAL Metals, pH
	SS-3	11/14/90	TCL VOCs, TAL Metals, pH
Subsurface Soil	Footer Excavation	11/17/99	TCL VOCs
	TP-1	11/01/99	TCL VOCs
	TP-2	11/19/99	TCL VOCs
	TP-3	11/19/99	TCL VOCs
	TP-4	11/19/99	TCL VOCs
	TP-5	11/19/99	TCL VOCs
Drywell	004	02/20/91	TCL VOCs
	005	02/20/91	TCL VOCs
	007	01/03/00	TCL VOCs
Surface Water	Outfall 002 Discharge	05/05/92	TCL VOCs
	Location 1	05/12/00	TCL VOCs
	Location 2	06/09/00	TCL VOCs
	Location 2A	05/12/00	TCL VOCs
	Location 3	05/12/00	TCL VOCs
Stream Sediments	Location 1	05/12/00	TCL VOCs
	Location 2	06/09/00	TCL VOCs
	Location 3	05/12/00	TCL VOCs

Notes:

PCBs	Polychlorinated Biphenyls.
PP	Priority Pollutant.
SVOC	Semi-Volatile Organic Compounds.
TAL	Target Analyte List.
TCL	Target Compound List.
TPH	Total Petroleum Hydrocarbons.
VOCs	Volatile Organic Compounds.

TABLE 5.2

WELL INSTALLATION DETAILS
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Well Number	*Date Installed*	*Top of Casing Elevation (Ft. NGVD)*	*Ground Elevation (Ft. NGVD)*	*Borehole Depth (Ft. BGS)*	*Screened Interval*		*Sandpack Interval*	
					(Ft. BGS)	*(Ft. NGVD)*	*(Ft. BGS)*	*(Ft. NGVD)*
ESI-1	Nov-90	1264.17	1264.4	16.0	4.7 to 14.7	1259.7 to 1249.7	3.5 to 14.7	1260.9 to 1249.7
ESI-2	Nov-90	1264.60	1264.8	17.0	4.7 to 14.7	1260.1 to 1250.1	3.5 to 14.7	1261.3 to 1250.1
ESI-2D	Apr-92	1264.53	1264.8	60.0	35.3 to 45.3	1229.5 to 1219.5		1264.8 to 1264.8
ESI-3	Nov-90	1264.89	1265.1	15.9	4.5 to 14.5	1260.6 to 1250.6	3.4 to 14.5	1261.7 to 1250.6
ESI-4	Nov-90	1265.06	1265.3	16.8	5.0 to 15.0	1260.3 to 1250.3	4.0 to 15.0	1261.3 to 1250.3
ESI-5	Nov-90	1264.80	1265.3	16.0	5.2 to 15.2	1260.1 to 1250.1	3.9 to 15.2	1261.4 to 1250.1
ESI-6	Dec-90	1264.66	1264.9	14.0	3.5 to 13.5	1261.4 to 1251.4	3.0 to 13.5	1261.9 to 1251.4
ESI-7	Dec-90	1264.93	1265.1	15.0	6.5 to 14.5	1258.6 to 1250.6	6.0 to 14.5	1259.1 to 1250.6
ESI-8	Apr-92	1268.25	1268.7	20.0	8.0 to 18.0	1260.7 to 1250.7	7.0 to 18.0	1261.7 to 1250.7
ESI-9	Apr-92	1265.99	1266.4	15.0	4.0 to 14.0	1262.4 to 1252.4	3.6 to 14.0	1262.8 to 1252.4
ESI-10	Apr-92	1265.08	1265.5	17.0	9.8 to 14.8	1255.7 to 1250.7	9.5 to 14.8	1256.0 to 1250.7
ESI-11	Apr-92	1265.09	1265.4	17.5	10.1 to 15.1	1255.3 to 1250.3	9.8 to 15.1	1255.6 to 1250.3
ESI-12	Apr-92	1264.95	1265.3	17.8	10.2 to 15.2	1255.1 to 1250.1	9.5 to 15.2	1255.8 to 1250.1
ESI-13	Apr-92	NM	NM	18.0	5.0 to 15.0	NM	3.9 to 15.0	NM
ESI-13R	Apr-98	1263.31	1263.9	18.0	5.1 to 15.1	1258.8 to 1248.8	4.0 to 16.0	1259.9 to 1247.9
ESI-14	May-00	1262.58	1262.8	15.0	5.0 to 15.0	1257.8 to 1247.8	3.5 to 15.0	1259.3 to 1247.8
PW-1	Nov-92	1264.60	1265.1	28.0	7.0 to 22.0	1258.1 to 1243.1	5.0 to 22.0	1260.1 to 1243.1
PW-2	Nov-92	1264.70	1265.0	28.0	10.0 to 25.0	1255.0 to 1240.0	6.0 to 25.0	1259.0 to 1240.0
PW-3	Oct-93	NM	1265.6	42.0	26.7 to 41.7	1238.9 to 1223.9	10.0 to 42.0	1255.6 to 1223.6
PW-3R	May-00	1265.04	1265.3	52.0	26.9 to 41.9	1238.4 to 1223.4	11.9 to 42.0	1253.4 to 1223.3

20

Notes:

Elevations surveyed May 2000.

Original ground elevations are assumed to be equal to surveyed rim elevations.

Ft. BGS	Feet Below Ground Surface.
Ft. NGVD	Feet above National Geodetic Vertical Datum.
NM	Not Measured.

TABLE 6.1

STRATIGRAPHIC SUMMARY
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Borehole/ Well No.	*Ground Elevation (Ft. NGVD)*	*Fill*		*Sand and Gravel*		*Silt/Clay*	
		Depth (Ft. BGS)	*Elevation (Ft. NGVD)*	*Depth (Ft. BGS)*	*Elevation (Ft. NGVD)*	*Depth (Ft. BGS)*	*Elevation (Ft. NGVD)*
ESI-1	1264.4	0 to 8	1264.4 to 1256.4	8 to >16	1256.4 to <1248.4	Not encountered or logged	
ESI-2/-2D	1264.8	0 to 6	1264.8 to 1258.8	6 to 20.5	1258.8 to 1244.3	20.5 to 27.5	1244.3 to 1237.3
				27.5 to 43.5	1237.3 to 1221.3	43.5 to >60.0	1221.3 to <1204.8
ESI-3	1265.1	0 to 4	1265.1 to 1261.1	4 to >15.9	1261.1 to <1249.2	Not encountered or logged	
ESI-4	1265.3	0 to 6	1265.3 to 1259.3	6 to >16.8	1259.3 to <1248.5	Not encountered or logged	
ESI-5	1265.3	0 to 6	1265.3 to 1259.3	6 to >16.0	1259.3 to <1249.3	Not encountered or logged	
ESI-6	1264.9	0 to >14	1264.9 to <1250.9	Not encountered or logged		Not encountered or logged	
ESI-7	1265.2	0 to 8	1265.2 to 1257.2	8 to >15.0	1257.2 to <1250.2	Not encountered or logged	
ESI-8	1268.2	0 to 7	1268.2 to 1261.2	7 to >20.0	1261.2 to <1248.2	Not encountered or logged	
ESI-9	1266.4	0 to 2	1266.4 to 1264.4	2 to >15.0	1264.4 to <1251.4	Not encountered or logged	
ESI-10	1265.5	Not encountered or logged		<10 to >17.0	>1255.5 to <1248.5	Not encountered or logged	
ESI-11	1265.4	Not encountered or logged		<10 to >17.5	>1255.4 to <1247.9	Not encountered or logged	
ESI-12	1265.3	0 to 8	1265.3 to 1257.3	8 to >17.8	1257.3 to <1247.5	Not encountered or logged	
ESI-13R	1263.9	0 to 8	1263.9 to 1255.9	8 to >18.0	1255.9 to <1245.9	Not encountered or logged	
ESI-14	1262.8	0 to 6	1262.8 to 1256.8	6 to >15.0	1256.8 to <1247.8	Not encountered or logged	
BH-15	1268.2	0 to 8	1268.2 to 1260.2	8 to 22.0	1260.2 to 1246.2	22.0 to 30.0	1246.2 to 1238.2
				30.0 to 38.0	1238.2 to 1230.2	38.0 to >48.0	1230.2 to <1220.2
BH-16	1265.0	0 to 8	1265.0 to 1257.0	8 to 17.5	1257.0 to 1247.5	17.5 to 25.0	1247.5 to 1240.0
				25 to 47.0	1240.0 to 1218.0	47.0 to >50	1218.0 to <1215.0
PW-1	1265.2	Not encountered or logged		<4 to 22.0	>1261.2 to 1243.2	22.0 to >28.0	1243.2 to <1237.2
PW-2	1265.0	0 to 14	1265.0 to 1251.0	14 to 25.0	1251.0 to 1240.0	25.0 to >28.0	1240.0 to <1237
PW-3	1265.6	Not encountered or logged		<20 to 40.7	>1245.6 to 1224.9	40.7 to >42.0	1224.9 to <1223.6
PW-3R	1265.3	0 to 8	1265.3 to 1257.3	8 to 44.0	1257.3 to 1221.3	44.0 to >52.0	1221.3 to <1213.3
IBH-1	1265.3	Not encountered or logged		<25 to >27	>1239.5 to <1237.5	Not encountered or logged	
IBH-2	1265.4	Not encountered or logged		<27 to 28.0	>1238.4 to 1237.4	28.0 to >29	1237.4 to <1236.4
IBH-3	1265.5	Not encountered or logged		<28 to >30	>1237.5 to <1235.5	Not encountered or logged	
IBH-4	1265.4	Not encountered or logged		<25 to 27.5	>1240.4 to 1237.9	27.5 to >29	1237.9 to <1236.4
IBH-5	1265.4	Not encountered or logged		<25 to 29.7	>1240.4 to 1235.7	29.7 to >30	1235.7 to <1235.4

Notes:

Ft. BGS	Feet Below Ground Surface.
Ft. NGVD	Feet above National Geodetic Vertical Datum.

TABLE 6.2

SUMMARY OF GRAIN SIZE DATA
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Boring	*Sample Depth (Ft. BGS)*	*Percent Gravel*	*Percent Sand*	*Percent Silt/Clay*	*Estimated Hydraulic Conductivity (cm/sec)*
PW-1	8 to 22	20.2	62.0	17.8	1.6×10^{-4}
	22 to 28	0.0	6.7	93.3	$10^{-7} \times 10^{-8}$
PW-2	10 to 25	18.2	70.6	11.2	2.2×10^{-4}
	25 to 28	0.0	6.7	93.3	$10^{-7} \times 10^{-8}$
BH-15	16 to 20	50.9	35.5	13.6	1.3×10^{-4}
	42 to 46	0.0	1.7	98.3	2.1×10^{-5}
BH-16	10 to 16	9.2	74.7	16.1	1.6×10^{-4}
	46 to 50	1.9	11.0	87.1	7.0×10^{-7}

Note:

Ft. BGS	Feet Below Ground Surface.
cm/sec	Centimeters per second.

TABLE 6.3

SUMMARY OF WATER LEVEL ELEVATIONS
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Well Number	*Top of Casing Elevation (ft. NGVD)*	*11/12/90*	*02/09/93*	*02/10/93*	*07/19/96*	*12/01/99*	*05/16/00*	*06/09/00*
ESI-1	1264.17	1256.48	1256.06	1255.98	1256.91	1255.77	1254.57	1254.71
ESI-2	1264.60	1256.60	1256.22	1256.14	1256.90	1255.85	1254.65	1254.85
ESI-2D	1264.53	-	1256.61	1256.56	1257.38	1255.63	NM	1255.23
ESI-3	1264.89	1256.81	1256.27	1256.21	NM	1255.89	1254.87	1255.04
ESI-4	1265.06	1256.83	1256.33	1256.26	1257.08	1256.01	1254.85	1255.02
ESI-5	1264.80	1257.08	1256.84	1256.74	1257.28	1256.50	1255.38	1255.55
ESI-6	1264.66	-	1256.11	1256.03	NM	1255.81	1254.71	1254.85
ESI-7	1264.93	-	1256.17	1256.13	NM	1255.83	1254.73	1254.86
ESI-8	1268.25	-	1257.04	1257.00	1257.76	1256.25	1255.14	1255.34
ESI-9	1265.99	-	1258.74	1258.72	1259.45	NM	1257.89	1258.01
ESI-10	1265.08	-	1255.92	1255.02	1256.62	1255.53	1254.28	1254.35
ESI-11	1265.09	-	1255.96	1255.94	1256.70	1255.64	1254.36	1254.44
ESI-12	1264.95	-	1256.21	1256.11	1256.84	1255.80	1254.47	1254.50
ESI-13		-	NM	(89.95)	NM	-	-	-
ESI-13R	1263.31	-	-	-	-	1255.61	1254.38	1254.50
ESI-14	1262.58	-	-	-	-	-	1254.37	1254.58
PW-1	1264.60	-	1256.31	1256.25	1256.88	1255.85	1254.65	1254.80
PW-2	1264.70	-	1256.13	1256.04	1256.88	1255.85	1254.66	1254.90
PW-3R	1265.04	-	-	-	-	-	1255.00	1255.17
River	1266.50	NM	1255.94	1255.88	NM	NM	1257.23+	1257.10+

Notes:

Top of casing elevations surveyed May 2000.

- Replaced or not installed.

+ Measured at the northwest corner of the JCC building, previous measurement point(s) unknown.

Ft. NGVD Feet above National Geodetic Vertical Datum.

NM Not Measured.

TABLE 6.4

SUMMARY OF AQUIFER PUMPING TEST ANALYTICAL RESULTS
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Parameter	*Units*	*Sample Designation and Time Elapsed from Beginning of Pumping*				
		PW-1 (5 Minutes)	*PW-1 (129 Minutes)*	*PW-2 (5 Minutes)*	*PW-2 (1,184 Minutes)*	*PW-2 (1,658 Minutes)*
Aluminum, total	µg/L	61,500	10,100	7,520	847	1,170
Aluminum, dissolved	µg/L	35	53	46	33	<30
Iron, total	µg/L	133,000	22,400	16,100	1,610	2,760
Iron, dissolved	µg/L	67	98	80	47	79
Manganese, total	µg/L	5,100	1,690	2,850	940	900
Manganese, dissolved	µg/L	1,480	1,140	2,240	831	893
Trichloroethene	µg/L	5,900	8,100	22,000	20,000	19,000
1,2-Dichloroethene	µg/L	180	160	410	190	190
Tetrachloroethene	µg/L	ND	ND	76	58	54
1,1,1-Trichloroethane	µg/L	ND	ND	18	16	15
Vinyl chloride	µg/L	ND	ND	11	ND	ND
Total VOCs	µg/L	6,080	8,260	22,515	20,264	19,259

Notes:

µg/L	Micrograms per Liter.
ND	Not detected.
VOCs	Volatile Organic Compounds.

TABLE 7.1

SUMMARY OF ORGANIC VAPOR READINGS
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Test Boring Number	*Depth (Feet)*	*Measurement (ppm)*	*Notes*
ESI-2D	14 to 16	1 to 4	
	16 to 18	5 to 10	
	18 to 20	5 to 10	
	20 to 22	5 to 10	
	22 to 24	3 to 5	
	24 to 26	BG	
	26 to 28	BG	
	>28	BG	
ESI-A/ESI-6	0 to 2	BG	
	2 to 4	0.6	
	4 to 6	BG	
	6 to 8	0.8	
	8 to 10	0.8	
	10 to 12	6.6	
	12 to 14	7.1	
ESI-B/ESI-7	0 to 2	BG	Screened in Laboratory
	2 to 4	BG	Screened in Laboratory
	4 to 6	0.7	Screened in Laboratory
	6 to 8	BG	Screened in Laboratory
	8 to 10	0.6	Screened in Laboratory
	10 to 12	BG	Screened in Laboratory
	12 to 14	BG	Screened in Laboratory
	14 to 15	BG	Screened in Laboratory
ESI-10	10 to 12	5.5	
	12 to 14	4.5	
	14 to 16	1.0	
PW-1	4 to 6	1 to 2	
	6 to 8	BG	
	8 to 10	BG	
	10 to 12	BG	
	12 to 14	BG-2	
	14 to 16	5 to 7	
	16 to 18	1 to 2	
	18 to 20	3 to 5	
	20 to 22	3 to 5	
	22 to 24	BG to 1	
	24 to 26	BG to 1	
	26 to 28	BG to 1	

TABLE 7.1

SUMMARY OF ORGANIC VAPOR READINGS
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Test Boring Number	*Depth (Feet)*	*Measurement (ppm)*	*Notes*
PW-2	10 to 12	BG	
	12 to 14	BG	
	14 to 16	2	
	16 to 18	BG	
	18 to 20	20 to 30	
	20 to 22	8 to 10	
	22 to 24	10 to 15	
	24 to 26	50 to 70	
	26 to 28	1 to 2	
Footing N. Wall	0.5 to 3.0	0.3 to 0.6	
Footing W. Wall	0.5 to 3.5	0.1 to 0.8	
TP-1	0 to 4	0.4 to 1.4	
	4 to 9	0.4 to 1.2	
	9 to 10	0.7 to 1.0	
TP-2	0 to 3.5	0.5 to 1.0	
	3.5 to 9	0.5	
	9 to 9.5	1.3 to 20	Wet
TP-3	9.5 to 10	1.2 to 13.4	Wet
TP-4	4 to 8	0.8 to 24	
	8 to 11	35 to 200	Wet
TP-5	8 to 11.5	0.8 to 1.5	
Below Concrete Floor Slabs	-	BG to 2	
New Sewer Excavation	-	BG	

Notes:
All measurements from ESI-8, ESI-9, ESI-11, and ESI-12 were ≤BG.

-	No value.
BG	Equal to background.
ppm	Parts Per Million.

TABLE 7.2

CONCENTRATIONS OF COMPOUNDS DETECTED IN SURFACE SOILS
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Parameter	*Units*	*Recommended Soil Cleanup Objective* [1]	*Eastern USA Background* [1]	*Sample Location*		
				SS-1	*SS-2*	*SS-3*
Antimony	mg/kg	SB	-	12.7	ND$_{12.7}$	ND$_{11.4}$
Arsenic	mg/kg	7.5 or SB	3 to 12	11.4	7.09	10.5
Beryllium	mg/kg	0.16 or SB	0 to 1.75	ND$_{1.27}$	ND$_{1.27}$	1.23
Chromium	mg/kg	10 or SB	1.5 to 40	59.5	81.4	115
Copper	mg/kg	25 or SB	1 to 50	141	236	122
Lead	mg/kg	SB	200 to 500 [2]	177	251	469
Nickel	mg/kg	13 or SB	0.5 to 25	30.0	24.9	40.4
Silver	mg/kg	SB	-	3.54	4.73	7.45
Zinc	mg/kg	20 or SB	9 to 50	1300	630	548

Notes:

(1)	Determination of Soil Cleanup Objectives and Cleanup Levels, NYSDEC TAGM 4046, January 24, 1994.
(2)	For developed areas or near highways.
-	No value.
mg/kg	Milligrams per Kilogram.
ND$_x$	Non-detect at or above associated value.
SB	Site Background.
▨	Concentration exceeds regional background.

TABLE 7.3

CONCENTRATIONS OF COMPOUNDS
DETECTED IN DRYWELL SOIL SAMPLES
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Parameter	*Units*	*Recommended Soil Cleanup Objective* (1)	*Sample Location*		
			004	*005*	*007*
1,2-Dichloroethene	µg/kg	300	ND	440	ND$_{5.9}$
Trichloroethene	µg/kg	700	120	310	ND$_{5.9}$

Notes:

(1)	Determination of Soil Cleanup Objectives and Cleanup Levels, NYSDEC TAGM 4046, January 24, 1994.
µg/kg	Micrograms per Kilogram.
ND	Non-Detect.
ND$_x$	Non-detect at or above associated value.
▨	Concentration exceeds Cleanup Objective.

TABLE 7.4

CONCENTRATIONS OF COMPOUNDS DETECTED IN SUBSURFACE SOILS
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Parameters	*Units*	*Recommended Soil Cleanup Objective* (1)	*Sample Location/Sample Depth (Ft. BGS)*					
			Footing Excavation 0.5 to 3	*TP-1 9 to 10*	*TP-2 9 to 9.5*	*TP-3 9.5 to 10*	*TP-4 9.5 to 10*	*TP-5 8 to 9*
cis-1,2-Dichloroethene	µg/kg	300	$ND_{6.6}$	$ND_{5.7}$	$ND_{6.0}$	16.5	$ND_{5.7}$	$ND_{5.6}$
Trichloroethene	µg/kg	700	35	8.1	18	335	480	2.2J

Notes:

(1)	Determination of Soil Cleanup Objectives and Cleanup Levels, NYSDEC TAGM 4046, January 24, 1994
-	No value.
µg/kg	Micrograms per Kilogram.
Ft. BGS	Feet Below Ground Surface.
J	Associated value is estimated.
ND_x	Non-detect at or above associated value.

TABLE 7.5

SUMMARY OF COMPOUNDS DETECTED IN GROUNDWATER
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

		Location:	*ESI-1*		*ESI-2*				*ESI-2D*
		Sample Date:	*11/14/90*	*04/16/92*	*11/30/90*	*03/09/92*	*04/16/92*	*05/19/97*	*04/16/92*
Parameters	*Units*	*Standard*(1)							
Volatile Organic Compounds									
cis-1,2-Dichloroethene	µg/L	5	NA	NA	NA	NA	NA	NA	NA
Dichloroethene (total)	µg/L	5	ND 5	ND 5	230	390	58	NA	ND 5
Trichloroethene	µg/L	5	12	20	1300	3100	340	NA	100
Vinyl chloride	µg/L	2	ND 10	ND 5	ND 250	ND 100	ND 10	NA	ND 10
Tetrachloroethene	µg/L	5	ND 5	ND 5	ND 250	ND 50	ND 5	NA	ND 5
1,1,1-Trichloroethane	µg/L	5	ND 5	ND 5	ND 250	ND 50	ND 5	NA	ND 5
1,1-Dichloroethane	µg/L	5	ND 5	ND 5	ND 250	ND 50	ND 5	NA	ND 5
Semi-Volatile Organic Compounds									
bis(2-Ethylhexyl) phthalate	µg/L	5	NA	NA	NA	NA	NA	9.1	NA
Total Metals									
Aluminum	mg/L	NS	NA	1.03	NA	NA	1.71	4.9	0.62
Arsenic	mg/L	0.025	ND 0.01	ND 0.01	ND 0.01	NA	ND 0.01	ND 0.01	ND 0.01
Barium	mg/L	1	NA	0.08	NA	NA	0.13	0.2	0.13
Cadmium	mg/L	0.005	NA	ND 0.005	NA	NA	ND 0.005	ND 0.005	ND 0.005
Calcium	mg/L	NS	NA	63.8	NA	NA	88.2	75.6	60.1
Chromium	mg/L	0.05	ND 0.05	ND 0.01	ND 0.01	NA	0.04	0.03	ND 0.01
Copper	mg/L	0.2	0.01	ND 0.01	0.02	NA	ND 0.01	0.03	ND 0.01
Iron	mg/L	0.3	NA	1.57	NA	NA	2.64	8.2	0.73
Lead	mg/L	0.025	0.006	0.006	ND 0.005	NA	0.01	0.03	ND 0.005
Magnesium	mg/L	NS	NA	6.69	NA	NA	11.7	10.3	11.4
Manganese	mg/L	0.3	NA	0.18	NA	NA	0.12	0.24	0.52
Potassium	mg/L	NS	NA	4.1	NA	NA	5.65	4.65	21.6
Selenium	mg/L	0.01	ND 0.005	ND 0.005	ND 0.005	NA	0.008	ND 0.005	ND 0.005
Sodium	mg/L	20	NA	38.2	NA	NA	45.7	25.3	ND 21.5
Zinc	mg/L	NS	0.02	ND 0.02	ND 0.02	NA	ND 0.02	0.09	ND 0.02

TABLE 7.5

SUMMARY OF COMPOUNDS DETECTED IN GROUNDWATER
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

		Location:	*ESI-3*		*ESI-4*		*ESI-5*	
		Sample Date:	***11/13/90***	***04/16/92***	***11/13/90***	***04/16/92***	***11/13/90***	***04/16/92***
Parameters	***Units***	***Standard*** [(1)]						
Volatile Organic Compounds								
cis-1,2-Dichloroethene	µg/L	5	NA	NA	NA	NA	NA	NA
Dichloroethene (total)	µg/L	5	ND 25	310	ND 5	ND 5	ND 5	ND 5
Trichloroethene	µg/L	5	180	2800	ND 5	ND 5	ND 5	ND 5
Vinyl chloride	µg/L	2	ND 50	ND 10	ND 10	ND 10	ND 10	ND 10
Tetrachloroethene	µg/L	5	ND 25	ND 5	ND 5	ND 5	ND 5	ND 5
1,1,1-Trichloroethane	µg/L	5	ND 25	ND 5	ND 5	ND 5	ND 5	ND 5
1,1-Dichloroethane	µg/L	5	ND 25	ND 5	ND 5	ND 5	ND 5	ND 5
Semi-Volatile Organic Compounds								
bis(2-Ethylhexyl) phthalate	µg/L	5	NA	NA	NA	NA	NA	NA
Total Metals								
Aluminum	mg/L	NS	NA	7.01	NA	0.65	NA	1.08
Arsenic	mg/L	0.025	ND 0.01	ND 0.01	0.02	ND 0.01	0.01	ND 0.01
Barium	mg/L	1	NA	0.17	NA	0.08	NA	0.1
Cadmium	mg/L	0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	0.013	ND 0.005
Calcium	mg/L	NS	NA	76.1	NA	65.5	NA	53.7
Chromium	mg/L	0.05	0.03	0.05	0.05	ND 0.01	0.03	ND 0.01
Copper	mg/L	0.2	0.04	0.03	0.06	ND 0.01	0.05	ND 0.01
Iron	mg/L	0.3	NA	10.2	NA	0.25	NA	1.07
Lead	mg/L	0.025	0.03	0.04	0.038	ND 0.005	0.06	ND 0.005
Magnesium	mg/L	NS	NA	11.5	NA	8.73	NA	7.43
Manganese	mg/L	0.3	NA	0.52	NA	0.01	NA	0.06
Potassium	mg/L	NS	NA	5.8	NA	4.3	NA	3.1
Selenium	mg/L	0.01	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Sodium	mg/L	20	NA	33.2	NA	36.4	NA	14.7
Zinc	mg/L	NS	0.08	0.09	0.13	ND 0.02	ND 0.06	ND 0.02

TABLE 7.5

SUMMARY OF COMPOUNDS DETECTED IN GROUNDWATER
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

		Location:	*ESI-A/ESI-6*			*ESI-B/ESI-7*			*ESI-8*	*ESI-9*
		Sample Date:	*01/02/91*	*04/16/92*	*02/10/93*	*01/02/91*	*04/16/92*	*05/19/97*	*04/16/92*	*04/16/92*
Parameters	*Units*	*Standard* (1)								
Volatile Organic Compounds										
cis-1,2-Dichloroethene	µg/L	5	NA	NA	NA	NA	NA	NA	NA	NA
Dichloroethene (total)	µg/L	5	20	1900	1900	ND 0.5	7.1	NA	ND 5	ND 5
Trichloroethene	µg/L	5	57	13000	14000	3.9	50	NA	ND 5	ND 5
Vinyl chloride	µg/L	2	ND 1	100	36	ND 1	ND 10	NA	ND 5	ND 5
Tetrachloroethene	µg/L	5	ND 0.5	13	17	ND 0.5	ND 5	NA	ND 5	ND 5
1,1,1-Trichloroethane	µg/L	5	ND 0.5	5.0	ND 10	ND 0.5	ND 5	NA	ND 5	ND 5
1,1-Dichloroethane	µg/L	5	ND 0.5	8.7	ND 10	ND 0.5	ND 5	NA	ND 5	ND 5
Semi-Volatile Organic Compounds										
bis(2-Ethylhexyl) phthalate	µg/L	5	NA	NA	NA	NA	NA	ND 5	NA	NA
Total Metals										
Aluminum	mg/L	NS	NA	3.35	NA	NA	10.8	0.8	7.7	3.33
Arsenic	mg/L	0.025	NA	0.02	NA	NA	ND 0.01	ND 0.01	ND 0.01	ND 0.01
Barium	mg/L	1	NA	0.19	NA	NA	0.33	0.07	0.19	0.1
Cadmium	mg/L	0.005	NA	ND 0.005	NA	NA	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Calcium	mg/L	NS	NA	53.3	NA	NA	40.6	42.7	44.8	71.2
Chromium	mg/L	0.05	NA	0.01	NA	NA	0.02	ND 0.01	ND 0.01	ND 0.01
Copper	mg/L	0.2	NA	0.02	NA	NA	0.02	ND 0.02	ND 0.01	ND 0.01
Iron	mg/L	0.3	NA	6.54	NA	NA	11.3	0.87	8.18	3.55
Lead	mg/L	0.025	NA	0.02	NA	NA	0.018	ND 0.005	0.011	0.008
Magnesium	mg/L	NS	NA	9.66	NA	NA	6.64	4.58	5.41	11.0
Manganese	mg/L	0.3	NA	4.43	NA	NA	1.05	0.08	0.59	0.17
Potassium	mg/L	NS	NA	4.6	NA	NA	6.7	2.4	5	4.1
Selenium	mg/L	0.01	NA	ND 0.005	NA	NA	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Sodium	mg/L	20	NA	37.4	NA	NA	33.5	14.8	26.4	22.5
Zinc	mg/L	NS	NA	0.02	NA	NA	0.07	0.19	0.03	ND 0.02

TABLE 7.5

SUMMARY OF COMPOUNDS DETECTED IN GROUNDWATER
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

		Location:	*ESI-10*	*ESI-11*		*ESI-12*	*ESI-13*
		Sample Date:	**04/16/92**	**04/16/92**	**05/19/97**	**04/16/92**	**04/16/92**
Parameters	*Units*	*Standard* [1]					
Volatile Organic Compounds							
cis-1,2-Dichloroethene	µg/L	5	NA	NA	NA	NA	NA
Dichloroethene (total)	µg/L	5	590	620	NA	160	ND 5
Trichloroethene	µg/L	5	87	590	NA	650	21
Vinyl chloride	µg/L	2	160	87	NA	ND 10	ND 10
Tetrachloroethene	µg/L	5	ND 5	ND 5	NA	ND 5	5
1,1,1-Trichloroethane	µg/L	5	ND 5	ND 5	NA	ND 5	51
1,1-Dichloroethane	µg/L	5	ND 5	ND 5	NA	ND 5	12
Semi-Volatile Organic Compounds							
bis(2-Ethylhexyl) phthalate	µg/L	5	NA	NA	ND 5	NA	NA see tables 5.1 (5/19/97)
Total Metals							
Aluminum	mg/L	NS	0.05	3.27	2.8	3.29	16.5
Arsenic	mg/L	0.025	ND 0.01	ND 0.01	ND 0.01	0.01	ND 0.01
Barium	mg/L	1	0.13	0.18	0.263	0.11	0.38
Cadmium	mg/L	0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Calcium	mg/L	NS	55.1	66.9	74.1	48.5	68.2
Chromium	mg/L	0.05	ND 0.01	ND 0.01	ND 0.01	ND 0.01	0.04
Copper	mg/L	0.2	ND 0.01	ND 0.01	ND 0.02	ND 0.01	0.02
Iron	mg/L	0.3	1.07	6.45	7.95	4.92	18.6
Lead	mg/L	0.025	ND 0.005	ND 0.01	0.01	0.009	0.03
Magnesium	mg/L	NS	5.82	8.66	9.12	8.2	13.8
Manganese	mg/L	0.3	1.04	1.12	1.24	0.08	0.61
Potassium	mg/L	NS	4.27	5.8	4.65	3.8	7.3
Selenium	mg/L	0.01	ND 0.005	ND 0.005	ND 0.005	ND 0.005	ND 0.005
Sodium	mg/L	20	25.1	27.2	17.8	25.5	22.3
Zinc	mg/L	NS	ND 0.02	ND 0.02	38.9	ND 0.02	0.01

Notes:

(1)	6 NYCRR, Chapter X, Part 703, "Surface Water & Groundwater Quality Standards & Groundwater Effluent Limitations", August 1999.
▨	Concentration exceeds Cleanup Objective.
mg/L	Milligrams per Liter.
NA	Not analyzed.
NDx	Non-detect at or above associated value.
NS	No Standard.
µg/L	Micrograms per Liter.

TABLE 7.6

SUMMARY OF COCs DETECTED IN GROUNDWATER
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

		Location:	*ESI-1*			*ESI-2*				*ESI-2D*	
		Sample Date:	*11/14/90*	*04/16/92*	*12/03/99*	*11/30/90*	*03/09/92*	*04/16/92*	*12/02/99*	*04/16/92*	*12/03/99*
Parameters	*Units*	*Standard* [1]									
cis-1,2-Dichloroethene	µg/L	5	NA	NA	ND 5	NA	NA	NA	210	NA	ND 5
Dichloroethene (total)	µg/L	5	ND 5	ND 5	NA	230	390	58	NA	ND 5	NA
Trichloroethene	µg/L	5	12	20	ND 7.4	1300	3100	340	1800	100	ND 5
Vinyl chloride	µg/L	2	ND 10	ND 5	ND 10	ND 250	ND 100	ND 10	ND 100	ND 10	ND 10

TABLE 7.6

SUMMARY OF COCs DETECTED IN GROUNDWATER
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

		Location:	*ESI-3*			*ESI-4*			*ESI-5*		
		Sample Date:	11/13/90	04/16/92	12/02/99	11/13/90	04/16/92	12/02/99	11/13/90	04/16/92	12/02/99
Parameters	*Units*	*Standard* $^{(1)}$									
cis-1,2-Dichloroethene	µg/L	5	NA	NA	2.3J	NA	NA	ND 5	NA	NA	ND 5
Dichloroethene (total)	µg/L	5	ND 25	310	NA	ND 5	ND 5	NA	ND 5	ND 5	NA
Trichloroethene	µg/L	5	180	2800	33J	ND 5	ND 5	ND 5	ND 5	ND 5	ND 5
Vinyl chloride	µg/L	2	ND 50	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10	ND 10

TABLE 7.6

SUMMARY OF COCs DETECTED IN GROUNDWATER
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

		Location:	*ESI-A/ESI-6*			*ESI-B/ESI-7*			*ESI-8*	
		Sample Date:	01/02/91	04/16/92	02/10/93	01/02/91	04/16/92	12/03/99	04/16/92	12/03/99
Parameters	*Units*	*Standard* [(1)]								
cis-1,2-Dichloroethene	μg/L	5	NA	NA	NA	NA	NA	5.1	NA	ND 5
Dichloroethene (total)	μg/L	5	20	1900	1900	ND 0.5	7.1	NA	ND 5	NA
Trichloroethene	μg/L	5	57	13000	14000	3.9	50	79	ND 5	ND 5
Vinyl chloride	μg/L	2	ND 1	100	36	ND 1	ND 10	ND 10	ND 5	ND 10

TABLE 7.6

SUMMARY OF COCs DETECTED IN GROUNDWATER
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

		Location:	*ESI-9*		*ESI-10*		*ESI-11*		*ESI-12*		*ESI-13*
		Sample Date:	*04/16/92*	*05/09/00*	*04/16/92*	*12/03/99*	*04/16/92*	*12/03/99*	*04/16/92*	*12/03/99*	*04/16/92*
Parameters	*Units*	*Standard* [(1)]									
cis-1,2-Dichloroethene	µg/L	5	NA	ND 5	NA	93	NA	32	NA	4.7J	NA
Dichloroethene (total)	µg/L	5	ND 5	NA	590	NA	620	NA	160	NA	ND 5
Trichloroethene	µg/L	5	ND 5	ND 5	87	48	590	ND 7.1	650	52	21
Vinyl chloride	µg/L	2	ND 5	ND 10	160	43	87	17	ND 10	ND 10	ND 10

TABLE 7.6

SUMMARY OF COCs DETECTED IN GROUNDWATER
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

		Location:	*ESI-13R*	*ESI-14*	*PW-1*	*PW-2*		*PW-3*	*PW-3R*	*BH-15*	*BH-16*
		Sample Date:	*12/03/99*	*05/12/00*	*02/09/93*	*02/10/93*	*12/02/99*	*11/05/93*	*05/15/00*	*05/09/00*	*05/11/00*
Parameters	*Units*	*Standard* [1]									
cis-1,2-Dichloroethene	µg/L	5	37	ND 5	NA	NA	730 / 750	ND 20000	1500J / 1700J	ND 5	ND 5
Dichloroethene (total)	µg/L	5	NA	NA	180	410	NA / NA	NA	NA / NA	NA	NA
Trichloroethene	µg/L	5	63	ND 5	5900	22000	6600 / 7100	320000	58000 / 67000	3.6J	ND 5
Vinyl chloride	µg/L	2	ND 10	ND 10	ND 10	11	ND500 / ND500	ND 20000	ND5000 / ND5000	ND 10	ND 10

Notes:

[1]	6 NYCRR, Chapter X, Part 703, "Surface Water & Groundwater Quality Standards & Groundwater Effluent Limitations", August 1999.
▨	Concentration exceeds Standard.
COCs	Chemicals of Concern.
J	Associated value is estimated.
NA	Not analyzed.
NDx	Non-detect at or above associated value.
µg/L	Micrograms per Liter.
100/110	Results of duplicate analyses.

TABLE 9.1

SUMMARY OF COCs DETECTED IN ADDITIONAL IRM MONITORING POINTS
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

	Location:	*ESI-2*					*ESI-3*			
	Sample Date:	*11/30/90*	*03/09/92*	*04/16/92*	*12/02/99*	*07/18/00*	*11/13/90*	*04/16/92*	*12/02/99*	*07/18/00*
Parameters	*Units*									
cis-1,2-Dichloroethene	μg/L	NA	NA	NA	210	1600	NA	NA	2.3J	11
Dichloroethene (total)	μg/L	230	390	58	NA	NA	ND 25	310	NA	NA
Trichloroethene	μg/L	1300	3100	340	1800	3400	180	2800	33J	120
Vinyl chloride	μg/L	ND 250	ND 100	ND 10	ND 100	ND 200	ND 50	ND 10	ND 10	ND 10
Tetrachloroethene	μg/L	ND 250	ND 50	ND 5	ND 50	ND 100	ND 25	ND 5	ND 5	ND 5

TABLE 9.1

SUMMARY OF COCs DETECTED IN ADDITIONAL IRM MONITORING POINTS
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

	Location:	*ESI-A/ESI-6*				*ESI-10*		
	Sample Date:	*01/02/91*	*04/16/92*	*02/10/93*	*07/18/00*	*04/16/92*	*12/03/99*	*07/18/00*
Parameters	***Units***							
cis-1,2-Dichloroethene	µg/L	NA	NA	NA	400	NA	93	1100
Dichloroethene (total)	µg/L	20	1900	1900	NA	590	NA	NA
Trichloroethene	µg/L	57	13000	14000	7300	87	48	73
Vinyl chloride	µg/L	ND 1	100	36	ND 500	160	43	100
Tetrachloroethene	µg/L	ND 0.5	13	17	ND 500	ND 5	ND 5	ND 50

TABLE 9.1

SUMMARY OF COCs DETECTED IN ADDITIONAL IRM MONITORING POINTS
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

	Location:	*ESI-11*			*ESI-12*			*PW-1*	
	Sample Date:	04/16/92	12/03/99	07/18/00	04/16/92	12/03/99	07/18/00	02/09/93	07/18/00
Parameters	*Units*								
cis-1,2-Dichloroethene	µg/L	NA	32	200	NA	4.7J	51	NA	ND 5
Dichloroethene (total)	µg/L	620	NA	NA	160	NA	NA	180	NA
Trichloroethene	µg/L	590	ND 7.1	26	650	52	200	5900	2.7J
Vinyl chloride	µg/L	87	17	76	ND 10	ND 10	ND 20	ND 10	ND 10
Tetrachloroethene	µg/L	ND 5	ND 5	ND 10	ND 5	ND 5	ND 10	ND 10	1.4J

TABLE 9.1

SUMMARY OF COCs DETECTED IN ADDITIONAL IRM MONITORING POINTS
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

	Location:	PW-2			PW-3/PW-3R		
	Sample Date:	*02/10/93*	*12/02/99*	*07/18/00*	*11/05/93*	*05/15/00*	*07/18/00*
Parameters	***Units***						
cis-1,2-Dichloroethene	µg/L	NA	730 / 750	610	ND 20000	1500J / 1700J	1300J / 1200J
Dichloroethene (total)	µg/L	410	NA / NA	NA	NA	NA / NA	NA
Trichloroethene	µg/L	22000	6600 / 7100	1100	320000	58000 / 67000	79000 / 52000J
Vinyl chloride	µg/L	11	ND500 / ND500	110	ND 20000	ND5000 / ND5000	ND 5000 / ND 5000
Tetrachloroethene	µg/L	76	ND250 / ND250	ND 50	ND 20000	ND2500 / ND2500	ND 2500 / ND 2500

Notes:

COCs	Chemicals of Concern.
J	Associated value is estimated.
NA	Not analyzed.
NDx	Non-detect at or above associated value.
µg/L	Micrograms per Liter.
100/110	Results of duplicate analyses.

TABLE 10.1

POTENTIAL STATE STANDARDS, CRITERIA, AND GUIDELINES
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Applicable or Relevant and Appropriate Requirement Citation	*Rationale for Use*
Chemical-Specific	
New York Air Pollution Control Regulations (6 NYCRR Parts 200 through 257)	Remedial activities may impact air quality. The Site area is classified as Level III (commercial and industrial in small and medium metropolitan complexes).
New York Water Classifications and Quality Standards (6 NYCRR Parts 609, 700-704)	Standards impact selection of groundwater remediation goals, as well as treatment goals for reinjection of treated effluent to the aquifer. The Site groundwater is classified as GA.
New York Public Water Supply Regulations (10 NYCRR Part 5)	Drinking water standards impact selection of groundwater remediation goals, as well as treatment goals for reinjection of treated effluent to the aquifer.
Action-Specific	
Selection of Remedial Actions at Inactive Hazardous Waste Sites (TAGM HWR-90-4030)	
New York Environmental Conservation Law (ECL) (New York Consolidated Laws, Chapter 43-B):	
• Water Pollution Control (ECL Article 17)	Discharges to State groundwater are prohibited unless in conjunction with all standards, criteria, limitation, rules, and regulations.
• Air Pollution Control Act (ECL Article 19)	Provides policy to maintain the quality of air resources of the State. Regulations provided in 6 NYCRR Parts 200 to 257.
• New York Solid and Hazardous Waste Management Laws (ECL Article 27)	Addresses solid and hazardous waste management. In addition, a preferred State-wide hazardous management practices hierarchy is provided.
• Uniform Procedures (ECL Article 70)	Establishes uniform review procedures for major regulatory programs. Procedures are provided for coordinating permitting for a project requiring one or more NYSDEC permits.
New York State Air Guide (1991)	Provides guidance on calculating limits for off-gas emissions.
New York Waste Transport Permit Regulations (6 NYCRR Part 364)	Off-Site transport of treatment residuals will require compliance with these regulations.
New York Hazardous Waste Management System Regulations (6 NYCRR Part 370 series)	Treatment residuals could be considered as hazardous waste subject to these regulations.
Endangered & Threatened Species of Fish & Wildlife, Species of Special Concern (6 NYCRR Part 182)	Identifies endangered and threatened species. May need to be considered if species are present in the vicinity of the Site.

TABLE 10.2

WATER QUALITY CRITERIA FOR COMPOUNDS OF CONCERN
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Compound	*Units*	*Class GA Groundwater (1)*
1,2-Dichloroethene	µg/L	5
Trichloroethene	µg/L	5
Vinyl chloride	µg/L	5

Notes:

(1) 6 NYCRR, Chapter X, Part 703, "Surface Water and Groundwater Quality Standards and Groundwater Effluent Limitations", August 1999. Class GA groundwater is suitable as a potable water source.

µg/L micrograms per liter.

TABLE 10.3

POTENTIAL RESPONSE ACTIONS AND REMEDIAL TECHNOLOGIES
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

General *Response Action*	*Remedial Technology*	*Process Options*	*Description*
No Further Action	None	Not Applicable	No further action.
Institutional Controls & Monitoring	Access Restrictions	Deed Restrictions	Restrict groundwater usage on Site and in the immediate vicinity of the Site.
	Long-Term Groundwater Monitoring	Monitor Groundwater	Monitor the natural degradation and attenuation of COCs in groundwater through sampling and analysis.
Containment	Barrier Walls	Slurry Wall/Grout Curtain/Sheet Piling	Construction of a barrier wall downgradient or around the area of concern to restrict off-Site groundwater migration and limit upgradient groundwater flow to the Site.
	Groundwater Extraction and Injection	Groundwater Injection/Extraction Well Network	Installation and operation of groundwater extraction and injection wells to provide a hydraulic barrier to groundwater migration through the establishment and maintenance of an inward hydraulic gradient.
		Collection Trenches	Installation of downgradient groundwater collection drains/trenches to achieve a hydraulic barrier that will restrict migration of groundwater off Site.
Collection	Groundwater Extraction	Extraction Wells	Installation and operation of groundwater extraction well(s) to remove groundwater containing COCs from the source area.
		Collection Trenches	Installation and operation of collection trenches to remove groundwater containing COCs from the source area.

TABLE 10.3

POTENTIAL RESPONSE ACTIONS AND REMEDIAL TECHNOLOGIES
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

General *Response Action*	*Remedial Technology*	*Process Options*	*Description*
Treatment of Collected Groundwater	On-Site Physical Treatment	Activated Carbon Treatment	Adsorption of contaminants onto activated carbon for off-Site disposal or treatment. Clean water would be reinjected or disposed.
		Air Stripping Treatment	Remove contaminants to vapor phase, reinject or dispose of water. Vapor treatment may be required.
	Chemical Treatment	Chemical Oxidation	Destruction of contaminants with oxidizing agent. Treated water would be reinjected or disposed.
In-Situ Groundwater Treatment	Physical/Chemical Treatment	Chemical Oxidation	Oxidation agent(s) are injected into the saturated zone to breakdown chemicals.
	Physical Treatment	Air Sparging	Installation of an air injection system to air-strip volatiles from the groundwater. May be used in conjunction with vapor extraction.
	Physical/Thermal Treatment	Steam Sparging	Steam is injected into the groundwater to increase volatility of contaminants.
	Biological Treatment	Aerobic/Anaerobic Biodegradation	Nutrients are injected into groundwater to stimulate biological degradation indigenous (native) bacteria. If the indigenous microbial population is inactive or inadequate, can supplement with microbes specifically designed for the treatment. Oxygen or oxygen consuming materials may be added to create aerobic or anaerobic conditions.
Disposal	Off-Site Treatment/ Disposal	Off-Site Disposal	Transportation of extracted groundwater to a permitted treatment, storage, and disposal facility.

TABLE 10.4

RESULTS OF INITIAL SCREENING OF REMEDIAL TECHNOLOGIES
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

General Response Action	*Technology Type*	*Process Options*	*Retained for Further Evaluation*	*Comments*
No Further Action		None	Yes	Required by FS Guidance Documents
Limited Action		Access Restrictions	Yes	May be utilized as a support technology. Will not reach remediation goals alone.
		Long-Term Groundwater Monitoring	Yes	May be utilized as a support technology. Will not reach remediation goals alone.
Physical Containment	Barrier Walls	Slurry	Yes	May reduce volume of contaminated groundwater to be treated and/or migration of contaminants off Site.
		Sheet Piles	Yes	Same as slurry walls.
		Vibrated Beam Wall	Yes	Same as slurry walls.
Hydraulic Containment and/or Source Removal	Groundwater Removal	Extraction Wells	Yes	Demonstrated effective collection and containment technology. Would collect contaminated groundwater, prevent future migration, and reduce concentrations of COCs.
		Groundwater Injection/Extraction Well Systems	Yes	Demonstrated effective collection and containment technology. Would collect contaminated groundwater, prevent future migration, and reduce concentrations of COCs.
		Collection Trench	No	Existing extraction wells provide comparable containment.

TABLE 10.4

RESULTS OF INITIAL SCREENING OF REMEDIAL TECHNOLOGIES
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

General *Response Action*	*Technology* *Type*	*Process* *Options*	*Retained for* *Further Evaluation*	*Comments*
Treatment and Disposal of Collected Groundwater	Physical Treatment	Air Stripping Treatment	Yes	Demonstrated effective treatment technology.
		Activated Carbon Treatment	No	Eliminated due to presence of existing air stripping system.
	Chemical Treatment	Treatment by Oxidation	No	Eliminated due to presence of existing air stripping system.
	Off-Site Disposal	Off-Site Disposal	No	Eliminated due to presence of existing air stripping system.
		Discharge to POTW	Yes	Demonstrated effective for disposal of treated water.
		Reinjection	Yes	Effective for disposal of treated water. May reduce or improve effectiveness of collection. Permit may be required
In Situ Groundwater Treatment	Biological	Aerobic/Anaerobic Biodegradation	No	Effectiveness uncertain in degrading COCs, undesired degradation products may be formed. More difficult than chemical oxidation.
	Physical/Chemical	Chemical Oxidation	Yes	Implemented as IRM.
	Physical	Air Sparging	Yes	May require soil vapor extraction system to be effective.
	Physical/Thermal	Steam Sparging	No	Eliminated due to it being only incrementally more effective than air sparging but at substantial additional cost.

TABLE 10.5

INITIAL SCREENING OF POTENTIAL ALTERNATIVES
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

General Response Action	*Description*	*Effectiveness*	*Implementability*
No Further Action	No measures are taken to improve Site environmental conditions with respect to groundwater. All contaminants remain on Site. Environmental risks and potential exposure pathways are not addressed by any activities.	- Not effective in meeting all RAOs - No additional risk during implementation	- Very implementable
Institutional Controls and Monitoring			
Institutional Controls	Implementation of institutional controls, such as deed or access restrictions, to reduce potential exposure to Site related chemicals, restrict installation of new water supply wells, and restrict future use of groundwater from the sand and gravel unit.	- Effectiveness is dependant on future enforcement of restrictions - No reduction of volume, toxicity, or mobility of COCs - Effective in reducing potential for human exposure to COCs	- Very implementable
Long-term Groundwater Monitoring	Implementation of a groundwater monitoring program to track background water quality, the natural attenuation/degradation of COCs, and the migration of the COC plume.	- No reduction of volume, toxicity, or mobility of COCs - Effective in identifying and tracking the COC plume and its natural degradation and attenuation - Does not reduce potential for human exposure to COCs	- Very implementable; groundwater monitoring wells at the Site are sufficient in number and location.
PHYSICAL CONTAINMENT			
Hydraulic Containment and/or Source Removal			
Extraction Wells	Installation and operation of groundwater extraction wells either on Site at the source of contamination or downgradient of the source to induce an inward gradient.	- Very effective for collection of groundwater and provision of hydraulic containment - Reduces mobility of contaminants - Site geology is favorable for groundwater collection	- Very implementable at the Site - Construction to required depths for sand/gravel unit is feasible - Effective IRM already implemented
Injection/Extraction Well Network	Installation and operation of groundwater extraction and injection wells to collect contaminated groundwater and provide a hydraulic barrier to minimize off-Site migration of contaminated groundwater.	- Very effective for collection of groundwater and provision of hydraulic containment - Reduces mobility of contaminants	- Slightly more difficult to implement than simple extraction system due to complicated controls required to maintain hydraulic containment.
Collection Trenches	Installation of downgradient groundwater collection drains/trenches to achieve a hydraulic barrier which will restrict migration of groundwater off Site. Intercepts groundwater at the Site boundary.	- Very effective and proven for collection of groundwater from shallow aquifers with a lower confining layer - as at the Site - Reduces mobility of contaminants	- Very implementable at the Site - Construction to required depths for collection of water from the sand/gravel unit is feasible.
Treatment of Collected Groundwater			
Air Stripping Treatment	Contaminants (VOCs) are removed from the water using an air purging system. Product vapor will need treatment prior to discharge	- Very effective in reducing VOC concentrations	- Implementable with low construction costs. - Construction and operation and maintenance are feasible. - Requires routine maintenance. - May require vapor treatment. - Already purchased and permitted for Site

TABLE 10.5

INITIAL SCREENING OF POTENTIAL ALTERNATIVES
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

General Response Action	*Description*	*Effectiveness*	*Implementability*
In Situ Groundwater Treatment			
Air Sparging	Installation of an air injection system to air-strip volatiles from the groundwater. It may be used in conjunction with vapor extraction to collect and treat the vapor produced.	• May need to be combined with a vapor extraction system to be effective in removal of VOCs; therefore, may not achieve SCGs as a stand alone treatment	- Technically feasible due to low construction and O & M costs. - Systems are readily available.
Chemical Oxidation	Delivery of oxidizing agent to impacted groundwater to destroy contaminants or convert them into less toxic or harmless compounds. May be used in conjunction with other technologies (i.e., containment or collection)	• Proven effectiveness in treating COCs	- Technically feasible due to low costs - Oxidizing agent commercially available and easy to handle

Notes:

COCs	Compounds of Concern.
O&M	Operation and Maintenance.
RAOs	Remedial Action Objectives.
SCGs	Standards, Criteria, and Guidelines.
VOC	Volatile Organic Compound

TABLE 10.6

SUMMARY OF DEVELOPMENT AND SCREENING OF REMEDIAL ALTERNATIVES
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

			Hydraulic Containment & Collection		*Physical Containment* ***and Collection***	***In Situ Treatment***		
	No Further Action	**Institutional Controls** *and Monitoring*	*Extraction Wells*	*Extraction and Injection Wells*	*Barrier Wall and Extraction Wells*	*Chemical Oxidation*	*Air Sparging*	*Thermal Treatment*
Effectiveness								
• Reduce toxicity, mobility, and volume of COCs	No	No	Yes	Yes	Yes	Yes	Yes	Yes
• Minimizes residual risk and affords long-term protection	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Implementability	Readily implemented	Readily implemented	Readily implemented	Moderate concerns	Difficult to implement	Readily implemented	Moderate concerns	Moderate concerns
Relative Cost								
• Capital	None	Low	Low	Moderate	High	Low	Low	Low
• O&M (30 years)	None	Low	Moderate	High	High	Low	Moderate	Moderate-High
Recommendation	Retained for detailed analysis	Retained for detailed analysis	Retained for detailed analysis	Eliminated from further consideration	Eliminated from further consideration	Retained for detailed analysis	Retained for detailed analysis	Eliminated from further consideration

TABLE 10.7

COST ANALYSIS SUMMARY - ALTERNATIVE NO. 1
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

No Further Action

Item		*Estimated Cost*	*Net Present Worth* (1)
A.	Administrative Costs	$0	$0
	Total Cost:		$0

Notes:

(1) Net present worth calculated using a 7 percent net discount rate.

TABLE 10.8

COST ANALYSIS SUMMARY - ALTERNATIVE NO. 2
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

Institutional Controls and Monitoring

Item		*Estimated Cost*	*Net Present Worth* (1)
A.	Administrative Costs	$ 15,000	$ 15,000
	Total, Capital Cost:		$ 15,000
		Estimated Annual Cost	*Net Present Worth* (1)
B.	Operation and Maintenance	$ 2,000	$ 25,000
C.	Monitoring and Reporting		
	1. Year 1 - 5	$ 11,000	$ 45,000
	2. Year 6 - 30	$ 5,500	$ 46,000
	Sub-Total, O&M:		$ 116,000
	Total Cost:		**$ 131,000**

Notes:

(1) Net present worth calculated using a 7 percent net discount rate, rounded to nearest thousand dollars.

TABLE 10.9

COST ANALYSIS SUMMARY - ALTERNATIVE 3
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

	Item	*Estimated Cost*	*Net Present Worth [1]*
A.	Administrative Costs (Institutional Controls)	$ 15,000	$ 15,000
	Sub-Total, Administration:		$ 15,000
B.	Direct Capital Cost:		
	• Pre-Design Evaluation of Air Stripper	$ 3,000	$ 3,000
	• Pumping System	$ 21,000	$ 21,000
	• Treatment System	$ 27,000	$ 27,000
	• System Startup	$ 3,000	$ 3,000
	Sub-Total, Direct Capital Cost:		$ 54,000
C.	Indirect Capital Cost:		
	• Design and Engineering	$ 8,000	$ 8,000
	• Construction Management	$ 5,000	$ 5,000
	• Contingency	$ 11,000	$ 11,000
	Sub-Total, Indirect Capital Cost:		$ 24,000
	Total Capital Cost:		$ 93,000
		Estimated Annual Cost	*Net Present Worth [1]*
E.	Operation and Maintenance		
	• Monitoring Wells	$ 2,000	$ 25,000
	• Extraction and Treatment System	$ 30,000	$ 372,000
F.	Site Monitoring		
	• Years 1 through 5	$ 13,500	$ 55,000
	• Years 6 through 30	$ 8,000	$ 66,000
	Sub-Total O&M:		$ 518,000
	Total Costs:		$ 611,000

Notes:

(1) Net present worth calculated using a 7 percent net discount rate, rounded to nearest thousand dollars.

TABLE 10.10

COST ANALYSIS SUMMARY - ALTERNATIVE 4
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

	Item	*Estimated Cost*	*Net Present Worth* [1]
A.	Administrative Costs	$ 15,000	$ 15,000
	Sub-Total, Administration:		$ 15,000
B.	Direct Capital Costs:		
	• Potassium Permanganate	$ 52,000	$ 52,000
	• Injection	$ 18,000	$ 18,000
	Sub-Total, Direct Capital Cost:		$ 70,000
C	Indirect Capital Cost:		
	• Design and Engineering	$ 10,000	$ 10,000
	• Construction Management	$ 7,000	$ 7,000
	• Contingency Allowance	$ 14,000	$ 14,000
	Sub-Total, Indirect Capital Cost:		$ 31,000
	Total Capital Cost:		**$ 116,000**

		Estimated Annual Cost	*Net Present Worth* [1]
	Operation and Maintenance		
D.	Monitoring Well Maintenance	$ 2,000	$ 4,000
E.	Monitoring and Reporting	$ 9,700	$ 19,000
	Sub-Total, O&M:		$ 23,000
	Total Cost:		**$ 139,000**

Notes:

[1] Net present worth calculated using a 7 percent net discount rate, rounded to nearest thousand dollars.

TABLE 10.11

COST ANALYSIS SUMMARY - ALTERNATIVE 5
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

	Item	*Estimated Cost*	*Net Present Worth (1)*
A.	Administrative Costs	$ 15,000	$ 15,000
	Sub-Total, Administrative:		$ 15,000
B.	Direct Capital Cost:		
	• Equipment and Controls	$ 33,000	$ 33,000
	• System Startup	$ 5,000	$ 5,000
	Sub-Total, Direct Capital Cost:		$ 38,000
C.	Indirect Capital Cost:		
	• Design and Engineering	$ 6,000	$ 6,000
	• Construction Management	$ 4,000	$ 4,000
	• Contingency	$ 4,000	$ 4,000
	Sub-Total, Indirect Capital Cost:		$ 14,000
	Total Capital Cost:		**$ 67,000**

		Estimated Annual Cost	*Net Present Worth* [(1)]
Operation and Maintenance			
D.	Monitoring Well Maintenance	$ 2,000	$ 11,000
E.	Inspection and Maintenance	$ 25,000	$ 135,000
F.	Monitoring and Reporting	$ 9,700	$ 52,000
	Sub-Total, O&M:		$ 198,000
	Total Cost:		**$ 265,000**

Notes:

(1) Net present worth calculated using a 7 percent net discount rate, rounded to nearest thousand dollars.

TABLE 10.12

RANKING OF REMEDIAL ALTERNATIVES
SUPPLEMENTAL REMEDIAL INVESTIGATION/FEASIBILITY STUDY
DOWCRAFT CORPORATION
FALCONER, NEW YORK

	Alternative				
	No. 1: No Further Action	*No. 2: Institutional Controls and Monitoring*	*No. 3: Containment and Collection*	*No. 4: In Situ Chemical Oxidation*	*No. 5: In Situ Air Sparging*
Overall Protection of Human Health	5	4	3	1	2
Compliance with SCGs	4*	4*	3	1	2
Reduction of Toxicity, Mobility, and Volume	4*	4*	3	1	2
Short-Term Effectiveness	1*	1*	3	2*	2*
Long-Term Effectiveness and Permanence	5	4	3	1	2
Implementability	1	2	5	3	4
Net Present Worth Cost**	$0	$ 131,000	$ 611,000	$ 139,000	$ 265,000

Notes:

* Alternatives of same ranking are equally effective.

** Calculated at 7 percent discount rate.

APPENDICES

A

APPENDIX A

SITE RECONNAISSANCE PHOTOGRAPHS

EMPIRE
SOILS INVESTIGATIONS INC

CLIENT: Dowcraft Corporation

PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 1 OF 15

①

DESCRIPTION: Particle separator used for control of metal dust.

CLIENT: Dowcraft Corporation

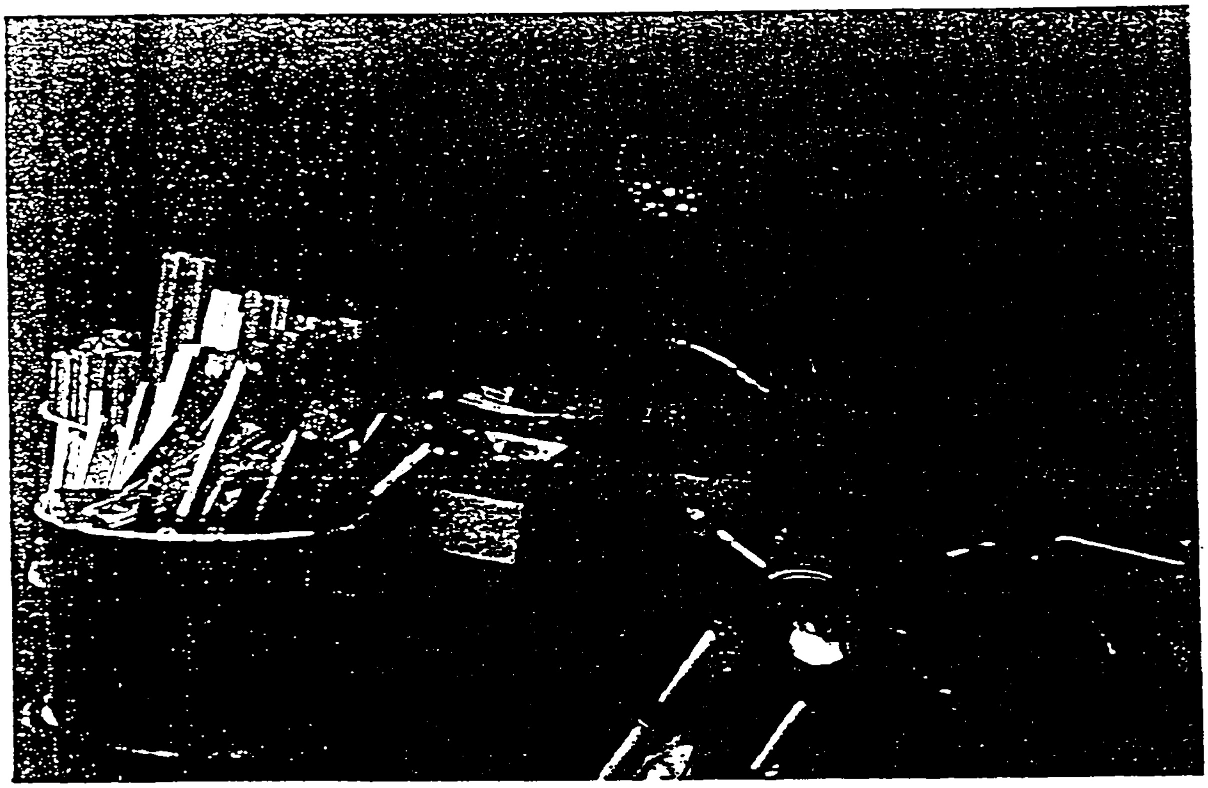
PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: M. Shanahan PAGE 2 OF 15

②



DESCRIPTION: Storage area for recyclable metal located on north side of plant.

CLIENT: Dowcraft Corporation

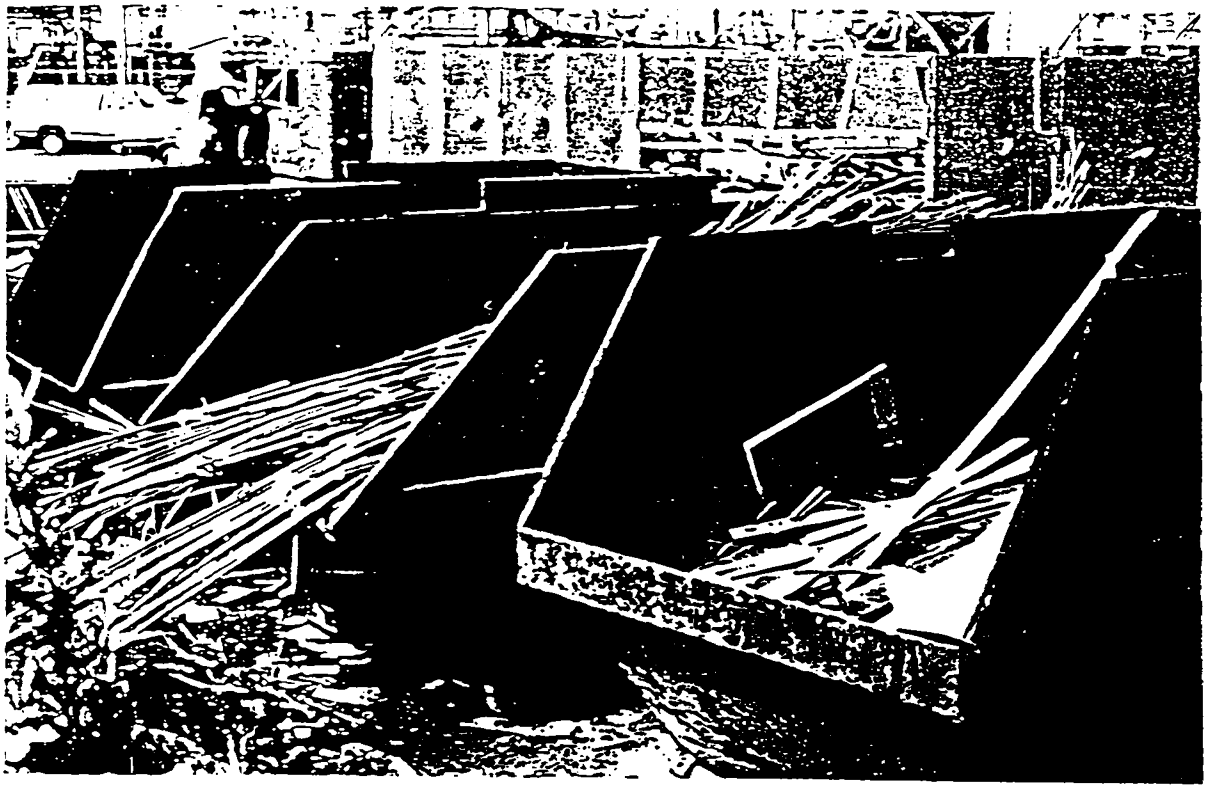
PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 3 OF 15

③



DESCRIPTION: Storage dumpsters for recyclable metal scraps located at the south west corner of the plant.

EMPIRE
SOILS INVESTIGATIONS INC.

CLIENT: Dowcraft Corporation

PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 4 OF 15

④

DESCRIPTION: Solvent recovery still located in the mixing room.

EMPIRE
SOILS INVESTIGATIONS INC.

CLIENT: Dowcraft Corporation

PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 5 OF 15

⑤

DESCRIPTION: Storage area for spent paint stripper and scrappings from used fifty five gallon drums located east of the boiler room on the exterior of the plant.

EMPIRE
SOILS INVESTIGATIONS INC.

CLIENT: Dowcraft Corporation

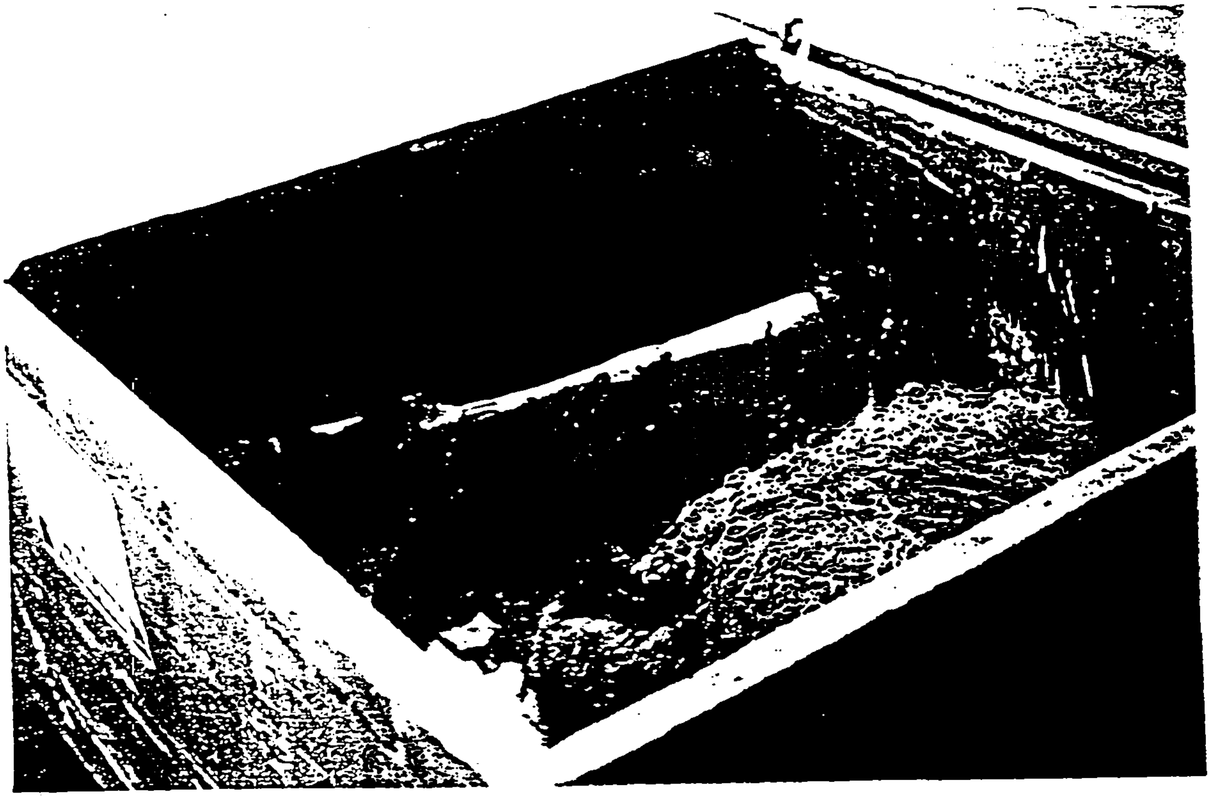
PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 6 OF 15

⑥



DESCRIPTION: Dumpster designated for storage of spent air filters from the painting operations.

EMPIRE
SOILS INVESTIGATIONS INC

CLIENT: Dowcraft Corporation

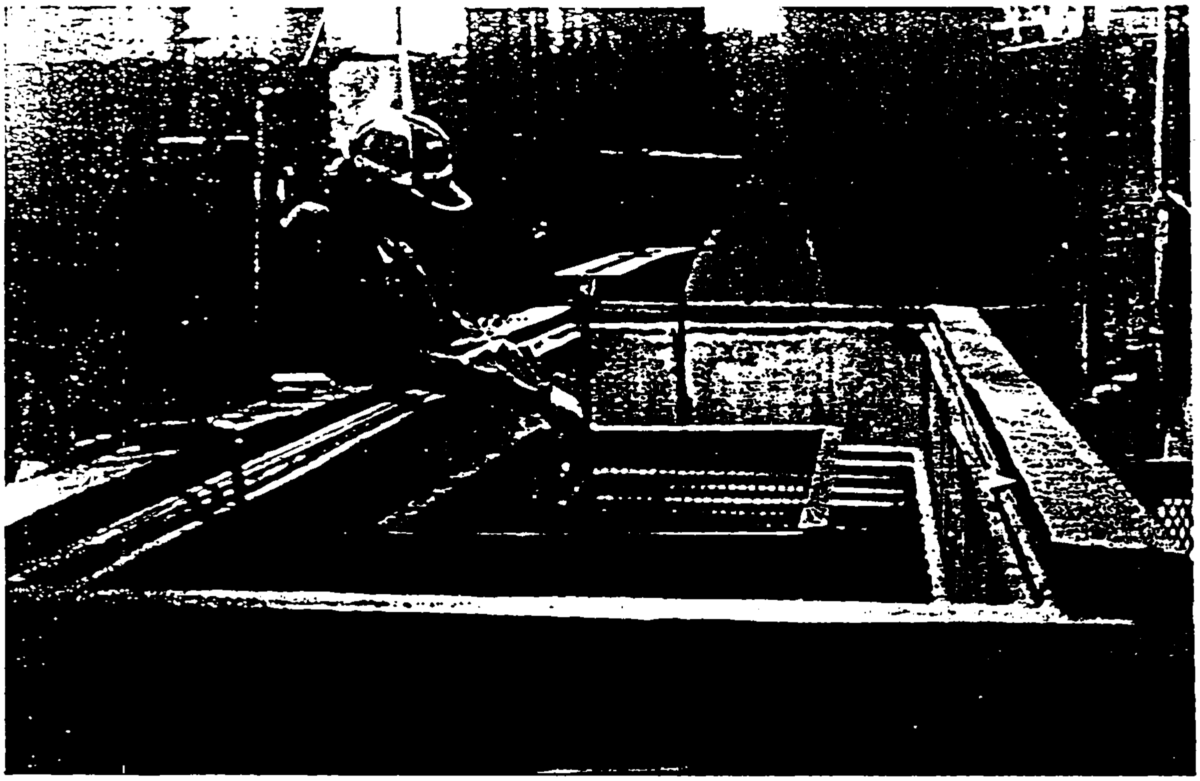
PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 7 OF 15

⑦



DESCRIPTION: Trichloroethylene vapor degreaser located in the southeast corner of the original plant on the first floor.

EMPIRE SOILS INVESTIGATIONS INC.

CLIENT: Dowcraft Corporation

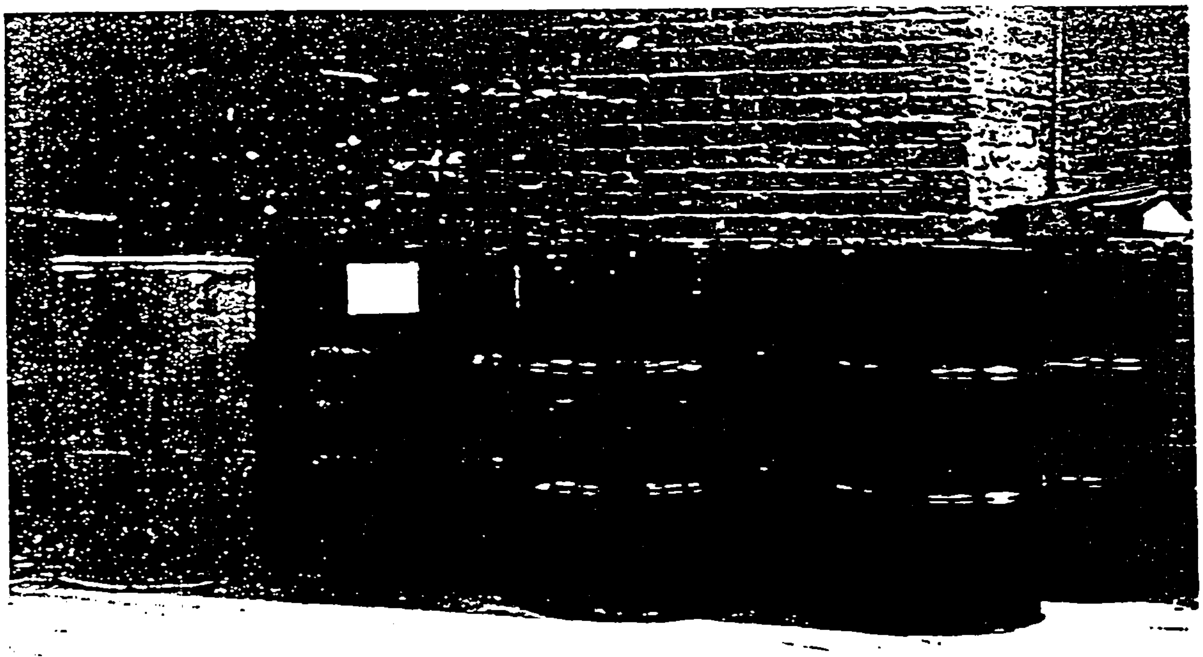
PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 8 OF 15

8



DESCRIPTION: Trichloroethylene and spent trichloroethylene bottoms storage located approximately ten feet east of the degreaser unit.

EMPIRE
SOILS INVESTIGATIONS INC

CLIENT: Dowcraft Corporation

PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 9 OF 15

⑨

DESCRIPTION: Paints, solvents, and adhesives in the mixing room.

EMPIRE
SOILS INVESTIGATIONS INC.

CLIENT: Dowcraft Corporation

PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: ETA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 10 OF 15

⑩

DESCRIPTION: Scupper drain located at the mixing room doorway.

EMPIRE
SOILS INVESTIGATIONS INC.

CLIENT: Dowcraft Corporation

PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 11 OF 15

⑪

DESCRIPTION: Paint, adhesive, gum cleaner, and reducer storage located in two trailers on the north side of the plant.

EMPIRE
SOILS INVESTIGATIONS INC.

CLIENT: Dowcraft Corporation

PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 12 OF 15

⑫

DESCRIPTION: 'Painting area located on second floor. Five gallon pails of paint and adhesive were located in the vicinity.

EMPIRE
SOILS INVESTIGATIONS INC

CLIENT: Dowcraft Corporation

PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 13 OF 15

⑬

DESCRIPTION: Underground storage tank and pump located approximately 100-feet east of subject site. The fill pipe was noted to be present in the concrete pad in front of the wooden pallets.

EMPIRE
SOILS INVESTIGATIONS INC.

CLIENT: Dowcraft Corporation

PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 14 OF 15

⑭

DESCRIPTION: Pole mounted transformer located on Jamestown container property.

EMPIRE
SOILS INVESTIGATIONS INC.

CLIENT: Dowcraft Corporation

PROJECT: Dowcraft Corporation

PROJECT LOCATION: 65 South Dow Street, Falconer, New York

PROJECT NO.: BTA-90-179 DATE PHOTOGRAPHED: 10-2-90

PHOTOGRAPHED BY: K. Shanahan PAGE 15 OF 15

15

DESCRIPTION: Dry well (manhole cover) 004 located on the north side of the plant.

B

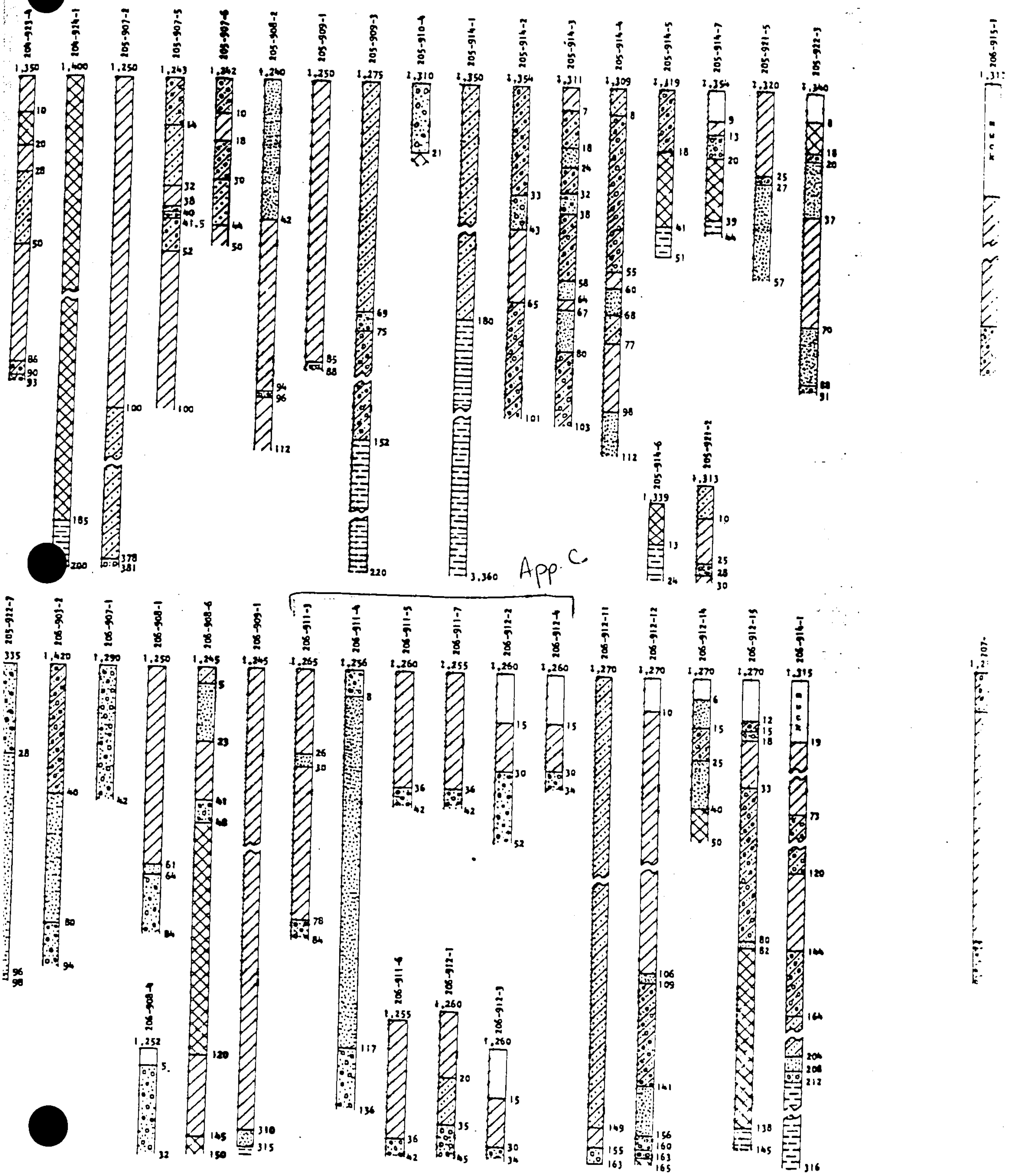
APPENDIX B

BUILDING FLOOR PLANS

C

APPENDIX C

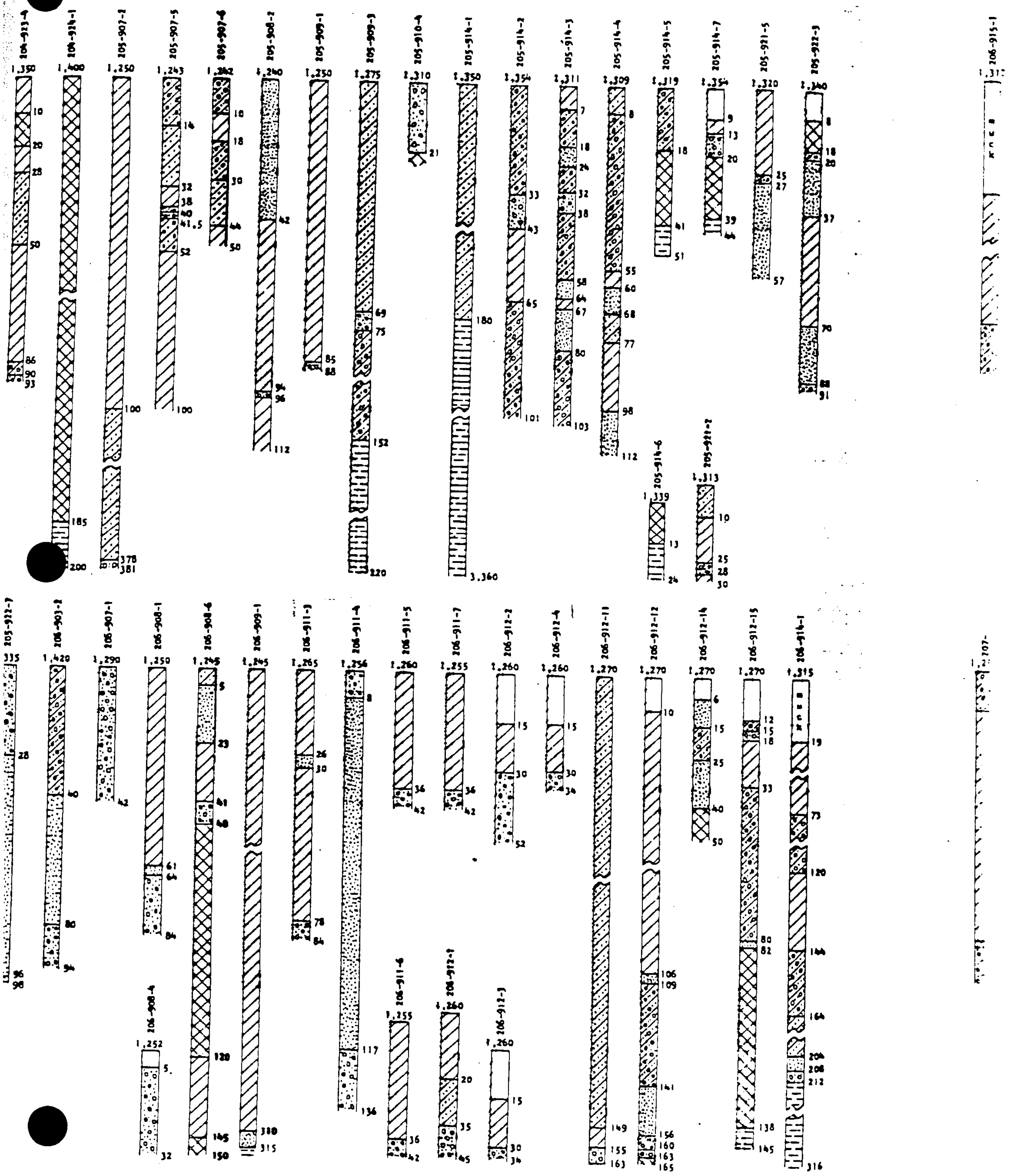
OFF-SITE WELL LOGS



App. C

App C

Figure 43.--Logs of wells and test holes (continued).



App C

Figure 43.--Logs of wells and test holes (continued).

D

APPENDIX D

INFORMATION REQUEST RESPONSES

BTA 90 - 179

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION II
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, NEW YORK 10278

MAR 06 1991

Mr. Kevin J. Shanahan
Empire Soils Investigations, Inc.
S-5167 South Park Avenue
P.O. Box 0913
Hamburg, New York 14075

Re: Freedom of Information Act Request Nos. (2) RIN-2720-90
RIN-2721-90

Dear Mr. Shanahan:

This is in response to your letters dated September 26, 1990, requesting information regarding the following sites:

Dowcraft Corporation
65 South Dow Street
Falconer, New York

Ellison Bronze Co., Inc.
125 West Main Street
Falconer, New York

As per your request, this letter will confirm that our CERCLIS database of potential hazardous waste sites does not show a listing of the above mentioned facilities in Chautauqua County, New York. Enclosed is a copy of the CERCLIS list for Chautauqua County.

Please note that the inclusion of a facility on this list does not confirm the presence of an environmental problem or public health threat. All identified sites will be assessed by the Environmental Protection Agency to determine the extent, if any, of a hazardous waste problem.

I understand a copy of your letter has been forwarded to other EPA Divisions for a more complete response to your request.

Sincerely yours,

Leslie H Peterson

Leslie H. Peterson, Chief
Planning and Information Management Section
Program Support Branch
Emergency and Remedial Response Division

Enclosure

New York State Department of Environmental Conservation
600 Delaware Avenue, Buffalo, New York 14202

Thomas C. Jorling
Commissioner

October 2, 1990

Mr. Kevin J. Shanahan
Empire Soils Investigations, Inc.
S-5167 South Park Avenue
P.O. Box 0913
Hamburg, New York 14075

Dear Mr. Shanahan:

This letter is to acknowledge receipt of your request for information relative to

- Dow Craft Corp.
  Falconer, NY

Because of the multi-divisional nature of your request, it has been forwarded to the individual divisions involved.

Individual program staff will contact you relative to your request.

Very truly yours,

Charles W. Kollatz
Regional Citizen
Participation Specialist

CWK/jmm

2/90

SHAWLER

New York State Department of Environmental Conservation
600 Delaware Avenue, Buffalo, New York 14202

Thomas C. Jorling
Commissioner

October 11, 1990

Mr. Kevin J. Shanahan
Empire Soils Investigations, Inc.
S-5167 South Park Avenue
P.O. Box 0913
Hamburg, New York 14075

Dear Mr. Shanahan:

Dow Craft Corp.
Falconer, NY

In response to your FOIL request of October 2, 1990 relative to the subject property, a search of this Region's Solid and Hazardous Waste Program files has been completed.

We have found no records of currently active solid or hazardous waste facilities associated with the subject property. In addition, we have found no records of past solid or hazardous waste disposal at this site. We do have a file on this site in our Hazardous Substances Regulation Section. For information on this file please contact Mr. Louis Violanti at 716/847-4585.

Please be advised that our files only reflect information on those sites where investigation by this Department, the USEPA or local county health/environmental agencies, or information from the public has revealed that waste disposal has or may have occurred. The Department makes no guarantee as to the completeness of our files. Therefore, our file search should in no way be considered as a substitute for a site inspection or environmental audit by qualified personnel. If such an inspection/audit were to reveal that waste disposal has occurred, it should be promptly reported to this office.

You may wish to contact the local county health/environmental department to determine if they have any information on the subject site.

Yours truly,

Edward J Feron Jr

Edward J. Feron, Jr., P.E.
Environmental Engineer II

EJF:vam
cc: Mr. James Wilding
Mr. Charles Kollatz

New York State Department of Environmental Conservation
600 Delaware Avenue, Buffalo, New York 14202

Thomas C. Jorling
Commissioner

December 28, 1990

Mr. Kevin J. Shanahan
Empire Soils Investigations, Inc.
S-5167 South Park Avenue
P.O. Box 0913
Hamburg, NY 14075

Dear Mr. Shanahan:

This is in response to your request for information regarding Dow Craft Corp., Falconer, NY. A search of our spill computer files (1986-present) and bulk storage computer files has been conducted. Based on these reviews, the following information is provided:

___ See attached response sheets for reported spills.

___ See attached response sheets for tanks registered pursuant to the NYS Petroleum Bulk Storage Program.

___ See attached response sheets for tanks registered pursuant to the NYS Chemical Bulk Storage Program.

___ This Office has no record of spills reported.

_x_ This Office has no record of tanks registered pursuant to the NYS Petroleum Bulk Storage Program.

___ This Office has no record of tanks registered pursuant to the NYS Chemical Bulk Storage Program.

_x_ Refer to the spill record summary previously provided to your firm.

___ Request cannot be processed due to insufficient street address.

Please be advised that requests for area-wide searches of our records cannot be accommodated. As such, information presented in response to your request is site-specific.

Very truly yours,

Daniel K King

Daniel K. King, P.E.
Associate Sanitary Engineer

cc: FOIL File

STATE OF NEW YORK
DEPARTMENT OF LABOR

GOVERNOR W. AVERELL HARRIMAN
STATE OFFICE BUILDING CAMPUS
ALBANY, NEW YORK 12240

Counsel's Office
(518) 457-4380

December 26, 1990

Kevin J. Shanahan
Environmental Engineer
Empire Soils Investigations, Inc.
S.5167 South Park Avenue
P.O. Box 0913
Hamburg, New York 14075

Re: Freedom of Information Law Request--
Shanahan/Empire Soils/Dowcraft Corporation

Dear Mr. Shanahan:

I am informed that the Department of Labor has no records concerning the subject of your request.

Please be advised that Department records are accessible only be specific location and can not be accessed by location described in terms of radius.

Very truly yours,

Barbara C. Deinhardt
Deputy Commissioner of Labor
for Legal Affairs
Records Access Officer

Christine J. Timber

By: Christine J. Timber
Attorney I

CJT:sg

LH 1 (4-86)

STATE OF NEW YORK
DEPARTMENT OF LABOR

GOVERNOR W. AVERELL HARRIMAN
STATE OFFICE BUILDING CAMPUS
ALBANY, NEW YORK 12240

Counsel's Office
(518) 457-4380

October 2, 1990

Kevin J. Shanahan
Environmental Engineer
Empire Soils Investigations, Inc.
S.5167 South Park Avenue
P.O. Box 0913
Hamburg, New York 14075

Re: Freedom of Information Law Request--
Shanahan/Empire Soils/Dowcraft Corporation

Dear Mr. Shanahan:

Receipt is acknowledged of the Freedom of Information Law request contained in your correspondence dated September 26, 1990 and received in this office October 1, 1990.

We are in the process of obtaining and reviewing the materials to which you have requested access. We will advise as to those documents to which access can be granted and the cost for same as soon as possible.

Please be advised that our records are accessible only by specific location. We will be unable to advise as to any location as described by radius.

Very truly yours,

Barbara C. Deinhardt
Deputy Commissioner of Labor
for Legal Affairs
Records Access Officer

Christine J. Timber

By: Christine J. Timber
Attorney I

CJT:sg

E

APPENDIX E

BORING AND TEST PIT LOGS AND WELL INSTALLATION DIAGRAMS

Huntingdon

Empire Soils Investigations, Inc., Division
[illegible]
[illegible]
[illegible] New York [illegible]
[illegible]
Fax [illegible]

LIMITATIONS

1. Empire Soils Investigations, Inc. (ESI) work was completed in accordance with generally accepted practices of other consultants undertaking similar studies, and ESI observed that degree of care and skill generally exercised by other consultants under similar circumstances and conditions. ESI's findings and conclusions must be considered not as scientific certainties but as probabilities based on our professional judgement concerning the significance of the limited data gathered during the course of the work.

2. The Environmental Investigation completed has not included comprehensive analytical testing on the site due to cost constraints. Without such testing, ESI can assume no responsibility for the undetected presence of either identified potential conditions or other latent conditions.

3. The observations described in this report were made under conditions stated therein. The conclusions presented in the report were based solely upon the services described therein and not on tasks and procedures beyond the scope of described services or the time and budgetary constraints imposed by the client.

4. In preparing this report, ESI has relied on certain information provided by the State, County and Town Officials and other parties referenced herein and on information contained in the files of the state and local agencies made available to ESI at the time this report was prepared.

5. Observations were made of the subject site and on adjacent sites as indicated within the report. Where access to portions of the site or structures were limited or unavailable, ESI renders no opinion as to the presence of hazardous materials or to the presence of indirect evidence relating to hazardous material in that portion of the site or adjacent structures.

6. Unless otherwise specified in the report, ESI did not perform testing or analyses to determine the presence of concentrations of hazardous chemical compounds, asbestos, polychlorinated biphenyls (PCB's), oil, gasoline, radon and lead paint at the subject property.

LIMITATIONS (Continued)

7. The purpose of the Environmental Ivestigation was to assess the physical characteristics of the subject property with respect to the presence in the environment of hazardous materials. No specific attempt was made to check on the compliance of present or past owners or operators of the site with federal, state or local laws and regulations, environmental or otherwise.

8. Except as noted within the text of the report, no quantitative laboratory testing was performed as part of the Environmental Investigation. Where such analyses have been conducted by a laboratory, ESI has relied upon the data provided and has not conducted an independent evaluation of the reliability of these data.

9. Evaluation of the possible impact of activities at neighboring locations on the subject property was beyond the scope of services for this investigation.

11. This report has been prepared for the exclusive use of the Dowcraft Corporation and its designated agents and lending institutions for the specific application to the subject property in accordance with generally accepted engineering practice. No other warrant, expressed or implied, is made. The environmental concerns noted in this report (if any) are applicable to the current identified proposed usage of this property.

12. ESI cannot warranty that the proposed Remediation Plan will successfully remove the levels of contamination identified at both the Dowcraft and Jamestown Container properties.

GENERAL INFORMATION & KEY TO SUBSURFACE LOGS

The Subsurface Logs attached to this report present the observations and mechanical data collected by the driller at the site, supplemented by classification of the material removed from the borings as determined through visual identification by technicians in the laboratory. It is cautioned that the materials removed from the borings represent only a fraction of the total volume of the deposits at the site and may not necessarily be representative of the subsurface conditions between adjacent borings or between the sampled intervals. The data presented on the Subsurface Logs together with the recovered samples will provide a basis for evaluating the character of the subsurface conditions relative to the project. The evaluation must consider all the recorded details and their significance relative to each other. Often analyses of standard boring data indicate the need for additional testing or sampling procedures to more accurately evaluate the subsurface conditions. Any evaluation of the contents of this report and the recovered samples must be performed by Professionals. The information presented in the following defines some of the procedures and terms used on the Subsurface Logs to describe the conditions encountered.

1. The figures in the Depth column defines the scale of the Subsurface Log.

2. The sample column shows, graphically, the depth range from which a sample was recovered. See Table 1 for a description of the symbols used to signify the various types of samples.

3. The Sample No. is used for identification on sample containers and/or Laboratory Test Reports.

4. Blows on Sampler — shows the results of the "Penetration Test", recording the number of blows required to drive a split spoon sampler into the soil. The number of blows required for each six inches of penetration is recorded. The first 6 inches of penetration is considered to be a seating drive. The number of blows required for the second and third 6 inches of penetration is termed the penetration resistance, N. The outside diameter of the sampler, the hammer weight and the length of drop are noted at the bottom of the Subsurface Log.

5. Blows on Casing — shows the number of blows required to advance the casing a distance of 12 inches. The casing size, the hammer weight and the length of drop are noted at the bottom of the Subsurface Log. If the casing is advanced by means other than driving, the method of advancement will be indicated in the Notes column or under the Method of Investigation at the bottom of the Subsurface Log.

6. All recovered soil samples are reviewed in the laboratory by an engineering technician, geologist or geotechnical engineer, unless note otherwise. The visual descriptions are made on the basis of a combination of the driller's field descriptions and observations and the sample as received in the laboratory. The method of visual classification is based primarily on the Unified Soil Classification (ASTM D 2487-83) with regard to the particle size and plasticity. (See Table No. II) Additionally, the relative portion, by weight, of two or more soil types is described for granular soils in accordance with "Suggested Methods of Test for Identification of Soils" by D. M. Burmister, ASTM Special Technical Publication 479, June 1970. (See Table No. III) The description of the relative soil density or consistency is based upon the penetration records as defined on Table No. IV. The description of the soil moisture is based upon the relative wetness of the soil as recovered and is described as dry, moist, wet and saturated. Water introduced in the boring either naturally or during drilling may have affected the moisture condition of the recovered sample. Special terms are used as required to describe materials in greater detail; several such terms are listed in Table V. When sampling gravelly soils with a standard two inch diameter split spoon, the true percentage of gravel is often not recovered due to the relatively small sampler diameter. The presence of boulders and large gravel is sometimes, but not necessarily, detected by an evaluation of the casing and samplers blows or through the "action" of the drill rig as reported by the driller.

7. The description of the rock shown is based on the recovered rock core and the driller's observations. The terms frequently used in the description are included in Table VI.

8. The stratification lines represent the approximate boundary between soil types and the transition may be gradual. Solid stratification lines are based on the driller's field observations.

9. Miscellaneous observations and procedures noted by the driller are shown in this column, including water level observations. It is important to realize the reliability of the water level observations depends upon the soil type (water does not readily stabilize in a hole through fine grained soils), and that drill water used to advance the boring may have influenced the observations. The ground water level typically will fluctuate seasonally. One or more perched or trapped water levels may exist in the ground seasonally. All the available readings should be evaluated. If definite conclusions cannot be made, it is often prudent to examine the conditions more thoroughly through test pit excavations or water observation wells.

10. The length of core run is defined as the length of penetration of the core barrel. Core recovery is the length of core recovered divided by the core run. The RQD (Rock Quality Designation) is the total pieces of NX core exceeding 4 inches in length divided by the core run. The size core barrel used is also noted.

DATE
STARTED 11-2-90
FINISHED 11-2-90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. ESI-1
SURF. ELEV. ---
G. W. DEPTH See Notes

PROJECT Dowcraft
(BTA-90-179A)

LOCATION S. Dow Street
Falconer, New York

DEPTH-FT	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID Sample
0	1	11	13		24	
		11	11			
	2	11	13		29	
		16	16			
5	3	1	3		8	
		5	3			
	4	3	1		2	
		1	9			
	5	8	10		14	
10		4	5			
	6	5	7		11	
		4	4			
	7	3	1		2	
		1	3			
	8	1	3		5	
		2	4			
20						

SOIL OR ROCK CLASSIFICATION

Brown-black f-c SAND, some f-m Gravel, little-tr. Silt, tr. brick (moist, FILL)
Becomes brown-red-gray
Contains "and" f-c GRAVEL (concrete and brick)
Becomes black
Contains tr. coal
Contains tr. brick

Lt. brown-tan f-m GRAVEL and f-c Sand, little Clayey Silt (wet,firm)

(loose)

Contains occasional broken rock fragments

Boring Complete at 16.0'.

Ground water monitoring well installed tip set at 14.7'. Refer to monitoring well completion report for details.

NOTES

Note:Concrete obstruction at 2 locations moved twice to final plan location.

Water at approx. 8.0'.

Driller notes running sands and gravel at 14.0'.

Free Standing Water measured at 10.2' inside augers at boring completion.

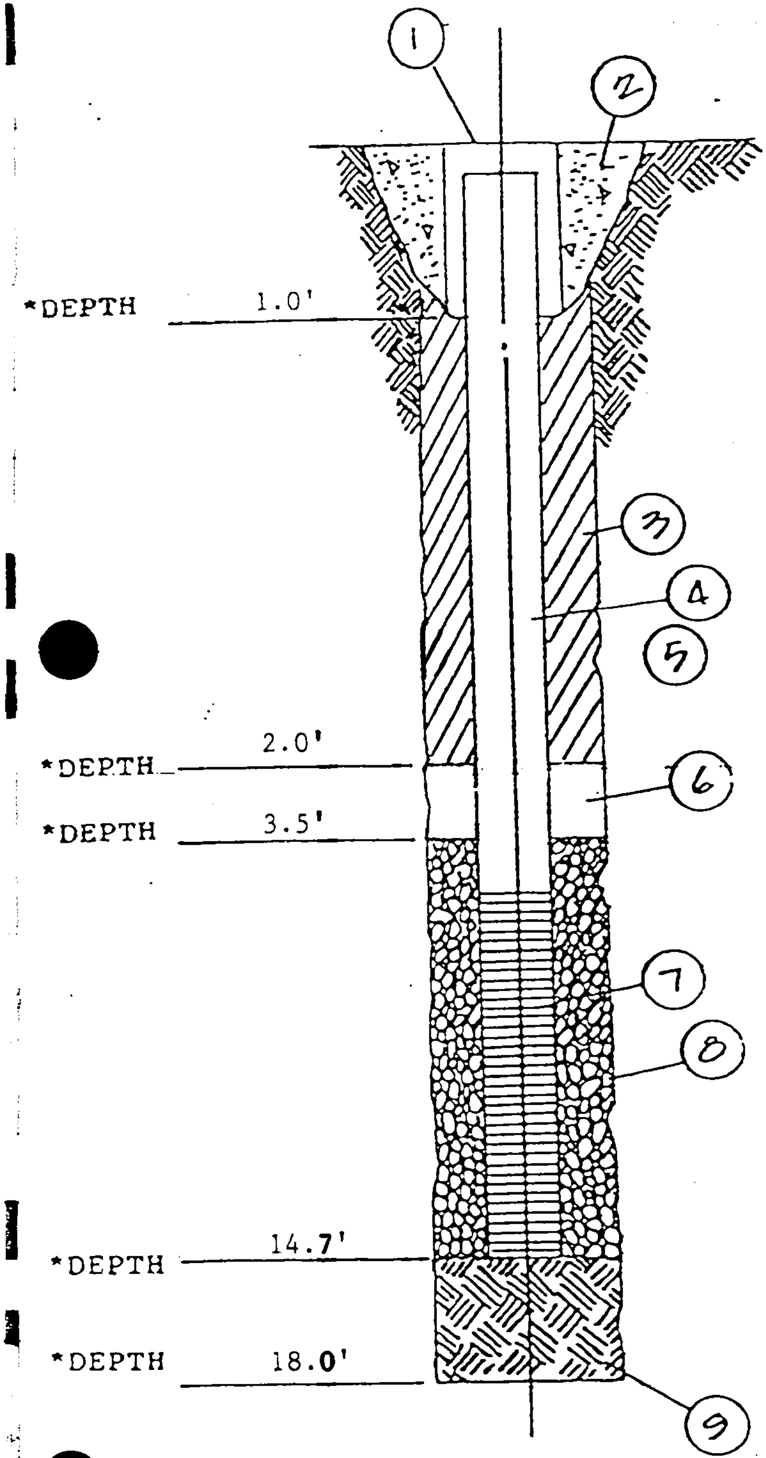
N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow.
CLASSIFICATION Visual by Geologist
C = No. blows to drive ______ " casing ______ " with ______ lb. weight falling ______ " per blow.
METHOD OF INVESTIGATION ASTM D-1586 USING 4-1/4" HOLLOW STEM AUGERS

MONITOR WELL COMPLETION REPORT:

WELL No. ESI-1 JOB No. BTA-90-179A

PROJECT: Dowcraft Corporation

Falconer, New York



1. GATE BOX I.D.: 8 INCHES
2. SURFACE SEAL TYPE: Type I Portland Cement
3. BOREHOLE DIAMETER 8 INCHES
4. RISER PIPE:
   - a. TYPE 40 Schedule PVC
   - b. I.D. 2 INCHES
   - c. LENGTH 4.5 FEET
   - d. JOINT TYPE Flush Couple Threaded
5. BACKFILL:
   - a. TYPE Type I Portland Cement
   - b. INSTALLATION Surface Pour
6. TYPE OF SEAL: Bentonite Pellet
7. SCREEN:
   - a. TYPE 40 Schedule PVC
   - b. I.D. 2 INCHES
   - c. SLOT SIZE 0.010 In.
   - d. LENGTH 10 FT.
8. SCREEN FILTER TYPE: #2 Q Rok Sand
9. BACKFILL TYPE: Natural Sands & Gravel

EPTH IN FEET BELOW GROUND SURFACE.

EMPIRE
SOILS INVESTIGATIONS INC.

DATE
STARTED 11-5-90
FINISHED 11-5-90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. ESI-2
SURF. ELEV. ---
C. W. DEPTH See Notes

PROJECT Dowcraft Corporation (BTA-90-179A)
LOCATION S. Dow Street Falconer, New York

DEPTH FT.	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID Sample
0						
	1	26	23		-	
	2	16	13		25	
		12	10			
5	3	8	7		11	
		4	25			
	4	5	2		5	
		3	7			
	5	2	5		15	
		10	14			
10	6	8	10		20	
		10	9			
	7	9	4		9	
		5	5			
20						

SOIL OR ROCK CLASSIFICATION

0-2' ASPHALTIC CONCRETE
0-8' CRUSHER RUN STONE
Brown WOOD (RAILROAD TIE), some f-c Sand, tr. gravel (moist, FILL)
Black f-c SAND, little Clayey Silt, tr. gravel, tr. wood, tr. coal, tr. brick (moist, FILL)
Contains "and" f-m GRAVEL, tr. lime
Gray-brown-tan mottled f-c SILTY SAND, some f-c Gravel (moist,loose)
Becomes brown-gray
Contains "and" f-c GRAVEL, occasional tan silt partings (wet,firm)
Contains tr. silt (loose)

Boring Complete at 17.0'.

Ground water monitoring well installed tip set at 14.7-feet. Refer to monitoring well completion report for details.

NOTES

Note: Water at approx. 10.0'.

Driller notes running sands and gravels at approx. 14.0'

Free Standing Water measured at 10.8' inside augers at boring completion.

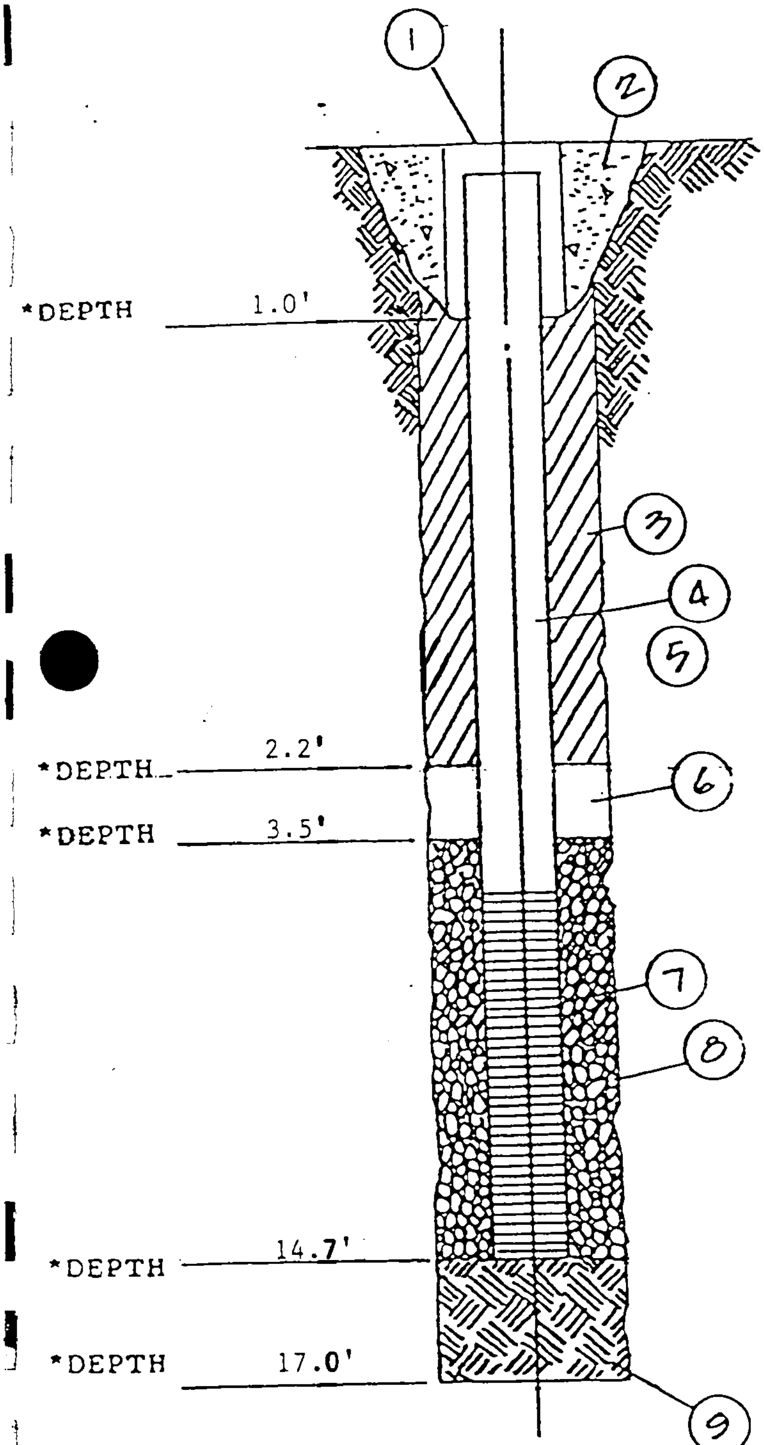
N = No blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow.
CLASSIFICATION Visual by Geologist
C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ " per blow.
METHOD OF INVESTIGATION ASTM D-1586 USING 4-1/4" HOLLOW STEM AUGERS

MONITOR WELL COMPLETION REPORT:

WELL No. ESI- 2 JOB No. BTA-90-179A

PROJECT: Dowcraft Corporation

Falconer, New York



1. GATE BOX I.D.: 8 INCHES

2. SURFACE SEAL TYPE: Type I Portland Cement

3. BOREHOLE DIAMETER 8 INCHES

4. RISER PIPE:

 a. TYPE 40 Schedule PVC

 b. I.D. 2 INCHES

 c. LENGTH 4.5 FEET

 d. JOINT TYPE Flush Couple Threaded

5. BACKFILL:

 a. TYPE Type I Portland Cement

 b. INSTALLATION Surface Pour

6. TYPE OF SEAL: Bentonite Pellet

7. SCREEN:

 a. TYPE 40 Schedule PVC

 b. I.D. 2 INCHES

 c. SLOT SIZE 0.020 In.

 d. LENGTH 10 FT.

8. SCREEN FILTER TYPE: #4 Q Rok Sand

9. BACKFILL TYPE: Natural Sands & Gravel

EPTH IN FEET BELOW GROUND SURFACE.

EMPIRE
SOILS INVESTIGATIONS INC.

DATE
STARTED: 4-3-92
FINISHED: 4-6-92

EMPIRE
SOILS INVESTIGATIONS INC.

SUBSURFACE LOG
BTA-92179B

BORING NO.: ESI-2D
SURF. ELEV.: 98.8 ±
SHEET 1 OF 3

PROJECT: Dowcraft Environmental Investigation
CLIENT: Dowcraft Corporation
LOCATION: 65 South Dow Street
Falconer, NY

DEPTH-FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	P.I.D.	SYMBOL	SOIL OR ROCK CLASSIFICATION	NOTES
0										Auger with 8 1/4" I.D. to 15 feet - No samples collected. Refer to Log for ESI-2 for Soil Characteristics	BG PID = 0.2 - 0.6 ppm
5											
10											PID=BG after augering to 10'
15		1	2	3	3	5	6	1-4		Brown f-c SAND, some f-m Gravel, tr. silt (wet, loose, SW)	
		2	4	3	2	2	5	5-10			
		3	3	2	3	4	5	5-10			
20										Gray SILT, tr. sand, tr. clay (wet,loose,ML)	
		4	3	2	2	3	4	5-10			
		5	2	2	3	4	5	3-5			
25											

DRILLER: P. Bence
DRILL RIG: CME-75
METHOD OF INVESTIGATION: ASTM D-1586 USING HOLLOW STEM AUGERS
WEATHER: Partly Cloudy, 40-50 F.
CLASSIFIED BY: D. R. Steiner

DATE STARTED: 4-3-92	**EMPIRE** SOILS INVESTIGATIONS INC.
FINISHED: 4-6-92	

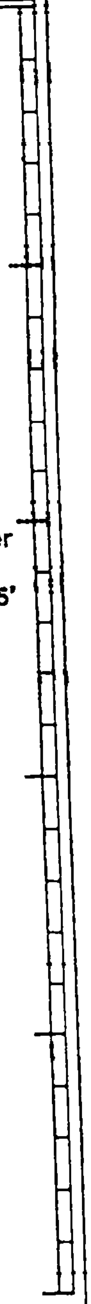
SUBSURFACE LOG

BTA-92179B

BORING NO.: ESI-2D
SURF. ELEV.: 98.8 ±
SHEET 2 OF 3

PROJECT: Dowcraft Environmental Investigation
CLIENT: Dowcraft Corporation
LOCATION: 65 South Dow Street
Falconer, NY

DEPTH-FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	P.I.D.	SYMBOL	SOIL OR ROCK CLASSIFICATION	NOTES
25		6	5	5	7	19	12	BG		Contains increased clay content Contains Gravel and/or Rock fragments in bottom of spoon (firm)	
		7	3	7	10	13	17	BG		Gray f-c SAND, some f-c Gravel, some Clayey Silt (wet, firm, SM-SW)	
		8	WOR/1'		11	14	11	BG		Gray f-c GRAVEL, some f-c Sand, tr.-little clayey silt (wet, firm, SW)	
30											
		9	14	26	39	40	65	BG		Contains "and" f-c Sand, some Clayey Silt (moist-wet, very compact, GW-GM)	
		10	16	17	14	14	31	BG		Contains tr. silt	
										Gray and brown Clayey SILT, little-some f-m Sand, tr. gravel (moist, ML)	
35		11	WOR	1	6	7	7	BG		Gray-brown f-m SAND, tr.-little f-m gravel, tr.-little silt (wet, loose, SP)	Free standing water recorded at 14.8' after augering to 35'
		12	3	6	8	13	14	BG		Becomes gray, contains little Silt, tr. gravel (firm, SP-SM)	
		13	3	10	13	15	23	BG		Contains sandy silt seam 40.5' - 41.0' (compact)	
40											
		14	22	19	21	20	40	BG			
		15	8	8	8	12	16	BG		Gray SILT, little f. Sand (wet, firm,ML) (Slight plasticity)	
45		16	3	4	6	6	10	BG		Contains little-some f. Sand, occ. moist seams (loose)	
		AUGER									
		17	2	2	4	7	6	BG			
50											



DRILLER: P. Bence
DRILL RIG: CME-75
METHOD OF INVESTIGATION: ASTM D-1586 USING HOLLOW STEM AUGERS
WEATHER: Partly Cloudy, 40-50 F.
CLASSIFIED BY: D. R. Steiner

DATE
STARTED: 4-3-92
FINISHED: 4-6-92

EMPIRE
SOILS INVESTIGATIONS INC.

SUBSURFACE LOG
BTA-92179B

BORING NO.: ESI-2D
SURF. ELEV.: 98.8 ±
SHEET 3 OF 3

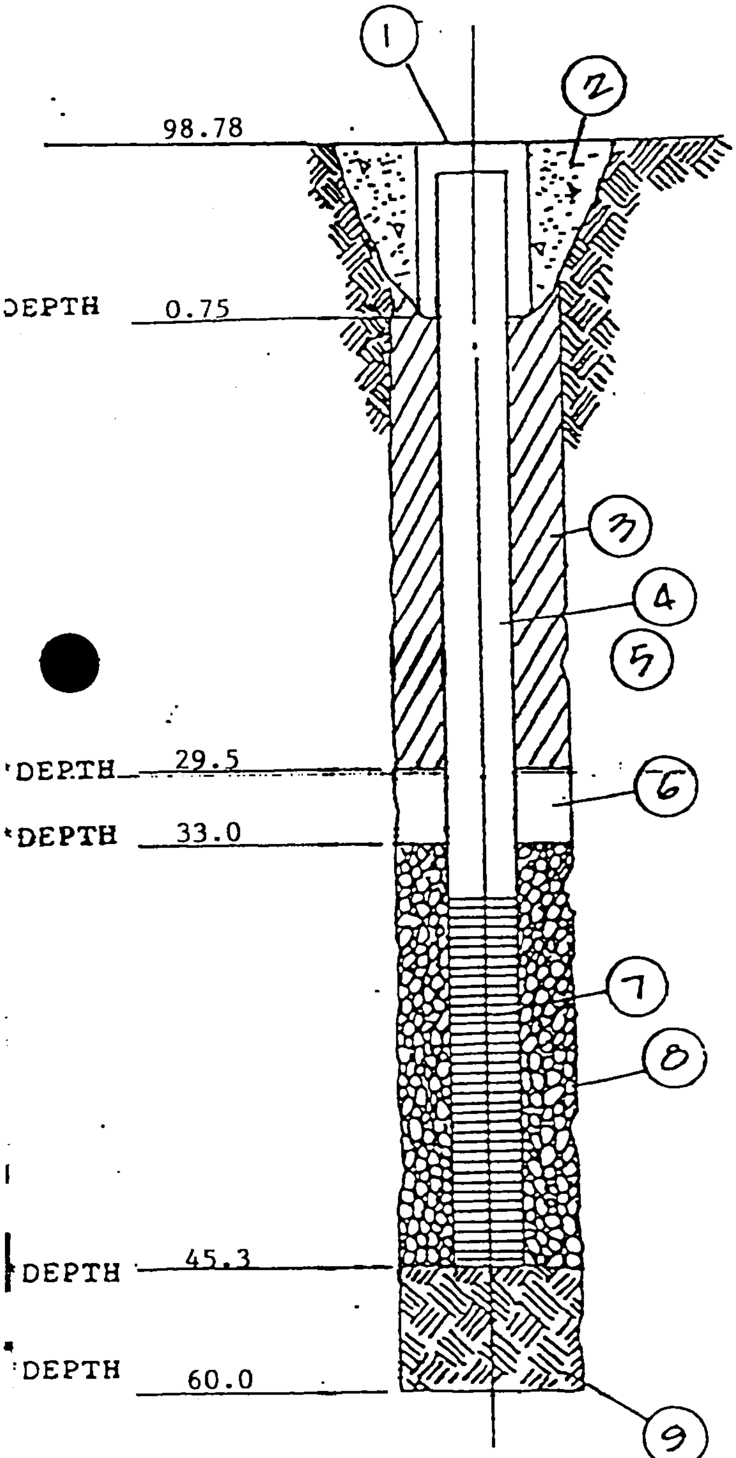
PROJECT: Dowcraft Environmental Investigation
CLIENT: Dowcraft Corporation
LOCATION: 65 South Dow Street
Falconer, NY

DEPTH-FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	P.I.D.	SYMBOL	SOIL OR ROCK CLASSIFICATION	NOTES
50		18	4	5	4	5	9			Gray fine SAND, little Silt (wet, SP-SM)	No recovery for Sample S-18
		19	4	10	21	19	31	BG			
										Gray Silty CLAY, tr.-little f. sand, tr. gravel (moist, CL)	
		AUGER									
55		20	8	13	12	11	25	BG		Gray SILT, tr. sand (slight plasticity) (wet, firm,ML)	—
		AUGER									
		21	4	14	13	18	27	BG		Contains silty clay seam 59' - 59.5'	
60										Boring complete at 60.0'	
65											
70											
75											

DRILLER: P. Bence
DRILL RIG: CME-75
METHOD OF INVESTIGATION: ASTM D-1586 USING HOLLOW STEM AUGERS
WEATHER: Partly Cloudy, 40-50 F.
CLASSIFIED BY: D. R. Steiner

MONITOR WELL COMPLETION REPORT:

WELL No. ESI-2D JOB No. BTA-92-179B
PROJECT: Dowcraft Environmental Investigation



1. GATE BOX I.D.: 9 INCHES
2. SURFACE SEAL TYPE: Concrete
3. BOREHOLE DIAMETER 8 INCHES
4. RISER PIPE:
    - a. TYPE Schedule 40 PVC
    - b. I.D. 2.0 INCHES
    - c. LENGTH 35.1 FEET
    - d. JOINT TYPE Flush Threaded
5. BACKFILL:
    - a. TYPE Cement Grout
    - b. INSTALLATION Surface
6. TYPE OF SEAL: Bentonite Pellets
7. SCREEN:
    - a. TYPE Schedule 40 PVC
    - b. I.D. 2.0 INCHES
    - c. SLOT SIZE 0.010 In.
    - d. LENGTH 10.0 FT.
8. SCREEN FILTER TYPE: No. 1 Morie Silica Sand
9. BACKFILL TYPE: No. 1 Morie Silica Sand

*[illegible]TH IN FEET BELOW GROUND SURFACE.

EMPIRE
SOILS INVESTIGATIONS INC

DATE
STARTED 11-5-90
FINISHED 11-5-90
SHEET 1 OF 1

EMPIRE
SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. ESI-3
SURF. ELEV. ---
G. W. DEPTH See Notes

PROJECT Dowcraft Corporation
BTA-90-179A

LOCATION Dow Street
Falconer, New York

DEPTH FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER				PID Sample	SOIL OR ROCK CLASSIFICATION	NOTES
			0 / 6	6 / 12	12 / 18	N			
0								0.2' ASPHALTIC CONCRETE	
								0.8' CRUSHER RUN STONE	Driller notes railroad tie at approximately 1.0'.
								1' Wood Railroad Tie	
		1	11	22		49		Brown-gray f-c GRAVEL, some f-c Sand, little-tr. Silt, tr. coal, tr. concrete (moist, FILL)	
			27	9					
5		2	8	5		10		Brown-tan mottled f-c SAND, some Clayey Silt, little f-c Gravel (moist, loose)	
			5	6					
		3	6	7		17			Water at approximately 8.5'.
			10	11					
		4	8	13		25		Brown f-c GRAVEL, some f-c Sand, little Clayey Silt (wet, firm)	
			12	9					
10		5	10	6		13			
			7	6					
		6	9	5		9		Contains occasional brown-gray f-c sand seams (loose)	Driller notes running sands at 13.0'.
			4	4					
								Boring Complete at 15.9'.	Free Standing Water measured at 12.3' inside augers at boring completion.
20								Ground water monitoring well installed tip set at 14.5-feet. Refer to monitoring well completion report for details.	
25									

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt. falling 30 " per blow.

CLASSIFICATION Visual by Onsite Geologist

C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ " per blow.

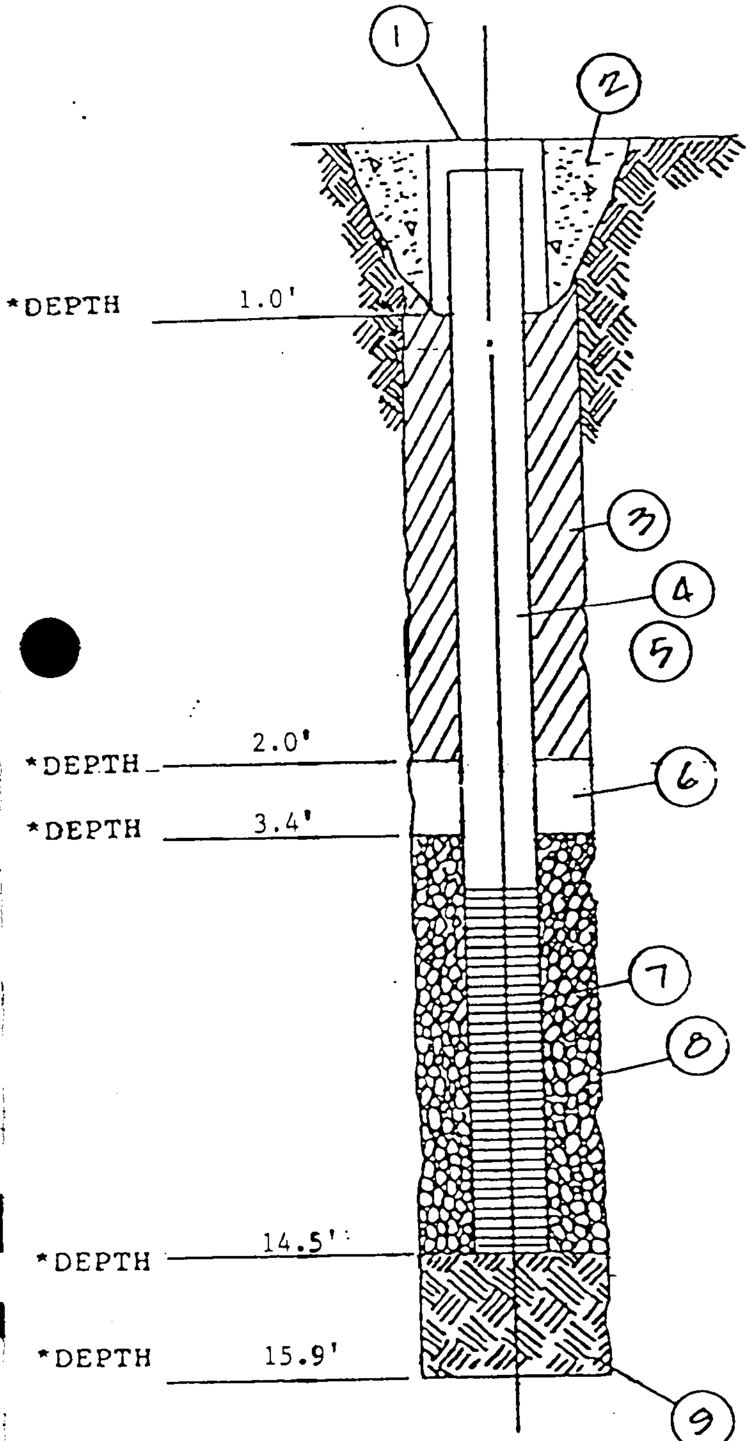
METHOD OF INVESTIGATION ASTM D-1586 USING 4-1/4" HOLLOW STEM AUGERS

MONITOR WELL COMPLETION REPORT:

WELL No. ESI-3 JOB No. BTA-90-179A

PROJECT: Dowcraft Corporation

Falconer, New York



1. GATE BOX I.D.: 8 INCHES

2. SURFACE SEAL TYPE: Type I Portland Cement

3. BOREHOLE DIAMETER 8 INCHES

4. RISER PIPE:

   a. TYPE 40 Schedule PVC

   b. I.D. 2 INCHES

   c. LENGTH 4.6 FEET

   d. JOINT TYPE Flush Couple Threaded

5. BACKFILL:

   a. TYPE Type I Portland Cement

   b. INSTALLATION Surface Pour

6. TYPE OF SEAL: Bentonite Pellet

7. SCREEN:

   a. TYPE 40 Schedule PVC

   b. I.D. 2 INCHES

   C. SLOT SIZE 0.020 In.

   d. LENGTH 10 FT.

8. SCREEN FILTER TYPE: #4 Q Rok Sand

9. BACKFILL TYPE: Natural Sands & Gravel

DEPTH IN FEET BELOW GROUND SURFACE.

EMPIRE
SOILS INVESTIGATIONS INC.

DATE
STARTED 11-5-90
FINISHED 11-5-90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. ESI-4
SURF. ELEV. ---
G. W. DEPTH See Notes

PROJECT Dowcraft Corporation
(BTA-90-179A)

LOCATION Dow Street
Falconer, New York

DEPTH FEET	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER				BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
			0/6	6/12	12/18	N			
0								0.2' ASPHALTIC CONCRETE 0.8' CRUSHER RUN STONE FILL	
		1	17	8		-		Black f-c SAND, some f-m Gravel, little-tr. Silt, tr. coal, tr. concrete, tr. metal shavings, tr. brick (moist, FILL)	
		2	10	8		12			
			4	3					
		3	3	5		10		Becomes brown	
5			5	5				Contains little Clayey Silt	
		4	5	6		12		Contains "and" Clayey Silt, little f. Gravel	
			6	7				Brown-tan f-c GRAVEL, some f-c Sand, little Clayey Silt (moist, firm)	
		5	7	9		18			
			9	7					
10		6	8	6		11		Contains "and" f-c SAND (wet)	
			5	5					Drilling completed to 8.0' on 11-5-90. Water at approximately 10.0'.
		7	5	5		10		(loose)	
			5	4					
								Boring Complete at 16.8'.	Free Standing Water measured at 14.4' inside augers at boring completion.
20									
								Ground water monitoring well installed tip set at 15.0-feet. Refer to monitoring well completion report for details.	
25									

N = No blows to drive 2" spoon 12" with 140 lb. pin wt. falling 30" per blow.

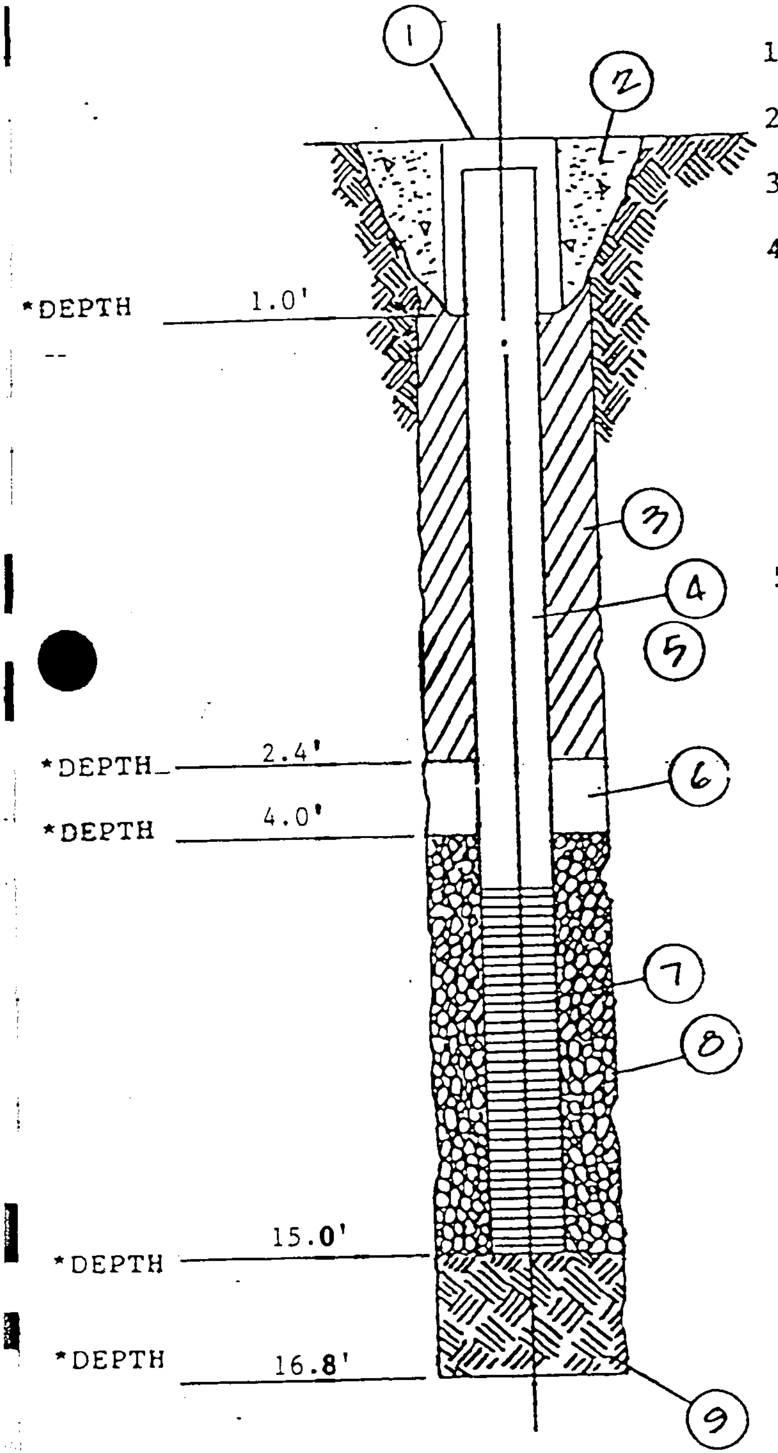
CLASSIFICATION Visual by Geologist

C = No blows to drive ___" casing ___" with ___ lb. weight falling ___" per blow.

METHOD OF INVESTIGATION ASTM D-1586 USING 4-1/4" HOLLOW STEM AUGERS

MONITOR WELL COMPLETION REPORT:

WELL No. ESI-4 JOB No. BTA-90-179A
PROJECT: Dowcraft Corporation
Falconer, New York



1. GATE BOX I.D.: 8 INCHES
2. SURFACE SEAL TYPE: Type I Portland Cement
3. BOREHOLE DIAMETER 8 INCHES
4. RISER PIPE:
    - a. TYPE 40 Schedule PVC
    - b. I.D. 2 INCHES
    - c. LENGTH 4.8 FEET
    - d. JOINT TYPE Flush Couple Threaded
5. BACKFILL:
    - a. TYPE Type I Portland Cement
    - b. INSTALLATION Surface Pour
6. TYPE OF SEAL: Bentonite Pellet
7. SCREEN:
    - a. TYPE 40 Schedule PVC
    - b. I.D. 2 INCHES
    - c. SLOT SIZE 0.020 In.
    - d. LENGTH 10 FT.
8. SCREEN FILTER TYPE: #4 Q Rok Sand
9. BACKFILL TYPE: Natural Sands & Gravel

*DEPTH IN FEET BELOW GROUND SURFACE.

EMPIRE SOILS INVESTIGATIONS INC.

DATE
STARTED 11-6-90
FINISHED 11-6-90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. ESI-5
SURF. ELEV. ---
G. W. DEPTH See Notes

PROJECT Dowcraft Corporation
(BTA-90-179A)

LOCATION Dow Street
Falconer, New York

DEPTH	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	BLOWS ON SAMPLER 6/12	BLOWS ON SAMPLER 12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0								0.4' ASPHALTIC CONCRETE	
								0.6' CRUSHER RUN STONE FILL	
								Thin Concrete layer	
								Wood Railroad tie	
		2	7	10		-		Brown-tan f-c SAND, some f-c Gravel,	Railroad tie from
		3	7	12		26		little Silt, tr. brick, tr. wood,	approximately 1.5'
5			14	19				(moist, FILL)	to 2.7'.
		4	19	13		24		Contains tr. rusted metal shaving	
			11	9				Brown-tan f-c GRAVEL, some f-c	
		5	8	8		14		Sand, little Silt (moist, firm)	
			6	5				(wet)	
10		6	2	4		9		Contains "and" f-c Sand	Water at approximately 8.0'.
			5	3				(loose)	
		7	1	1		2			
			1	1					
5									
								Boring Complete at 16.0'.	Free Standing Water measured at 12.1' inside augers at boring completion.
20									
								Ground water monitoring well installed tip set at 15.2-feet. Refer to monitoring well completion report for details.	

N = No blows to drive 2 " spoon 12 " with 140 lb pin wt. falling 30 " per blow.

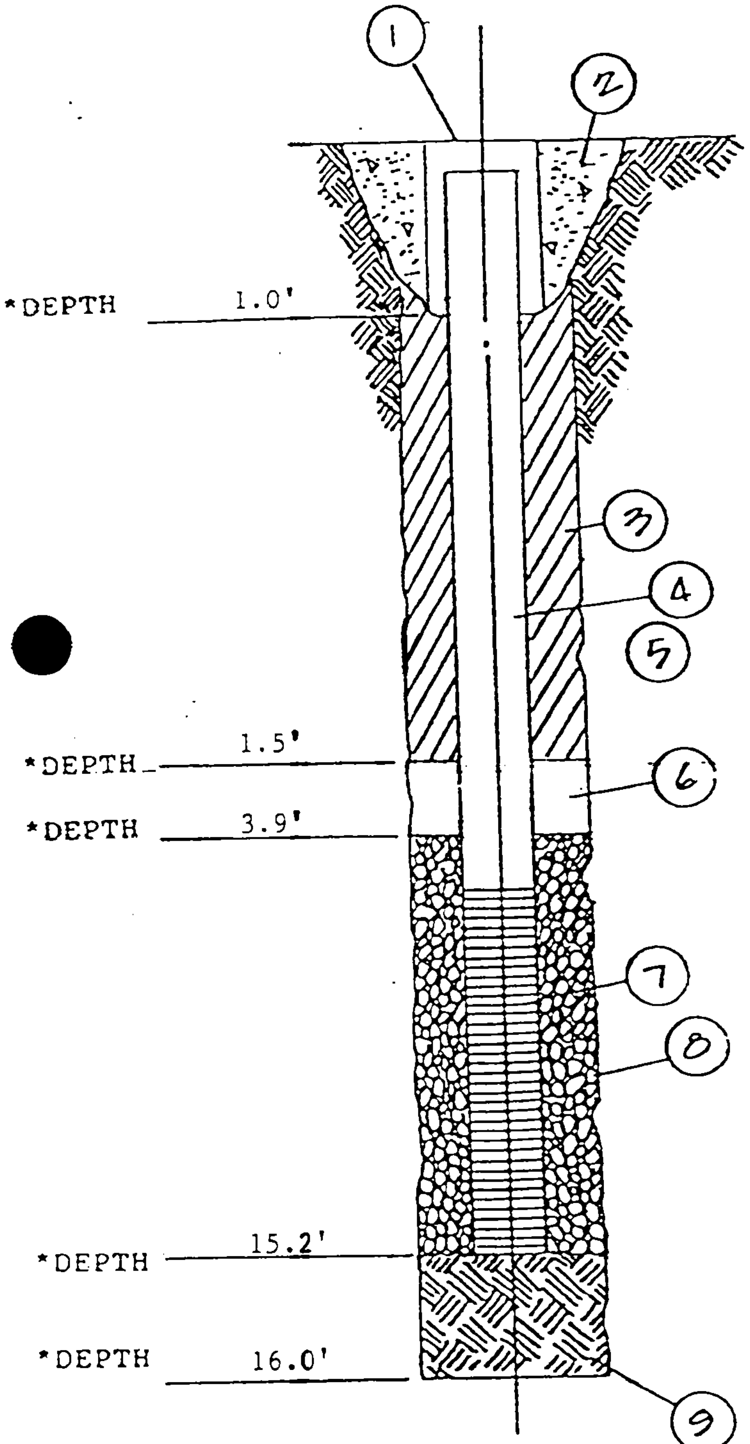
C = No blows to drive ______ " casing ______ " with ______ lb weight falling ______ " per blow.

CLASSIFICATION Visual by Geologist

METHOD OF INVESTIGATION ASTM D-1586 USING 4-1/4" HOLLOW STEM AUGERS

MONITOR WELL COMPLETION REPORT:

WELL No. ESI- 5 JOB No. BTA-90-179A
PROJECT: Dowcraft Corporation
Falconer, New York



1. GATE BOX I.D.: 8 INCHES
2. SURFACE SEAL TYPE: Type I Portland Cement
3. BOREHOLE DIAMETER 8 INCHES
4. RISER PIPE:
   - a. TYPE 40 Schedule PVC
   - b. I.D. 2 INCHES
   - c. LENGTH 5.0 FEET
   - d. JOINT TYPE Flush Couple Threaded
5. BACKFILL:
   - a. TYPE Type I Portland Cement
   - b. INSTALLATION Surface Pour
6. TYPE OF SEAL: Bentonite Pellet
7. SCREEN:
   - a. TYPE 40 Schedule PVC
   - b. I.D. 2 INCHES
   - c. SLOT SIZE 0.010 In.
   - d. LENGTH 10 FT.
8. SCREEN FILTER TYPE: #2 Q Rok Sand
9. BACKFILL TYPE: Natural Sands & Gravel

*DEPTH IN FEET BELOW GROUND SURFACE.

DATE

STARTED 12-26-90

FINISHED 12-26-90

SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

(BTA-90-179B)

HOLE NO. ESI-A /ESI-6

SURF. ELEV. ----

G. W. DEPTH **

PROJECT Dowcraft Corporation
Environmental Investigation

LOCATION 65 South Dow Street
Falconer, New York 14733

DEPTH-FT.	SAMPLES	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID F	PID L
0	/	1	8	7			BG	BG
			11	21		18		
	/	2	10	10			BG	0.6
			7	8		17		
5	/	3	2	3			BG	0.4
			2	1		5		
	/	4	3	2			BG	0.3
			6	4		8		
	/	5	1	2			BG	0.8
10			2	6		4		
	/	6	2	2			BG	6.6
			2	3		4		
	/	7	5	6			BG	7.1
			6	7		12		
20								

SOIL OR ROCK CLASSIFICATION

Brown Clayey SILT, and black CINDERS, some crushed red Brick, some f-c Sand, little f.-Gravel (damp, FILL)

Black crushed CINDERS, some Slag, tr. silt, tr. f-c sand, tr. black-brown sand, (moist, FILL)

Some Silt, some f-m Sand, some crushed red Brick

tr. red brick pieces (wet)

"And" f-m SAND, little crushed red Brick, tr. crushed cinders

Gray f-m GRAVEL, some Silt, tr. f.-sand, tr. clay (wet, FILL)

Boring Complete at 14.0'. Tip of ground water monitoring well set at 13.5' (See Well Construction Diagram for details).

NOTES

*Organic vapor measurements recorded in-field (F) using a photoionization detector (PID) by an ESI geologist. Measurements collected as split-spoon was opened measurements recorded in parts per million (ppm).

Field Background (BG) =0.3-0.5 ppm. Laboratory headspace measurements (L) collected as aluminum foil capped jar was opened. BG=0.3 ppm.

S-5,6,7: Water had slight sheen on surface.

**Free standing water measured in well after completion of well construction at depth of 7.21' below grade.

N = No. blows to drive 2 " spoon 12 " with 140 lb. pin wt. falling 30 " per blow.

C = No. blows to drive ____ " casing ____ " with ____ lb. weight falling ____ " per blow.

CLASSIFICATION Visual by Geologist

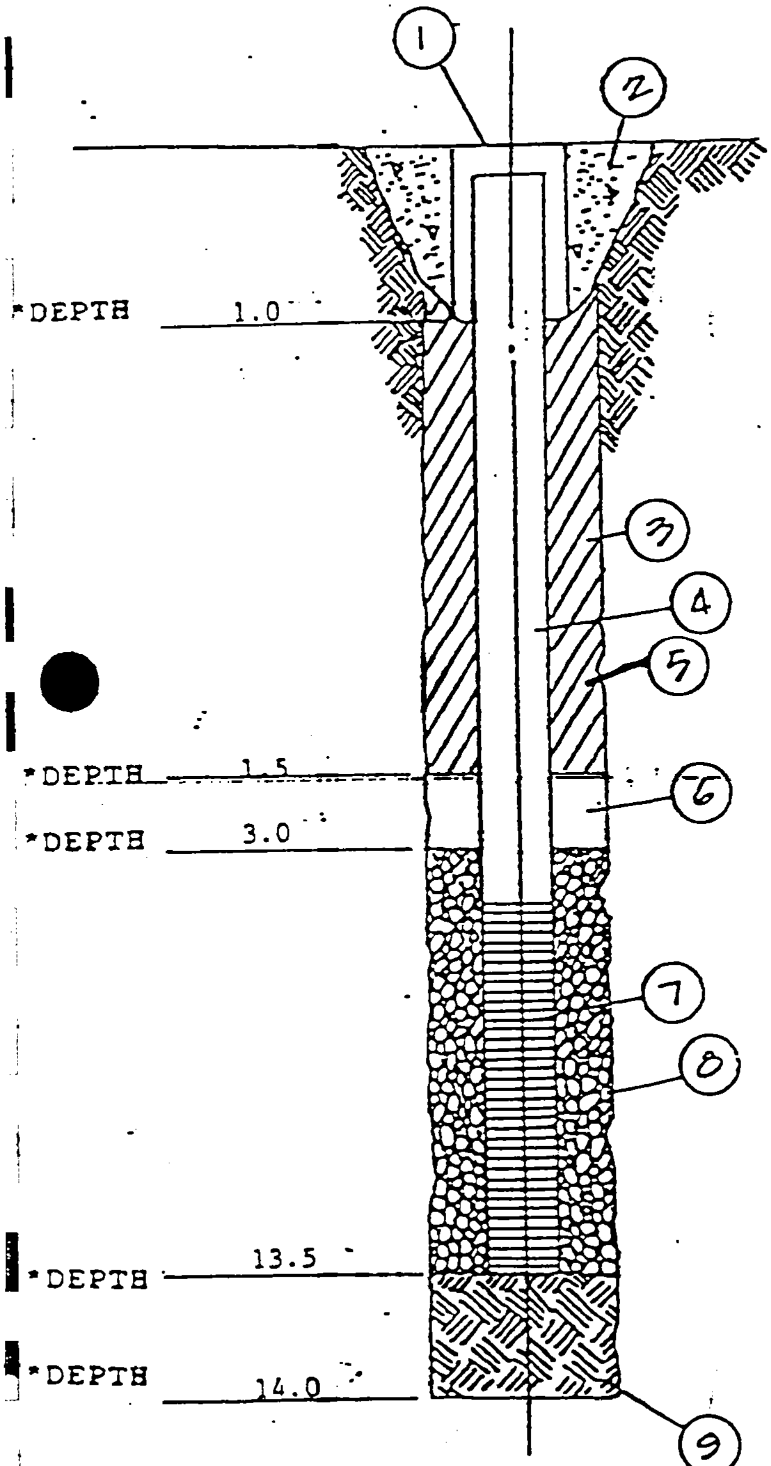
METHOD OF INVESTIGATION: ASTM D-1586; BORING ADVANCED USING A CME-45B DRILL RIG W/4¼" I.D.H.S.A.

MONITOR WELL COMPLETION REPORT:

WELL No. ESI-A/ ESI-6 JOB No. BTA-90-179B

PROJECT: Dowcraft Corp. Environmental Invest.

65 South Dow Street



1. GATE BOX I.D.: 8-3/8" INCHES
2. SURFACE SEAL TYPE: Cement Grout
3. BOREHOLE DIAMETER 8 INCHES
4. RISER PIPE:
   - a. TYPE Schedule 40 PVC
   - b. I.D. 2 INCHES
   - c. LENGTH 3.5 FEET
   - d. JOINT TYPE Flush Threaded
5. BACKFILL:
   - a. TYPE Cement Grout
   - b. INSTALLATION Pour From Ground Surface
6. TYPE OF SEAL: Bentonite Pellets
7. SCREEN:
   - a. TYPE Schedule 40 PVC
   - b. I.D. 2 INCHES
   - c. SLOT SIZE 0.020 In.
   - d. LENGTH 10 FT.
8. SCREEN FILTER TYPE: 4 QRok Sand
9. BACKFILL TYPE: 4 QRok Sand

[illegible]PTH IN FEET BELOW GROUND SURFACE.

EMPIRE SOILS INVESTIGATIONS INC

DATE
STARTED 12-26-90
FINISHED 12-26-90
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

(BTA-90-179B)

HOLE NO. ESI-B/ESI-7
SURF. ELEV. -----
G. W. DEPTH **

PROJECT Dowcraft Corporation
Environmental Investigation

LOCATION 65 South Dow Street
Falconer, New York 14733

DEPTH-FT.	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	PID F	PID L
0	1	14	9			BG	0.4
		6	6		15		
	2	3	3				
		4	10		7	BG	0.4
	3	8	100	0.3	100	*	0.8
5	4	11	6		17	*	0.6
	5	9	6			*	0.5
		15	11		21		
	6	6	8			*	0.6
10		9	7		17		
	7	2	8			*	0.4
		8	7		16		
	8	9	7			*	0.4
		6	5		13		
15	9	4	5		9	*	0.6
20							

SOIL OR ROCK CLASSIFICATION

Brown Clayey SILT AND f-c Sand, little f. Gravel, tr. concrete (damp,FILL)
Does not contain concrete
little Coal

CONCRETE

Brown Clayey SILT, little Brick, little Coal (moist,FILL)
some f.-Gravel
(wet)

Brown f-c SAND, some Silt, tr. clay, tr. calcareous shells (wet,stiff)
tr. silt, tr. clay, no calcareous shells
"And" SILT "And" f.-SAND (medium)
"And" f-c SAND, little f.-Gravel, little Silt, tr. clay

Boring Complete at 15.0'. Tip of ground water monitoring well set at 14.5' (See Well Construction Diagram for details).

NOTES

*Organic vapor measurements recorded in-field (F) using photoionization detector (PID) by an ESI Geologist. Measurements collected as split-spoon was opened. Measurements recorded in parts per million (ppm).
Field Background (BG) =0.4-0.5 ppm.
Laboratory headspace measurements (L) collected as aluminum foil capped jar was opened. BG=0.3 ppm.

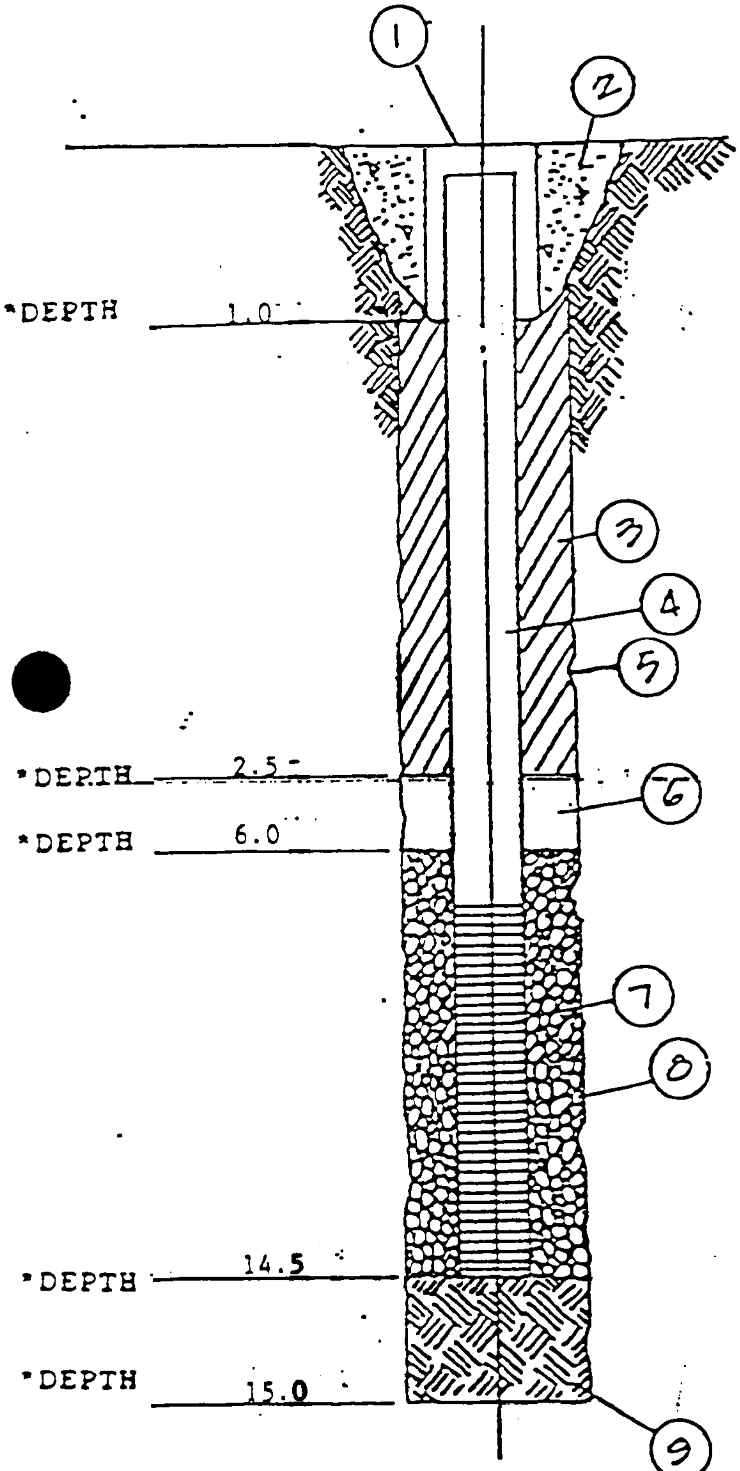
PID not working properly due to temperature.
S-8,9: Slight sheen on water surface
Note: Auger spoil has slight sheen.

**Free standing water measured in well after completion of well construction at depth of 7.11' below grade.

N = No. blows to drive 2" spoon 12" with 140 lb. pin wt. falling 30" per blow.
C = No. blows to drive ____" casing ____" with ____ lb. weight falling ____" per blow.
CLASSIFICATION Visual by Geologist
METHOD OF INVESTIGATION: ASTM D-1586; BORING ADVANCED USING A CME-45B DRILL RIG W/4¼" I.D.H.S.A.

MONITOR WELL COMPLETION REPORT:

WELL No. ESI-B/ESI-7 JOB No. BTA-90-179B
PROJECT: Dowcraft Corp. Environmental Invest.
65 South Dow Street



1. GATE BOX I.D.: 8-3/8" INCHES

2. SURFACE SEAL TYPE: Cement Grout

3. BOREHOLE DIAMETER 8 INCHES

4. RISER PIPE:

   a. TYPE Schedule 40 PVC

   b. I.D. 2.0 INCHES

   c. LENGTH 6.0 FEET

   d. JOINT TYPE Flush Threaded

5. BACKFILL:

   a. TYPE Cement Grout

   b. INSTALLATION Pour From Ground Surface

6. TYPE OF SEAL: Bentonite Pellet

7. SCREEN:

   a. TYPE Schedule 40 PVC

   b. I.D. 2 INCHES

   c. SLOT SIZE 0.020 In.

   d. LENGTH 8 FT.

8. SCREEN FILTER TYPE: 4QRok Sand

9. BACKFILL TYPE: 4QRok Sand

*DEPTH IN FEET BELOW GROUND SURFACE.

EMPIRE
SOILS INVESTIGATIONS INC

DATE
STARTED: 4-8-92
FINISHED: 4-8-92

EMPIRE
SOILS INVESTIGATIONS INC.

SUBSURFACE LOG
BTA-92179B

BORING NO.: ESI-8
SURF. ELEV.: 102.3 ±
SHEET 1 OF 1

PROJECT: Dowcraft Environmental Investigation
CLIENT: Dowcraft Corporation
LOCATION: 65 South Dow Street
Falconer, New York

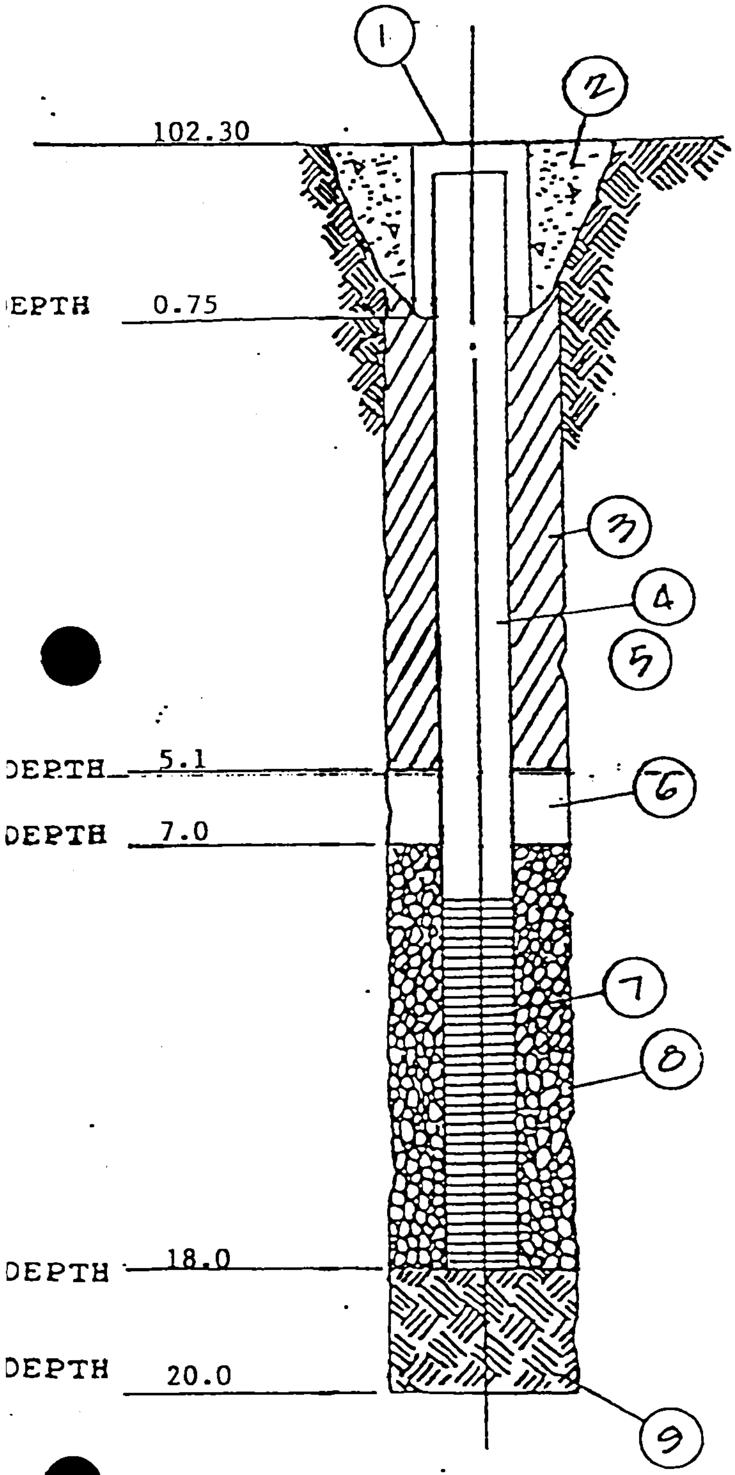
DEPTH-FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	P.I.D.	SYMBOL	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	3	5	5	7	10	BG		Red BRICK, little gray Shale, little black Sand (moist, FILL)	Organic vapor measurements recorded in the field as the split spoons were opened. Measurements recorded in parts per million (ppm). Background measurement 0.2 ppm.
		2	7	3	4	3	7	BG		Black and gray f-c SAND, little Concrete, little Brick, tr. gravel (moist, FILL)	
		3	4	1	1	1	2	BG		Black m-c SAND, little Coal, little Concrete, tr. organics (moist, FILL)	
5											
		4	24	12	24	25	36	BG		Mottled Brown and Black f-c SAND and f-c Gravel, tr. silt (moist, compact, SW)	
		5	25	11	12	12	23	BG		Brown m.SAND, little f-Gravel (moist,firm,SW)	
10		6	34	27	23	14	50	BG		f-c GRAVEL, some brown f-c Sand (moist, compact,GW)	
		7	10	9	12	8	21	BG		f-c GRAVEL, some brown f-c Sand, tr. silt (wet, firm,GW)	Apparent water table at 13.5 feet below ground surface.
		8	10	9	11	12	20	BG			
15											
		9	12	11	6	6	17	BG			
		10	11	11	8	8	19	BG			
20										Boring complete at 20.0'	
25											
30											

DRILLER: P. Bence
DRILL RIG: CME-75
METHOD OF INVESTIGATION: ASTM D-1586 USING HOLLOW STEM AUGERS
WEATHER: Partly cloudy 50-60 F.
CLASSIFIED BY: K. Shanahan

MONITOR WELL COMPLETION REPORT:

WELL No. ESI-8 JOB No. BTA-92-179B

PROJECT: Dowcraft Environmental Investigation



1. GATE BOX I.D.: 9 INCHES

2. SURFACE SEAL TYPE: Concrete

3. BOREHOLE DIAMETER 8 INCHES

4. RISER PIPE:

   a. TYPE Schedule 40 PVC

   b. I.D. 2.0 INCHES

   c. LENGTH 7.77 FEET

   d. JOINT TYPE Flush Threaded

5. BACKFILL:

   a. TYPE Cement Grout

   b. INSTALLATION Surface

6. TYPE OF SEAL: Bentonite Pellets

7. SCREEN:

   a. TYPE Schedule 40 PVC

   b. I.D. 2.0 INCHES

   c. SLOT SIZE 0.010 In.

   d. LENGTH 10.0 FT.

8. SCREEN FILTER TYPE: No. 1 Morie Silica Sand

9. BACKFILL TYPE: No. 1 Morie Silica Sand

*D[illegible]H IN FEET BELOW GROUND SURFACE.

EMPIRE

SOILS INVESTIGATIONS INC

DATE
STARTED: 4-8-92
FINISHED: 4-8-92

EMPIRE
SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

BTA-92179B

BORING NO.: ESI-9
SURF. ELEV.: 100.2 ±
SHEET 1 OF 1

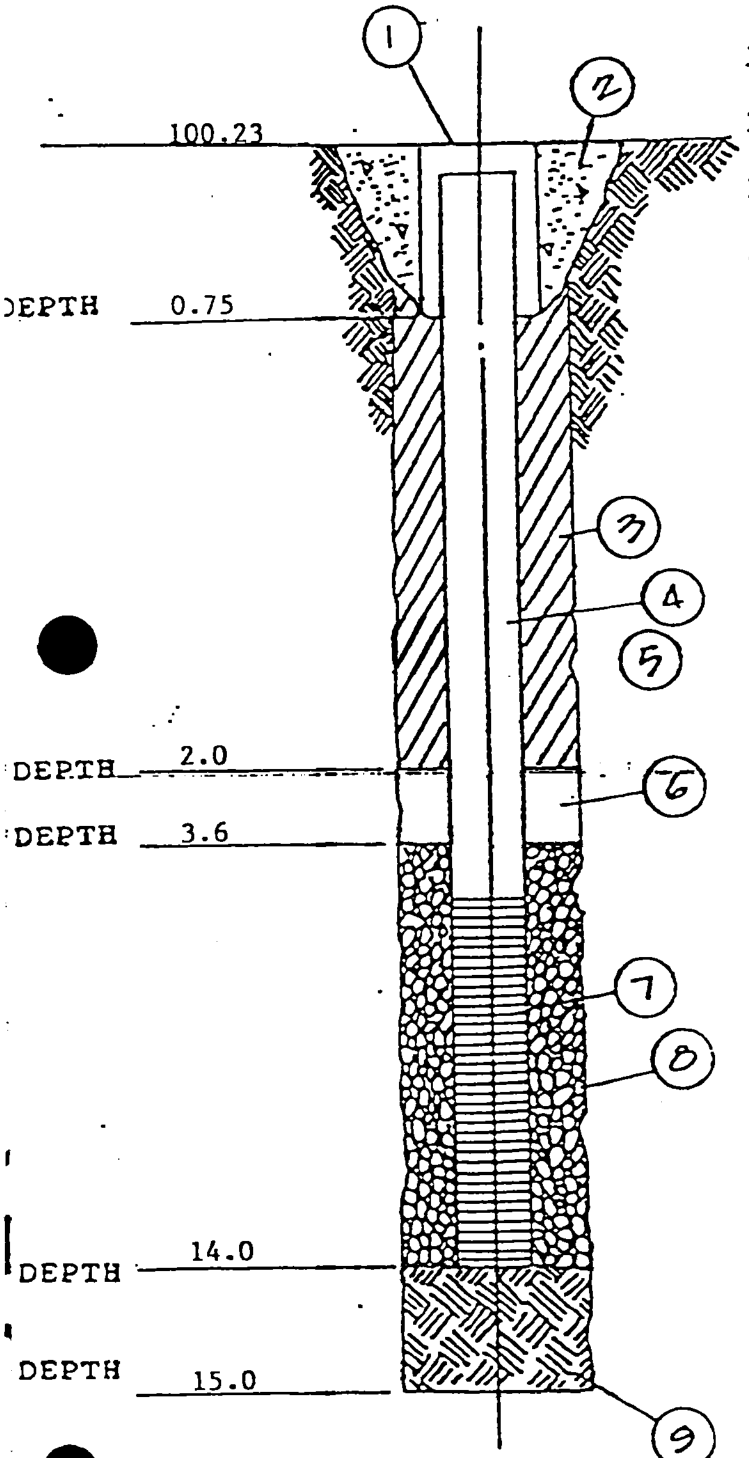
PROJECT: Dowcraft Environmental Investigation
CLIENT: Dowcraft Corporation
LOCATION: 65 South Dow Street
Falconer, New York

DEPTH-FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER					P.I.D.	SYMBOL	SOIL OR ROCK CLASSIFICATION	NOTES
			0/6	6/12	12/18	18/24	N				
0		1		11	6	2	17	BG		ASPHALT Brown f-c SAND and f-c Gravel, tr. black sand, tr. coal (moist, FILL)	Organic vapor measurements recorded in the field as the split spoons were opened. Measurements recorded in parts per million (ppm). Background measurement 0.2 ppm. Apparent water at 8.2 feet below ground surface.
		2	3	5	6	10	11	BG		Yellow-Brown SILT, tr. Clay (moist, medium,ML)	
5		3	9	9	9	10	18	BG		Brown f-c GRAVEL, some Sand (moist, compact,GW)	
		4	20	13	8	7	21	BG			
		5	8	11	13	12	24	BG		Brown f-c SAND, some f. Gravel, tr. silt (wet, firm,SW)	
10		6	13	10	8	6	18	BG		Gray c. SAND, some f. Gravel, little Silt (wet,firm,SM)	
		7	6	2	1	1	3	BG		Brown f. SAND (wet, loose,SP)	
15										Boring complete at 15.0'	
20											
25											
30											

DRILLER: P. Bence
DRILL RIG: CME-75
METHOD OF INVESTIGATION: ASTM D-1586 USING HOLLOW STEM AUGERS
WEATHER: Partly Cloudy 50's
CLASSIFIED BY: K. Shanahan

MONITOR WELL COMPLETION REPORT:

WELL No. ESI-9 JOB No. BTA-92-179B
PROJECT: Dowcraft Environmental Investigation



*DEPTH IN FEET BELOW GROUND SURFACE.

1. GATE BOX I.D.: 9 INCHES
2. SURFACE SEAL TYPE: Concrete
3. BOREHOLE DIAMETER 8 INCHES
4. RISER PIPE:
    a. TYPE Schedule 40 PVC
    b. I.D. 2.0 INCHES
    c. LENGTH 3.8 FEET
    d. JOINT TYPE Flush Threaded
5. BACKFILL:
    a. TYPE Cement Grout
    b. INSTALLATION Surface
6. TYPE OF SEAL: Bentonite Pellets
7. SCREEN:
    a. TYPE Schedule 40 PVC
    b. I.D. 2.0 INCHES
    c. SLOT SIZE 0.010 In.
    d. LENGTH 10.0 FT.
8. SCREEN FILTER TYPE: No. 1 Morie Silica Sand
9. BACKFILL TYPE: No. 1 Morie Silica Sand

EMPIRE

DATE
STARTED: 4-9-92
FINISHED: 4-9-92

EMPIRE
SOILS INVESTIGATIONS INC.

SUBSURFACE LOG
BTA-92179B

BORING NO.: ESI-10
SURF. ELEV.: 99.4 ±
SHEET 1 OF 1

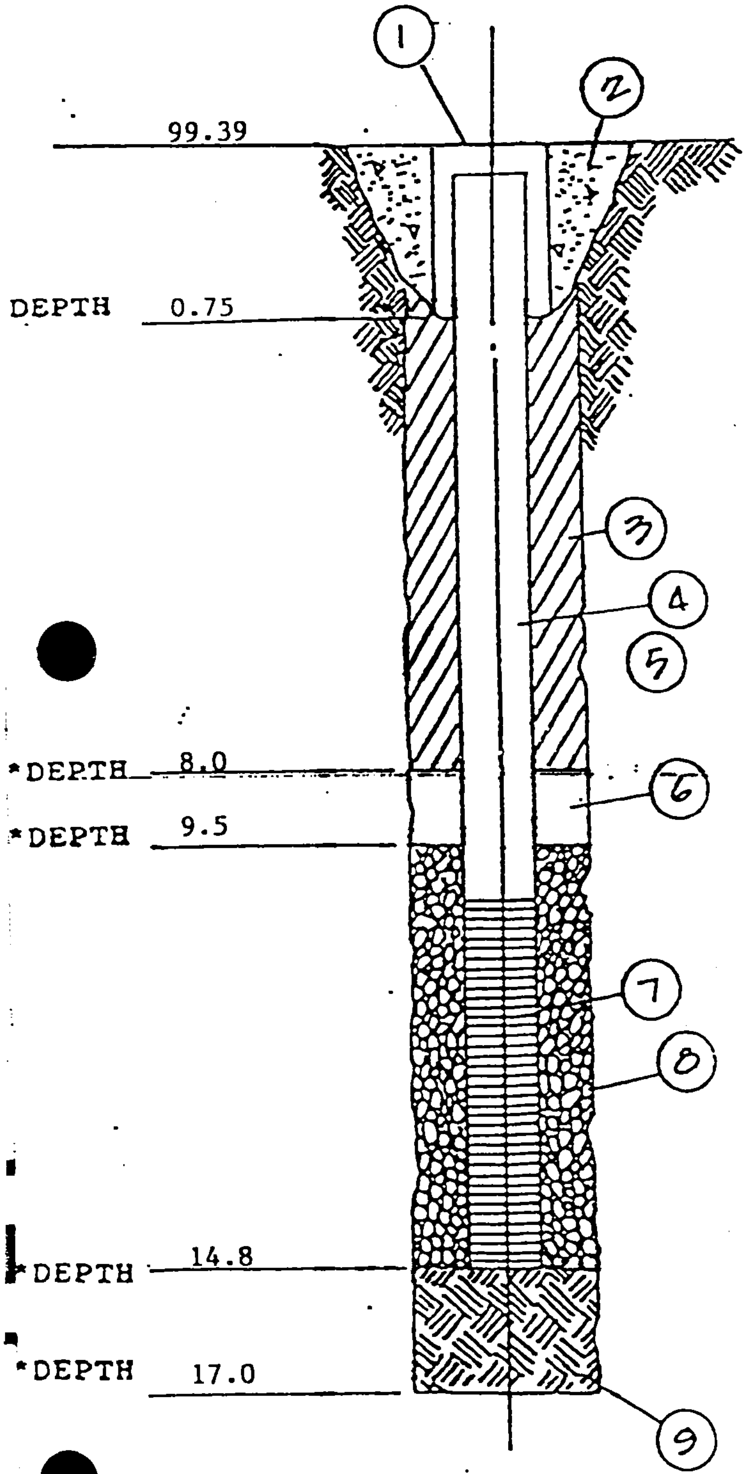
PROJECT: Dowcraft Environmental Investigation
CLIENT: Dowcraft Corporation
LOCATION: 65 South Dow Street
Falconer, New York

DEPTH-FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	P.I.D.	SYMBOL	SOIL OR ROCK CLASSIFICATION	NOTES
0										CONCRETE FLOOR	
										Basement Area	Organic vapor measurements recorded in the field as the split spoons were opened. Measurements recorded in parts per million (ppm) Background measurement 0.2 ppm Background HNu reading 0.3 - 0.4 ppm Apparent ground water at 10.0 feet below surface concrete slab. Unable to obtain blow counts due to limited space
5											
10	▨	1						5.5		f-c GRAVEL, some f-c Sand, tr. silt (wet,GW)	
	▨	2						4.5			
										f-c Brown SAND (wet,SP)	
15	▨	3						1.0		Brown f-c SAND and f-c Gravel, tr. silt (wet,SW)	
										Boring complete at 17.0'	
20											
25											
30											

DRILLER: P. Bence
DRILL RIG: CME-75
METHOD OF INVESTIGATION: ASTM D-1586 USING HOLLOW STEM AUGERS
WEATHER: Partly cloudy 50-60 F
CLASSIFIED BY: K. Shanahan

MONITOR WELL COMPLETION REPORT:

WELL No. ESI-10 JOB No. BTA-92-179B
PROJECT: Dowcraft Environmental Investigation



1. GATE BOX I.D.: 9 INCHES
2. SURFACE SEAL TYPE: Concrete
3. BOREHOLE DIAMETER 8 INCHES
4. RISER PIPE:
   a. TYPE Schedule 40 PVC
   b. I.D. 2.0 INCHES
   c. LENGTH 9.6 FEET
   d. JOINT TYPE Flush Threaded
5. BACKFILL:
   a. TYPE Cement Grout
   b. INSTALLATION Surface
6. TYPE OF SEAL: Bentonite Pellets
7. SCREEN:
   a. TYPE Schedule 40 PVC
   b. I.D. 2.0 INCHES
   C. SLOT SIZE 0.010 In.
   d. LENGTH 5.0 FT.
8. SCREEN FILTER TYPE: No. 1 Morie Silica Sand
9. BACKFILL TYPE: No. 1 Morie Silica Sand

PTH IN FEET BELOW GROUND SURFACE.

EMPIRE
SOILS INVESTIGATIONS INC

A 10-inch diameter protecting casing was installe
from approximately 0.4-feet and 8.0-feet below
ground surface due to the presence of the basemen

DATE
STARTED: 4-10-92
FINISHED: 4-10-92

EMPIRE
SOILS INVESTIGATIONS INC.

SUBSURFACE LOG
BTA-92179B

BORING NO.: ESI-11
SURF. ELEV.: 99.3 ±
SHEET 1 OF 1

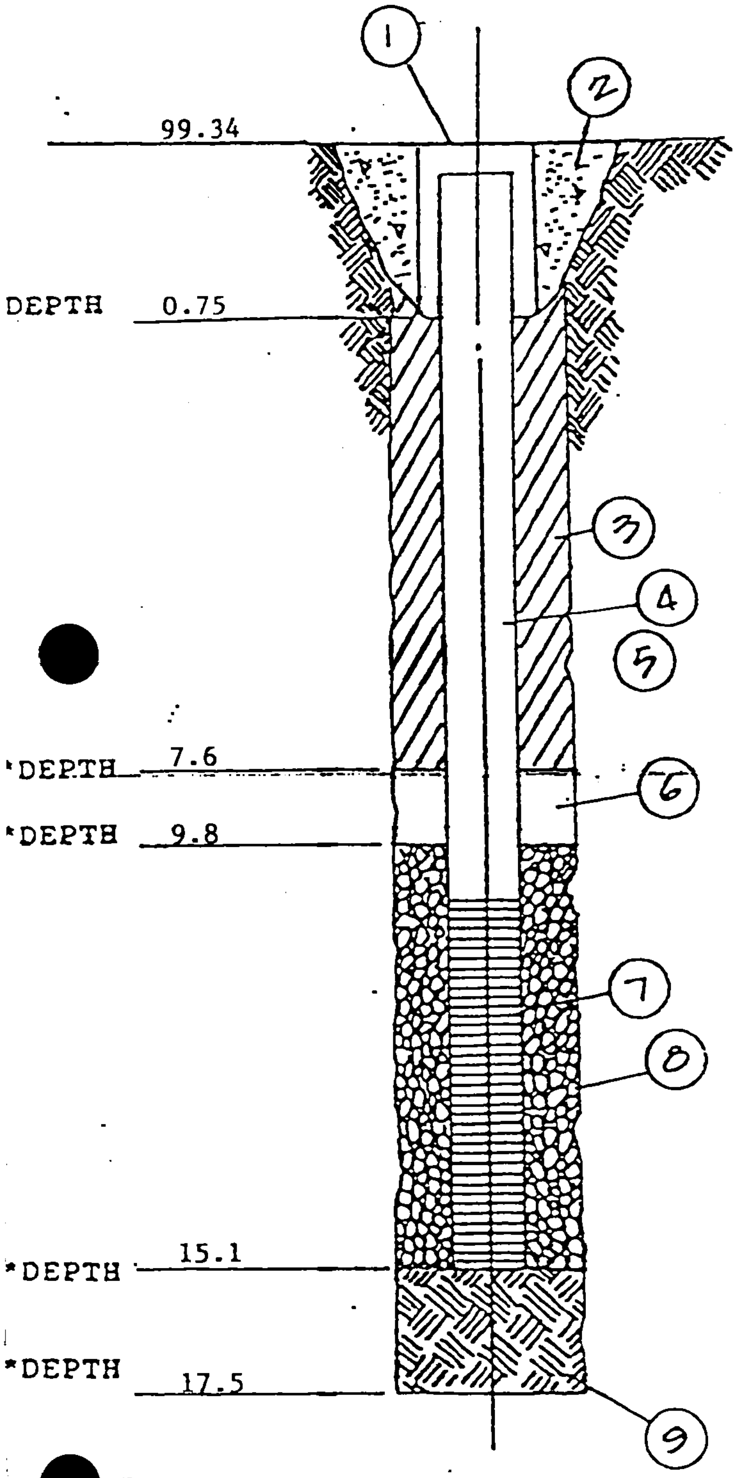
PROJECT: Dowcraft Environmental Investigation
CLIENT: Dowcraft Corporation
LOCATION: 65 South Dow Street
Falconer, New York

DEPTH-FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	P.I.D.	SYMBOL	SOIL OR ROCK CLASSIFICATION	NOTES
0										CONCRETE FLOOR Basement Area	Organic vapor measurements recorded in the field as the split spoons were opened. Measurements recorded in parts per million (ppm). Background measurement 0.2 ppm. Background HNu - 0.5 ppm Apparent ground water at 10.1 feet below concrete slab surface. Unable to obtain blow counts due to limited space.
5											
10	▨	1						BG		Gray m-c GRAVEL, little f-c Sand, little Silt (wet,GM)	
	▨	2						BG		Gray f-c SAND, little f. Gravel, tr. silt (wet,SW)	
15	▨	3						BG			
										Boring complete at 17.5'	
20											
25											
30											

DRILLER: P. Bence
DRILL RIG: CME-75
METHOD OF INVESTIGATION: ASTM D-1586 USING HOLLOW STEM AUGERS
WEATHER: Partly cloudy 50-60 F.
CLASSIFIED BY: K. Shanahan

MONITOR WELL COMPLETION REPORT:

WELL No. ESI-11 JOB No. BTA-92-179B
PROJECT: Dowcraft Environmental Investigation



1. GATE BOX I.D.: 9 INCHES

2. SURFACE SEAL TYPE: Concrete

3. BOREHOLE DIAMETER 8 INCHES

4. RISER PIPE:

   a. TYPE Schedule 40 PVC

   b. I.D. 2.0 INCHES

   c. LENGTH 9.9 — FEET

   d. JOINT TYPE Flush Threaded

5. BACKFILL:

   a. TYPE Cement Grout

   b. INSTALLATION Surface

6. TYPE OF SEAL: Bentonite Pellets

7. SCREEN:

   a. TYPE Schedule 40 PVC

   b. I.D. 2.0 INCHES

   c. SLOT SIZE 0.010 In.

   d. LENGTH 5.0 FT.

8. SCREEN FILTER TYPE: No. 1 Morie Silica Sand

9. BACKFILL TYPE: No. 1 Morie Silica Sand

*[illegible]TH IN FEET BELOW GROUND SURFACE.

EMPIRE
SOILS INVESTIGATIONS INC

A 10-inch diameter protecting casing was installe from approximately 0.4-feet and 8.0-feet below ground surface due to the presence of the basemen area.

DATE
STARTED: 4-10-92
FINISHED: 4-10-92

EMPIRE
SOILS INVESTIGATIONS INC.

SUBSURFACE LOG
BTA-92179B

BORING NO.: ESI-12
SURF. ELEV.: 99.3 ±
SHEET 1 OF 1

PROJECT: Dowcraft Environmental Investigation
CLIENT: Dowcraft Corporation
LOCATION: 65 South Dow Street
Falconer, New York

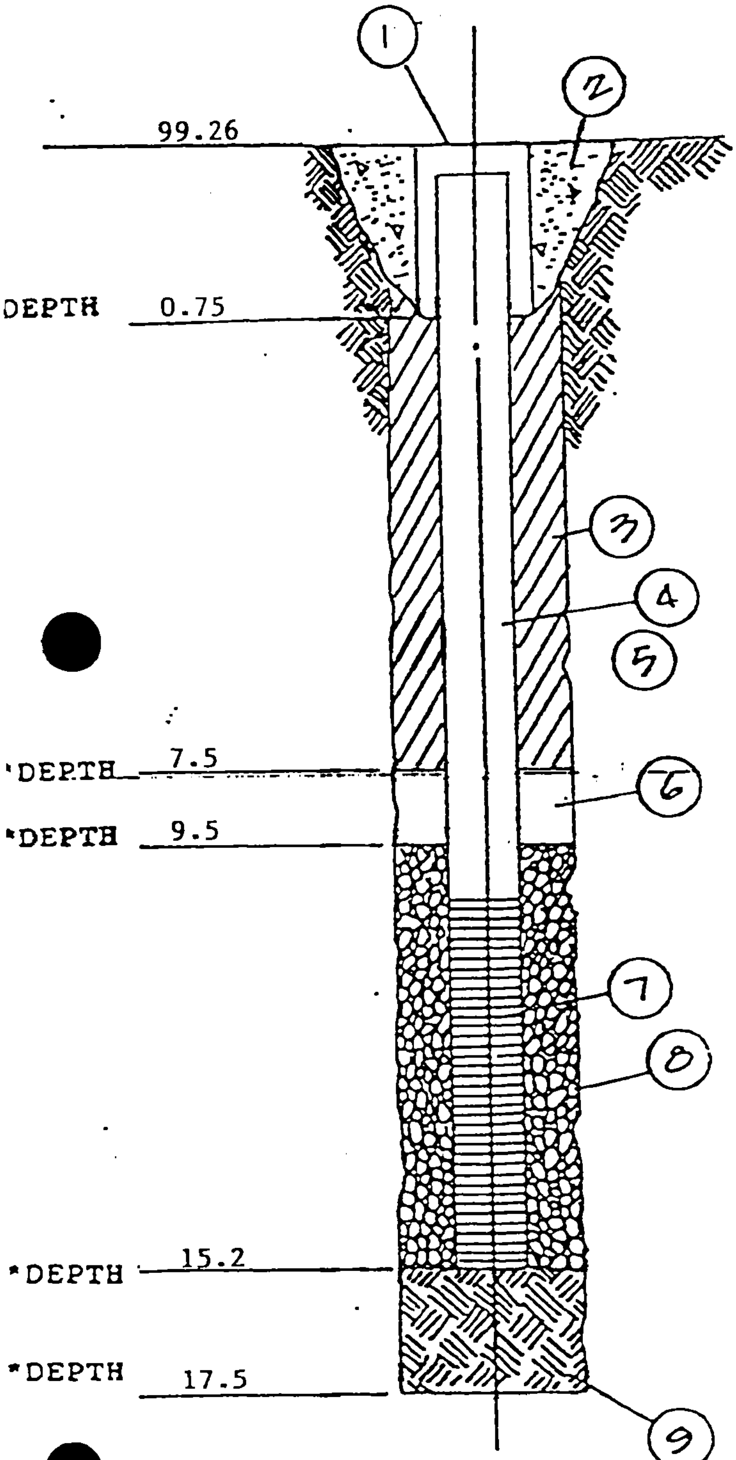
DEPTH-FT.	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	P.I.D.	SOIL OR ROCK CLASSIFICATION	NOTES
0								CONCRETE FLOOR	
	1						BG	Brown f. GRAVEL and Silt, little f-c Sand (moist, FILL)	Organic vapor measurements recorded in the field as the split spoons were opened. Measurements recorded in parts per million (ppm). Background measurement 0.2 ppm. Background HNu - 0.6 ppm Apparent ground water at 10.2 feet below concrete slab surface.
	2						BG	Brown f-c SAND and Silt, little f. Gravel (moist, FILL)	
5									
	3						BG		
								CONCRETE	
	4						BG	f-c Brown GRAVEL, some f-c Sand, tr. silt (moist-wet,GW)	
10									
	5						BG	Gray f-c SAND, tr. silt, tr. gravel (wet,SP)	
	6						BG	Brown f-c SAND, some f. Gravel, tr. silt (wet,SW)	Unable to obtain blow counts due to limited space.
								Gray f-c SAND, tr. silt (wet,SP)	
15									
	7						BG		
								Gray f-c SAND and f-c Gravel, tr. silt (wet,SW)	
								Boring complete at 17.8'	
20									
25									
30									

DRILLER: P. Bence
DRILL RIG: CME-75
METHOD OF INVESTIGATION: ASTM D-1586 USING HOLLOW STEM AUGERS
WEATHER: Partly cloudy 50-60 F.
CLASSIFIED BY: K. Shanahan

MONITOR WELL COMPLETION REPORT:

WELL No. ESI-12 JOB No. BTA-92-179B

PROJECT: Dowcraft Environmental Investigation



*DEPTH IN FEET BELOW GROUND SURFACE.

1. GATE BOX I.D.: 9 INCHES
2. SURFACE SEAL TYPE: Concrete
3. BOREHOLE DIAMETER 8 INCHES
4. RISER PIPE:
   - a. TYPE Schedule 40 PVC
   - b. I.D. 2.0 INCHES
   - c. LENGTH 10.0 – FEET
   - d. JOINT TYPE Flush Threaded
5. BACKFILL:
   - a. TYPE Cement Grout
   - b. INSTALLATION Surface
6. TYPE OF SEAL: Bentonite Pellets
7. SCREEN:
   - a. TYPE Schedule 40 PVC
   - b. I.D. 2.0 INCHES
   - c. SLOT SIZE 0.010 In.
   - d. LENGTH 5.0 FT.
8. SCREEN FILTER TYPE: No. 1 Morie Silica Sand
9. BACKFILL TYPE: No. 1 Morie Silica Sand

EMPIRE

DATE
STARTED: 4-13-92
FINISHED: 4-13-92

EMPIRE
SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

BTA-92179B

BORING NO.: ESI-13
SURF. ELEV.: 97.8 ±
SHEET 1 OF 1

PROJECT: Dowcraft Environmental Investigation
CLIENT: Dowcraft Corporation
LOCATION: 65 South Dow Street
Falconer, New York

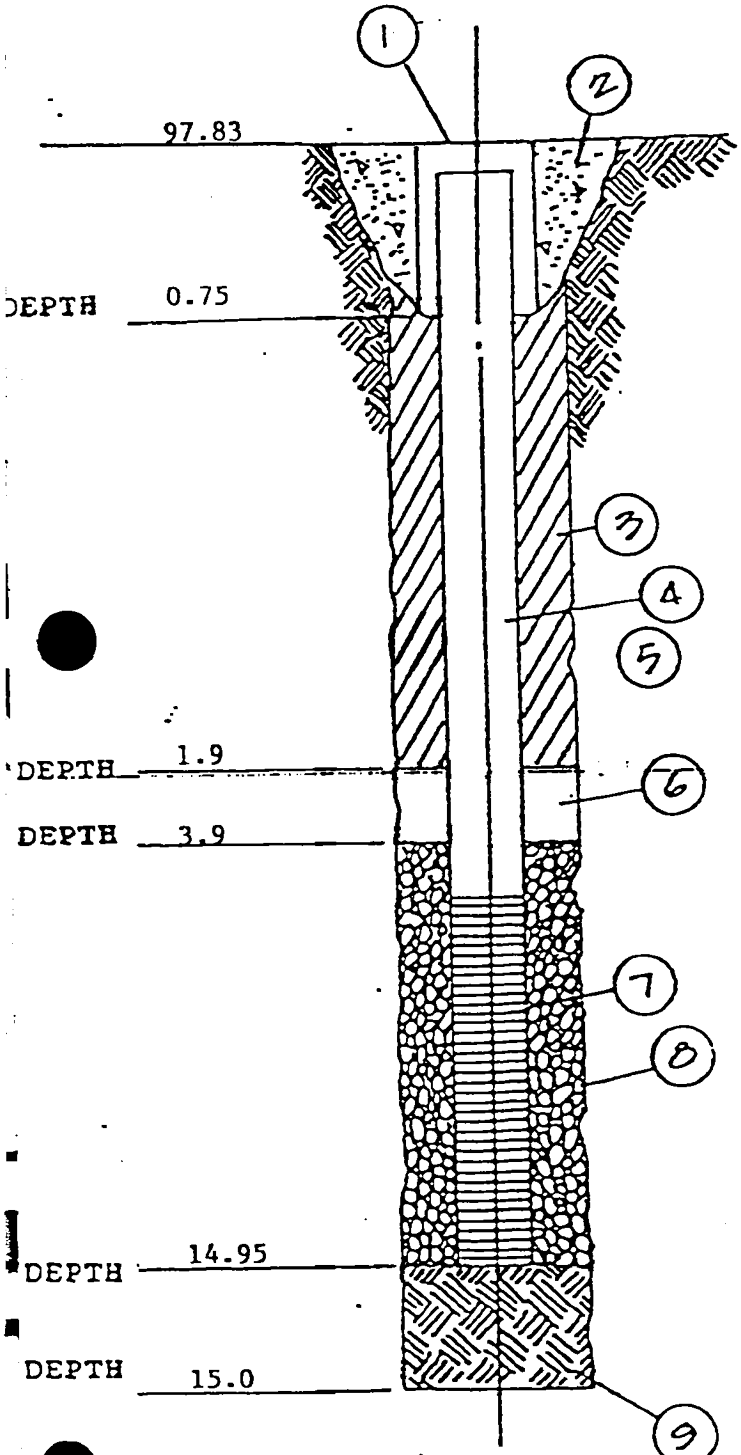
DEPTH-FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	P.I.D.	SYMBOL	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	17	21	23	18	44	*		Brown-Black f-c SAND, some Gravel, little Cinders, tr. silt (moist, FILL)	Organic vapor measurements recorded in the field as the split spoons were opened. Measurements recorded in parts per million (ppm) Background measurement 0.2 ppm
		2	10	11	13	6	24			Contains tr. wood	
5		3	6	3	5	6	8				
		4	8	2	2	7	4			Becomes brown-tan mottled, some clayey Silt, contains little f. Gravel, tr. cinders (moist,FILL)	
		5	7	6	7	12	13			Brown f-c GRAVEL and Sand, little-tr. Silt (wet, medium,GW)	Apparent Ground water at approximately 9.0 feet below ground surface.
10		6	9	6	3	5	9			(loose)	
		7	3	4	4	4	8			Contains tr. silt	
15		8	5	3	3	4	6			Becomes brown gray	*HNu battery low - no field measuremtns taken.
		9	5	2	3	7	5			Contains occasional f. Sand partings	
										Boring complete at 18.0'	
20											
25											
30											

DRILLER: P. Bence
DRILL RIG: CME-75
METHOD OF INVESTIGATION: ASTM D-1586 USING HOLLOW STEM AUGERS
WEATHER: Partly cloudy 50-60 F.
CLASSIFIED BY: L. Zimmerman

MONITOR WELL COMPLETION REPORT:

WELL No. ESI-13 JOB No. BTA-92-179B

PROJECT: Dowcraft Environmental Investigation



1. GATE BOX I.D.: 9 INCHES
2. SURFACE SEAL TYPE: Concrete
3. BOREHOLE DIAMETER 8 INCHES
4. RISER PIPE:
    - a. TYPE Schedule 40 PVC
    - b. I.D. 2.0 INCHES
    - c. LENGTH 4.7 – FEET
    - d. JOINT TYPE Flush Threaded
5. BACKFILL:
    - a. TYPE Cement Grout
    - b. INSTALLATION Surface
6. TYPE OF SEAL: Bentonite Pellets
7. SCREEN:
    - a. TYPE Schedule 40 PVC
    - b. I.D. 2.0 INCHES
    - C. SLOT SIZE 0.010 In.
    - d. LENGTH 10.0 FT.
8. SCREEN FILTER TYPE: No. 1 Morie Silica Sand
9. BACKFILL TYPE: No. 1 Morie Silica Sand

*[illegible]TH IN FEET BELOW GROUND SURFACE.

EMPIRE

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(WL-02)
Page 1 of 1

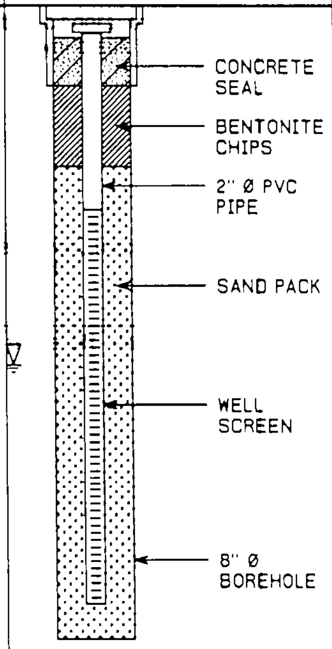
PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: 20' WEST OF ESI-13

HOLE DESIGNATION: ESI-13R
DATE COMPLETED: APRIL 24, 1998
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. OSCAR

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	0.00 0.00				
	SAND (FILL), some gravel, little cinders, trace silt, fine to coarse grained, brown-black, moist		1SS	☒	44	
-2.5	- trace wood		2SS	☒	24	
-5.0			3SS	☒	8	
	- some clayey silt, little fine gravel, trace cinders, brown-tan mottled, moist		4SS	☒	4	
-7.5		-8.0				
	GRAVEL and SAND, little to trace silt, fine to coarse gravel, brown, wet		5SS	☒	13	
-10.0	- loose		6SS	☒	9	
-12.5	- trace silt		7SS	☒	8	
	- brown gray		8SS	☒	6	
-15.0						
	- occasional fine sand partings		9SS	☒	5	
-17.5		-18.0				
	END OF HOLE @ 18.0ft BGS					
-20.0						
-22.5						
-25.0						
-27.5						
-30.0						
-32.5						

NOTE:
1. Monitoring well ESI-13R is installed as a replacement well for ESI-13 which was destroyed. Stratigraphy shown for ESI-13R is taken from the original subsurface log prepared for well ESI-13 (Empire Soils, 4/13/92).

MONITOR INSTALLATION



SCREEN DETAILS
Screened interval:
5.1 to 15.1ft BGS
Length: 10.0ft
Diameter: 2"
Slot Size: #10
Material: PVC
Sand Pack:
4.0 to 16.0ft BGS
Material: Unimin Granular
#2095

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

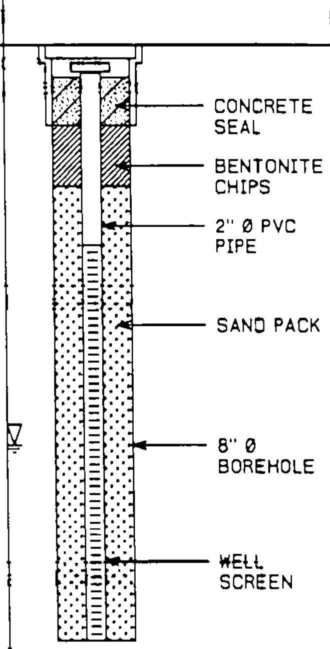
(WL-04)
Page 1 of 1

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: EAST OF ESI-13R

HOLE DESIGNATION: ESI-14
DATE COMPLETED: MAY 8, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*1262.8* *1262.58*
	FILL, medium gravel and cinders, brick fragments, loose, black, dry, coal-like odor	
-2.5		
	- gray silty sand	
-5.0		
		1256.8
	SM-SAND (NATIVE), some silt, trace clay, gray, moist, no odor	
-7.5		
	- brown/gray	
-10.0	- wet	
-12.5		
		1249.8
	SP-SAND, fine to medium grained, brown, no odor	
	- running sands	
-15.0		*1247.8*
	END OF HOLE @ 15.0ft BGS	
-17.5		
-20.0		
-22.5		
-25.0		
-27.5		
-30.0		
-32.5		

MONITOR INSTALLATION



SCREEN DETAILS
Screened interval:
5.0 to 15.0ft BGS
Length: 10.0ft
Diameter: 2"
Slot Size: #10
Material: PVC
Sand Pack:
3.5 to 15.0ft BGS
Material: 0 Morie Silica Sand

SAMPLE			
NUMBER	STATE	'N' VALUE	PID (ppm)
1SS	☒	18	0.0
2SS	☒	8	0.0
3SS	☒	2	0.0
4SS	☒	5	0.0
5SS	☒	11	0.0
6SS	☒	2	0.0
7SS	☒	2	0.0
8SS	☒	1	0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

DATE
STARTED: 11-11-92
FINISHED: 11-12-92

EMPIRE
SOILS INVESTIGATIONS INC.

SUBSURFACE LOG
BTA-92-266

BORING NO.: PW-1
SURF. ELEV.: ±
SHEET 1 OF 1

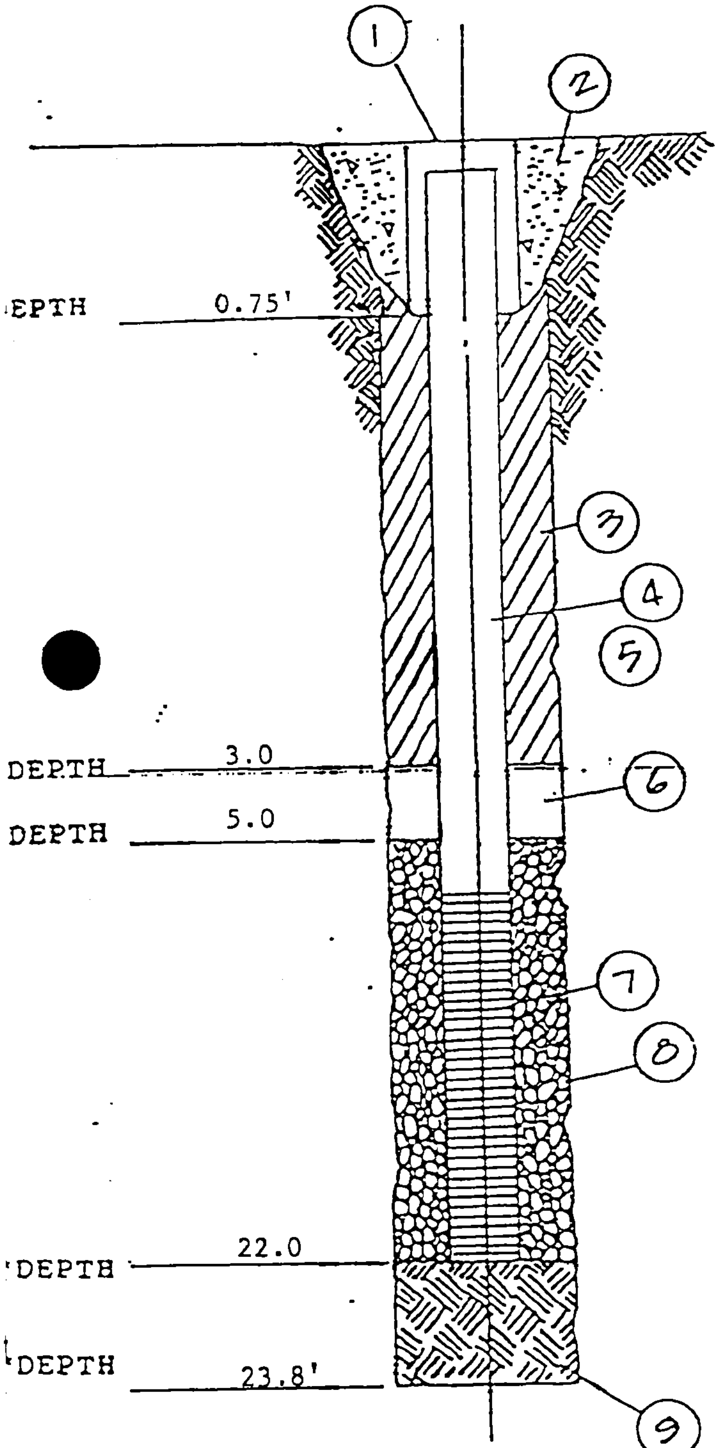
PROJECT: Dowcraft -Pumping Wells
CLIENT: Dowcraft Corporation
LOCATION: South Dow Street
Falconer, New York

DEPTH-FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	PID	SYMBOL	SOIL OR ROCK CLASSIFICATION	NOTES
0										Asphaltic Concrete Pavement @ Surface Auger to 4' before taking S. S. Samples	
		A	U	G	E	R					
		1	3	5	4	5	9	1-2		Brown f-c SAND, some Clayey Silt, some f-c Gravel (moist, loose, SM)	PID = Photoionization Detector Readings (PPM) Background (BG) PID = 0.2 - 0.6 ppm
5											
		2	3	3	3	7	6	BG		Contains occ. Silty Clay seams	
		3	8	12	27	37	39	BG		Contains little Clayey Silt (wet, compact)	
10		4	2	21	25	21	46	BG			
		5	9	5	4	4	9	BG-2		Contains tr. silt, some f-m Gravel (loose, SW)	
		6	6	4	3		7	5-7		Contains tr. gravel	
15											
		7	7	10	7	10	17	1-2		Contains occ f-m Sand seams	
		8	4	1	1	2	2	3-5		Contains f. Sand, tr. - little Silt (loose, SP-S)	
20		9	2	3	1	2	4	3-5		Contains occ. seams of f. Sand and Silt	
		10	12	4	5	6	9	BG-1		Gray SILT, tr. - little f. Sand (wet, loose, ML)	
		11	4	3	4	5	7	BG-1			
25											
		12	5	6	5	5	11	BG-1		(firm)	
										Boring Complete at 28.0'	
30											

DRILLER: P. Bence
DRILL RIG: CME-75 Truck
METHOD OF INVESTIGATION: ASTM D-1586 USING HOLLOW STEM AUGERS
WEATHER: Partly Cloudy 50's
CLASSIFIED BY: D.R. Steiner

MONITOR WELL COMPLETION REPORT:

WELL No. PW-1 JOB No. BTA-92-266
PROJECT: Dowcraft Pumping Wells



1. GATE BOX I.D.: 9 INCHES
2. SURFACE SEAL TYPE: Concrete
3. BOREHOLE DIAMETER 12 INCHES
4. RISER PIPE: (PVC 0.5'-2.0' feet)
    - a. TYPE Stainless Steel (Type 304)
    - b. I.D. 6 INCHES
    - c. LENGTH 5 FEET
    - d. JOINT TYPE Flush Thread
5. BACKFILL:
    - a. TYPE Cement Grout
    - b. INSTALLATION Surface
6. TYPE OF SEAL: Bentonite Pellets
7. SCREEN:
    - a. TYPE 304 Stainless Steel
    - b. I.D. 6 INCHES
    - c. SLOT SIZE 0.010 In.
    - d. LENGTH 15 FT.
8. SCREEN FILTER TYPE: No. 1 Morie Silica Sand
9. BACKFILL TYPE: Bentonite Pellets 23.2-23.8 feet; No. 1 Morie Silica Sand above 23.2-feet.

*D[illegible]TH IN FEET BELOW GROUND SURFACE.

EMPIRE
SOILS INVESTIGATIONS INC

DATE
STARTED: 11-12-92
FINISHED: 11-12-92

EMPIRE
SOILS INVESTIGATIONS INC.

SUBSURFACE LOG
BTA-92-266

BORING NO.: PW-2
SURF. ELEV.: ±
SHEET 1 OF 1

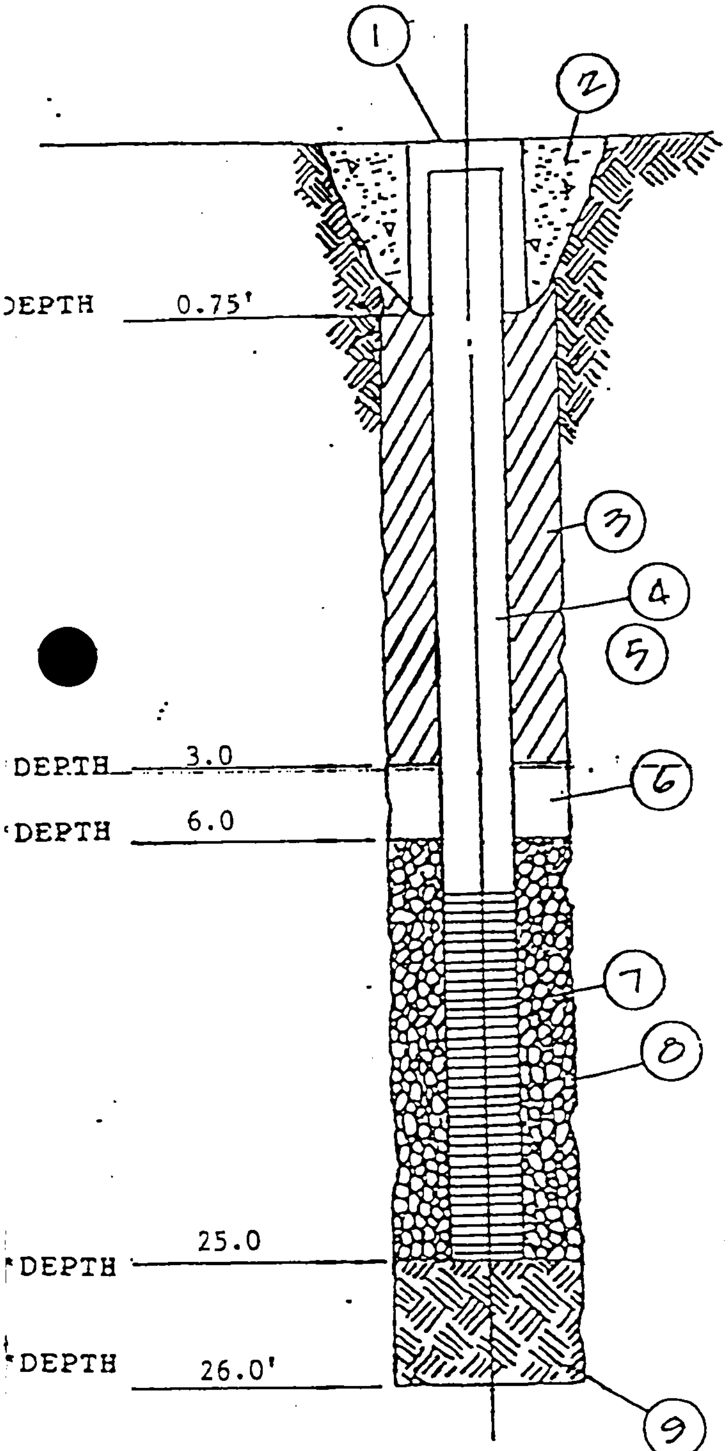
PROJECT: Dowcraft -Pumping Wells
CLIENT: Dowcraft Corporation
LOCATION: South Dow Street
Falconer, New York

DEPTH-FT.	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	18/24	N	PID	SYMBOL	SOIL OR ROCK CLASSIFICATION	NOTES
0										Auger to 10 feet before taking first split-spoon sample. Refer to log for well ESI-6 for soil classification from 0-10'	
5		A	U	G	E	R					PID = Photoionization Detector readings (PPM) Background (BG) PID = 0.2 - 0.6 ppm
10		1	1	1	1	3	2	BG		Dark brown f-c Sand, little f-m Gravel, little Silt, tr. brick(wet,FILL)	
		2	5	4	2	5	6	BG			
		3	4	2	1	1	3	2		Brown, f-c SAND, some f-m Gravel, little Silt, (wet, loose, SW-SM)	
15											
		4	1	2	3	3	5	BG			S-4: Poor Recovery
		5	6	2	6	5	8	20-30		Contains brown fine Sand, tr. gravel, tr. silt (SP)	
20		6	2	6	4	2	10	8-10			S-6: Poor Recovery
		7	1	2	1	3	3	10-15		Contains tr. - little Silt	
		8	2	3	7	8	10	50-70			
25										Gray SILT, tr. Sand (wet, firm, ML)	
		9	3	7	5	4	12	1-2			
										Boring Complete at 28.0'	
30											

DRILLER: P. Bence
DRILL RIG: CME-75 Truck
METHOD OF INVESTIGATION: ASTM-D-1586 USING HOLLOW STEM AUGERS
WEATHER: Overcast, Rain in PM, 50's
CLASSIFIED BY: D. Steiner

MONITOR WELL COMPLETION REPORT:

WELL No. PW-2 JOB No. BTA-92-266
PROJECT: Dowcraft Pumping Wells



1. GATE BOX I.D.: 9 INCHES
2. SURFACE SEAL TYPE: Concrete
3. BOREHOLE DIAMETER 12 INCHES
4. RISER PIPE: (PVC 0.5-5.0' feet)
   a. TYPE Stainless Steel (Type 304)
   b. I.D. 6 INCHES
   c. LENGTH 5 FEET
   d. JOINT TYPE Flush Thread
5. BACKFILL:
   a. TYPE Cement Grout
   b. INSTALLATION Surface
6. TYPE OF SEAL: Bentonite Pellets
7. SCREEN:
   a. TYPE 304 Stainless Steel
   b. I.D. 6 INCHES
   c. SLOT SIZE 0.010 In.
   d. LENGTH 15.0 FT.
8. SCREEN FILTER TYPE: No. 1 Morie Silica Sand
9. BACKFILL TYPE: No. 1 Morie Silica Sand

*[illegible]TH IN FEET BELOW GROUND SURFACE.

EMPIRE
SOILS INVESTIGATIONS INC

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

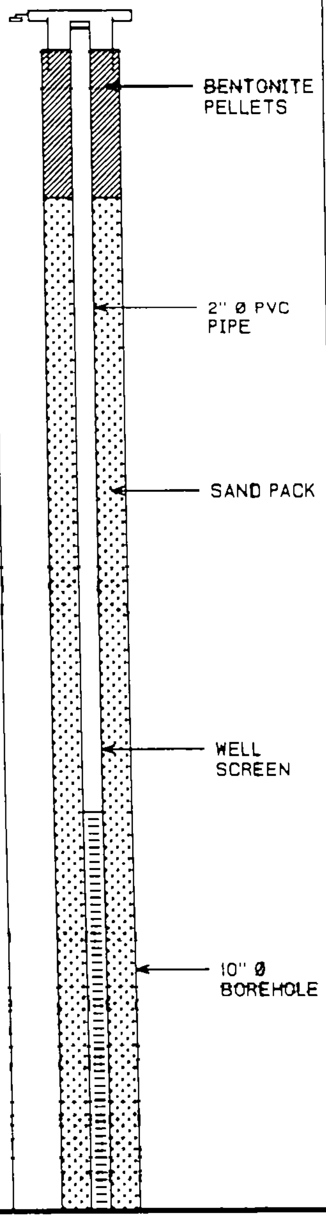
(WL-13)
Page 1 of 2

PROJECT NAME: **DOWCRAFT CORPORATION**
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: PW-3
DATE COMPLETED: OCTOBER 23, 1993
DRILLING METHOD: 6 ¼" ID HSA
CRA SUPERVISOR: D. OSCAR

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	SAMPLE			
			NUMBER	STATE	'N' VALUE	HEADSPACE WITH PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	*0.00* *0.00*				
	VAULT					
-2.5						
-5.0						
	CONCRETE	*-6.0*				
	Augered without sampling	*-7.0*				
-7.5						
-10.0						
-12.5						
-15.0						
-17.5						
-20.0	SM-SAND (NATIVE), some silt, some fine to medium gravel, fine to medium sand, brown, wet	*-20.0*	1SS	☒	6	2968
-22.5			2SS	☒	16	3095
-25.0			3SS	☒	-	854
-27.5			4SS	☒	21	1127
	- drilling becomes hard					
-30.0	- some fine gravel, trace silt, medium to coarse sand		5SS	☒	59	-
	GM-GRAVEL, some silt, trace clay, fine to medium gravel, yellow-brown, wet	*-31.4*				
-32.5	SW-SAND, trace coarse sand and silt, fine to medium sand, brown, wet	*-33.0* *-33.5*	6SS	☒	-	6000
-35.0	GW-GRAVEL, some fine to coarse sand, little silt, fine to medium gravel, brown to gray, wet	*-35.0*	7SS	☒	37	648
	SW-SAND, trace silt, medium to coarse sand, gray, wet		8SS	☒	44	1696

MONITOR INSTALLATION



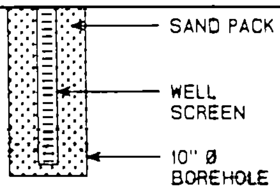
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(WL-13)
Page 2 of 2

PROJECT NAME: **DOWCRAFT** CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: PW-3
DATE COMPLETED: OCTOBER 23, 1993
DRILLING METHOD: 6 ¼" ID HSA
CRA SUPERVISOR: D. OSCAR

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	HEADSPACE WITH PID (ppm)
	- little silt, fine to medium sand - some silt			8SS	☒	44	1698
-40.0							
	ML-SILT, trace fine sand, clay, gray, moist to wet	-40.7		9SS	☒	36	-
-42.5	END OF HOLE @ 42.0ft BGS	-42.0					
-45.0							
-47.5							
-50.0							
-52.5							
-55.0							
-57.5							
-60.0							
-62.5							
-65.0							
-67.5							
-70.0							
-72.5							

SCREEN DETAILS
Screened Interval:
26.7 to 41.7ft BGS
Length: 15.0ft
Diameter: 2"
Slot Size: #10
Material: PVC
Sand Pack:
10.0 to 42.0ft BGS
Material: #0 Morie Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

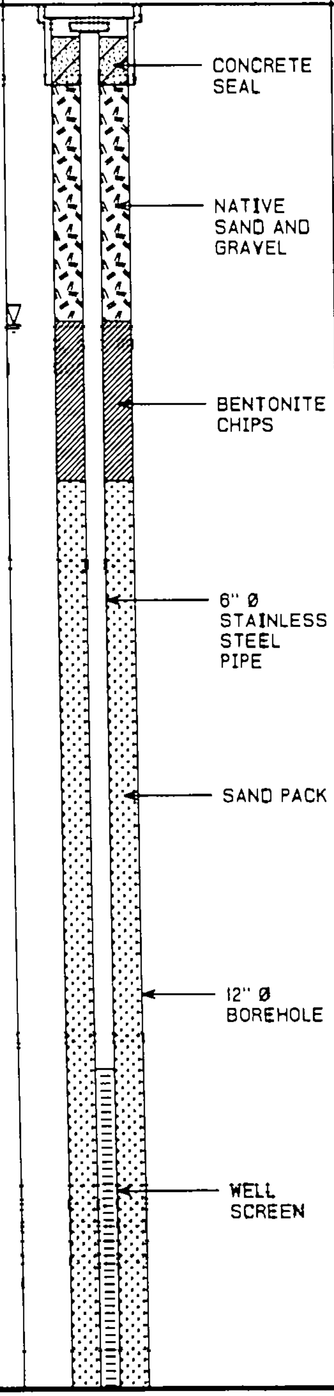
(WL-03)
Page 1 of 2

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: EAST OF PW-3

HOLE DESIGNATION: PW-3R
DATE COMPLETED: MAY 10, 2000
DRILLING METHOD: 8 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*1265.3* *1265.04*
	Stratigraphy taken from borehole drilled 3.0ft to the north from PW-3R	
	FILL, gravel, brick debris, red or red brown, dry, no odor	
-2.5		
	- more sand and gravel	
-5.0		
-7.5		
		1257.3
	GM-GRAVEL (NATIVE), some sand, silt, medium to fine grained, brown, wet, no odor	
-10.0	- trace silt	
-12.5		
	- medium sand, fine gravel, brown/gray	
-15.0		
-17.5		
-20.0		
	- medium to coarse sand	
-22.5		
	- coarse sand	
-25.0		
	- fine sand, coarse (3/4") gravel, brown	
-27.5		
		1235.5
-30.0	GM-GRAVEL, trace silt, loose, fine to coarse grained, brown and gray, sheen, chemical odor	*1235.3*
	SM/ML-SAND and SILT, trace fine gravel, fine grained sand, gray and brown	
-32.5		
		1231.3

MONITOR INSTALLATION



SAMPLE			
NUMBER	STATE	'N' VALUE	PID (ppm)
1SS	☒	38	0.0
2SS	☒	32	0.0
3SS	☒	13	0.0
4SS	☒	25	0.6
5SS	☒	22	10.0
6SS	☒	12	0.9
7SS	☒	9	10.0
8SS	☒	6	2.0
9SS	☒	9	10.9
10SS	☒	7	10.8
11SS	☒	6	8.0
12SS	☒	16	14.5
13SS	☒	14	17.2
14SS	☒	6	24.0
15SS	☒	12	21.0
16SS	☒	47	211.0
17SS	☒	55	213.0
18SS	☒	18	394.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

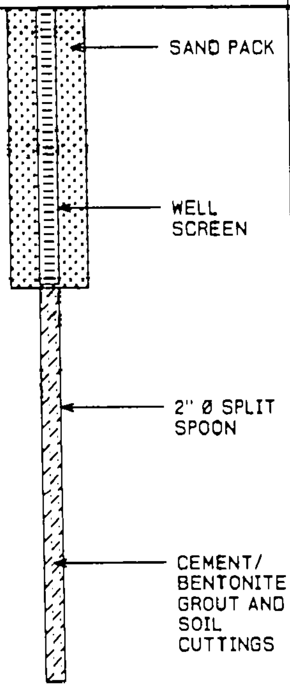
(WL-03)
Page 2 of 2

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: EAST OF PW-3

HOLE DESIGNATION: PW-3R
DATE COMPLETED: MAY 10, 2000
DRILLING METHOD: 8 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	ML/GM-SILT and GRAVEL, some fine sand, fine gravel, chemical odor - black stained soils		18SS	☒	18	394.0
			19SS	☒	16	143.0
-37.5		1227.3				
	SM/ML-SAND and SILT, very fine grained, gray/brown, slight chemical odor		20SS	☒	20	20.0
-40.0	- mostly gray, less odor					
			21SS	☒	21	16.0
		1223.6				
-42.5	SM/GM-SAND and GRAVEL, fine grained sand, fine grained gravel, silt, trace clay, dense		22SS	☒	28	6.0
		1221.3				
-45.0	ML-SILT, some fine sand, trace clay, dense, gray, no odor		23SS	☒	35	3.0
			24SS	☒	32	2.2
-47.5						
			25SS	☒	28	1.0
-50.0	- no clay to trace clay					
			26SS	☒	32	0.0
		1213.3				
-52.5	END OF HOLE @ 52.0ft BGS NOTE: 1. PW-3R total depth is 42.0ft BGS. From 42.0 to 52.0ft BGS, stratigraphy taken from borehole drilled 3.0ft to the north of PW-3R.					
-55.0						
-57.5						
-60.0						
-62.5						
-65.0						
-67.5						

MONITOR INSTALLATION



SCREEN DETAILS
Screened Interval:
26.9 to 41.9ft BGS
Length: 15.0ft
Diameter: 6"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
11.9 to 42.0ft BGS
Material: 0 Morie Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

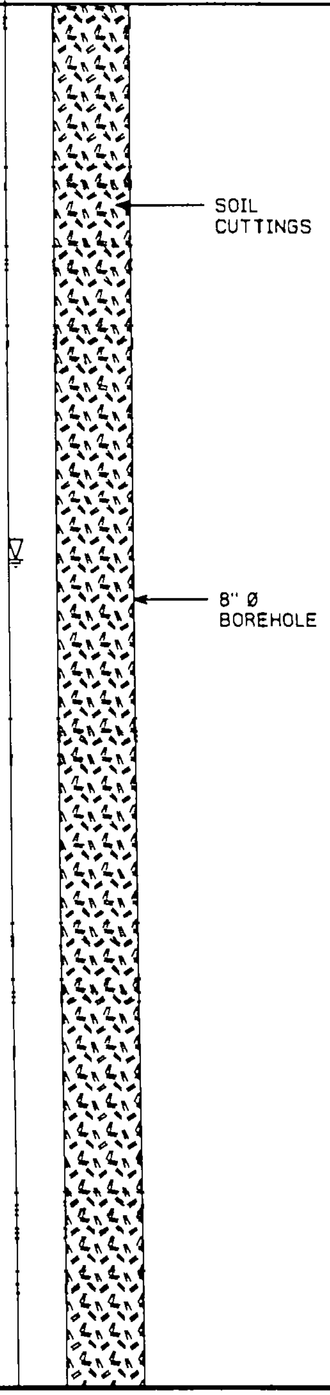
(WL-11)
Page 1 of 2

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: BH-15
DATE COMPLETED: MAY 9, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	1268.2				
	FILL, gravel, sand, brick debris, black, dry, no odor		1SS	☒	>50	0.0
-2.5	No recovery		2SS	/	>50	0.0
-5.0	FILL, cement-like, hard, tan, dry, no odor	1264.2	3SS	☒	7	0.0
-7.5	FILL, sand and gravel, trace cinders, brown, dry, no odor	1262.2	4SS	☒	28	0.0
	GM-GRAVEL, some sand, trace silt, medium to fine grained, brown/tan, dry, no odor	1260.2	5SS	☒	22	0.0
-10.0	- moist		6SS	☒	13	0.0
-12.5			7SS	☒	10	0.0
-15.0	- more gravel, wet		8SS	☒	12	0.0
-17.5	No recovery		9SS	/	5	0.0
	SW-SAND, some fine gravel, trace silt, medium to fine grained, brown, wet, no odor	1250.2	10SS	☒	8	0.0
-20.0	- wet		11SS	☒	3	0.0
-22.5			12SS	☒	3	0.0
	SM-SAND, some silt, fine grained, brown, wet, no odor	1245.0				
-25.0	ML-SILT, trace sand and clay, brown, mottled, wet, no odor	1244.2	13SS	☒	5	0.0
	- trace fine grained sand, gray		14SS	☒	7	0.0
-27.5			15SS	☒	16	0.0
-30.0	ML-SILT, some fine sand, trace fine clay and fine gravel, gray, mottled, wet, no odor	1238.2	16SS	☒	47	0.0
-32.5	SM-SAND, some silt, trace to no clay	1236.2	17SS	☒	61	0.0
	- trace fine grained gravel		18SS	☒	15	0.0

MONITOR INSTALLATION



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

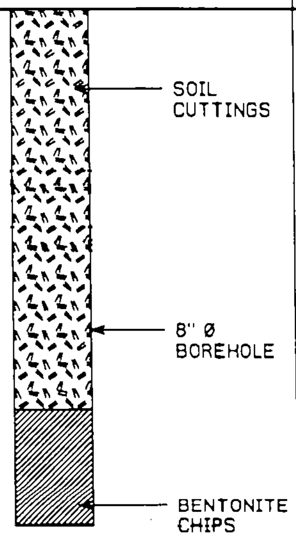
(WL-11)
Page 2 of 2

PROJECT NAME: **DOWCRAFT CORPORATION**
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: BH-15
DATE COMPLETED: MAY 9, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
-37.5		
	SW/GW-SAND and GRAVEL, fine to medium grained, gray, wet, no odor	*1229.2*
-40.0	ML-SILT, some sand, trace clay, fine grained sand	*1228.2*
-42.5		
-45.0		
-47.5		
	END OF HOLE @ 48.0ft BGS	*1220.2*
-50.0		
-52.5		
-55.0		
-57.5		
-60.0		
-62.5		
-65.0		
-67.5		

MONITOR INSTALLATION



SAMPLE			
NUMBER	STATE	'N' VALUE	PID (ppm)
18SS	☒	15	0.0
19SS	☒	14	0.0
20SS	☒	19	0.0
21SS	☒	43	0.0
22SS	☒	17	0.0
23SS	☒	27	0.0
24SS	☒	29	0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊻ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

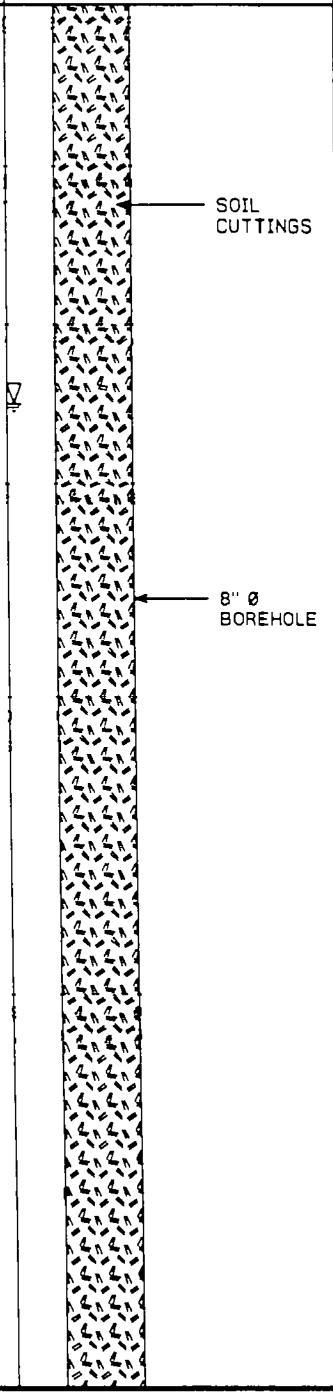
(WL-12)
Page 1 of 2

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: BH-16
DATE COMPLETED: MAY 11, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
	GROUND SURFACE	1265.0
-2.5	FILL, cinders, brick debris, gravel and sand, brown, dry, no odor	
-5.0 -7.5	FILL, medium to fine grained sand and medium grained gravel, brown, dry, no odor - moist	1261.0
-10.0	GM-GRAVEL (NATIVE), some silt and sand, brown/tan/gray	1257.0
-12.5 -15.0	SM-SAND, fine gravel, trace silt, fine grained, brown/tan, no odor - trace fine gravel, no odor	1253.0
-17.5 -20.0 -22.5	ML-SILT, some fine sand, no odor - very fine sand and some silt, gray - no gravel, no odor - trace clay - no odor - trace clay, no odor	1247.5
-25.0 -27.5 -30.0 -32.5	SM/GM-SAND and GRAVEL, some silt, trace clay, very fine grained sand, coarse gravel (1" Ø average), brown, no odor - brown - gray - more silt, trace to no clay - very fine sand and silt, no odor	1240.0

MONITOR INSTALLATION



SAMPLE NUMBER	STATE	'N' VALUE	PID (ppm)
1SS	X	18	0.0
2SS	/	22	0.0
3SS	X	23	0.0
4SS	X	13	0.0
5SS	X	5	0.0
6SS	X	2	0.0
7SS	X	4	0.0
8SS	X	2	0.0
9SS	/	2	0.0
10SS	X	3	0.0
11SS	X	3	0.0
12SS	X	4	0.0
13SS	X	14	0.0
14SS	X	15	0.0
15SS	X	13	0.0
16SS	X	13	0.0
17SS	X	17	0.0
18SS	X	23	0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ▭

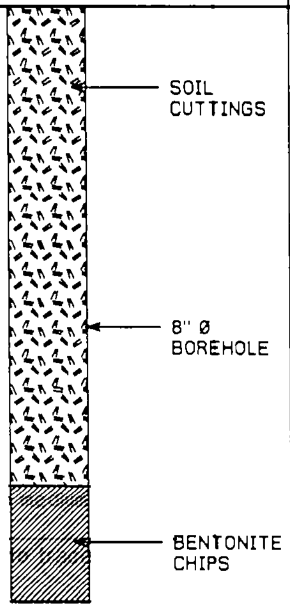
STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: BH-16
DATE COMPLETED: MAY 11, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
-37.5		
-40.0		
	- trace to some clay	
-42.5		
	- more clay	
-45.0		
		1218.0
-47.5	CL-CLAY, some silt, with slight to medium plasticity, gray, no odor	
		1217.0
	CL-CLAY (TILL), some silt, some to trace fine gravel, gray, no odor	
-50.0		*1215.0*
	END OF HOLE @ 50.0ft BGS	
-52.5		
-55.0		
-57.5		
-60.0		
-62.5		
-65.0		
-67.5		

MONITOR INSTALLATION



SAMPLE			
NUMBER	STATE	'N' VALUE	PID (ppm)
18SS	☒	23	0.0
19SS	☒	25	0.0
20SS	☒	27	0.0
21SS	☒	32	0.0
22SS	☒	28	0.0
23SS	☒	18	0.0
24SS	☒	15	0.0
25SS	☒	44	0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

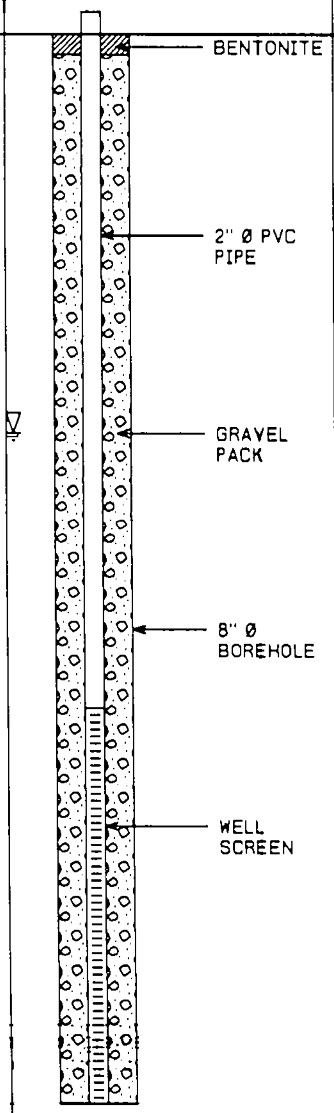
(WL-05)
Page 1 of 1

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: IBH-1
DATE COMPLETED: MAY 12, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*1265.3* *1265.11*				
	Augered without sampling					
2.5						
5.0						
7.5						
10.0						
12.5						
15.0						
17.5						
20.0						
22.5						
25.0	SW/GW-SAND and GRAVEL, medium grained sand, fine grained gravel, brown, wet, no odor	*1240.3*	1SS	☒		0.0
27.5	END OF HOLE @ 27.0ft BGS	*1238.3*				
30.0						
32.5						

MONITOR INSTALLATION



SCREEN DETAILS
Screened interval:
17.0 to 27.0ft BGS
Length: 10.0ft
Diameter: 2"
Material: PVC

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL ▼

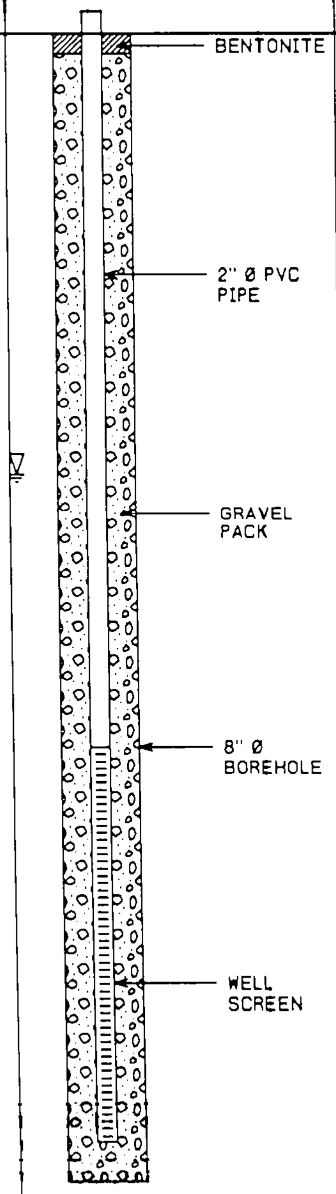
STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(WL-08)
Page 1 of 1

PROJECT NAME: **DOWCRAFT CORPORATION**
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: IBH-2
DATE COMPLETED: MAY 16, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*1265.4* *1265.16*					
	Augered without sampling						
-2.5							
-5.0							
-7.5							
-10.0							
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5	SW/GW-SAND and GRAVEL, medium to fine grained sand, fine grained gravel	*1238.4* *1237.4*		1SS	☒		0.0
	ML-SILT, some very fine sand, brown/gray, wet, no odor	*1236.4*					
-30.0	END OF HOLE @ 29.0ft BGS						
-32.5							



SCREEN DETAILS
Screened Interval:
18.0 to 28.0ft BGS
Length: 10.0ft
Diameter: 2"
Material: PVC

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

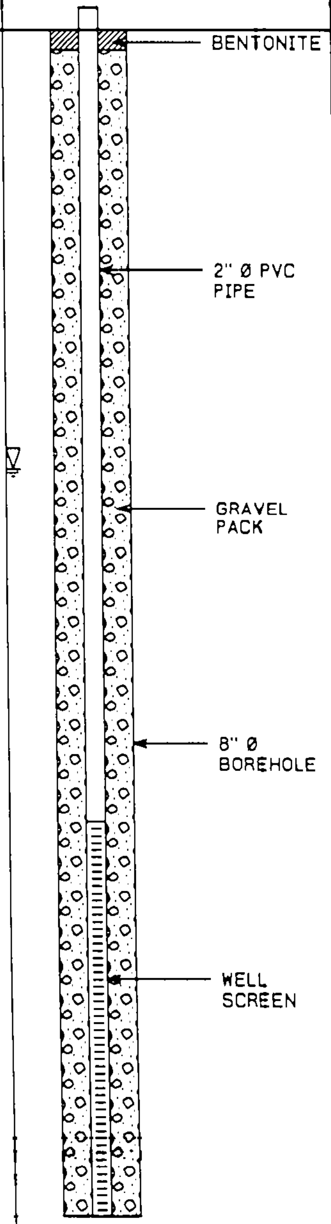
STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(WL-07)
Page 1 of 1

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: IBH-3
DATE COMPLETED: MAY 15, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*1265.5* *1265.27*					
	Augered without sampling						
-2.5							
-5.0							
-7.5							
-10.0							
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5		*1237.5*					
	SW/GW-SAND and GRAVEL, medium to fine grained sand, fine grained gravel			ISS	☒		0.0
-30.0	SM/ML-SAND and SILT, very fine grained sand, gray	*1235.5* *1235.5*					
	END OF HOLE @ 30.0ft BGS						
-32.5							



SCREEN DETAILS
Screened Interval:
20.0 to 30.0ft BGS
Length: 10.0ft
Diameter: 2"
Material: PVC

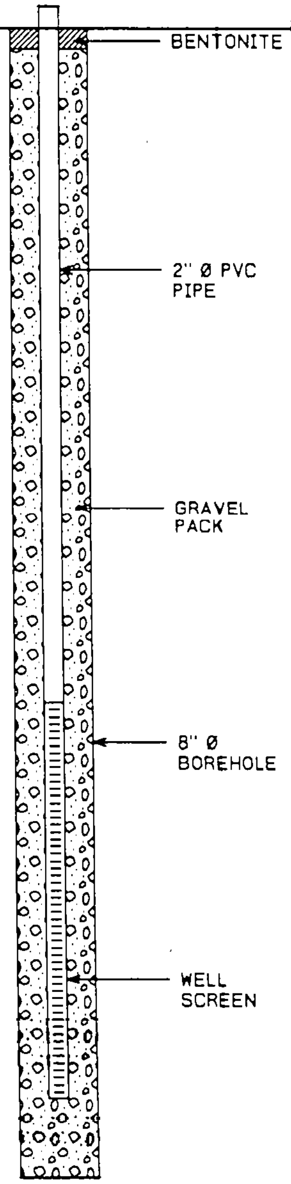
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(WL-08)
Page 1 of 1

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: IBH-4
DATE COMPLETED: MAY 16, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*1265.4* *1265.21*					
	Augered without sampling						
-2.5							
-5.0							
-7.5							
-10.0		▽					
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0	SW/GW-SAND and GRAVEL, medium to fine grained sand, fine grained gravel, brown, wet	*1240.4*		1SS	☒		0.0
-27.5	ML-SILT, some very fine sand, dense, gray, wet, no odor	*1237.9*		2SS	☒		0.0
	END OF HOLE @ 29.0ft BGS	*1236.4*	SCREEN DETAILS Screened Interval: 17.0 to 27.0ft BGS Length: 10.0ft Diameter: 2" Material: PVC				
-30.0							
-32.5							

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

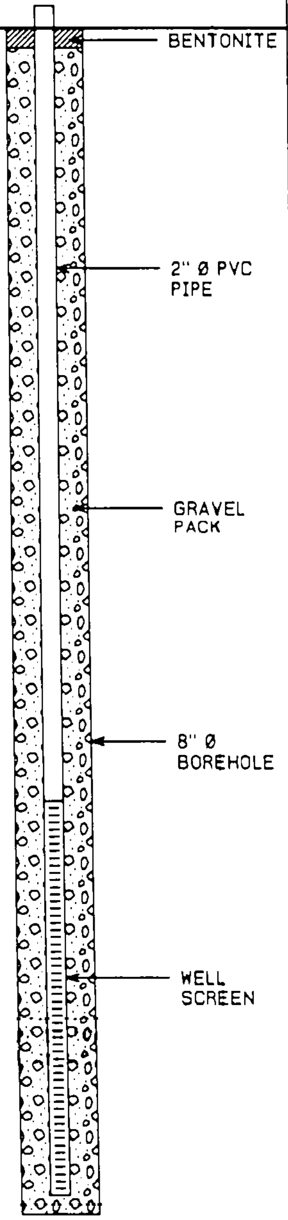
(WL-09)
Page 1 of 1

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: IBH-5
DATE COMPLETED: MAY 15, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	REFERENCE POINT (Top of Riser) GROUND SURFACE	*0.00* *0.00*				
	Augered without sampling					
-2.5						
-5.0						
-7.5						
-10.0						
-12.5						
-15.0						
-17.5						
-20.0						
-22.5						
-25.0	SM/GM-SAND and GRAVEL, medium to fine grained sand, fine grained gravel, brown, wet	*-25.0*	1SS	☒		0.0
-27.5			2SS	☒		0.0
			3SS	☒		0.0
-30.0	ML-SANDY SILT, dense, very fine grained, gray, wet, no odor	*-29.7* *-30.0*				
	END OF HOLE @ 30.0ft BGS					
-32.5						

MONITOR INSTALLATION



SCREEN DETAILS
Screened Interval:
19.5 to 29.5ft BGS
Length: 10.0ft
Diameter: 2"
Material: PVC

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

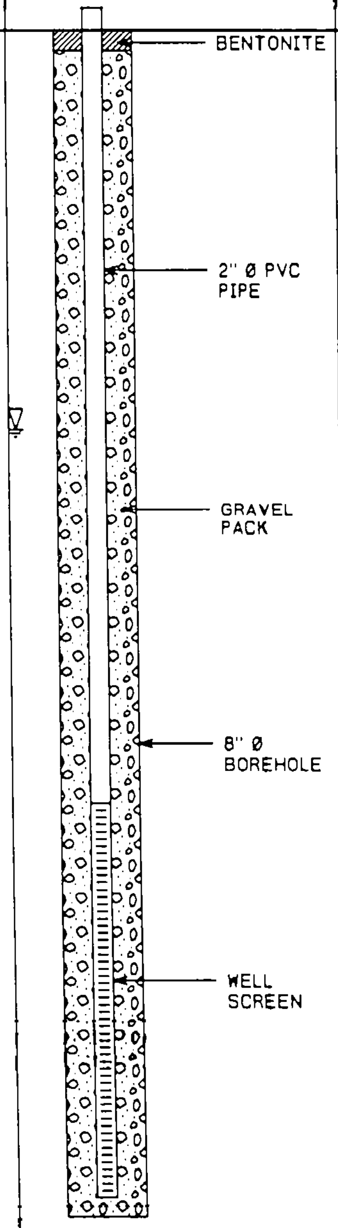
(WL-10)
Page 1 of 1

PROJECT NAME: **DOWCRAFT CORPORATION**
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: IBH-5
DATE COMPLETED: MAY 15, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*1265.4* *1265.28*				
	Augered without sampling					
2.5						
5.0						
7.5						
10.0						
12.5						
15.0						
17.5						
20.0						
22.5						
25.0	SW/GW-SAND and GRAVEL, medium to fine grained sand, fine grained gravel, brown, wet	*1240.4*	1SS	☒		0.0
27.5			2SS	☒		0.0
30.0	ML-SILT, some very fine sand, dense, gray, wet, no odor	*1235.7* *1235.4*	3SS	☒		0.0
	END OF HOLE @ 30.0ft BGS					
32.5						

MONITOR INSTALLATION



SCREEN DETAILS
Screened Interval:
19.5 to 29.5ft BGS
Length: 10.0ft
Diameter: 2"
Material: PVC

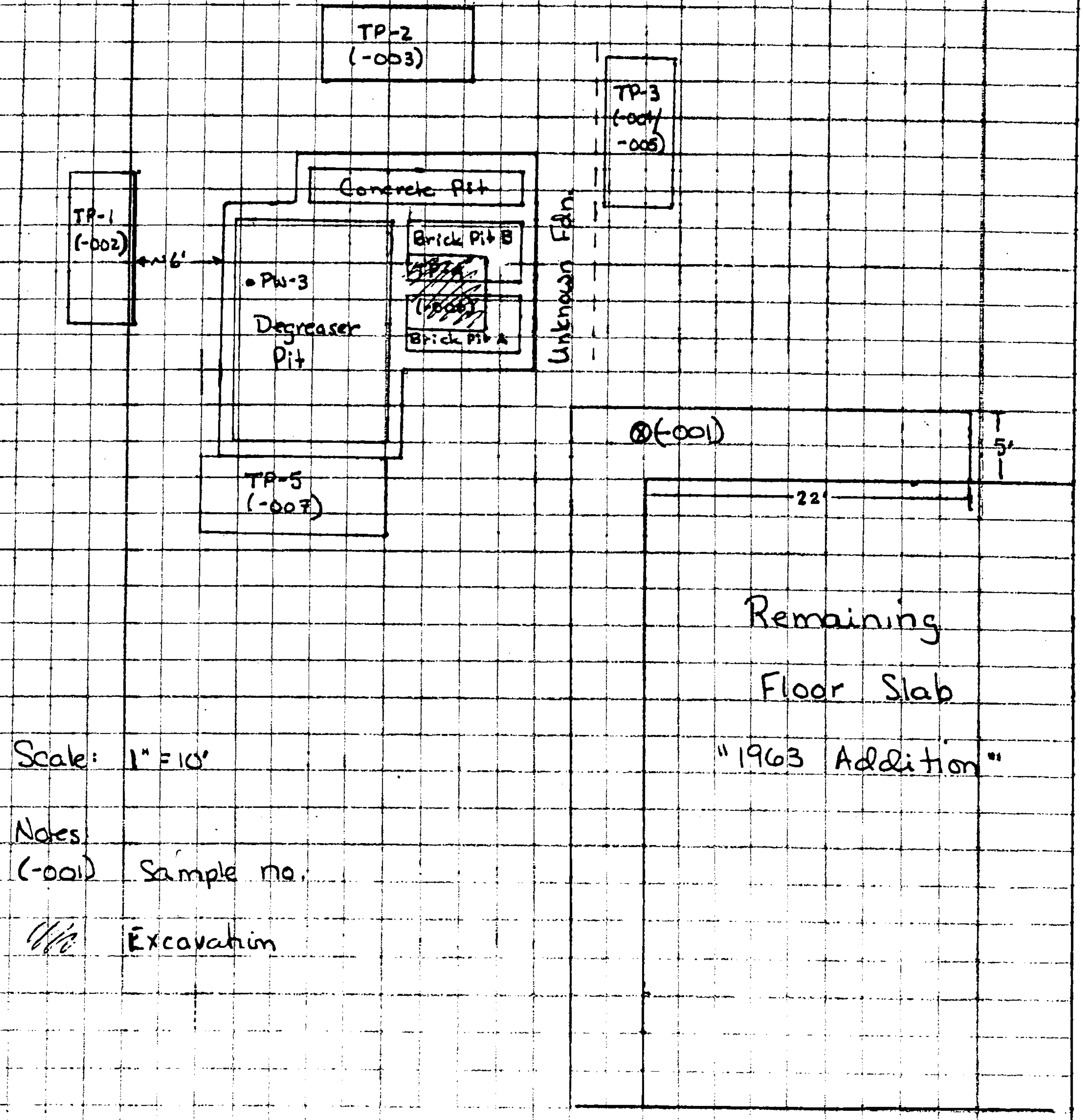
NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊽ STATIC WATER LEVEL ▼

- Field File

CRA
CONESTOGA-ROVERS & ASSOCIATES

PROJECT No.: 5020
PROJECT NAME: Dowcraft
DATE: 11/19/99

DESIGNED BY: cfd
CHECKED BY:
PAGE 1 OF 1



Scale: 1" = 10'

Notes:
(-001) Sample no.
▨ Excavation

TEST PIT STRATIGRAPHY LOG

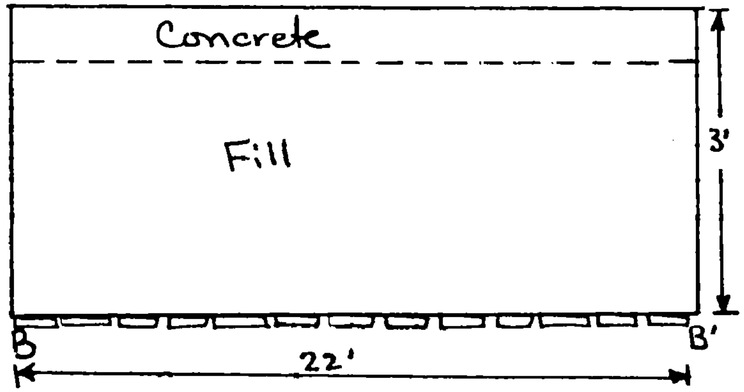
Page 1 of 1

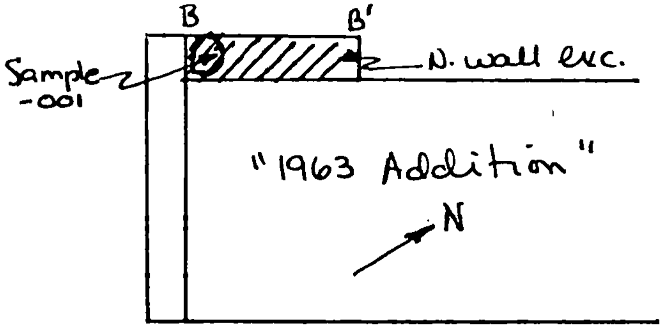
Project Name: Dowcraft	**Contractor:** Lee Well Drilling	**Test Pit Designation:** N. wall excavation
Project Number: 5020		**Date Started:** 11/17/99
Client: Dowcraft Corporation	**Surface Elevation:**	**Date Completed:** 11/17/99
Location: Falconer, NY	**Test Pit Method:** Backhoe	**CRA Supervisor:** C. Dunnigan

Depth (m/ft)			*Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors*	*Sample No.*	*Sample Interval*	*PID*
From	*At*	*To*				
0		0.5	Concrete			
0.5		3.0	Mixed red brick, concrete, slate, red-brown sand, gray sand. Dry-moist.		0.5	0.3-0.8
				-001	2.5-3.0	0.4-0.6
	3.0		Laid brick on bottom			

Location: Footer excavation - N. Wall

Geologic Profile





Completed by: C. Dunnigan

Date: 12/20/99

CRA

CRA 1001 (29) Rev. 5, September 13, 1999, Form SP-03

TEST PIT STRATIGRAPHY LOG

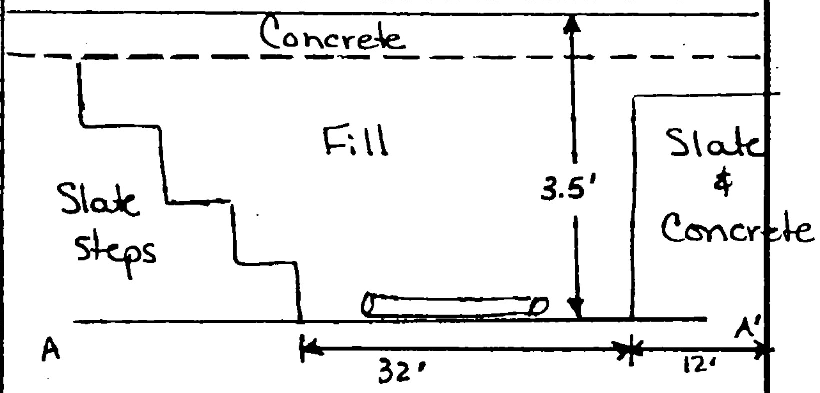
Page 1 of 1

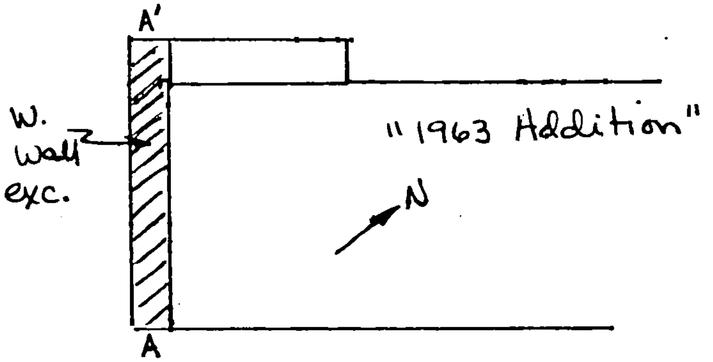
Project Name: Dowcraft	**Contractor:** Lee Well Drilling	**Test Pit Designation:** W. Wall excavation
Project Number: 5020		**Date Started:** 11/17/99
Client: Dowcraft Corporation	**Surface Elevation:**	**Date Completed:** 11/17/99
Location: Falconer, NY	**Test Pit Method:** Backhoe	**CRA Supervisor:** C. Dunnigan

Depth (m/ft) From	At	To	*Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors*	*Sample No.*	*Sample Interval*	*PID*
0		0.5	Concrete			
0.5		3.5	Mixed red & yellow brick, slate pieces, red-brown sand. Dry-moist.		0.5	0.3-0.8
						0.1-0.3
	3.5		Orangeburg tile			0.8 (inside tile)

Location: Footer excavation – W. Wall

Geologic Profile





Completed by: C. Dunnigan

Date: 12/20/99

CRA

CRA 1001 (29) Rev. 5, September 13, 1999, Form SP-03

TEST PIT STRATIGRAPHY LOG

Page 1 of 1

Project Name: Dowcraft
Project Number: 5020
Client: Dowcraft Corporation
Location: Falconer, NY

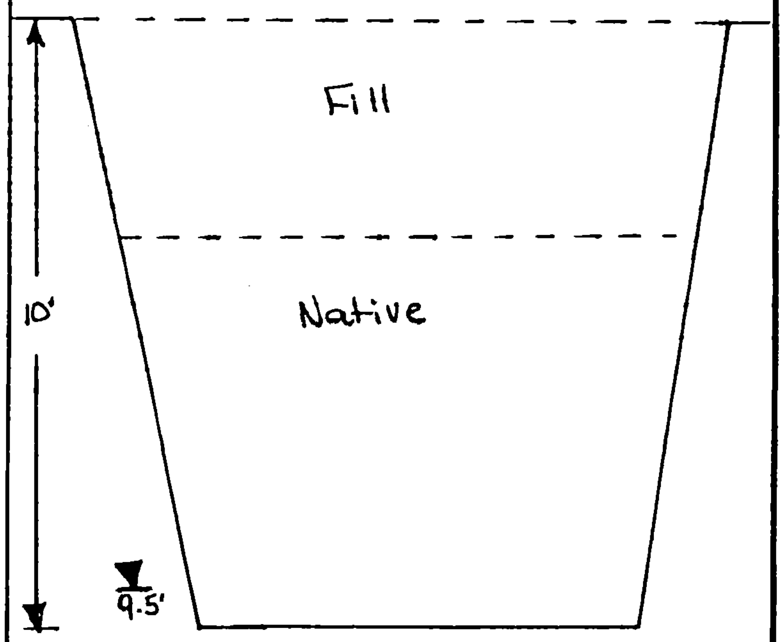
Contractor: Lee Well Drilling
Surface Elevation:
Test Pit Method: Backhoe

Test Pit Designation: TP-1
Date Started: 11/18/99
Date Completed: 11/18/99
CRA Supervisor: C. Dunnigan

Location: ~6' W. of W. wall of degreaser pit.

Depth (m/ft) From	At	To	*Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors*	*Sample No.*	*Sample Interval*	PID
0		4.0	Mixed cinders, brick, sand, gray. Dry			0.4-1.4
4.0		10.0	Rounded gravel, brown sand. Dry-moist			0.4-1.2
				-002	9'-10'	
	9.5		Wet			0.7-1.0

Geologic Profile



Completed by: C. Dunnigan

Date: 12/20/99

CRA

CRA 1001 (29) Rev. 5, September 13, 1999, Form SP-03

TEST PIT STRATIGRAPHY LOG

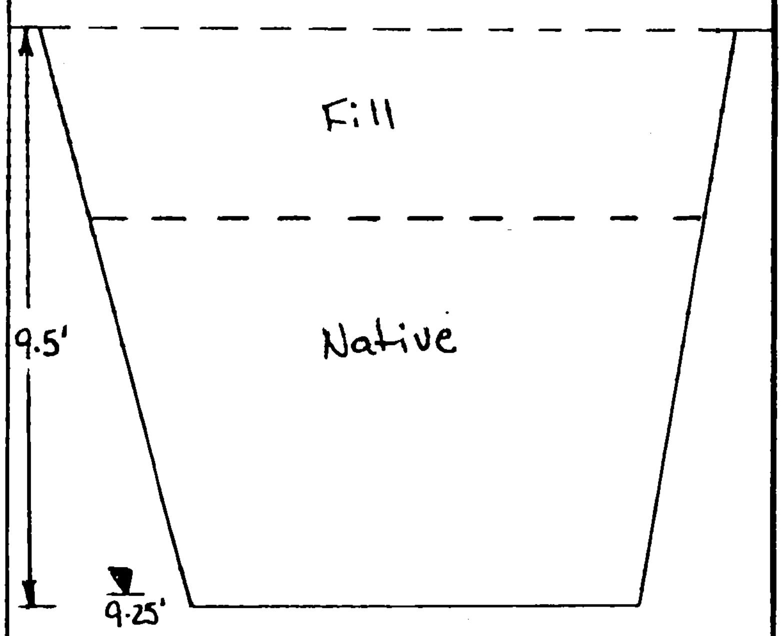
Page 1 of 1

Project Name: Dowcraft	**Contractor:** Lee Well Drilling	**Test Pit Designation:** TP-2
Project Number: 5020		**Date Started:** 11/18/99
Client: Dowcraft Corporation	**Surface Elevation:**	**Date Completed:** 11/18/99
Location: Falconer, NY	**Test Pit Method:** Backhoe	**CRA Supervisor:** C. Dunnigan

Depth (m/ft) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval	PID
0		3.5	Brown & black cinders & sand. Dry			0.5-1.0
	2.0	2.75	Red brick & sand. Dry.			
3.5		9.5	Rounded gravel, brown sand. Dry-moist			0.5
	9.25		Wet	-003	9.0-9.5	1.3*
						*spike 20

Location: ~6' N. of N. wall of concrete pit. (Concrete pit is NE of degreaser pit.)

Geologic Profile



Completed by: C. Dunnigan

Date: 12/20/99

CRA

CRA 1001 (29) Rev. 5, September 13, 1999, Form SP-03

TEST PIT STRATIGRAPHY LOG

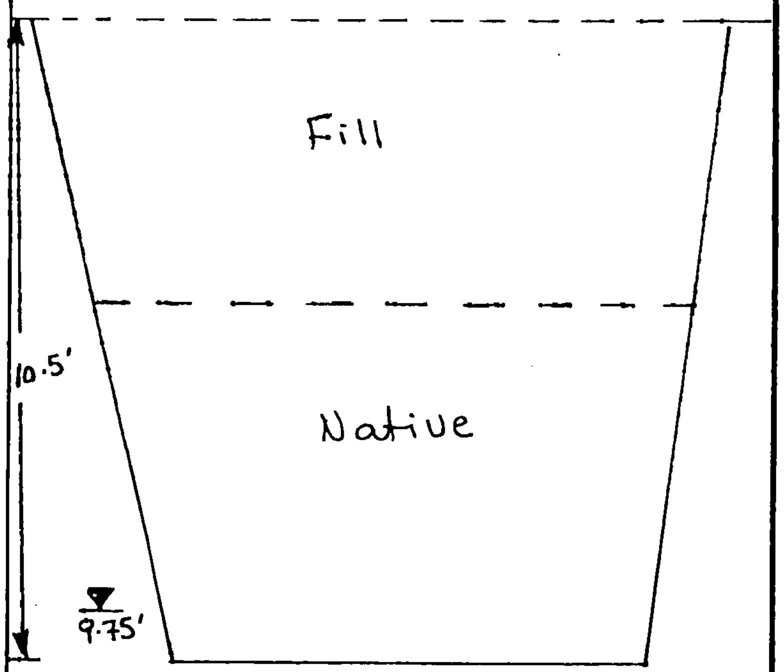
Page 1 of 1

Project Name: Dowcraft
Project Number: 5020
Client: Dowcraft Corporation
Location: Falconer, NY
Contractor: Lee Well Drilling
Surface Elevation:
Test Pit Method: Backhoe
Test Pit Designation: TP-3
Date Started: 11/18/99
Date Completed: 11/18/99
CRA Supervisor: C. Dunnigan

Depth (m/ft)			*Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors*	*Sample No.*	*Sample Interval*	*PID*
From	*At*	*To*				
0		4.8	Gray ash, sand, brick. Dry			
	4.5		10" Ø clay tile			
4.8		10.5	Brown gravel w/ sand. Dry-moist.			
	9.75		Wet	-004/ -005 (Dupl.)	9.5- 10.0	1.2 6.4- 13.4

Location: ~7' E. of E. wall of conrete pit. (Concrete pit is NE of degreaser pit.)

Geologic Profile



Completed by: C. Dunnigan

Date: 12/20/99

CRA

CRA 1001 (29) Rev. 5, September 13, 1999, Form SP-03

TEST PIT STRATIGRAPHY LOG

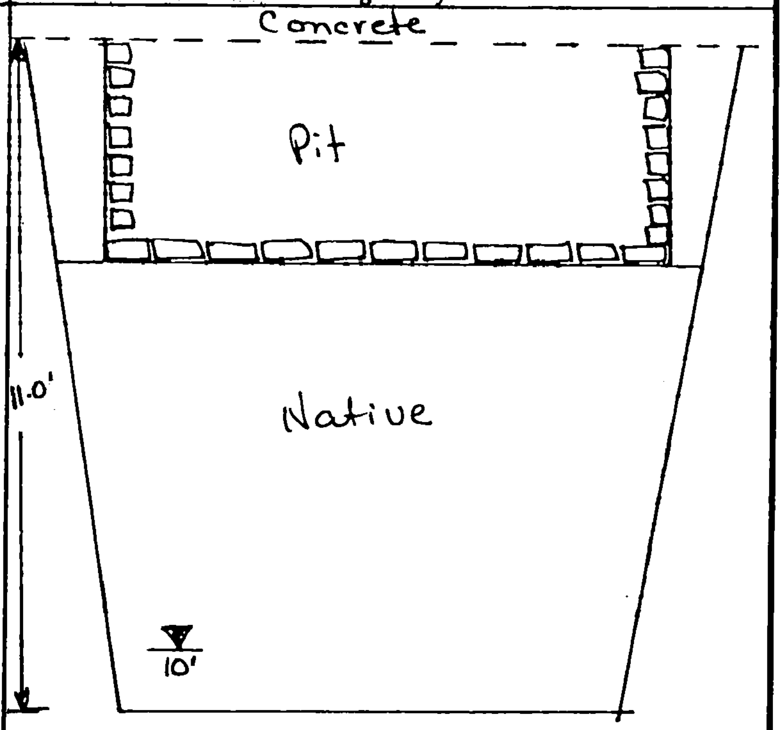
Page ___ of ___

Project Name: Dowcraft	**Contractor:** Lee Well Drilling	**Test Pit Designation:** TP-4	
Project Number: 5020		**Date Started:** 11/18/99	
Client: Dowcraft Corporation	**Surface Elevation:**	**Date Completed:** 11/18/99	
Location: Falconer, NY	**Test Pit Method:** Backhoe	**CRA Supervisor:** C. Dunnigan	

Location: Beneath brick pits E. of degreaser pit.

Depth (m/ft) From	At	To	*Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors*	*Sample No.*	*Sample Interval*	*PID*
0		0.5	Concrete			
0.5		4.0	Brick-walled pit			
4.0		11.0	Brown gravel with sand. Dry-moist			0.8
						24
	10.0	11.0	Gravel shows some black staining. Wet	-006	9.5-10.0	35
						200

Geologic Profile



Completed by: C. Dunnigan

Date: 12/20/99

CRA

CRA 1001 (29) Rev. 5, September 13, 1999, Form SP-03

TEST PIT STRATIGRAPHY LOG

Page 1 of 1

Project Name: Dowcraft
Project Number: 5020
Client: Dowcraft Corporation
Location: Falconer, NY

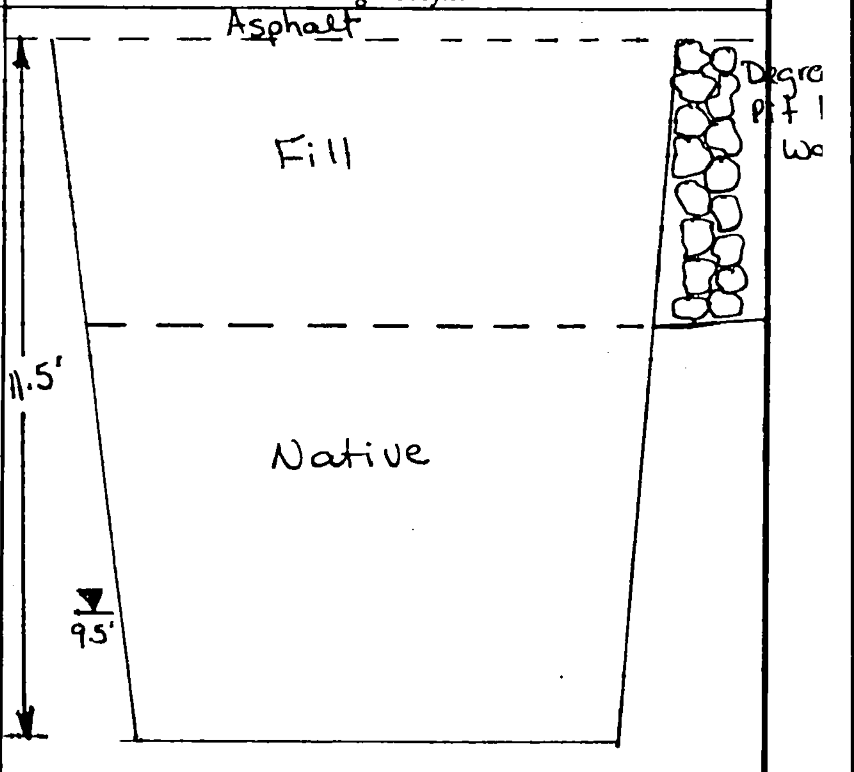
Contractor: Lee Well Drilling
Surface Elevation:
Test Pit Method: Backhoe

Test Pit Designation: TP-5
Date Started: 11/18/99
Date Completed: 11/18/99
CRA Supervisor: C. Dunnigan

Depth (m/ft)			*Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors*	*Sample No.*	*Sample Interval*	*PID*
From	*At*	*To*				
0		0.3	Asphalt			
0.3		3.0	Gray & black sand, silt, & gravel. Dry.			
3.0		5.0	Lt. brown, sand, silt, gravel. Dry.			
5.0		11.5	Brown gravel with sand. Dry-moist			
	8.0	9.0	Slight brown stain on gravel.	-007	8-9	0.8-1.3
	9.5		Wet			1.5

Location: Along S. wall of degreaser pit.

Geologic Profile



Completed by: C. Dunnigan

Date: 12/20/99

CRA

CRA 1001 (29) Rev. 5, September 13, 1999, Form SP-03

TEST PIT STRATIGRAPHY LOG

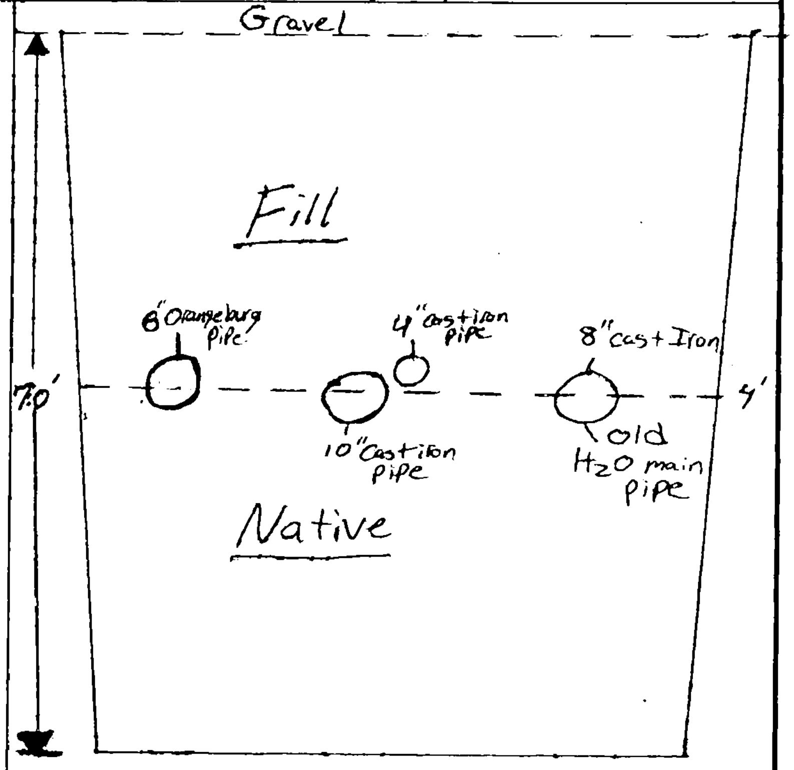
Page 1 of 1

Project Name: Dowcraft	**Contractor:** Lee Well Drilling	**Test Pit Designation:** Utility Bedding
Project Number: 5020		**Date Started:** 6/9/00
Client: Dowcraft Corporation	**Surface Elevation:**	**Date Completed:** 6/9/00
Location: Falconer, NY	**Test Pit Method:** Backhoe	**CRA Supervisor:** D. Steiner

Depth (m/ft) From	At	To	Soil Symbol, Primary Component, Secondary Components, Relative Density/Consistency, Grain Size/Plasticity, Gradation/Structure, Colour, Moisture Content, Supplementary Descriptors	Sample No.	Sample Interval	PID
0		0.4'	Gravel			
0.4		4	Fill, brick debris, cinders, rocks, sand, and gravel, brown/black. Dry to Moist Typical fill on the Site, NO odor			0
4.0		7.0	GW- brown/Tan, sandy-gravel coarse grained sand, 2"-6" rocks, moist, NO odor			0

Location: 23' South of the Jamesburn Container Bldg. between ESI-4 and ESI-5

Geologic Profile



Completed by: D. Steiner

Date: 6/12/00

CRA

CRA 1001 (29) Rev. 5, September 13, 1999, Form SP-03

F

APPENDIX F

SITE SURVEY DATA

```
                         COORDINATE LIST.TXT
C:\MSCAD31\Data\2941\2941    Job Description: A-2941
19:34:55 05/23/00                                                Page N
o.: 1
------------------------------------------------------------------------
------
   1 N:  5000.000 E:  5000.000 El:  1264.510 D:  trav pt
   2 N:  5216.441 E:  5001.422 El:  1263.429 D:  bm
   3 N:  5156.586 E:  5001.712 El:  1266.460 D:  brick course
   4 N:  5086.436 E:  5005.524 El:  1264.156 D:  bldg cor
   5 N:  5054.493 E:  5011.652 El:  1264.879 D:  bldg cor
   6 N:  4896.303 E:  5017.082 El:  1266.356 D:  well 9 rim
   7 N:  4896.296 E:  5017.613 El:  1265.987 D:  well 9 casing
   8 N:  5058.873 E:  5338.051 El:  1265.439 D:  trav nail
   9 N:  5096.778 E:  5273.893 El:  1265.299 D:  well 5 rim
  10 N:  5096.495 E:  5273.611 El:  1264.801 D:  well 5 casing
  11 N:  5112.850 E:  5356.317 El:  1265.345 D:  well 4 rim
  12 N:  5112.631 E:  5355.906 El:  1265.055 D:  well 4 casing
  13 N:  5124.795 E:  5425.807 El:  1265.133 D:  well 3 rim
  14 N:  5125.056 E:  5425.477 El:  1264.894 D:  well 3 casing
  15 N:  5128.974 E:  5447.607 El:  1265.149 D:  pwell 1 rim
  16 N:  5129.000 E:  5447.437 El:  1264.601 D:  pwell 1 casing
  17 N:  5135.504 E:  5472.061 El:  1264.831 D:  a/b rim              ESI-2D
  18 N:  5135.909 E:  5471.947 El:  1264.534 D:  a/b casing           ESI-20
  19 N:  5135.091 E:  5502.709 El:  1264.823 D:  trav nail
  20 N:  4963.516 E:  5391.266 El:  1265.766 D:  trav nail
  21 N:  5031.319 E:  5395.260 El:  1265.312 D:  pwell 3r rim
  22 N:  5031.108 E:  5395.022 El:  1265.038 D:  pwell 3r casing
  23 N:  5029.347 E:  5390.008 El:  1265.609 D:  pwell 3 rim
  24 N:  5029.161 E:  5389.952 El:  1265.314 D:  pwell 3 casing
  25 N:  4971.254 E:  5423.260 El:  1265.533 D:  bldg cor
  26 N:  5020.227 E:  5413.488 El:  1264.819 D:  bldg cor
  27 N:  5171.280 E:  5461.441 El:  1265.490 D:  trav pt
  28 N:  5113.505 E:  5494.061 El:  1264.987 D:  pwell 2 rim
  29 N:  5109.004 E:  5498.865 El:  1264.929 D:  well 6 rim
  30 N:  5109.308 E:  5498.722 El:  1264.659 D:  well 6 casing
  31 N:  5062.731 E:  5503.904 El:  1265.147 D:  well 7 rim
  32 N:  5062.802 E:  5504.197 El:  1264.930 D:  well 7 casing
  33 N:  5066.029 E:  5579.370 El:  1264.355 D:  well 1 rim
  34 N:  5065.905 E:  5579.653 El:  1264.172 D:  well 1 casing
  35 N:  5133.511 E:  5590.411 El:  1263.917 D:  well 13r rim
  36 N:  5133.959 E:  5590.362 El:  1263.308 D:  well 13r casing
  37 N:  5062.131 E:  5628.732 El:  1263.431 D:  wall cor
  38 N:  5133.742 E:  5479.843 El:  1264.831 D:  well 2 rim
  39 N:  5134.160 E:  5479.877 El:  1264.603 D:  well 2 casing
  40 N:  4966.020 E:  5441.393 El:  1268.687 D:  well 8 rim
  41 N:  4965.784 E:  5441.334 El:  1268.194 D:  well 8 gnd
  42 N:  4966.435 E:  5441.188 El:  1268.246 D:  well 8 casing
  43 N:  5209.539 E:  5448.599 El:  1265.439 D:  trav pt
  44 N:  5226.616 E:  5574.264 El:  1265.492 D:  well 10 rim
  45 N:  5227.001 E:  5574.265 El:  1265.083 D:  well 10 casing
  46 N:  5222.407 E:  5503.511 El:  1265.411 D:  well 11 rim
```

```
47 N:  5222.802 E:  5503.560 El:  1265.090 D:  well 11 casing
48 N:  5213.456 E:  5416.354 El:  1265.310 D:  well 12 rim
49 N:  5213.164 E:  5416.462 El:  1264.948 D:  well 12 casing
```

G

APPENDIX G

WELL DEVELOPMENT RECORDS

WELL DEVELOPMENT RECORD

PROJECT: Dowcraft Phase II Environmental Site Assessment

PROJECT NUMBER: BTA-90-179A DATE: 11-13-90

LOCATION: Dowcraft Plant, 65 South Dow Street, Falconer, New York

WELL NUMBER: ESI- 1

PERSONNEL: K. Shanahan, D. Lauzon

DEVELOPMENT METHOD: BAILERS - BK PUMP - PERASTALLIC PUMP
DOWN HOLE PUMP - COMPRESSED AIR
OTHER: Guzzler Pump

REQUIRED DEVELOPMENT CRITERIA:

TURBIDITY --- NTU
WELL VOLUMES 10
STABLE pH Yes
STABLE CONDUCTIVITY Yes

WATER LEVEL PRIOR TO DEVELOPMENT 7.69' (TOR) (elevation in feet)
WATER LEVEL AFTER DEVELOPMENT 7.72' (TOR) (elevation in feet)
DEVELOPMENT STARTED 11:20 am
DEVELOPMENT COMPLETED 12:00 Noon
TOTAL VOLUME OF WATER REMOVED 16 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES F)	TURBIDITY NTU
1	6.39	56.3	51	Extremely Turbid
5	6.61	36.4	52	345
8	6.58	33.6	52	195
13	6.63	32.2	52	89
16	6.66	31.0	53	98

TES: Depth To Water Surface = 7.69' (TOR)

Depth To Bottom of Well= 14.05' (TOR)

1 Well Volume= 1.04 Gallons

WELL DEVELOPMENT RECORD

PROJECT: Dowcraft Phase II Environmental Site Assessment

PROJECT NUMBER: BTA-90-179A DATE: 11-12-90

LOCATION: Dowcraft Plant, 65 South Dow Street, Falconer, New York

WELL NUMBER: ESI- 2

PERSONNEL: K. Shanahan

DEVELOPMENT METHOD: BAILERS - BK PUMP - PERASTALLIC PUMP
DOWN HOLE PUMP - COMPRESSED AIR
OTHER: Guzzler Pump

REQUIRED DEVELOPMENT CRITERIA:

TURBIDITY --- NTU
WELL VOLUMES 10
STABLE pH Yes
STABLE CONDUCTIVITY Yes

WATER LEVEL PRIOR TO DEVELOPMENT 8.0' (TOR) (elevation in feet)
WATER LEVEL AFTER DEVELOPMENT 8.0' (TOR) (elevation in feet)
DEVELOPMENT STARTED 3:25 pm
DEVELOPMENT COMPLETED 4:20 pm
TOTAL VOLUME OF WATER REMOVED 13 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES F)	TURBIDITY NTU
1	7.57	53.6	57	Extremely Turbid
4	7.42	50.9	57	"
7	7.37	50.0	57	"
10	7.21	48.2	58	"
12	7.17	47.2	61	"

N[illegible]ES: Depth To Water Surface = 8.0' (TOR)

Depth To Bottom of Well= 12.92' (TOR)

1 Well Volume= 0.803 Gallons

WELL DEVELOPMENT RECORD

PROJECT: Dowcraft Phase II Environmental Site Assessment

PROJECT NUMBER: BTA-90-179A DATE: 11-12-90

LOCATION: Dowcraft Plant, 65 South Dow Street, Falconer, New York

WELL NUMBER: ESI- 3

PERSONNEL: K. Shanahan

DEVELOPMENT METHOD: BAILERS - BK PUMP - PERASTALLIC PUMP
DOWN HOLE PUMP - COMPRESSED AIR
OTHER: Guzzler Pump

REQUIRED DEVELOPMENT CRITERIA:

TURBIDITY -- NTU
WELL VOLUMES 10
STABLE pH Yes
STABLE CONDUCTIVITY Yes

WATER LEVEL PRIOR TO DEVELOPMENT 8.08' (TOR) (elevation in feet)
WATER LEVEL AFTER DEVELOPMENT 8.15' (TOR) (elevation in feet)
DEVELOPMENT STARTED 2:30 pm
DEVELOPMENT COMPLETED 3:15 pm
TOTAL VOLUME OF WATER REMOVED 15 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES F)	TURBIDITY NTU
1	10.53	27.7	38	Extremely Turbid
8	9.61	36.4	41	"
12	9.73	35.4	41	"
14	9.56	35.4	41	"
15	10.16	30.3	39	"

NOTES: Depth To Water Surface = 8.08' (TOR)

Depth To Bottom of Well= 13.80' (TOR)

1 Well Volume= 0.933 Gallons

WELL DEVELOPMENT RECORD

PROJECT: Dowcraft Phase II Environmental Site Assessment

PROJECT NUMBER: BTA-90-179A DATE: 11-12-90

LOCATION: Dowcraft Plant, 65 South Dow Street, Falconer, New York

WELL NUMBER: ESI-4

PERSONNEL: K. Shanahan

DEVELOPMENT METHOD: BAILERS - BK PUMP - PERASTALLIC PUMP
DOWN HOLE PUMP - COMPRESSED AIR
OTHER: Guzzler Pump

REQUIRED DEVELOPMENT CRITERIA:

TURBIDITY --- NTU
WELL VOLUMES 10
STABLE pH Yes
STABLE CONDUCTIVITY Yes

WATER LEVEL PRIOR TO DEVELOPMENT 8.23' (TOR) (elevation in feet)
WATER LEVEL AFTER DEVELOPMENT 8.27' (TOR) (elevation in feet)
DEVELOPMENT STARTED 1:20 pm
DEVELOPMENT COMPLETED 2:20 pm
TOTAL VOLUME OF WATER REMOVED 17 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES F)	TURBIDITY NTU
1	6.94	63.6	49	Extremely Turbid
10	6.93	57.9	49	"
12	7.24	63.0	52	"
15	7.11	59.0	56	"
17	7.12	59.8	56	"

N[illegible]ES: Depth To Water Surface = 8.23 (TOR)

Depth To Bottom of Well= 12.23' (TOR)

1 Well Volume= 0.653 Gallons

WELL DEVELOPMENT RECORD

PROJECT: Dowcraft Phase II Environmental Site Assessment

PROJECT NUMBER: BTA-90-179A DATE: 11-12-90

LOCATION: Dowcraft Plant, 65 South Dow Street, Falconer, New York

WELL NUMBER: ESI- 5

PERSONNEL: K. Shanahan

DEVELOPMENT METHOD: BAILERS - BK PUMP - PERASTALLIC PUMP
DOWN HOLE PUMP - COMPRESSED AIR
OTHER: Guzzler Pump

REQUIRED DEVELOPMENT CRITERIA:

TURBIDITY --- NTU
WELL VOLUMES 10
STABLE pH Yes
STABLE CONDUCTIVITY Yes

WATER LEVEL PRIOR TO DEVELOPMENT 7.70' (TOR) (elevation in feet)
WATER LEVEL AFTER DEVELOPMENT 7.72' (TOR) (elevation in feet)
DEVELOPMENT STARTED 11:45 pm
DEVELOPMENT COMPLETED 1:00 pm
TOTAL VOLUME OF WATER REMOVED 14 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES F)	TURBIDITY NTU
1	6.10	64.2	51	Extremely Turbid
5	6.56	62.6	52	65
10	6.65	60.0	52	27
11	6.79	62.4	53	> 200
13	7.20	62.7	55	87
14	7.14	63.7	53	64

[illegible]ES: Depth To Water Surface = 7.70' (TOR)

Depth To Bottom of Well= 14.19' (TOR)

1 Well Volume= 1.06 Gallons

WELL DEVELOPMENT PARAMETERS

PROJECT: Dowcraft - Additional Wells - Development

LOCATION: 65 South Dow Street

WELL NO: ESI-6

DATE: 1-2-91

WATER LEVEL PRIOR TO DEVELOPMENT: 6.34' (Top of Well Riser)
(elevation in feet)

WATER LEVEL AFTER DEVELOPMENT: 6.34' (Top of Well Riser)
(elevation in feet)

DEVELOPMENT STARTED: 12:25 pm

DEVELOPMENT COMPLETED: 12:50 pm

TOTAL VOLUME OF WATER PRODUCED: 15 (gallons)

SCREENED INTERVAL: 13.5'-3.5'
(elevation in feet)

DEVELOPMENT METHOD: Stainless Steel Bailer and Guzzler Band w/ garden hose.

Date	pH (Standard Units)	Conductivity (umho/cm)	Temp (°C)	Volume Evacuated (Gallons)	Turbidity (NTU's) & Comments	
1-2-91	7.03	1870	13.2	Initial	<200	Grey Color, No odor
1-2-91	7.35	1230	9.7	2 gal	<200	Grey Color, No odor
1-2-91	7.24	990	13.1	4 gal	<200	Grey-Black
1-2-91	7.36	760	13.7	6 gal	<200	Grey-Black
1-2-91	7.43	740	11.8	8 gal	<200	Light Grey, No odor
1-2-91	7.31	730	11.2	10 gal	<200	Light Grey, No odor
1-2-91	7.17	730	14.1	12 gal	<200	Light Grey, No odor
1-2-91	7.19	700	14.1	15 gal	174	V. Light Grey, No odor

WELL DEVELOPMENT PARAMETERS

PROJECT: Dowcraft - Additional Wells - Development

LOCATION: 65 South Dow Street

WELL NO: ESI -7

DATE: 1-2-91

WATER LEVEL PRIOR TO DEVELOPMENT: 6.34' (Top of Well Riser)
(elevation in feet)

WATER LEVEL AFTER DEVELOPMENT: 6.36' (Top of Well Riser)
(elevation in feet)

DEVELOPMENT STARTED: 12:56 pm

DEVELOPMENT COMPLETED: 1:37 pm

TOTAL VOLUME OF WATER PRODUCED: 20 (gallons)

SCREENED INTERVAL: 14.5'-6.5'
(elevation in feet)

DEVELOPMENT METHOD: Stainless Steel Bailer and Guzzler Band w/ garden hose.

Date	pH (Standard Units)	Conductivity (umbo/cm)	Temp (°C)	Volume Evacuated (Gallons)	Turbidity (NTU's) & Comments	
1-2-91	8.88	470	11.1	Initial	<200	Brown-Sandy Order, No odor
1-2-91	9.01	430	10.4	2 gal	<200	Brown-Sandy, No odor
1-2-91	9.33	380	10.1	6 gal	<200	Brown-Sandy, No odor
1-2-91	8.82	350	5.9	8 gal	<200	Light Brown, No odor
1-2-91	8.45	350	8.2	10 gal	<200	Light Brown, No odor
1-2-91	7.99	360	7.6	12 gal	<200	Light Brown, No odor
1-2-91	7.75	360	11.2	14 gal	<200	Light Brown, No odor
1-2-91	7.60	370	11.3	16 gal	<200	Light Brown, No odor
1-2-91	7.74	350	11.0	18 gal	<200	Light Brown, No odor
1-2-91	7.45	350	11.1	20 gal	<200	Light Brown, No odor

WELL DEVELOPMENT RECORD

PROJECT: Dowcraft Corporation

PROJECT NUMBER: BTA-90-179D DATE: 4-14-92

LOCATION:

WELL NUMBER: ESI-1

PERSONNEL: L.A. Zimmerman

DEVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

REQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 20 NTU
WELL VOLUMES 10
STABLE pH X
STABLE CONDUCTIVITY x

WATER LEVEL PRIOR TO DEVELOPMENT 8.74 (elevation in feet) 14.3
WATER LEVEL AFTER DEVELOPMENT 14.3 Bottom of hole (elevation in feet)
DEVELOPMENT STARTED 10.00
DEVELOPMENT COMPLETED 11.25
TOTAL VOLUME OF WATER REMOVED 9 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
1.8	6.94	0.936	8.5	-------
3.6	7.19	0.702	8.6	------------
5.4	7.07	0.573	8.7	---------
7.2	7.07	0.523	8.5	---------
9.0	7.08	0.502	8.7	20

[illegible]TES: 1 Well volume = .9 gallon 90% REC=9.30

Well dry at 2.5 gallons then recharges & pumps app. 1 gallon at a time. Sample taken at

5.4 water very clear

WELL DEVELOPMENT RECORD

PROJECT: Dowcraft Corporation

PROJECT NUMBER: BTA-90-179D DATE: 4-15-92

LOCATION:

WELL NUMBER: ESI-2

PERSONNEL: L.A. Zimmerman

DEVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

REQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 9 NTU
WELL VOLUMES 10
STABLE pH X
STABLE CONDUCTIVITY X

WATER LEVEL PRIOR TO DEVELOPMENT 8.90 (elevation in feet)14
WATER LEVEL AFTER DEVELOPMENT 9.00 (elevation in feet)
DEVELOPMENT STARTED 3:15
DEVELOPMENT COMPLETED 3:30
TOTAL VOLUME OF WATER REMOVED 9.0 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
1.8	7.18	0.504	14.8	-----------
3.6	7.05	0.490	14.6	--------
5.4	7.03	0.486	14.5	----------
7.2	7.02	0.486	14.4	------------
9.0	7.01		14.4	9

TES: 1 Well Volume = 0.9 90% REC=9.41

WELL DEVELOPMENT RECORD

PROJECT: Dowcraft Corporation

PROJECT NUMBER: BTA-90-179D DATE: 4-15-92

LOCATION:

WELL NUMBER: ESI- 2D

PERSONNEL: L.A. Zimmerman

DEVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

REQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 144 NTU
WELL VOLUMES 10
STABLE pH x
STABLE CONDUCTIVITY x

WATER LEVEL PRIOR TO DEVELOPMENT 8.67 (elevation in feet)
WATER LEVEL AFTER DEVELOPMENT 10.10 (elevation in feet)
DEVELOPMENT STARTED 12:30
DEVELOPMENT COMPLETED 3:00
TOTAL VOLUME OF WATER REMOVED 55 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
11	7.85	0.601	16.1	----------
22	7.71	0.590	16.3	------------
33	7.67	0.581	16.2	------------
44	7.72	0.587	16.0	-----------
55	7.71	0.593	15.9	-----------

90% REC= 11.89

TES: 1 Well volumne = 5.5 Gallons

WELL DEVELOPMENT RECORD

ROJECT: Dowcraft Corporation
ROJECT NUMBER: BTA-90-179D DATE: 4-15-92
OCATION:
ELL NUMBER: ESI-3
ERSONNEL: L. A. Zimmerman

EVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

EQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 10 NTU
WELL VOLUMES 10
STABLE pH x
STABLE CONDUCTIVITY x

VATER LEVEL PRIOR TO DEVELOPMENT 9.27 (elevation in feet) 13.95
VATER LEVEL AFTER DEVELOPMENT 9.28 (elevation in feet)
DEVELOPMENT STARTED 3:45
DEVELOPMENT COMPLETED 4:00
TOTAL VOLUME OF WATER REMOVED 8 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
1.6	7.25	0.627	14.5	------
3.2	7.22	0.628	14.3	-------
4.8	7.15	0.629	14.3	-------
6.4	7.18	0.628	14.3	------
8.0	7.13	0.633	14.3	10

ES: 1 Well volumne = 0.8 Gallons 90% REC= 9.74

WELL DEVELOPMENT RECORD

ROJECT: Dowcraft Corporation

ROJECT NUMBER: BTA-90-179D DATE: 4-15-92

OCATION:

ELL NUMBER: ESI- 4

ERSONNEL: LA Zimmerman

EVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

EQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 40 NTU
WELL VOLUMES 10
STABLE pH x
STABLE CONDUCTIVITY x

ATER LEVEL PRIOR TO DEVELOPMENT 9.33 (elevation in feet)(14.5
ATER LEVEL AFTER DEVELOPMENT 9.35 (elevation in feet)
EVELOPMENT STARTED 4:10
EVELOPMENT COMPLETED 4:30
OTAL VOLUME OF WATER REMOVED 9 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
1.8	7.35	0.661	10.6	-------------
3.6	7.4	0.659	10.2	----------
5.4	7.42	0.658	10.2	----------
7.2	7.39	0.655	10.0	-----------
9.0	7.39	0.656	10.0	40

90% REC=9.85

[illegible]ES: 1 Well volumne = 0.9 Gallons

WELL DEVELOPMENT RECORD

ROJECT: Dowcraft Corporation

ROJECT NUMBER: BTA-90-179D DATE: 4-15-92

OCATION:

ELL NUMBER: ESI- 5

ERSONNEL: L.A. Zimmerman

EVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

EQUIRED DEVELOPMENT CRITERIA:

TURBIDITY NTU
WELL VOLUMES 10
STABLE pH x
STABLE CONDUCTIVITY x

WATER LEVEL PRIOR TO DEVELOPMENT 8.59 (elevation in feet) 14.4
WATER LEVEL AFTER DEVELOPMENT Bottom of Well (elevation in feet)
DEVELOPMENT STARTED 4:40
DEVELOPMENT COMPLETED 4-16-92
TOTAL VOLUME OF WATER REMOVED 10 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
2	7.91	0.450	11.5	----------
4				------------
6				------
8				-------
10				--------

90% REC= 9.17

TES: 1 well volume = 1 Gallon

Well went dry after 1.5 gallons and again at 2 gallons after well set fo 10 minutes It takes 5 minutes/foot to recharge will repurge on 4-16-92 in A.M. Stopped Development at 3 gallons. 4-16-92 Purged 1.5 gallon well went dry water well was at 8.61

WELL DEVELOPMENT RECORD

ROJECT: Dowcraft Corporation

ROJECT NUMBER: BTA-90-179D DATE: 4-14-92

OCATION:

ELL NUMBER: ESI- 6

ERSONNEL: L.A. Zimmerman

EVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

EQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 140 NTU
WELL VOLUMES 10
STABLE pH x
STABLE CONDUCTIVITY x

WATER LEVEL PRIOR TO DEVELOPMENT 9.22 (elevation in feet)
WATER LEVEL AFTER DEVELOPMENT Botton of Hole (elevation in feet)
DEVELOPMENT STARTED 2:00
DEVELOPMENT COMPLETED 3:00
TOTAL VOLUME OF WATER REMOVED 7 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
1.4	6.97	0.616	15.6	--
2.8	7.07	0.606	16.0	--
4.2	7.04	0.602	16.1	--
5.6	7.03	0.589	15.7	--
7.0	7.10	0.592	15.5	--

90% REC= 9.62

ES: 1 Well volumne= 0.7 gallon

Well dry at 1 gallon and again at 2 gallans

WELL DEVELOPMENT RECORD

ROJECT: Dowcraft Corpporation

ROJECT NUMBER: BTA-90-179D DATE: 4-14-92

OCATION:

ELL NUMBER: ESI- 7

ERSONNEL: L.A. Zimmerman

EVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

EQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 57 NTU
WELL VOLUMES 10
STABLE pH x
STABLE CONDUCTIVITY x

ATER LEVEL PRIOR TO DEVELOPMENT 9.29 (elevation in feet) 13.95
ATER LEVEL AFTER DEVELOPMENT 9.30 (elevation in feet)
EVELOPMENT STARTED 1:00
EVELOPMENT COMPLETED 1:30
OTAL VOLUME OF WATER REMOVED 8 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
1.6	7.21	0.470	11.5	--
3.2	7.12	0.438	11.5	--
4.8	7.10	0.432	11.3	--
6.4	7.09	0.430	11.2	--
8.0	7.06	0.434	11.1	--

90% REC= 9.76

ES: 1 Well volumne = .8 gallons

WELL DEVELOPMENT RECORD

ROJECT: Dowcraft Corporation

ROJECT NUMBER: BTA-90-179D DATE: 4-14-92

CATION:

LL NUMBER: ESI- 8

ERSONNEL: L.A. Zimmerman

EVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

EQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 200 NTU
WELL VOLUMES 10
STABLE pH x
STABLE CONDUCTIVITY x

ATER LEVEL PRIOR TO DEVELOPMENT 11.90 (elevation in feet) 16.95
ATER LEVEL AFTER DEVELOPMENT 11.92 (elevation in feet)
EVELOPMENT STARTED 11.35
EVELOPMENT COMPLETED 12:20
OTAL VOLUME OF WATER REMOVED 9 GALLONS

VOLUME VACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
1.8	7.23	0.548	11.1	--
3.6	7.05	0.522	11.0	--
5.4	6.95	0.490	10.9	--
7.2	6.94	0.484	10.7	--
9.0	6.98	0.476	10.7	--

90% REC= 12.41

N[illegible]ES: 1 Well volumne = .9 gallons

Water very turbid (brown) Pump pulls a lot of sand and silt from the bottom of the well.

WELL DEVELOPMENT RECORD

ROJECT: Dowcraft Corporation

ROJECT NUMBER: BTA-90-179D DATE: 4-13-92

OCATION: Dow Street, Falconer, NY

ELL NUMBER: ESI- 9

ERSONNEL: L.A Zimmerman

EVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

EQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 93 NTU
WELL VOLUMES 10
STABLE pH x
STABLE CONDUCTIVITY x

WATER LEVEL PRIOR TO DEVELOPMENT 7.42 (elevation in feet) Bottom
WATER LEVEL AFTER DEVELOPMENT 14 (elevation in feet) 12.85
DEVELOPMENT STARTED 10:40
DEVELOPMENT COMPLETED 12:00
TOTAL VOLUME OF WATER REMOVED 10 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
2	6.95	0.442	10.3	--
3	7.15	0.365	9.4	--
4	7.36	0.650	10.3	--
5	7.16	0.626	10.5	--
6	7.43	0.630	10.2	--
7	7.25	0.632	10.1	--

90% REC= 7.98

ES: 1 well volumne = 1 gallon

Well dry at 2 gallons but recharges quickly. Well dry at 3 gallons Water very turbid (brown) Let well recharge to 10 took from 11:10 to 11:25 well continues to go dry every 1 to 1½ gallons

NOTE: ESI purged as additional 3 gallons to complete 10 well volumne criteria.

Well dry at 2 gallons= Let recharge and purged additional 1 gallon

WELL DEVELOPMENT RECORD

ROJECT: Dowcraft Corporation

ROJECT NUMBER: BTA-90-179D DATE: 4-15-92

OCATION:

ELL NUMBER: ESI-10

ERSONNEL: L.A. Zimmerman

EVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

EQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 190 NTU
WELL VOLUMES 10
STABLE pH x
STABLE CONDUCTIVITY x

ATER LEVEL PRIOR TO DEVELOPMENT 10.03 (elevation in feet) 14.0
ATER LEVEL AFTER DEVELOPMENT 10.16 (elevation in feet)
EVELOPMENT STARTED 9:30
EVELOPMENT COMPLETED 10:00
OTAL VOLUME OF WATER REMOVED 7 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
1.4	6.66	0.536	15.4	--
2.8	6.76	0.510	15.5	--
4.2	6.82	0.520	15.5	--
5.6	6.89	0.565	15.4	--
7.0	6.87	0.517	15.5	--

90% REC= 10.43

N[illegible]ES: 1 well volumne = 0.7 gallon

WELL DEVELOPMENT RECORD

ROJECT: Dowcraft Corporation

ROJECT NUMBER: BTA-90-179D DATE: 4-15-92

OCATION:

ELL NUMBER: ESI- 11

ERSONNEL: L.A. Zimmerman

EVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

EQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 87 NTU
WELL VOLUMES 10
STABLE pH x
STABLE CONDUCTIVITY x

WATER LEVEL PRIOR TO DEVELOPMENT 10.11 (elevation in feet) 14.55
WATER LEVEL AFTER DEVELOPMENT 10.00 (elevation in feet)
DEVELOPMENT STARTED 10:15
DEVELOPMENT COMPLETED 10:45
TOTAL VOLUME OF WATER REMOVED 7 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
1.4	7.25	0.627	16.1	--
2.8	7.18	0.605	16.1	--
4.2	7.14	0.641	16.0	--
5.6	7.18	0.589	16.0	--
7.0	7.11	0.575	16.0	--

90% REC= 10.55

ES: 1 well volumne = 0.7

WELL DEVELOPMENT RECORD

ROJECT: Dowcraft Corporation

ROJECT NUMBER: BTA-90-179D DATE: 4-15-92

OCATION:

ELL NUMBER: ESI- 12

ERSONNEL: L.A. Zimmerman

EVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

EQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 196 NTU
WELL VOLUMES 10
STABLE pH x
STABLE CONDUCTIVITY x

ATER LEVEL PRIOR TO DEVELOPMENT 9.65 (elevation in feet)
ATER LEVEL AFTER DEVELOPMENT 9.75 (elevation in feet)
EVELOPMENT STARTED 11:00
EVELOPMENT COMPLETED 11:30
OTAL VOLUME OF WATER REMOVED 8 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
1.6	7.53	0.515	15.9	--
3.2	7.50	0.506	15.4	--
4.8	7.41	0.505	15.7	--
6.4	7.36	0.497	15.6	--
8.0	7.38		15.6	196

90% REC= 10.14

ES: 1 Well volume = 0.8

WELL DEVELOPMENT RECORD

ROJECT: Dowcraft Corporation

ROJECT NUMBER: BTA-90-179D DATE: 4-14-92

OCATION:

ELL NUMBER: ESI- 13

ERSONNEL: L.A. Zimmerman

EVELOPMENT METHOD: BAILERS - BK PUMP - [✓ PERASTALLIC PUMP]
DOWN HOLE PUMP - COMPRESSED AIR
OTHER:

REQUIRED DEVELOPMENT CRITERIA:

TURBIDITY 186 NTU
WELL VOLUMES 10
STABLE pH x
STABLE CONDUCTIVITY x

WATER LEVEL PRIOR TO DEVELOPMENT 8.15 (elevation in feet) 14.5
WATER LEVEL AFTER DEVELOPMENT 8.21 (elevation in feet)
DEVELOPMENT STARTED 3:20
DEVELOPMENT COMPLETED 4:00
TOTAL VOLUME OF WATER REMOVED 11 GALLONS

VOLUME EVACUATED (GALLONS)	pH (STANDARD UNITS)	CONDUCTIVITY (umhos cm) x 10	TEMPERATURE (DEGREES	TURBIDITY NTU
2.2	6.85	2.02	10.9	--
4.4	6.75	1.84	11.0	--
6.6	6.73	1.64	10.5	--
8.8	6.72	1.65	10.5	--
11.0	6.73	1.59	10.6	--

TES: 1 Well volume = 1.1 gallon 90% REC= 8.79

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: Dowcraft PROJECT NO.: 5020
DATE OF WELL DEVELOPMENT: 12/1-2/99
DEVELOPMENT CREW MEMBERS: cfd, RW.
PURGING METHOD: trash pump, bucket auger
SAMPLE NO.: N/A
SAMPLE TIME: N/A

WELL INFORMATION

WELL NUMBER: ESI-3
WELL TYPE (diameter/material) 2" Ø PVC
MEASURING POINT ELEVATION:
STATIC WATER DEPTH: ELEVATION:
BOTTOM DEPTH: ELEVATION:
WATER COLUMN LENGTH:
SCREENED INTERVAL:
WELL VOLUME: Well is filled w/ sediment.

Note: For 2-inch diameter well: 1 foot = 0.14 gallons (imp) or 0.16 gallons (us)
1 meter = 2 liters

	UNITS	1	2	3	4	5	TOTAL/ AVERAGE
VOLUME PURGED (volume/total volume):							45
FIELD pH:							
FIELD TEMPERATURE:							
FIELD CONDUCTIVITY:							
CLARITY/TURBIDITY VALUES:						Clear	
COLOR:						None	
ODOR:						None	
COMMENTS:		Mud			Added 18 gal. potable water to suspend sediment.		

COPIES TO:

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: Dowcraft PROJECT NO.: 5020

DATE OF WELL DEVELOPMENT: 4/24/98

DEVELOPMENT CREW MEMBERS: DJO

PURGING METHOD: SS Bailer

SAMPLE NO.: N/A

SAMPLE TIME: N/A

WELL INFORMATION

WELL NUMBER: ESJ-13R

WELL TYPE (diameter/material) 2"Ø PVC

MEASURING POINT ELEVATION: ?

STATIC WATER DEPTH: ~ 8.75' BTOC ELEVATION:

BOTTOM DEPTH: 15.1' [illegible] BGS ELEVATION:

WATER COLUMN LENGTH: 6.25'

SCREENED INTERVAL: 5.1-15.1' BGS

WELL VOLUME: 1.0 gallon

Note: For 2-inch diameter well: 1 foot = 0.14 gallons (imp) or 0.16 gallons (us)
1 meter = 2 liters

	UNITS	1	2	3	4	13 ~~5~~	*TOTAL/ AVERAGE*
VOLUME PURGED (volume/total volume):							13 gal
FIELD pH:							
FIELD TEMPERATURE:							
FIELD CONDUCTIVITY:							
CLARITY/TURBIDITY VALUES:		Turbid				Less Turbid	
COLOR:		Brown				Brown	
ODOR:		None				None	
COMMENTS:		Much Sed.				Sed.	

COPIES TO:

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: Dowcraft　PROJECT NO.: 5020

DATE OF WELL DEVELOPMENT: 5/11/00

DEVELOPMENT CREW MEMBERS: SJB Services

PURGING METHOD: Peristaltic pump

SAMPLE NO.: W-051200-DRS-004

SAMPLE TIME: 5/12/00 0900

WELL INFORMATION

WELL NUMBER: EST-14

WELL TYPE (diameter/material) 2" Black steel

MEASURING POINT ELEVATION: 1262.58

STATIC WATER DEPTH: 7.93'　ELEVATION: 1254.65

BOTTOM DEPTH: 15'　ELEVATION: 1247.8

WATER COLUMN LENGTH: 6.9'

SCREENED INTERVAL: 5-15' BGS

WELL VOLUME: 1.1 gal

Note: For 2-inch diameter well: 1 foot = 0.14 gallons (imp) or 0.16 gallons (us)
1 meter = 2 liters

	UNITS	1	~~2~~ 5	~~3~~ 7	~~4~~ 9	~~5~~ 12	~~TOTAL/ AVERAGE~~ 13
VOLUME PURGED (volume/total volume):	gal						
FIELD pH:		7.4	6.9	6.8	6.6	6.7	6.7
FIELD TEMPERATURE:		11.9	11.9	11.8	11.8	11.8	11.7
FIELD CONDUCTIVITY:		600	480	470	450	450	610
CLARITY/TURBIDITY VALUES:		>1000	573	884	637	147	6
COLOR:							
ODOR:							
COMMENTS:							5/12, prior to sample collection

COPIES TO:

WELL DEVELOPMENT AND STABILIZATION FORM

PROJECT NAME: Dowcraft PROJECT NO.: 5020

DATE OF WELL DEVELOPMENT: 5/12-15/00

DEVELOPMENT CREW MEMBERS: SJB Services

PURGING METHOD: Surge & pump

SAMPLE NO.: W-051500-DRS-012/-013 (Dup)

SAMPLE TIME: 1700

WELL INFORMATION

WELL NUMBER: PW-3R

WELL TYPE (diameter/material) 6" ∅ SS

MEASURING POINT ELEVATION: 1265.04

STATIC WATER DEPTH: ~ 8' BGS ELEVATION: 1257.3

BOTTOM DEPTH: 52' BGS (BH) ELEVATION: 1213.3

WATER COLUMN LENGTH: ~~44'~~ 34'

SCREENED INTERVAL: 26.9 - 41.9' BGS

WELL VOLUME: 50 gal.

Note: For 2-inch diameter well: 1 foot = 0.14 gallons (imp) or 0.16 gallons (us)
1 meter = 2 liters

	UNITS	1	2	3	4	5	*TOTAL/ AVERAGE*
VOLUME PURGED (volume/total volume):	gal	45	90	135			
FIELD pH:		7.6	7.3	7.3			
FIELD TEMPERATURE:	°C	13.5	13.6	13.5			
FIELD CONDUCTIVITY:		480	480	460			
CLARITY/TURBIDITY VALUES:	NTU	143	>1000	>1000			
COLOR:							
ODOR:							
COMMENTS:		Dry	Dry	Dry			

COPIES TO:

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-09

APPENDIX H

GROUNDWATER PURGING AND SAMPLING INFORMATION

EST-13R
DEVELOPMENT
4/28/93

TOTAL LENGTH BTOC = 14.6'
- W/L 6.25
8.35
X .16
1.3 GAL/VOL

1.3 X 10 = 13 GALLONS
SOUNDED BOTTOM 14.6' BTOC - SOFT
INITIAL W/Q - CLOUDY, BROWN, EXTREMELY TURBID, MUCH SEDIMENT, NO ODOR, NO SHEEN.
PURGED 13 GALLONS
METHOD BAILER
PURGE WATER DISCHARGED TO ONSITE GWT.
FINAL W/Q - SAME, SLIGHTLY LESS TURBID.

DEPTH BELOW GROUND SURFACE = 15.1'

ESI-2D

DEVELOPMENT / PRE-PURGING.

TOTAL DEPTH = 45.3'
- DEPTH TO W/L = 7.02'
38.28
x .16
6.1 GAL/VOL.

SOUNDED BOTTOM - FIRM.

INITIAL W/Q - VERY TURBID, GRAY, MUCH SEDIMENT, NO ODOR, NO SHEEN (NOTE RE; ~~ODOR~~ ODOR - WELL LOCATION DOWNWIND OF DISCHARGE POINT FOR SPRAY PAINTING BOOTHS.

- PURGED 30 GALLONS
- METHOD BAILER
- PURGE WATER DISCHARGED TO ON-SITE GWT.
- FINAL W/Q - SAME, SLIGHTLY LESS TURBID.

PAGE 1 of 5

ESI SAMPLING LOG

PROJECT: Dowcraft

FILE: BTA-90-179A

SAMPLE LOCATION: ESI-1

DATE: 11-14-90 TIME: 11:20

GENERAL

SAMPLING EQUIPMENT USED: Stainless Steel Bailer

DECONTAMINATION PROCEDURE (Indicate if equipment was precleaned): Alconox soap wash distilled water rinse.

SAMPLE COLLECTION PROCEDURES (include purging, if appropriate): Purging not required due to sample collection within 24 hours of development.

IN SITU MONITORING EQUIPMENT USED AND CALIBRATED: N/A

SAMPLE IDENTIFICATION

SAMPLE TYPE: Water

SAMPLE CODE: ESI-1

CONTAINER	SEQUENCE NUMBER *	TEST PARAMETER	CONTAINER VOLUME	PRESERVATION
1.		TCL Volatiles	40 mls	----
2.		" "	40 mls	----
3.		PP Metals	1 liter	HNO_3
4.				
5.				
6.				
7.				
8.				

IN SITU MEASUREMENTS

INITIAL WATER LEVEL (MEASURED FROM MONITORING POINT): 7.74' (TOR)

WATER VOLUME REMOVED (IF APPLICABLE): Approx. 1.5 liters

pH (STANDARD UNITS): 6.50

CONDUCTANCE (μ ohms/cm): 374

TEMPERATURE (☒ °C, ☐ °F): 11.8

TOTAL ORGANIC VAPOR (VIA PID): N/A

LOCATION OF PID MEASUREMENT: N/A

OTHER MEASUREMENTS:

1. Turbidity 1000 NTU
2.
3.
4.

MISCELLANEOUS INFORMATION:

CHAIN-OF-CUSTODY COMPLETED (☒ YES, ☐ NO)

SAMPLE CONTAINERS LABELED (☒ YES, ☐ NO)

SHIPPING CONTAINERS SEALED (☒ YES, ☐ NO)

TRIP BLANK (☐ YES, ☒ NO)

FIELD BLANK (☐ YES, ☒ NO)

REMARKS: Metals sample turbidity was approximately 50 NTU.

* SEQUENCE NUMBER CORRESPONDS TO IDENTIFICATION USED ON CHAIN-OF-CUSTODY

EMPIRE

Kevin J. Shanahan
SAMPLER

SAMPLER

PAGE 2 of 5

ESII SAMPLING LOG

PROJECT: Dowcraft
FILE: BTA-90-179A
SAMPLE LOCATION: ESI-2
DATE: 11-13-90
TIME: 3:55

GENERAL

SAMPLING EQUIPMENT USED: Stainless Steel Bailer

DECONTAMINATION PROCEDURE (indicate if equipment was precleaned): Alconox soap wash with distilled water rinse.

SAMPLE COLLECTION PROCEDURES (include purging, if appropriate): Purging not required since sample collection was within 24 hours of well development.

IN SITU MONITORING EQUIPMENT USED AND CALIBRATED: N/A

SAMPLE IDENTIFICATION

SAMPLE TYPE: Water
SAMPLE CODE: ESI-2

CONTAINER	SEQUENCE NUMBER *	TEST PARAMETER	CONTAINER VOLUME	PRESERVATION
1.		TCL Volatiles	40 mls	----
2.		" "	40 mls	----
3.		PP Metals	1 liter	HNO_3
4.				
5.				
6.				
7.				
8.				

IN SITU MEASUREMENTS

INITIAL WATER LEVEL (MEASURED FROM MONITORING POINT): 8.01' (TOR)
WATER VOLUME REMOVED (IF APPLICABLE): Approximately 2 liters
pH (STANDARD UNITS): 6.82
CONDUCTANCE (µ ohms/cm): 459
TEMPERATURE (☒ °C, ☐ °F): 14.9
TOTAL ORGANIC VAPOR (VIA PID): N/A
LOCATION OF PID MEASUREMENT: N/A

OTHER MEASUREMENTS:

1. Turbidity approximately 610 NTU
2.
3.
4.

MISCELLANEOUS INFORMATION:

CHAIN-OF-CUSTODY COMPLETED (☒ YES, ☐ NO)
SAMPLE CONTAINERS LABELED (☒ YES, ☐ NO)
SHIPPING CONTAINERS SEALED (☒ YES, ☐ NO)
TRIP BLANK (☐ YES, ☒ NO)
FIELD BLANK (☐ YES, ☒ NO)

REMARKS: Metals sample contained much lower turbidity.

* SEQUENCE NUMBER CORRESPONDS TO IDENTIFICATION USED ON CHAIN-OF-CUSTODY

Kevin J. Shanahan
SAMPLER

SAMPLER

EMPIRE
SOILS INVESTIGATIONS INC

ESII SAMPLING LOG

PROJECT: Dowcraft Corporation

FILE: BTA-90-179A

SAMPLE LOCATION: ESI-3

DATE: 11-13-90

TIME: 3:40 pm

GENERAL

SAMPLING EQUIPMENT USED: Stainless Steel Bailer

DECONTAMINATION PROCEDURE (Indicate if equipment was precleaned): Alconox soap wash and distilled water rinse.

SAMPLE COLLECTION PROCEDURES (include purging, if appropriate): Purging not required since sample collection was within 24 hours of well development.

IN SITU MONITORING EQUIPMENT USED AND CALIBRATED: N/A

SAMPLE IDENTIFICATION

SAMPLE TYPE: Water

SAMPLE CODE: ESI-3

CONTAINER	SEQUENCE NUMBER *	TEST PARAMETER	CONTAINER VOLUME	PRESERVATION
1.		TCL Volatiles	40 mls	----
2.		TCL Volatiles	40 mls	----
3.		PP Metals	1 liter	HNO_3
4.				
5.				
6.				
7.				
8.				

IN SITU MEASUREMENTS

INITIAL WATER LEVEL (MEASURED FROM MONITORING POINT): 8.24' (TOR)

WATER VOLUME REMOVED (IF APPLICABLE): Approximately 2 liters

pH (STANDARD UNITS): 9.28

CONDUCTANCE (μ ohms/cm): 402

TEMPERATURE (☒ °C, ☐ °F): 11.80

TOTAL ORGANIC VAPOR (VIA PID): N/A

LOCATION OF PID MEASUREMENT: N/A

OTHER MEASUREMENTS:

1. Turbidity = 940 NTU
2.
3.
4.

MISCELLANEOUS INFORMATION:

CHAIN-OF-CUSTODY COMPLETED (☒ YES, ☐ NO)

SAMPLE CONTAINERS LABELED (☒ YES, ☐ NO)

SHIPPING CONTAINERS SEALED (☒ YES, ☐ NO)

TRIP BLANK (☐ YES, ☒ NO)

FIELD BLANK (☐ YES, ☒ NO)

REMARKS: Metals sample contained much lower turbidity.

* SEQUENCE NUMBER CORRESPONDS TO IDENTIFICATION USED ON CHAIN-OF-CUSTODY

Kevin J. Shanahan

SAMPLER

SAMPLER

EMPIRE
SOILS INVESTIGATIONS INC

PAGE 4 of 5

ESII SAMPLING LOG

FILE: BTA-90-179A

PROJECT: Dowcraft Corporation

SAMPLE LOCATION: ESI-4

DATE: 11-13-90 TIME: 3:20 pm

GENERAL

SAMPLING EQUIPMENT USED: Stainless Steel Bailer

DECONTAMINATION PROCEDURE (Indicate if equipment was precleaned): Alconox soap wash with distilled water rinse.

SAMPLE COLLECTION PROCEDURES (include purging, if appropriate): Purging not required due to sample collection within 24 hours of well development.

IN SITU MONITORING EQUIPMENT USED AND CALIBRATED: N/A

SAMPLE IDENTIFICATION

SAMPLE TYPE: Water

SAMPLE CODE: ESI-4

CONTAINER	SEQUENCE NUMBER *	TEST PARAMETER	CONTAINER VOLUME	PRESERVATION
1.		TCL Volatiles	40 mls	----
2.		TCL Volatiles	40 mls	----
3.		PP Metals	1 liter	HNO_3
4.				
5.				
6.				
7.				
8.				

IN SITU MEASUREMENTS

INITIAL WATER LEVEL (MEASURED FROM MONITORING POINT): 8.24' (TOR)

WATER VOLUME REMOVED (IF APPLICABLE): Approximately 2 liters

pH (STANDARD UNITS): 8.26

CONDUCTANCE (μ ohms/cm): 608

TEMPERATURE (☒ °C, ☐ °F): 10.8

TOTAL ORGANIC VAPOR (VIA PID): N/A

LOCATION OF PID MEASUREMENT: N/A

OTHER MEASUREMENTS:

1. Turbidity approximately 880 NTU
2.
3.
4.

MISCELLANEOUS INFORMATION:

CHAIN-OF-CUSTODY COMPLETED (☒ YES, ☐ NO)

SAMPLE CONTAINERS LABELED (☒ YES, ☐ NO)

SHIPPING CONTAINERS SEALED (☒ YES, ☐ NO)

TRIP BLANK (☐ YES, ☒ NO)

FIELD BLANK (☐ YES, ☒ NO)

REMARKS: Metals sample contained much lower turbidity.

* SEQUENCE NUMBER CORRESPONDS TO IDENTIFICATION USED ON CHAIN-OF-CUSTODY

Kevin J. Shanahan

SAMPLER

SAMPLER

EMPIRE
SOILS INVESTIGATIONS INC

PAGE 5 of 5

ESII SAMPLING LOG

PROJECT: Dowcraft Corporation

FILE: BTA-90-179A

SAMPLE LOCATION: ESI-5

DATE: 11-13-90

TIME: 3:05 PM

GENERAL

SAMPLING EQUIPMENT USED: Stainless Steel Bailer

DECONTAMINATION PROCEDURE (Indicate if equipment was precleaned): Alconox soap wash and distilled water rinse.

SAMPLE COLLECTION PROCEDURES (include purging, if appropriate): Purging not required due to sample collection within 24 hours of well developement.

IN SITU MONITORING EQUIPMENT USED AND CALIBRATED: N/A

SAMPLE IDENTIFICATION

SAMPLE TYPE: Water

SAMPLE CODE: ESI-5

CONTAINER	SEQUENCE NUMBER *	TEST PARAMETER	CONTAINER VOLUME	PRESERVATION
1.		TCL Volatiles	40 mls	-----
2.		" "	40 mls	-----
3.		PP Metals	1 liter	HNO_3
4.				
5.				
6.				
7.				
8.				

IN SITU MEASUREMENTS

INITIAL WATER LEVEL (MEASURED FROM MONITORING POINT): 7.75' (TOR)

WATER VOLUME REMOVED (IF APPLICABLE): 2 liters

pH (STANDARD UNITS): 12.05

CONDUCTANCE (μ ohms/cm): 1566

TEMPERATURE (☒ °C, ☐ °F): 10.4°

TOTAL ORGANIC VAPOR (VIA PID): N/A

LOCATION OF PID MEASUREMENT: N/A

OTHER MEASUREMENTS:

1. Turbidity 600 NTU
2.
3.
4.

MISCELLANEOUS INFORMATION:

CHAIN-OF-CUSTODY COMPLETED (☒ YES, ☐ NO)

SAMPLE CONTAINERS LABELED (☒ YES, ☐ NO)

SHIPPING CONTAINERS SEALED (☒ YES, ☐ NO)

TRIP BLANK (☐ YES, ☒ NO)

FIELD BLANK (☐ YES, ☒ NO)

REMARKS: Metals sample contained much lower tubidity

* SEQUENCE NUMBER CORRESPONDS TO IDENTIFICATION USED ON CHAIN-OF-CUSTODY

Kevin J. Shanahan

SAMPLER

SAMPLER

EMPIRE
SOILS INVESTIGATIONS INC

5/19/97 ESI-2 /MS/MSD

DIAMETER 2" TD = 14.7'
STATIC W/L = 7.85

14.7
-7.85
6.85
x0.16
1.1 G/V.

VOL PURGED ____
METHOD P.PUMP W/ DEDICATED POLY TUBING
INITIAL W/Q - CLOUDY, DARK GRAY, HEAVY
SEDIMENT, NO ODOR, NO SHEEN
FINAL W/Q. - CLEAR, OCCASIONAL SLUGS
OF SEDIMENT. METALS WERE SLIGHTLY
CLOUDY. NO ODOR, NO SHEEN.
METHOD P.PUMP + DEDICATED POLY TUBING.
PARAMETERS
3x1L AMBER SEMI VOA'S
3x1L AMBER PCBS
3x1L PLASTIC TCL METALS w/ HNO3

5/19/97 ESI-11/ESI-15 DUP

2" Ø ~~17'~~ T.D 15.1

STATIC W/L 8.49

15.1
- 8.49
6.61
x 0.16
3966
661
10576

VOL PURGED 10 GALS
METHOD P.PUMP + POLY TUBING
INITIAL W/Q - SLIGHTLY CLOUDY, BROWN
+ ORANGE TINT, SOME SEDIMENT.
CLEARED QUICKLY, NO ODOR,
NO SHEEN.
FINAL W/Q - CLEAR, COLORLESS, NO
SHEEN, SEDIMENT, ODOR.
METHOD P.PUMP + POLY TUBING.
PARAMETERS
2x1L AMBER SEMI VOAS
2x1L AMBER PCBS
2x1L PLASTIC TCL METALS W/ HNO3
TIME 1530/1600
CREW DD/CA

ES1-1~~3~~7 qd 5/19/97

2"Ø 14.95 T.D
STATIC w/L 8.29' BTOC

14.95
- 8.29
6.66
x 0.16
1.1 GAL/V.

VOL PURGED = 11 GALLONS
METHOD P. PUMP w/ POLY TUBING.
INITIAL w/Q - CLOUDY, BROWN, SOME
SEDIMENT, NO ODOR, NO SHEEN.
FINAL w/Q - CLEAR, COLORLESS, NO
SEDIMENT, ODOR OR SHEEN
METHOD P. PUMP + DEDICATED TUBING
PARAMETERS - 1x1L AMBER SEMI VOAS
1x1L PCB'S
1x1L TCL METALS w/ HNO3

TIME 1145
CREW DDO/CD

WELL PURGING FIELD INFORMATION FORM

JOB# 5020-

SITE/PROJECT NAME: Dowcraft

WELL# PW-01

Not Sampled

WELL PURGING INFORMATION

120299	120299	16.5	
PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/[✓ GALLONS])	UAL VOLUME PURGED (LITRES/[✓ GALLONS])

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT........DEDICATED Y [✓ N] (CIRCLE ONE)

NG EQIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

PURGING DEVICE		A - SUBMERSIBLE PUMP	D - GAS LIFT PUMP	G - BAILER	X-	PURGING OTHER (SPECIFY)
		B - PERISTALTIC PUMP	E - PURGE PUMP	H - WATE		
SAMPLING DEVICE	G	C - BLADDER PUMP	F - DIPPER BOTTLE		X-	SAMPLING OTHER (SPECIFY)
PURGING DEVICE		A - TEFLON	D - PVC		X-	PURGING OTHER (SPECIFY)
		B - STAINLESS STEEL	E - POLYETHYLE			
SAMPLING DEVICE		C - POLYPROPYLENE			X-	SAMPLING OTHER (SPECIFY)
PURGING DEVICE		A - TEFLON	D - PO	F - SILICONE	X-	PURGING OTHER (SPECIFY)
		B - TYGON	E - POLYETHYLENE	G - COMBINATION TEFLON/POLYPROPYLENE		
SAMPLING DEVICE		C - ROPE	X- (SP FY)		X-	SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45 N/A A - IN-LINE DISPOS B - PRESSURE C - VACUUM

FI MEASUREMENTS

WELL ELEVATION (m/ft)

DEPTH TO WATER 20 (m/[✓ ft])

GROUNDWATER ELEVATION (m/ft)

WELL DEPTH (m/ft)

pH	TURBIDITY	CONDUCTIVITY	SAMPLE TEMPERATURE
7 (std)	(ntu)	516 (µm/cm) AT 25°C	11.8 (°C)
7 (std)	(ntu)	520 (µm/cm) AT 25°C	12.2 (°C)
7 (std)	(ntu)	516 (µm/cm) AT 25°C	12.2 (°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)

FIELD COMMENTS

SAMPLE APPEARANCE: ODOR: None COLOR: None TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED DIRECTION PRECIPITATION Y/N OUTLOOK

SPECIFIC COMMENTS Initial W/Q red-brown & silty.

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

DATE PRINT SIGNATURE

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

WELL PURGING FIELD INFORMATION FORM

JOB# 5020-

SITE/PROJECT NAME: Dowcraft

WELL# PW-02

WELL PURGING INFORMATION

120299	120299	23.	20.
PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/ [✓ GALLONS])	ACTUAL VOLUME PURGED (LITRES/ [✓ GALLONS])

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

SAMPLING EQIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

PURGING DEVICE		A - SUBMERSIBLE PUMP	D - GAS LIFT PUMP	G - BAILER	X- PURGING OTHER (SPECIFY)
		B - PERISTALTIC PUMP	E - PURGE PUMP	H - WATERRA®	
SAMPLING DEVICE	G	C - BLADDER PUMP	F - DIPPER BOTTLE		X- SAMPLING OTHER (SPECIFY)
PURGING DEVICE		A - TEFLON	D - PVC		X- PURGING OTHER (SPECIFY)
		B - STAINLESS STEEL	E - POLYETHYLENE		
SAMPLING DEVICE		C - POLYPROPYLENE			X- SAMPLING OTHER (SPECIFY)
PURGING DEVICE		A - TEFLON	D - POLYPROPYLENE	F - SILICONE	X- PURGING OTHER (SPECIFY)
		B - TYGON	E - POLYETHYLENE	G - COMBINATION TEFLON/POLYPROPYLENE	
SAMPLING DEVICE		C - ROPE	X- (SPECIFY)		X- SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45 N/A A - IN-LINE DISPOSABLE B - PRESSURE C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION (m/ft)

GROUNDWATER ELEVATION (m/ft)

DEPTH TO WATER 24.40 (m/ [✓ ft])

WELL DEPTH (m/ft)

pH	TURBIDITY	CONDUCTIVITY	SAMPLE TEMPERATURE
7.2 (std)	(ntu)	608. (µm/cm) AT 25°C	12.4 (°C)
7.1 (std)	(ntu)	563. (µm/cm) AT 25°C	13.0 (°C)
7.1 (std)	(ntu)	581. (µm/cm) AT 25°C	12.6 (°C)
7.1 (std)	(ntu)	555. (µm/cm) AT 25°C	13.2 (°C)
7.1 (std)	(ntu)	555. (µm/cm) AT 25°C	13.5 (°C)

FIELD COMMENTS

SAMPLE APPEARANCE: ODOR: None COLOR: Colorless TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED DIRECTION PRECIPITATION Y/N OUTLOOK

SPECIFIC COMMENTS Initial water quality clear, no odor. Well has good recharge

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

DATE PRINT SIGNATURE

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

WELL PURGING FIELD INFORMATION FORM

JOB# 5020-

SITE/PROJECT NAME: ______________

WELL# ESI-01

WELL PURGING INFORMATION

1120399	1120399	1.0	5.0
PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/GALLONS)	ACTUAL VOLUME PURGED (LITRES/GALLONS)

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

SAMPLING EQIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

PURGING DEVICE B — A - SUBMERSIBLE PUMP; B - PERISTALTIC PUMP; C - BLADDER PUMP; D - GAS LIFT PUMP; E - PURGE PUMP; F - DIPPER BOTTLE; G - BAILER; H - WATERRA®

SAMPLING DEVICE G

X- ______ PURGING OTHER (SPECIFY)

X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE ☐ — A - TEFLON; B - STAINLESS STEEL; C - POLYPROPYLENE; D - PVC; E - POLYETHYLENE

SAMPLING DEVICE ☐

X- ______ PURGING OTHER (SPECIFY)

X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE ☐ — A - TEFLON; B - TYGON; C - ROPE; X- ______ (SPECIFY); D - POLYPROPYLENE; E - POLYETHYLENE; F - SILICONE; G - COMBINATION TEFLON/POLYPROPYLENE

SAMPLING DEVICE ☐

X- ______ PURGING OTHER (SPECIFY)

X- ______ SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45 N/A — A - IN-LINE DISPOSABLE; B - PRESSURE; C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION ______ (m/ft)

GROUNDWATER ELEVATION ______ (m/ft)

DEPTH TO WATER 14.45 (m/[✓ ft])

WELL DEPTH ______ (m/ft)

pH	TURBIDITY	CONDUCTIVITY	SAMPLE TEMPERATURE
6.8 (std)	(ntu)	352 (μm/cm) AT 25°C	11.2 (°C)
6.8 (std)	(ntu)	328 (μm/cm) AT 25°C	11.4 (°C)
6.8 (std)	(ntu)	329 (μm/cm) AT 25°C	11.6 (°C)
6.9 (std)	(ntu)	320 (μm/cm) AT 25°C	11.8 (°C)
6.8 (std)	(ntu)	318 (μm/cm) AT 25°C	12.1 (°C)

FIELD COMMENTS

SAMPLE APPEARANCE: ______ ODOR: None COLOR: None TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED ______ DIRECTION ______ PRECIPITATION Y/N OUTLOOK ______

SPECIFIC COMMENTS Initial W/Q light ~~brown~~ grey. Good recharge.

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

A

DATE PRINT SIGNATURE

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

WELL PURGING FIELD INFORMATION FORM

JOB# 5020-

SITE/PROJECT NAME: Dowcraft

WELL# ESI-02

WELL PURGING INFORMATION

1120299	1120299	0.9	3.4
PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/[✓ GALLONS])	ACTUAL VOLUME PURGED (LITRES/GALLONS)

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

SAMPLING EQIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

PURGING DEVICE B — A - SUBMERSIBLE PUMP, B - PERISTALTIC PUMP, C - BLADDER PUMP, D - GAS LIFT PUMP, E - PURGE PUMP, F - DIPPER BOTTLE, G - BAILER, H - WATERRA®

SAMPLING DEVICE G

X- PURGING OTHER (SPECIFY)

X- SAMPLING OTHER (SPECIFY)

PURGING DEVICE — A - TEFLON, B - STAINLESS STEEL, C - POLYPROPYLENE, D - PVC, E - POLYETHYLENE

SAMPLING DEVICE

X- PURGING OTHER (SPECIFY)

X- SAMPLING OTHER (SPECIFY)

PURGING DEVICE — A - TEFLON, B - TYGON, C - ROPE, X- (SPECIFY), D - POLYPROPYLENE, E - POLYETHYLENE, F - SILICONE, G - COMBINATION TEFLON/POLYPROPYLENE

SAMPLING DEVICE

X- PURGING OTHER (SPECIFY)

X- SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45 N/A — A - IN-LINE DISPOSABLE, B - PRESSURE, C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION (m/ft)

GROUNDWATER ELEVATION (m/ft)

DEPTH TO WATER 14.10 (m/[✓ ft])

WELL DEPTH (m/ft)

pH	TURBIDITY	CONDUCTIVITY	SAMPLE TEMPERATURE
7.0 (std)	(ntu)	600 (µm/cm) AT 25°C	12.9 (°C)
7.0 (std)	(ntu)	600 (µm/cm) AT 25°C	13.2 (°C)
7.0 (std)	(ntu)	601 (µm/cm) AT 25°C	13.2 (°C)
7.0 (std)	(ntu)	609 (µm/cm) AT 25°C	13.4 (°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)

FIELD COMMENTS

SAMPLE APPEARANCE: ODOR: None COLOR: None TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED DIRECTION PRECIPITATION Y/N OUTLOOK

SPECIFIC COMMENTS Initial W/Q cloudy no odor. Recharges well.

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

DATE PRINT SIGNATURE

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

WELL PURGING FIELD INFORMATION FORM

JOB# 5020 -

SITE/PROJECT NAME: Dowcraft

WELL# ESI-2D

WELL PURGING INFORMATION

PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/GALLONS)	ACTUAL VOLUME PURGED (LITRES/GALLONS)
1120299	1120299	5.3	15.9

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

SAMPLING EQIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

PURGING DEVICE B

SAMPLING DEVICE G

A - SUBMERSIBLE PUMP D - GAS LIFT PUMP G - BAILER
B - PERISTALTIC PUMP E - PURGE PUMP H - WATERRA®
C - BLADDER PUMP F - DIPPER BOTTLE

X- PURGING OTHER (SPECIFY)
X- SAMPLING OTHER (SPECIFY)

PURGING DEVICE

SAMPLING DEVICE

A - TEFLON D - PVC
B - STAINLESS STEEL E - POLYETHYLENE
C - POLYPROPYLENE

X- PURGING OTHER (SPECIFY)
X- SAMPLING OTHER (SPECIFY)

PURGING DEVICE

SAMPLING DEVICE

A - TEFLON D - POLYPROPYLENE F - SILICONE
B - TYGON E - POLYETHYLENE G - COMBINATION TEFLON/POLYPROPYLENE
C - ROPE X- (SPECIFY)

X- PURGING OTHER (SPECIFY)
X- SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45 N/A A - IN-LINE DISPOSABLE B - PRESSURE C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION (m/ft)

GROUNDWATER ELEVATION (m/ft)

DEPTH TO WATER ~~41.95~~ 8.90 gd (m/[✓ ft])

WELL DEPTH (m/ft)

pH	TURBIDITY	CONDUCTIVITY	SAMPLE TEMPERATURE
7.3 (std)	(ntu)	413 (µm/cm) AT 25°C	11.8 (°C)
7.5 (std)	(ntu)	421 (µm/cm) AT 25°C	10.7 (°C)
7.4 (std)	(ntu)	429 (µm/cm) AT 25°C	11.9 (°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)

FIELD COMMENTS

SAMPLE APPEARANCE: ODOR: None COLOR: None TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED DIRECTION PRECIPITATION Y/N OUTLOOK

SPECIFIC COMMENTS Initial W/Q gray, sl. cloudy. Recharges well.

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

DATE PRINT SIGNATURE

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

WELL PURGING FIELD INFORMATION FORM

JOB# 5020-

SITE/PROJECT NAME: Dowcraft

WELL# ESI-03

WELL PURGING INFORMATION

12 02 99	12 02 99	0.6	3.5
PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/[✓ GALLONS])	ACTUAL VOLUME PURGED (LITRES/GALLONS)

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

SAMPLING EQIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

PURGING DEVICE ☐ A - SUBMERSIBLE PUMP D - GAS LIFT PUMP G - BAILER X- ______ PURGING OTHER (SPECIFY)
B - PERISTALTIC PUMP E - PURGE PUMP H - WATERRA®
SAMPLING DEVICE G C - BLADDER PUMP F - DIPPER BOTTLE X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE ☐ A - TEFLON D - PVC X- ______ PURGING OTHER (SPECIFY)
B - STAINLESS STEEL E - POLYETHYLENE
SAMPLING DEVICE ☐ C - POLYPROPYLENE X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE ☐ A - TEFLON D - POLYPROPYLENE F - SILICONE X- ______ PURGING OTHER (SPECIFY)
B - TYGON E - POLYETHYLENE G - COMBINATION TEFLON/POLYPROPYLENE
SAMPLING DEVICE ☐ C - ROPE X- ______ (SPECIFY) X- ______ SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45 D/A A - IN-LINE DISPOSABLE B - PRESSURE C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION ______ (m/ft)

GROUNDWATER ELEVATION ______ (m/ft)

DEPTH TO WATER 12.90 (m/ft)

WELL DEPTH ______ (m/ft)

pH	TURBIDITY	CONDUCTIVITY	SAMPLE TEMPERATURE
7.1 (std)	(ntu)	598 (µm/cm) AT 25°C	12.9 (°C)
6.6 (std)	(ntu)	635 (µm/cm) AT 25°C	12.9 (°C)
6.7 (std)	(ntu)	627 (µm/cm) AT 25°C	12.9 (°C)
6.7 (std)	(ntu)	641 (µm/cm) AT 25°C	12.9 (°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)

FIELD COMMENTS

SAMPLE APPEARANCE: ______ ODOR: None COLOR: None TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED ______ DIRECTION ______ PRECIPITATION Y/N OUTLOOK ______

SPECIFIC COMMENTS Initial W/Q (after redevelopment) clear & colorless. Well has good recharge

Redevelopment performed 12/1/99. Redeveloped by adding ~18 gal potable water in small increments w/ vigorous pumping & use of bucket auger to suspend & remove accumulated sediment. Removed ~25 gal H2O during redevelopment 12/1 & an additional 20 gals B4 purging for sampling 12/2. Total volume removed before sample collection ≅ 50 gals.

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

DATE ______ PRINT ______ SIGNATURE ______

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

WELL PURGING FIELD INFORMATION FORM

JOB# 5020 -

SITE/PROJECT NAME: Dowcraft

WELL# ESI-04

WELL PURGING INFORMATION

1120299	1120299	0.9	3.5
PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/[✓ GALLONS])	ACTUAL VOLUME PURGED (LITRES/GALLONS)

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

SAMPLING EQIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

PURGING DEVICE ☐ A - SUBMERSIBLE PUMP D - GAS LIFT PUMP G - BAILER x- ______ PURGING OTHER (SPECIFY)
B - PERISTALTIC PUMP E - PURGE PUMP H - WATERRA®
SAMPLING DEVICE G C - BLADDER PUMP F - DIPPER BOTTLE x- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE ☐ A - TEFLON D - PVC x- ______ PURGING OTHER (SPECIFY)
B - STAINLESS STEEL E - POLYETHYLENE
SAMPLING DEVICE ☐ C - POLYPROPYLENE x- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE ☐ A - TEFLON D - POLYPROPYLENE F - SILICONE x- ______ PURGING OTHER (SPECIFY)
B - TYGON E - POLYETHYLENE G - COMBINATION TEFLON/POLYPROPYLENE
SAMPLING DEVICE ☐ C - ROPE x- ______ (SPECIFY) x- ______ SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45 N/A A - IN-LINE DISPOSABLE B - PRESSURE C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION ______ (m/ft) GROUNDWATER ELEVATION ______ (m/ft)

DEPTH TO WATER 14.50 (m/[✓ ft]) WELL DEPTH ______ (m/ft)

pH	TURBIDITY	CONDUCTIVITY	SAMPLE TEMPERATURE
6.8 (std)	(ntu)	692 (µm/cm) AT 25°C	12.6 (°C)
6.9 (std)	(ntu)	689 (µm/cm) AT 25°C	12.7 (°C)
6.9 (std)	(ntu)	688 (µm/cm) AT 25°C	12.3 (°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)

FIELD COMMENTS

SAMPLE APPEARANCE: ______ ODOR: None COLOR: None TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED ______ DIRECTION ______ PRECIPITATION Y/N OUTLOOK ______

SPECIFIC COMMENTS

Initial W/Q slightly cloudy. Well has good recharge

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

DATE PRINT SIGNATURE

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

WELL PURGING FIELD INFORMATION FORM

JOB# 5020 -

SITE/PROJECT NAME: Dowcraft

WELL# ESI-05

WELL PURGING INFORMATION

112099	112099	1.0	3.0
PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/[✓ GALLONS])	ACTUAL VOLUME PURGED (LITRES/GALLONS)

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

SAMPLING EQIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

PURGING DEVICE B

SAMPLING DEVICE G

A - SUBMERSIBLE PUMP; B - PERISTALTIC PUMP; C - BLADDER PUMP; D - GAS LIFT PUMP; E - PURGE PUMP; F - DIPPER BOTTLE; G - BAILER; H - WATERRA®

X- ________ PURGING OTHER (SPECIFY)

X- ________ SAMPLING OTHER (SPECIFY)

PURGING DEVICE ____

SAMPLING DEVICE ____

A - TEFLON; B - STAINLESS STEEL; C - POLYPROPYLENE; D - PVC; E - POLYETHYLENE

X- ________ PURGING OTHER (SPECIFY)

X- ________ SAMPLING OTHER (SPECIFY)

PURGING DEVICE ____

SAMPLING DEVICE ____

A - TEFLON; B - TYGON; C - ROPE; X- ________ (SPECIFY); D - POLYPROPYLENE; E - POLYETHYLENE; F - SILICONE; G - COMBINATION TEFLON/POLYPROPYLENE

X- ________ PURGING OTHER (SPECIFY)

X- ________ SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45 N/A A - IN-LINE DISPOSABLE B - PRESSURE C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION ________ (m/ft)

GROUNDWATER ELEVATION ________ (m/ft)

DEPTH TO WATER 14.55 (m/[✓ ft])

WELL DEPTH ________ (m/ft)

pH	TURBIDITY	CONDUCTIVITY	SAMPLE TEMPERATURE
7.2 (std)	(ntu)	624 (µm/cm) AT 25°C	12.2 (°C)
7.3 (std)	(ntu)	616 (µm/cm) AT 25°C	12.8 (°C)
7.3 (std)	(ntu)	624 (µm/cm) AT 25°C	12.1 (°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)

FIELD COMMENTS

SAMPLE APPEARANCE: ________ ODOR: ________ COLOR: ________ TURBIDITY: ________

WEATHER CONDITIONS: WIND SPEED ________ DIRECTION ________ PRECIPITATION Y/N OUTLOOK ________

SPECIFIC COMMENTS

Initial W/Q cloudy no odor. Well recharges well.

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

DATE ________ PRINT ________ SIGNATURE ________

WELL PURGING FIELD INFORMATION FORM

JOB# 5020 -

SITE/PROJECT NAME: Dowcraft

WELL# ESI-07

WELL PURGING INFORMATION

120299	120299	10.8	3.8
PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/GALLONS)	ACTUAL VOLUME PURGED (LITRES/GALLONS)

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

SAMPLING EQIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

PURGING DEVICE: B — A - SUBMERSIBLE PUMP; B - PERISTALTIC PUMP; C - BLADDER PUMP; D - GAS LIFT PUMP; E - PURGE PUMP; F - DIPPER BOTTLE; G - BAILER; H - WATERRA®

SAMPLING DEVICE: G

X- ______ PURGING OTHER (SPECIFY)

X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE: ______ — A - TEFLON; B - STAINLESS STEEL; C - POLYPROPYLENE; D - PVC; E - POLYETHYLENE

SAMPLING DEVICE: ______

X- ______ PURGING OTHER (SPECIFY)

X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE: ______ — A - TEFLON; B - TYGON; C - ROPE; X- ______ (SPECIFY); D - POLYPROPYLENE; E - POLYETHYLENE; F - SILICONE; G - COMBINATION TEFLON/POLYPROPYLENE

SAMPLING DEVICE: ______

X- ______ PURGING OTHER (SPECIFY)

X- ______ SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45: N/A — A - IN-LINE DISPOSABLE; B - PRESSURE; C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION ______ (m/ft)

GROUNDWATER ELEVATION ______ (m/ft)

DEPTH TO WATER 13.85 (m/[✓ ft])

WELL DEPTH ______ (m/ft)

pH (std)	TURBIDITY (ntu)	CONDUCTIVITY (µm/cm) AT 25°C	SAMPLE TEMPERATURE (°C)
6.7		367	11.9
6.8		360	11.9
6.8		328	12.1
6.8		311	12.1
6.8		311	12.3

FIELD COMMENTS

SAMPLE APPEARANCE: ______ ODOR: None COLOR: None TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED ______ DIRECTION ______ PRECIPITATION Y/N OUTLOOK ______

SPECIFIC COMMENTS Initial W/Q cloudy brown. Good recharge.

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

DATE ______ PRINT ______ SIGNATURE ______

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

WELL PURGING FIELD INFORMATION FORM

JOB# 5020 -

SITE/PROJECT NAME: Dowcraft

WELL# ESI-08

WELL PURGING INFORMATION

120399	120399	1.0	5.0
PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/GALLONS)	ACTUAL VOLUME PURGED (LITRES/GALLONS)

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

SAMPLING EQIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

PURGING DEVICE B

SAMPLING DEVICE G

A - SUBMERSIBLE PUMP
B - PERISTALTIC PUMP
C - BLADDER PUMP
D - GAS LIFT PUMP
E - PURGE PUMP
F - DIPPER BOTTLE
G - BAILER
H - WATERRA®

X- ______ PURGING OTHER (SPECIFY)

X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE

SAMPLING DEVICE

A - TEFLON
B - STAINLESS STEEL
C - POLYPROPYLENE
D - PVC
E - POLYETHYLENE

X- ______ PURGING OTHER (SPECIFY)

X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE

SAMPLING DEVICE

A - TEFLON
B - TYGON
C - ROPE
X- ______ (SPECIFY)
D - POLYPROPYLENE
E - POLYETHYLENE
F - SILICONE
G - COMBINATION TEFLON/POLYPROPYLENE

X- ______ PURGING OTHER (SPECIFY)

X- ______ SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45 N/A A - IN-LINE DISPOSABLE B - PRESSURE C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION ____ (m/ft)

GROUNDWATER ELEVATION ____ (m/ft)

DEPTH TO WATER 18.25 (m/[✓ ft])

WELL DEPTH ____ (m/ft)

pH	TURBIDITY	CONDUCTIVITY	SAMPLE TEMPERATURE
6.9 (std)	(ntu)	320 (µm/cm) AT 25°C	11.9 (°C)
6.9 (std)	(ntu)	318 (µm/cm) AT 25°C	12.1 (°C)
6.9 (std)	(ntu)	331 (µm/cm) AT 25°C	12.2 (°C)
6.8 (std)	(ntu)	316 (µm/cm) AT 25°C	12.3 (°C)
6.8 (std)	(ntu)	313 (µm/cm) AT 25°C	12.1 (°C)

FIELD COMMENTS

SAMPLE APPEARANCE: ______ ODOR: None COLOR: None TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED ______ DIRECTION ______ PRECIPITATION Y/N OUTLOOK ______

SPECIFIC COMMENTS Initial W/Q light brown. Good recharge.

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

DATE PRINT SIGNATURE

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

WELL PURGING FIELD INFORMATION FORM

JOB# 5020 -

SITE/PROJECT NAME: Dowcraft

WELL# ESI-10

WELL PURGING INFORMATION

PURGE DATE (MM DD YY): 1120399

SAMPLE DATE (MM DD YY): 1129399

WATER VOL. IN CASING (LITRES/[✓ GALLONS]): 10.8

ACTUAL VOLUME PURGED (LITRES/[✓ GALLONS]): 14.0

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED [✓ Y] N (CIRCLE ONE) tubing

SAMPLING EQIPMENT.........DEDICATED Y N (CIRCLE ONE)

PURGING DEVICE: B
SAMPLING DEVICE: G

A - SUBMERSIBLE PUMP
B - PERISTALTIC PUMP
C - BLADDER PUMP
D - GAS LIFT PUMP
E - PURGE PUMP
F - DIPPER BOTTLE
G - BAILER
H - WATERRA®

X- PURGING OTHER (SPECIFY)
X- SAMPLING OTHER (SPECIFY)

PURGING DEVICE:
SAMPLING DEVICE:

A - TEFLON
B - STAINLESS STEEL
C - POLYPROPYLENE
D - PVC
E - POLYETHYLENE

X- PURGING OTHER (SPECIFY)
X- SAMPLING OTHER (SPECIFY)

PURGING DEVICE:
SAMPLING DEVICE:

A - TEFLON
B - TYGON
C - ROPE
X- (SPECIFY)
D - POLYPROPYLENE
E - POLYETHYLENE
F - SILICONE
G - COMBINATION TEFLON/POLYPROPYLENE

X- PURGING OTHER (SPECIFY)
X- SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45: D/A
A - IN-LINE DISPOSABLE
B - PRESSURE
C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION: (m/ft)

GROUNDWATER ELEVATION: (m/ft)

DEPTH TO WATER: 14.45 (m/[✓ ft])

WELL DEPTH: (m/ft)

pH (std)	TURBIDITY (ntu)	CONDUCTIVITY (µm/cm) AT 25°C	SAMPLE TEMPERATURE (°C)
6.2		4410	15.4
6.5		4812	15.8
6.5		4666	15.8
6.5		4713	16.0

FIELD COMMENTS

SAMPLE APPEARANCE: ODOR: None COLOR: None TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED DIRECTION PRECIPITATION Y/N OUTLOOK

SPECIFIC COMMENTS: Initial W/Q drawn.

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

DATE PRINT SIGNATURE

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

WELL PURGING FIELD INFORMATION FORM

JOB# 5020-

TE/PROJECT NAME: Dowcraft

WELL# ESI-11

WELL PURGING INFORMATION

1129399	1129399	0.9	.
PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/GALLONS)	ACTUAL VOLUME PURGED (LITRES/GALLONS)

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED [✓ Y] N Tubing (CIRCLE ONE)

SAMPLING EQIPMENT.........DEDICATED Y N (CIRCLE ONE)

PURGING DEVICE B — A - SUBMERSIBLE PUMP; B - PERISTALTIC PUMP; C - BLADDER PUMP; D - GAS LIFT PUMP; E - PURGE PUMP; F - DIPPER BOTTLE; G - BAILER; H - WATERRA® — X- ______ PURGING OTHER (SPECIFY)

SAMPLING DEVICE G — X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE ☐ — A - TEFLON; B - STAINLESS STEEL; C - POLYPROPYLENE; D - PVC; E - POLYETHYLENE — X- ______ PURGING OTHER (SPECIFY)

SAMPLING DEVICE ☐ — X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE ☐ — A - TEFLON; B - TYGON; C - ROPE X- ______ (SPECIFY); D - POLYPROPYLENE; E - POLYETHYLENE; F - SILICONE; G - COMBINATION TEFLON/POLYPROPYLENE — X- ______ PURGING OTHER (SPECIFY)

SAMPLING DEVICE ☐ — X- ______ SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45 N/A — A - IN-LINE DISPOSABLE; B - PRESSURE; C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION ______ (m/ft)

GROUNDWATER ELEVATION ______ (m/ft)

DEPTH TO WATER 15.30 (m/ft)

WELL DEPTH ______ (m/ft)

pH	TURBIDITY	CONDUCTIVITY	SAMPLE TEMPERATURE
6.7 (std)	(ntu)	506 (µm/cm) AT 25°C	15.9 (°C)
6.8 (std)	(ntu)	485 (µm/cm) AT 25°C	16.1 (°C)
6.7 (std)	(ntu)	507 (µm/cm) AT 25°C	16.1 (°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)

FIELD COMMENTS

SAMPLE APPEARANCE: ______ ODOR: None COLOR: None TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED ______ DIRECTION ______ PRECIPITATION Y/N OUTLOOK ______

SPECIFIC COMMENTS

Initial W/Q clear.

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA DATE ______ PRINT ______ SIGNATURE ______

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

WELL PURGING FIELD INFORMATION FORM

JOB# 5020 -

[illegible]TE/PROJECT NAME: Dowcraft

WELL# ESI-12

WELL PURGING INFORMATION

PURGE DATE (MM DD YY): 112039 9

SAMPLE DATE (MM DD YY): 112039 9

WATER VOL. IN CASING (LITRES/GALLONS): 0.9

ACTUAL VOLUME PURGED (LITRES/GALLONS):

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED [✓ Y] N (CIRCLE ONE) Tubing

SAMPLING EQIPMENT.........DEDICATED Y N (CIRCLE ONE)

PURGING DEVICE: B

SAMPLING DEVICE: G

A - SUBMERSIBLE PUMP
B - PERISTALTIC PUMP
C - BLADDER PUMP
D - GAS LIFT PUMP
E - PURGE PUMP
F - DIPPER BOTTLE
G - BAILER
H - WATERRA®

X- PURGING OTHER (SPECIFY)

X- SAMPLING OTHER (SPECIFY)

PURGING DEVICE:

SAMPLING DEVICE:

A - TEFLON
B - STAINLESS STEEL
C - POLYPROPYLENE
D - PVC
E - POLYETHYLENE

X- PURGING OTHER (SPECIFY)

X- SAMPLING OTHER (SPECIFY)

PURGING DEVICE:

SAMPLING DEVICE:

A - TEFLON
B - TYGON
C - ROPE
X- (SPECIFY)
D - POLYPROPYLENE
E - POLYETHYLENE
F - SILICONE
G - COMBINATION TEFLON/POLYPROPYLENE

X- PURGING OTHER (SPECIFY)

X- SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45: A - IN-LINE DISPOSABLE B - PRESSURE C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION (m/ft):

GROUNDWATER ELEVATION (m/ft):

DEPTH TO WATER: 14.45 (m/[✓ ft])

WELL DEPTH (m/ft):

pH	TURBIDITY	CONDUCTIVITY	SAMPLE TEMPERATURE
6.9 (std)	(ntu)	4812 (µm/cm) AT 25°C	15.0 (°C)
6.9 (std)	(ntu)	4819 (µm/cm) AT 25°C	15.9 (°C)
6.8 (std)	(ntu)	4817 (µm/cm) AT 25°C	15.8 (°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)
(std)	(ntu)	(µm/cm) AT 25°C	(°C)

FIELD COMMENTS

SAMPLE APPEARANCE: ODOR: None COLOR: None TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED DIRECTION PRECIPITATION Y/N OUTLOOK

SPECIFIC COMMENTS: Initial W/Q clear.

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

DATE PRINT SIGNATURE

WELL PURGING FIELD INFORMATION FORM

JOB# 5020 -

TE/PROJECT NAME: Dowcraft

WELL# ESI-9

WELL PURGING INFORMATION

050900	050900	1.0	4.0
PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/GALLONS)	ACTUAL VOLUME PURGED (LITRES/GALLONS)

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

SAMPLING EQIPMENT.........DEDICATED Y [✓ N] (CIRCLE ONE)

PURGING DEVICE	B	A - SUBMERSIBLE PUMP	D - GAS LIFT PUMP	G - BAILER	X- ______ PURGING OTHER (SPECIFY)
		B - PERISTALTIC PUMP	E - PURGE PUMP	H - WATERRA®	
SAMPLING DEVICE	G	C - BLADDER PUMP	F - DIPPER BOTTLE		X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE		A - TEFLON	D - PVC	X- ______ PURGING OTHER (SPECIFY)
		B - STAINLESS STEEL	E - POLYETHYLENE	
SAMPLING DEVICE		C - POLYPROPYLENE		X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE		A - TEFLON	D - POLYPROPYLENE	F - SILICONE	X- ______ PURGING OTHER (SPECIFY)
		B - TYGON	E - POLYETHYLENE	G - COMBINATION TEFLON/POLYPROPYLENE	
SAMPLING DEVICE		C - ROPE X- ______ (SPECIFY)			X- ______ SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45 ☐ A - IN-LINE DISPOSABLE B - PRESSURE C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION		(m/ft)	GROUNDWATER ELEVATION		(m/ft)
DEPTH TO WATER	7.97	(m/ft)	WELL DEPTH	14.2	(m/ft)

pH		TURBIDITY		CONDUCTIVITY		SAMPLE TEMPERATURE	
6.3	(std)		(ntu)	640	(μm/cm) AT 25°C	13.1	(°C)
6.5	(std)		(ntu)	620	(μm/cm) AT 25°C	13.	(°C)
6.6	(std)		(ntu)	620	(μm/cm) AT 25°C	13.1	(°C)
	(std)		(ntu)		(μm/cm) AT 25°C		(°C)
	(std)		(ntu)		(μm/cm) AT 25°C		(°C)

FIELD COMMENTS

SAMPLE APPEARANCE: ______ ODOR: None COLOR: yellow/br. TURBIDITY: Sl. cloudy

WEATHER CONDITIONS: WIND SPEED ______ DIRECTION ______ PRECIPITATION Y/N OUTLOOK ______

SPECIFIC COMMENTS ______

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

DATE PRINT SIGNATURE

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

WELL PURGING FIELD INFORMATION FORM

JOB# 5020 -

SITE/PROJECT NAME: Dowcraft

WELL# ESI-13 R

WELL PURGING INFORMATION

120399	120399	.	5.6
PURGE DATE (MM DD YY)	SAMPLE DATE (MM DD YY)	WATER VOL. IN CASING (LITRES/GALLONS)	ACTUAL VOLUME PURGED (LITRES/GALLONS)

PURGING AND SAMPLING EQUIPMENT

PURGING EQUIPMENT.........DEDICATED Y N (CIRCLE ONE)

SAMPLING EQIPMENT.........DEDICATED Y N (CIRCLE ONE)

PURGING DEVICE B — A - SUBMERSIBLE PUMP, B - PERISTALTIC PUMP, C - BLADDER PUMP, D - GAS LIFT PUMP, E - PURGE PUMP, F - DIPPER BOTTLE, G - BAILER, H - WATERRA® — X- ______ PURGING OTHER (SPECIFY)

SAMPLING DEVICE G — X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE ☐ — A - TEFLON, B - STAINLESS STEEL, C - POLYPROPYLENE, D - PVC, E - POLYETHYLENE — X- ______ PURGING OTHER (SPECIFY)

SAMPLING DEVICE ☐ — X- ______ SAMPLING OTHER (SPECIFY)

PURGING DEVICE ☐ — A - TEFLON, B - TYGON, C - ROPE, D - POLYPROPYLENE, E - POLYETHYLENE, F - SILICONE, G - COMBINATION TEFLON/POLYPROPYLENE, X- ______ (SPECIFY) — X- ______ PURGING OTHER (SPECIFY)

SAMPLING DEVICE ☐ — X- ______ SAMPLING OTHER (SPECIFY)

FILTERING DEVICES 0.45 N/A — A - IN-LINE DISPOSABLE, B - PRESSURE, C - VACUUM

FIELD MEASUREMENTS

WELL ELEVATION . (m/ft)

GROUNDWATER ELEVATION . (m/ft)

DEPTH TO WATER 14.70 (m/[✓ ft])

WELL DEPTH . (m/ft)

pH (std)	TURBIDITY (ntu)	CONDUCTIVITY (µm/cm) AT 25°C	SAMPLE TEMPERATURE (°C)
6.6	.	573.	13.7
6.6	.	556.	13.9
6.6	.	556.	13.7
6.6	.	560.	13.9
6.7	.	560.	13.3

FIELD COMMENTS

SAMPLE APPEARANCE: ______ ODOR: None COLOR: None TURBIDITY: Clear

WEATHER CONDITIONS: WIND SPEED ______ DIRECTION ______ PRECIPITATION Y/N OUTLOOK ______

SPECIFIC COMMENTS Initial W/Q light brown, no odor. Good recharge.

I CERTIFY THAT SAMPLING PROCEDURES WERE IN ACCORDANCE WITH APPLICABLE CRA PROTOCOLS

CRA

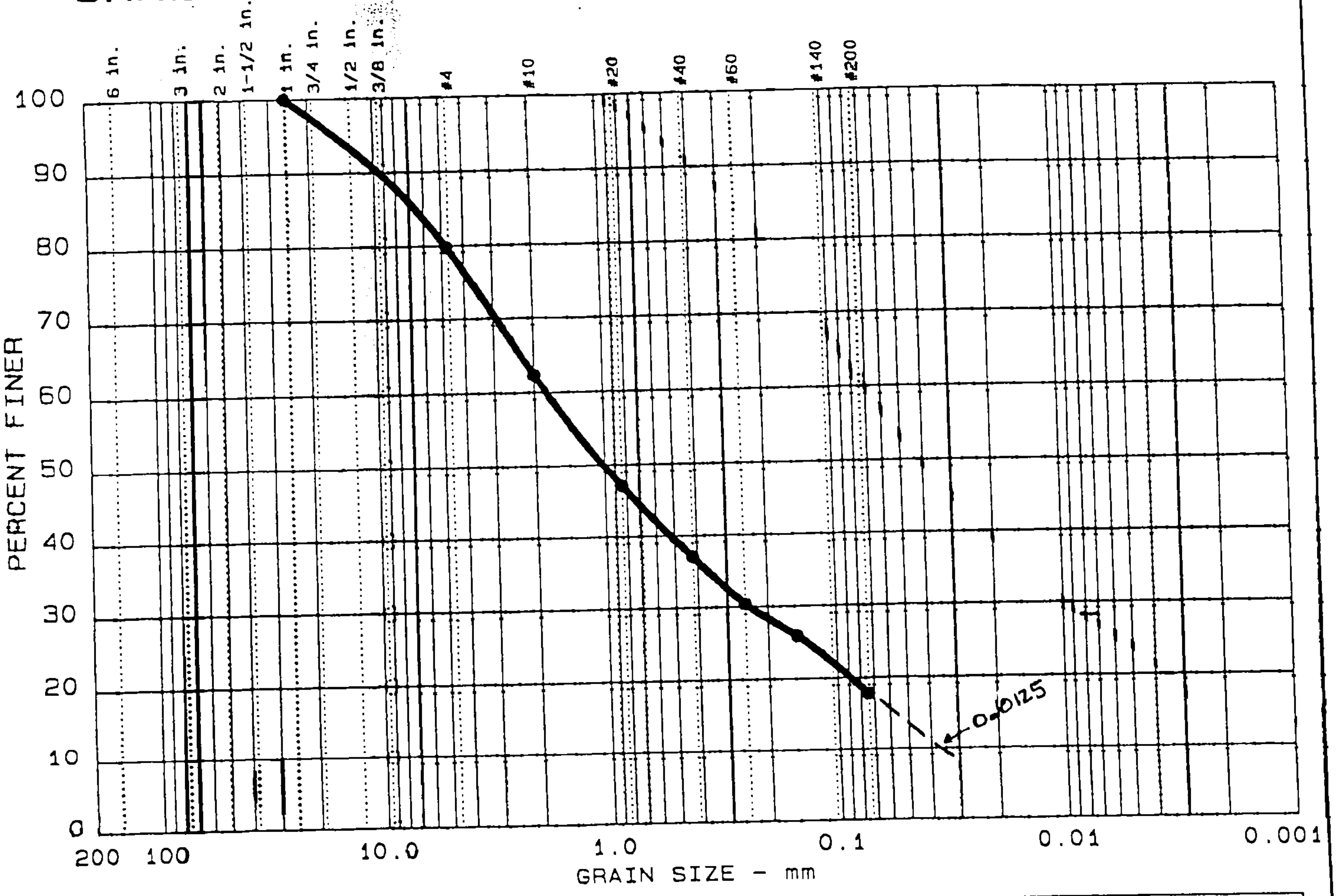
DATE ______ PRINT ______ SIGNATURE ______

CRA 1001 (29) Rev. 6, September 13, 1999, Form SP-10

APPENDIX I

SOILS PHYSICAL TESTING DATA

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	20.2	62.0	17.8	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			6.53	1.78	1.01	0.240				

MATERIAL DESCRIPTION	USCS	AASHTO
● F-C SAND with Little GRAVEL, Little SILT		

Project No.: BTA-92-266

Project: Dowcraft Pumping Wells

● Location: PW - 1U Composite

Date: 12/16/92

Remarks:

Sample collected

by Empire Soils

GRAIN SIZE DISTRIBUTION TEST REPORT

EMPIRE SOILS INVESTIGATIONS, INC.

Figure No. 1

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 2

ıte: 12/16/92
:oject No.: BTA-92-266
:oject: Dowcraft Pumping Wells

Sample Data

ɔcation of Sample: PW - 1U Composite
ample Description: F-C SAND with Little GRAVEL, Little SILT
SCS Class:
ASHTO Class:
Liquid limit:
Plasticity index:

Notes

emarks: Sample collected by Empire Soils

ig. No.: 1

Mechanical Analysis Data

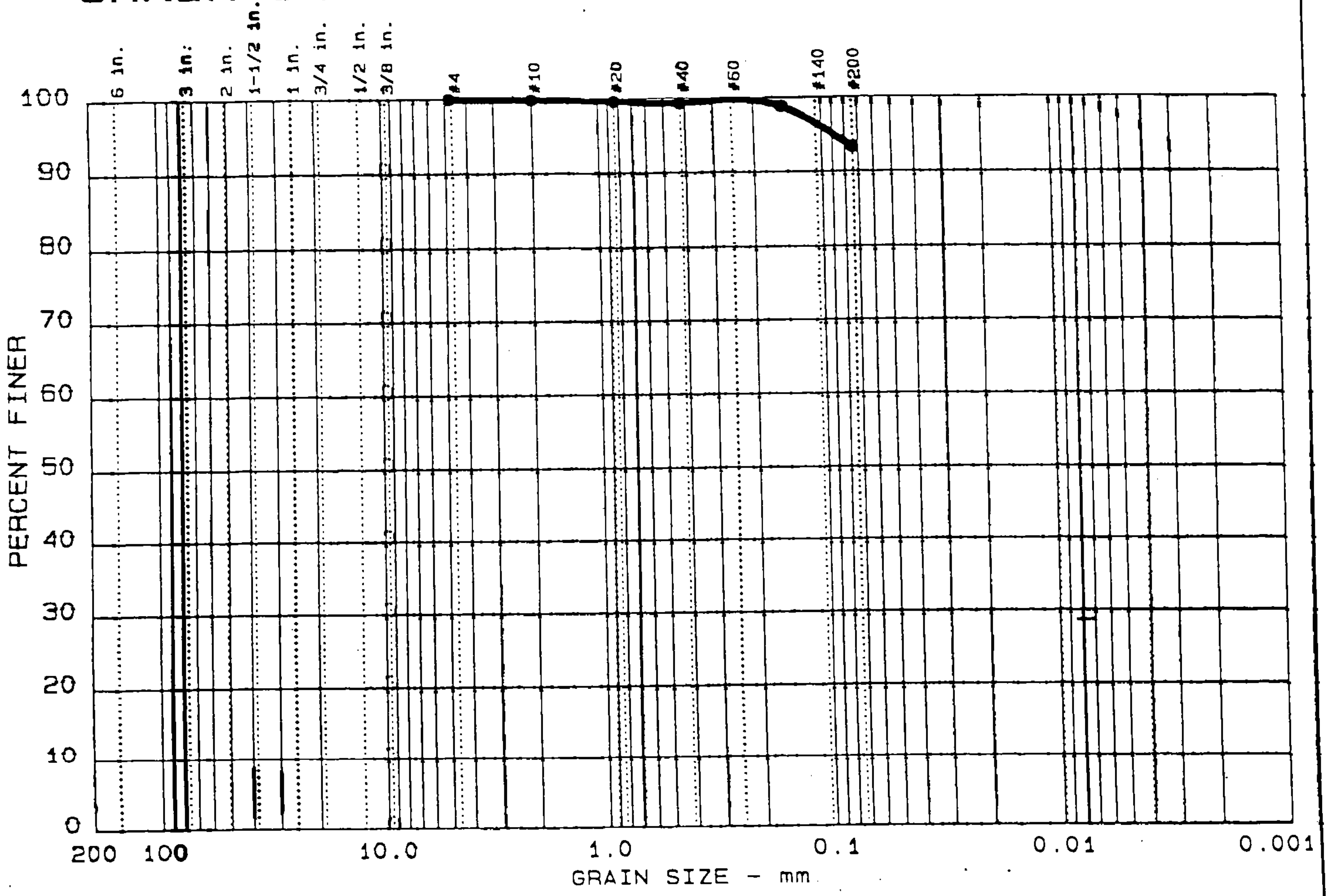
ieve	Size, mm	Percent finer
inches	25.40	100.0
4	4.760	79.8
1[illegible]	2.000	62.3
2[illegible]	0.840	47.0
40	0.420	37.1
60	0.250	30.4
100	0.149	25.9
200	0.074	17.8

Fractional Components

: + 3 in. = 0.0 % GRAVEL = 20.2 % SAND = 62.0
FINES = 17.8

)85= 6.53 D60= 1.778 D50= 1.012
)30= 0.2399

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	6.7	93.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●										

MATERIAL DESCRIPTION	USCS	AASHTO
● SILT or CLAY with Trace SAND		

Project No.: BTA-92-266
Project: Dowcraft Pumping Wells
● Location: PW - 1L Composite

Date: 12/16/92

Remarks:
Sample collected
by Empire Soils

GRAIN SIZE DISTRIBUTION TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC.

Figure No. 2

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 1

at[illegible] 12/16/92
roject No.: BTA-92-266
roject: Dowcraft Pumping Wells

Sample Data

ocation of Sample: PW - 1L Composite
ample Description: SILT or CLAY with Trace SAND
SCS Class:
ASHTO Class:
Liquid limit:
Plasticity index:

Notes

emarks: Sample collected by Empire Soils

ig. No.: 2

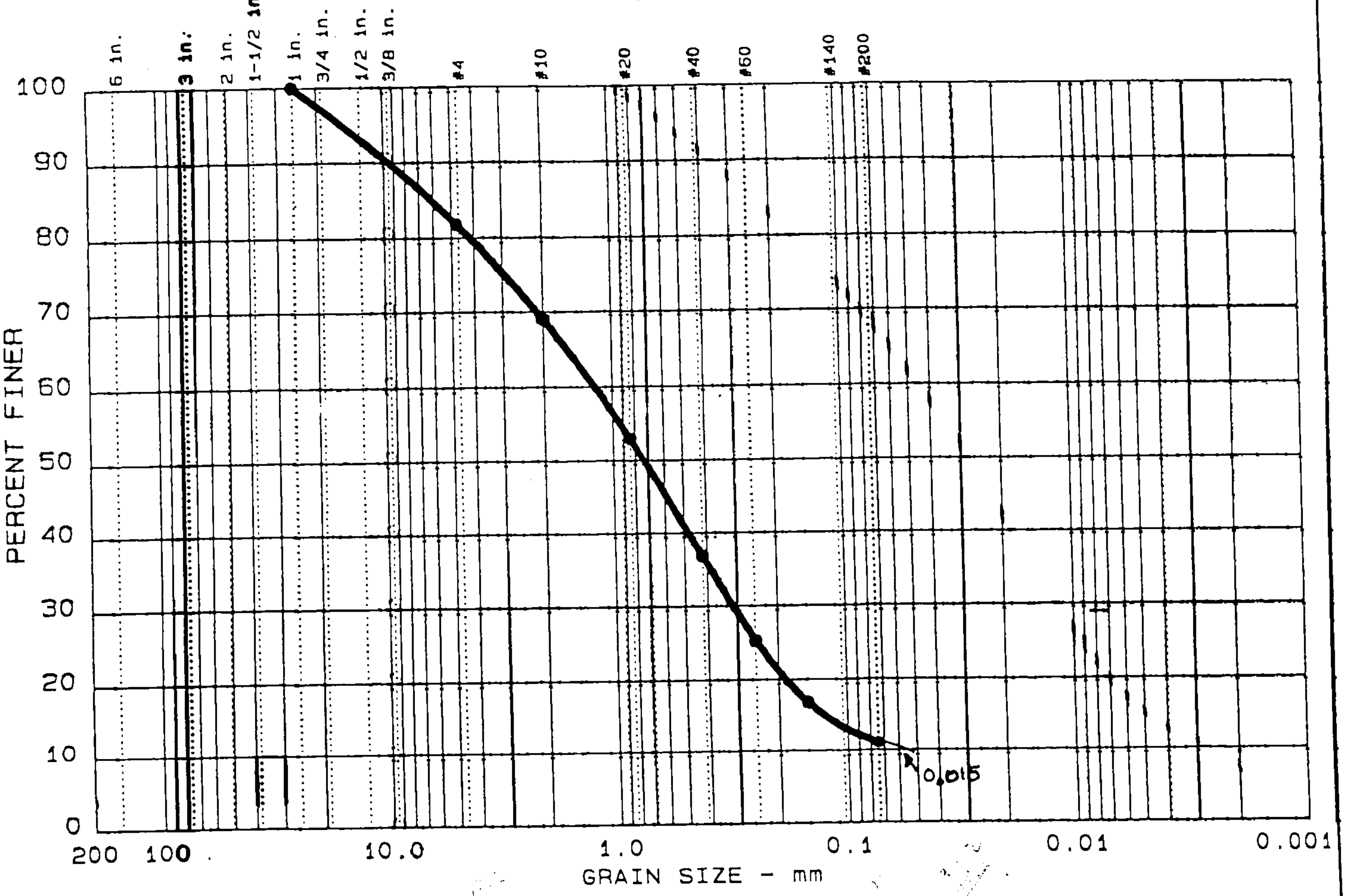
Mechanical Analysis Data

ieve	Size, mm	Percent finer
4	4.760	100.0
10	2.000	99.9
20	0.840	99.6
[illegible]	0.420	99.3
[illegible]	0.149	98.8
200	0.074	93.3

Fractional Components

+ 3 in. = 0.0 % GRAVEL = 0.0 % SAND = 6.7
FINES = 93.3

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75 mm	% GRAVEL	% SAND	% SILT	% CLAY
●	2	0.0	18.2	70.6	11.2	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			6.10	1.19	0.73	0.312	0.1242			

MATERIAL DESCRIPTION	USCS	AASHTO
● F-C SAND with Little GRAVEL, Little SILT		

Project No.: BTA-92-266
Project: Dowcraft Pumping Wells
● Location: PW - 2U Composite

Date: 12/16/92

Remarks:
Sample collected
by Empire Soils

GRAIN SIZE DISTRIBUTION TEST REPORT
EMPIRE SOILS INVESTIGATIONS, INC.

Figure No. 3

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 2

at[illegible] 12/16/92
roject No.: BTA-92-266
roject: Dowcraft Pumping Wells

Sample Data

ocation of Sample: PW - 2U Composite
ample Description: F-C SAND with Little GRAVEL, Little SILT
SCS Class:
ASHTO Class:
Liquid limit:
Plasticity index:

Notes

emarks: Sample collected by Empire Soils

ig. No.: 3

Mechanical Analysis Data

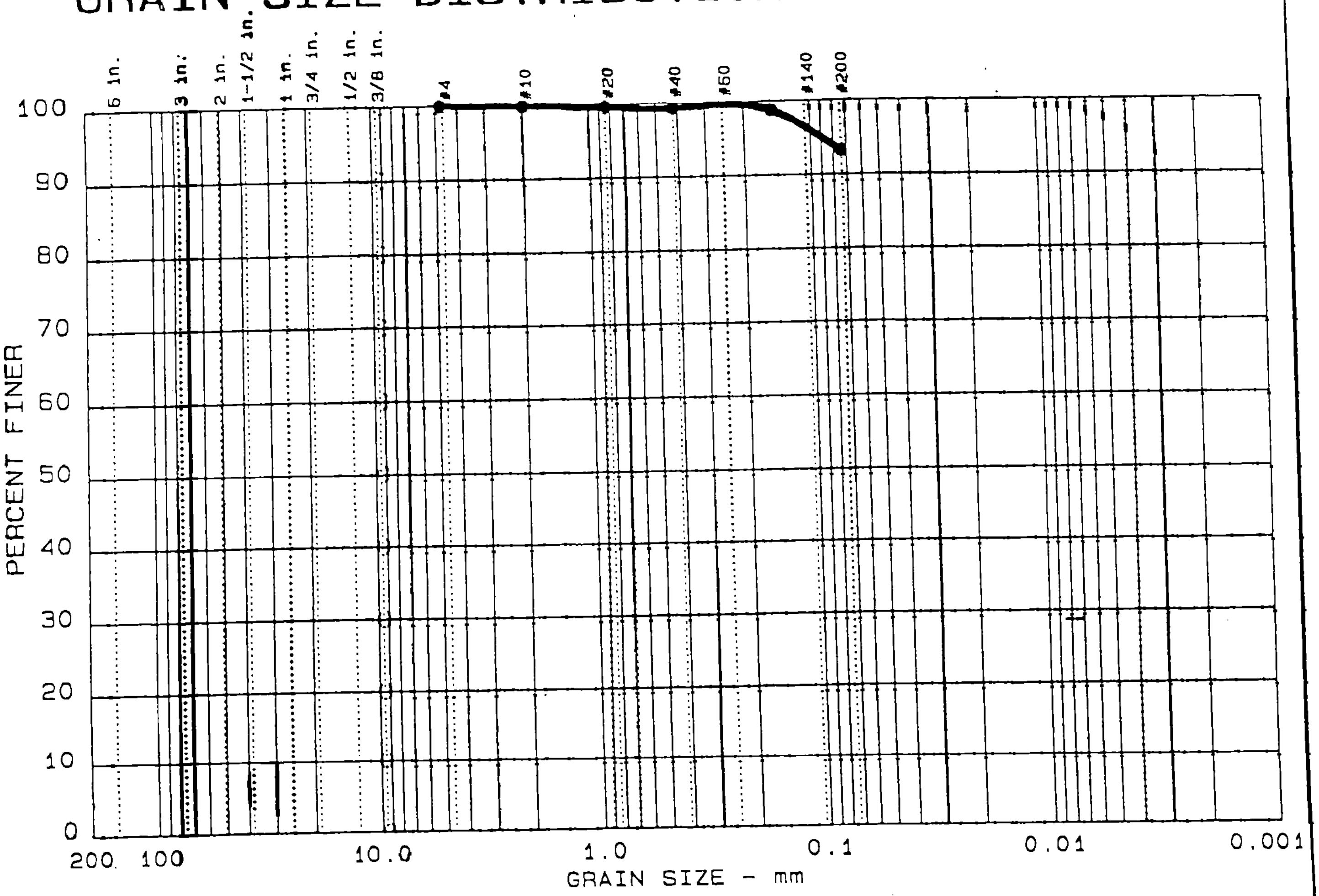
ieve	Size, mm	Percent finer
inches	25.40	100.0
# 4	4.760	81.8
# 10	2.000	69.0
# 2[illegible]	0.840	53.0
# 4[illegible]	0.420	36.9
# 60	0.250	25.3
# 100	0.149	16.9
# 200	0.074	11.2

Fractional Components

% + 3 in. = 0.0 % GRAVEL = 18.2 % SAND = 70.6
% FINES = 11.2

)85= 6.10 D60= 1.189 D50= 0.732
)30= 0.3119 D15= 0.12417

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	%+75mm	% GRAVEL	% SAND	% SILT	% CLAY
●	1	0.0	0.0	6.7	93.3	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●										

MATERIAL DESCRIPTION	USCS	AASHTO
● SILT or CLAY with Trace SAND		

Project No.: BTA-92-266
Project: Dowcraft Pumping Wells
● Location: PW - 2L Composite of S-8, and S-9

24-26' 26'-28'

[illegible]

Date: -1

Remarks:
Sample collected
by Empire Soils

GRAIN SIZE DISTRIBUTION TEST REPORT

EMPIRE SOILS INVESTIGATIONS, INC.

Figure No. 4

GRAIN SIZE DISTRIBUTION TEST DATA

Test No.: 1

at -1
roject No.: BTA-92-266
roject: Dowcraft Pumping Wells

Sample Data

ocation of Sample: PW - 2L Composite of S-8, and S-9
ample Description: SILT or CLAY with Trace SAND
SCS Class: Liquid limit:
ASHTO Class: Plasticity index:

Notes

emarks: Sample collected by Empire Soils

ig. No.: 4

Mechanical Analysis Data

ieve	Size, mm	Percent finer
4	4.760	100.0
10	2.000	99.9
20	0.840	99.6
4[illegible]	0.420	99.3
[illegible]	0.149	98.8
200	0.074	93.3

Fractional Components

+ 3 in. = 0.0 % GRAVEL = 0.0 % SAND = 6.7
FINES = 93.3

SJB SERVICES, INC.

Contract Drilling and Testing

1951-1 Hamburg Turnpike
Buffalo, NY 14218
Phone: (716) 821-5911
Fax: (716) 821-0163

55 Oliver Street
Cohoes, New York 12047
Phone: (518) 238-1145
Fax: (518) 238-1249

P.O. Box 416 • 208 Le Fevre Road
Stockertown, PA 18083
Phone: (610) 746-2670
Fax: (610) 746-2669

TOLL FREE: 1-800-821-5911

Laboratory Test Report

PROJECT: Dow Craft Corp.

CLIENT: Conestoga-Rovers & Associates

DATE: May 18, 2000

PROJECT NO.: SJB-D1697
REPORT NO.: LTR-1

SAMPLE INFORMATION:

Sample No. 00-281 was collected from the project site by a SJB Services, Inc. Drill Crew, and received at the laboratory on May 9, 2000. Sample is described as brown gravel with some sand, and little fines material. Sample was collected from boring BH-15 : 16' - 20'.

ASTM C-136: Sieve Analysis of Fine and Coarse Aggregates

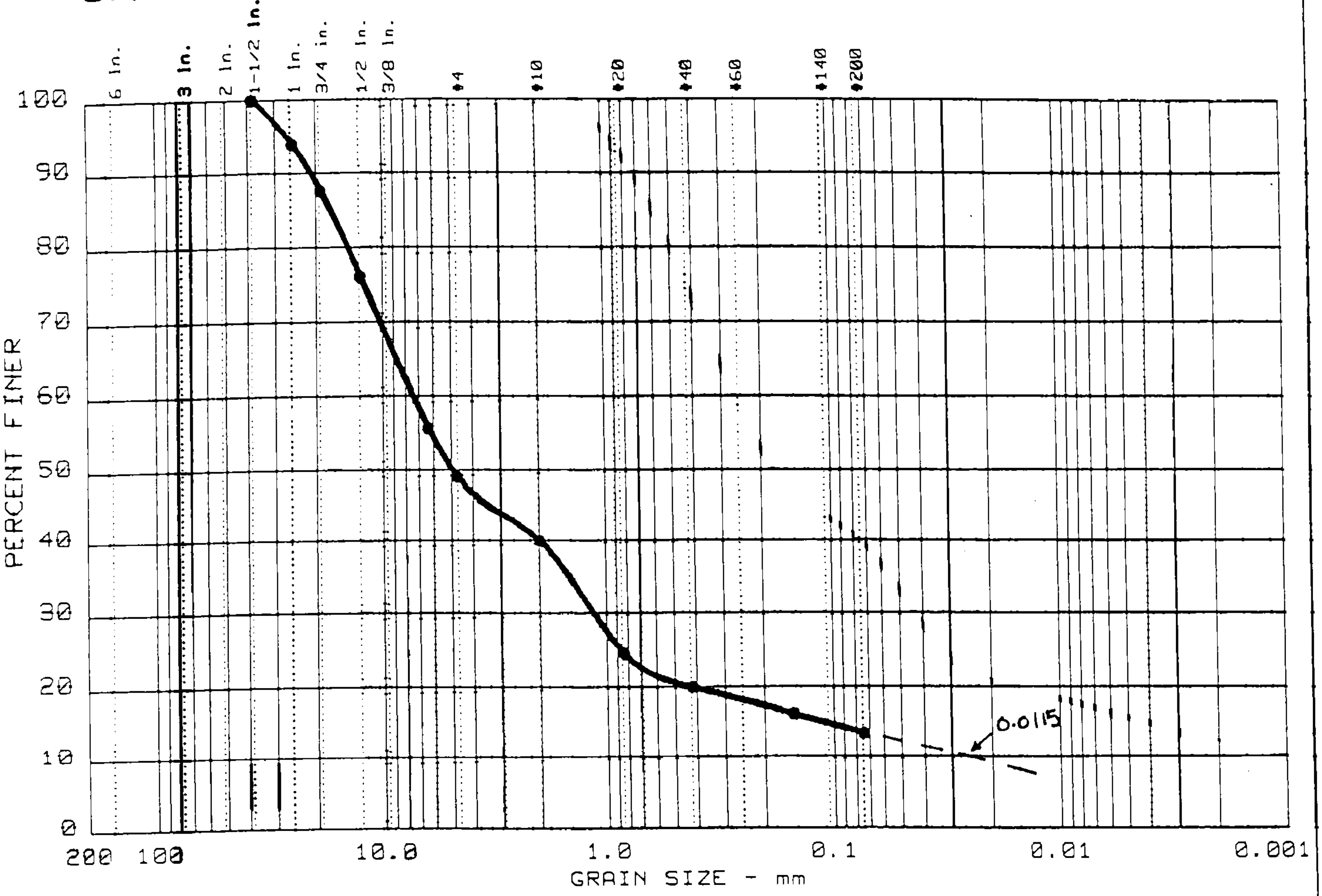
Sieve Size	*Percent Passing*
1½"	100.0
1"	94.0
¾"	87.6
½"	76.2
¼"	55.8
#4	49.1
#10	40.0
#20	24.6
#40	20.0
#100	16.3
#200	13.6

SJB Services, Inc.

Paul Gregorczyk
Laboratory Testing Supervisor

Ray J. Kron
Vice President Testing Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	16	0.0	50.9	35.5	13.6	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			17.18	7.40	4.95	1.147	0.1046			

MATERIAL DESCRIPTION	USCS	AASHTO
● BROWN GRAVEL & SAND, LITTLE FINES	GM	A-1-a

Project No.: SJB-D1697 : LTR-1
Project: DOW CRAFT
● Location: BH-15 : 16' - 20'

Date: MAY 18, 2000

Remarks:

Collected by a SJB Drill Crew and received at lab on May 9, 2000.

SJB Sample Number 00-281

GRAIN SIZE DISTRIBUTION TEST REPORT
SJB Services, Inc.

Figure No. ______

SJB SERVICES, INC.

Contract Drilling and Testing

1951-1 Hamburg Turnpike
Buffalo, NY 14218
Phone: (716) 821-5911
Fax: (716) 821-0163

55 Oliver Street
Cohoes, New York 12047
Phone: (518) 238-1145
Fax: (518) 238-1249

P.O. Box 416 • 208 Le Fevre Road
Stockertown, PA 18083
Phone: (610) 746-2670
Fax: (610) 746-2669

TOLL FREE: 1-800-821-5911

Laboratory Test Report

PROJECT: Dow Craft Corp.

CLIENT: Conestoga-Rovers & Associates

DATE: May 18, 2000

PROJECT NO.: SJB-D1697
REPORT NO.: LTR-2

SAMPLE INFORMATION:
Sample No. 00-282 was collected from the project site by a SJB Services, Inc. Drill Crew, and received at the laboratory on May 9, 2000. Sample is described as gray silt, with little clay, and trace sand material. Sample was collected from boring BH-15 : 42' - 46'.

ASTM D-422: Particle Size Analysis of Soils

Sieve Size	*Percent Passing*
#4	100.0
#10	99.9
#20	99.9
#40	99.7
#100	99.3
#200	98.3

PERCENT COMPONENTS

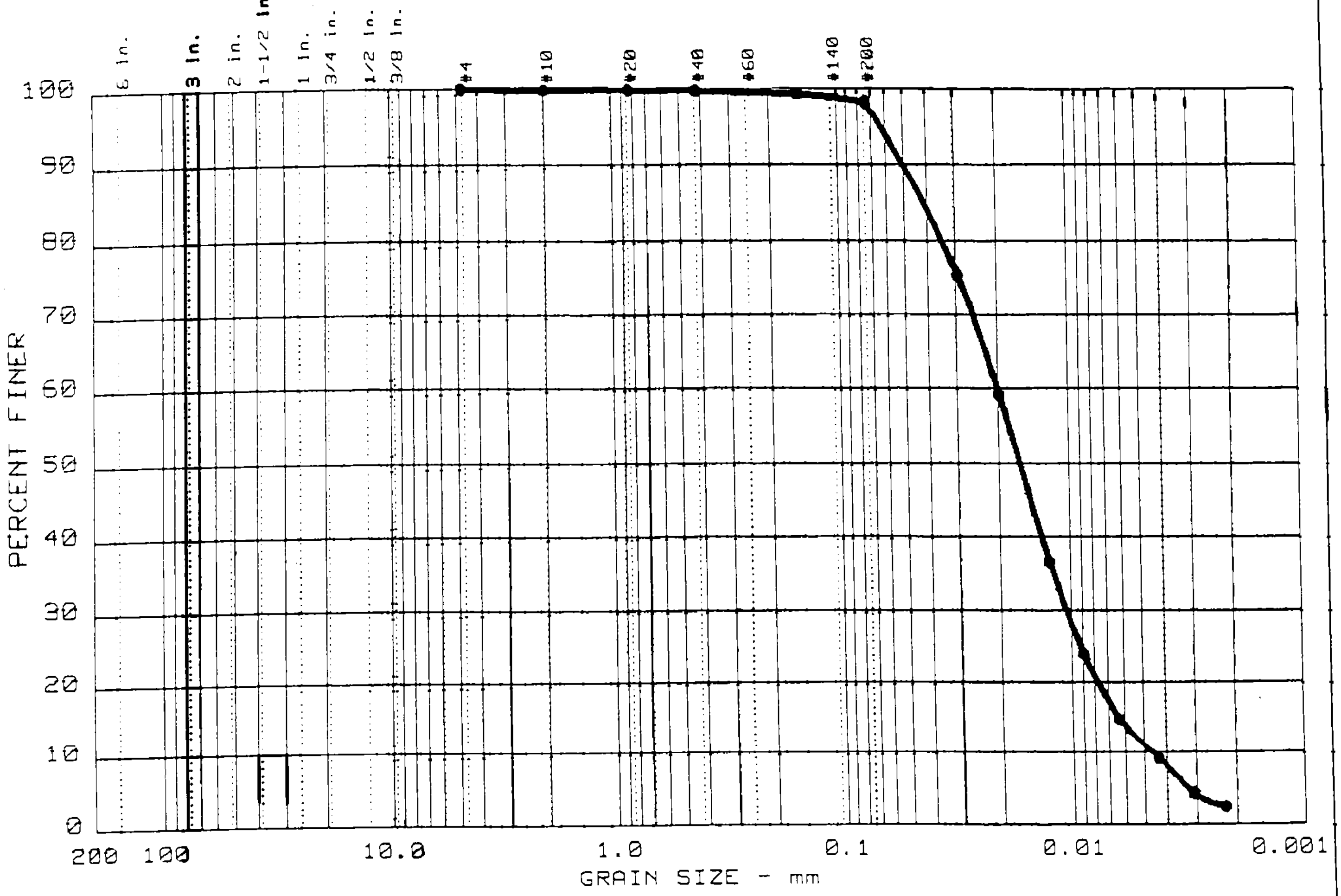
GRAVEL	SAND	SILT	CLAY
0%	1.7%	87.2%	11.1%

SJB Services, Inc.

Paul Gregorczyk
Laboratory Testing Supervisor

Ray J. Kron
Vice President Testing Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	17	0.0	0.0	1.7	87.2	11.1

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●					0.02	0.011	0.0063	0.0046	1.19	4.4

MATERIAL DESCRIPTION	USCS	AASHTO
● GREY SILT, LITTLE CLAY, TRACE SAND	ML	A-4(0.0)

Project No.: SJB-D1697 : LTR-2
Project: DOW CRAFT
● Location: BH-15 : 42' - 46'

Date: MAY 18, 2000

Remarks:
Collected by a SJB Drill Crew and received at lab on May 9, 2000.
SJB Sample Number 00-282

GRAIN SIZE DISTRIBUTION TEST REPORT
SJB Services, Inc.

Figure No. ______

SJB SERVICES, INC.

Contract Drilling and Testing

1951-1 Hamburg Turnpike
Buffalo, NY 14218
Phone: (716) 821-5911
Fax: (716) 821-0163

55 Oliver Street
Cohoes, New York 12047
Phone: (518) 238-1145
Fax: (518) 238-1249

P.O. Box 416 • 208 Le Fevre Road
Stockertown, PA 18083
Phone: (610) 746-2670
Fax: (610) 746-2669

TOLL FREE: 1-800-821-5911

Laboratory Test Report

PROJECT: Dow Craft Corp.

CLIENT: Conestoga-Rovers & Associates

DATE: May 18, 2000

PROJECT NO.: SJB-D1697
REPORT NO.: LTR-3

SAMPLE INFORMATION:

Sample No. 00-283 was collected from the project site by a SJB Services, Inc. Drill Crew, and received at the laboratory on May 9, 2000. Sample is described as brown sand, with little fines and trace gravel. Material. Sample was collected from boring BH-16 : 10' - 16'.

ASTM C-136: Sieve Analysis of Fine and Coarse Aggregates

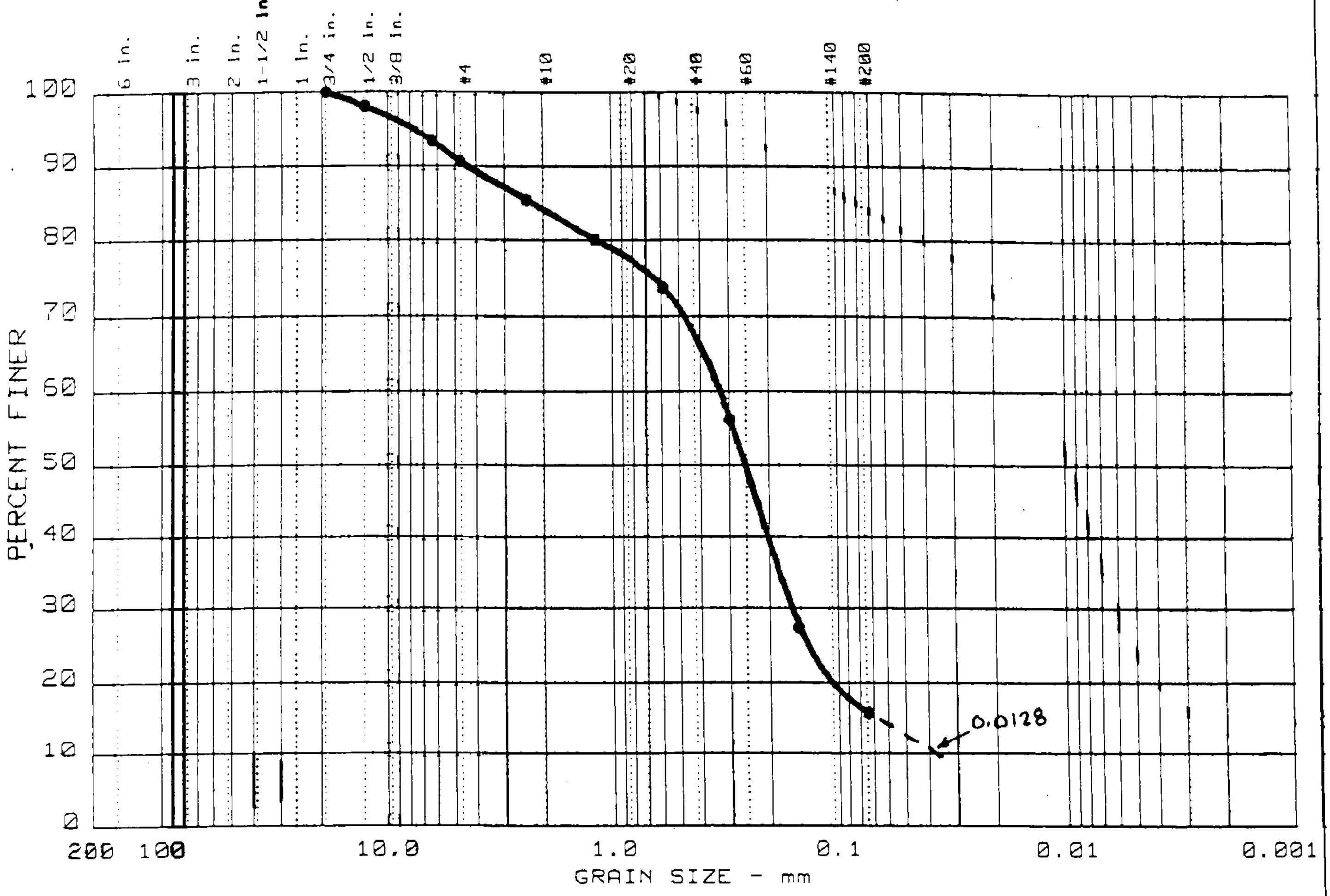
Sieve Size	*Percent Passing*
¾"	100.0
½"	98.1
¼"	93.5
#4	90.8
#8	85.5
#16	80.2
#30	73.9
#50	56.3
#100	27.6
#200	16.0

SJB Services, Inc.

Paul Gregorczyk
Laboratory Testing Supervisor

Ray J. Kron
Vice President Testing Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	18	0.0	9.2	74.7	16.1	

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●			2.21	0.33	0.25	0.160				

MATERIAL DESCRIPTION	USCS	AASHTO
● BROWN SAND, LITTLE FINES, TRACE GRAVEL	SM	A-2-4(0.0)

Project No.: SJB-D1697 : LTR-3
Project: DOW CRAFT
● Location: BH-16 : 10' - 16'

Date: MAY 18, 2000

GRAIN SIZE DISTRIBUTION TEST REPORT

SJB Services, Inc.

Remarks:

Collected by a SJB Drill Crew and received at lab on May 9, 2000.

SJB Sample Number 00-283

Figure No. ______

SJB SERVICES, INC.

Contract Drilling and Testing

1951-1 Hamburg Turnpike
Buffalo, NY 14218
Phone: (716) 821-5911
Fax: (716) 821-0163

55 Oliver Street
Cohoes, New York 12047
Phone: (518) 238-1145
Fax: (518) 238-1249

P.O. Box 416 • 208 Le Fevre Road
Stockertown, PA 18083
Phone: (610) 746-2670
Fax: (610) 746-2669

TOLL FREE: 1-800-821-5911

Laboratory Test Report

PROJECT: Dow Craft Corp.

CLIENT: Conestoga-Rovers & Associates

DATE: May 18, 2000

PROJECT NO.: SJB-D1697
REPORT NO.: LTR-4

SAMPLE INFORMATION:
Sample No. 00-284 was collected from the project site by a SJB Services, Inc. Drill Crew, and received at the laboratory on May 9, 2000. Sample is described as gray clay & silt, with little sand and trace gravel material. Sample was collected from boring BH-16 : 46' - 50'.

ASTM D-422: Particle Size Analysis of Soils

Sieve Size	*Percent Passing*
½"	100.0
¼"	98.7
#4	98.1
#10	95.9
#20	94.3
#40	93.0
#100	90.1
#200	87.1

PERCENT COMPONENTS

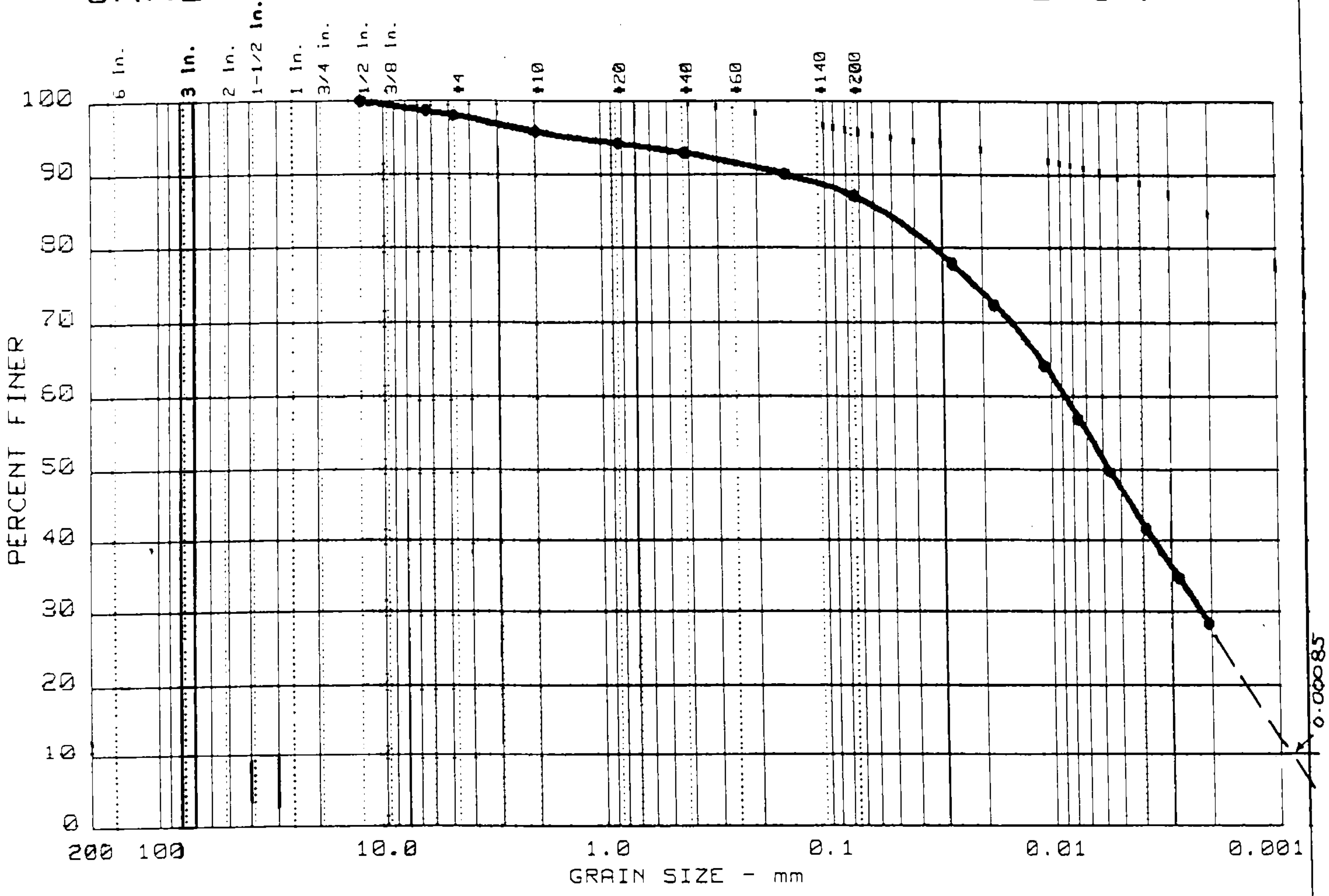
GRAVEL	SAND	SILT	CLAY
1.9%	11.0%	39.8%	47.3%

SJB Services, Inc.

Paul Gregorczyk
Laboratory Testing Supervisor

Ray J. Kron
Vice President Testing Services

GRAIN SIZE DISTRIBUTION TEST REPORT



	Test	% +3"	% GRAVEL	% SAND	% SILT	% CLAY
●	20	0.0	1.9	11.0	39.8	47.3

	LL	PI	D_{85}	D_{60}	D_{50}	D_{30}	D_{15}	D_{10}	C_c	C_u
●					0.01	0.002				

MATERIAL DESCRIPTION	USCS	AASHTO
● GREY CLAY & SILT, LITTLE SAND, TRACE GRAVEL	ML	A-4(0.0)

Project No.: SJB-D1697 : LTR-4
Project: DOW CRAFT
● Location: BH-16 : 46' - 50'

Date: MAY 18, 2000

Remarks:
Collected by a SJB Drill Crew and received at lab on May 9, 2000.
SJB Sample Number 00-284

GRAIN SIZE DISTRIBUTION TEST REPORT

SJB Services, Inc.

Figure No. ______

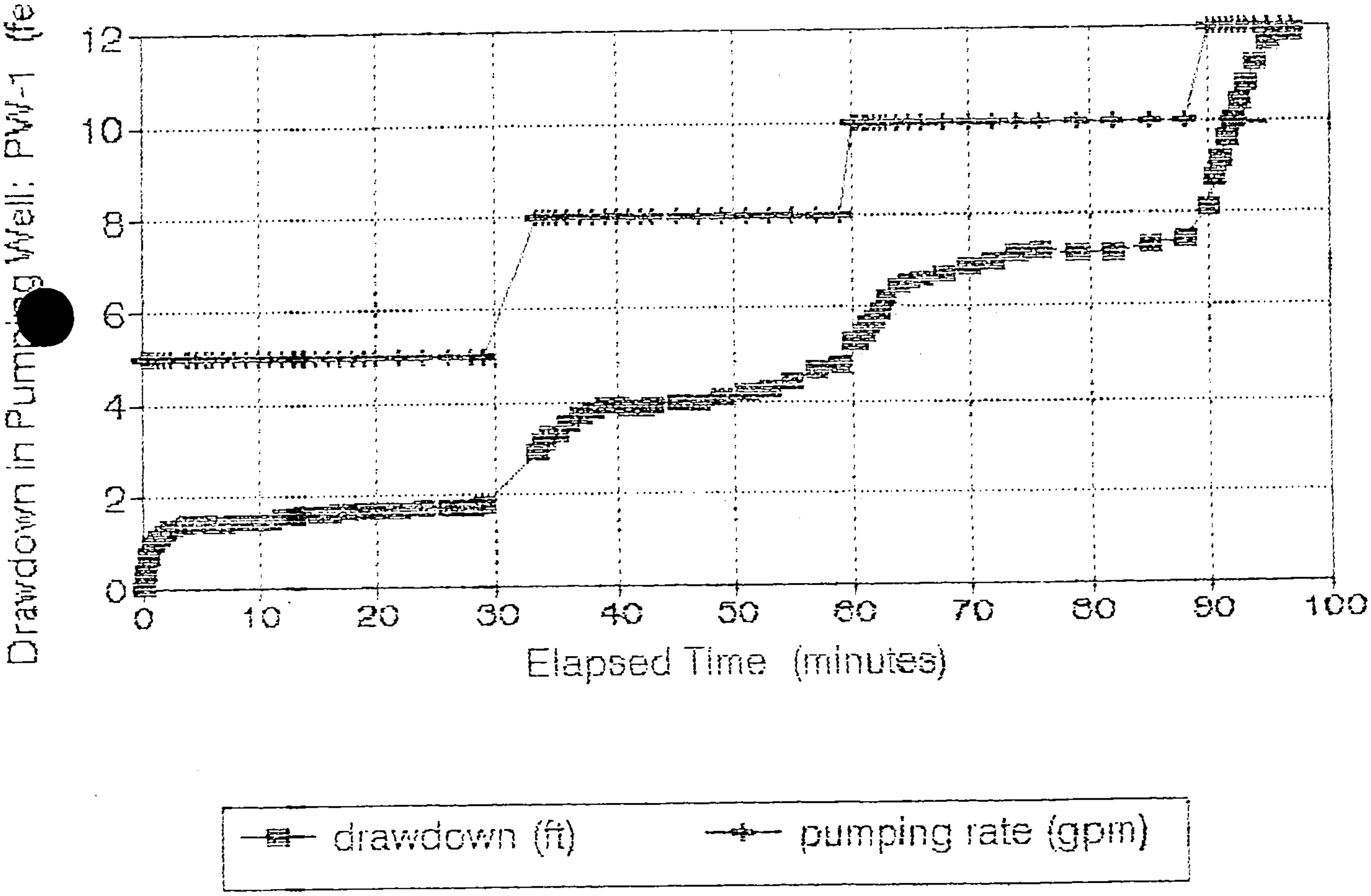
J

APPENDIX J

AQUIFER PUMPING TEST RESULTS

DOWCRAFT

STEP TEST ON PW-1



2/9/93

STEP TEST ON PW-1

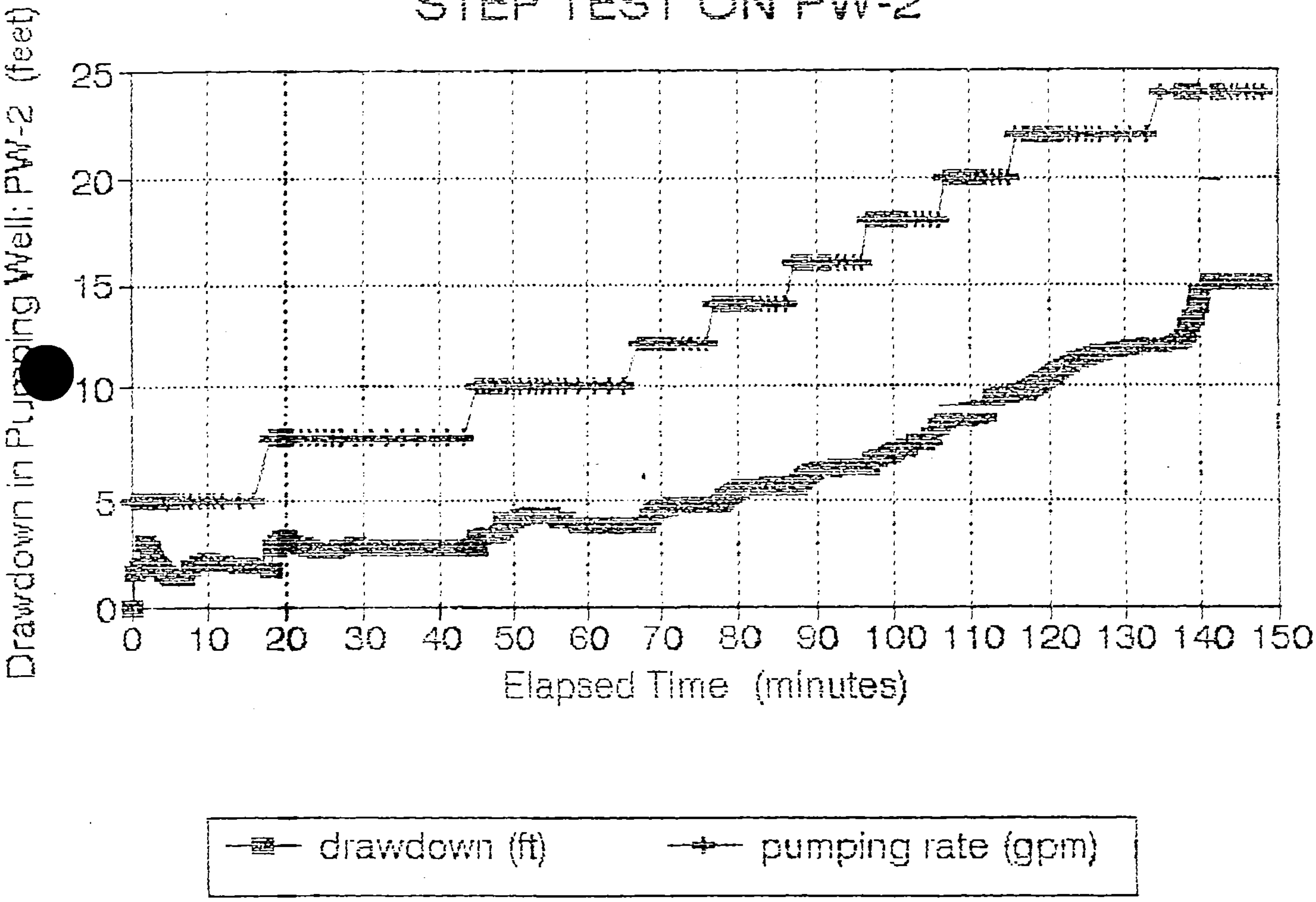
DRAWDOWN IN THE PUMPING WELL

ELAPSED TIME (MIN)	DEPTH TO WATER (FT)	DRAWDOWN (FT)	PUMPING RATE (FT)
0.00	8.37	0.00	5.00
0.25	8.75	0.38	5.00
0.50	9.05	0.68	5.00
1.00	9.35	0.98	5.00
1.50	9.50	1.13	5.00
2.00	9.57	1.20	5.00
2.50	9.67	1.30	5.00
3.75	9.76	1.39	5.00
4.00	9.81	1.44	5.00
4.75	9.83	1.46	5.00
5.50	9.84	1.47	5.00
6.00	9.79	1.42	5.00
7.00	9.77	1.42	5.00
8.00	9.81	1.44	5.00
9.00	9.83	1.46	5.00
10.00	9.84	1.47	5.00
11.00	9.85	1.48	5.00
12.00	9.92	1.55	5.00
13.00	9.94	1.57	5.00
14.00	9.98	1.61	5.00
15.00	10.00	1.63	5.00
16.00	10.01	1.64	5.00
17.00	10.03	1.66	5.00
18.00	10.03	1.66	5.00
19.00	10.03	1.66	5.00
20.00	10.03	1.66	5.00
22.00	10.04	1.67	5.00
24.00	10.06	1.69	5.00
26.00	10.09	1.72	5.00
28.00	10.11	1.74	5.00
29.00	10.12	1.75	5.00
33.50	11.31	2.94	8.00
34.00	11.48	3.11	8.00
34.50	11.68	3.31	8.00
35.00	11.69	3.32	8.00
36.00	11.88	3.51	8.00
37.00	12.03	3.66	8.00
38.00	12.16	3.79	8.00
39.00	12.26	3.89	8.00
40.00	12.28	3.91	8.00
41.00	12.23	3.86	8.00
42.00	12.22	3.85	8.00
43.00	12.27	3.90	8.00
45.00	12.37	4.00	8.00
47.00	12.38	4.01	8.00
49.00	12.45	4.08	8.00
51.00	12.57	4.20	8.00
53.00	12.62	4.25	8.00
55.00	12.81	4.44	8.00

```
 57.00              13.01              4.64              8.00
 59.00              13.11              4.74              8.00
 60.00              13.64              5.27             10.00
 60.50              13.64              5.27             10.00
 61.00              13.80              5.43             10.00
 61.50              13.98              5.61             10.00
 62.00              14.12              5.75             10.00
 62.50              14.25              5.88             10.00
 63.00              14.54              6.17             10.00
 64.00              14.79              6.42             10.00
 65.00              14.93              6.56             10.00
 66.00              14.98              6.61             10.00
 68.00              15.09              6.72             10.00
 70.00              15.28              6.91             10.00
 72.00              15.41              7.04             10.00
 74.00              15.55              7.18             10.00
 76.00              15.63              7.26             10.00
 79.00              15.57              7.20             10.00
 82.00              15.57              7.20             10.00
 85.00              15.70              7.33             10.00
 88.00              15.81              7.44             10.00
 90.00              16.52              8.15             12.00
 90.50              17.11              8.74             12.00
 91.00              17.55              9.18             12.00
 91.50              17.96              9.59             12.00
 92.00              18.36              9.99             12.00
 92.50              18.75             10.38             12.00
 93.00              19.15             10.78             12.00
 94.00              19.57             11.20             12.00
 95.00              20.04             11.67             12.00
 96.00              20.19             11.82             12.00
 97.00              20.18             11.81             12.00
 98.00         INTERMITANT PUMPING

*************************************************************************
```

DOWCRAFT

STEP TEST ON PW-2



2/10/93

STEP TEST ON PW-2
DRAWDOWN IN THE PUMPING WELL

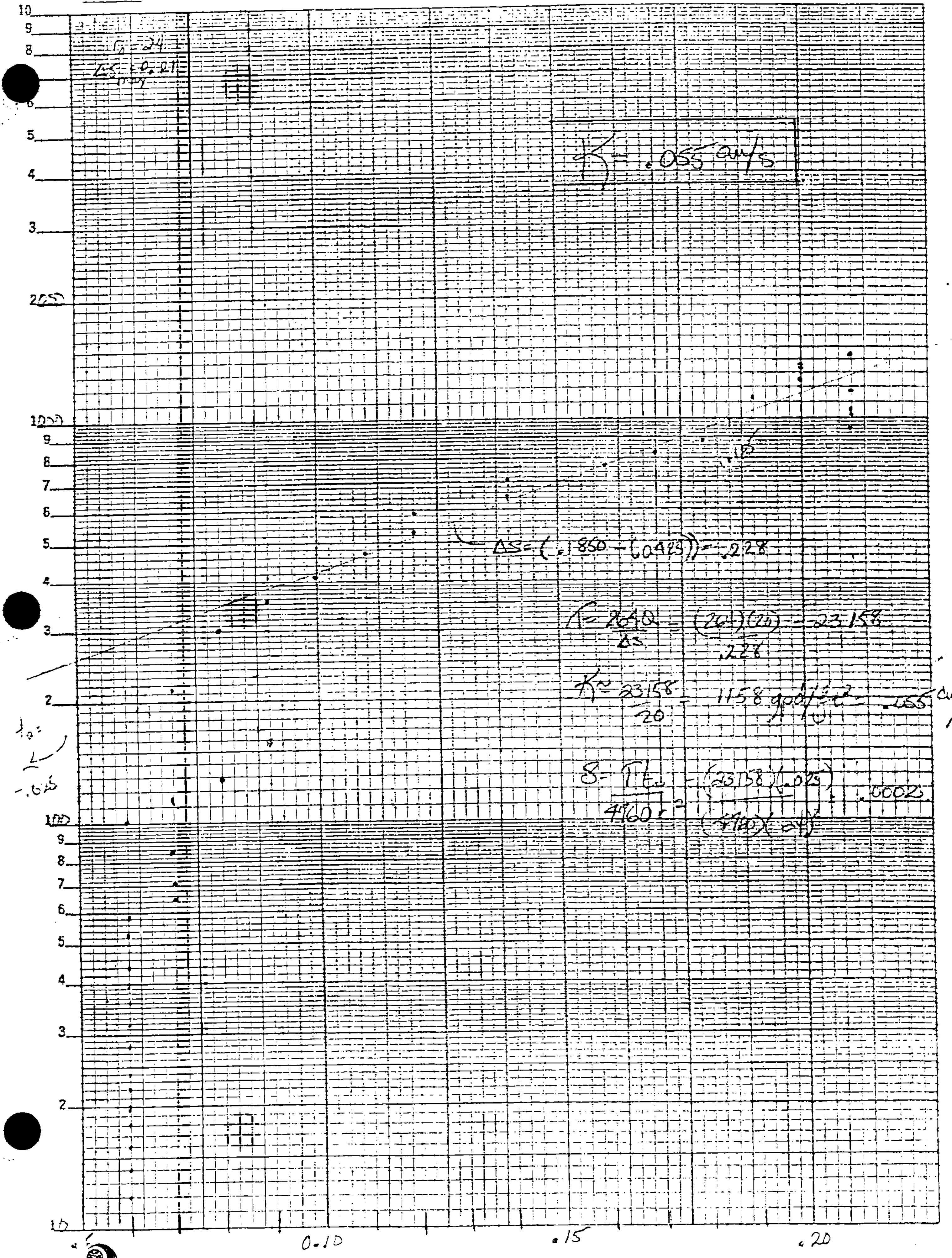
ELAPSED TIME (MIN)	DEPTH TO WATER (FT)	DRAWDOWN (FT)	PUMPING RATE (FT)
0.00	8.55	0.00	5.00
0.50	10.14	1.59	5.00
1.00	10.35	1.80	5.00
1.50	10.55	2.00	5.00
2.00	11.62	3.07	5.00
2.50	11.26	2.71	5.00
3.00	10.90	2.35	5.00
3.50	10.65	2.10	5.00
4.00	10.35	1.80	5.00
4.50	10.22	1.67	5.00
5.00	10.08	1.53	5.00
5.50	9.96	1.41	5.00
6.00	9.92	1.37	5.00
7.00	9.85	1.30	5.00
8.00	10.37	1.82	5.00
9.00	10.59	2.04	5.00
10.00	10.72	2.17	5.00
11.00	10.64	2.09	5.00
12.00	10.62	2.07	5.00
14.00	10.52	1.97	5.00
16.00	10.46	1.91	5.00
18.00	10.30	1.75	8.00
18.50	11.35	2.80	8.00
19.00	11.64	3.09	8.00
19.50	11.78	3.23	8.00
20.00	11.75	3.20	8.00
20.50	11.64	3.09	8.00
21.00	11.54	2.99	8.00
22.00	11.46	2.91	8.00
23.00	11.30	2.75	8.00
24.00	11.22	2.67	8.00
25.00	11.20	2.65	8.00
26.00	11.18	2.63	8.00
27.00	11.38	2.83	8.00
29.00	11.40	2.85	8.00
31.00	11.38	2.83	8.00
33.00	11.38	2.83	8.00
35.00	11.37	2.82	8.00
37.00	11.32	2.77	8.00
39.00	11.34	2.79	8.00
41.00	11.33	2.78	8.00
43.00	11.32	2.77	8.00
45.00	11.32	2.77	10.00
45.00	11.76	3.21	10.00
45.50	11.85	3.30	10.00
46.00	11.88	3.33	10.00

46.50	11.96	3.43	10.00
47.00	11.96	3.41	10.00
47.50	11.95	3.40	10.00
48.00	12.03	3.48	10.00
48.50	12.14	3.59	10.00
49.00	12.37	3.82	10.00
48.50	12.53	3.98	10.00
50.00	12.66	4.11	10.00
51.00	12.75	4.20	10.00
52.00	12.84	4.29	10.00
53.00	12.89	4.34	10.00
54.00	12.86	4.31	10.00
55.00	12.84	4.29	10.00
56.00	12.65	4.10	10.00
57.00	12.53	3.98	10.00
59.00	12.45	3.90	10.00
61.00	12.44	3.89	10.00
63.00	12.45	3.90	10.00
65.00	12.43	3.88	10.00
67.00	12.38	3.83	12.00
67.50	12.36	3.81	12.00
68.00	12.38	3.83	12.00
68.50	12.74	4.19	12.00
69.00	12.94	4.39	12.00
69.50	13.08	4.53	12.00
70.00	13.06	4.51	12.00
70.50	13.21	4.66	12.00
71.00	13.25	4.70	12.00
71.50	13.28	4.73	12.00
72.00	13.30	4.75	12.00
73.00	13.35	4.80	12.00
74.00	13.36	4.81	12.00
75.00	13.35	4.80	12.00
76.00	13.35	4.80	12.00
77.00	13.35	4.80	14.00
77.50	13.34	4.79	14.00
78.00	13.42	4.87	14.00
78.50	13.66	5.11	14.00
79.00	13.78	5.23	14.00
79.50	13.90	5.35	14.00
80.00	13.96	5.41	14.00
80.50	14.08	5.53	14.00
81.00	14.11	5.56	14.00
81.50	14.13	5.58	14.00
82.00	14.14	5.59	14.00
83.00	14.19	5.64	14.00
84.00	14.22	5.67	14.00
85.00	14.22	5.67	14.00
86.00	14.17	5.62	14.00
87.00	14.15	5.60	16.00
87.50	14.20	5.65	16.00
88.00	14.31	5.76	16.00
88.50	14.57	6.02	16.00
89.00	14.72	6.17	16.00
89.50	14.87	6.32	16.00
91.00	14.93	6.40	16.00

90.50	14.97	6.42	16.00
91.00	14.98	6.43	16.00
91.50	15.01	6.42	16.00
92.00	15.01	6.46	16.00
93.00	15.07	6.52	16.00
94.00	15.06	6.51	16.00
95.00	15.09	6.54	16.00
96.00	15.13	6.58	16.00
97.00	15.14	6.59	18.00
97.50	15.40	6.85	18.00
98.00	15.48	6.93	18.00
98.50	15.57	7.02	18.00
99.00	15.62	7.07	18.00
99.50	15.66	7.11	18.00
100.00	15.77	7.22	18.00
100.50	15.83	7.28	18.00
101.00	15.87	7.32	18.00
101.50	15.95	7.40	18.00
102.00	16.04	7.47	18.00
103.00	16.17	7.62	18.00
104.00	16.28	7.73	18.00
105.00	16.55	8.00	18.00
106.00	16.93	8.38	18.00
107.00	17.17	8.62	20.00
107.50	17.27	8.72	20.00
108.00	17.31	8.76	20.00
108.50	17.30	8.75	20.00
109.00	17.34	8.79	20.00
109.50	17.36	8.81	20.00
110.00	17.40	8.85	20.00
110.50	17.43	8.88	20.00
111.00	17.43	8.88	20.00
111.50	17.52	8.97	20.00
112.00	17.57	9.02	20.00
113.00	17.93	9.38	20.00
114.00	18.08	9.53	20.00
115.00	18.13	9.58	20.00
116.00	18.22	9.67	22.00
117.00	18.31	9.76	22.00
117.50	18.37	9.82	22.00
118.00	18.48	9.93	22.00
118.50	18.58	10.03	22.00
119.00	18.68	10.13	22.00
119.50	18.83	10.28	22.00
120.00	18.92	10.37	22.00
120.50	19.04	10.49	22.00
121.00	19.18	10.63	22.00
121.50	19.30	10.75	22.00
122.00	19.40	10.85	22.00
123.00	19.52	10.97	22.00
124.00	19.67	11.12	22.00
125.00	19.88	11.33	22.00
126.00	20.01	11.46	22.00
127.00	20.08	11.53	22.00
129.00	20.23	11.68	22.00
131.00	20.40	11.85	22.00

134.00	20.47	11.92	22.00
135.00	20.51	11.96	24.00
137.00	20.60	12.05	24.00
137.50	20.68	12.13	24.00
138.00	20.99	12.44	24.00
138.50	21.44	12.89	24.00
139.00	21.83	13.28	24.00
139.50	22.45	13.90	24.00
140.00	23.10	14.55	24.00
141.50	23.68	15.13	24.00
142.00	23.68	15.13	24.00
142.50	23.70	15.15	24.00
143.00	23.66	15.13	24.00
144.00	23.68	15.13	24.00
145.00	23.70	15.15	24.00
146.00	23.68	15.13	24.00
147.00	23.69	15.14	24.00
148.00	23.69	15.14	24.00

ESI-2: TIME DRAWDOWN - 24 HR TEST



$Q = 24$

$\Delta s = 0.21$ per log

$K = .055$ cm/s

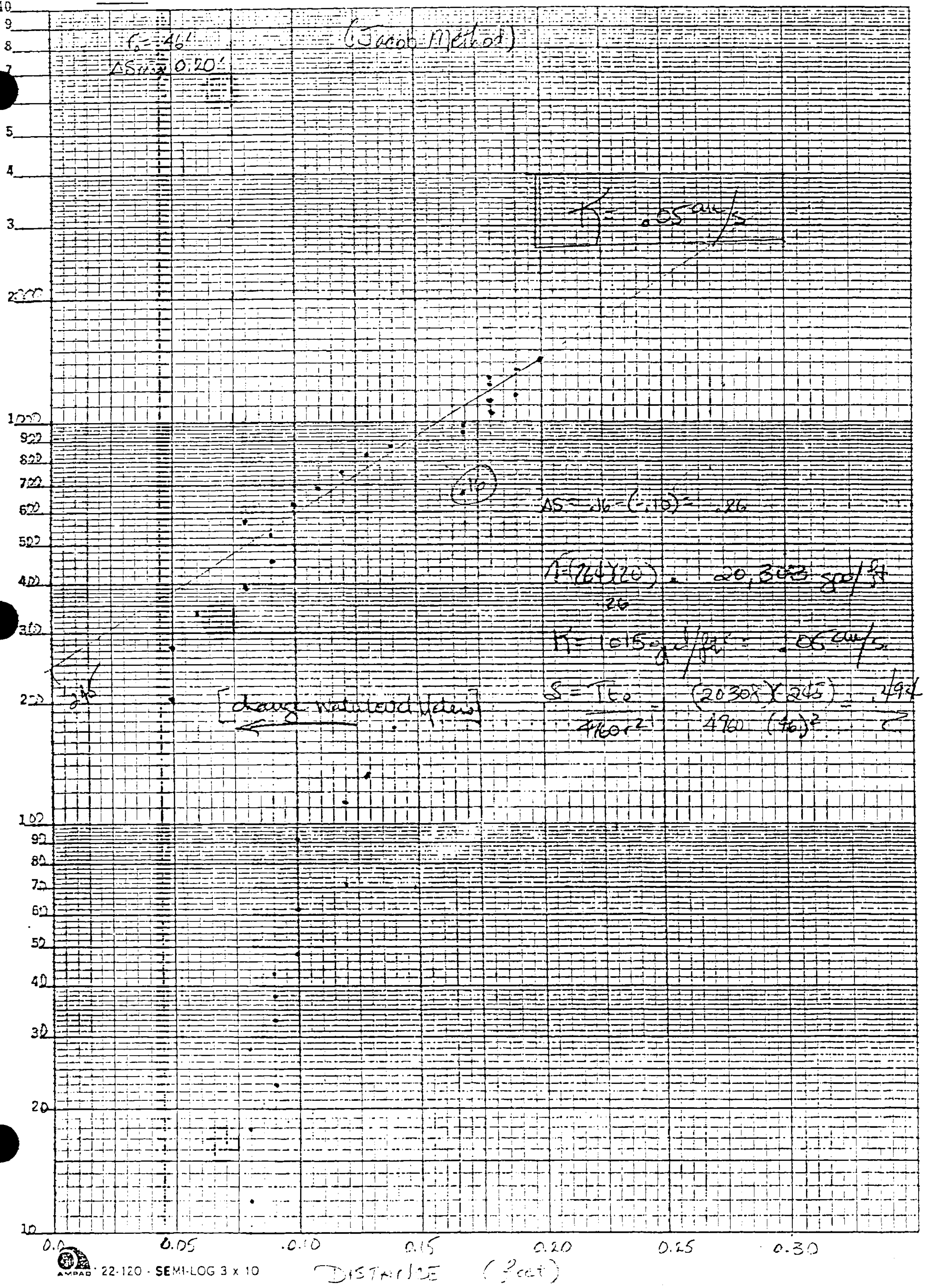
$\Delta s = (.1850 - (.0425)) = .228$

$T = \frac{264Q}{\Delta s} = \frac{(264)(20)}{.228} = 23158$

$K \approx \frac{23158}{20} = 1158$ gpd/ft² $= .055$ cm/s

$S = \frac{T t_0}{4790 r^2} = \frac{(23158)(.025)}{(4790)(24)^2} = .0002$

ESI-1: TIME DRAWDOWN



$\boxed{K = .05\ cm/s}$

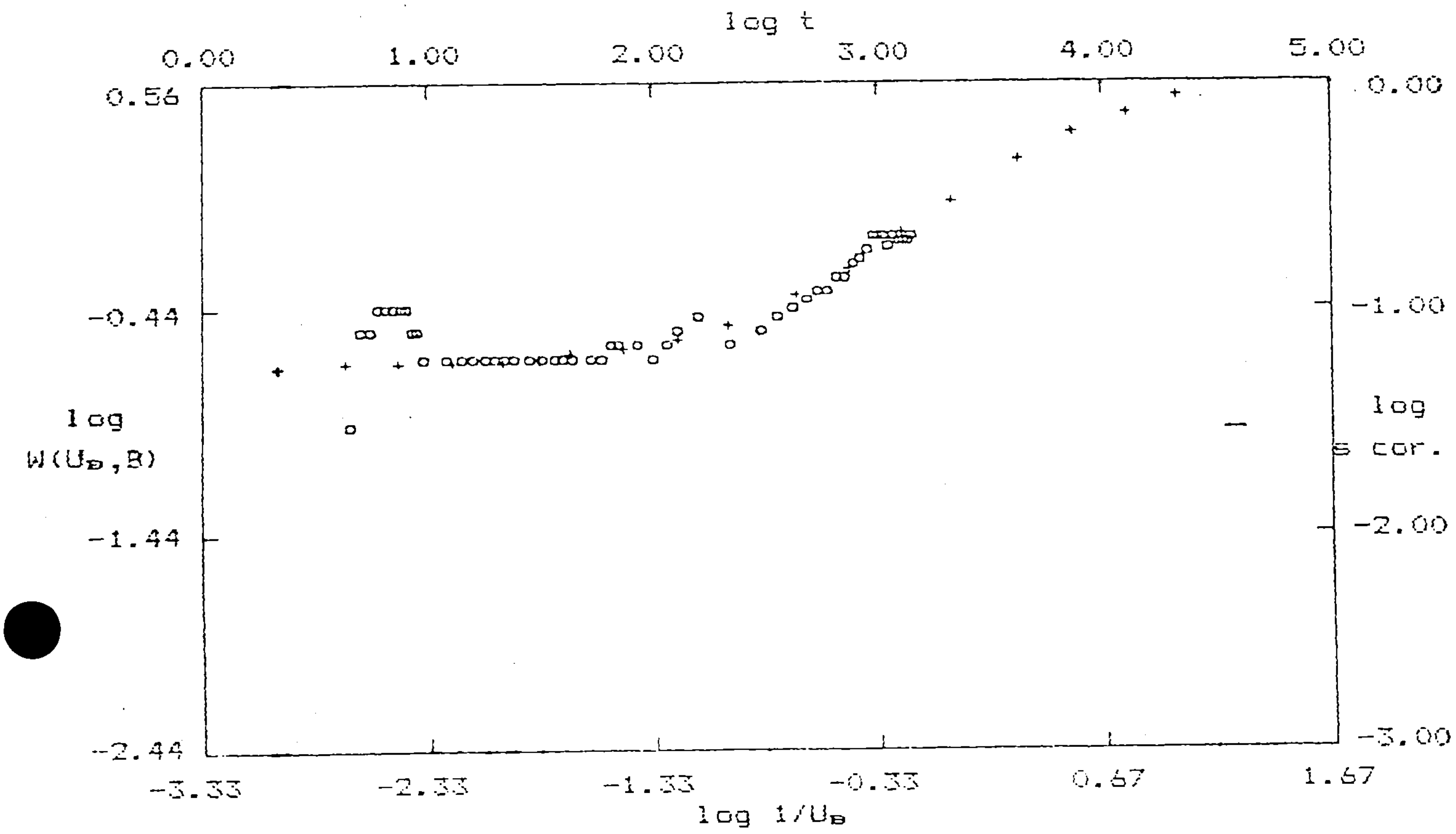
ΔS = .16 − (−.10) = .26

$T = \frac{(264)(20)}{.26} = 20{,}303\ gpd/ft$

K = 1015 gpd/ft² = .06 cm/s

$S = \frac{Tt_o}{4790r^2} = \frac{(20303)(245)}{4790\ (46)^2} = .494$

ESI-2: DELAYED RESPONSE (β=1.5)



o - Data

\+ - Type Curve
Unconfined Delayed: beta = 1.50

SOLUTION

Transmissivity = 8.32E+003 gal/day/ft
Aquifer Thick. = 2.00E+001 ft
Hydraulic Cond.= 4.16E+002 gal/day/sq ft
Specific Yield = 2.87E+000

K= 416 gpd/ft² = .02 cm/s.

TABLE A

DONCRAFT WATER LEVELS - PW-1: STEP TEST

2/9/93
BEGIN @ 15:53
END @ 17:32

WELL	ELEV TOR (msl)	SWL 14:30 pretest (ft)	WL 16:15 @5gpm (ft)	WL 17:15 @10gpm (ft)	WL 18:00 pump off (ft)		DD (ft)	WELL
PW-1	98.52	8.37	10.03	13.57	20.19	@17:32	11.82	PW-1
PW-2	98.63	8.49		8.61	8.63		0.14	PW-2
ESI-6	98.66	8.46	8.50	8.51	8.52		0.06	ESI-6
ESI-7	98.82	8.62	8.63	8.65	8.66		0.04	ESI-7
ESI-1	98.10	8.00		8.02	8.03		0.03	ESI-1
ESI-8	102.20	11.56	11.57	11.57	11.57		0.01	ESI-8
ESI-9	99.94	7.37	7.37	7.37	7.37		0.00	ESI-9
ESI-5	98.66	7.88	7.89	7.90	7.91		0.03	ESI-5
ESI-4	98.91	8.56	8.57	8.58	8.59		0.03	ESI-4
ESI-3	98.83	8.59	8.63	8.65	8.66		0.07	ESI-3
ESI-2D	98.46	7.87	7.92	7.94	7.96	← (pump	0.09	ESI-2D
ESI-2	98.51	8.34	8.38	8.41	8.43	↙ on)	0.09	ESI-2
ESI-12	98.89	8.72	8.80	8.82	8.84		0.12	ESI-12
ESI-11	99.02	9.12	9.12	9.16	9.18		0.06	ESI-11
ESI-10	99.00	9.18	9.20	9.23	9.23		0.05	ESI-10
ESI-13	97.26	FLOWING						ESI-13
VER		2.21						RIVER

DOWCRAFT WATER LEVELS -- PW-2: STEP TEST

2/10/93
BEGIN @ 10:33:30
END @ 13:00

WELL	ELEV TOR (msl)	SWL 10:30am pretest (ft)	WL 11:00 @8gpm (ft)	WL 11:30 @10gpm (ft)	WL 11:50 @14gpm (ft)	WL 12:15 @18gpm (ft)	WL 12:40 @22gpm (ft)	WL 14:00 post recovery (ft)	DD (ft)	
PW-2	98.63	8.55	11.38	12.53	13.35	16.04	20.08	8.60	11.53	
PW-1	98.52	8.43	6.54	8.59	8.61	8.66	8.71	8.45	0.27	
ESI-6	98.66	8.54	8.57	8.57	8.49	8.56	8.56	8.55	0.02	
ESI-7	98.82	8.70	8.67	8.72	8.72	8.73	8.71	8.73	0.01	
ESI-1	98.10	8.08	8.06	8.08	8.07	8.10	8.08	8.10	0.00	
ESI-8	102.20	11.58	11.59	11.65	11.61	11.63	11.61	11.62	0.03	
ESI-9	99.94	7.40	7.38	7.41	7.38	7.44	7.38	7.39	-0.02	
ESI-5	98.66	8.02	7.97	7.99	7.96	8.01	7.93	7.93	-0.09	
ESI-4	98.91	8.64	8.60	8.63	8.60	8.75	8.62	8.63	-0.02	
ESI-3	98.83	8.66	8.62	8.66	8.63	8.67	8.68	8.67	0.02	
ESI-2D	98.46	7.93	7.98	7.95	7.92	7.95	7.91	7.97	-0.04	?
ESI-2	98.51	8.43	8.43	8.49	8.37	7.90(?)	6.28(?)	8.42	~~-0.45~~	*
I-12	98.89	8.87	8.82	8.86	8.85	8.88	8.86	8.85	-0.01	
I-11	99.02	9.19	9.12	9.21	9.19	9.24	9.23	9.16	0.04	
ESI-10	99.00	9.28	9.23	9.29	9.27	9.30	9.29	9.24	0.01	
ESI-13	97.26								0.00	
RIVER	(Rel. Change)		2.25	2.26	2.25	2.27	2.25	2.25	2.25	

NOTE Final Maximum drawdown on Pumping well PW-2 = 23.69-8.55 = 15.14

TABLE B

DOWCRAFT WATER LEVELS - 24 HOUR TEST

CAPTURE ZONE DATA
MAXIMUM DRAWDOWNS & RESULTING GROUNDWATER ELEVATIONS

USE

WELL	ELEV TOR (msl)	SWL BT (ft)	SWL INIT (ft)	WL FINAL (ft)	DD FI-IN (ft)	DD FI-BT (ft)	ELEV BT SWL (msl)	ELEV FIN WL (msl)
PW-2	98.63	8.58	8.58	20.20	11.62	11.62	90.05	78.43
ESI-6	98.66	8.55	8.50	8.78	0.23	0.28	90.11	89.88
ESI-7	98.82	8.73	8.73	8.93	0.20	0.20	90.07	89.89
ESI-1	98.10	8.10	8.10	8.28	0.18	0.18	90.00	89.82
ESI-8	102.20	11.62	11.62	11.77	0.15	0.15	90.58	90.43
ESI-9	99.94	7.39	7.42	7.42	0.03	0.00	92.55	92.52
ESI-5	98.66	7.93	7.91	8.01	0.08	0.10	90.73	90.65
ESI-4	98.91	8.63	8.65	8.79	0.16	0.14	90.28	90.12
ESI-3	98.83	8.67	8.65	8.88	0.21	0.23	90.16	89.95
PW-1	98.52	8.45	8.43	8.85	0.40	0.42	90.07	89.67
I-20	98.46	7.97	7.96	8.09	0.12	0.13	90.49	90.37
SI-2	98.51	8.42	8.42	8.63	0.21	0.21	90.09	89.88
ESI-12	98.89	8.85	8.89	9.02	0.17	0.13	90.04	89.87
ESI-11	99.02	9.16	9.24	9.38	0.22	0.14	89.86	89.64
ESI-10	99.00	9.24	9.31	9.42	0.18	0.11	89.76	89.58
ESI-13	97.26	7.41	7.41	7.60	0.19	0.19	89.85	89.66
RIVER	(Rel.	Change)	2.25	2.31		0.06		

TABLE C

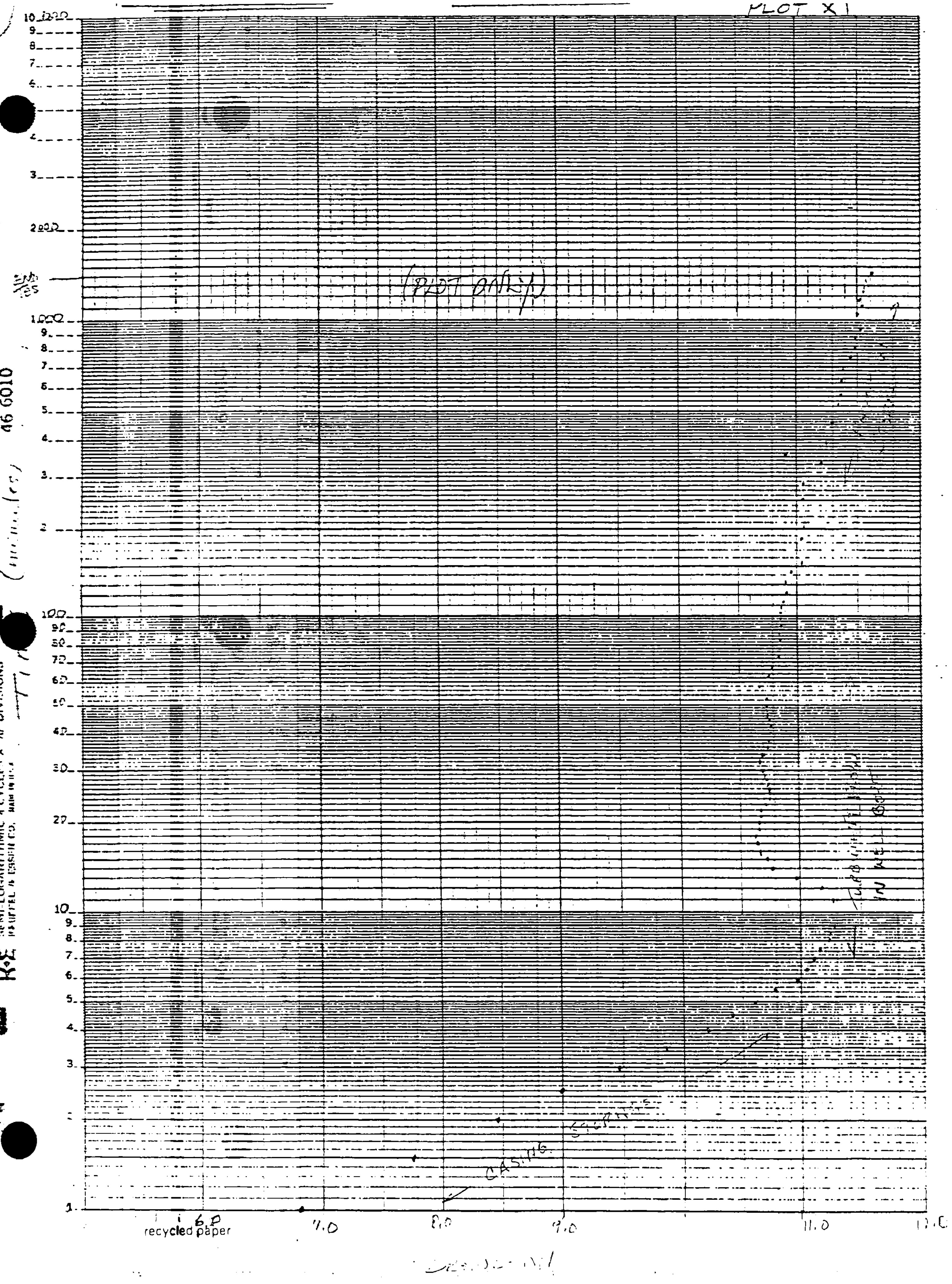
DOWCRAFT WATER LEVELS - 24 HOUR TEST

PUMP PW-2

DISTANCE-DRAWDOWN DATA

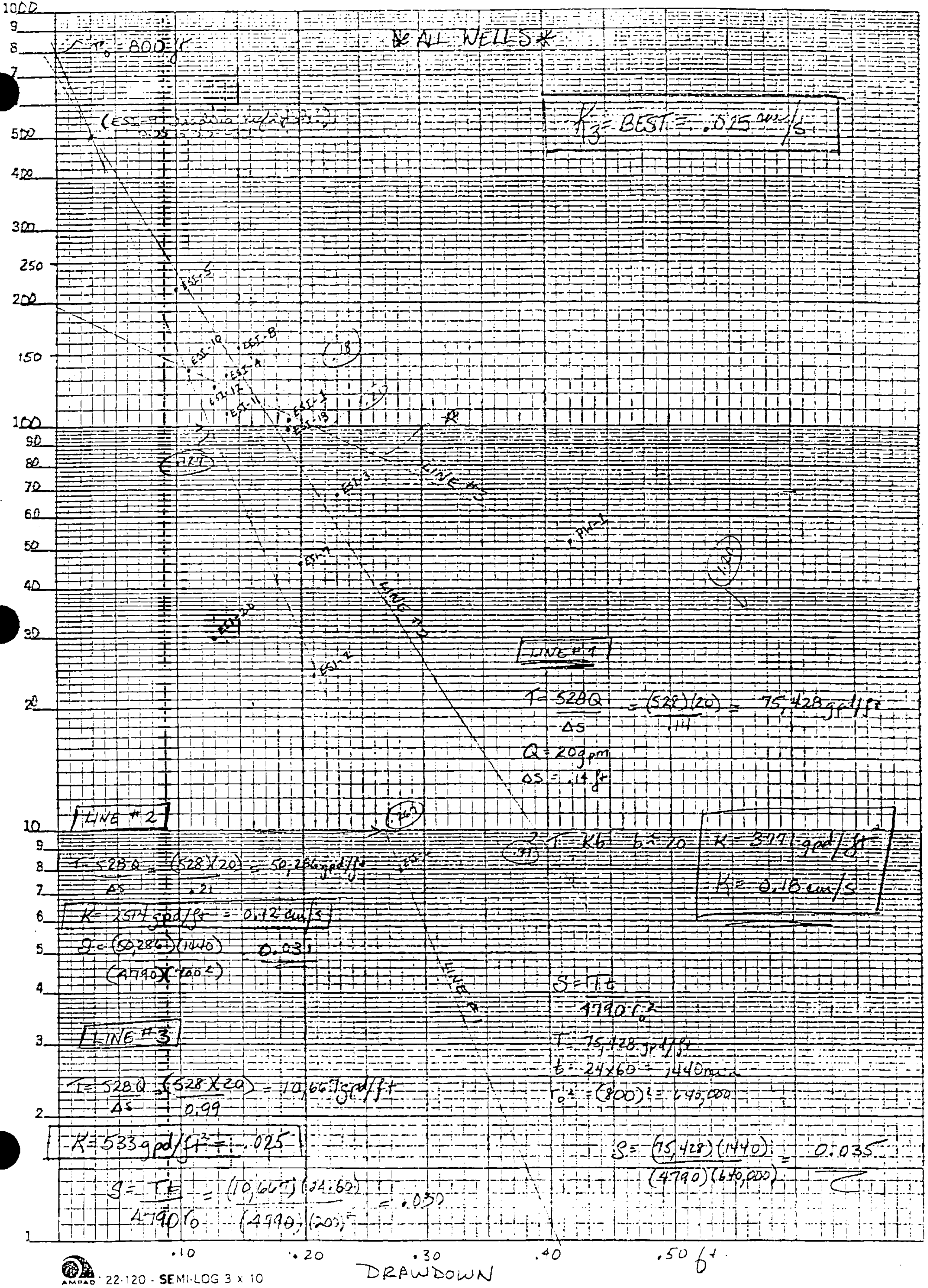
WELL		MAX DRAWDOWN (ft)	DIST to PW2 (ft)	WELL DEPTH (ft)	SCREEN INTV (ft)	ELEV TOR (msl)
PW-2	MAX DD	11.62	0	26.0	6-26	98.63
PW-1		0.42	52	27.0	2-27	98.52
ESI-6		0.28	8	13.5	3.5-13.5	98.66
ESI-3		0.23	68	15.0	5-15	98.83
ESI-2		0.21	24	15.0	5-15	98.51
ESI-7		0.20	46	14.5	4.5-14.5	98.82
ESI-13		0.19	98	?	?	97.26
ESI-1		0.18	104	15.0	5-15	98.10
ESI-8		0.15	156	18.0	8-18	102.20
[illegible]-11		0.14	109	15.0	10-15	99.02
ESI-4		0.14	133	15.0	5-15	98.91
ESI-12		0.13	125	15.0	10-15	98.69
ESI-2D		0.13	30	60.0	35-45	98.46
ESI-10		0.11	138	15.0	10-15	99.00
ESI-5		0.10	213	15.0	5-15	98.66
RIVER		0.06	173	15.0	5-15	
ESI-9	MIN DD	0.00	506	15.0	5-15	99.94

PLOT X1



10,000
9
8
7
6
4
3
2000
1000
9
8
7
6
5
4
3
2
100
90
80
70
60
50
40
30
20
10
9
8
7
6
5
4
3
2
1
6.0
7.0
8.0
9.0
11.0
12.0
(PLOT DATA)
CASING STORAGE
TURB [illegible]
IN WELL BORE
Time (minutes)
Drawdown

DISTANCE - DRAWDOWN



K3 = BEST = .025 cm/s

LINE #1

$T = \frac{528Q}{\Delta s} = \frac{(528)(20)}{.14} = 75,428$ gpd/ft

$Q = 20$ gpm

$\Delta s = .14$ ft

$T = Kb$ $b \approx 20$

K = 3771 gpd/ft²

K = 0.18 cm/s

$S = \frac{Tt}{4790 r_0^2}$

T = 75,428 gpd/ft

t = 24×60 = 1440 min

$r_0^2 = (800)^2 = 640,000$

$S = \frac{(75,428)(1440)}{(4790)(640,000)} = 0.035$

LINE #2

$T = \frac{528Q}{\Delta s} = \frac{(528)(20)}{.21} = 50,286$ gpd/ft

K = 2514 gpd/ft = 0.12 cm/s

$S = \frac{(50,286)(1440)}{(4790)(700^2)}$ = 0.031

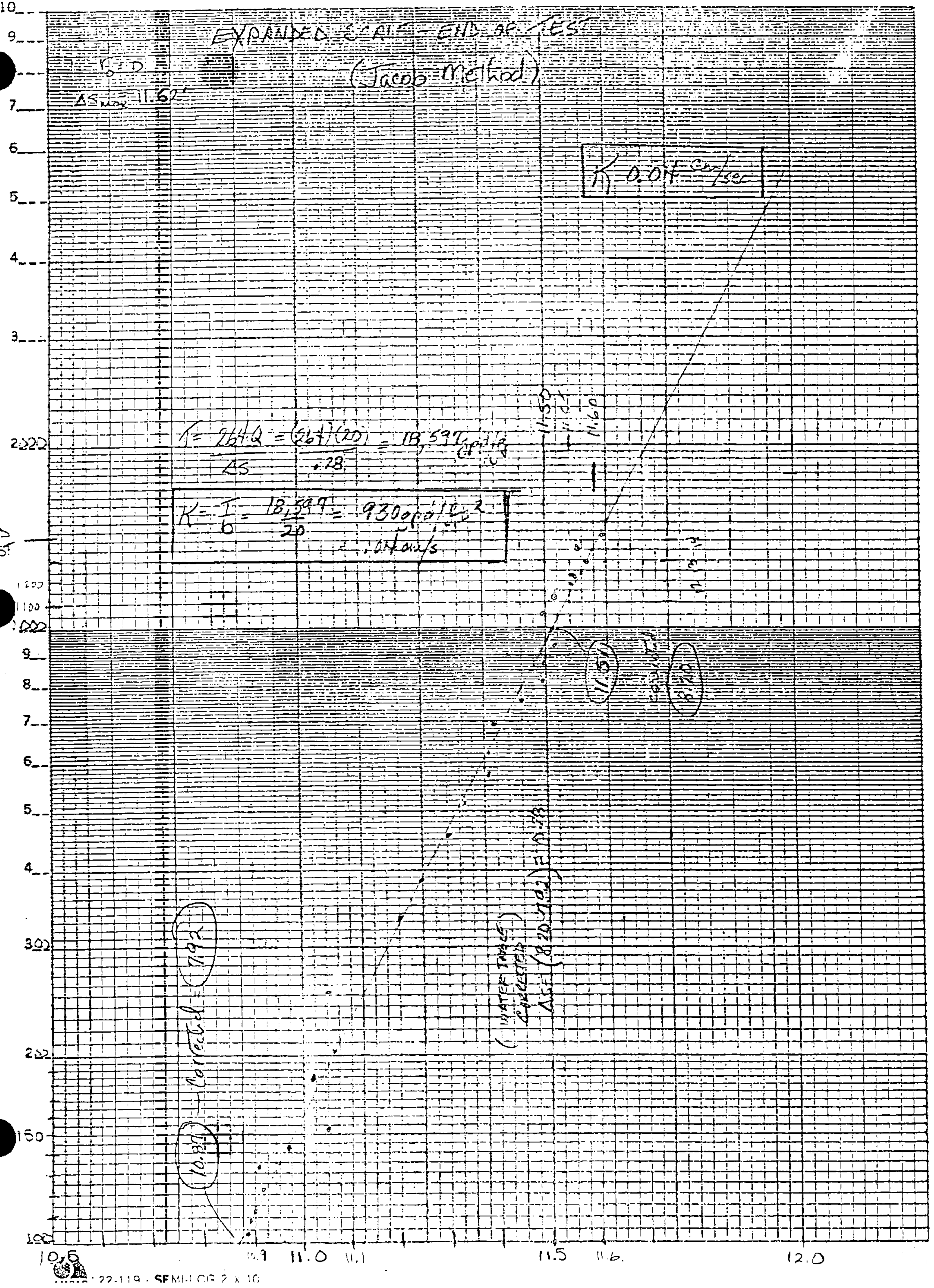
LINE #3

$T = \frac{528Q}{\Delta s} = \frac{(528 \times 20)}{0.99} = 10,667$ gpd/ft

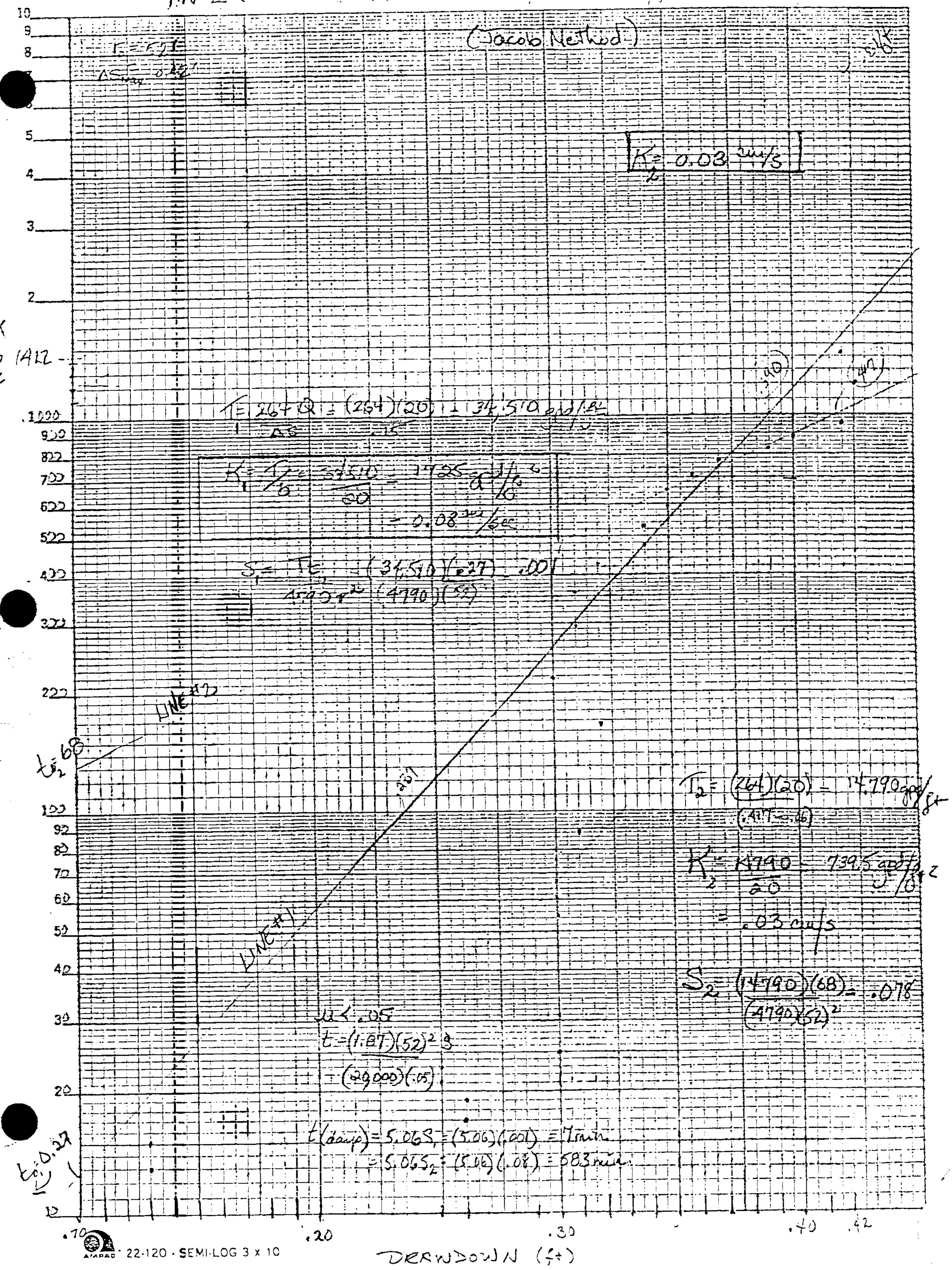
K = 533 gpd/ft² = .025

$S = \frac{Tt}{4790 r_0} = \frac{(10,667)(24 \cdot 60)}{(4790)(20)^2} = .030$

PW-2 (PUMPING WELL): TIME - DRAWDOWN



P.W-1 (Observation): TIME-DRAWDOWN -



22-120 · SEMI-LOG 3 x 10

(Jacob Method)

r = 52'

$\Delta S_{max} = 0.42'$

$\boxed{K_2 = 0.03\ cm/s}$

$T_1 = \frac{264\,Q}{\Delta S} = \frac{(264)(20)}{.15} = 34,510\ gpd/ft$

$\boxed{K_1 = \frac{T_1}{b} = \frac{34510}{20} = 1725\ gpd/ft^2 = 0.08\ cm/sec}$

$S_1 = \frac{T t_1}{4790\, r^2} = \frac{(34,510)(.27)}{(4790)(52^2)} = .001$

$T_2 = \frac{(264)(20)}{(.417 - .06)} = 14,790\ gpd/ft$

$K_2 = \frac{14790}{20} = 739.5\ gpd/ft^2$

$= .03\ cm/s$

$S_2 = \frac{(14790)(68)}{(4790)(52)^2} = .078$

$u < .05$

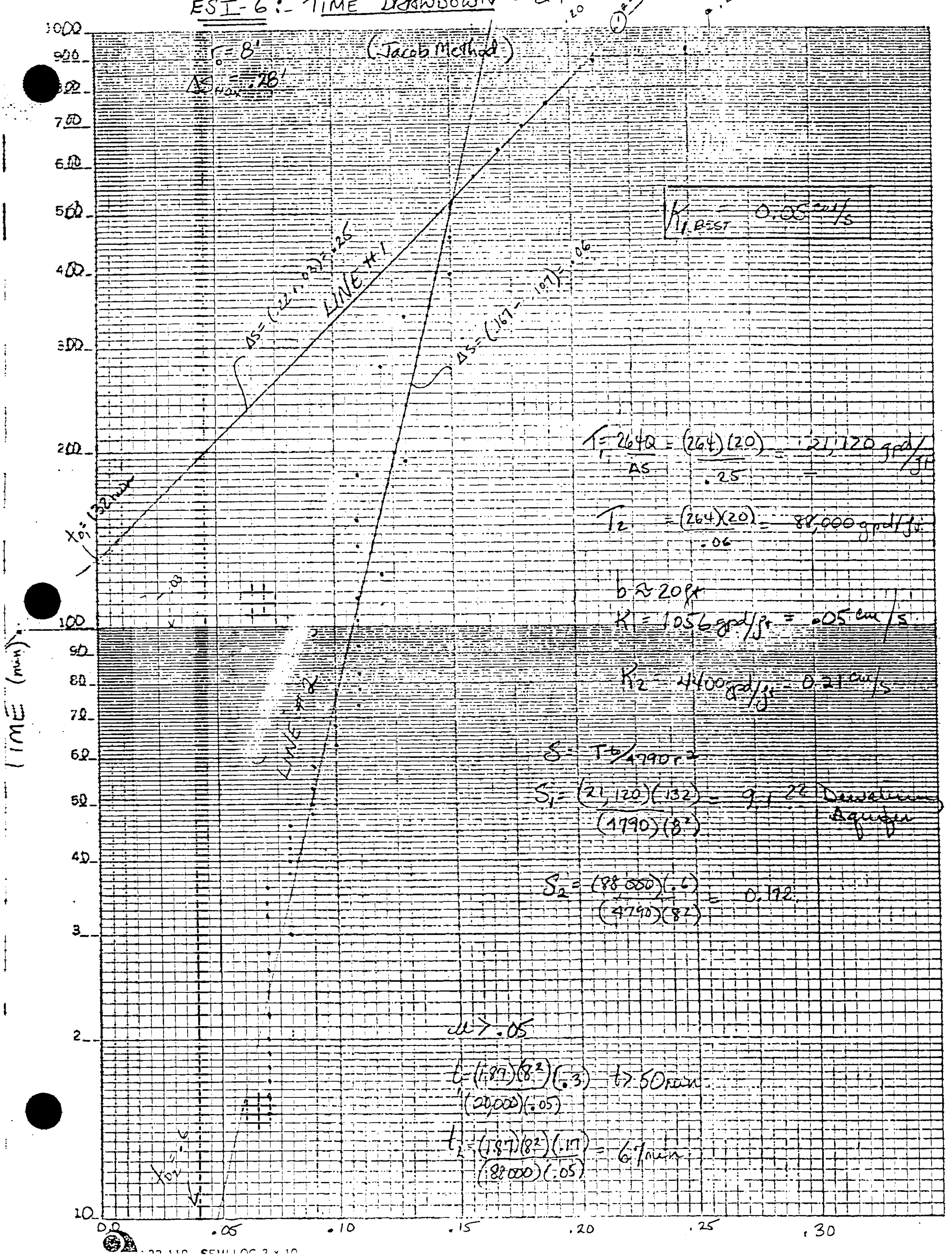
$t = \frac{(1.87)(52)^2 S}{(29,000)(.05)}$

$t(days) = 5.06 S_1 = (5.06)(.001) = 7\ min$

$= 5.06 S_2 = (5.06)(.08) = 583\ min$

ESI-6 :- TIME DRAWDOWN - 24 HR TEST

(Jacob Method)



$r_0 = 8'$

$\Delta s_{max} = .28'$

$\boxed{K_{1,BEST} \quad 0.05\ cm/s}$

$T_1 = \frac{264Q}{\Delta s} = \frac{(264)(20)}{.25} = 21,120$ gpd/ft

$T_2 = \frac{(264)(20)}{.06} = 88,000$ gpd/ft

$b \approx 20$ ft

$K_1 = 1056$ gpd/ft $= .05$ cm/s

$K_2 = 4400$ gpd/ft $= 0.21$ cm/s

$S = Tt_0/4790r^2$

$S_1 = \frac{(21,120)(132)}{(4790)(8^2)} = 9.1$?? Dewatering Aquifer

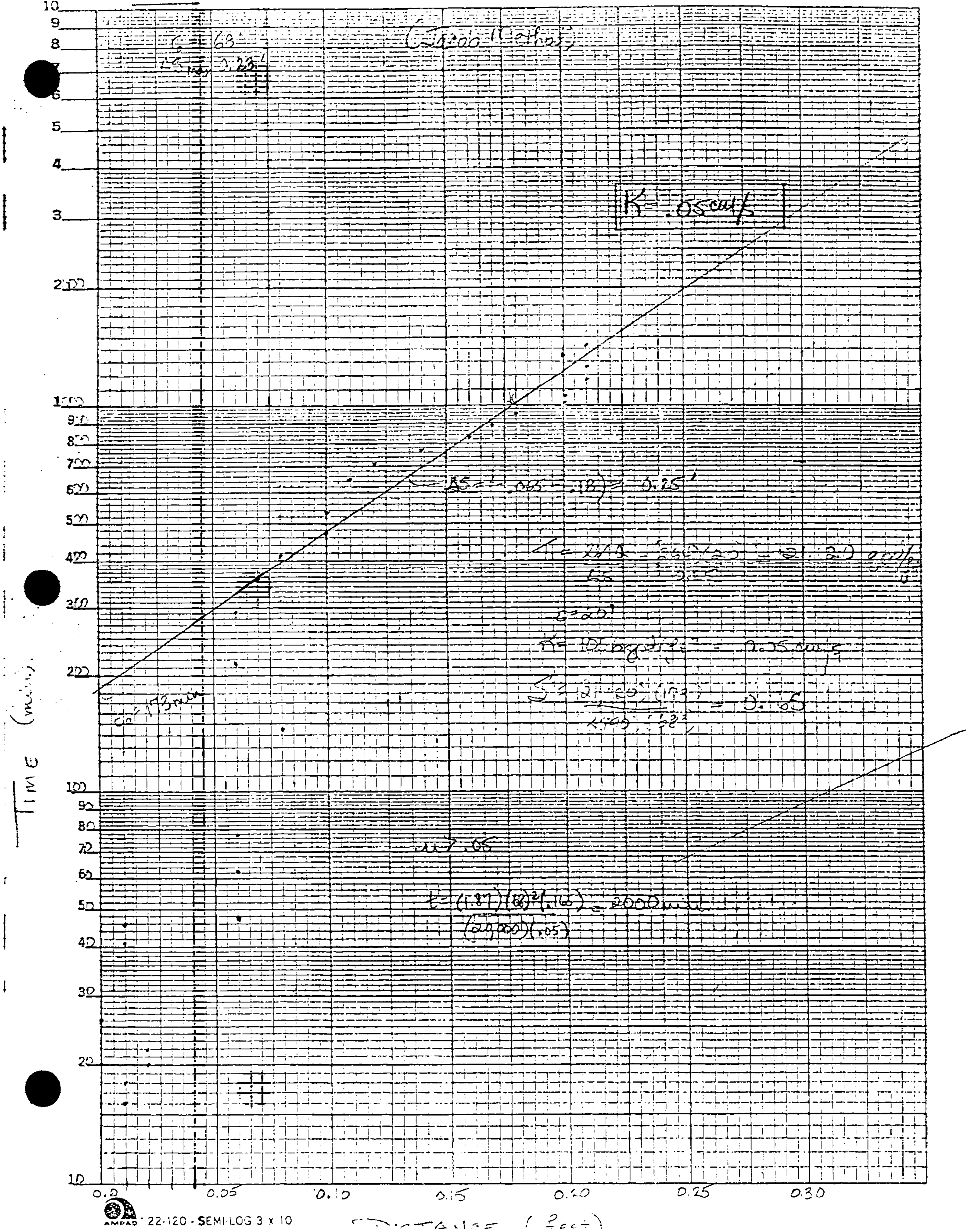
$S_2 = \frac{(88,000)(.6)}{(4790)(8^2)} = 0.172$

$u > .05$

$t_1 = \frac{(1.87)(8^2)(.3)}{(20,000)(.05)}$ $t > 50$ min

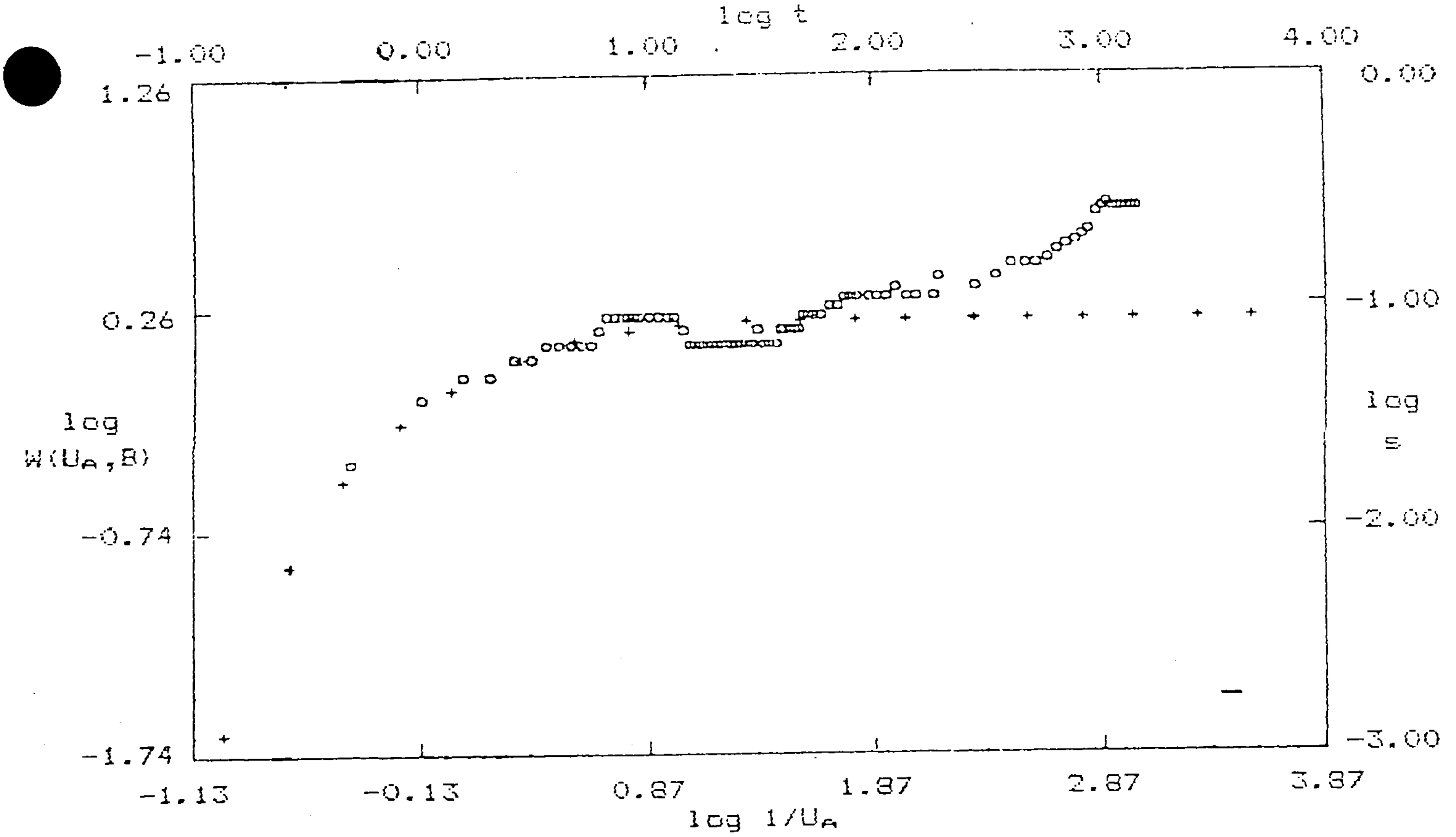
$t_2 = \frac{(1.87)(8^2)(.17)}{(88,000)(.05)} = 67$ min

ESI-3: TIME DRAWDOWN - 24 HR TEST



AMPAD 22-120 · SEMI-LOG 3 x 10

ESI-6: ELASTIC RESPONSE (β=.10)



o - Data

\+ - Type Curve
Unconfined Elastic: beta = 0.10

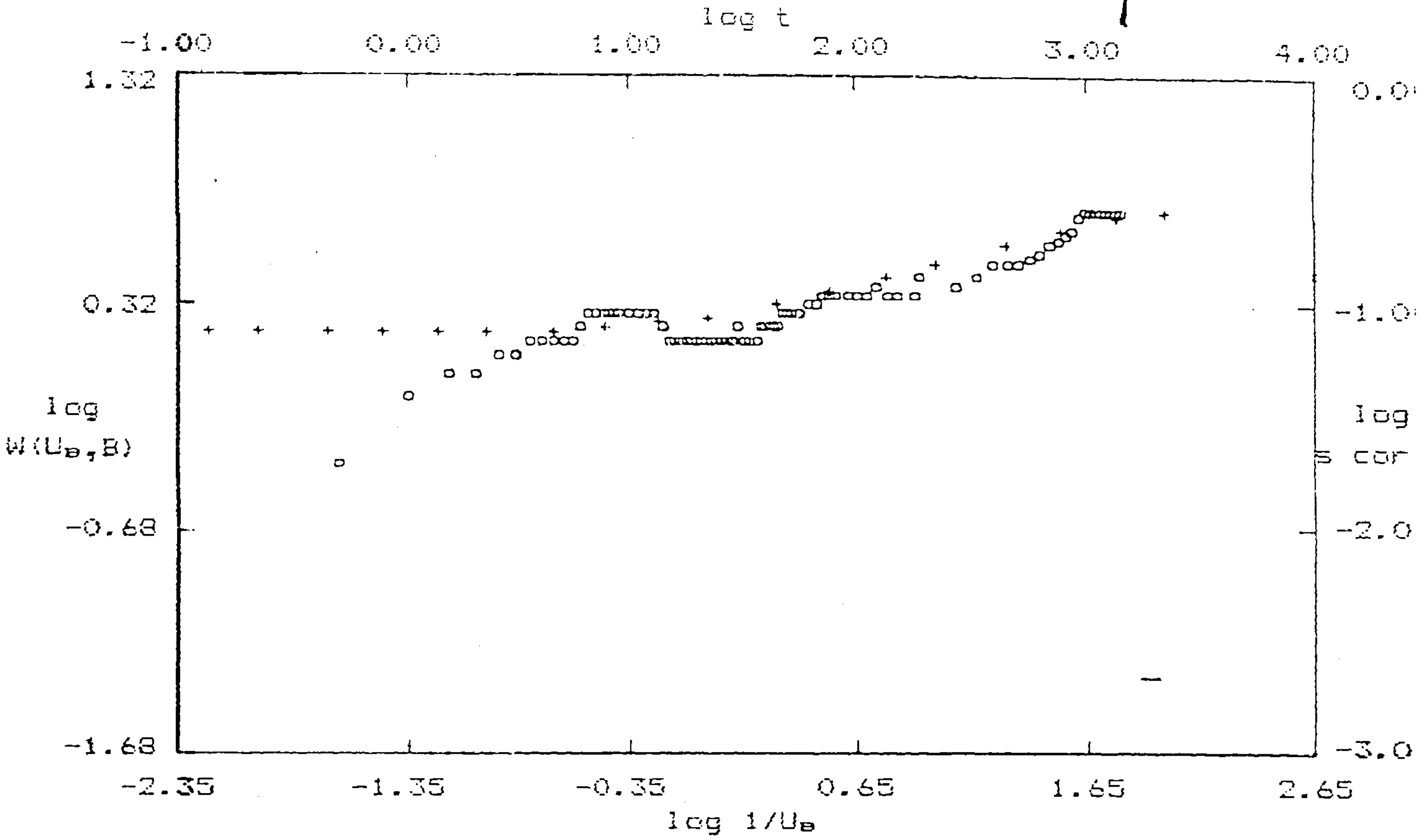
SOLUTION

Transmissivity = 4.17E+004 gal/day/ft
Aquifer Thick. = 2.00E+001 ft
Hydraulic Cond.= 2.08E+003 gal/day/sq ft
Storativity = 8.16E-002

$\beta = r^2/b^2 = 8^2/20^2 = 0.16$

$K = 208 \text{ gpd/ft}^2 = .010 \text{ cm/s}$

ESI-6: DELAYED RESPONSE (β=.10)



o - Data

\+ - Type Curve
Unconfined Delayed: beta = 0.10

SOLUTION

Transmissivity = 4.79E+004 gal/day/ft
Aquifer Thick. = 2.00E+001 ft
Hydraulic Cond.= 2.39E+003 gal/day/sq ft
Specific Yield = 1.55E+000

$\beta = \frac{r^2}{b^2} = \frac{(8)^2}{(20)^2} = 0.16$

K = 239 gpd/ft² = 0.011 cm/s

Data for Pump Test

l Name: ESI-6 Date of Test: 2/10/93

Thickness (b): 20.000 feet

Well Discharge(Q) = 20.000 gpm

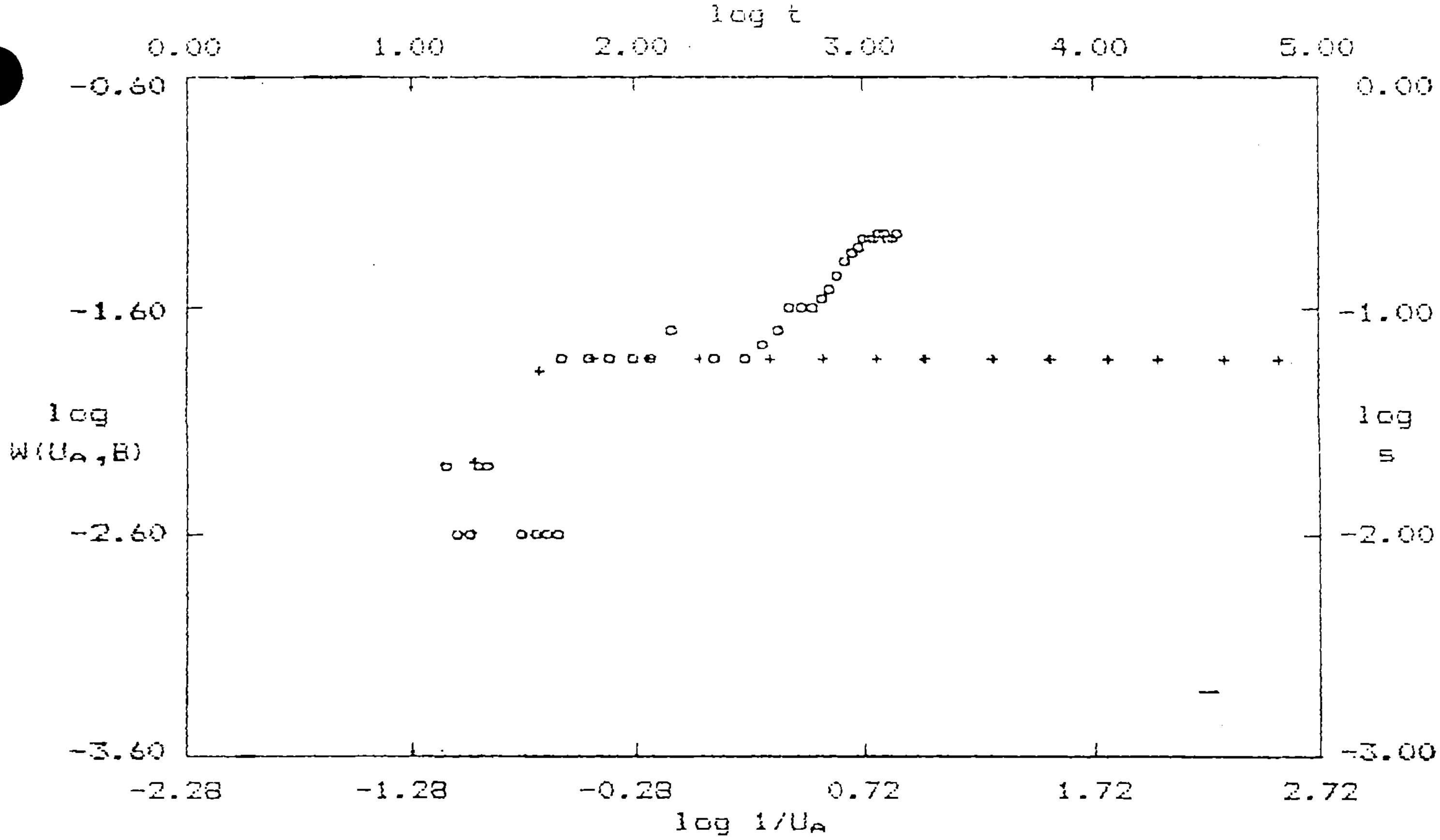
dius of Pumping Well = 0.083 feet

stance of Observation Well from Pumping Well = 8.000 feet

try No.	Time(t) (min.)	Drawdown(s) (ft.)	t / d^2 (min./sq.ft.)
******	************	************	*************
1	0.500	0.020	7.8E-003
2	1.000	0.040	1.6E-002
3	1.500	0.050	2.3E-002
4	2.000	0.050	3.1E-002
5	2.500	0.060	3.9E-002
6	3.000	0.060	4.7E-002
7	3.500	0.070	5.5E-002
8	4.000	0.070	6.3E-002
9	4.500	0.070	7.0E-002
10	5.000	0.070	7.8E-002
11	5.500	0.070	8.6E-002
12	6.000	0.080	9.4E-002
13	6.500	0.090	1.0E-001
14	7.000	0.090	1.1E-001
15	7.500	0.090	1.2E-001
16	8.000	0.090	1.3E-001
17	8.500	0.090	1.3E-001
18	9.000	0.090	1.4E-001
1[illegible]	10.000	0.090	1.6E-001
20	11.000	0.090	1.7E-001
21	12.000	0.090	1.9E-001
22	13.000	0.090	2.0E-001
23	14.000	0.080	2.2E-001
24	15.000	0.070	2.3E-001
25	16.000	0.070	2.5E-001
26	17.000	0.070	2.7E-001
27	18.000	0.070	2.8E-001
28	19.000	0.070	3.0E-001
29	20.000	0.070	3.1E-001
30	21.000	0.070	3.3E-001
31	22.000	0.070	3.4E-001
32	23.000	0.070	3.6E-001
33	24.000	0.070	3.8E-001
34	25.000	0.070	3.9E-001
35	26.000	0.070	4.1E-001
36	27.000	0.070	4.2E-001
37	28.000	0.070	4.4E-001
38	29.000	0.070	4.5E-001
39	30.000	0.080	4.7E-001
40	32.000	0.070	5.0E-001
41	34.000	0.070	5.3E-001
42	36.000	0.070	5.6E-001
43	38.000	0.080	5.9E-001
4[illegible]	40.000	0.080	6.3E-001
4[illegible]	42.000	0.080	6.6E-001
46	44.000	0.080	6.9E-001
47	46.000	0.080	7.2E-001
48	48.000	0.090	7.5E-001
49	50.000	0.090	7.8E-001
50	53.000	0.090	8.3E-001
51	58.000	0.090	9.1E-001

54	73.000	[illegible]	[illegible]
55	73.000	0.110	1.2E+000
56	83.000	0.110	1.3E+000
57	93.000	0.110	1.5E+000
58	103.000	0.110	1.6E+000
5	113.000	0.110	1.8E+000
60	123.000	0.120	1.9E+000
61	138.000	0.110	2.2E+000
62	153.000	0.110	2.4E+000
63	183.000	0.110	2.9E+000
64	192.000	0.130	3.0E+000
65	276.000	0.120	4.3E+000
66	337.000	0.130	5.3E+000
67	397.000	0.150	6.2E+000
68	457.000	0.150	7.1E+000
69	516.000	0.150	8.1E+000
70	575.000	0.160	9.0E+000
71	635.000	0.170	9.9E+000
72	695.000	0.180	1.1E+001
73	755.000	0.190	1.2E+001
74	815.000	0.200	1.3E+001
75	876.000	0.210	1.4E+001
76	937.000	0.250	1.5E+001
77	995.000	0.260	1.6E+001
78	1055.000	0.270	1.6E+001
79	1116.000	0.260	1.7E+001
80	1175.000	0.260	1.8E+001
81	1240.000	0.260	1.9E+001
82	1295.000	0.260	2.0E+001
83	1352.000	0.260	2.1E+001
84	1412.000	0.260	2.2E+001

ESI-3: ELASTIC RESPONSE (=7.0)



o - Data

\+ - Type Curve
Unconfined Elastic: beta = 7.00

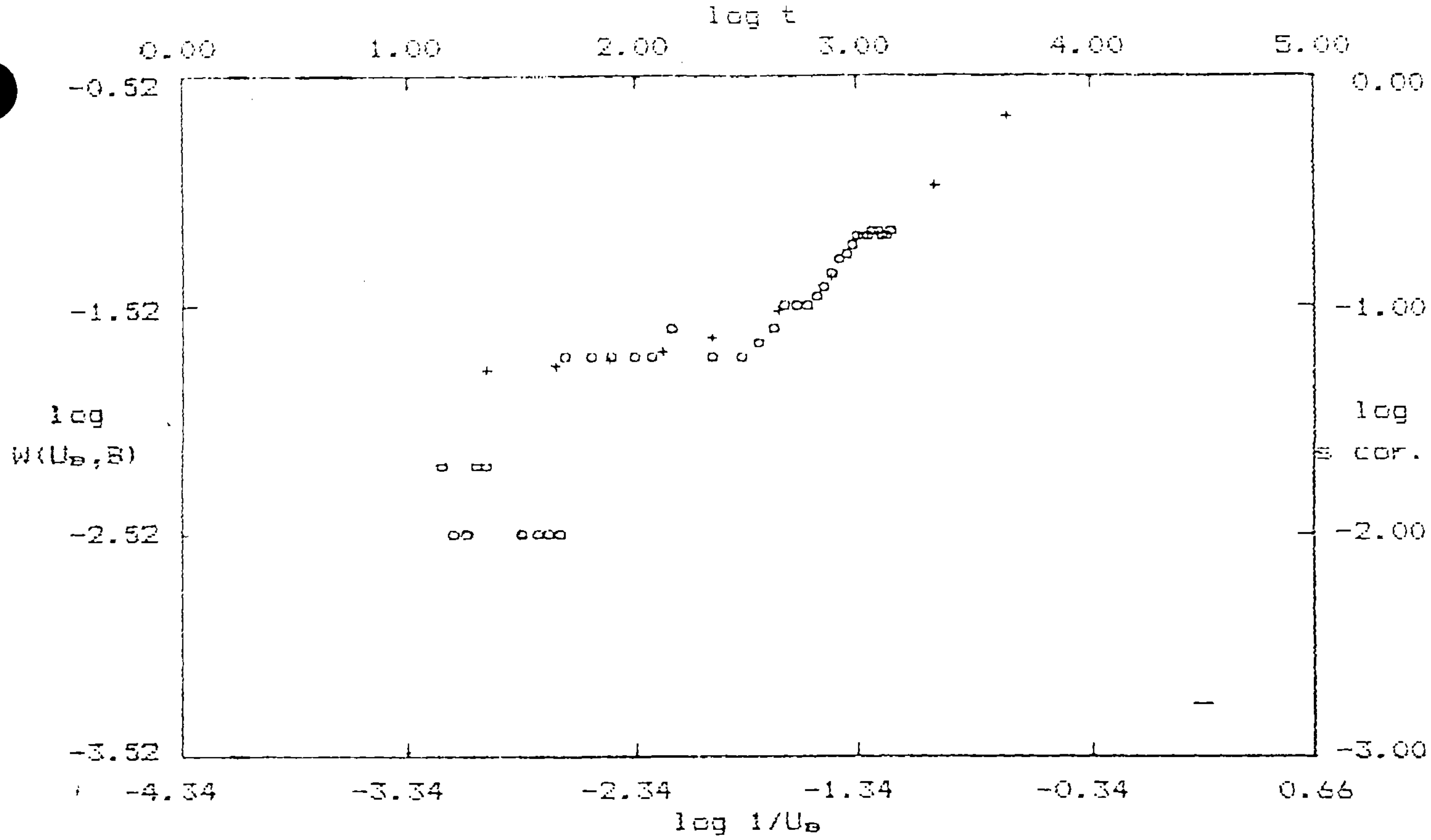
SOLUTION

Transmissivity = 5.76E+002 gal/day/ft
Aquifer Thick. = 2.00E+001 ft
Hydraulic Cond.= 2.88E+001 gal/day/sq ft
Storativity = 2.20E-003

$\beta = \frac{r^2}{b^2} = \frac{(68)^2}{(20)^2} = 11.56$

$K = 28.8$ gpd/ft^2 = .001 cm/s

ESI-3: DELAYED RESPONSE ([illegible]



o - Data

\+ - Type Curve
Unconfined Delayed: beta = 7.00

SOLUTION

Transmissivity = 6.92E+002 gal/day/ft
Aquifer Thick. = 2.00E+001 ft
Hydraulic Cond.= 3.46E+001 gal/day/sq ft
Specific Yield = 3.04E-001

$\beta = \frac{r^2}{b^2} = \frac{(68)^2}{(20)^2} = 11.56$

$K = 34.6 \text{ gpd/ft}^2 = .002 \text{ cm/s}$

Data for Pump Test

Well Name: ESI-3 Date of Test: 2/10/93
Aquifer Thickness (b): 20.000 feet
Pumped Well Discharge(Q) = 20.000 gpm
Radius of Pumping Well = 0.083 feet
Distance of Observation Well from Pumping Well = 68.000 feet

Entry No.	Time(t) (min.)	Drawdown(s) (ft.)	t / d^2 (min./sq.ft.)
********	************	***********	*************
1	14.000	0.020	3.0E-003
2	16.000	0.010	3.5E-003
3	18.000	0.010	3.9E-003
4	20.000	0.020	4.3E-003
5	22.000	0.020	4.8E-003
6	26.000	0.000	5.6E-003
7	31.000	0.010	6.7E-003
8	36.000	0.010	7.8E-003
9	41.000	0.010	8.9E-003
10	46.000	0.010	9.9E-003
11	48.000	0.060	1.0E-002
12	63.000	0.060	1.4E-002
13	78.000	0.060	1.7E-002
14	98.000	0.060	2.1E-002
15	118.000	0.060	2.6E-002
16	143.000	0.080	3.1E-002
17	218.000	0.060	4.7E-002
18	296.000	0.060	6.4E-002
19	353.000	0.070	7.6E-002
20	413.000	0.080	8.9E-002
21	467.000	0.100	1.0E-001
22	528.000	0.100	1.1E-001
23	586.000	0.100	1.3E-001
24	647.000	0.110	1.4E-001
25	705.000	0.120	1.5E-001
26	767.000	0.140	1.7E-001
27	828.000	0.160	1.8E-001
28	889.000	0.170	1.9E-001
29	950.000	0.180	2.1E-001
30	1005.000	0.200	2.2E-001
31	1064.000	0.200	2.3E-001
32	1123.000	0.200	2.4E-001
33	1181.000	0.210	2.6E-001
34	1246.000	0.210	2.7E-001
35	1301.000	0.200	2.8E-001
36	1359.000	0.200	2.9E-001
37	1407.000	0.210	3.0E-001
38	1417.000	0.210	3.1E-001
39		0.210	0.0E-308

K

APPENDIX K

ANALYTICAL TEST RESULTS 1990-1993 AND ANALYTICAL DATA ASSESSMENT AND VALIDATION REPORTS 1997-2000

HAS

HUNTINGDON ANALYTICAL SERVICES
Division of **EMPIRE SOILS INVESTIGATIONS INC.**
PO Box 250 Middleport New York 14105
Tel: (716) 735-3400 FAX (716) 735-3653

Environmental Analytical Report For:

EMPIRE SOILS INVESTIGATIONS, INC. - HAMBURG

PROJECT NAME: DOWCRAFT

HAS Ref. #90-1653; 1658

December 4, 1990

HAS

HUNTINGDON ANALYTICAL SERVICES
ELAP #10833
ENVIRONMENTAL REPORT

HAS Reference Numbers: #90-1653

November 27, 1990

Statement of Work Performed

I hereby declare that the work was performed under my supervision according to the procedures outlined by the following references and that this report provides a correct and faithful record of the results obtained.

- 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act," October 26, 1984 (Federal Register) U. S. Environmental Protection Agency.
- U. S. Environmental Protection Agency, "Test Methods of Evaluating Solid Waste - Physical/Chemical Methods, " Office of Solid Waste and Emergency Response, SW-846, 2nd Edition and 3rd Edition.
- New York State Department of Health, Analytical Toxicology Laboratory Handbook, August 1982.

Katherine A Syracuse/LMK

Katherine A. Syracuse
Lab Director, Environmental

REPORT CODE LEGEND:

<DL = Less than detection limit
ND = Not detected
NA = Not applicable
INP = Information not provided
MB = Method Blank

EUB[illegible]N ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 624
VOLATILE ORGANICS

SAMPLE IDENTIFICATION :	DOWCRAFT ESI-1	ESI-2	ESI-3	ESI-4	ESI-5	METHOD BLANK	
EAS SAMPLE #98-1653	021	004	003	002	001	-----	
COMPOUND	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l	MDL ug/l
CHLOROMETHANE	<10	<250	<50	<10	<10	<10	<10
BROMOMETHANE	<10	<250	<50	<10	<10	<10	<10
VINYL CHLORIDE	<10	<250	<50	<10	<10	<10	<10
CHLOROETHANE	<10	<250	<50	<10	<10	<10	<10
METHYLENE CHLORIDE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
ACETONE	<10	<250	<50	<10	13	<10	<10
TRICHLOROFLUOROMETHANE	<10	<250	<50	<10	<10	<10	<10
CARBON DISULFIDE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
1,[illegible]CHLOROETHENE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
1,[illegible]CHLOROETHANE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
1,2-DICHLOROETHENE (TOTAL)	<5.0	230	<25	<5.0	<5.0	<5.0	<5.0
CHLOROFORM	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
1,2-DICHLOROETHANE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
2-BUTANONE	<10	<250	<50	<10	<10	<10	<10
1,1,1-TRICHLOROETHANE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
CARBON TETRACHLORIDE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
VINYL ACETATE	<10	<250	<50	<10	<10	<10	<10
BROMODICHLOROMETHANE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
1,2-DICHLOROPROPANE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
cis-1,3-DICHLOROPROPENE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
TRICHLOROETHENE	12	1,300	100	<5.0	<5.0	<5.0	<5.0
DIBROMOCHLOROMETHANE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
1,1,2-TRICHLOROETHANE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
BENZENE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
trans-1,3-DICHLOROPROPENE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
2-CHLOROETHYLVINYL ETHER	<20	<500	<100	<20	<20	<20	<20
BROMOFORM	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
4-METHYL-2-PENTANONE	<10	<250	<50	<10	<10	<10	<10
2-HEXANONE	<10	<250	<50	<10	<10	<10	<10
TETRACHLOROETHENE	<5.0	<130	<25	<5.0	-<5.0	<5.0	<5.0
1,1,2,2-TETRACHLOROETHANE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
TOLUENE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
CHLOROBENZENE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
ETHYL BENZENE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
[illegible]NE	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
[illegible]ENE (TOTAL)	<5.0	<130	<25	<5.0	<5.0	<5.0	<5.0
1,3-DICHLOROBENZENE	<10	<250	<50	<10	<10	<10	<10
1,2-DICHLOROBENZENE	<10	<250	<50	<10	<10	<10	<10
1,4-DICHLOROBENZENE	<10	<250	<50	<10	<10	<10	<10
DATE RECEIVED:	11-15-98	11-14-98	11-14-98	11-14-98	11-14-98	-----	-----
DATE SAMPLED:	11-14-98	11-13-98	11-13-98	11-13-98	11-13-98	-----	-----
		[illegible]	[illegible]	11-15-98	11-15-98	11-17-98	-----

HUNTINGDON ANALYTICAL SERVICES

Sample ID: ESI-2
HAS Sample #90-1653-004
Date Sampled: 11/13/90

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ANTIMONY	6010	11/15/90	11/21/90	0.05	<DL	*95
ARSENIC	7060	11/15/90	11/20/90	0.01	<DL	*95
BERYLLIUM	6010	11/15/90	11/21/90	0.005	<DL	*95
CADMIUM	6010	11/15/90	11/21/90	0.005	<DL	*95
CHROMIUM	6010	11/15/90	11/21/90	0.01	<DL	*95
COPPER	6010	11/15/90	11/21/90	0.01	0.02	*95
LEAD	7421	11/15/90	11/19/90	0.005	<DL	*95
MERCURY	7470	11/27/90	11/27/90	0.0002	<DL	*95
NICKEL	6010	11/15/90	11/21/90	0.04	<DL	*95
SELENIUM	7740	11/15/90	11/21/90	0.005	<DL	*95
SILVER	6010	11/15/90	11/21/90	0.01	<DL	*95
THALLIUM	7841	11/15/90	11/21/90	0.01	<DL	*95
ZINC	6010	11/15/90	11/21/90	0.02	<DL	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: ESI-3
HAS Sample #90-1653-003
Date Sampled: 11/13/90

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	MS %REC	MSD %REC	RPD
ANTIMONY	6010	11/15/90	11/21/90	0.05	<DL	84.6	85.5	1.0
ARSENIC	7060	11/15/90	11/20/90	0.01	<DL	*95		
BERYLLIUM	6010	11/15/90	11/21/90	0.005	<DL	96.2	95.0	1.2
CADMIUM	6010	11/15/90	11/21/90	0.005	<DL	109	114	5.2
CHROMIUM	6010	11/15/90	11/21/90	0.01	0.03	92.2	91.7	<1.0
COPPER	6010	11/15/90	11/21/90	0.01	0.04	117	116	<1.0
LEAD	7421	11/15/90	11/19/90	0.010	0.030	*95		
MERCURY	7470	11/27/90	11/27/90	0.0002	<DL	*95		
NICKEL	6010	11/15/90	11/21/90	0.04	<DL	91.8	93.4	1.7
SELENIUM	7740	11/15/90	11/21/90	0.005	<DL	*95		
ILVER	6010	11/15/90	11/21/90	0.01	<DL	112	112	<1.0
THALLIUM	7841	11/15/90	11/21/90	0.01	<DL	*95		
ZINC	6010	11/15/90	11/21/90	0.02	0.08	89.3	89.3	<1.0

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: ESI-4
HAS Sample #90-1653-002
Date Sampled: 11/13/90

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ANTIMONY	6010	11/15/90	11/21/90	0.05	<DL	*95
ARSENIC	7060	11/15/90	11/20/90	0.01	0.02	*95
BERYLLIUM	6010	11/15/90	11/21/90	0.005	<DL	*95
CADMIUM	6010	11/15/90	11/21/90	0.005	<DL	*95
CHROMIUM	6010	11/15/90	11/21/90	0.01	0.05	*95
COPPER	6010	11/15/90	11/21/90	0.01	0.06	*95
LEAD	7421	11/15/90	11/19/90	0.005	0.038	*95
MERCURY	7470	11/27/90	11/27/90	0.0002	<DL	*95
NICKEL	6010	11/15/90	11/21/90	0.04	<DL	*95
SELENIUM	7740	11/15/90	11/21/90	0.005	<DL	*95
SILVER	6010	11/15/90	11/21/90	0.01	<DL	*95
THALLIUM	7841	11/15/90	11/21/90	0.01	<DL	*95
ZINC	6010	11/15/90	11/21/90	0.02	0.13	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: ESI-5
HAS Sample #90-1653-001
Date Sampled: 11/13/90

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ANTIMONY	6010	11/15/90	11/21/90	0.05	<DL	*95
ARSENIC	7060	11/15/90	11/20/90	0.01	0.01	*95
BERYLLIUM	6010	11/15/90	11/21/90	0.005	<DL	*95
CADMIUM	6010	11/15/90	11/21/90	0.005	0.013	*95
CHROMIUM	6010	11/15/90	11/21/90	0.01	0.03	*95
COPPER	6010	11/15/90	11/21/90	0.01	0.05	*95
LEAD	7421	11/15/90	11/19/90	0.005	0.060	*95
MERCURY	7470	11/27/90	11/27/90	0.0002	<DL	*95
NICKEL	6010	11/15/90	11/21/90	0.04	<DL	*95
SELENIUM	7740	11/15/90	11/21/90	0.005	<DL	*95
[illegible]LVER	6010	11/15/90	11/21/90	0.01	<DL	*95
THALLIUM	7841	11/15/90	11/21/90	0.01	<DL	*95
ZINC	6010	11/15/90	11/21/90	0.02	0.06	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: METHOD BLANK
HAS Sample #90-1653-MB
Date Sampled: N/A

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ANTIMONY	6010	11/15/90	11/21/90	0.05	<DL	*95
ARSENIC	7060	11/15/90	11/20/90	0.01	<DL	*95
BERYLLIUM	6010	11/15/90	11/21/90	0.005	<DL	*95
CADMIUM	6010	11/15/90	11/21/90	0.005	<DL	*95
CHROMIUM	6010	11/15/90	11/21/90	0.01	<DL	*95
COPPER	6010	11/15/90	11/21/90	0.01	<DL	*95
LEAD	7421	11/15/90	11/19/90	0.005	<DL	*95
MERCURY	7470	11/27/90	11/27/90	0.0002	<DL	*95
NICKEL	6010	11/15/90	11/21/90	0.04	<DL	*95
SELENIUM	7740	11/15/90	11/21/90	0.005	<DL	*95
SILVER	6010	11/15/90	11/21/90	0.01	<DL	*95
THALLIUM	7841	11/15/90	11/21/90	0.01	<DL	*95
ZINC	6010	11/15/90	11/21/90	0.02	<DL	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 624
VOLATILE ORGANICS

SAMPLE IDENTIFICATION :	DOWCRAFT ESI-1	METHOD BLANK	
HAS SAMPLE #90-1658	001	-----	
COMPOUND	RESULT ug/l	RESULT ug/l	MDL ug/l
CHLOROMETHANE --------------	<10	<10	<10
BROMOMETHANE --------------	<10	<10	<10
VINYL CHLORIDE ------------	<10	<10	<10
CHLOROETHANE --------------	<10	<10	<10
METHYLENE CHLORIDE ---------	<5.0	<5.0	<5.0
ACETONE -------------------	<10	<10	<10
TRICHLOROFLUOROMETHANE -----	<10	<10	<10
CARBON DISULFIDE ----------	<5.0	<5.0	<5.0
1,1-DICHLOROETHENE ---------	<5.0	<5.0	<5.0
1,1-DICHLOROETHANE ---------	<5.0	<5.0	<5.0
1,2-DICHLOROETHENE (TOTAL) -	<5.0	<5.0	<5.0
CHLOROFORM ----------------	<5.0	<5.0	<5.0
1,2-DICHLOROETHANE ---------	<5.0	<5.0	<5.0
2-BUTANONE ----------------	<10	<10	<10
1,1,1-TRICHLOROETHANE ------	<5.0	<5.0	<5.0
CARBON TETRACHLORIDE -------	<5.0	<5.0	<5.0
VINYL ACETATE -------------	<10	<10	<10
BROMODICHLOROMETHANE -------	<5.0	<5.0	<5.0
1,2-DICHLOROPROPANE --------	<5.0	<5.0	<5.0
cis-1,3-DICHLOROPROPENE ----	<5.0	<5.0	<5.0
TRICHLOROETHENE -----------	<5.0	<5.0	<5.0
DIBROMOCHLOROMETHANE -------	<5.0	<5.0	<5.0
1,1,2-TRICHLOROETHANE ------	<5.0	<5.0	<5.0
BENZENE -------------------	5.0	<5.0	<5.0
trans-1,3-DICHLOROPROPENE --	<5.0	<5.0	<5.0
2-CHLOROETHYLVINYL ETHER ---	10	<10	10
BROMOFORM -----------------	<5.0	5.0	<5.0
4-METHYL-2-PENTANONE -------	<10	<10	<10
2-HEXANONE ----------------	<10	<10	<10
TETRACHLOROETHENE ----------	<5.0	<5.0	<5.0
1,1,2,2-TETRACHLOROETHANE --	<5.0	<5.0	<5.0
TOLUENE -------------------	<5.0	<5.0	<5.0
CHLOROBENZENE -------------	<5.0	<5.0	<5.0
ETHYL BENZENE -------------	<5.0	<5.0	<5.0
STYRENE ------------------	<5.0	<5.0	<5.0
XYLENE (TOTAL) ------------	<5.0	<5.0	<5.0
1,3-DICHLOROBENZENE --------	<10	10	<10
1,2-DICHLOROBENZENE --------	<10	<10	<10
1,4-DICHLOROBENZENE --------	<10	<10	<10
DATE RECEIVED:	11-15-90	-----	-----
DATE SAMPLED:	11-14-90	-----	-----
DATE ANALYZED:	11-17-90	11-20-90	-----

HUNTINGDON ANALYTICAL SERVICES
[illegible]RONMENTAL

METHOD 8240
VOLATILE ORGANICS

SAMPLE IDENTIFICATION :	DOWCRAFT SS-1	DOWCRAFT SS-2	DOWCRAFT SS-3	METHOD BLANK	
HAS SAMPLE #90-1658	005	006	007	-----	
COMPOUND	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	RESULT ug/Kg	MDL ug/Kg
CHLOROMETHANE	<1,000	<1,000	<1,000	<1,000	<1,000
BROMOMETHANE	<1,000	<1,000	<1,000	<1,000	<1,000
VINYL CHLORIDE	<1,000	<1,000	<1,000	<1,000	<1,000
CHLOROETHANE	<1,000	<1,000	<1,000	<1,000	<1,000
METHYLENE CHLORIDE	<500	<500	<500	<500	<500
ACETONE	<1,000	<1,000	<1,000	<1,000	<1,000
TRICHLOROFLUOROMETHANE	<1,000	<1,000	<1,000	<1,000	<1,000
CARBON DISULFIDE	<500	<500	<500	<500	<500
1,1-DICHLOROETHENE	<500	<500	<500	<500	<500
[illegible]1-DICHLOROETHANE	<500	<500	<500	<500	<500
[illegible]-DICHLOROETHENE (TOTAL)	<500	<500	<500	<500	<500
CHLOROFORM	<500	<500	<500	<500	<500
1,2-DICHLOROETHANE	<500	<500	<500	<500	<500
2-BUTANONE	<1,000	<1,000	<1,000	<1,000	<1,000
1,1,1-TRICHLOROETHANE	<500	<500	<500	<500	<500
CARBON TETRACHLORIDE	<500	<500	<500	<500	<500
VINYL ACETATE	<1,000	<1,000	<1,000	<1,000	<1,000
BROMODICHLOROMETHANE	<500	<500	<500	<500	<500
1,2-DICHLOROPROPANE	<500	<500	<500	<500	<500
cis-1,3-DICHLOROPROPENE	<500	<500	<500	<500	<500
TRICHLOROETHENE	<500	<500	<500	<500	<500
DIBROMOCHLOROMETHANE	<500	<500	<500	<500	<500
1,1,2-TRICHLOROETHANE	<500	<500	<500	<500	<500
BENZENE	<500	<500	<500	<500	<500
trans-1,3-DICHLOROPROPENE	<500	<500	<500	<500	<500
2-CHLOROETHYLVINYL ETHER	<2,000	<2,000	<2,000	<2,000	<2,000
BROMOFORM	<500	<500	<500	<500	<500
4-METHYL-2-PENTANONE	<1,000	<1,000	<1,000	<1,000	<1,000
2-HEXANONE	<1,000	<1,000	<1,000	<1,000	<1,000
TETRACHLOROETHENE	<500	<500	<500	<500	<500
1,1,2,2-TETRACHLOROETHANE	<500	<500	<500	<500	<500
TOLUENE	<500	<500	<500	<500	<500
CHLOROBENZENE	<500	<500	<500	<500	<500
ETHYL BENZENE	<500	<500	<500	<500	<500
STYRENE	<500	<500	<500	<500	<500
[illegible]LENE (TOTAL)	<500	<500	<500	<500	<500
[illegible],3-DICHLOROBENZENE	<1,000	<1,000	<1,000	<1,000	<1,000
1,2-DICHLOROBENZENE	<1,000	<1,000	<1,000	<1,000	<1,000
1,4-DICHLOROBENZENE	<1,000	<1,000	<1,000	<1,000	<1,000
DATE RECEIVED:	11-15-90	11-15-90	11-15-90	----	----
DATE SAMPLED:	11-14-90	11-14-90	11-14-90	----	----
DATE ANALYZED:	11-17-90	11-17-90	11-17-90	11-17-90	----

HUNTINGTON ANALYTICAL SERVICES
ENVIRONMENTAL

QUALITY CONTROL MS/MSD
METHOD 624/8240
WATERS

SAMPLE #	FILE #
90-1658-001	D2447061
90-1658-001MS	D2447071
90-1658-001MSD	D2447081

HAS SAMPLE #90-1658-001

DATE ANALYZED: 11-17-90

NOTEBOOK: E208-98

COMPOUND	CONC. OF SPIKE (ug/L)	SAMPLE RESULT	CONC. MS	% REC.	CONC. MSD	% REC.	RPD
1,1-DICHLOROETHENE	50	0	58	116	54	108	7.1
TRICHLOROETHENE	50	12	64	104	60	96	6.5
BENZENE	50	0	54	108	51	102	5.7
TOLUENE	50	0	50	100	48	96	4.1
CHLOROBENZENE	50	0	52	104	50	100	3.9

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

Inorganic Wet Chemical Analyses

Analyte: Percent Solid - dry weight

EPA Method No.: 160.3

Sample Date	HAS Sample #90-	Client I.D.	Date Prepared	Date Analyzed	Method Detection Limit	Result	Units	QC in %
11/14/90	1658-005	SS-1	11/21/90	11/26/90	0.1	78.0	% Solid	---
11/14/90	1658-006	SS-2	11/21/90	11/26/90	0.1	79.3	% Solid	---
11/14/90	1658-007	SS-3	11/21/90	11/26/90	0.1	86.8	% Solid	---

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT SS-2
HAS Sample #90-1658-006
Date Sampled: 11/14/90

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/kg	QC
ANTIMONY	6010	11/15/90	11/21/90	12.7	<DL	*95
ARSENIC	7060	11/15/90	11/20/90	2.53	7.09	*95
BERYLLIUM	6010	11/15/90	11/21/90	1.27	<DL	*95
CADMIUM	6010	11/15/90	11/21/90	1.27	<DL	*95
CHROMIUM	6010	11/15/90	11/21/90	2.53	81.4	*95
COPPER	6010	11/15/90	11/21/90	2.53	236	*95
LEAD	7421	11/15/90	11/19/90	127	251	*95
MERCURY	7471	11/21/90	11/21/90	0.13	<DL	*95
NICKEL	6010	11/15/90	11/21/90	10.10	24.9	*95
SELENIUM	7740	11/15/90	11/21/90	1.27	<DL	*95
SILVER	6010	11/15/90	11/21/90	2.53	4.73	*95
THALLIUM	7841	11/15/90	11/21/90	2.53	<DL	*95
ZINC	6010	11/15/90	11/21/90	5.06	630	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT SS-3
HAS Sample #90-1658-007
Date Sampled: 11/14/90

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/kg	QC
ANTIMONY	6010	11/15/90	11/21/90	11.4	<DL	*95
ARSENIC	7060	11/15/90	11/20/90	2.27	10.5	*95
BERYLLIUM	6010	11/15/90	11/21/90	1.14	1.23	*95
CADMIUM	6010	11/15/90	11/21/90	1.14	<DL	*95
CHROMIUM	6010	11/15/90	11/21/90	2.27	115	*95
COPPER	6010	11/15/90	11/21/90	2.27	122	*95
LEAD	6010	11/15/90	11/21/90	10.2	469	*95
MERCURY	7471	11/21/90	11/21/90	0.12	<DL	*95
NICKEL	6010	11/15/90	11/21/90	9.09	40.4	*95
SELENIUM	7740	11/15/90	11/21/90	1.14	<DL	*95
SILVER	6010	11/15/90	11/21/90	2.27	7.45	*95
THALLIUM	7841	11/15/90	11/21/90	2.27	<DL	*95
ZINC	6010	11/15/90	11/21/90	4.55	548	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

ALL SOIL/SLUDGE SAMPLE RESULTS ARE BASED UPON DRY WEIGHT

HUNTINGDON ANALYTICAL SERVICES - CHAIN-OF-CUSTODY RECORD AND ANALYTICAL REQUEST FORM Page 1 of 1

Client Name EMPIRE SOILS INV.
Address 5167 SOUTH PARK
HAMBURG, N.Y.

Client Contact DAVE HARTY
Phone 649-8110

HAS Quote #
P.O. #

Project No.: BTA 90-179A
Project/Site Name: DOWCRAFT
Samplers (Signature): Diane L. Lauzon
HAS Ref. #90- 1653

Sample I.D.	Date	Time	Comp.	Grab	Sample Location	HAS Seq. #	MATRIX	# of Containers	VOL. 40 ML	1L-Plastic					Analysis Requested/ Remarks 40 ML VOL.	1L Plastic
E.S.I-5	11/13/90	3:05		X	E.S.I-5	001	W	3	2	1					[illegible] VOLATILES	METALS
E.S.I-4	11/13/90	3:20		X	E.S.I-4	002	W	3	2	1					"	"
E.S.I-3	11/13/90	3:40		X	E.S.I-3	003	W	3	2	1					"	"
E.S.I-[illegible]	11/13/90	3:55		X	E.S.I-[illegible]	004	W	3	2	1					"	"
						MEB										

Relinquished by:	Date/ Time:	Received by:	Relinquished by:	Date/ Time:	Received by:
D. Lauzon	11/13/90 5:30			11/14/90 1:10	Mary Beaudoin

Relinquished by:	Date/ Time:	Received by:	Relinquished by:	Date/ Time:	Received by:

Relinquished by:	Date/ Time:	Received for Lab by:	Date/ Time:	Remarks:

HAS

HUNTINGDON ANALYTICAL SERVICES
Division of **EMPIRE SOILS INVESTIGATIONS INC.**
PO Box 250 Middleport New York 14105
Tel: (716) 735-3400 FAX (716) 735-3653

Environmental Analytical Report For:

EMPIRE SOILS INVESTIGATIONS, INC. - HAMBURG

PROJECT NAME: DOWCRAFT

HAS Ref. #91-011

January 22, 1991

HAS

HUNTINGDON ANALYTICAL SERVICES
ELAP #10833
ENVIRONMENTAL REPORT

HAS Reference Numbers: #91-011

January 22, 1991

Statement of Work Performed

I hereby declare that the work was performed under my supervision according to the procedures outlined by the following references and that this report provides a correct and faithful record of the results obtained.

- 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act," October 26, 1984 (Federal Register) U. S. Environmental Protection Agency.
- U. S. Environmental Protection Agency, "Test Methods of Evaluating Solid Waste - Physical/Chemical Methods, " Office of Solid Waste and Emergency Response, SW-846, 2nd Edition and 3rd Edition.
- New York State Department of Health, Analytical Toxicology Laboratory Handbook, August 1982.

Katherine A. Syracuse
Lab Director, Environmental

REPORT CODE LEGEND:

<DL = Less than detection limit
ND = Not detected
NA = Not applicable
INP = Information not provided
MB = Method Blank

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD DOH 310-13
PETROLEUM PRODUCTS IN WATER

SAMPLE IDENTIFICATION :	ESI-A	ESI-B	METHOD BLANK
HAS SAMPLE #91-011-	001	002	----
DATE ANALYZED:	1-7-91	1-7-91	1-7-91
COMPOUND	RESULT ug/l	RESULT ug/l	RESULT ug/l
GASOLINE ----------------	ND	ND	ND
KE[illegible]ENE ----------------	<100	<100	<100
FUEL OILS ---------------	<100	<100	<100
LUBE OIL ----------------	ND	ND	ND

ND = NONE DETECTED

UNTINGDON ANALYTICAL SERVICES
NVIRONMENTAL

ETHOD 601
URGEABLE HALOCARBONS

AMPLE IDENTIFICATION :	ESI-A	ESI-B	METHOD BLANK
AS SAMPLE #91-011	001	002	----
ATE ANALYZED:	1-9-91	1-9-91	1-9-91
OMPOUND	RESULT ug/l	RESULT ug/l	RESULT ug/l
HLOROMETHANE -----------	<1.0	<1.0	<1.0
ROMOMETHANE ------------	<1.0	<1.0	<1.0
INYL CHLORIDE ----------	<1.0	<1.0	<1.0
ICHLORODIFLUOROMETHANE -	<1.0		<1.0
HLOROETHANE ------------	<1.0	<1.0	<1.0
ETHYLENE CHLORIDE ------	<0.50	<0.50	<0.50
RICHLOROFLUOROMETHANE --	<0.50	<0.50	<0.50
,1-DICHLOROETHENE ------	<0.50	<0.50	<0.50
,1-DICHLOROETHANE ------	<0.50	<0.50	<0.50
otal-1,2-DICHLOROETHENE	30	<0.50	<0.50
HLOROFORM --------------	<0.50	<0.50	<0.50
,2-DICHLOROETHANE ------	<0.50	<0.50	<0.50
,1,1-TRICHLOROETHANE ---	<0.50	<0.50	<0.50
ARBON TETRACHLORIDE ----	<0.50	<0.50	<0.50
ROMODICHLOROMETHANE ----	<0.50	<0.50	<0.50
,2-DICHLOROPROPANE -----	<0.50	<0.50	<0.50
is-1,3-DICHLOROPROPENE -	<0.50	<0.50	<0.50
RICHLOROETHENE ---------	57	3.9	<0.50
trans-1,3-DICHLOROPROPENE	<0.50	<0.50	<0.50
IBROMOCHLOROMETHANE ----	<0.50	<0.50	<0.50
1,1,2-TRICHLOROETHANE ---	<0.50	<0.50	<0.50
2-CHLOROETHYLVINYL ETHER	<5.0	<5.0	<5.0
ROMOFORM ---------------	<5.0	<5.0	<5.0
1,[illegible],2-TETRACHLOROETHANE	<0.50	<0.50	<0.50
TETRACHLOROETHENE -------	<0.50	<0.50	<0.50
HLOROBENZENE -----------	<0.50	<0.50	<0.50
1,4-DICHLOROBENZENE -----	<1.0	<1.0	<1.0
1,2-DICHLOROBENZENE -----	<1.0	<1.0	<1.0
1,3-DICHLOROBENZENE -----	<1.0	<1.0	<1.0

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 602
PURGEABLE AROMATICS

SAMPLE IDENTIFICATION :	ESI-A	ESI-B	METHOD BLANK
HAS SAMPLE #91-011-	001	002	----
DATE ANALYZED:	1/11/91	1/11/91	1/11/91
COMPOUND	RESULT ug/l	RESULT ug/l	RESULT ug/l
BENZENE -----------------	<0.50	<0.50	<0.50
TOLUENE -----------------	<0.50	<0.50	<0.50
ETHYL BENZENE -----------	<0.50	<0.50	<0.50
TOTAL XYLENES -----------	<1.0	<1.0	<1.0
CHLOROBENZENE -----------	<0.50	<0.50	<0.50
1,4-DICHLOROBENZENE -----	<0.50	<0.50	<0.50
1,3-DICHLOROBENZENE -----	<0.50	<0.50	<0.50
1,2-DICHLOROBENZENE -----	<1.0	<1.0	<1.0

Page 1 of 1

HUNTINGDON ANALYTICAL SERVICES - CHAIN-OF-CUSTODY RECORD AND ANALYTICAL REQUEST FORM

Client Name Dowcraft

Address S. Dow Street

Client Contact David Harty-ESI

Phone 649-8110

HAS Quote # —

P.O. # —

Project No.: BTA-90-179

Project/Site Name: Dowcraft

HAS Ref. ~~###~~ 91-011

Samplers (Signature):

Sample I.D.	Date	Time	Comp.	Grab	Sample Location	HAS Sam. #	MATRIX	# of Containers	950ml amber	40ml VOA					Analysis Requested/ Remarks
ESI-A	1/2/91	1:43		x	ESI-A	001	W	3	1	2					TPH, EPA 624
ESI-B	1/2/91	1:55		x	ESI-B	002	W	3	1	2					TPH, EPA 624
						PUP									

Relinquished by:	Date/ Time:	Received by:
David M Harty	1/3/91 2:48	Pam Pearson
Relinquished by:	Date/ Time:	Received by:

Relinquished by:	Date/ Time:	Received By:
Relinquished by:	Date/ Time:	Received By:

PMSM

HAS

HUNTINGDON ANALYTICAL SERVICES
Division of **EMPIRE SOILS INVESTIGATIONS INC.**
PO Box 250 Middleport New York 14105
Tel: (716) 735-3400 FAX (716) 735-3653

Environmental Analytical Report For:

EMPIRE SOILS INVESTIGATIONS, INC. - HAMBURG

PROJECT NAME: DOWCRAFT

HAS Ref. #91-345

February 28, 1991

HAS

HUNTINGDON ANALYTICAL SERVICES
ELAP #10833
ENVIRONMENTAL REPORT

HAS Reference Numbers: #91-345

February 28, 1991

Statement of Work Performed

I hereby declare that the work was performed under my supervision according to the procedures outlined by the following references and that this report provides a correct and faithful record of the results obtained.

- 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of Pollutants Under the Clean Water Act," October 26, 1984 (Federal Register) U. S. Environmental Protection Agency.
- U. S. Environmental Protection Agency, "Test Methods of Evaluating Solid Waste - Physical/Chemical Methods, " Office of Solid Waste and Emergency Response, SW-846, 2nd Edition and 3rd Edition.
- New York State Department of Health, Analytical Toxicology Laboratory Handbook, August 1982.

Katherine A. Syracuse
Lab Director, Environmental

REPORT CODE LEGEND:

<DL = Less than detection limit
ND = Not detected
NA = Not applicable
INP = Information not provided
MB = Method Blank

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 8010
PURGEABLE HALOCARBONS

	004	005	
SAMPLE IDENTIFICATION :	DRY WELL IN	DRY WELL OUT	METHOD BLANK
HAS SAMPLE #91-345-	001	002	----
DATE ANALYZED :	2/25/91	2/25/91	2/25/91
COMPOUND	RESULT ug/kg	RESULT ug/kg	RESULT ug/kg
CHLOROMETHANE -----------	<100	<100	<100
BROMOMETHANE -----------	<100	<100	<100
VINYL CHLORIDE ----------	<100	[illegible]	[illegible]
DICHLORODIFLUOROMETHANE -	[illegible]	[illegible]	[illegible]
CHLOROETHANE -----------	[illegible]	[illegible]	[illegible]
METHYLENE CHLORIDE -----	[illegible]	[illegible]	[illegible]
TRICHLOROFLUOROMETHANE	[illegible]	[illegible]	[illegible]
1,1-DICHLOROETHENE ------	[illegible]	[illegible]	[illegible]
1,1-DICHLOROETHANE ----	[illegible]	[illegible]	[illegible]
TOTAL 1,2-DICHLOROETHENE	[illegible]	[illegible]	[illegible]
CHLOROFORM --------------	[illegible]	[illegible]	[illegible]
1,2-DICHLOROETHANE ------	<50	<50	<50
1,1,1-TRICHLOROETHANE ---	<50	<50	<50
CARBON TETRACHLORIDE ----	<50	<50	<50
BROMODICHLOROMETHANE ----	<50	<50	<50
1,2-DICHLOROPROPANE -----	<50	<50	<50
cis-1,3-DICHLOROPROPENE -	<50	<50	<50
TRICHLOROETHENE ---------	310	120	<50
trans-1,3-DICHLOROPROPENE	<50	<50	<50
DIBROMOCHLOROMETHANE ----	<50	<50	<50
1,1,2-TRICHLOROETHANE ---	<50	<50	<50
2-CHLOROETHYLVINYL ETHER	<500	<500	<500
BROMOFORM ---------------	<500	<500	<500
1,1,2,2-TETRACHLOROETHANE	<50	<50	<50
TETRACHLOROETHENE -------	<50	<50	<50
CHLOROBENZENE -----------	<50	<50	<50
1,4-DICHLOROBENZENE -----	<100	<100	<100
1,2-DICHLOROBENZENE -----	<100	<100	<100
1,3-DICHLOROBENZENE -----	<100	<100	<100

HUNTINGDON ANALYTICAL SERVICES - CHAIN-OF-CUSTODY RECORD AND ANALYTICAL REQUEST FORM Page 1 of 1

Client Name EMPIRE SOILS INVESTIGATIONS Client Contact DAVE HARTY HAS Quote #

Address S-5161 S. PARK AVE. HAMBURG, NY 14075 Phone 6498110 P.O. #

Project No.: BTA90179B Project/Site Name: POWCRAFT

Samplers (Signature):

HAS Ref. #99- 345

Container Size & Type

Sample I.D.	Date	Time	Comp.	Grab	Sample Location	HAS Seq. #	MATRIX	# of Containers	40 ml VOA Vials	125 glass septum					Analysis Requested/ Remarks
DRYWELL IN	2/20/91	10:45		X	DRYWELL 004	001 A+B	S	2	2						601's
DRYWELL OUT	2/20/91	10:55		X	DRYWELL 005	002	S	1		1					601's

Relinquished by:	Date/ Time	Received by:	Relinquished by:	Date/ Time	Received by:
	2/20/91 11:45				

Relinquished by:	Date/ Time	Received by:	Relinquished by:	Date/ Time	Received by:
	2/21/91 8:10 AM				

ENVIRONMENTAL ANALYTICAL REPORT

REPORT NUMBER 92-412

PREPARED FOR:

EMPIRE SOILS INVESTIGATIONS, INC.
S-5167 S. PARK AVENUE
HAMBURG, NEW YORK 14075

RE: BTA-90-179B, DOWCRAFT

PREPARED BY:

HUNTINGDON ANALYTICAL SERVICES
DIVISION OF EMPIRE SOILS INVESTIGATIONS, INC.
P.O. BOX 250
MIDDLEPORT, NEW YORK 14105

MARCH 24, 1992

HAS

HUNTINGDON ANALYTICAL SERVICES
ELAP #10833
ENVIRONMENTAL REPORT

REPORT NUMBER 92-412

STATEMENT OF WORK PERFORMED

I HEREBY DECLARE THAT THE WORK WAS PERFORMED UNDER MY SUPERVISION ACCORDING TO THE PROCEDURES OUTLINED BY THE FOLLOWING REFERENCES AND THAT THIS REPORT PROVIDES A CORRECT AND FAITHFUL RECORD OF THE RESULTS OBTAINED.

- 40 CFR PART 136, "GUIDELINES ESTABLISHING TEST PROCEDURES FOR THE ANALYSIS OF POLLUTANTS UNDER THE CLEAN WATER ACT", OCTOBER 26, 1984 (FEDERAL REGISTER) U. S. ENVIRONMENTAL PROTECTION AGENCY.
- U.S. ENVIRONMENTAL PROTECTION AGENCY, "TEST METHODS OF EVALUATING SOLID WASTE - PHYSICAL/CHEMICAL METHODS, " OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, SW-846, 2ND EDITION AND 3RD EDITION.
- NEW YORK STATE DEPARTMENT OF HEALTH, ANALYTICAL TOXICOLOGY LABORATORY HANDBOOK, AUGUST 1982.

Richd J. Ronan

RICHARD J. RONAN, PH.D. MARCH 24, 1992
LABORATORY DIRECTOR, ENVIRONMENTAL

REPORT CODE LEGEND:
<DL = LESS THAN DETECTION LIMIT
ND = NOT DETECTED
NA = NOT APPLICABLE
INP = INFORMATION NOT PROVIDED
MB = METHOD BLANK

HAS

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

METHOD 601
PURGEABLE HALOCARBONS

SAMPLE IDENTIFICATION :	METHOD BLANK	ESI-2
HAS SAMPLE #92-412-	----	001
DATE ANALYZED:	3-11-92	3-11-92
COMPOUND	RESULT ug/l	RESULT ug/l
CHLOROMETHANE	<1.0	<100
BROMOMETHANE	<1.0	<100
VINYL CHLORIDE	<1.0	<100
DICHLORODIFLUOROMETHANE	<1.0	<100
CHLOROETHANE	<1.0	<100
METHYLENE CHLORIDE	<0.50	<50
TRICHLOROFLUOROMETHANE	<0.50	<50
1,1-DICHLOROETHENE	<0.50	<50
1,1-DICHLOROETHANE	<0.50	<50
total-1,2-DICHLOROETHENE	<0.50	390 *
CHLOROFORM	<0.50	<50
1,2-DICHLOROETHANE	<0.50	<50
1,1,1-TRICHLOROETHANE	<0.50	<50
CARBON TETRACHLORIDE	<0.50	<50
BROMODICHLOROMETHANE	<0.50	<50
1,2-DICHLOROPROPANE	<0.50	<50
cis-1,3-DICHLOROPROPENE	<0.50	<50
TRICHLOROETHENE	<0.50	3,100 *
trans-1,3 DICHLOROPROPENE	<0.50	<50
DIBROMOCHLOROMETHANE	<0.50	<50
1,1,2-TRICHLOROETHANE	<0.50	<50
2-CHLOROETHYLVINYL ETHER	<5.0	<500
BROMOFORM	<5.0	<500
1,1,2,2-TETRACHLOROETHANE	<0.50	<50
TETRACHLOROETHENE	<0.50	<50
CHLOROBENZENE	<0.50	<50
1,4-DICHLOROBENZENE	<1.0	<100
1,2-DICHLOROBENZENE	<1.0	<100
1,3-DICHLOROBENZENE	<1.0	<100

* CONFIRMED BY GC/MS.

Pa[illegible] of 1

HUNTINGDON ANALYTICAL SERVICES - CHAIN-OF-CUSTODY RECORD ANALYTICAL REQUEST FORM

HAS Quote # 00530

Client Name Empire Soils Investigations, Inc.

Client Contact Kevin J. Shanahan

Address S-5167 South Park Avenue
Hamburg, New York 14075

Phone (716)649-8110

P.O. #

Project No.: BTA 90179B

Project/Site Name: DEWCRAFT

HAS Ref. [illegible]92 412

Samplers (Signature) Kevin Shanahan

Sample I.D.	Date	Time	Comp.	Grab	Sample Location	HAS Seq. #	MATRIX	# of Containers	40ml VOA						Analysis Requested/ Remarks
ESI-2	3/9/91	1510		X	ESI-2	001	W	2	2						TCL Volatiles

Relinquished by: Kevin J. Shanahan	Date/ Time: 3/9/92 1700	Received by:	
Relinquished by:	Date/ Time:	Received by:	
Relinquished by:	Date/ Time:	Received by:	
Relinquished by:	Date/ Time:	Received by:	
	Date/ Time:	Received for Lab by:	Date/ Time:

Remarks:

ENVIRONMENTAL ANALYTICAL REPORT

REPORT NUMBER 92-631

PREPARED FOR:

EMPIRE SOILS INVESTIGATIONS, INC.
S-5167 S. PARK AVENUE
HAMBURG, NEW YORK 14075

RE: BTA-92, DOWCRAFT

PREPARED BY:

HUNTINGDON ANALYTICAL SERVICES
DIVISION OF EMPIRE SOILS INVESTIGATIONS, INC.
P.O. BOX 250
MIDDLEPORT, NEW YORK 14105

MAY 1, 1992

HAS

HUNTINGDON ANALYTICAL SERVICES
ELAP #10833
ENVIRONMENTAL REPORT

REPORT NUMBER 92-631

STATEMENT OF WORK PERFORMED

I HEREBY DECLARE THAT THE WORK WAS PERFORMED UNDER MY SUPERVISION ACCORDING TO THE PROCEDURES OUTLINED BY THE FOLLOWING REFERENCES AND THAT THIS REPORT PROVIDES A CORRECT AND FAITHFUL RECORD OF THE RESULTS OBTAINED.

- 40 CFR PART 136, "GUIDELINES ESTABLISHING TEST PROCEDURES FOR THE ANALYSIS OF POLLUTANTS UNDER THE CLEAN WATER ACT", OCTOBER 26, 1984 (FEDERAL REGISTER) U. S. ENVIRONMENTAL PROTECTION AGENCY.
- U.S. ENVIRONMENTAL PROTECTION AGENCY, "TEST METHODS OF EVALUATING SOLID WASTE - PHYSICAL/CHEMICAL METHODS", OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, SW-846, 2ND EDITION AND 3RD EDITION.
- NEW YORK STATE DEPARTMENT OF HEALTH, ANALYTICAL TOXICOLOGY LABORATORY HANDBOOK, AUGUST 1982.

Richard J. Ronan

RICHARD J. RONAN, PH.D. MAY 1, 1992
LABORATORY DIRECTOR, ENVIRONMENTAL

REPORT CODE LEGEND:

<DL = LESS THAN DETECTION LIMIT
ND = NOT DETECTED
NA = NOT APPLICABLE
INP = INFORMATION NOT PROVIDED
MB = METHOD BLANK

HAS

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

Inorganic Wet Chemical Analyses

Analyte: pH

EPA Method No.: 150.1

Sample Date	HAS Sample #92-	Client I.D.	Date Prepared	Date Analyzed	Method Detection Limit	Result	Units	QC in %
4/16/92	631-001	ESI-10	4/21/92	4/21/92	0.10	7.02	S.U.	95**
4/16/92	631-002	ESI-11	4/21/92	4/21/92	0.10	7.39	S.U.	95**
4/16/92	631-003	ESI-12	4/21/92	4/21/92	0.10	7.34	S.U.	95**
4/16/92	631-004	ESI-20	4/21/92	4/21/92	0.10	7.93	S.U.	95**
4/16/92	631-005	ESI-2	4/21/92	4/21/92	0.10	7.30	S.U.	<1*** 95**
4/16/92	631-006	ESI-3	4/21/92	4/21/92	0.10	7.46	S.U.	95**
4/16/92	631-007	ESI-4	4/21/92	4/21/92	0.10	7.51	S.U.	95**

** This indicates that a 95% confidence limit was achieved with an EPA Quality Control Check analyzed with this sample.

*** This sample was analyzed in duplicate with the RPD indicated above.

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

Inorganic Wet Chemical Analyses

Analyte: pH

EPA Method No.: 150.1

Sample Date	HAS Sample #92-	Client I.D.	Date Prepared	Date Analyzed	Method Detection Limit	Result	Units	QC in %
4/16/92	631-008	ESI-5	4/21/92	4/21/92	0.10	7.77	S.U.	95**
4/16/92	631-009	ESI-9	4/21/92	4/21/92	0.10	7.56	S.U.	95**
4/16/92	631-010	ESI-8	4/21/92	4/21/92	0.10	7.23	S.U.	95**
4/16/92	631-011	ESI-1	4/21/92	4/21/92	0.10	7.27	S.U.	95**
4/16/92	631-012	ESI-7	4/21/92	4/21/92	0.10	7.48	S.U.	95**
4/16/92	631-013	ESI-6	4/21/92	4/21/92	0.10	7.49	S.U.	95**
4/16/92	631-014	ESI-13	4/21/92	4/21/92	0.10	7.14	S.U.	<1*** 95**

** This indicates that a 95% confidence limit was achieved with an EPA Quality Control Check analyzed with this sample.

*** This sample was analyzed in duplicate with the RPD indicated above.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT ESI-10
HAS Sample #92-0631-001
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	0.05	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.13	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	55.1	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	<DL	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	<DL	*95
IRON	6010	4/23/92	4/27/92	0.02	1.07	*95
LEAD	7421	4/23/92	4/28/92	0.005	<DL	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	5.82	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	1.04	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	4.27	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	25.1	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	<DL	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT ESI-11
HAS Sample #92-0631-002
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	3.27	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.18	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	66.9	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	<DL	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	<DL	*95
IRON	6010	4/23/92	4/27/92	0.02	6.45	*95
LEAD	7421	4/23/92	4/28/92	0.01	<DL	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	8.66	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	1.12	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	5.8	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	27.2	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	<DL	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT ESI-12
HAS Sample #92-0631-003
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	3.29	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	0.01	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.11	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	48.5	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	<DL	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	<DL	*95
IRON	6010	4/23/92	4/27/92	0.02	4.92	*95
LEAD	7421	4/23/92	4/28/92	0.005	0.009	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	8.20	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	0.08	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	3.8	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	25.5	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	<DL	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT ESI-2D
HAS Sample #92-0631-004
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	0.62	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.13	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	60.1	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	<DL	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	<DL	*95
IRON	6010	4/23/92	4/27/92	0.02	0.73	*95
LEAD	7421	4/23/92	4/28/92	0.005	<DL	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	11.4	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	0.52	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	21.6	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	21.5	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	<DL	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON **ANALYTICAL** SERVICES

Sample ID: DOWCRAFT ESI-2
HAS Sample #92-0631-005
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	1.71	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.13	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	88.2	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	0.04	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	<DL	*95
IRON	6010	4/23/92	4/27/92	0.02	2.64	*95
LEAD	7421	4/23/92	4/28/92	0.005	0.010	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	11.7	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	0.12	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	5.65	*95
SELENIUM**	7740	4/23/92	4/27/92	0.005	0.008	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	45.7	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	<DL	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

**SELENIUM POST SPIKES WERE OUT OF RANGE FOR THIS SAMPLE. IT WILL BE REANALYZED AND AN AMENDED REPORTED FORWARDED.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT ESI-3
HAS Sample #92-0631-006
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	7.01	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.17	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	76.1	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	0.05	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	0.03	*95
IRON	6010	4/23/92	4/27/92	0.02	10.2	*95
LEAD	7421	4/23/92	4/28/92	0.005	0.040	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	11.5	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	0.52	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	5.8	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	33.2	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	0.09	*95

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT ESI-4
HAS Sample #92-0631-007
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	0.65	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.08	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	65.5	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	<DL	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	<DL	*95
IRON	6010	4/23/92	4/27/92	0.02	0.25	*95
LEAD	7421	4/23/92	4/28/92	0.005	<DL	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	8.73	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	0.01	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	4.3	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	36.4	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	<DL	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT ESI-5
HAS Sample #92-0631-008
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	1.08	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.10	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	53.7	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	<DL	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	<DL	*95
IRON	6010	4/23/92	4/27/92	0.02	1.07	*95
LEAD	7421	4/23/92	4/28/92	0.005	<DL	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	7.43	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	0.06	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	3.1	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	14.7	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	<DL	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT ESI-9
HAS Sample #92-0631-009
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	3.33	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.10	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	71.2	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	<DL	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	<DL	*95
IRON	6010	4/23/92	4/27/92	0.02	3.55	*95
LEAD	7421	4/23/92	4/28/92	0.005	0.008	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	11.0	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	0.17	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	4.1	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	22.5	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	<DL	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT ESI-8
HAS Sample #92-0631-010
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	7.70	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.19	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	44.8	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	<DL	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	<DL	*95
IRON	6010	4/23/92	4/27/92	0.02	8.18	*95
LEAD	7421	4/23/92	4/28/92	0.005	0.011	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	5.41	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	0.59	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	5.0	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	26.4	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	0.03	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES .

Sample ID: DOWCRAFT ESI-1
HAS Sample #92-0631-011
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	MS %REC	MSD %REC	RPD
ALUMINUM	6010	4/23/92	4/27/92	0.03	1.03	*95		
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95		
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	104	104	<1.0
BARIUM	6010	4/23/92	4/27/92	0.01	0.08	87.1	89.1	2.1
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95		
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95		
CALCIUM	6010	4/23/92	4/27/92	0.02	63.8	*95		
CHROMIUM	6010	4/23/92	4/27/92	0.01	<DL	*95		
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95		
COPPER	6010	4/23/92	4/27/92	0.01	<DL	80.0	86.0	7.2
IRON	6010	4/23/92	4/27/92	0.02	1.57	*95		
LEAD	7421	4/23/92	4/28/92	0.005	0.006	104	104	<1.0
MAGNESIUM	6010	4/23/92	4/27/92	0.04	6.69	*95		
MANGANESE	6010	4/23/92	4/27/92	0.01	0.18	*95		
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95	102	<1.0
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95		
POTASSIUM	6010	4/23/92	4/27/92	3.0	4.1	*95		
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95		
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95		
SODIUM	6010	4/23/92	4/27/92	0.05	38.2	*95		
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	90.6	91.2	<1.0
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95		
ZINC	6010	4/23/92	4/27/92	0.02	<DL	81.2	83.0	2.1

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT ESI-7
HAS Sample #92-0631-012
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	10.8	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.33	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	40.6	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	0.02	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	0.02	*95
IRON	6010	4/23/92	4/27/92	0.02	11.3	*95
LEAD	7421	4/23/92	4/28/92	0.005	0.018	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	6.64	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	1.05	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	6.7	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	33.5	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	0.07	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: DOWCRAFT ESI-6
HAS Sample #92-0631-013
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	3.35	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	0.02	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.19	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	53.3	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	0.01	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	0.02	*95
IRON	6010	4/23/92	4/27/92	0.02	6.54	*95
LEAD	7421	4/23/92	4/28/92	0.01	0.02	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	9.66	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	4.43	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	4.6	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	37.4	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	0.02	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES .

Sample ID: DOWCRAFT ESI-13
HAS Sample #92-0631-014
Date Sampled: 4/16/92

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	16.5	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	*95
BARIUM	6010	4/23/92	4/27/92	0.01	0.38	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	68.2	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	0.04	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	0.02	*95
IRON	6010	4/23/92	4/27/92	0.02	18.6	*95
LEAD	7421	4/23/92	4/28/92	0.005	0.03	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	13.8	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	0.61	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	7.3	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	223	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	0.10	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES

Sample ID: METHOD BLANK
HAS Sample #92-0631-MB
Date Sampled: NA

ANALYTE	EPA METHOD	DATE PREPARED	DATE ANALYZED	DETECTION LIMIT	RESULT mg/l	QC
ALUMINUM	6010	4/23/92	4/27/92	0.03	<DL	*95
ANTIMONY	6010	4/23/92	4/27/92	0.05	<DL	*95
ARSENIC	7060	4/23/92	4/24/92	0.01	<DL	*95
BARIUM	6010	4/23/92	4/27/92	0.01	<DL	*95
BERYLLIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CADMIUM	6010	4/23/92	4/27/92	0.005	<DL	*95
CALCIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
CHROMIUM	6010	4/23/92	4/27/92	0.01	<DL	*95
COBALT	6010	4/23/92	4/27/92	0.01	<DL	*95
COPPER	6010	4/23/92	4/27/92	0.01	<DL	*95
IRON	6010	4/23/92	4/27/92	0.02	<DL	*95
LEAD	7421	4/23/92	4/28/92	0.005	<DL	*95
MAGNESIUM	6010	4/23/92	4/27/92	0.04	<DL	*95
MANGANESE	6010	4/23/92	4/27/92	0.01	<DL	*95
MERCURY	7470	4/23/92	4/30/92	0.0002	<DL	*95
NICKEL	6010	4/23/92	4/27/92	0.04	<DL	*95
POTASSIUM	6010	4/23/92	4/27/92	3.0	<DL	*95
SELENIUM	7740	4/23/92	4/27/92	0.005	<DL	*95
SILVER	6010	4/23/92	4/27/92	0.01	<DL	*95
SODIUM	6010	4/23/92	4/27/92	0.05	<DL	*95
THALLIUM	7841	4/23/92	4/28/92	0.01	<DL	*95
VANADIUM	6010	4/23/92	4/27/92	0.02	<DL	*95
ZINC	6010	4/23/92	4/27/92	0.02	<DL	*95

---

*THIS INDICATES A 95% CONFIDENCE LIMIT ACHIEVED WITH AN EPA QUALITY CONTROL SOLUTION ANALYZED ALONG WITH YOUR SAMPLE.

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

EPA METHOD 8240
VOLATILE ORGANICS

SAMPLE IDENTIFICATION :	ESI-10	ESI-11	ESI-12	ESI-2D	ESI-2	ESI-3
HAS SAMPLE #92-631-	001	002	003	004	005	006
COMPOUND	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l
CHLOROMETHANE	<10	<10	<10	<10	<10	<10
BROMOMETHANE	<10	<10	<10	<10	<10	<10
VINYL CHLORIDE	160	87	<10	<10	<10	<10
CHLOROETHANE	<10	<10	<10	<10	<10	<10
METHYLENE CHLORIDE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
ACETONE	<10	<10	<10	<10	28	<10
TRICHLOROFLUOROMETHANE	<10	<10	<10	<10	<10	<10
CARBON DISULFIDE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-DICHLOROETHENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-DICHLOROETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-DICHLOROETHENE (TOTAL)	590	620	160	<5.0	58	310
CHLOROFORM	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-DICHLOROETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2-BUTANONE	<10	<10	<10	<10	<10	<10
1,1,1-TRICHLOROETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CARBON TETRACHLORIDE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
VINYL ACETATE	<10	<10	<10	<10	<10	<10
BROMODICHLOROMETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-DICHLOROPROPANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,3-DICHLOROPROPENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
TRICHLOROETHENE	87	590	650	100	340	2,800
DIBROMOCHLOROMETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-TRICHLOROETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
BENZENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-DICHLOROPROPENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2-CHLOROETHYLVINYL ETHER	<20	<20	<20	<20	<20	<20
BROMOFORM	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4-METHYL-2-PENTANONE	<10	<10	<10	<10	<10	<10
2-HEXANONE	<10	<10	<10	<10	<10	<10
TETRACHLOROETHENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-TETRACHLOROETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
TOLUENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CHLOROBENZENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
ETHYL BENZENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
STYRENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
XYLENE (TOTAL)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10
1,2-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10
1,4-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10
DATE SAMPLED:	4-16-92	4-16-92	4-16-92	4-16-92	4-16-92	4-16-92
DATE RECEIVED:	4-21-92	4-21-92	4-21-92	4-21-92	4-21-92	4-21-92
DATE ANALYZED:	4-27-92	4-27-92	4-27-92	4-27-92	4-27-92	4-27-92

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

EPA METHOD 8240
VOLATILE ORGANICS

SAMPLE IDENTIFICATION :	ESI-4	ESI-5	ESI-9	ESI-8	ESI-1	ESI-7
HAS SAMPLE #92-631-	007	008	009	010	011	012
COMPOUND	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l	RESULT ug/l
CHLOROMETHANE	<10	<10	<10	<10	<10	<10
BROMOMETHANE	<10	<10	<10	<10	<10	<10
VINYL CHLORIDE	<10	<10	<10	<10	<10	<10
CHLOROETHANE	<10	<10	<10	<10	<10	<10
METHYLENE CHLORIDE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
ACETONE	<10	<10	<10	<10	<10	<10
TRICHLOROFLUOROMETHANE	<10	<10	<10	<10	<10	<10
CARBON DISULFIDE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-DICHLOROETHENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-DICHLOROETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	7.1
1,2-DICHLOROETHENE (TOTAL)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CHLOROFORM	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-DICHLOROETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2-BUTANONE	<10	<10	<10	<10	<10	<10
1,1,1-TRICHLOROETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CARBON TETRACHLORIDE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
VINYL ACETATE	<10	<10	<10	<10	<10	<10
BROMODICHLOROMETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-DICHLOROPROPANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
cis-1,3-DICHLOROPROPENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
TRICHLOROETHENE	<5.0	<5.0	<5.0	<5.0	20	50
DIBROMOCHLOROMETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-TRICHLOROETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
BENZENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
trans-1,3-DICHLOROPROPENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
2-CHLOROETHYLVINYL ETHER	<20	<20	<20	<20	<20	<20
BROMOFORM	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
4-METHYL-2-PENTANONE	<10	<10	<10	<10	<10	<10
2-HEXANONE	<10	<10	<10	<10	<10	<10
TETRACHLOROETHENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-TETRACHLOROETHANE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
TOLUENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
CHLOROBENZENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
ETHYL BENZENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
STYRENE	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
XYLENE (TOTAL)	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10
1,2-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10
1,4-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10
DATE SAMPLED:	4-16-92	4-16-92	4-16-92	4-16-92	4-16-92	4-16-92
DATE RECEIVED:	4-21-92	4-21-92	4-21-92	4-21-92	4-21-92	4-21-92
DATE ANALYZED:	4-27-92	4-27-92	4-27-92	4-27-92	4-27-92	4-27-92

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

EPA METHOD 8240
VOLATILE ORGANICS

SAMPLE IDENTIFICATION :	ESI-6	ESI-13	METHOD BLANK	
HAS SAMPLE #92-631-	013	014	—	
COMPOUND	RESULT ug/l	RESULT ug/l	RESULT ug/l	MDL ug/l
CHLOROMETHANE	<10	<10	<10	<10
BROMOMETHANE	<10	<10	<10	<10
VINYL CHLORIDE	100	<10	<10	<10
CHLOROETHANE	<10	<10	<10	<10
METHYLENE CHLORIDE	<5.0	<5.0	<5.0	<5.0
ACETONE	<10	<10	<10	<10
TRICHLOROFLUOROMETHANE	<10	<10	<10	<10
CARBON DISULFIDE	<5.0	<5.0	<5.0	<5.0
1,1-DICHLOROETHENE	8.7	<5.0	<5.0	<5.0
1,1-DICHLOROETHANE	<5.0	12	<5.0	<5.0
1,2-DICHLOROETHENE (TOTAL)	1,900	<5.0	<5.0	<5.0
CHLOROFORM	<5.0	<5.0	<5.0	<5.0
1,2-DICHLOROETHANE	<5.0	<5.0	<5.0	<5.0
2-BUTANONE	<10	<10	<10	<10
1,1,1-TRICHLOROETHANE	5.0	51	<5.0	<5.0
CARBON TETRACHLORIDE	<5.0	<5.0	<5.0	<5.0
VINYL ACETATE	<10	<10	<10	<10
BROMODICHLOROMETHANE	<5.0	<5.0	<5.0	<5.0
1,2-DICHLOROPROPANE	<5.0	<5.0	<5.0	<5.0
cis-1,3-DICHLOROPROPENE	<5.0	<5.0	<5.0	<5.0
TRICHLOROETHENE	13,000	21	<5.0	20
DIBROMOCHLOROMETHANE	<5.0	<5.0	<5.0	<5.0
1,1,2-TRICHLOROETHANE	<5.0	<5.0	<5.0	<5.0
BENZENE	<5.0	<5.0	<5.0	<5.0
trans-1,3-DICHLOROPROPENE	<5.0	<5.0	<5.0	<5.0
2-CHLOROETHYLVINYL ETHER	<20	<20	<20	<20
BROMOFORM	<5.0	<5.0	<5.0	<5.0
4-METHYL-2-PENTANONE	<10	<10	<10	<10
2-HEXANONE	<10	<10	<10	<10
TETRACHLOROETHENE	13	5.0	<5.0	<5.0
1,1,2,2-TETRACHLOROETHANE	<5.0	<5.0	<5.0	<5.0
TOLUENE	<5.0	<5.0	<5.0	<5.0
CHLOROBENZENE	<5.0	<5.0	<5.0	<5.0
ETHYL BENZENE	<5.0	<5.0	<5.0	<5.0
STYRENE	<5.0	<5.0	<5.0	<5.0
XYLENE (TOTAL)	<5.0	<5.0	<5.0	<5.0
1,3-DICHLOROBENZENE	<10	<10	<10	<10
1,2-DICHLOROBENZENE	<10	<10	<10	<10
1,4-DICHLOROBENZENE	<10	<10	<10	<10
DATE SAMPLED:	4-16-92	4-16-92	—	
DATE RECEIVED:	4-21-92	4-21-92	—	
DATE ANALYZED:	4-27-92	4-27-92	4-27-92	

Page ____ of ____

HUNTIN[illegible] ANALYTICAL SERVICES - CHAIN-OF-CUSTODY RECORD AND ANALYTICAL REQUEST FORM

Client Name: Dowcraft Corporation

Address: 93 S. Dow St.
FALCONER, N.Y

Client Contact: Kevin Shanahan

Phone: 649-8110

HAS Quote #: ____

P.O. #: ____

Project No.: BTA-92-?

Project/Site Name: DOWCRAFT

Samplers (Signature): Lori A. Zimmerman

HAS Ref. #: 6.2 631

Sample I.D.	Date	Time	Comp.	Grab	Sample Location	HAS Seq. #	MATRIX	# of Containers	40 ml VOA	1000ml PLASTIC	500 ml PLASTIC				Analysis Requested/ Remarks
ESI-10	4.16.92	10:45		X	SAME AS ID	001	W	4	2	1	1				TCL Volatiles, TAL Metals, P
ESI-11	4.16.92	11:10		X		002	W	4	2	1	1				
ESI-12	4.16.92	11:40		X		003	W	4	2	1	1				
ESI-2D	4.16.92	12:20		X		004	W	4	2	1	1				
ESI-2	4.16.92	12:50		X		005	W	4	2	1	1				
ESI-3	4.16.92	1:20		X		006	W	4	2	1	1				
ESI-4	4.16.92	1:50		X		007	W	4	2	1	1				
ESI-5	4.16.92	2:[illegible]		X		008	W	4	2	1	1				
ESI-9	4.16.92	4:00		X		009	W	4	2	1	1				
ESI-8	4.16.92	4:40		X		010	W	4	2	1	1				
ESI-1	4.16.92	5:[illegible]		X		011	W	4	2	1	1				
ESI-7	4.16.92	5:50		X		012	W	4	2	1	1				
ESI-6	4.16.92	6:15		X		013	W	4	2	1	1				
ESI-13	4.16.92	6:40		X		014	W	4	2	1	1				

Relinquished by:	Date/ Time:	Received by:	Relinquished by:	Date/ Time:	Received By:
Lori A. Zimmerman	4.16.92 9:[illegible]				

Relinquished by:	Date/ Time:	Received by:	Relinquished by:	Date/ Time:	Received By:

Relinquished by:	Date/ Time:	Received for Lab by:	Date/ Time:	Remarks:

ENVIRONMENTAL ANALYTICAL REPORT

REPORT NUMBER: 93-0225

PREPARED FOR:

EMPIRE SOILS INVESTIGATIONS, INC.
S-5167 S. PARK AVENUE
HAMBURG, NEW YORK 14075

RE: BTA-92-226; DOWCRAFT

PREPARED BY:

HUNTINGDON ANALYTICAL SERVICES
DIVISION OF EMPIRE SOILS INVESTIGATIONS, INC.
P.O. BOX 250
MIDDLEPORT, NEW YORK 14105
TELEPHONE: 716/735-3400; FAX: 716/735-3653

MARCH 2, 1993

Huntingdon
Analytical Laboratory

Analytical Services Division

HUNTINGDON ANALYTICAL SERVICES
ELAP #10833
ENVIRONMENTAL REPORT

REPORT NUMBER: 93-0225

STATEMENT OF WORK PERFORMED

I HEREBY DECLARE THAT THE WORK WAS PERFORMED UNDER MY SUPERVISION ACCORDING TO THE PROCEDURES OUTLINED BY THE FOLLOWING REFERENCES AND THAT THIS REPORT PROVIDES A CORRECT AND FAITHFUL RECORD OF THE RESULTS OBTAINED.

- 40 CFR PART 136, "GUIDELINES ESTABLISHING TEST PROCEDURES FOR THE ANALYSIS OF POLLUTANTS UNDER THE CLEAN WATER ACT", OCTOBER 26, 1984 (FEDERAL REGISTER) U. S. ENVIRONMENTAL PROTECTION AGENCY.
- U.S. ENVIRONMENTAL PROTECTION AGENCY, "TEST METHODS OF EVALUATING SOLID WASTE - PHYSICAL/CHEMICAL METHODS", OFFICE OF SOLID WASTE AND EMERGENCY RESPONSE, SW-846, 2ND EDITION AND 3RD EDITION.

THIS REPORT CONTAINS ANALYTICAL DATA BASED ON OUR EXAMINATION OF THE SAMPLE(S) PRESENTED TO US. THIS REPORT CONTAINS (EXCEPT WHERE EXPLICITLY STATED) A COMPLETE ACCOUNT OF THE ANALYSES REQUESTED TO BE PERFORMED ON THE SAMPLE(S). INFORMATION WHICH WAS NOT REQUESTED TO BE REPORTED IS NOT INCLUDED.

A. Clifton

ANDREW P. CLIFTON   MARCH 2, 1993
ENVIRONMENTAL LABORATORY DIRECTOR

REPORT CODE LEGEND:

<DL = LESS THAN DETECTION LIMIT
ND = NOT DETECTED
NA = NOT APPLICABLE
INP = INFORMATION NOT PROVIDED
MB = METHOD BLANK

HUNTINGDON ANALYTICAL SERVICES

Analyte: ALUMINUM (TOTAL)

Date Sampled : 2/11/93
Date Prepared: 2/23/93

SAMPLE ID: HAS #	CLIENT	EPA METHOD	DATE ANALYZED	DET.LIMIT (ug/L)	RESULT ug/L	
93-0225-03	ESI-9	6010	2/26/93	30.0	6,470	*95
93-0225-04	PW-2	6010	2/26/93	30.0	7,520	*95
93-0225-05	PW-2	6010	2/26/93	30.0	847	*95
93-0225-06	PW-2	6010	2/26/93	30.0	1,170	*95
93-0225-07	PW-1	6010	2/26/93	150.0	61,500	*95
93-0225-08	PW-1	6010	2/26/93	30.0	10,100	*95

HUNTINGDON ANALYTICAL SERVICES

Analyte: IRON (TOTAL)

Date Sampled : 2/11/93
Date Prepared: 2/23/93

SAMPLE ID: HAS #	CLIENT	EPA METHOD	DATE ANALYZED	DET.LIMIT (ug/L)	RESULT ug/L
93-0225-03	ESI-9	6010	2/26/93	20.0	5,550
93-0225-04	PW-2	6010	2/26/93	20.0	16,100
93-0225-05	PW-2	6010	2/26/93	20.0	1,610
93-0225-06	PW-2	6010	2/26/93	20.0	2,760
93-0225-07	PW-1	6010	2/26/93	100.0	133,000
93-0225-08	PW-1	6010	2/26/93	20.0	22,400

HUNTINGDON ANALYTICAL SERVICES

Analyte: MANGANESE (TOTAL)

Date Sampled : 2/11/93
Date Prepared: 2/23/93

SAMPLE ID: HAS #	CLIENT	EPA METHOD	DATE ANALYZED	DET.LIMIT (ug/L)	RESULT ug/L
93-0225-03	ESI-9	6010	2/26/93	10.0	326
93-0225-04	PW-2	6010	2/26/93	10.0	2,850
93-0225-05	PW-2	6010	2/26/93	10.0	940
93-0225-06	PW-2	6010	2/26/93	10.0	900
93-0225-07	PW-1	6010	2/26/93	50.0	5,100
93-0225-08	PW-1	6010	2/26/93	10.0	1,690

HUNTINGDON ANALYTICAL SERVICES

Analyte: ALUMINUM (DISSOLVED)

Date Sampled : 2/11/93
Date Prepared: 2/23/93

SAMPLE ID: HAS #	CLIENT	EPA METHOD	DATE ANALYZED	DET.LIMIT (ug/L)	RESULT ug/L
93-0225-03	ESI-9	6010	2/26/93	30.0	<30
93-0225-04	PW-2	6010	2/26/93	30.0	46
93-0225-05	PW-2	6010	2/26/93	30.0	33
93-0225-06	PW-2	6010	2/26/93	30.0	<30
93-0225-07	PW-1	6010	2/26/93	30.0	35
93-0225-08	PW-1	6010	2/26/93	30.0	53

HUNTINGDON ANALYTICAL SERVICES

Analyte: IRON (DISSOLVED)

Date Sampled : 2/11/93
Date Prepared: 2/23/93

SAMPLE ID: HAS #	CLIENT	EPA METHOD	DATE ANALYZED	DET.LIMIT (ug/L)	RESULT ug/L
93-0225-03	ESI-9	6010	2/26/93	20.0	43
93-0225-04	PW-2	6010	2/26/93	20.0	80
93-0225-05	PW-2	6010	2/26/93	20.0	47
93-0225-06	PW-2	6010	2/26/93	20.0	79
93-0225-07	PW-1	6010	2/26/93	20.0	67
93-0225-08	PW-1	6010	2/26/93	20.0	98

HUNTINGDON ANALYTICAL SERVICES

Analyte: MANGANESE (DISSOLVED)

Date Sampled : 2/11/93
Date Prepared: 2/23/93

SAMPLE ID: HAS #	CLIENT	EPA METHOD	DATE ANALYZED	DET.LIMIT (ug/L)	RESULT ug/L
93-0225-03	ESI-9	6010	2/26/93	10.0	11
93-0225-04	PW-2	6010	2/26/93	10.0	2,240
93-0225-05	PW-2	6010	2/26/93	10.0	831
93-0225-06	PW-2	6010	2/26/93	10.0	893
93-0225-07	PW-1	6010	2/26/93	10.0	1,480
93-0225-08	PW-1	6010	2/26/93	10.0	1,140

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

EPA METHOD 8240
VOLATILE ORGANICS

SAMPLE IDENTIFICATION :	EFFLUENT	ES1-6	PW-2 2/10/93 10:44	PW-2 2/11/93 06:30	PW-2 2/11/93 14:22	
HAS SAMPLE #930225	01	02	04	05	06	
COMPOUND	RESULT ug/L	RESULT ug/L	RESULT ug/L	RESULT ug/L	RESULT ug/L	DL ug/L
CHLOROMETHANE	<10	<10	<10	<10	<10	<10
BROMOMETHANE	<10	<10	<10	<10	<10	<10
VINYL CHLORIDE	<10	36	11	<10	<10	<10
CHLOROETHANE	<10	<10	<10	<10	<10	<10
METHYLENE CHLORIDE	<10	<10	<10	<10	<10	<10
ACETONE	<10	<10	<10	<10	<10	<10
TRICHLOROFLUOROMETHANE	<10	<10	<10	<10	<10	<10
CARBON DISULFIDE	<10	<10	<10	<10	<10	<10
1,1-DICHLOROETHENE	<10	<10	<10	<10	<10	<10
1,1-DICHLOROETHANE	<10	<10	<10	<10	<10	<10
1,2-DICHLOROETHENE (TOTAL)	<10	1,900	410	190	190	<10
CHLOROFORM	<10	<10	<10	<10	<10	<10
1,2-DICHLOROETHANE	<10	<10	<10	<10	<10	<10
2-BUTANONE	<10	<10	<10	<10	<10	<10
1,1,1-TRICHLOROETHANE	<10	<10	18	16	15	<10
CARBON TETRACHLORIDE	<10	<10	<10	<10	<10	<10
VINYL ACETATE	<10	<10	<10	<10	<10	<10
BROMODICHLOROMETHANE	<10	<10	<10	<10	<10	<10
1,2-DICHLOROPROPANE	<10	<10	<10	<10	<10	<10
cis-1,3-DICHLOROPROPENE	<10	<10	<10	<10	<10	<10
TRICHLOROETHENE	<10	14,000	22,000	20,000	19,000	<10
DIBROMOCHLOROMETHANE	<10	<10	<10	<10	<10	<10
1,1,2-TRICHLOROETHANE	<10	<10	<10	<10	<10	<10
BENZENE	<10	<10	<10	<10	<10	<10
trans-1,3-DICHLOROPROPENE	<10	<10	<10	<10	<10	<10
2-CHLOROETHYLVINYL ETHER	<10	<10	<10	<10	<10	<10
BROMOFORM	<10	<10	<10	<10	<10	<10
4-METHYL-2-PENTANONE	<10	<10	<10	<10	<10	<10
2-HEXANONE	<10	<10	<10	<10	<10	<10
TETRACHLOROETHENE	<10	17	76	58	54	<10
1,1,2,2-TETRACHLOROETHANE	<10	<10	<10	<10	<10	<10
TOLUENE	<10	<10	<10	<10	<10	<10
CHLOROBENZENE	<10	<10	<10	<10	<10	<10
ETHYL BENZENE	<10	<10	<10	<10	<10	<10
STYRENE	<10	<10	<10	<10	<10	<10
XYLENE (TOTAL)	<10	<10	<10	<10	<10	<10
1,3-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10
1,2-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10
1,4-DICHLOROBENZENE	<10	<10	<10	<10	<10	<10
DATE SAMPLED:	2-11-93	2-10-93	2-10-93	2-11-93	2-11-93	
DATE RECEIVED:	2-12-93	2-12-93	2-12-93	2-12-93	2-12-93	
DATE ANALYZED:	2-16-93	2-16-93	2-16-93	2-16-93	2-16-93	

HUNTINGDON ANALYTICAL SERVICES
ENVIRONMENTAL

EPA METHOD 8240
VOLATILE ORGANICS

SAMPLE IDENTIFICATION :	PW-1 2/9/93 3:30	PW-1 2/9/93 5:39	METHOD BLANK	
HAS SAMPLE #930225	07	08	—	
COMPOUND	RESULT ug/L	RESULT ug/L	RESULT ug/L	DL ug/L
CHLOROMETHANE	<10	<10	<10	<10
BROMOMETHANE	<10	<10	<10	<10
VINYL CHLORIDE	<10	<10	<10	<10
CHLOROETHANE	<10	<10	<10	<10
METHYLENE CHLORIDE	<10	<10	<10	<10
ACETONE	<10	<10	<10	<10
TRICHLOROFLUOROMETHANE	<10	<10	<10	<10
CARBON DISULFIDE	<10	<10	<10	<10
1,1-DICHLOROETHENE	<10	<10	<10	<10
1,1-DICHLOROETHANE	<10	<10	<10	<10
1,2-DICHLOROETHENE (TOTAL)	180	160	<10	<10
CHLOROFORM	<10	<10	<10	<10
1,2-DICHLOROETHANE	<10	<10	<10	<10
2-BUTANONE	<10	<10	<10	<10
1,1,1-TRICHLOROETHANE	<10	<10	<10	<10
CARBON TETRACHLORIDE	<10	<10	<10	<10
VINYL ACETATE	<10	<10	<10	<10
BROMODICHLOROMETHANE	<10	<10	<10	<10
1,2-DICHLOROPROPANE	<10	<10	<10	<10
cis-1,3-DICHLOROPROPENE	<10	<10	<10	<10
TRICHLOROETHENE	5,900	8,100	<10	<10
DIBROMOCHLOROMETHANE	<10	<10	<10	<10
1,1,2-TRICHLOROETHANE	<10	<10	<10	<10
BENZENE	<10	<10	<10	<10
trans-1,3-DICHLOROPROPENE	<10	<10	<10	<10
2-CHLOROETHYLVINYL ETHER	<10	<10	<10	<10
BROMOFORM	<10	<10	<10	<10
4-METHYL-2-PENTANONE	<10	<10	<10	<10
2-HEXANONE	<10	<10	<10	<10
TETRACHLOROETHENE	<10	<10	<10	<10
1,1,2,2-TETRACHLOROETHANE	<10	<10	<10	<10
TOLUENE	<10	<10	<10	<10
CHLOROBENZENE	<10	<10	<10	<10
ETHYL BENZENE	<10	<10	<10	<10
STYRENE	<10	<10	<10	<10
XYLENE (TOTAL)	<10	<10	<10	<10
1,3-DICHLOROBENZENE	<10	<10	<10	<10
1,2-DICHLOROBENZENE	<10	<10	<10	<10
1,4-DICHLOROBENZENE	<10	<10	<10	<10
DATE SAMPLED:	2-09-03	2-09-03	—	
DATE RECEIVED:	2-12-93	2-12-93	—	
DATE ANALYZED:	2-16-93	2-16-93	2-16-93	

EMPIRE SOILS [illegible]ESTIGATIONS, INC.

PAGE OF

HUNTINGDON ANALYTICAL SERVICES - CHAIN-OF-CUSTODY RECORD AND ANALYTICAL REQUEST FORM

Client Name: Empire Soils Inc.
Address: S- 5167 South Park
Hamburg, NY 14075

Client Contact: K. Shanahan
Phone: 649-8110

HAS Quote #
P.O. #

Project No.: BTA 92266

Project/Site Name: Dowcraft

Sampler's Signature: Kevin J. Shanahan

HAS Ref. No. ~~92~~ KP 2/12/93 93-0225

Sample I.D.	Date	Time	Comp or Grab	Sample Location	HAS Seq. #	MATRIX	No. of Cont.	Container Size & Type: 40ml VOA's	500ml plastic							Analysis Requested/Remarks: 40ml VOA	500ml plastic
Effluent	2/11/93	14:25	G	Carbon Effluent	01 A+B	W	2	2								TCL Volatiles	—
ESI-6	2/10/93	0919	G	ESI-6	02	W	2	2								" "	—
ESI-9	2/11/93	1945	G	ESI-9	03	W	2		2								Al, Fe, Mn
PW-2	2/10/93	1044 ~~0630~~	G	PW-2	04	W	4	2	2							TCL Volatiles A+B	Al, Fe, Mn
PW-2	2/11/93	0630	G	PW-2	05	W	4	2	2							"	"
PW-2	2/11/93	1422	G	PW-2	06	W	4	2	2							"	"
PW-1	2/9/93	3:30	G	PW-1	07	W	4	2	2							"	"
PW-1	2/9/93	5:39	G	PW-1	08	W	4	2	2								

Relinquished by: Kevin J. Shanahan
Date/Time: 2/12/93 10Am
Received by: Karen Kremer 11:20A

Relinquished by: Karen Kremer
Date/Time: 2/12/93 12:50
Received by:

Relinquished by:
Date/Time:
Received for Lab by: Pam Pearson
Date/Time: 2/12/93 1230

Remarks: TOTAL + DISSOLVED METALS

C:\QPRO\CO

CC: D. OSCAR
J. KAY.

ADVANCED ENVIRONMENTAL SERVICES
P.O. Box 165
2186 Liberty Drive
Niagara Falls, New York 14304
(716) 283-3120
FAX (716) 283-4727

11/10/93

Destination Fax number: (716) 283-6724

Attention : Lisa Reyes
Conestoga-Rovers & Associates, Inc.
7703 Niagara Falls Blvd.
Niagara Falls, NY 14304

From : Joe Curtis

Number of Pages (including cover sheet): 8

Ref: 348J

Dowcraft/Ellison Bronze
Project #5020

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CLIENT: Conestoga-Rovers & Associates, Inc.
SAMPLE ID: PW3-1-11593
COLLECTION METHOD: GRAB
COLLECTION DATE(S): 11/05/93
SAMPLE TYPE: WATER

AES CLIENT ID: CRANF
AES SAMPLE ID: 348J-1

PROJECT ID: 348J

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
TCL Volatiles					
Chloromethane	ND	µg/L	6000	20000	SW 846 8240
Bromomethane	ND	µg/L	4000	20000	SW 846 8240
Vinyl chloride	ND	µg/L	6000	20000	SW 846 8240
Chloroethane	ND	µg/L	6000	20000	SW 846 8240
Methylene chloride	ND	µg/L	3000	20000	SW 846 8240
Acetone	ND	µg/L	10000	20000	SW 846 8240
Carbon disulfide	ND	µg/L	5000	20000	SW 846 8240
1,1-Dichloroethene	ND	µg/L	6000	20000	SW 846 8240
1,1-Dichloroethane	ND	µg/L	4000	20000	SW 846 8240
trans-1,2-Dichloroethene	ND	µg/L	5000	20000	SW 846 8240
Chloroform	ND	µg/L	8000	20000	SW 846 8240
1,2-Dichloroethane	ND	µg/L	2000	20000	SW 846 8240
2-Butanone	ND	µg/L	10000	20000	SW 846 8240
1,1,1-Trichloroethane	ND	µg/L	5000	20000	SW 846 8240
Carbon tetrachloride	ND	µg/L	6000	20000	SW 846 8240
Vinyl acetate	ND	µg/L	2000	20000	SW 846 8240
Bromodichloromethane	ND	µg/L	2000	20000	SW 846 8240
1,2-Dichloropropane	ND	µg/L	4000	20000	SW 846 8240
cis-1,3-Dichloropropene	ND	µg/L	2000	20000	SW 846 8240
Trichloroethene	320000	µg/L	5000	20000	SW 846 8240
Benzene	ND	µg/L	4000	20000	SW 846 8240
trans-1,3-Dichloropropene	ND	µg/L	2000	20000	SW 846 8240
Chlorodibromomethane	ND	µg/L	2000	20000	SW 846 8240
1,1,2-Trichloroethane	ND	µg/L	2000	20000	SW 846 8240
Bromoform	ND	µg/L	2000	20000	SW 846 8240
4-Methyl-2-pentanone	ND	µg/L	10000	20000	SW 846 8240
2-Hexanone	ND	µg/L	10000	20000	SW 846 8240
Tetrachloroethene	ND	µg/L	5000	20000	SW 846 8240

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CLIENT: Conestoga-Rovers & Associates, Inc.
SAMPLE ID: PW3-1-11593
COLLECTION METHOD: GRAB
COLLECTION DATE(S): 11/05/93
SAMPLE TYPE: WATER

AES CLIENT ID: CRANF
AES SAMPLE ID: 348J-1

PROJECT ID: 348J

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
1,1,2,2-Tetrachloroethane	ND	µg/L	2000	20000	SW 846 8240
Toluene	ND	µg/L	4000	20000	SW 846 8240
Chlorobenzene	ND	µg/L	3000	20000	SW 846 8240
Ethylbenzene	ND	µg/L	6000	20000	SW 846 8240
Styrene	ND	µg/L	3000	20000	SW 846 8240
m-Xylene	ND	µg/L	4000	20000	SW 846 8240
o/p-Xylene	ND	µg/L	7000	20000	SW 846 8240

CLIENT: Conestoga-Rovers & Associates, Inc.
SAMPLE ID: PW3-2-11593
COLLECTION METHOD: GRAB
COLLECTION DATE(S): 11/05/93
SAMPLE TYPE: WATER

AES CLIENT ID: CRAMP
AES SAMPLE ID: 348J-2

PROJECT ID: 348J

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
TCL Volatiles					
Chloromethane	ND	µg/L	6000	20000	SW 846 8240
Bromomethane	ND	µg/L	4000	20000	SW 846 8240
Vinyl chloride	ND	µg/L	6000	20000	SW 846 8240
Chloroethane	ND	µg/L	6000	20000	SW 846 8240
Methylene chloride	ND	µg/L	3000	20000	SW 846 8240
Acetone	ND	µg/L	10000	20000	SW 846 8240
Carbon disulfide	ND	µg/L	5000	20000	SW 846 8240
1,1-Dichloroethene	ND	µg/L	6000	20000	SW 846 8240
1,1-Dichloroethane	ND	µg/L	4000	20000	SW 846 8240
trans-1,2-Dichloroethene	ND	µg/L	5000	20000	SW 846 8240
Chloroform	ND	µg/L	8000	20000	SW 846 8240
1,2-Dichloroethane	ND	µg/L	2000	20000	SW 846 8240
2-Butanone	ND	µg/L	10000	20000	SW 846 8240
1,1,1-Trichloroethane	ND	µg/L	5000	20000	SW 846 8240
Carbon tetrachloride	ND	µg/L	6000	20000	SW 846 8240
Vinyl acetate	ND	µg/L	2000	20000	SW 846 8240
Bromodichloromethane	ND	µg/L	2000	20000	SW 846 8240
1,2-Dichloropropane	ND	µg/L	4000	20000	SW 846 8240
cis-1,3-Dichloropropene	ND	µg/L	2000	20000	SW 846 8240
Trichloroethene	500000	µg/L	5000	20000	SW 846 8240
Benzene	ND	µg/L	4000	20000	SW 846 8240
trans-1,3-Dichloropropene	ND	µg/L	2000	20000	SW 846 8240
Chlorodibromomethane	ND	µg/L	2000	20000	SW 846 8240
1,1,2-Trichloroethane	ND	µg/L	2000	20000	SW 846 8240
Bromoform	ND	µg/L	2000	20000	SW 846 8240
4-Methyl-2-pentanone	ND	µg/L	10000	20000	SW 846 8240
2-Hexanone	ND	µg/L	10000	20000	SW 846 8240
Tetrachloroethene	ND	µg/L	5000	20000	SW 846 8240

CLIENT: Conestoga-Rovers & Associates, Inc.
SAMPLE ID: PW3-2-11593
COLLECTION METHOD: GRAB
COLLECTION DATE(S): 11/05/93
SAMPLE TYPE: WATER

AES CLIENT ID: CRANF
AES SAMPLE ID: 348J-2

PROJECT ID: 348J

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
1,1,2,2-Tetrachloroethane	ND	µg/L	2000	20000	SW 846 8240
Toluene	ND	µg/L	4000	20000	SW 846 8240
Chlorobenzene	ND	µg/L	3000	20000	SW 846 8240
Ethylbenzene	ND	µg/L	6000	20000	SW 846 8240
Styrene	ND	µg/L	3000	20000	SW 846 8240
m-Xylene	ND	µg/L	4000	20000	SW 846 8240
o/p-Xylene	ND	µg/L	7000	20000	SW 846 8240

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CLIENT: Conestoga-Rovers & Associates, Inc.
SAMPLE ID: METHOD BLANK
COLLECTION METHOD:
COLLECTION DATE(S):
SAMPLE TYPE:

AES CLIENT ID: CRANF

PROJECT ID: 348J

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
TCL Volatiles					
Chloromethane	BQL	µg/L	3.0	10	SW 846 8240
Bromomethane	BQL	µg/L	2.0	10	SW 846 8240
Vinyl chloride	BQL	µg/L	3.0	10	SW 846 8240
Chloroethane	BQL	µg/L	3.0	10	SW 846 8240
Methylene chloride	BQL	µg/L	1.5	10	SW 846 8240
Acetone	BQL	µg/L	5.0	10	SW 846 8240
Carbon disulfide	BQL	µg/L	2.5	10	SW 846 8240
1,1-Dichloroethene	BQL	µg/L	3.0	10	SW 846 8240
1,1-Dichloroethane	BQL	µg/L	2.0	10	SW 846 8240
trans-1,2-Dichloroethene	BQL	µg/L	2.5	10	SW 846 8240
Chloroform	BQL	µg/L	4.0	10	SW 846 8240
1,2-Dichloroethane	BQL	µg/L	1.0	10	SW 846 8240
2-Butanone	BQL	µg/L	5.0	10	SW 846 8240
1,1,1-Trichloroethane	BQL	µg/L	2.5	10	SW 846 8240
Carbon tetrachloride	BQL	µg/L	3.0	10	SW 846 8240
Vinyl acetate	BQL	µg/L	1.0	10	SW 846 8240
Bromodichloromethane	BQL	µg/L	1.0	10	SW 846 8240
1,2-Dichloropropane	BQL	µg/L	2.0	10	SW 846 8240
cis-1,3-Dichloropropene	BQL	µg/L	1.0	10	SW 846 8240
Trichloroethene	BQL	µg/L	2.5	10	SW 846 8240
Benzene	BQL	µg/L	2.0	10	SW 846 8240
trans-1,3-Dichloropropene	BQL	µg/L	1.0	10	SW 846 8240
Chlorodibromomethane	BQL	µg/L	1.0	10	SW 846 8240
1,1,2-Trichloroethane	BQL	µg/L	1.0	10	SW 846 8240
Bromoform	BQL	µg/L	1.0	10	SW 846 8240
4-Methyl-2-pentanone	BQL	µg/L	5.0	10	SW 846 8240
2-Hexanone	BQL	µg/L	5.0	10	SW 846 8240
Tetrachloroethene	BQL	µg/L	2.5	10	SW 846 8240

ADVANCED ENVIRONMENTAL SERVICES LABORATORY REPORT

CLIENT: Conestoga-Rovers & Associates, Inc.
SAMPLE ID: METHOD BLANK
COLLECTION METHOD:
COLLECTION DATE(S):
SAMPLE TYPE:

AES CLIENT ID: CRANF

PROJECT ID: 348J

Analytical Parameters	Analytical Results	Units	Method Detection Limits	Practical Quantifiable Limit	Method
1,1,2,2-Tetrachloroethane	BQL	µg/L	1.0	10	SW 846 8240
Toluene	BQL	µg/L	2.0	10	SW 846 8240
Chlorobenzene	BQL	µg/L	1.5	10	SW 846 8240
Ethylbenzene	BQL	µg/L	3.0	10	SW 846 8240
Styrene	BQL	µg/L	1.5	10	SW 846 8240
m-Xylene	BQL	µg/L	2.0	10	SW 846 8240
o/p-Xylene	BQL	µg/L	3.5	10	SW 846 8240

ADVANCED ENVIRONMENTAL SERVICES, INC.
QUALITY CONTROL REPORT

CLIENT: Conestoga-Rovers & Associates, Inc.

AES CLIENT ID: CRANF
PROJECT ID: 348J

ACCURACY

Analytical Parameter(s)	Method	Sample ID	Type	Percent Recovery
1,1-Dichloroethene	SW 846 8240	---	Independent Standard	102
1,1-Dichloroethene	SW 846 8240	---	Independent Standard	102
Trichloroethene	SW 846 8240	---	Independent Standard	104
Trichloroethene	SW 846 8240	---	Independent Standard	104
Benzene	SW 846 8240	---	Independent Standard	104
Benzene	SW 846 8240	---	Independent Standard	104
Toluene	SW 846 8240	---	Independent Standard	102
Toluene	SW 846 8240	---	Independent Standard	102
Chlorobenzene	SW 846 8240	---	Independent Standard	110
Chlorobenzene	SW 846 8240	---	Independent Standard	110

ADVANCED ENVIRONMENTAL SERVICES, INC.
QUALITY CONTROL REPORT

CLIENT: Conestoga-Rovers & Associates, Inc.

AES CLIENT ID: CRANF
PROJECT ID: 348J

ACCURACY - SURROGATE RECOVERIES

Analytical Parameter(s)	Method	Sample ID	Acceptable Range	Percent Recovery
1,2-Dichloroethane-d4	SW 846 8240	348J-1	81-106	101
1,2-Dichloroethane-d4	SW 846 8240	348J-2	81-106	102
1,2-Dichloroethane-d4	SW 846 8240	BLANK	81-106	95
Toluene-d8	SW 846 8240	348J-1	90-108	104
Toluene-d8	SW 846 8240	348J-2	90-108	104
Toluene-d8	SW 846 8240	BLANK	90-108	104
4-Bromofluorobenzene	SW 846 8240	348J-1	91-105	100
4-Bromofluorobenzene	SW 846 8240	348J-2	91-105	101
4-Bromofluorobenzene	SW 846 8240	BLANK	91-105	96

CRA
2055 Niagara Falls Boulevard
Suite Three
Niagara Falls, NY 14304
716-297-6150

MEMO

TO: Jim Kay

REFERENCE NO.: 5020

FROM: Susan Scrocchi/js/2

DATE: June 16, 1997

RE: Analytical Data Assessment and Validation
Identification of Chemicals of Concern
Dowcraft Corporation, Falconer, New York

C.C.: C. Dunnigan, D. Oscar

1.0 OVERVIEW

The following details the assessment and validation of analytical results for four groundwater samples collected in May 1997 at the Dowcraft Corporation located in Falconer, New York. A sampling and analysis summary is presented in Table 1. The samples were submitted for Target Compound List (TCL) semi-volatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), and Target Analyte List (TAL) metals.

Methods of analyses were referenced from "Test Methods for Evaluating Solid Waste", SW-846, 3rd Edition, 1986 (with revisions) as follows:

Parameter	*Methodology*
TCL SVOCs	8270
PCBs	8080
TAL Metals	6010/7470

The analytical results are summarized in Table 2. The final sample results and supporting Quality Assurance/Quality Control (QA/QC) results were reported by the laboratory. The Analytical Data Assessment and Validaiton was performed based on information obtained from the Chain of Custody forms, finished report forms, blank data, duplicate data, and recovery data for matrix, surrogate, and blank spikes. The QA/QC criteria used to assess these data are outlined in the following:

i) "Test Methods for Evaluating Solid Waste-Physical/Chemical Methods", USEPA SW-846, 3rd Edition, 1986 (with revisions);

ii) "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review", February 1994, EPA 540/R-94/012; and

iii) "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review", February 1994, EPA 540/R-94/013.

2.0 SAMPLE HOLDING TIMES

The sample holding time criteria for this program were as follows:

Parameter	*Holding Time*
SVOCs	7 days from collection to extraction 40 days from extraction to analysis
PCBs	7 days from collection to extraction 40 days from extraction to analysis
Metals (Except Mercury)	6 months from collection to analysis
Mercury	28 days from collection to analysis

All sample preparation and/or analyses were performed within the specified holding times.

3.0 SURROGATE SPIKE RECOVERY - ORGANICS

Surrogate compounds are added to all SVOC and PCB samples prior to preparative extraction to assess the effects of individual sample matrices on analytical efficiency.

The appropriate surrogate compounds were added to all samples and all recoveries were acceptable, demonstrating good analytical efficiency.

4.0 BLANK SPIKE (BS) ANALYSES

BSs are prepared and analyzed as samples to assess the analytical efficiencies of the methods employed, independent of sample matrix effects. BSs were prepared and analyzed for all parameters.

All recoveries were acceptable.

5.0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES - ORGANICS

MS/MSD samples were prepared and analyzed for SVOCs and PCBs to assess analytical accuracy and precision. For this study, MS/MSD analyses were performed on sample ESI-2-051997-DJO.

All recoveries were acceptable demonstrating good analytical accuracy and precision.

6.0 MATRIX SPIKE - METALS

To evaluate the effects of sample matrices on the accuracy of a particular analysis, samples are spiked with a known concentration of the analytes of concern and analyzed as MS samples.

MS analyses were performed on sample ESI-2-051997-DJO. All recoveries were acceptable with the exception of the iron and calcium results which could not be assessed due to the concentrations of these analytes being significantly higher than the spiking levels. Accuracy for iron and calcium was demonstrated by acceptable blank spike recoveries.

7.0 DUPLICATE SAMPLE ANALYSES - METALS

For inorganic parameters, analytical precision is evaluated based on the analysis of duplicate samples. Laboratory duplicate results significantly higher than the Contract Required Detection Limit (CRDL) were assessed against a relative percent difference (RPD) criteria of 20 percent. Sample results near the CRDL were evaluated based on the difference between the sample and duplicate results.

All duplicate analyses showed acceptable precision.

8.0 LABORATORY BLANK ANALYSES

Contamination introduced by the laboratory is characterized by the analysis of laboratory blanks. These blanks are prepared from deionized water and are extracted and/or analyzed with each batch of samples.

Laboratory blanks were prepared and analyzed at the required frequency for all parameters. All method blanks were non-detect for the compounds of interest.

9.0 SAMPLE QUANTITATION - SVOCs

Sample results were quantitated using internal standards (IS) as specified in the analytical methods. All IS recoveries were acceptable.

10.0 FIELD QA/QC - FIELD DUPLICATE SAMPLES

To assess overall analytical and sampling precision, field duplicate samples identified as ESI-11-051997-DJO and ESI-15-051997-DJO, were submitted "blind" to the laboratory for analysis. A comparison of the results showed good analytical and sampling precision with the exception of some variability in the metals results. The aluminum, iron, lead, and zinc results for well ESI-11, and its field duplicate, were qualified as estimated to reflect the indicated variability (see Table 3).

11.0 CONCLUSION

Based on the QC review, the data provided were judged to be acceptable with the qualifications noted.

TABLE 1

SAMPLING AND ANALYSIS SUMMARY
DOWCRAFT CORPORATION
MAY 1997

Sample I.D.	*Location*	*Analytical Parameters*	*Notes*
ESI-2-051997-DJO	ESI-2	TCL SVOCs, PCBs, TAL Metals	MS/MSD
ESI-13-051997-DJO	ESI-7	TCL SVOCs, PCBs, TAL Metals	
ESI-11-051997-DJO	ESI-11	TCL SVOCs, PCBs, TAL Metals	
ESI-15-051997-DJO	ESI-11	TCL SVOCs, PCBs, TAL Metals	Field Duplicate of ESI-11

Notes:

MS	Matrix Spike.
MSD	Matrix Spike Duplicate.
PCBs	Polychlorinated Biphenyls.
SVOCs	Semi-Volatile Organic Compounds.
TAL	Target Analyte List.
TCL	Target Compound List.

TABLE 2

ANALYTICAL RESULTS SUMMARY
DOWCRAFT CORPORATION
MAY 1997

Sample ID:	*ESI-2-051997-DJO*	*ESI-13-051997-DJO*	*ESI-11-051997-DJO*	*ESI-15-051997-DJO* *(Duplicate of ESI-11)*
Location:	*ESI-2*	*ESI-7*	*ESI-11*	
Collection Date:	*05/19/97*	*05/19/97*	*05/19/97*	*05/19/97*
TCL Semi-Volatiles (µg/L)				
Acenaphthene	5.0 U	5.0 U	5.0 U	5.0 U
Acenaphthylene	5.0 U	5.0 U	5.0 U	5.0 U
Anthracene	5.0 U	5.0 U	5.0 U	5.0 U
Benzo(a)anthracene	5.0 U	5.0 U	5.0 U	5.0 U
Benzo(a)pyrene	5.0 U	5.0 U	5.0 U	5.0 U
Benzo(b)fluoranthene	5.0 U	5.0 U	5.0 U	5.0 U
Benzo(g,h,i)perylene	5.0 U	5.0 U	5.0 U	5.0 U
Benzo(k)fluoranthene	5.0 U	5.0 U	5.0 U	5.0 U
Benzyl alcohol	5.0 U	5.0 U	5.0 U	5.0 U
Butyl benzyl phthalate	5.0 U	5.0 U	5.0 U	5.0 U
Di-n-butyl phthalate	5.0 U	5.0 U	5.0 U	5.0 U
Carbazole	5.0 U	5.0 U	5.0 U	5.0 U
Indeno(1,2,3-cd)pyrene	5.0 U	5.0 U	5.0 U	5.0 U
4-Chloroaniline	5.0 U	5.0 U	5.0 U	5.0 U
bis(2-Chloroethoxy)methane	5.0 U	5.0 U	5.0 U	5.0 U
bis(2-Chloroethyl)ether	5.0 U	5.0 U	5.0 U	5.0 U
2-Chloronaphthalene	5.0 U	5.0 U	5.0 U	5.0 U
2-Chlorophenol	10 U	10 U	10 U	10 U
2,2'-oxybis(1-Chloropropane)	5.0 U	5.0 U	5.0 U	5.0 U
Chrysene	5.0 U	5.0 U	5.0 U	5.0 U
Dibenzo(a,h)anthracene	5.0 U	5.0 U	5.0 U	5.0 U
Dibenzofuran	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U
3,3'-Dichlorobenzidine	5.0 U	5.0 U	5.0 U	5.0 U
2,4-Dichlorophenol	10 U	10 U	10 U	10 U
Diethylphthalate	5 U	5 U	5 U	5 U
Dimethylphthalate	5 U	5 U	5 U	5 U
2,4-Dimethylphenol	10 U	10 U	10 U	10 U
2,4-Dinitrophenol	20 U	20 U	20 U	20 U
2,4-Dinitrotoluene	5.0 U	5.0 U	5.0 U	5.0 U
2,6-Dinitrotoluene	5.0 U	5.0 U	5.0 U	5.0 U
bis(2-Ethylhexyl)phthalate	9.1	5.0 U	5.0 U	5.0 U
Fluoranthene	5.0 U	5.0 U	5.0 U	5.0 U
Fluorene	5.0 U	5.0 U	5.0 U	5.0 U
Hexachlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U
Hexachlorobutadiene	5.0 U	5.0 U	5.0 U	5.0 U
Hexachlorocyclopentadiene	5.0 U	5.0 U	5.0 U	5.0 U
Hexachloroethane	5.0 U	5.0 U	5.0 U	5.0 U
Isophorone	5.0 U	5.0 U	5.0 U	5.0 U
2-Methylnaphthalene	10 U	10 U	10 U	10 U
2-Methylphenol	10 U	10 U	10 U	10 U
4,6-Dinitro-2-methylphenol	20 U	20 U	20 U	20 U
4-Chloro-3-methylphenol	10 U	10 U	10 U	10 U
4-Methylphenol	10 U	10 U	10 U	10 U

TABLE 2

ANALYTICAL RESULTS SUMMARY
DOWCRAFT CORPORATION
MAY 1997

Sample ID:	*ESI-2-051997-DJO*	***ESI-13-051997-DJO***	***ESI-11-051997-DJO***	***ESI-15-051997-DJO*** ***(Duplicate of ESI-11)***
Location:	*ESI-2*	*ESI-7*	*ESI-11*	
Collection Date:	05/19/97	05/19/97	05/19/97	05/19/97
TCL Semi-Volatiles (μg/L) (Con't.d)				
Naphthalene	5.0 U	5.0 U	5.0 U	5.0 U
2-Nitroaniline	5.0 U	5.0 U	5.0 U	5.0 U
3-Nitroaniline	5.0 U	5.0 U	5.0 U	5.0 U
4-Nitroaniline	5.0 U	5.0 U	5.0 U	5.0 U
Nitrobenzene	5.0 U	5.0 U	5.0 U	5.0 U
2-Nitrophenol	10 U	10 U	10 U	10 U
4-Nitrophenol	20 U	20 U	20 U	20 U
N-nitrosodimethylamine	5.0 U	5.0 U	5.0 U	5.0 U
N-nitrosodiphenylamine	5.0 U	5.0 U	5.0 U	5.0 U
Di-n-octyl phthalate	5.0 U	5.0 U	5.0 U	5.0 U
Pentachlorophenol	20 U	20 U	20 U	20 U
Phenanthrene	5.0 U	5.0 U	5.0 U	5.0 U
Phenol	10 U	10 U	10 U	10 U
4-Bromophenyl phenyl ether	5.0 U	5.0 U	5.0 U	5.0 U
4-Chlorophenyl phenyl ether	5.0 U	5.0 U	5.0 U	5.0 U
N-Nitroso-di-n-propylamine	5.0 U	5.0 U	5.0 U	5.0 U
Pyrene	5.0 U	5.0 U	5.0 U	5.0 U
1,2,4-Trichlorobenzene	5.0 U	5.0 U	5.0 U	5.0 U
2,4,5-Trichlorophenol	10 U	10 U	10 U	10 U
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U
PCBs (μg/L)				
PCB 1016	0.50 U	0.50 U	0.50 U	0.50 U
PCB 1221	0.50 U	0.50 U	0.50 U	0.50 U
PCB 1232	0.50 U	0.50 U	0.50 U	0.50 U
PCB 1242	0.50 U	0.50 U	0.50 U	0.50 U
PCB 1248	0.50 U	0.50 U	0.50 U	0.50 U
PCB 1254	0.50 U	0.50 U	0.50 U	0.50 U
PCB 1260	0.50 U	0.50 U	0.50 U	0.50 U
TAL Metals (μg/L)				
Aluminum	4920	799	4170 J	1420 J
Antimony	60.0 U	60.0 U	60.0 U	60.0 U
Arsenic	10.0 U	10.0 U	10.0 U	10.0 U
Barium	201	69.5	263	208
Beryllium	5.0 U	5.0 U	5.0 U	5.0 U
Cadmium	5.0 U	5.0 U	5.0 U	5.0 U
Calcium	75600	42700	75700	72500
Chromium	29.7	10.0 U	10.0 U	10.0 U
Cobalt	50.0 U	50.0 U	50.0 U	50.0 U
Copper	26.4	20.0 U	20.0 U	20.0 U
Iron	8200	869	10300 J	5590 J
Lead	31.8	5.0 U	15.0 J	10.3 J
Magnesium	10300	4580	9640	8600
Manganese	236	81.2	1280	1190
Nickel	40.0 U	40.0 U	40.0 U	40.0 U

TABLE 2

ANALYTICAL RESULTS SUMMARY
DOWCRAFT CORPORATION
MAY 1997

Sample ID:	*ESI-2-051997-DJO*	*ESI-13-051997-DJO*	*ESI-11-051997-DJO*	*ESI-15-051997-DJO* (*Duplicate of ESI-11*)
Location:	*ESI-2*	*ESI-7*	*ESI-11*	
Collection Date:	*05/19/97*	*05/19/97*	*05/19/97*	*05/19/97*
TAL Metals (µg/L) (Cont'd.)				
Potassium	4650	2400	5120	4180
Selenium	5.0 U	5.0 U	5.0 U	5.0 U
Silver	10.0 U	10.0 U	10.0 U	10.0 U
Sodium	25300	14800	17900	17700
Thallium	10.0 U	10.0 U	10.0 U	10.0 U
Vanadium	50.0 U	50.0 U	50.0 U	50.0 U
Zinc	85.0	19.4	51.3 J	26.4 J
Mercury (µg/L)	0.30 U	0.30 U	0.30 U	0.30 U

Notes:

J	Associated value is estimated.
NA	Not Available.
PCB	Polychlorinated Biphenyls.
TAL	Target Analyte List.
TCL	Target Compound List.
U	Non-detect at associated value.

TABLE 3

QUALIFIED SAMPLE DATA DUE TO VARIABILITY IN FIELD DUPLICATE RESULTS
DOWCRAFT CORPORATION
MAY 1997

		Original		*Duplicate*				
Parameter	*Analyte*	*Sample ID*	*Result*	*Sample ID*	*Result*	*RPD*	*Units*	*Qualifier*
Metals	Aluminum	ESI-11-051997-DJO	4.17	ESI-15-051997-DJO	1.42	98	mg/L	J
	Iron	ESI-11-051997-DJO	10.3	ESI-15-051997-DJO	5.59	59	mg/L	J
	Lead	ESI-11-051997-DJO	0.015	ESI-15-051997-DJO	0.0103	37	mg/L	J
	Zinc	ESI-11-051997-DJO	0.0513	ESI-15-051997-DJO	0.0264	64	mg/L	J

Notes:

J	Associated value is estimated.
RPD	Relative Percent Difference.

N.F. FILE COPY

ANALYTICAL DATA ASSESSMENT AND VALIDATION
SUPPLEMENTAL RI/FS DOCUMENTATION

DOWCRAFT CORPORATION
FALCONER, NEW YORK
DECEMBER 1999

TABLE 2B
ANALYTICAL RESULTS SUMMARY - SOILS
SUPPLEMENTAL RI/FS DOCUMENTATION
DOWCRAFT CORPORATION
FALCONER, N.Y.
NOVEMBER 1999 - JANUARY 2000

Sample Location:		TP-5
Sample ID:		S-CFD-007
Sample Date:		11/19/1999
Parameters	Units	
Volatile Organics		
cis-1,2-Dichloroethene	ug/kg	5.6 U
trans-1,2-Dichloroethene	ug/kg	5.6 UJ
Acetone	ug/kg	22 U
Benzene	ug/kg	5.6 U
Bromodichloromethane	ug/kg	5.6 U
Bromoform	ug/kg	5.6 U
Bromomethane	ug/kg	11 UJ
2-Butanone	ug/kg	22 U
Carbon disulfide	ug/kg	5.6 U
Carbon tetrachloride	ug/kg	5.6 U
Chlorobenzene	ug/kg	5.6 U
Dibromochloromethane	ug/kg	5.6 U
Chloroethane	ug/kg	11 U
Chloroform	ug/kg	5.6 U
Chloromethane	ug/kg	11 U
1,1-Dichloroethane	ug/kg	5.6 U
1,2-Dichloroethane	ug/kg	5.6 U
1,1-Dichloroethene	ug/kg	5.6 U
1,2-Dichloropropane	ug/kg	5.6 U
cis-1,3-Dichloropropene	ug/kg	5.6 U
trans-1,3-Dichloropropene	ug/kg	5.6 U
Ethylbenzene	ug/kg	5.6 U
2-Hexanone	ug/kg	22 U
Methylene chloride	ug/kg	5.6 UJ
4-Methyl-2-pentanone	ug/kg	22 U
Styrene	ug/kg	5.6 U
1,1,2,2-Tetrachloroethane	ug/kg	5.6 U
Tetrachloroethene	ug/kg	5.6 U
Toluene	ug/kg	5.6 U
1,1,1-Trichloroethane	ug/kg	5.6 U
1,1,2-Trichloroethane	ug/kg	5.6 U
Trichloroethene	ug/kg	2.2 J
Vinyl chloride	ug/kg	11 U
Xylenes (total)	ug/kg	5.6 U

TABLE 2B
ANALYTICAL RESULTS SUMMARY - SOILS
SUPPLEMENTAL RI/FS DOCUMENTATION
DOWCRAFT CORPORATION
FALCONER, N.Y.
NOVEMBER 1999 - JANUARY 2000

Notes

U - Non-detect at the associated value.

J - Associated value is estimated.

R - Rejected.

TABLE 3

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING INITIAL CALIBRATION RESULTS
SUPPLEMENTAL RI/FS DOCUMENTATION
DOWCRAFT CORPORATION
FALCONER, NEW YORK
DECEMBER 1999

Parameter	*Compound*	*Calibration Date*	*RRF*	*Associated Sample ID*	*Sample Results*	*Units*	*Qualifier*
VOCs	Acetone	08/26/99	0.043	S-010300-DW	24U	µg/Kg	R

Notes:

R	Rejected.
RRF	Relative Response Factor.
U	Non-detect at associated value.
VOCs	Volatile Organic Compounds.

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING CONTINUING CALIBRATION RESULTS
SUPPLEMENTAL RI/FS DOCUMENTATION
DOWCRAFT CORPORATION
FALCONER, NEW YORK
DECEMBER 1999

Parameter	*Calibration Date*	*Compound*	*RRF*	*%D*	*Associated Sample ID*	*Sample Results*	*Units*	*Qualifier*
VOCs	11/22/99	Bromomethane	>0.050	24	S-CDF-001	13 U	µg/Kg	J
					S-CDF-002	11 U	µg/Kg	J
					S-CDF-003	12 U	µg/Kg	J
					S-CDF-004	12 U	µg/Kg	J
					S-CDF-005	12 U	µg/Kg	J
					S-CDF-006	11 U	µg/Kg	J
VOCs	11/22/99	Chloroethane	>0.050	23	S-CDF-001	13 U	µg/Kg	J
					S-CDF-002	11 U	µg/Kg	J
					S-CDF-003	12 U	µg/Kg	J
					S-CDF-004	12 U	µg/Kg	J
					S-CDF-005	12 U	µg/Kg	J
					S-CDF-006	11 U	µg/Kg	J
VOCs	11/23/99	Bromomethane	>0.050	30	S-CDF-007	11 U	µg/Kg	J
VOCs	11/23/99	Methylene chloride	>0.050	24	S-CDF-007	5.6 U	µg/Kg	J
VOCs	11/23/99	trans-1,2-Dichloroethene	>0.050	21	S-CDF-007	5.6 U	µg/Kg	J
VOCs	01/06/00	Chloromethane	>0.050	29	S-010300-DW	12 U	µg/Kg	J
VOCs	01/06/00	2-Butanone	>0.050	24	S-010300-DW	24 U	µg/Kg	J
VOCs	12/06/99 (05:33)	Acetone	0.033	35	GW-RW-011	20 U	µg/L	R
					GW-RW-012	20 U	µg/L	R
					GW-RW-013	20 U	µg/L	R
					GW-RW-014	20 U	µg/L	R
					GW-RW-015	20 U	µg/L	R

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING CONTINUING CALIBRATION RESULTS
SUPPLEMENTAL RI/FS DOCUMENTATION
DOWCRAFT CORPORATION
FALCONER, NEW YORK
DECEMBER 1999

Parameter	*Calibration Date*	*Compound*	*RRF*	*%D*	*Associated Sample ID*	*Sample Results*	*Units*	*Qualifier*
VOCs	12/06/99 (05:33)	Chloroethane	>0.050	56	GW-RW-011	10 U	μg/L	J
					GW-RW-012	10 U	μg/L	J
					GW-RW-013	10 U	μg/L	J
					GW-RW-014	10 U	μg/L	J
					GW-RW-015	10 U	μg/L	J
VOCs	12/06/99 (05:33)	2-Butanone	>0.050	30	GW-RW-011	20 U	μg/L	J
					GW-RW-012	20 U	μg/L	J
					GW-RW-013	20 U	μg/L	J
					GW-RW-014	20 U	μg/L	J
					GW-RW-015	20 U	μg/L	J
VOCs	12/06/99 (05:33)	2-Hexanone	>0.050	30	GW-RW-011	20 U	μg/L	J
					GW-RW-012	20 U	μg/L	J
					GW-RW-013	20 U	μg/L	J
					GW-RW-014	20 U	μg/L	J
					GW-RW-015	20 U	μg/L	J
VOCs	12/06/99 (21:08)	Acetone	0.044	<20	GW-RW-001	20 U	μg/L	R
					GW-RW-002	1000 U	μg/L	R
					GW-RW-003	1000 U	μg/L	R
					GW-RW-004	20 U	μg/L	R
					GW-RW-005	20 U	μg/L	R
					GW-RW-006	200 U	μg/L	R
					GW-RW-008	20 U	μg/L	R

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING CONTINUING CALIBRATION RESULTS
SUPPLEMENTAL RI/FS DOCUMENTATION
DOWCRAFT CORPORATION
FALCONER, NEW YORK
DECEMBER 1999

Parameter	*Calibration Date*	*Compound*	*RRF*	*%D*	*Associated Sample ID*	*Sample Results*	*Units*	*Qualifier*
VOCs	12/06/99 (21:08)	Chloroethane	>0.050	44	GW-RW-001	10 U	µg/L	J
					GW-RW-002	500 U	µg/L	J
					GW-RW-003	500 U	µg/L	J
					GW-RW-004	10 U	µg/L	J
					GW-RW-005	10 U	µg/L	J
					GW-RW-006	100 U	µg/L	J
					GW-RW-008	10 U	µg/L	J
					GW-RW-010	10 U	µg/L	J

Notes:

%D	Percent Difference.
J	Associated value is estimated.
R	Rejected.
RRF	Relative Response Factor.
U	Non-detect at associated value.
VOCs	Volatile Organic Compounds.

TABLE 5

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERIES
SUPPLEMENTAL RI/FS DOCUMENTATION
DOWCRAFT CORPORATION
FALCONER, NEW YORK
DECEMBER 1999

Parameter	*Spike ID*	*Analyte*	*MS Recovery (Percent)*	*MSD Recovery (Percent)*	*RPD*	*Control Limits (Percent)*	*RPD Control Limits (Percent)*	*Associated Analytes*	*Sample Result*	*Units*	*Qualifier*
VOCs	GW-RW-001	1,1-Dichloroethene	103	69	39	57-138	15	cis-1,2-Dichloroethene	2.3 J	µg/L	*
		Trichloroethene	112	72	25	58-141	17	Trichloroethene	33	µg/L	J
		Benzene	118	81	37	73-123	11				
		Toluene	116	81	36	67-129	14				
		Chlorobenzene	115	80	36	70-122	14				

Notes:

*	Sample previously qualified as estimated by the laboratory.
J	Associated value is estimated.
MS	Matrix Spike.
MSD	Matrix Spike Duplicate.
RPD	Relative Percent Difference.
VOCs	Volatile Organic Compounds.

TABLE 6

QUALIFIED SAMPLE RESULTS DUE TO ANALYTE CONCENTRATIONS IN THE RINSE BLANKS
SUPPLEMENTAL RI/FS DOCUMENTATION
DOWCRAFT CORPORATION
FALCONER, NEW YORK
DECEMBER 1999

Parameter	*Rinse Blank Date*	*Analyte*	*Blank Result*	*Sample ID*	*Sample Result*	*Qualified Sample Result*	*Units*
VOCs	12/03/99	Trichloroethene	8.3	GW-RW-010	7.4	7.4 U	µg/L
				GW-RW-001	33	33 U	µg/L
				GW-RW-005	2.2J	5 U	µg/L
				GW-RW-014	7.1	7.1 U	µg/L

Notes:

ID	Identification.
J	Associated value is estimated.
U	Non-detect at associated value.
VOCs	Volatile Organic Compounds.

TABLE 7

QUALIFIED SAMPLE DATA DUE TO ANALYTE CONCENTRATIONS IN THE TRIP BLANK
SUPPLEMENTAL RI/FS DOCUMENTATION
DOWCRAFT CORPORATION
FALCONER, NEW YORK
DECEMBER 1999

Parameter	*Blank ID*	*Analyte*	***Blank** Result (µg/L)*	*Associated Sample I.D.*	*Sample Result (µg/L)*	*Qualified Sample Result*
VOCs	Trip Blank 12/03/99	Methylene chloride	2.0J	GW-RW-007	3.3J	5U

Notes:

J	Associated value is estimated.
U	Non-detected at associated value.
VOCs	Volatile Organic Compounds.

Quanterra Pittsburgh Laboratory

Chain of Custody Record

Quanterra, Inc. - Pittsburgh PA Lab
450 William Pitt Way
Pittsburgh PA 15238

Quanterra

QUA-4124

Client: CONESTOGA ROVERS

Project Manager: CAROL DUNNIGAN

Date: 12/06/99

Chain Of Custody Number: 63567

Address: 2055 NIAGARA FALLS BLVD

Telephone Number (Area Code)/Fax Number: 1-716-297-6150

Lab Number:

Page ____ of ____

City: NIAGARA FALLL

State: NY

Zip Code: 14304

Site Contact:

Project Name: DOWCRAFT (5020)

Carrier/Waybill Number:

Contract/Purchase Order/Quote No.

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: VOC
GW-5020-120399-RW-07	12/03/99	19³⁰	GW	80ML			HCL		X
TRIP BLANK	12/03/99						HCL		X

Special Instructions

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Turn Around Time Required
☐ Normal ☐ Rush

QC Level
☐ I. ☐ II. ☐ III.

Project Specific (Specify)

1. Relinquished By: Tallen — Date: 12/06/99 — Time: 7⁰⁰ AM
1. Received By: — Date: 12/7/99 — Time: 0940

2. Relinquished By — Date — Time
2. Received By — Date — Time

3. Relinquished By — Date — Time
3. Received By — Date — Time

Comments

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Sue FyI

CHAIN OF CUSTODY RECORD

CRA
CONESTOGA-ROVERS & ASSOCIATES
2055 Niagara Falls Blvd. Suite Three
Niagara Falls, NY 14304 (716)297-6150

SHIPPED TO (Laboratory Name): MICROSEEPS

REFERENCE NUMBER: 5020

SAMPLER'S SIGNATURE: Andrew P. Kriel

PRINTED NAME: Andrew P. Kriel

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	No. OF CONTAINERS	Hydrogen	Methane	REMARKS
	12/3/99	1130	GW-5020-120399-AK-19	AIR	1	X	X	EJI-2
	12/3/99	1200	GW-5020-120399-AK-18	AIR	1	X	X	PW-2

TOTAL NUMBER OF CONTAINERS: 2

HEALTH/CHEMICAL HAZARDS:

RELINQUISHED BY: ① Andrew P. Kriel DATE: 12/6/99 TIME: 1700

RECEIVED BY: ② DATE: TIME:

RELINQUISHED BY: ② DATE: TIME:

RECEIVED BY: ③ DATE: TIME:

RELINQUISHED BY: ③ DATE: TIME:

RECEIVED BY: ④ DATE: TIME:

METHOD OF SHIPMENT: Fed eX

WAY BILL No.

White	–Fully Executed Copy
Yellow	–Receiving Laboratory Copy
Pink	–Shipper Copy
Goldenrod	–Sampler Copy

SAMPLE TEAM:
Andrew P. Kriel
Roger Wall

RECEIVED FOR LABORATORY BY:

DATE: TIME:

№ NF-2352

1001 (D) OCT 31/94(NF) REV.1 (F-05)

CHAIN OF CUS DY RECORD

CRA
CONESTOGA-ROVERS & ASSOCIATES
2055 Niagara Falls Blvd. Suite Three
Niagara Falls, NY 14304 (716)297-6150

SHIPPED TO (Laboratory Name):
QUANTERRA INC.
450 WILLIAM PITT WAY
PITTSBURGH, PA 15238

REFERENCE NUMBER: 5020
DOW CRAFT
DRY WELL SOIL SAMPLE

SAMPLER'S SIGNATURE: Joseph S. VanderLinde
PRINTED NAME: JOSEPH VANDERLINDE

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS										REMARKS
	1/3/00	1100	S-5020-010300-DW	SOIL	2											dry well

TOTAL NUMBER OF CONTAINERS ② HEALTH/CHEMICAL HAZARDS

RELINQUISHED BY: ① Joseph S. VanderLinde DATE: 1/4/00 TIME: 1600
RECEIVED BY: ② DATE: TIME:
RELINQUISHED BY: ② DATE: TIME:
RECEIVED BY: ③ DATE: TIME:
RELINQUISHED BY: ③ DATE: TIME:
RECEIVED BY: ④ DATE: TIME:

METHOD OF SHIPMENT: FED EXPRESS
WAY BILL No. 4569 8650 8970

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

SAMPLE TEAM: J VanderLinde

RECEIVED FOR LABORATORY BY:
DATE: TIME:

№ NF-3945

1001 (D) OCT 31/94(NF) REV.1 (F-05)

CHAIN OF CUSTODY RECORD

CRA **CRA SERVICES**
2055 Niagara Falls Blvd. Suite Three
Niagara Falls, N.Y. 14304 (716) 297-2160

SHIPPED TO (Laboratory Name): Quanterra

REFERENCE NUMBER: 5020

SAMPLER'S SIGNATURE: C Dunnigan

PRINTED NAME: C Dunnigan

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS VOCs										REMARKS
	[illegible]	1245	S-11799-CFD-001	Soil	1	1										7-day turnaround
																Footer Excavation,
																Northwest Corner

TOTAL NUMBER OF CONTAINERS 1

HEALTH/CHEMICAL HAZARDS

RELINQUISHED BY: ① C Dunnigan	DATE: 1/7/99 TIME: 1545	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: Fed Ex.

WAY BILL No.

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

SAMPLE TEAM:

RECEIVED FOR LABORATORY BY:

№ 0940 NF

DATE: TIME:

1001 (D) OCT 31/94(NF) REV.0 (F-14)

CHAIN OF CUSTODY RECORD

CRA SERVICES
2055 Niagara Falls Blvd. Suite Three
Niagara Falls, N.Y. 14304 (716) 297-2160

SHIPPED TO (Laboratory Name): Quanterra

REFERENCE NUMBER: 5020

SAMPLER'S SIGNATURE: C. Dunnigan

PRINTED NAME: C. Dunnigan

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS VOCs										REMARKS
	[illegible]	0915	S-111999-CFD-002	Soil	1	✓										TP-1
		1000	S-111999-CFD-003	↓	1	✓										TP-2
		1045	S-111999-CFD-004	↓	1	✓										TP-3
		1045	S-111999-CFD-005	↓	1	✓										TP-3 Dup
		1125	S-111999-CFD-006	↓	1	✓										TP-4
		1210	S-111999-CFD-007	↓	1	✓										TP-5

TOTAL NUMBER OF CONTAINERS: 6

HEALTH/CHEMICAL HAZARDS: Unknown

RELINQUISHED BY: ① C. Dunnigan
DATE: 11/19/99
TIME: 1250

RECEIVED BY: ②
DATE:
TIME:

RELINQUISHED BY: ②
DATE:
TIME:

RECEIVED BY: ③
DATE:
TIME:

RELINQUISHED BY: ③
DATE:
TIME:

RECEIVED BY: ④
DATE:
TIME:

METHOD OF SHIPMENT: Fed Ex.

WAY BILL No.

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

SAMPLE TEAM: C. Dunnigan

RECEIVED FOR LABORATORY BY:
DATE: TIME:

№ 0941 NF

Sue FYI

CHAIN OF CUSTODY RECORD

CRA
CONESTOGA-ROVERS & ASSOCIATES
2055 Niagara Falls Blvd. Suite Three
Niagara Falls, NY 14304 (716)297-6150

SHIPPED TO (Laboratory Name): Quanterra

REFERENCE NUMBER: 5020

SAMPLER'S SIGNATURE: Andrew P. Kissel

PRINTED NAME: Andrew P. Kissel

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	No. OF CONTAINERS	TCL VOA (w/HCl)	Total Fe (w/HNO3)	NO3	SO4 Chloride	REMARKS
										Location ID
	12/2/99	1745	GW-5020-120299-RW-01 MS/MSD	GW	9	9				ESI-3
	↓	1400	GW-5020-120299-RW-02	↓	4	2	1	1	✓	PW-2
		1410	GW-5020-120299-RW-03		2	2				dup of 02
		1545	GW-5020-120299-RW-04		2	2				ESI-4
		1600	GW-5020-120299-RW-05		2	2				ESI-5
		1630	GW-5020-120299-RW-06		4	2	1	1	✓	ESI-2
	12/3/99	0815	GW-5020-120299-RW-08		2	2				ESI-7
	↓	1000	RB-5020-120399-RW-09	DI WATER	2	2				Rinse Blank
		1130	GW-5020-120399-RW-10	GW	2	2				ESI-1
		1200	GW-5020-120399-RW-11	↓	2	2				ESI-13R
		1330	GW-5020-120399-RW-12		2	2				ESI-8
		1620	GW-5020-120399-RW-13		2	2				ESI-10
		1645	GW-5020-120399-RW-14		2	2				ESI-11
		1700	GW-5020-120399-RW-15		2	2				ESI-12
		1715	~~GW~~ OF-5020-120399-RW-16	OUTFALL 002	2	2			CANCEL	Cancelled
	↓		TRIP BLANK	LAB Water	2	2				
			TOTAL NUMBER OF CONTAINERS		43	HEALTH/CHEMICAL HAZARDS				

RELINQUISHED BY: ① Andrew P. Kissel	DATE: 12/3/99 TIME: 1800	RECEIVED BY: ②	DATE: TIME:
RELINQUISHED BY: ②	DATE: TIME:	RECEIVED BY: ③	DATE: TIME:
RELINQUISHED BY: ③	DATE: TIME:	RECEIVED BY: ④	DATE: TIME:

METHOD OF SHIPMENT: FedEx

WAY BILL No.

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

SAMPLE TEAM: Andrew P. Kissel
Roger Waller

RECEIVED FOR LABORATORY BY:

DATE: TIME:

№ NF-2334

1001 (D) OCT 31/94(NF) REV.1 (F-05)

ANALYTICAL DATA ASSESSMENT AND VALIDATION
SUPPLEMENTAL RI/FS DOCUMENTATION
DOWCRAFT CORPORATION
FALCONER, NEW YORK
MAY-JUNE 2000

TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

1.0 INTRODUCTION

The following document details an assessment and validation of analytical results reported by STL, Pittsburgh, formerly Quanterra, for sediment, surface water, and groundwater samples collected at the Dowcraft Corporation Site (Site) in Falconer, New York. The samples were part of a supplemental Remedial Investigation/Feasibility Study (RI/FS). The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by Method 8260[1]. For sample identification, a sampling and analysis summary is presented in Table 1.

A summary of the analytical data is presented in Tables 2a and 2b. The Quality Assurance/Quality Control (QA/QC) criteria by which these data have been assessed are outlined in the analytical methods and the document entitled "National Functional Guidelines for Organic Data Review", February 1994, prepared by the United States Environmental Protection Agency (USEPA) Office of Emergency and Remedial Response.

The data quality assessment and validation presented in the following subsections are performed based on all raw data including calibration, spike, duplicate, and blank results. All sediment results were calculated on a dry weight basis.

---

[1] Method referenced from "Test Methods for Solid Waste Physical/Chemical Methods", SW-846, 3rd Edition, Sept. 86 (w/revisions).

2.0 SAMPLE HOLDING TIMES

All sample analyses were performed within the required hold time of 14 days from the date of collection.

All samples were properly preserved and cooled at 4°C (±2°C) after collection. All samples were received by the laboratory in good condition.

3.0 GAS CHROMATOGRAPH/MASS SPECTROMETER (GC/MS) TUNING AND MASS CALIBRATION - VOCs

Prior to analysis, GC/MS instrumentation is tuned to ensure optimization over the mass range of interest. To evaluate instrument tuning, the VOC method requires the analysis of the specific tuning compound bromofluorobenzene (BFB). The resulting spectra must meet the criteria cited in the method before analysis is initiated. Analysis of the tuning compound must then be repeated every 12 hours throughout sample analysis to ensure the continued optimization of the instrument.

All instrument tuning data were reviewed. The tuning compound was analyzed at the required frequency throughout the analytical periods. All tuning criteria were met for the analysis, indicating proper optimization of the instrumentation.

4.0 INSTRUMENT CALIBRATION - VOCs

4.1 INITIAL CALIBRATION

To quantify compounds of interest in samples, calibration of the GC/MS over a specific concentration range must be performed. Initially, a five-point calibration curve containing all compounds of interest is analyzed.

Linearity of the curve and instrument sensitivity were evaluated against the following criteria:

i) all relative response factors (RRFs) must be greater than or equal to 0.05; and

ii) percent relative standard deviation (%RSD) values must not exceed 30 percent.

The initial calibration data for VOCs were reviewed. All RRFs met the criteria with the exception of low bromomethane and chloroethane responses. All associated results were non-detect and were rejected due to the poor instrument response of this compound (see Table 3). Some initial calibration curves exceeded the %RSD criteria. All associated positive data were qualified as estimated to reflect the implied variability (see Table 3). The non-detect results were not impacted.

4.2 CONTINUING CALIBRATION

To ensure that instrument calibration is acceptable throughout the sample analysis period, continuing calibration standards must be analyzed and compared to the initial calibration curve every 12 hours.

The following criteria were employed to evaluate continuing calibration data:

i) all RRF values must be greater than or equal to 0.05; and

ii) percent difference (%D) values must not exceed 25 percent.

Low RRF values for chloroethane and bromomethane were observed in some of the continuing calibrations. All associated data were previously rejected due to the poor instrument response during initial calibration (see Table 3).

Various compounds exceeded the 25%D criteria for the continuing calibration. All associated data were qualified as estimated (see Table 4).

All remaining RRFs and %Ds were acceptable.

5.0 SURROGATE SPIKE RECOVERIES - VOCs

In accordance with the method, all samples, blanks, and standards analyzed for VOCs were spiked with surrogate compounds prior to sample analysis. Surrogate recoveries provide a means to evaluate the effects of individual sample matrices on analytical efficiency.

All surrogate recoveries reported were within the laboratory control limits, indicating good analytical efficiency.

6.0 INTERNAL STANDARD RECOVERIES - VOCs

To ensure that changes in GC/MS response and sensitivity do not affect sample analysis results, internal standard (IS) compounds are added to all samples, blanks, and spike samples prior to analyses. All results are calculated as a ratio of the IS response. The criteria by which the IS results are assessed are as follows:

i) IS area counts must not vary by more than a factor of 2 (-50 percent to +100 percent) from the associated calibration standard; and

ii) the retention time of the IS must not vary more than ±30 seconds from the associated calibration standard.

All applicable IS recoveries were acceptable, indicating adequate analytical efficiency.

All result calculations were performed correctly using the IS area counts.

7.0 LABORATORY BLANK ANALYSES

The purpose of assessing the results of laboratory blank analyses is to determine the existence and magnitude of sample contamination introduced during analysis. Laboratory blanks are prepared from deionized water and analyzed as samples.

Laboratory blanks were analyzed at a minimum frequency of one per analytical batch.

All laboratory blank results were non-detect for the compounds of interest with the exception of acetone present at 4.3 micrograms per kilogram (µg/kg) in the blank analyzed on May 16, 2000. The associated sample results had similar concentrations and were qualified as non-detect (see Table 5).

8.0 BLANK SPIKE ANALYSES - VOCs

Blank spikes are prepared and analyzed as samples to assess the analytical efficiencies of the method employed, independent of sample matrix effects.

Blank samples were spiked with benzene, chlorobenzene, 1,1-dichloroethene, toluene, and trichloroethene. All blank spike sample analyses yielded recoveries within the laboratory control limits, indicating acceptable analytical accuracy.

9.0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES - VOCs

The recoveries of MS/MSD analyses are used to assess the analytical accuracy achieved on individual sample matrices. The RPD between the MS and MSD is used to assess analytical precision.

An MS/MSD was analyzed at the required frequency for all parameters.

All recoveries were acceptable indicating adequate analytical accuracy and precision.

10.0 FIELD QA/QC

10.1 FIELD DUPLICATES

To assess the analytical and sampling protocol precision, field duplicates (as identified in Table 1) were collected and submitted "blind" to the laboratory. All data demonstrated acceptable agreement indicating adequate sampling and analytical procedures.

10.2 TRIP BLANKS

Two trip blanks were submitted for VOC analyses to evaluate the possibility of cross-contamination during sample collection, shipment, and/or storage. All results were non-detect for the compounds of interest.

11.0 CONCLUSION

Based on the assessment detailed in the foregoing, the data produced by STL are acceptable with the specific exceptions and qualifications noted within.

TABLES

TABLE 1

SAMPLING AND ANALYSIS SUMMARY
SUPPLEMENTAL RI/FS DOCUMENTATION
DOWCRAFT CORPORATION
FALCONER, NEW YORK
MAY-JUNE 2000

Sample ID	*Location*	*Collection Date*	*Collection Time*	*Matrix*	*Analytical Parameters*	*Comments*
W-050900-DRS- 001	BH-15	05/09/00	1000	Groundwater	TCL VOCs	TCL VOCs
W-050900-DRS- 002	ESI-9	05/09/00	1800	Groundwater	TCL VOCs	
W-051100-DRS- 003	BH-16	05/11/00	1200	Groundwater	TCL VOCs	
W-051200-DRS- 004	ESI-14	05/12/00	0900	Groundwater	TCL VOCs	
W-051200-DRS- 005	River Location #3	05/12/00	1045	Surface Water	TCL VOCs	
W-051200-DRS- 006	River Location #2A	05/12/00	1100	Surface Water	TCL VOCs	
W-051200-DRS- 007	River Location #1	05/12/00	1115	Surface Water	TCL VOCs	
S-051200-DRS- 008	River Location #3	05/12/00	1045	Sediment	TCL VOCs	
S-051200-DRS- 011	River Location #1	05/12/00	1115	Sediment	TCL VOCs	
W-051500-DRS- 012	PW-3R	05/15/00	1700	Groundwater	TCL VOCs	
W-051500-DRS- 013	PW-3R	05/15/00	1710	Groundwater	TCL VOCs	Field dup. of W-051500-DRS-012
W-060900-DRS- 001	River Location #2	06/09/00	1100	Surface Water	TCL VOCs	
S-060900-DRS- 002	River Location #2	06/09/00	1100	Sediment	TCL VOCs	

Notes:

Dup.	Field duplicate.
TCL	Target Compound List.
VOCs	Volatile Organic Compounds.

TABLE 2a

ANALYTICAL RESULTS SUMMARY - WATER SAMPLES
DOWCRAFT CORPORATION
FALCONER, NEW YORK
MAY-JUNE 2000

	Sample ID:	*W-050900-DRS-001*	*W-050900-DRS-002*	*W-051100-DRS-003*	*W-051200-DRS-004*	*W-051200-DRS-005*
	Location ID:	*BH-15*	*ESI-9*	*BH-16*	*ESI-14*	*River Location #3*
	Collection Dates:	*05/09/00*	*05/09/00*	*05/11/00*	*05/12/00*	*05/12/00*
Parameters	*Units*					
TCL Volatiles						
cis-1,2-Dichloroethene	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Acetone	ug/L	4.2 J	20 U	4.9 J	20 U	2.3 J
Benzene	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	ug/L	R	R	R	R	R
2-Butanone	ug/L	20 UJ	20 UJ	2.0 J	20 UJ	20 UJ
Carbon disulfide	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon tetrachloride	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromochloromethane	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	ug/L	R	R	R	R	R
Chloroform	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	ug/L	10 U	10 U	10 U	10 U	10 U
1,1-Dichloroethane	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Ethylbenzene	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
2-Hexanone	ug/L	20 U	20 U	20 U	20 U	20 U
Methylene chloride	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
4-Methyl-2-pentanone	ug/L	20 U	20 U	20 U	20 U	20 U
Styrene	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,1-Trichloroethane	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloroethane	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	ug/L	3.6 J	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl chloride	ug/L	10 U	10 U	10 U	10 U	10 U
Total Xylenes	ug/L	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U

TABLE 2a

ANALYTICAL RESULTS SUMMARY - WATER SAMPLES
DOWCRAFT CORPORATION
FALCONER, NEW YORK
MAY-JUNE 2000

	Sample ID:	*W-051200-DRS-006*	*W-051200-DRS-007*	*W-051500-DRS-012*	*W-051500-DRS-013*	*W-060900-DRS-001*
	Location ID:	*River Location #2A*	*River Location #1*	*PW-3R*	*PW-3R*	*River Location #2*
	Collection Dates:	*05/12/00*	*05/12/00*	*05/15/00*	*05/15/00*	*06/09/00*
Parameters	*Units*				*(Field Dup)*	
TCL Volatiles						
cis-1,2-Dichloroethene	ug/L	5.0 U	5.0 U	1500 J	1700 J	5.0 U
trans-1,2-Dichloroethene	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Acetone	ug/L	2.1 J	20 U	10000 U	10000 U	20 U
Benzene	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Bromodichloromethane	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Bromoform	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Bromomethane	ug/L	R	R	R	R	R
2-Butanone	ug/L	20 UJ	20 UJ	10000 U	10000 U	20 UJ
Carbon disulfide	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Carbon tetrachloride	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Chlorobenzene	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Dibromochloromethane	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Chloroethane	ug/L	R	R	R	R	R
Chloroform	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Chloromethane	ug/L	10 U	10 U	5000 U	5000 U	10 U
1,1-Dichloroethane	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
1,2-Dichloroethane	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
1,1-Dichloroethene	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
1,2-Dichloropropane	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
cis-1,3-Dichloropropene	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
trans-1,3-Dichloropropene	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Ethylbenzene	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
2-Hexanone	ug/L	20 U	20 U	10000 U	10000 U	20 U
Methylene chloride	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
4-Methyl-2-pentanone	ug/L	20 U	20 U	10000 U	10000 U	20 U
Styrene	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
1,1,2,2-Tetrachloroethane	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Tetrachloroethene	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Toluene	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
1,1,1-Trichloroethane	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
1,1,2-Trichloroethane	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U
Trichloroethene	ug/L	5.0 U	5.0 U	58000	67000	5.0 U
Vinyl chloride	ug/L	10 U	10 U	5000 U	5000 U	10 U
Total Xylenes	ug/L	5.0 U	5.0 U	2500 U	2500 U	5.0 U

Notes:

J	Associated value is estimated.
R	Rejected.
TCL	Target Compound List.
U	Non-detect at associated value.

TABLE 2b

ANALYTICAL RESULTS SUMMARY - SEDIMENT SAMPLES
DOWCRAFT CORPORATION
FALCONER, NEW YORK
MAY-JUNE 2000

	Sample ID:	*S-051200-DRS-008*	*S-051200-DRS-011*	*S-060900-DRS-002*
	Location ID:	*River Location #3*	*River Location #1*	*River Location #2*
	Collection Dates:	*05/12/00*	*05/12/00*	*06/09/00*
Parameters	*Units*			
TCL Volatiles				
cis-1,2-Dichloroethene	ug/kg	6.1 U	7.6 U	9.4 U
trans-1,2-Dichloroethene	ug/kg	6.1 U	7.6 U	9.4 U
Acetone	ug/kg	6.1 U	6.1 U	37 UJ
Benzene	ug/kg	6.1 U	7.6 U	9.4 U
Bromodichloromethane	ug/kg	6.1 U	7.6 U	9.4 U
Bromoform	ug/kg	6.1 U	7.6 U	9.4 U
Bromomethane	ug/kg	12 UJ	15 UJ	R
2-Butanone	ug/kg	24 U	30 U	37 UJ
Carbon disulfide	ug/kg	6.1 U	7.6 U	9.4 U
Carbon tetrachloride	ug/kg	6.1 U	7.6 U	9.4 U
Chlorobenzene	ug/kg	6.1 U	7.6 U	9.4 U
Dibromochloromethane	ug/kg	6.1 U	7.6 U	9.4 U
Chloroethane	ug/kg	12 U	15 U	19 U
Chloroform	ug/kg	6.1 U	7.6 U	9.4 U
Chloromethane	ug/kg	12 U	15 U	19 UJ
1,1-Dichloroethane	ug/kg	6.1 U	7.6 U	9.4 U
1,2-Dichloroethane	ug/kg	6.1 U	7.6 U	9.4 U
1,1-Dichloroethene	ug/kg	6.1 U	7.6 U	9.4 U
1,2-Dichloropropane	ug/kg	6.1 U	7.6 U	9.4 U
cis-1,3-Dichloropropene	ug/kg	6.1 U	7.6 U	9.4 U
trans-1,3-Dichloropropene	ug/kg	6.1 U	7.6 U	9.4 U
Ethylbenzene	ug/kg	6.1 U	7.6 U	9.4 U
2-Hexanone	ug/kg	24 U	30 U	37 U
Methylene chloride	ug/kg	6.1 U	7.6 U	9.4 UJ
4-Methyl-2-pentanone	ug/kg	24 U	30 U	37 U
Styrene	ug/kg	6.1 U	7.6 U	9.4 U
1,1,2,2-Tetrachloroethane	ug/kg	6.1 U	7.6 U	9.4 U
Tetrachloroethene	ug/kg	6.1 U	7.6 U	9.4 U
Toluene	ug/kg	6.1 U	7.6 U	9.4 U
1,1,1-Trichloroethane	ug/kg	6.1 U	7.6 U	9.4 U
1,1,2-Trichloroethane	ug/kg	6.1 U	7.6 U	9.4 U
Trichloroethene	ug/kg	6.1 U	7.6 U	9.4 U
Vinyl chloride	ug/kg	12 U	15 U	19 U
Total Xylenes	ug/kg	6.1 U	7.6 U	9.4 U

Notes:

J	Associated value is estimated.
R	Rejected.
TCL	Target Compound List.
U	Non-detect at associated value.

TABLE 3

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING INITIAL CALIBRATION RESULTS
DOWCRAFT CORPORATION
FALCONER, NEW YORK
MAY-JUNE 2000

Parameter	*Compound*	*Calibration Date*	RF	%D	*Associated Sample ID*	*Sample Results*	*Units*	*Qualifier*
VOCs	Chloroethane	05/04/00	0.037	<30	W-050900-DRS-001	10 U	µg/L	R
					W-050900-DRS-002	10 U	µg/L	R
					W-051100-DRS-003	10 U	µg/L	R
					W-051200-DRS-004	10 U	µg/L	R
					W-051200-DRS-005	10 U	µg/L	R
					W-051200-DRS-006	10 U	µg/L	R
					W-051200-DRS-007	10 U	µg/L	R
VOCs	Bromomethane	05/04/00	0.035	<30	W-050900-DRS-001	10 U	µg/L	R
					W-050900-DRS-002	10 U	µg/L	R
					W-051100-DRS-003	10 U	µg/L	R
					W-051200-DRS-004	10 U	µg/L	R
					W-051200-DRS-005	10 U	µg/L	R
					W-051200-DRS-006	10 U	µg/L	R
					W-051200-DRS-007	10 U	µg/L	R
VOCs	2-Butanone	05/04/00	>0.050	75	W-051100-DRS-003	2.0 J	µg/L	*
VOCs	Acetone	05/11/00	>0.050	42	S-051200-DRS-008	4.6 J	µg/Kg	*
					S-051200-DRS-011	4.6 J	µg/Kg	*
VOCs	Chloroethane	05/17/00	0.044	<30	W-051500-DRS-012	5000 U	µg/L	R
					W-051500-DRS-013	5000 U	µg/L	R
VOCs	Bromomethane	05/17/00	0.038	<30	W-051500-DRS-012	5000 U	µg/L	R
					W-051500-DRS-013	5000 U	µg/L	R
VOCs	Chloroethane	06/06/00	0.037	<30	W-060900-DRS-001	10 U	µg/L	R
VOCs	Bromomethane	06/06/00	0.028	<30	W-060900-DRS-001	10 U	µg/L	R

TABLE 3

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING INITIAL CALIBRATION RESULTS
DOWCRAFT CORPORATION
FALCONER, NEW YORK
MAY-JUNE 2000

Parameter	*Compound*	*Calibration Date*	RF	%D	*Associated Sample ID*	*Sample Results*	*Units*	*Qualifier*
VOCs	Bromomethane	04/03/00	0.031	<30	S-060900-DRS-002	19 U	µg/Kg	R

Notes:

%D	Percent Difference.
*	
J	Associated value is estimated.
R	Rejected.
RF	
U	Non-detect at associated value.

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING CONTINUING CALIBRATION RESULTS
DOWCRAFT CORPORATION
FALCONER, NEW YORK
MAY-JUNE 2000

Parameter	*Compound*	*Calibration Date*	*%D*	*Associated Sample ID*	*Sample Results*	*Units*	*Qualifier*
VOCs	2-Butanone	05/12/00	39	W-050900-DRS-001	20 U	µg/L	J
				W-050900-DRS-002	20 U	µg/L	J
VOCs	2-Butanone	05/15/00	39	W-051100-DRS-003	2.0 J	µg/L	*
				W-051200-DRS-004	20 U	µg/L	J
				W-051200-DRS-005	20 U	µg/L	J
				W-051200-DRS-006	20 U	µg/L	J
				W-051200-DRS-007	20 U	µg/L	J
VOCs	Bromomethane	05/16/00	33	S-051200-DRS-008	12 U	µg/Kg	J
				S-051200-DRS-011	15 U	µg/Kg	J
VOCs	Acetone	05/16/00	27	S-051200-DRS-008	4.6 J	µg/Kg	*
				S-051200-DRS-011	4.6 J	µg/Kg	*
VOCs	2-Butanone	06/12/00	31	W-060900-DRS-001	20 U	µg/L	J
VOCs	Chloromethane	06/12/00	27	S-060900-DRS-002	19 U	µg/Kg	J
VOCs	Acetone	06/12/00	29	S-060900-DRS-002	37 U	µg/Kg	J
VOCs	2-Butanone	06/12/00	54	S-060900-DRS-002	37 U	µg/Kg	J
VOCs	2-Hexanone	06/12/00	27	S-060900-DRS-002	37 U	µg/Kg	J

Notes:

%D	Percent Difference.
*	
J	Associated value is estimated.
U	Non-detect at associated value.
VOCs	Volatile Organic Compounds.

TABLE 5

QUALIFIED SAMPLE RESULTS DUE TO ANALYTE CONCENTRATIONS IN THE METHOD BLANKS
DOWCRAFT CORPORATION
FALCONER, NEW YORK
MAY-JUNE 2000

Parameter	*Blank ID/Date*	*Analyte*	*Blank Result*	*Sample ID*	*Sample Result*	*Qualified Sample Result*	*Units*
VOCs	05/16/00	Acetone	4.3J	S-051200-DRS-008	4.6J	6.1 U	µg/Kg
				S-051200-DRS-011	4.6J	7.6 U	µg/Kg

Notes:

J	Associated value is estimated.
U	Non-detect at associated value.
VOCs	Volatile Organic Compounds.

APPENDIX A

CHAIN OF CUSTODY FORMS

CHAIN OF CUSTODY RECORD

CRA
CONESTOGA-ROVERS & ASSOCIATES
2055 Niagara Falls Blvd. Suite Three
Niagara Falls, NY 14304 (716)297-6150

SHIPPED TO (Laboratory Name): STL - Pittsburgh

REFERENCE NUMBER: 5020 Dowcraft

SAMPLER'S SIGNATURE:

PRINTED NAME: Dustin Steiner

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS VOCs										REMARKS
	5/9/00	1000	W-050900-DRS-001 BH-15	water	2	X										2 x 40ml Via w/HCl
	5/9/00	1800	W-050900-DRS-002 ESI-9	water	2	X										
			TRIP BLANK		1	X										

TOTAL NUMBER OF CONTAINERS 5

HEALTH/CHEMICAL HAZARDS

RELINQUISHED BY: ①

DATE: 5/10/00

TIME: 1000

RECEIVED BY: ②

DATE:

TIME:

RELINQUISHED BY: ②

DATE:

TIME:

RECEIVED BY: ③

DATE:

TIME:

RELINQUISHED BY: ③

DATE:

TIME:

RECEIVED BY: ④

DATE:

TIME:

METHOD OF SHIPMENT: FEDEX

WAY BILL No. 808889354935

White	-Fully Executed Copy
Yellow	-Receiving Laboratory Copy
Pink	-Shipper Copy
Goldenrod	-Sampler Copy

SAMPLE TEAM: DRS

RECEIVED FOR LABORATORY BY:

DATE: TIME:

№ NF-2881

1001 (D) OCT 31/94(NF) REV.1 (F-05)

[redacted]

Chain of Custody Record

Quanterra, Inc. - Pittsburgh PA Lab
450 William Pitt Way
Pittsburgh PA 15238

Quanterra

QUA-4124

Client

Address

City | State | Zip Code

Project Name Dowcraft # 5020

Contract/Purchase Order/Quote No.

Project Manager

Telephone Number (Area Code)/Fax Number (716) 297-6150 (716) 297-2265

Site Contact

Carrier/Waybill Number FEDEX # 80888935 4968

Date 5/12/00

Lab Number

Chain Of Custody Number 57110

Page ______ of ______

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers Type	Containers No.	Preservative	Condition on Receipt	Analysis: VOCs
W-051100-DRS-003	5/11/00	1200	water	2x40ml	VOA	2	HCl	BH-16	X
W-051200-DRS-004 MS/MSD	5/12/00	0900	water	240ml	VOA	6	HCl	ESI-14	X
W-051200-DRS-005	5/12/00	1045	↓	80ml	↓	2	↓	River location #3	X
W-051200-DRS-006	5/12/00	1100	↓	↓	↓	2	↓	" " #2	X
W-051200-DRS-007	5/12/00	1115	↓	↓	↓	2	↓	" " #1	X
S-051200-DRS-008 MS/MSD	↓	1045	Soil	12oz.	4 oz.	3	—	" " #3	X
S-051200-DRS-009	↓	1100	↓	4oz.	↓	1	—	" " #2	X
S-051200-DRS-010	↓	1105	↓	4oz.	↓	1	—	Dup of 004	X
S-051200-DRS-011	↓	1115	↓	4oz.	↓	1	—	River location #1	X
TRIP BLANK	5/12/00		water	40ml	VOA	1	HCl		X

} these are the ones we told the lab to discard

Special Instructions

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Turn Around Time Required
☒ Normal ☐ Rush

QC Level
☐ I. ☐ II. ☐ III.

Project Specific (Specify)

1. Relinquished By | Date 5/12/00 | Time 1800
2. Relinquished By | Date | Time
3. Relinquished By | Date | Time

1. Received By | Date | Time
2. Received By | Date | Time
3. Received By | Date | Time

Comments Call Susan Schrocci w/any Questions @ CRA

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

Chain of Custody Record

Quanterra, Inc. - Pittsburg Lab
450 William Pitt W
Pittsburgh PA 15238

Quanterra

QUA-4124

Client: CRA

Project Manager:

Date: 5/15/00

Chain Of Custody Number: 67200

Address:

Telephone Number (Area Code)/Fax Number: (716) 297-6150/(716) 297 2265

Lab Number:

Page 1 of 1

City: Niagara Falls

State: NY

Zip Code: 14304

Site Contact: Susan Scrocchi

Project Name: Dowcraft

Carrier/Waybill Number: FEDEX 808889354946

Contract/Purchase Order/Quote No.:

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers		Preservative	Condition on Receipt	Analysis										
					Type	No.			VOCs										
W-051500-DRS-012 PW-3R	5/15/00	1700	Water	80ml	VOA	2	HCl		X										
W-051500-DRS-013 Dupot PW-3R	↓	1710	↓	80ml	VOA	2	HCl		X										

Special Instructions

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☒ Unknown

Sample Disposal
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Turn Around Time Required
☒ Normal ☐ Rush

QC Level
☐ I. ☐ II. ☐ III.

Project Specific (Specify)

1. Relinquished By — Date: 5/15/00 — Time: 1745
1. Received By — Date: — Time:
2. Relinquished By — Date: — Time:
2. Received By — Date: — Time:
3. Relinquished By — Date: — Time:
3. Received By — Date: — Time:

Comments: NO TRIP BLANK

DISTRIBUTION: WHITE - Stays with Sample; CANARY - Returned to Client with Report; PINK - Field Copy

CHAIN OF CUSTODY RECORD

CRA
CONESTOGA-ROVERS & ASSOCIATES
2055 Niagara Falls Blvd. Suite Three
Niagara Falls, NY 14304 (716)297-6150

SHIPPED TO (Laboratory Name): SEVERN Trent Labs STL

REFERENCE NUMBER: 5020 Dowcraft

SAMPLER'S SIGNATURE: Dustin R. Steiner

PRINTED NAME: Dustin Steiner

SEQ. No.	DATE	TIME	SAMPLE No.	SAMPLE TYPE	No. OF CONTAINERS	PARAMETERS VOCs	REMARKS
	6/9/00	1100	W-060900-DRS-001	water	2	✓	2x40ml w/ Hcl
	6/9/00	1100	S-060900-DRS-002	soil	1	✓	1x4 oz.

NO TRIP BLANK

DRS

TOTAL NUMBER OF CONTAINERS 3

HEALTH/CHEMICAL HAZARDS —

RELINQUISHED BY: ① Dustin R. Steiner DATE: 6/9/00 TIME: 1500

RECEIVED BY: ② DATE: TIME:

RELINQUISHED BY: ② DATE: TIME:

RECEIVED BY: ③ DATE: TIME:

RELINQUISHED BY: ③ DATE: TIME:

RECEIVED BY: ④ DATE: TIME:

WAY BILL No. 808889354957

METHOD OF SHIPMENT: FEDEX

White -Fully Executed Copy
Yellow -Receiving Laboratory Copy
Pink -Shipper Copy
Goldenrod -Sampler Copy

SAMPLE TEAM: DRS

RECEIVED FOR LABORATORY BY: Amber Y. Hall

DATE: 6-10-00 TIME: 925

№ NF-2476

1001 (D) OCT 31/94(NF) REV.1 (F-05)

STL Pittsburgh

ANALYTICAL DATA ASSESSMENT AND VALIDATION
SUPPLEMENTAL RI/FS DOCUMENTATION
DOWCRAFT CORPORATION
FALCONER, NEW YORK
JULY 2000

TABLE OF CONTENTS

Page

LIST OF TABLES

(Following Data Validation)

LIST OF APPENDICES

1.0 INTRODUCTION

The following document details an assessment and validation of analytical results reported by STL, Pittsburgh (formerly Quanterra) for groundwater samples collected at the Dowcraft Corporation Site (Site) in Falconer, New York on July 18, 2000. The samples were part of a supplemental Remedial Investigation/Feasibility Study (RI/FS). The samples were analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) by Method 8260[1]. For sample identification, a sampling and analysis summary is presented in Table 1.

A summary of the analytical data is presented in Table 2. The Quality Assurance/Quality Control (QA/QC) criteria by which these data have been assessed are outlined in the analytical methods and the document entitled "National Functional Guidelines for Organic Data Review", February 1994, prepared by the United States Environmental Protection Agency (USEPA) Office of Emergency and Remedial Response.

The data quality assessment and validation presented in the following subsections are performed based on all raw data including calibration, spike, duplicate, and blank results.

---

[1] Method referenced from "Test Methods for Solid Waste Physical/Chemical Methods", SW-846, 3rd Edition, Sept. 86 (w/revisions).

2.0 SAMPLE HOLDING TIMES

All sample analyses were performed within the required hold time of 14 days from the date of collection.

All samples were properly preserved and cooled at 4°C (±2°C) after collection. All samples were received by the laboratory in good condition.

3.0 GAS CHROMATOGRAPH/MASS SPECTROMETER (GC/MS) TUNING AND MASS CALIBRATION - VOCs

Prior to analysis, GC/MS instrumentation is tuned to ensure optimization over the mass range of interest. To evaluate instrument tuning, the VOC method requires the analysis of the specific tuning compound bromofluorobenzene (BFB). The resulting spectra must meet the criteria cited in the method before analysis is initiated. Analysis of the tuning compound must then be repeated every 12 hours throughout sample analysis to ensure the continued optimization of the instrument.

All instrument tuning data were reviewed. The tuning compound was analyzed at the required frequency throughout the analytical periods. All tuning criteria were met for the analysis, indicating proper optimization of the instrumentation.

4.0 INSTRUMENT CALIBRATION - VOCs

4.1 INITIAL CALIBRATION

To quantify compounds of interest in samples, calibration of the GC/MS over a specific concentration range must be performed. Initially, a five-point calibration curve containing all compounds of interest is analyzed.

Linearity of the curve and instrument sensitivity were evaluated against the following criteria:

i) all relative response factors (RRFs) must be greater than or equal to 0.05; and

ii) percent relative standard deviation (%RSD) values must not exceed 30 percent.

The initial calibration data for VOCs were reviewed. All RRFs met the criteria with the exception of low bromomethane and chloroethane responses. All associated results were non-detect and were rejected due to the poor instrument response of this compound (see Table 3). Some initial calibration curves exceeded the %RSD criteria. All associated positive data were qualified as estimated to reflect the implied variability (see Table 3). The associated non-detect results were judged to be acceptable based on adequate analyte sensitivity.

4.2 CONTINUING CALIBRATION

To ensure that instrument calibration is acceptable throughout the sample analysis period, continuing calibration standards must be analyzed and compared to the initial calibration curve every 12 hours.

The following criteria were employed to evaluate continuing calibration data:

i) all RRF values must be greater than or equal to 0.05; and

ii) percent difference (%D) values must not exceed 25 percent.

Low RRF values for bromomethane were observed in some of the continuing calibrations. All associated data were previously rejected due to the poor instrument response during initial calibration (see Table 3).

Various compounds exceeded the 25%D criteria for the continuing calibration. All associated data were qualified as estimated (see Table 4).

All remaining RRFs and %Ds were acceptable.

5.0 SURROGATE SPIKE RECOVERIES - VOCs

In accordance with the method, all samples, blanks, and standards analyzed for VOCs were spiked with surrogate compounds prior to sample analysis. Surrogate recoveries provide a means to evaluate the effects of individual sample matrices on analytical efficiency.

All surrogate recoveries reported were within the laboratory control limits, indicating good analytical efficiency.

6.0 INTERNAL STANDARD RECOVERIES - VOCs

To ensure that changes in GC/MS response and sensitivity do not affect sample analysis results, internal standard (IS) compounds are added to all samples, blanks, and spike samples prior to analyses. All results are calculated as a ratio of the IS response. The criteria by which the IS results are assessed are as follows:

i) IS area counts must not vary by more than a factor of 2 (-50 percent to +100 percent) from the associated calibration standard; and

ii) the retention time of the IS must not vary more than ±30 seconds from the associated calibration standard.

All applicable IS recoveries were acceptable, indicating adequate analytical efficiency.

All result calculations were performed correctly using the IS area counts.

7.0 LABORATORY BLANK ANALYSES

The purpose of assessing the results of laboratory blank analyses is to determine the existence and magnitude of sample contamination introduced during analysis. Laboratory blanks are prepared from deionized water and analyzed as samples.

Laboratory blanks were analyzed at a minimum frequency of one per analytical batch.

All laboratory blank results were non-detect for the compounds of interest with the exception of acetone present at 3.8 micrograms per liter (µg/L) in the blank analyzed on July 25, 2000. The associated sample results had similar concentrations and were qualified as non-detect (see Table 5). Acetone was present at 3.5 µg/L in the blank analyzed on July 26, 2000. All sample results were non-detect for acetone and would not have been impacted.

8.0 BLANK SPIKE ANALYSES - VOCs

Blank spikes are prepared and analyzed as samples to assess the analytical efficiencies of the method employed, independent of sample matrix effects.

Blank samples were spiked with benzene, chlorobenzene, 1,1-dichloroethene, toluene, and trichloroethene. All blank spike sample analyses yielded recoveries within the laboratory control limits, indicating acceptable analytical accuracy.

9.0 MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) ANALYSES - VOCs

The recoveries of MS/MSD analyses are used to assess the analytical accuracy achieved on individual sample matrices. The RPD between the MS and MSD is used to assess analytical precision.

An MS/MSD was analyzed at the required frequency for all parameters.

All recoveries were acceptable indicating adequate analytical accuracy and precision.

10.0 FIELD QA/QC

10.1 FIELD DUPLICATES

To assess the analytical and sampling protocol precision, field duplicates (as identified in Table 1) were collected and submitted "blind" to the laboratory. All data demonstrated acceptable agreement indicating adequate sampling and analytical procedures, with the exception of trichloroethene. Sample GW-5020-DRS-004 and its duplicate were qualified as estimated to reflect the implied variability of the trichloroethene (see Table 6).

10.2 TRIP BLANKS

One trip blank was submitted for VOC analyses to evaluate the possibility of cross-contamination during sample collection, shipment, and/or storage. All results were non-detect for the compounds of interest.

11.0 CONCLUSION

Based on the assessment detailed in the foregoing, the data produced by STL are acceptable with the specific exceptions and qualifications noted within.

TABLES

TABLE 1

SAMPLING AND ANALYSIS SUMMARY
DOWCRAFT CORPORATION
FALCONER, NEW YORK
JULY 2000

Sample ID	*Location*	*Collection Date*	*Collection Time*	*Matrix*	*Analytical Parameters*	*Comments*
GW-5020-DRS 001	ESI-2	07/18/00	1145	Groundwater	TCL VOCs	
GW-5020-DRS 002	ESI-3	07/18/00	1330	Groundwater	TCL VOCs	
GW-5020-DRS 003	ESI-6	07/18/00	1400	Groundwater	TCL VOCs	
GW-5020-DRS 004	PW-3R	07/18/00	1425	Groundwater	TCL VOCs	
GW-5020-DRS 005	PW-3R	07/18/00	1435	Groundwater	TCL VOCs	Field duplicate of GW-5020-DRS-004
GW-5020-DRS 006	ESI-10	07/18/00	1510	Groundwater	TCL VOCs	
GW-5020-DRS 007	ESI-11	07/18/00	1550	Groundwater	TCL VOCs	
GW-5020-DRS 008	ESI-12	07/18/00	1630	Groundwater	TCL VOCs	MS/MSD
GW-5020-DRS 009	PW-1	07/18/00	1645	Groundwater	TCL VOCs	
GW-5020-DRS 010	PW-2	07/18/00	1745	Groundwater	TCL VOCs	
TP-5020-DRS	-	07/18/00	-	Deionized Water	TCL VOCs	Trip Blank

Notes:

-	Not applicable.
MS	Matrix Spike.
MSD	Matrix Spike Duplicate.
TCL	Target Compound List.
VOCs	Volatile Organic Compounds.

Date Printed: September 8, 2000
Time Printed: 1:15 pm

TABLE 2

ANALYTICAL RESULTS SUMMARY
DOWCRAFT CORPORATION
FALCONER, NEW YORK
JULY 2000

Sample Location:		ESI-2	ESI-3	ESI-6	ESI-10	ESI-11	ESI-12	PW-1
Sample ID:		GW-DRS-001	GW-DRS-002	GW-DRS-003	GW-DRS-006	GW-DRS-007	GW-DRS-008	GW-DRS-009
Sample Date:		07/18/2000	07/18/2000	07/18/2000	07/18/2000	07/18/2000	07/18/2000	07/18/2000
Parameters	Units							
Volatile Organics								
1,1,1-Trichloroethane	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
1,1,2,2-Tetrachloroethane	ug/L	ND 100	ND 5.0 J	ND 250 J	ND 50 J	ND 10 J	ND 5.0 J	ND 5.0 J
1,1,2-Trichloroethane	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
1,1-Dichloroethane	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
1,1-Dichloroethene	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
1,2-Dichloroethane	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
1,2-Dichloropropane	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
2-Butanone	ug/L	ND 400	ND 20	ND 1000	ND 200	ND 40	ND 20	ND 20
2-Hexanone	ug/L	ND 400	ND 20	ND 1000	ND 200	ND 40	ND 20	ND 20
4-Methyl-2-pentanone	ug/L	ND 400	ND 20	ND 1000	ND 200	ND 40	ND 20	ND 20
Acetone	ug/L	ND 400	ND 20 J	ND 1000 J	ND 200 J	ND 40 J	ND 20 J	2.7 J
Benzene	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
Bromodichloromethane	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
Bromoform	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	7.6
Bromomethane	ug/L	R	ND 10	ND 500	ND 100	ND 20	ND 10	ND 10
Carbon disulfide	ug/L	ND 100 J	ND 5.0 J	ND 250 J	ND 50 J	ND 10 J	ND 5.0 J	ND 5.0 J
Carbon tetrachloride	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
Chlorobenzene	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
Chloroethane	ug/L	R	ND 10	ND 500	ND 100	ND 20	ND 10	ND 10
Chloroform	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
Chloromethane	ug/L	ND 200	ND 10	ND 500	ND 100	ND 20	ND 10	ND 10
cis-1,2-Dichloroethene	ug/L	1600	11	400	1100	200	49	ND 5.0
cis-1,3-Dichloropropene	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
Dibromochloromethane	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
Ethylbenzene	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
Methylene chloride	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
Styrene	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
Tetrachloroethene	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	1.4 J
Toluene	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
trans-1,2-Dichloroethene	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
trans-1,3-Dichloropropene	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0
Trichloroethene	ug/L	3400	120	7300	73	26	200	2.7 J
Vinyl chloride	ug/L	ND 200	ND 10	ND 500	100	76	ND 10	ND 10
Xylenes (total)	ug/L	ND 100	ND 5.0	ND 250	ND 50	ND 10	ND 5.0	ND 5.0

TABLE 2

ANALYTICAL RESULTS SUMMARY
DOWCRAFT CORPORATION
FALCONER, NEW YORK
JULY 2000

Sample Location:		PW-2	PW-3R	PW-3R
Sample ID:		GW-DRS-010	GW-DRS-004	GW-DRS-005
Sample Date:		07/18/2000	07/18/2000	07/18/2000
				Dupl.
Parameters	Units			
Volatile Organics				
1,1,1-Trichloroethane	ug/L	ND 50	ND 2500	ND 2500
1,1,2,2-Tetrachloroethane	ug/L	ND 50 J	ND 2500	ND 2500
1,1,2-Trichloroethane	ug/L	ND 50	ND 2500	ND 2500
1,1-Dichloroethane	ug/L	ND 50	ND 2500	ND 2500
1,1-Dichloroethene	ug/L	ND 50	ND 2500	ND 2500
1,2-Dichloroethane	ug/L	ND 50	ND 2500	ND 2500
1,2-Dichloropropane	ug/L	ND 50	ND 2500	ND 2500
2-Butanone	ug/L	ND 200	ND 10000	ND 10000
2-Hexanone	ug/L	ND 200	ND 10000 J	ND 10000
4-Methyl-2-pentanone	ug/L	ND 200	ND 10000 J	ND 10000
Acetone	ug/L	ND 200 J	ND 10000	ND 10000
Benzene	ug/L	ND 50	ND 2500	ND 2500
Bromodichloromethane	ug/L	ND 50	ND 2500	ND 2500
Bromoform	ug/L	ND 50	ND 2500	ND 2500
Bromomethane	ug/L	ND 100	R	R
Carbon disulfide	ug/L	ND 50 J	ND 2500	ND 2500 J
Carbon tetrachloride	ug/L	ND 50	ND 2500	ND 2500
Chlorobenzene	ug/L	ND 50	ND 2500	ND 2500
Chloroethane	ug/L	ND 100	R	R
Chloroform	ug/L	ND 50	ND 2500	ND 2500
Chloromethane	ug/L	ND 100	ND 5000	ND 5000
cis-1,2-Dichloroethene	ug/L	610	1300 J	1200 J
cis-1,3-Dichloropropene	ug/L	ND 50	ND 2500	ND 2500
Dibromochloromethane	ug/L	ND 50	ND 2500	ND 2500
Ethylbenzene	ug/L	ND 50	ND 2500	ND 2500
Methylene chloride	ug/L	ND 50	ND 2500	ND 2500
Styrene	ug/L	ND 50	ND 2500	ND 2500
Tetrachloroethene	ug/L	ND 50	ND 2500	ND 2500
Toluene	ug/L	ND 50	ND 2500	ND 2500
trans-1,2-Dichloroethene	ug/L	ND 50	ND 2500	ND 2500
trans-1,3-Dichloropropene	ug/L	ND 50	ND 2500	ND 2500
Trichloroethene	ug/L	1100	79000 J	52000 J
Vinyl chloride	ug/L	110	ND 5000	ND 5000
Xylenes (total)	ug/L	ND 50	ND 2500	ND 2500

Notes

Dupl. - Field duplicate.

NDx - Not detected at or above x.

J - Estimated.

R - Rejected.

TABLE 3

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING INITIAL CALIBRATION RESULTS
DOWCRAFT CORPORATION
FALCONER, NEW YORK
JULY 2000

Parameter	*Compound*	*Calibration Date*	RF	%*RSD*	*Associated Sample ID*	*Sample Results*	*Units*	*Qualifier*
VOCs	Bromoethane	05/15/00	0.036	<30	GW-5020-DRS-001	ND 200	µg/L	R
					GW-5020-DRS-005	ND 5000	µg/L	R
VOCs	Chloroethane	05/15/00	0.035	<30	GW-5020-DRS-001	ND 200	µg/L	R
					GW-5020-DRS-005	ND 5000	µg/L	R
VOCs	Acetone	07/18/00	0.257	68.7	GW-5020-DRS-009	2.7J	µg/L	*
VOCs	Bromoethane	07/24/00	0.019	<30	GW-5020-DRS-004	ND 5000	µg/L	R
VOCs	Chloroethane	07/24/00	0.028	<30	GW-5020-DRS-004	ND 5000	µg/L	R

NOTES:

*	Sample results were previously qualified as estimated by the laboratory.
%RSD	Percent Relative Standard Deviation.
J	Estimated.
NDx	Not detected at or above x.
R	Rejected.
RF	Response Factor.
VOCs	Volatile Organic Compounds.

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING CONTINUING CALIBRATION RESULTS
DOWCRAFT CORPORATION
FALCONER, NEW YORK
JULY 2000

Parameter	*Compound*	*Calibration Date*	*RF*	*%D*	*Associated Sample ID*	*Sample Results*	*Units*	*Qualifier*
VOCs	1,1,2,2-Tetrachloroethane	07/24/00	0.570	28.5	GW-5020-DRS-002	ND 5.0	µg/L	J
					GW-5020-DRS-003	ND 250	µg/L	J
					GW-5020-DRS-006	ND 50	µg/L	J
					GW-5020-DRS-007	ND 10	µg/L	J
					GW-5020-DRS-008	ND 5.0	µg/L	J
					GW-5020-DRS-009	ND 5.0	µg/L	J
					GW-5020-DRS-010	ND 50	µg/L	J
VOCs	Acetone	07/24/00	0.119	53.7	GW-5020-DRS-002	ND 20	µg/L	J
					GW-5020-DRS-003	ND 1000	µg/L	J
					GW-5020-DRS-006	ND 200	µg/L	J
					GW-5020-DRS-007	ND 40	µg/L	J
					GW-5020-DRS-008	ND 20	µg/L	J
					GW-5020-DRS-009	2.7J	µg/L	*
					GW-5020-DRS-010	ND 200	µg/L	J
VOCs	Carbon Disulfide	07/24/00	0.455	35.9	GW-5020-DRS-002	ND 5.0	µg/L	J
					GW-5020-DRS-003	ND 250	µg/L	J
					GW-5020-DRS-006	ND 50	µg/L	J
					GW-5020-DRS-007	ND 10	µg/L	J
					GW-5020-DRS-008	ND 5.0	µg/L	J
					GW-5020-DRS-009	ND 5.0	µg/L	J
					GW-5020-DRS-010	ND 50	µg/L	J
VOCs	Carbon Disulfide	07/25/00	0.519	25.6	GW-5020-DRS-001	ND 100	µg/L	J
					GW-5020-DRS-005	ND 2500	µg/L	J
VOCs	4-Methyl-2-Pentanone	07/26/00	1.44	26.0	GW-5020-DRS-004	ND 10000	µg/L	J

TABLE 4

QUALIFIED SAMPLE RESULTS DUE TO OUTLYING CONTINUING CALIBRATION RESULTS
DOWCRAFT CORPORATION
FALCONER, NEW YORK
JULY 2000

Parameter	*Compound*	*Calibration Date*	*RF*	*%D*	*Associated Sample ID*	*Sample Results*	*Units*	*Qualifier*
VOCs	2-Hexanone	07/26/00	1.00	31.2	GW-5020-DRS-004	ND 10000	µg/L	J

Notes:

*	Sample results were previously qualified as estimated by the laboratory.
%D	Percent Difference.
J	Estimated.
NDx	Not detected at or above x.
RF	Response Factor.
VOCs	Volatile Organic Compounds.

TABLE 5

QUALIFIED SAMPLE RESULTS DUE TO ANALYTE CONCENTRATIONS IN THE METHOD BLANKS

DOWCRAFT CORPORATION

FALCONER, NEW YORK

JULY 2000

Parameter	*Analysis Date*	*Analyte*	*Blank Result*	*Sample ID*	*Sample Result*	*Qualified Sample Result*	*Units*
VOCs	07/25/00	Acetone	3.8J	GW-5020-DRS-001	51J	ND 400	µg/L
				GW-5020-DRS-005	1700J	ND 10000	µg/L

NOTES:

J	Estimated.
NDx	Not detectected at or above x.
VOCs	Volatile Organic Compounds.

TABLE 6
QUALIFIED SAMPLE RESULTS DUE TO VARIABILITY IN FIELD DUPLICATE RESULTS
DOWCRAFT CORPORATION
FALCONER, NEW YORK
JULY 2000

Parameter	*Analyte*	*Original Result*	*Duplicate Result*	***RPD***	*Associanted Sample ID*	*Sample Results*	*Qualifier*	***Units***
VOCs	Trichloroethene	79000	52000	41	GW-5020-DRS-004	79000	J	µg/L
					GW-5020-DRS-005	52000	J	µg/L

Notes:

J	Associated value is estimated.
RPD	Relative Percent Difference.
VOCs	Volatile Organic Compounds.

APPENDIX A

CHAIN OF CUSTODY FORMS

CHAIN OF CUSTODY RECORD

CONESTOGA-ROVERS & ASSOCIATES
2055 Niagara Falls Blvd., Suite 3
Niagara Falls, N.Y. 14304 (716) 297-6150

SHIPPED TO (Laboratory Name): STL Pittsburgh

REFERENCE NUMBER: 5020 Dowcraft

SAMPLER'S SIGNATURE: Dustin R. Steiner

PRINTED NAME: Dustin Steiner

SEQ. No.	DATE	TIME	SAMPLE No.		SAMPLE TYPE	No. of Containers	PARAMETERS Tetrachloroethene	TCE	1,2-dichloroethene	Viny Chloride	REMARKS
	7/18/00	1145	GW-5020-DRS-001	ESI-2	water	2	✓	✓	✓	✓	2×40ml Vou w/ HCl
	↓	1330	GW-5020-DRS-002	ESI-3	↓	2	✓	✓	✓	✓	
		1400	GW-5020-DRS-003	ESI-6		2	✓	✓	✓	✓	
		1425	GW-5020-DRS-004	OW-3R		2	✓	✓	✓	✓	
		1435	GW-5020-DRS-005	Dup of 004		2	✓	✓	✓	✓	
		1510	GW-5020-DRS-006	ESI-10		2	✓	✓	✓	✓	
		1550	GW-5020-DRS-007	ESI-11		2	✓	✓	✓	✓	
		1630	GW-5020-DRS-008	MS/MSD ESI-12		6	✓	✓	✓	✓	
		1645	GW-5020-DRS-009	PW-1		2	✓	✓	✓	✓	
		1745	GW-5020-DRS-010	PW-2		2	✓	✓	✓	✓	
			TP-5020-DRS		DI H_2O	2	✓	✓	✓	✓	

TOTAL NUMBER OF CONTAINERS 26

HEALTH/CHEMICAL HAZARDS —

RELINQUISHED BY: ① Dustin R. Steiner
DATE: 1200
TIME: 7/19/00
RECEIVED BY: ①
DATE: 7/19/00
TIME: 1200

RELINQUISHED BY: ②
DATE: 7/19/00
TIME: 1800
RECEIVED BY: ②
DATE:
TIME:

RELINQUISHED BY: ③
DATE:
TIME:
RECEIVED BY: ③
DATE:
TIME:

METHOD OF SHIPMENT: FEDEX

WAY BILL No. 4569 8653 6099

White –Fully Executed Copy
Yellow –Receiving Laboratory Copy
Pink –Shipper Copy
Goldenrod –Sampler Copy

SAMPLE TEAM: DRS, JJW

RECEIVED FOR LABORATORY BY:
DATE: 7/20/00 TIME: 0945

No N 0404

APPENDIX L

SOIL GAS SURVEY REPORT

FROM
C.T. MALE ASSOCIATES, P.C.
50 Century Hill Drive
P.O. Box 727
Latham, New York 12110
Tel. (518) 786-7400
Fax. (518) 786-7299

LETTER OF TRANSMITTAL

DATE: Apr 20, 1992 PROJECT NO.: 92.884
RE: Dowcraft Soil Gas Survey 4/15/92 - 4/17/92

TO Empire Soils Investigations, Inc.
S-5167 S. Park Avenue
Hamburg, NY ZIP 14075

ATTENTION: Mr. Kevin Shannahan

WE ARE SENDING YOU
☒ ENCLOSED ☐ UNDER SEPARATE COVER
VIA Mail

THE FOLLOWING ITEMS:

☐ DRAWINGS
☐ PROJECT MANUAL
☐ SPECIFICATIONS
☐ COPY OF LETTER
☐ SHOP DRAWING PRINTS
☐ SHOP DRAWING REPRODUCIBLES
☐ SAMPLES
☐ PRODUCT LITERATURE
☐ MEETING NOTES
☐ CHANGE ORDER
☐ REPORT
☐ COST ESTIMATE
☒ OTHER Soil Gas Survey Chromatograms

NO. OF ORIG.	NO. OF COPIES	IDENT. NO.	DATE.	DESCRIPTION	ACTION CODE
1				Soil Gas Survey Chromatograms for Dowcraft	
				Job	

FOR ☐ APPROVAL ☐ REVIEW ☒ YOUR USE ☐ INFORMATION ☐ DISTRIBUTION
☒ OTHER as requested.

ACTION CODE
FS-FURNISH AS SUBMITTED
RR-REVISE AND RESUBMIT
FC-FURNISH AS CORRECTED
S-SUBMIT SPECIFIED ITEM
R-REJECTED

REMARKS

Kevin:

Please note that reported concentrations of 1,2-DCE are solvent peak interference. If this compound had been detected it would show a peak above the nominal baseline. TCE was detected in Points #3, #4, #11, #14, #17, #18 only. Toluene was detected in Point #12 only. All other points were non-detect.

COPIES TO:

SIGNED
NAME Kim L. Baines
TITLE: Environmental Scientist

DOWCRAFT
EMPIRE
Soil Gas S
PAGE-1

Method File: DOWCRAFT . MTD
Calibration File 4-92CAL

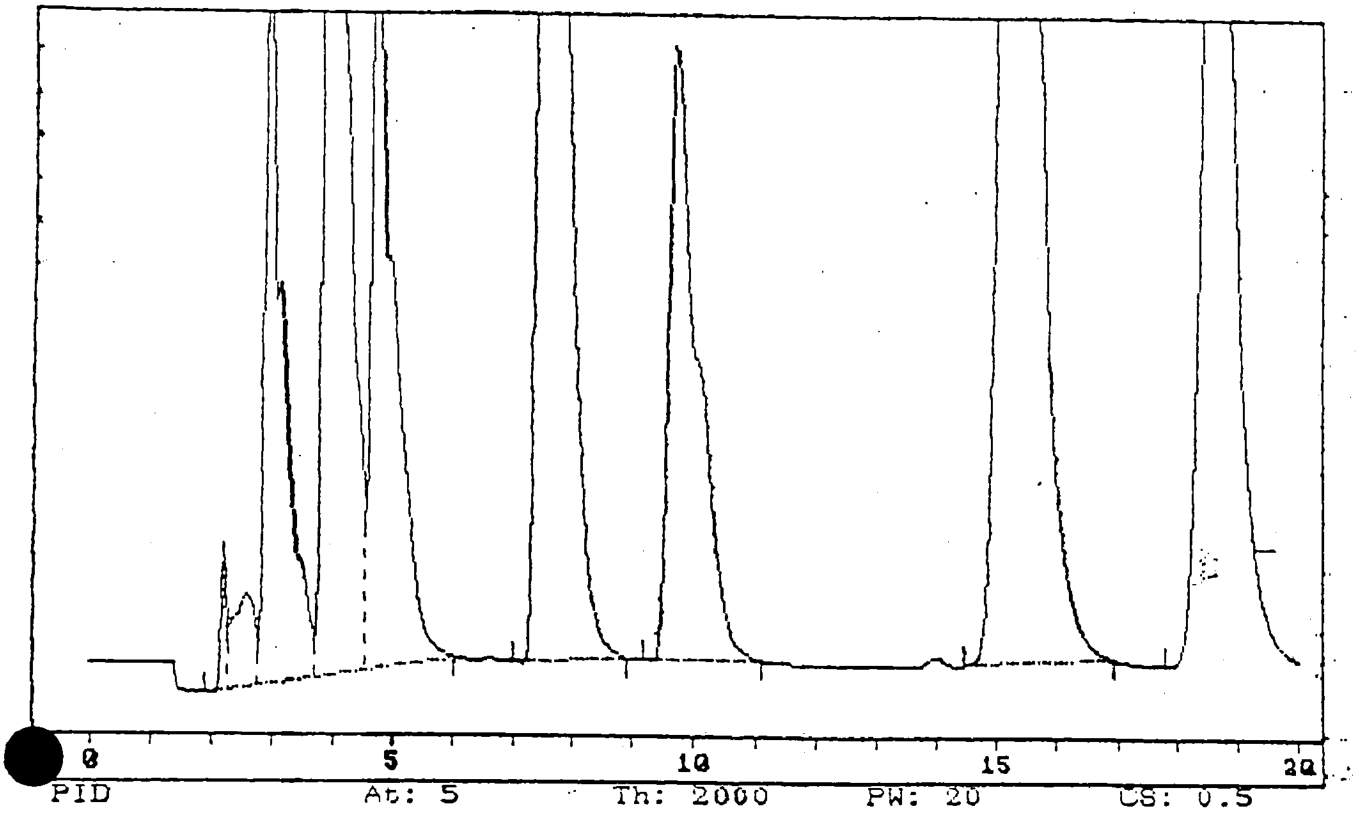
	DATA FILE NAME	DESCRIPTION	REMARKS
4/15/92	DOWCRAFTO	RETENTION CHECK STANDARD	GOOD
	DOWCRFT1	SYRINGE #1 BLANK	GOOD
	~~DOWCRFT2~~	~~SAMPLE POINT # SYR #1~~	
	DOWCRFT	SAMPLE POINT #1 SYR#1 1min	ND
	DOWCRFT2	SAMPLE POINT #1 SYR#1 2min	ND
	DOWCRFT3	SAM PT # 2 1 MIN 1000 UL SYR1	
		1000 UL INJ 2 ft deep	ND
	DOWCRFT4	SAM PT # 3 4-5 ft 1000 UL 1min	TCE HIT
	DOWCRFT5	" " " " " " " " 2 min	TCE HIT
	DOWCRFT 6	SAM PT # 4 1000 UL INJ 2 MIN SAM	ND
	DOWCRFT 7	SAM PT # 5 1000 UL INJ 2 MIN SAM	ND
	DOWCRFT 8	SAMPLE PT #5 1000 UL INJ 2MIN SAM	ND
	RETCAL 1	RETENTION CHECK #2 WITH STD	OK
	DOWCRFT 9	SAMPLE PT #7 @ 4' DEEP 1000 UL >2MIN	
	DOWCFT 10	SAMPLE PT #7 @ 6' DEEP 1000 UL	
	DOWCFT 11	SAMPLE PT #8 @ 4' DEEP 1000 UL 2MIN	
	DOWCFT 12	SAMPLE PT #9 @ 4' DEEP 1000 UL 2 MIN	
	DOWCFT 13	SAMPLE PT #10 @ 4' DEEP 1000 UL, 2 MIN	
4/16/92	RETCHK03	RETENTION CHECK WITH STD	GOOD
	DOWSBLK01	SYRINGE #1 BLANK RUN	
	" 02	SYRINGE #2 BLANK RUN	
	SYRING02	" " " " AFTER MESH CLEAN	
	SYRNG02A	" " " " " " "	
	DOWCF1	SAMPLE POINT # 11 IN PHOS ROOM, 2MIN, SYR#1	
	" 2	SAMPLE PT # 12 IN PHOS ROOM, 2MIN, SYR#2	
	3	SAMPLE PT # 13 " " ", 2MIN, SYR#1	
	DOWCRF1	SAMPLE PT # 14 " " #1	
	2	SAMPLE PT # 15 UNDER STAIRS SYR #2	
	3	RETENTION CHECK W/STANDARD	
	4	SAMPLE PT # 16 IN STORE ROOM SYR#1	
	5	SAMPLE PT # 17 NEAR VAPOR DEGREASER SYR#1	
	DOWCRT1	SAMPLE PT # 18 IN WAREHOUSE ROOM SYR#2	
	2	" " # 19 " " " SYR#1	
	3	" " # 20 " " " SYR#2	

DOWCRAF
EMPIRE
SGS
4/15-16
PAGE 2

DATA FILE	DESCRIPTION	REMARKS
DOWCRT 4	SAMPLE PT # 21 IN BOILER ROOM SYR # 1	
5	" " # 22 OUTSIDE BETWEEN PALLETS SYR # 2	
4/7/92		
DOWCT01	STANDARD AM RETENTION TIME RUN 1	NG
02	" " " CHECK RUN 2	
03	SYRINGE # 1 BLANK RUN	
04	SAMPLE POINT # 23 OUTSIDE CTR PKNG LOT	
05	SP # 24 OUTSIDE PKNG LOT CTR PKNG LOT	
06	SP # 25 " " " NEAR TRASH COMPACTOR	
07	SP # 26 " UNDER SHED ROOF NEAR LUMBER	
08	SP # 27 " NEXT TO CHIMNEY BASE	
09	SP # 28 " IN ALLEY DOWCRAFT SIDE	
10	SP # 29 " IN " JT CONTAINER SIDE	
11	~~SP~~ STANDARD RET CHECK RUN # 2	

Time : 01:11:50
Data File : DOWCRAFT
ethod File : DOWCRAFT
ample Notes: RETENTION CHECK

Date 4/15/1992

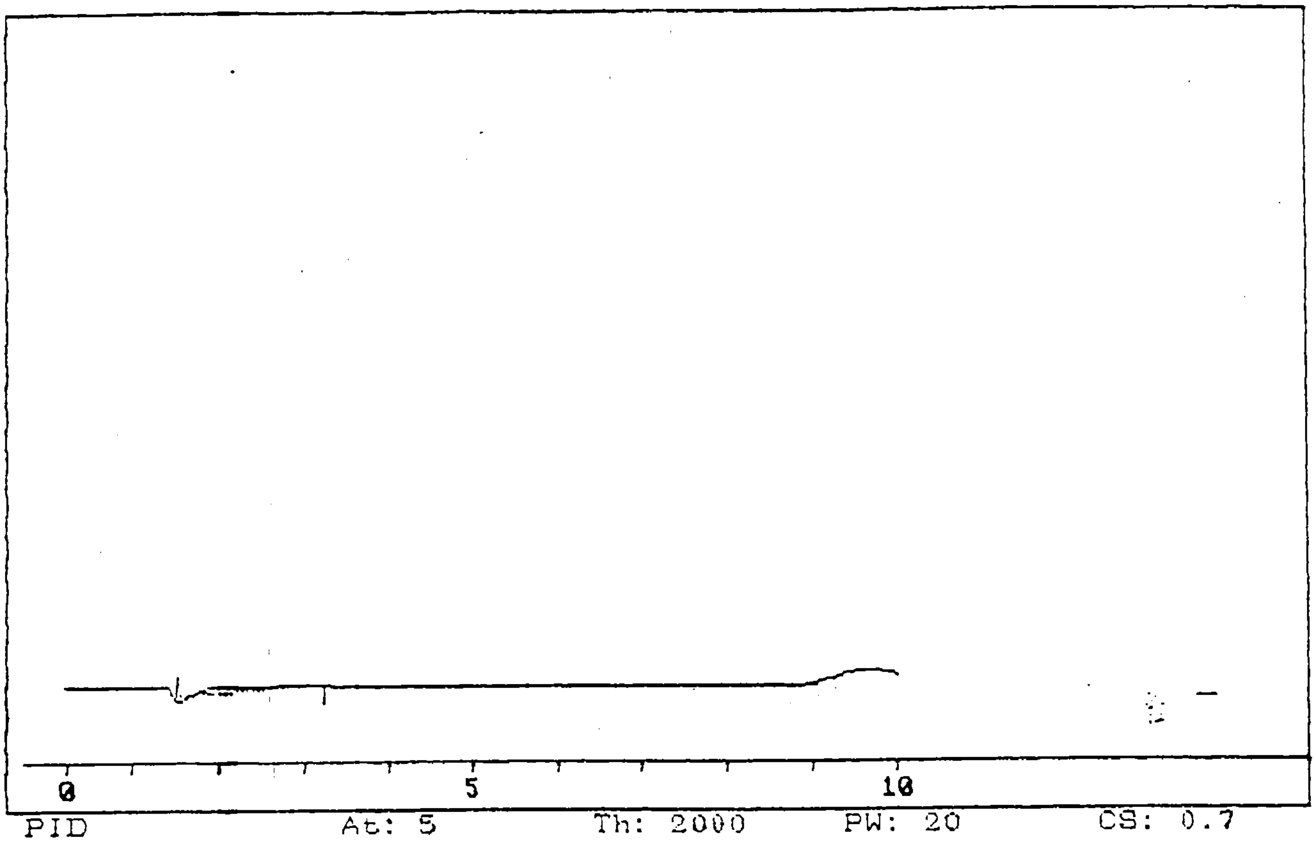


Peak Report

Time 01:11:50 Date 4/15/199
2
Data File: DOWCRAFT
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks : RETENTION CHECK

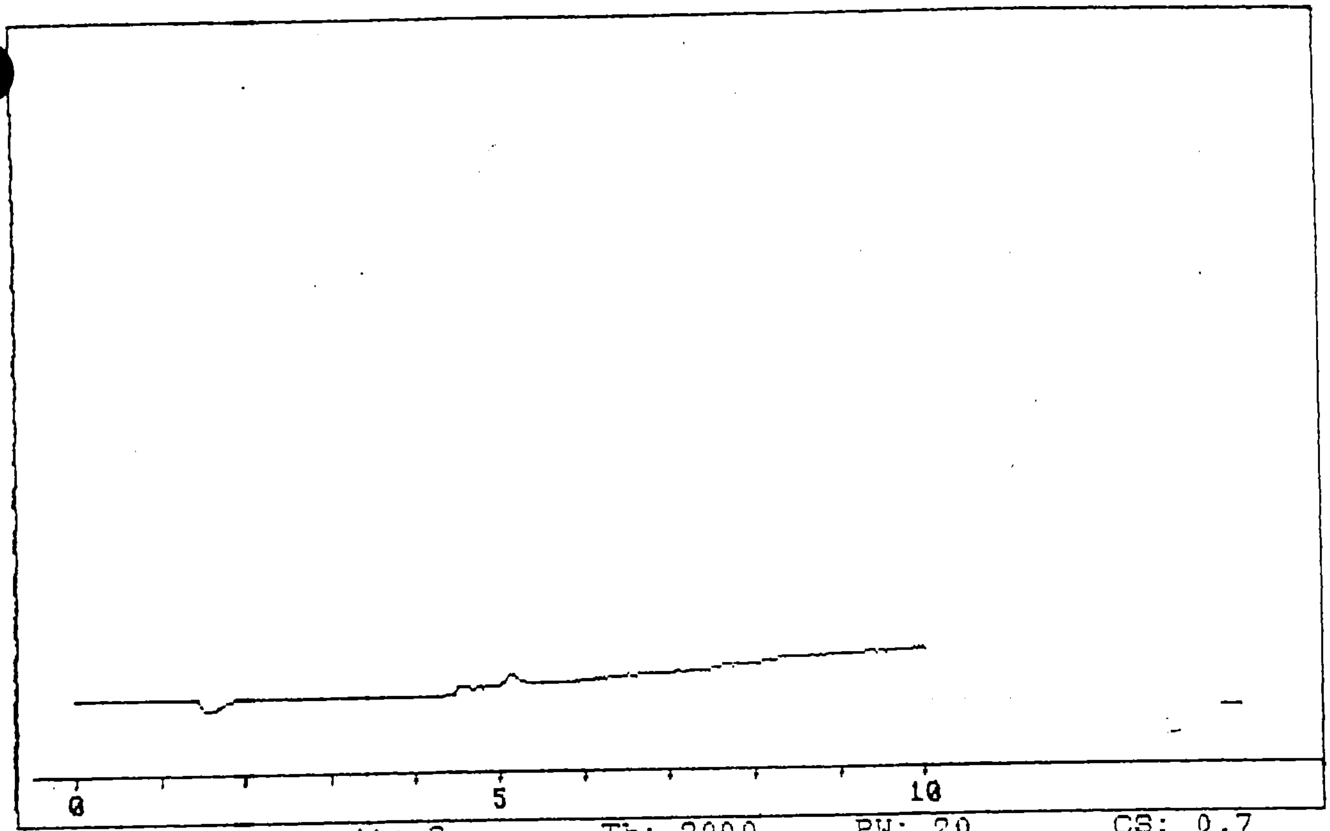
Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:08	2.712E+05	4.195E+04	TRA 12-DCE	505.4
2	00:02:32	6.967E+05	2.510E+04		
3	00:02:52	5.571E+06	5.670E+05	CIS 12-DCE	790.8
4	00:03:50	1.221E+07	8.634E+05	BENZENE	737.4
5	00:04:39	6.785E+06	4.805E+05	TCE	697.9
6	00:07:28	1.217E+07	4.365E+05	TOLUENE	655.2
7	00:09:41	5.119E+06	1.661E+05	PCE	609.5
8	00:15:20	2.634E+07	8.595E+05		



```
PID             At: 5       Th: 2000     PW: 20       CS: 0.7

                          Peak Report
Time       01:48:43                               Date     4/15/199
2
Data File: DOWCRFT1
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks : SYRINGE #1 BLANK RUN

                      Ch 1 Detector: PID

NUMBER    RET. TIME     AREA        HEIGHT       IDENTIFIER   CONCENTRA
TION

  1       00:02:55    6.836E+04   1.013E+03    CIS 12-DCE    -89.14
```

↑ NO, IN SOLVENT PEAK



PID At: 3 Th: 2000 PW: 20 CS: 0.7

Peak Report

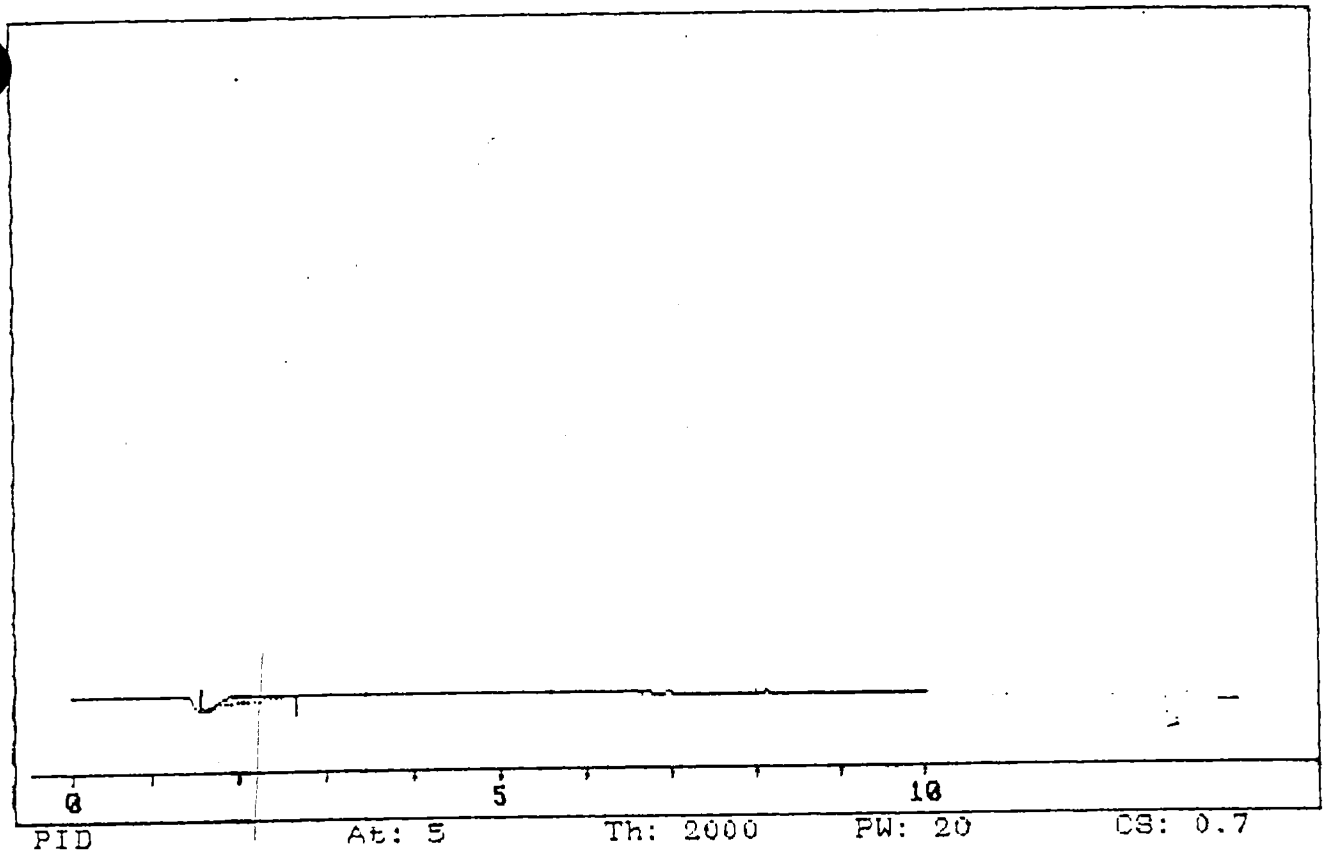
Time 02:12:33 Date 4/15/199
2

Data File: DOWCRFT
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks : HOLE NO 1 1000 UL INJ 1 MIN SAMPLE

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION

No peaks detected.



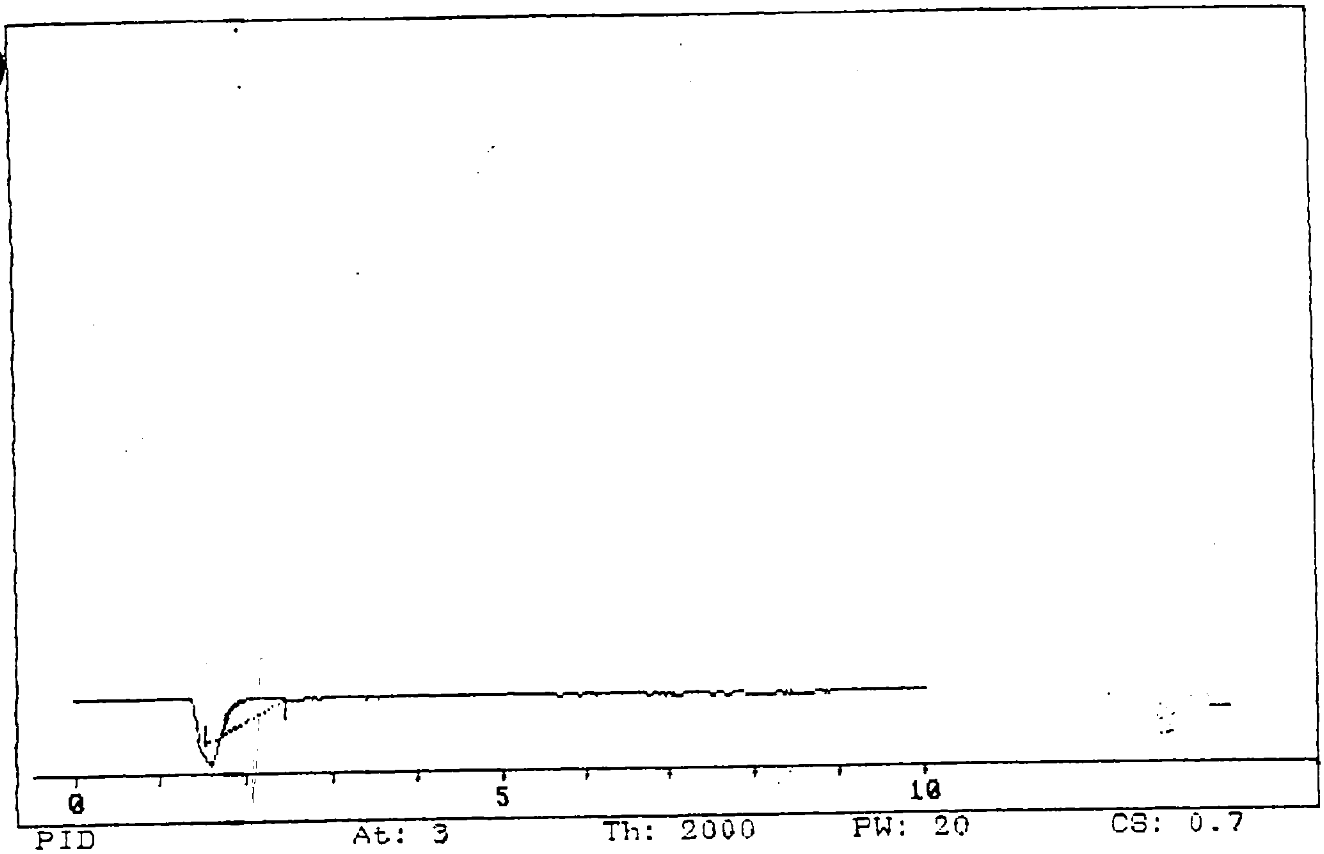
Peak Report

Time 02:28:16 Date 4/15/199
2
Data File: DOWCRFT2
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks : SAMPLE PT 1 RUN 2, 2 MIN SAMPLE

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:20	4.063E+04	8.488E+02	TRA 12-DCE	476.4

NO solvent peak
NOT DCE



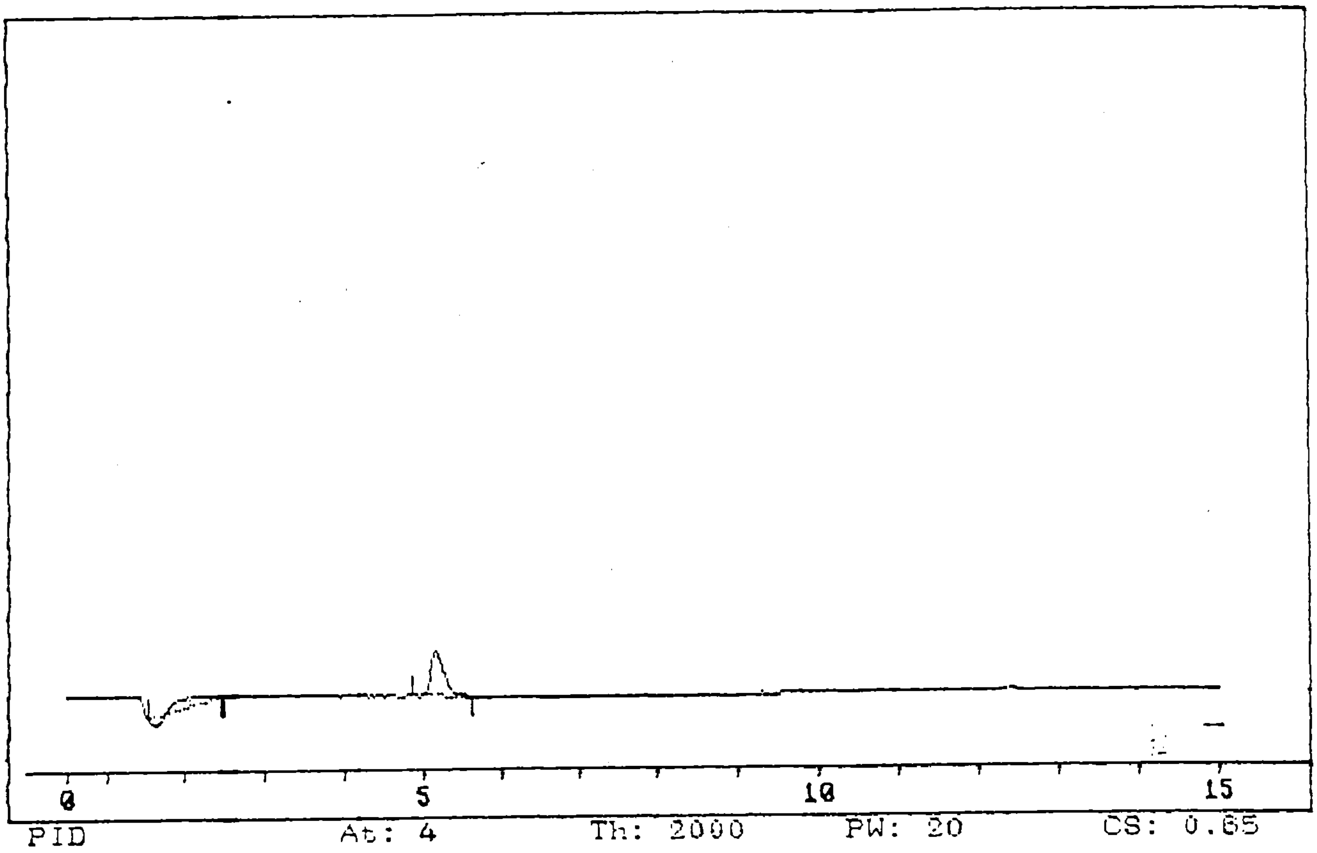
Peak Report

Time 02:59:34 Date 4/15/199
2
Data File: DOWCRFT3
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks : SAMPLE POINT 2, 1 MIN @ 2 FEET DP

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:08	3.049E+04	1.141E+03	TRA 12-DCE	475.1

↑ ND, IN SOLVENT PEAK



Peak Report

Time 03:41:29 Date 4/15/199
2
Data File: DOWCRFT5
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks : SAM POINT 3 1000UL INJ 2 MIN SMPL

Ch 1 Detector: PID

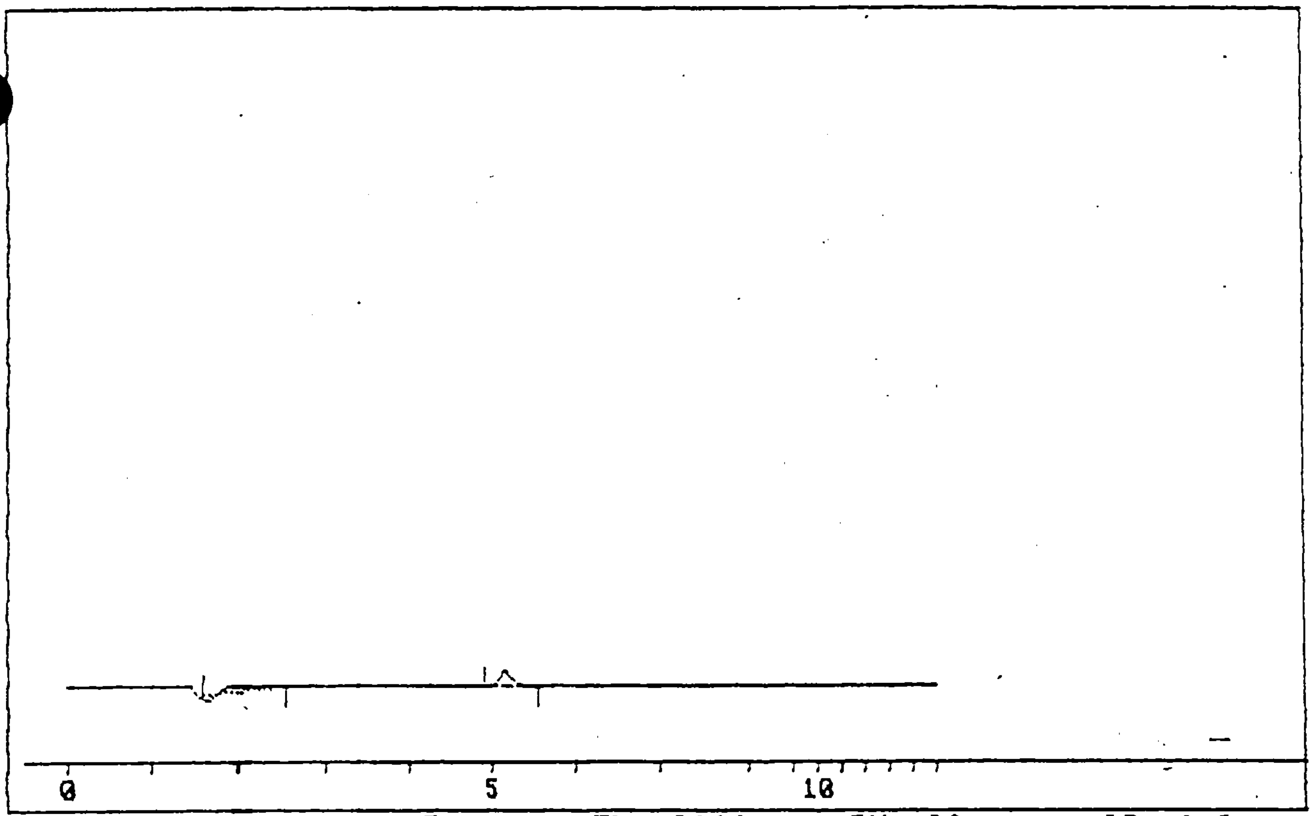
NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:14	2.720E+04	9.417E+02	TRA 12-DCE	474.7
2	00:05:07	7.567E+04	6.343E+03	TCE	6.904

NOTE

TRA. 1,2-DCE IS ND IN SOLVENT PEAK

TCE IS VALID CONC.

ALL CONCENTRATION VALUES ARE PPB WEIGHT / VOLUME



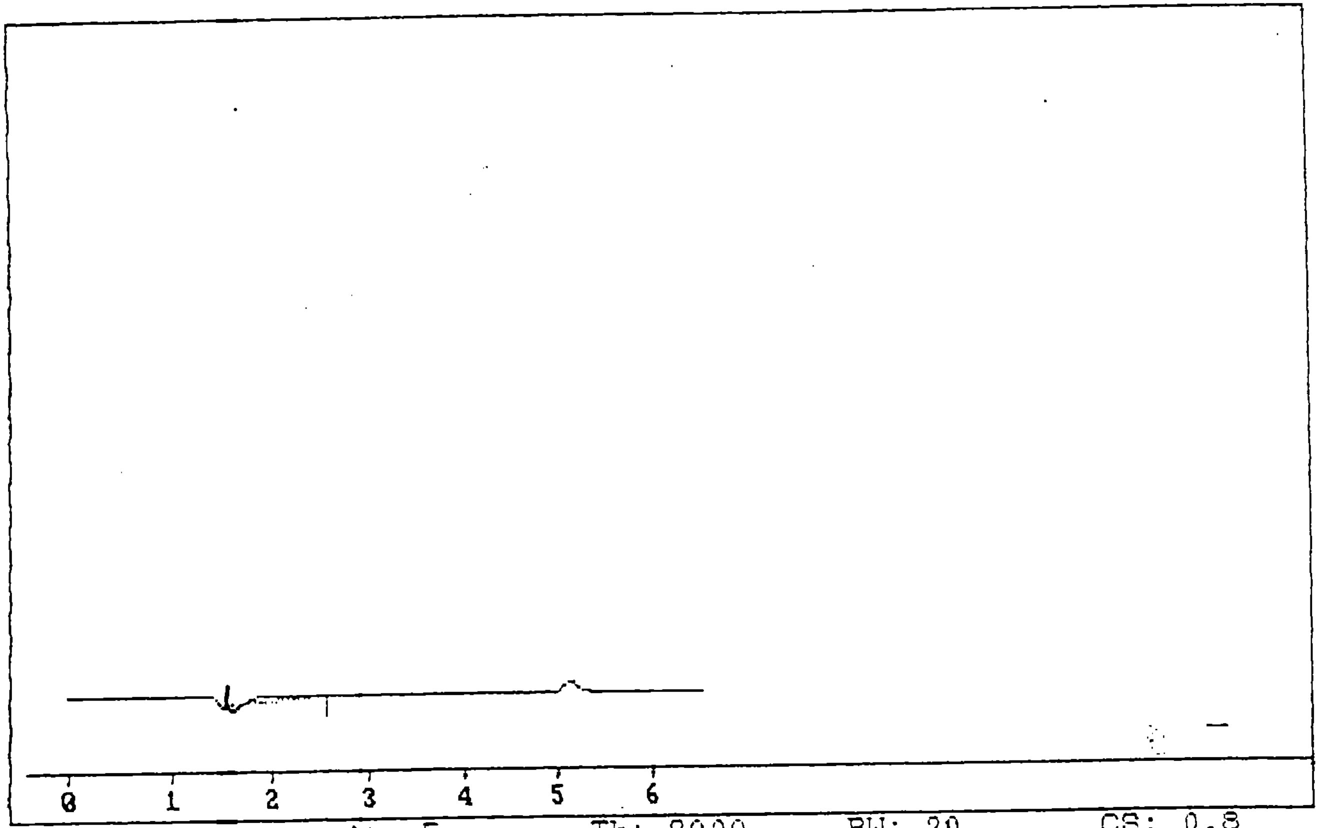
```
PID              At: 5        Th: 2000      PW: 20        CS: 0.2
```

```
                              Peak Report
Time      03:18:02                                Date      4/15/199
2
Data File: DOWCRFT4
Method File: DOWCRAFT
Method remarks  : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks  : PT NO 4 1000 UL INJ 1 MIN 4-5 FT

                         Ch 1 Detector: PID

NUMBER    RET. TIME    AREA        HEIGHT      IDENTIFIER    CONCENTRA
TION
------    ---------    ---------   ---------   ----------    ----------

  1       00:02:14     3.315E+04   1.016E+03   TRA 12-DCE     475.4
  2       00:05:07     4.751E+04   4.292E+03   TCE            4.281
```

NOTE

TRA 1,2-DCE IS ND IN SOLVENT PEAK

TCE IS VALID CONC. (PPB)



PID At: 5 Th: 2000 PW: 20 CS: 0.8

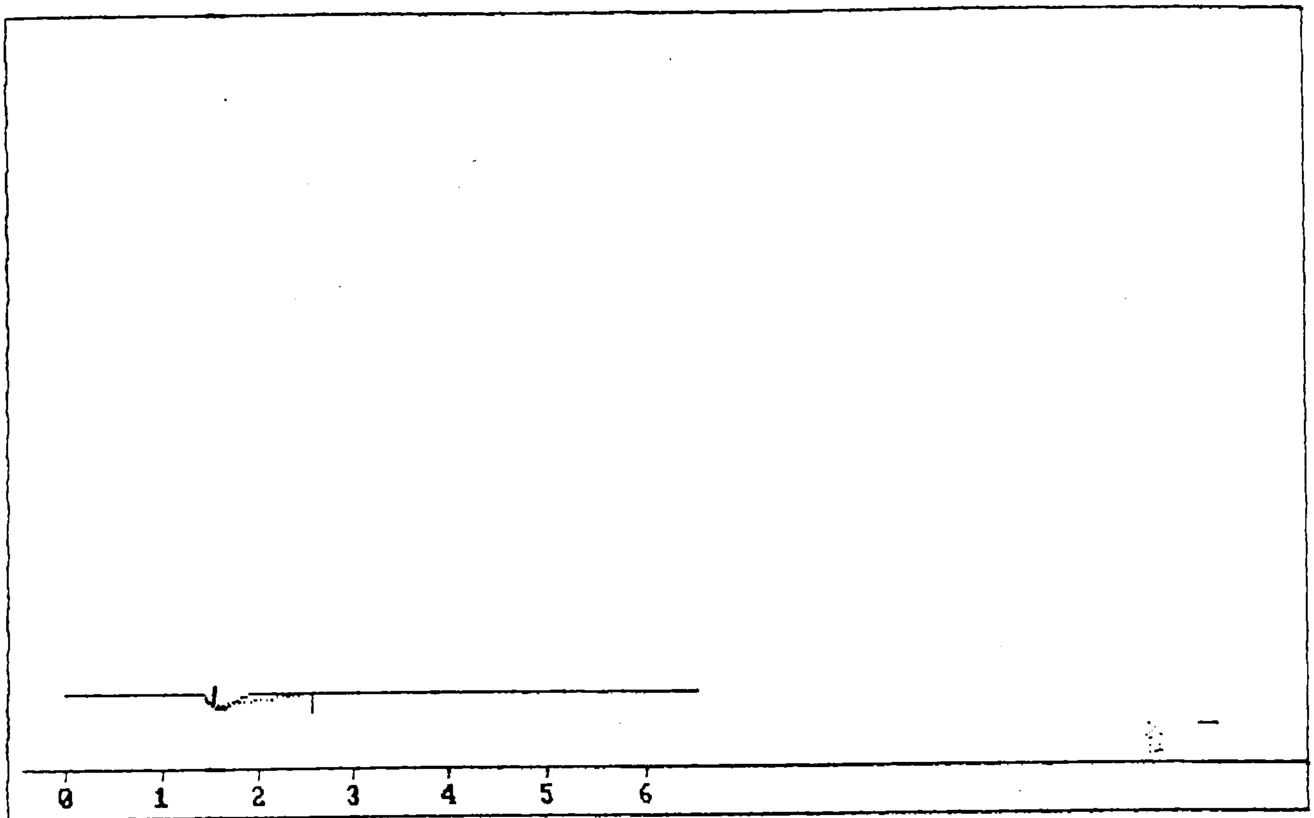
Peak Report

Time 04:03:10 Date 4/15/199
2
Data File: DOWCRFT6
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks : SAMPLE PT 4, 2 MIN SAMPLE 1000UL

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:17	3.952E+04	8.826E+02	TRA 12-DCE	476.2

↑
ND, IN SOLVENT PEAK



PID At: 5 Th: 2000 PW: 20 CS: 0.8

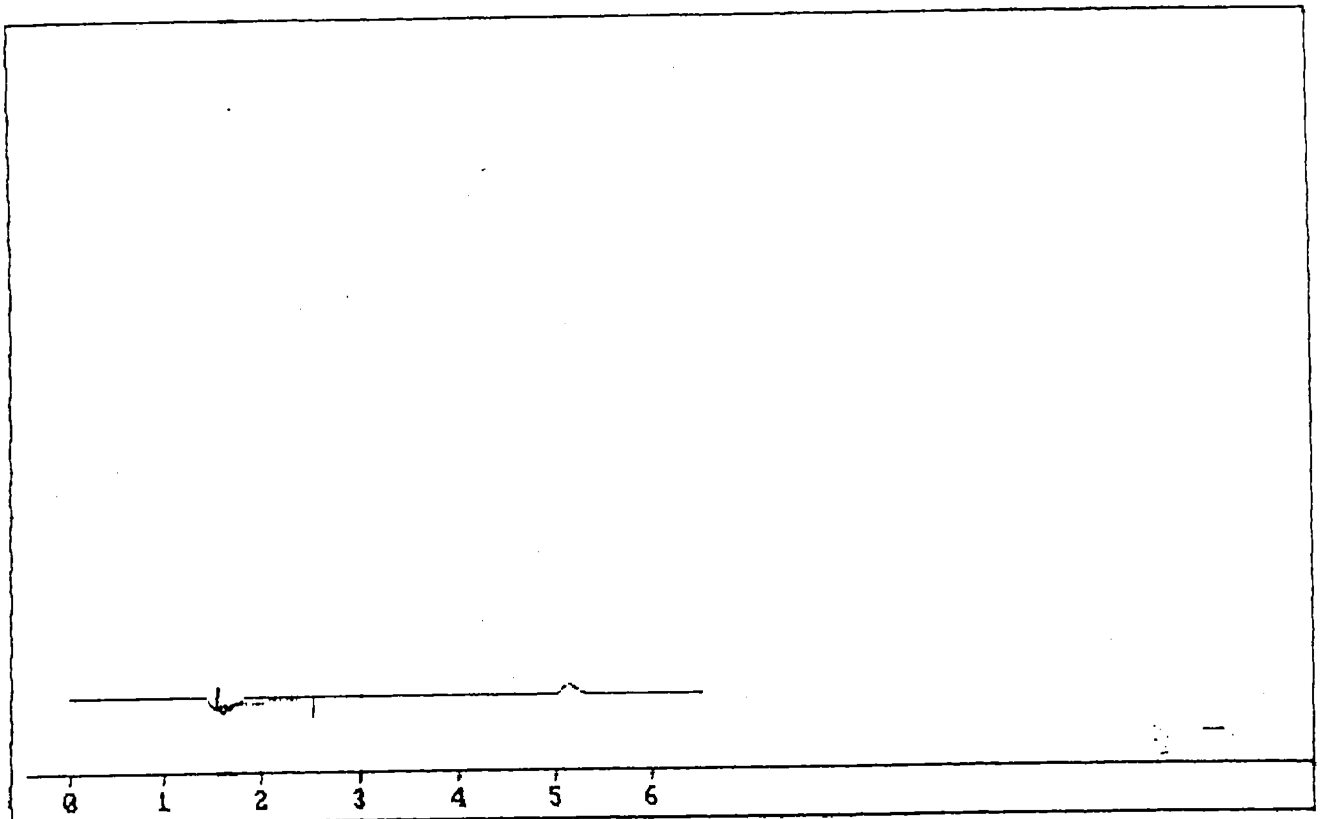
Peak Report

Time 04:14:11 **Date** 4/15/1992
Data File: DOWCRFT7
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks : SAMPLE PT 5 1000UL INJ 2 MIN SAM

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:14	3.351E+04	9.725E+02	TRA 12-DCE	475.5

← ND, IN SOLVENT PEAK



PID At: 5 Th: 2000 PW: 20 CS: 0.8

Peak Report

Time 04:28:45 Date 4/15/1992

Data File: DOWCRFT8

Method File: DOWCRAFT

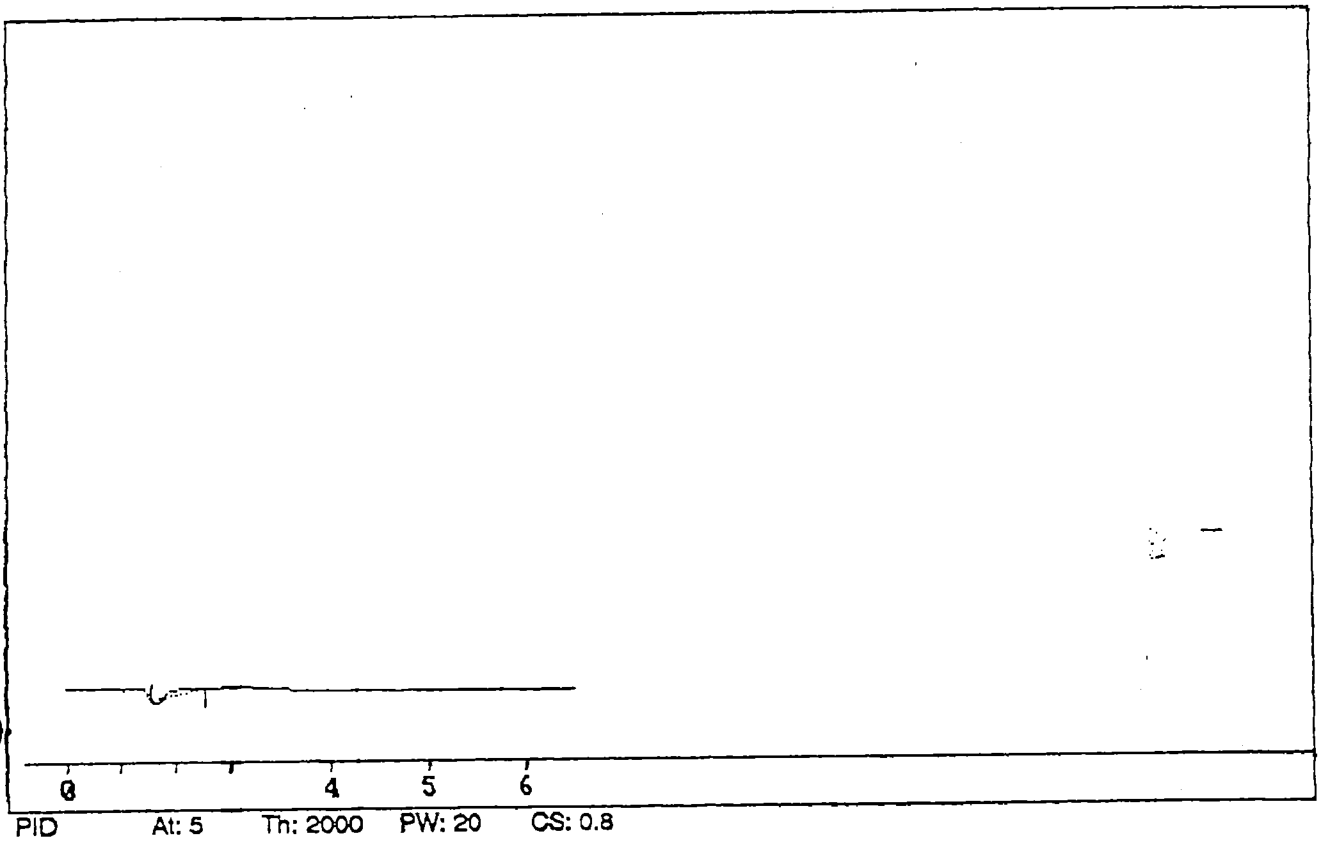
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92

Sample remarks : SAMPLE PT 8 1000UL INJ 2 MIN SAM

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:15	3.311E+04	8.249E+02	TRA 12-DCE	475.4

← ND , IN SOLVENT PEAK



Peak Report

Time 05:18:51 Date 4/15/1992

Data File: DOWCRFT9

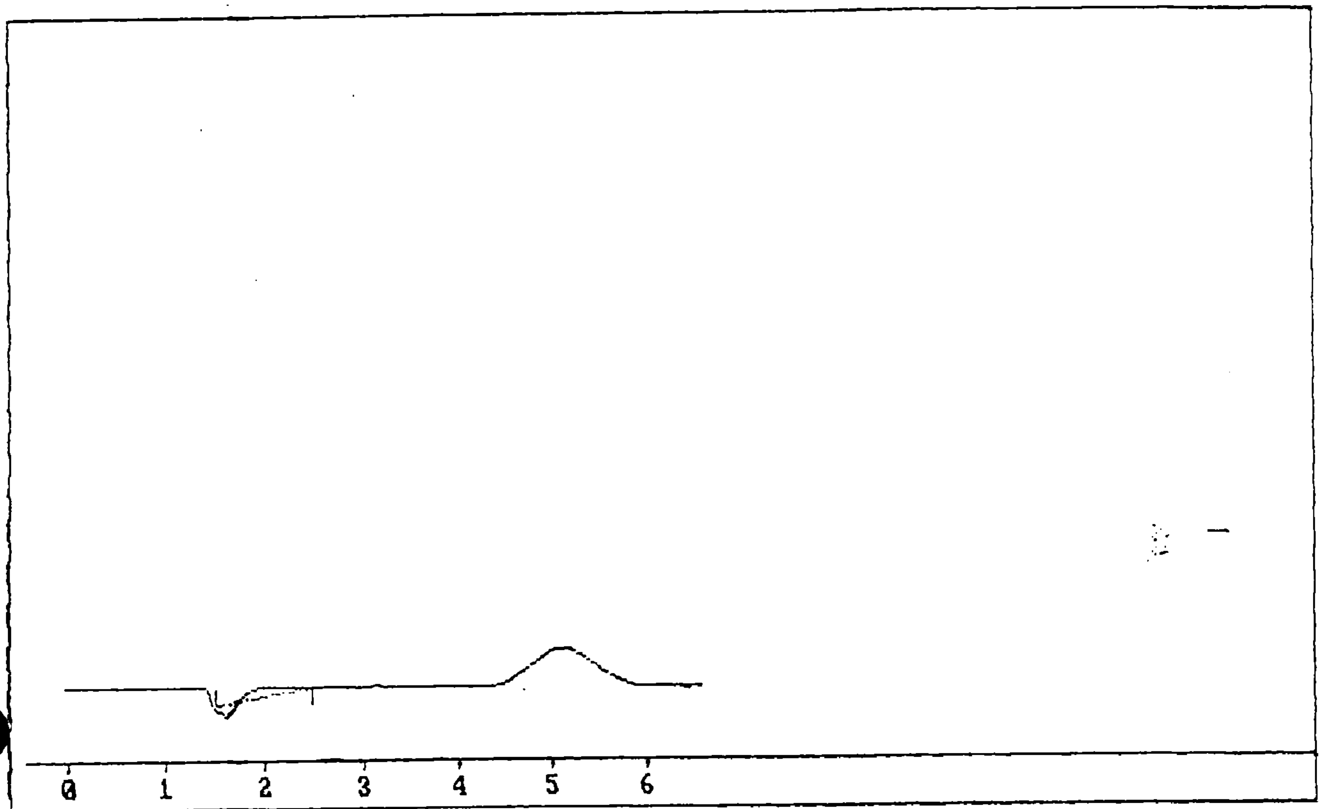
Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92

SAMPLE POINT # 7 @ 4' 1 MIN

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION	
1	00:02:18	2.906E+04	5.524E+02	TRA 12-DCE	474.9	← ND, IN SOLVENT PEAK



PID At: 4 Th: 2000 PW: 20 CS: 0.8

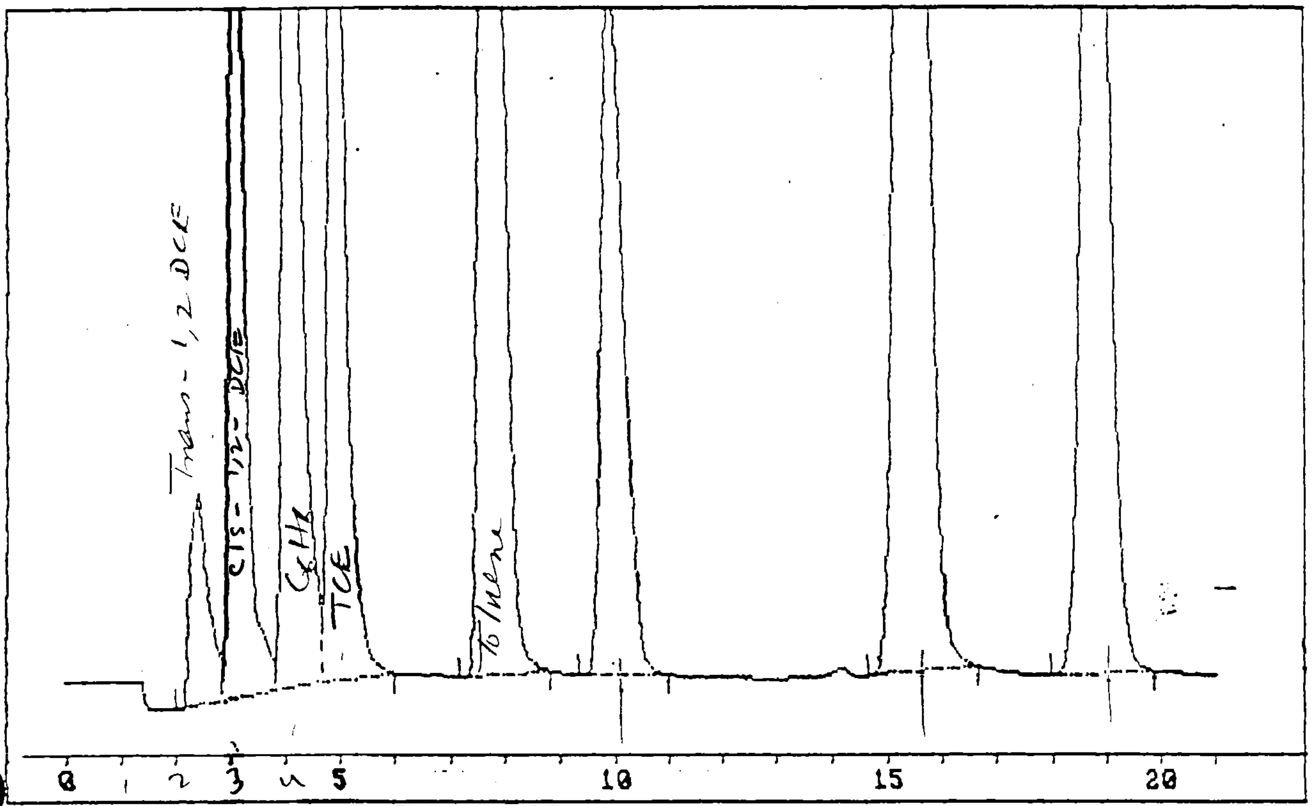
Peak Report

Time 05:28:10 Date 4/15/1992
Data File: DOWCFT10
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks : SAMPLE PT 7 @ 6 FT, 1000UL, 2 MIN

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:11	2.610E+04	9.679E+02	TRA 12-DCE	474.5 ← ND , Solvent PEAK

Time : 04:48:37 Date 4/15/1992
Data File : RETCAL1
Method File : DOWCRAFT
Sample Notes: RETENTION CHECK WITH STANDARD



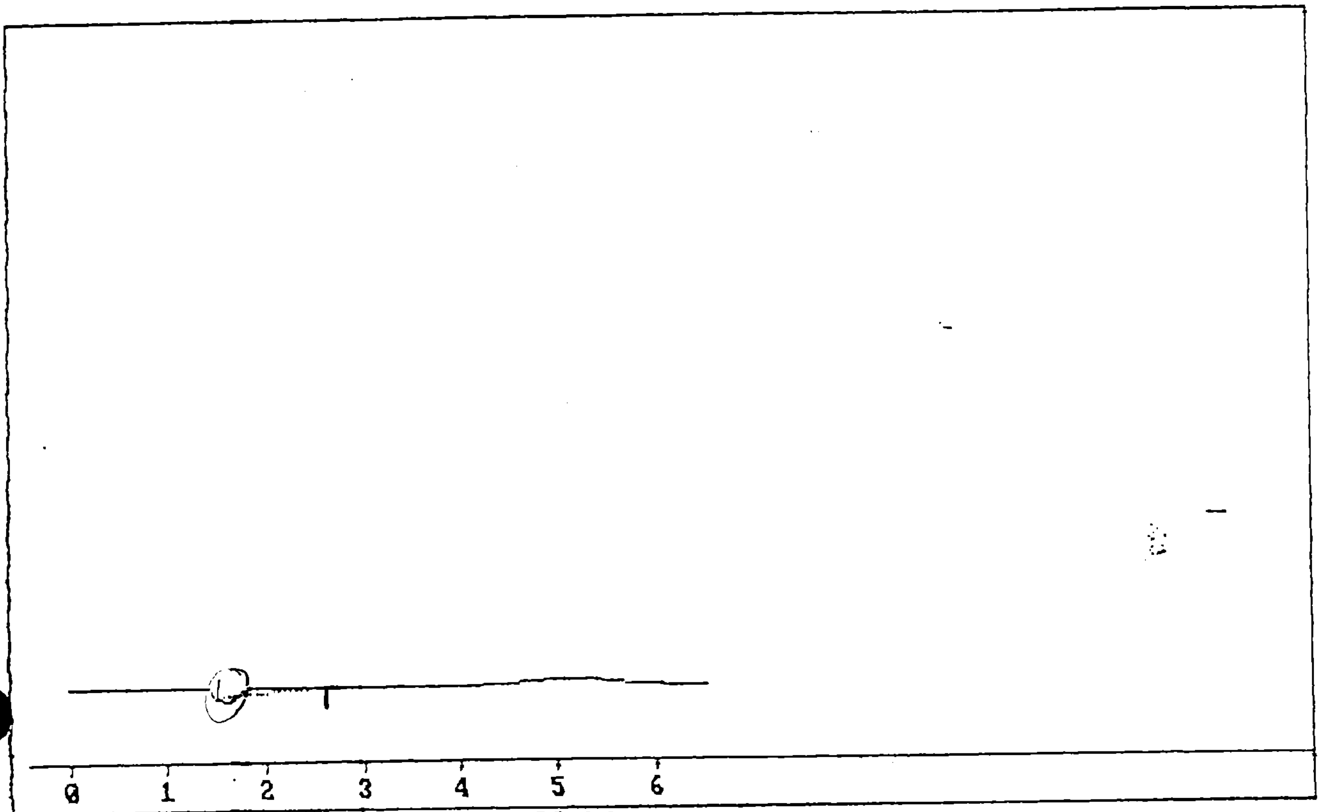
PID At: 5 Th: 2000 PW: 20 CS: 0.45

Peak Report

Time 04:48:37 Date 4/15/1992
Data File: RETCAL1
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks : RETENTION CHECK WITH STANDARD

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:23	1.365E+06	5.733E+04	TRA 12-DCE	643.1
2	00:03:00	6.157E+06	4.320E+05	CIS 12-DCE	882.3
3	00:04:00	1.348E+07	8.621E+05	BENZENE	822.5
4	00:04:49	6.940E+06	3.879E+05	TCE	714.2
5	00:07:38	1.259E+07	4.844E+05	TOLUENE	679
6	00:09:53	5.268E+06	1.895E+05		
7	00:15:33	2.685E+07	8.571E+05		
8	00:18:48	1.177E+07	3.919E+05		



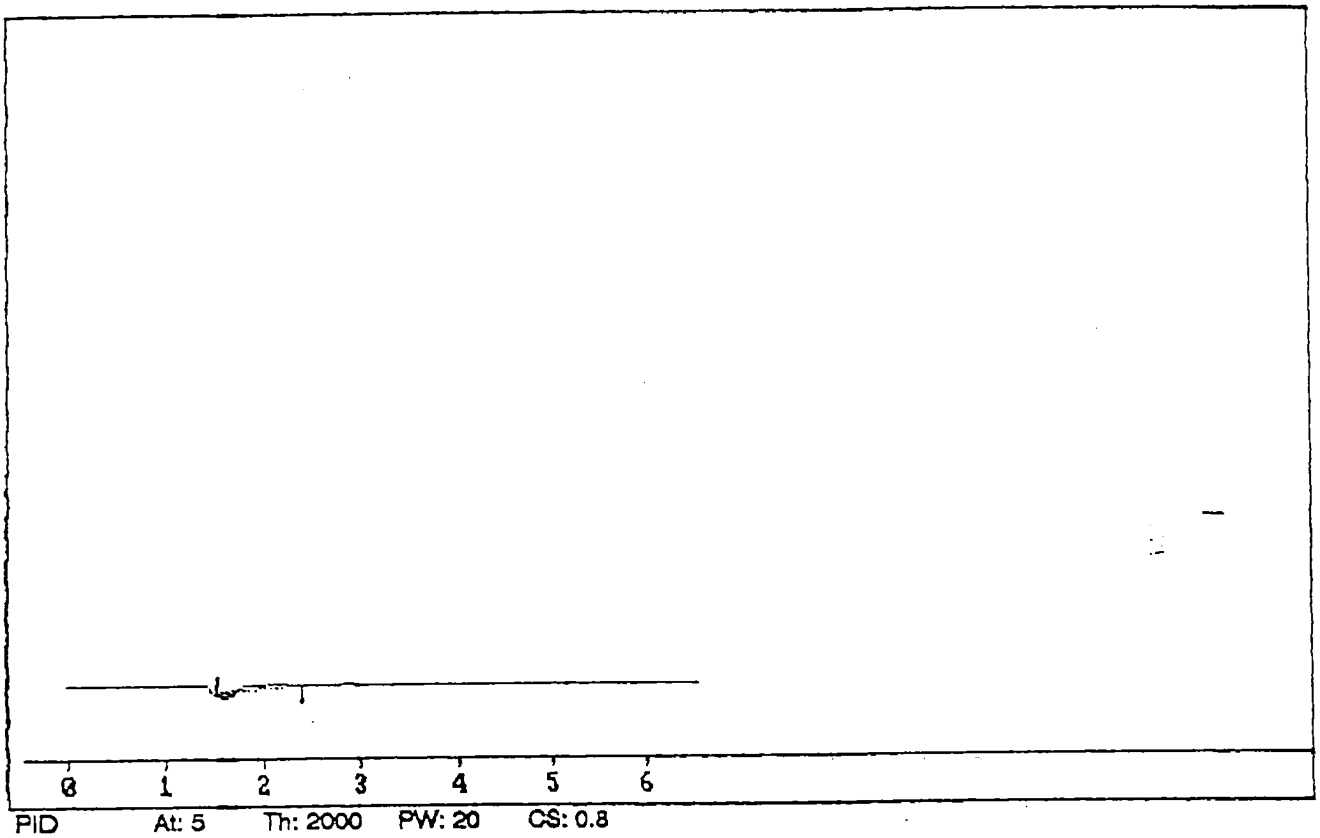
PID At: 5 Th: 2000 PW: 20 CS: 0.8

Peak Report

Time 05:40:38 Date 4/15/1992
Data File: DOWCFT11
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks : SAMPLE PT 8 @ 4 FT 1000UL, 2 MIN

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:17	3.629E+04	8.516E+02	TRA 12-DCE	475.8 ← ND, SOLVENT PEAK



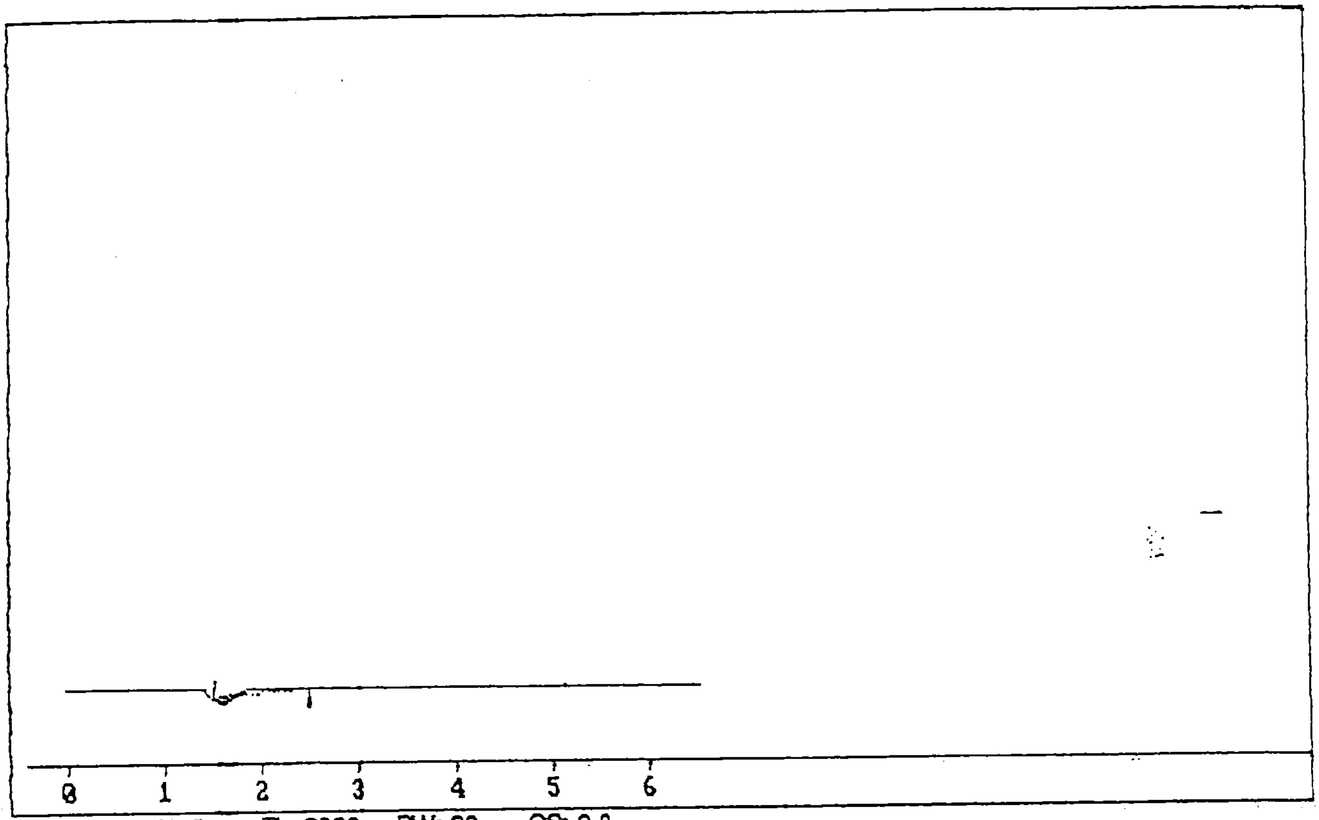
PID At: 5 Th: 2000 PW: 20 CS: 0.8

Peak Report

Time 05:53:58 Date 4/15/1992
Data File: DOWCFT12
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92
Sample remarks : SAMPLE PT 9 @ ~~8~~ 4 FT, 1000UL, 2 MIN

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:06	3.594E+04	1.801E+03	TRA 12-DCE	475.8 ← ND, SOLVENT PEAK



PID At: 5 Th: 2000 PW: 20 CS: 0.8

Peak Report

Time 08:06:51 **Date** 4/15/1992

Data File: DOWCFT13

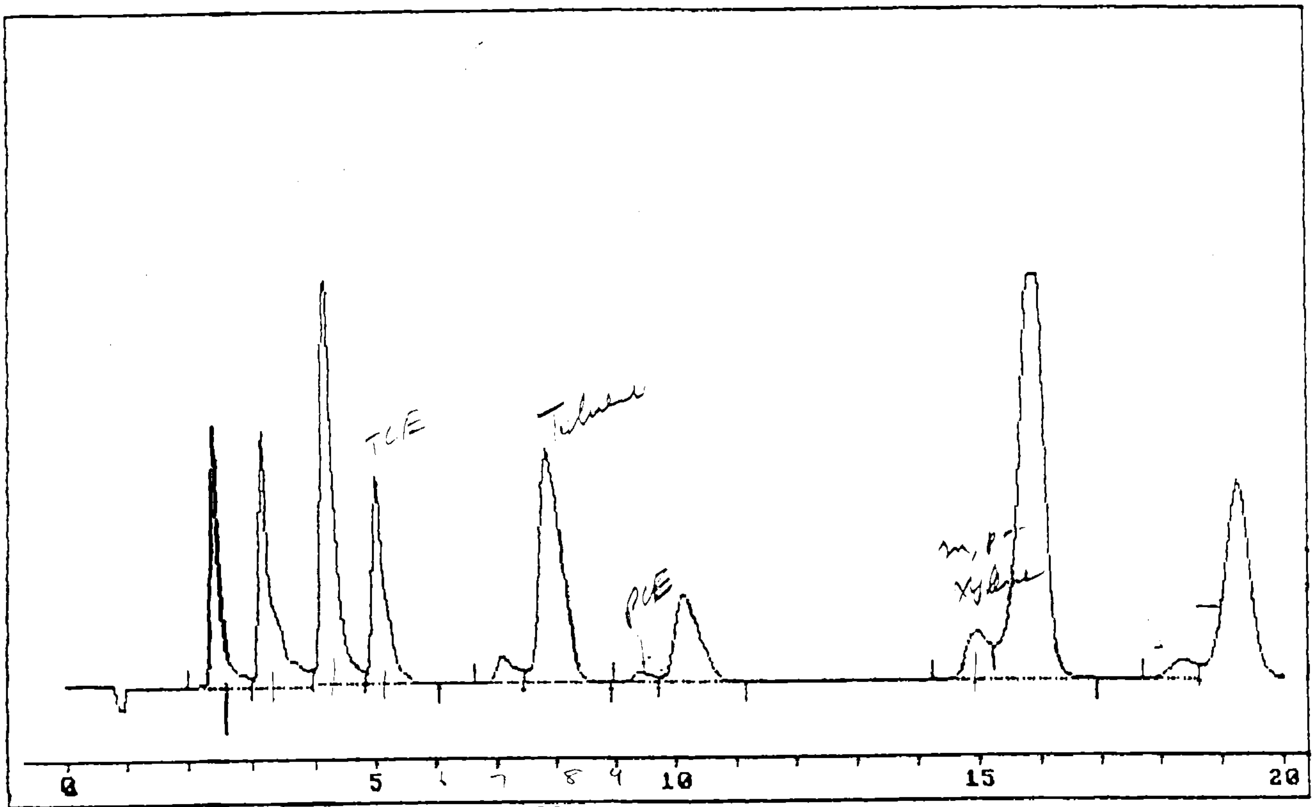
Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92

Sample remarks : SAMPLE PT 10 @ 4 FT, 1000UL, 2 MIN

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION	
1	00:02:13	2.763E+04	8.561E+02	TRA 12-DCE	474.7	← ND, SOLVENT PEAK



PID At: 8 Th: 2000 PW: 20 CS: 0.5

Peak Report

Time 20:20:20 Date 4/15/1992

Data File: RETCHK03

Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92

Sample remarks : 4/16/92 AM STD RETENTION CHECK

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:20	5.750E+06	5.630E+05	TRA 12-DCE	1195
2	00:03:06	7.733E+06	5.772E+05	CIS 12-DCE	1129
3	00:04:07	1.308E+07	8.596E+05	BENZENE	796.3
4	00:04:57	6.589E+06	4.566E+05	TCE	677.3
5	00:07:03	1.319E+06	5.964E+04	TOLUENE	39.32
6	00:07:47	1.242E+07	4.970E+05		
7	00:09:22	4.989E+05	2.184E+04	PCE	62.72
8	00:10:05	5.223E+06	1.888E+05		
9	00:14:54	2.803E+06	1.026E+05	M,P-XYLENE	1.412
10	00:15:55	2.821E+07	8.544E+05		
11	00:18:19	1.169E+06	3.979E+04		

Peak Report

Time 20:20:20 Date 4/15/1992

Data File: RETCHK03

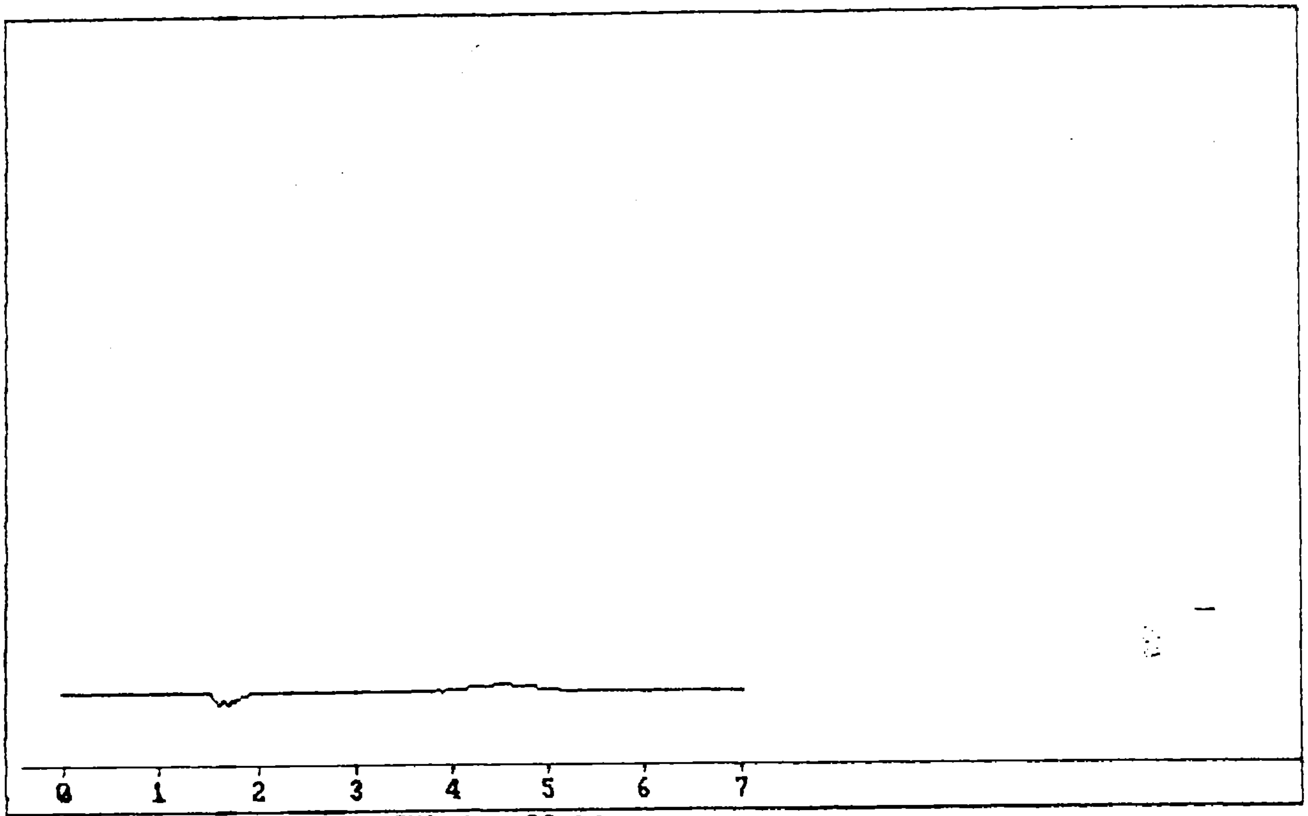
Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/15/92

Sample remarks : 4/16/92 AM STD RETENTION CHECK

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:20	5.750E+06	5.630E+05	TRA 12-DCE	1195
2	00:03:06	7.733E+06	5.772E+05	CIS 12-DCE	1129
3	00:04:07	1.308E+07	6.596E+05	BENZENE	796.3
4	00:04:57	6.589E+06	4.566E+05	TCE	677.3
5	00:07:03	1.319E+06	5.964E+04		
6	00:07:47	1.242E+07	4.970E+05	TOLUENE	669.3
7	00:09:22	4.989E+05	2.184E+04		
8	00:10:05	5.223E+06	1.888E+05	PCE	621.8
9	00:14:54	2.803E+06	1.026E+05	M,P-XYLENE	1.412
10	00:15:55	2.621E+07	6.544E+05		
11	00:18:19	1.169E+06	3.979E+04		



PID At: 5 Th: 2000 PW: 20 CS: 0.8

Peak Report

Time 20:54:49 Date 4/15/1992

Data File: DOWSBLK1

Method File: DOWCRAFT

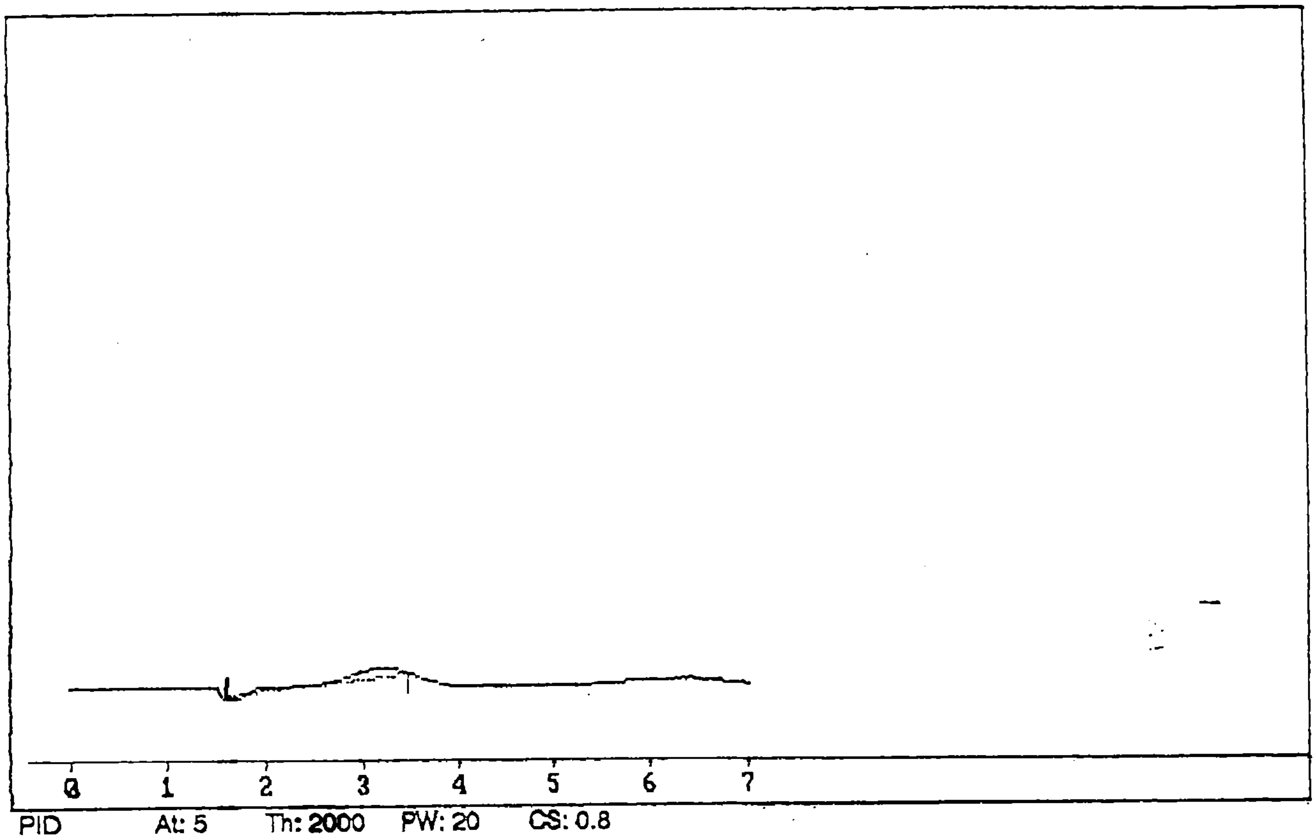
Method remarks : **EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92**

SYRINGE NO. 1 AM BLANK RUN

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION

No peaks detected.



Peak Report

Time 21:02:54 Date 4/15/1992

Data File: DOWSBLK2

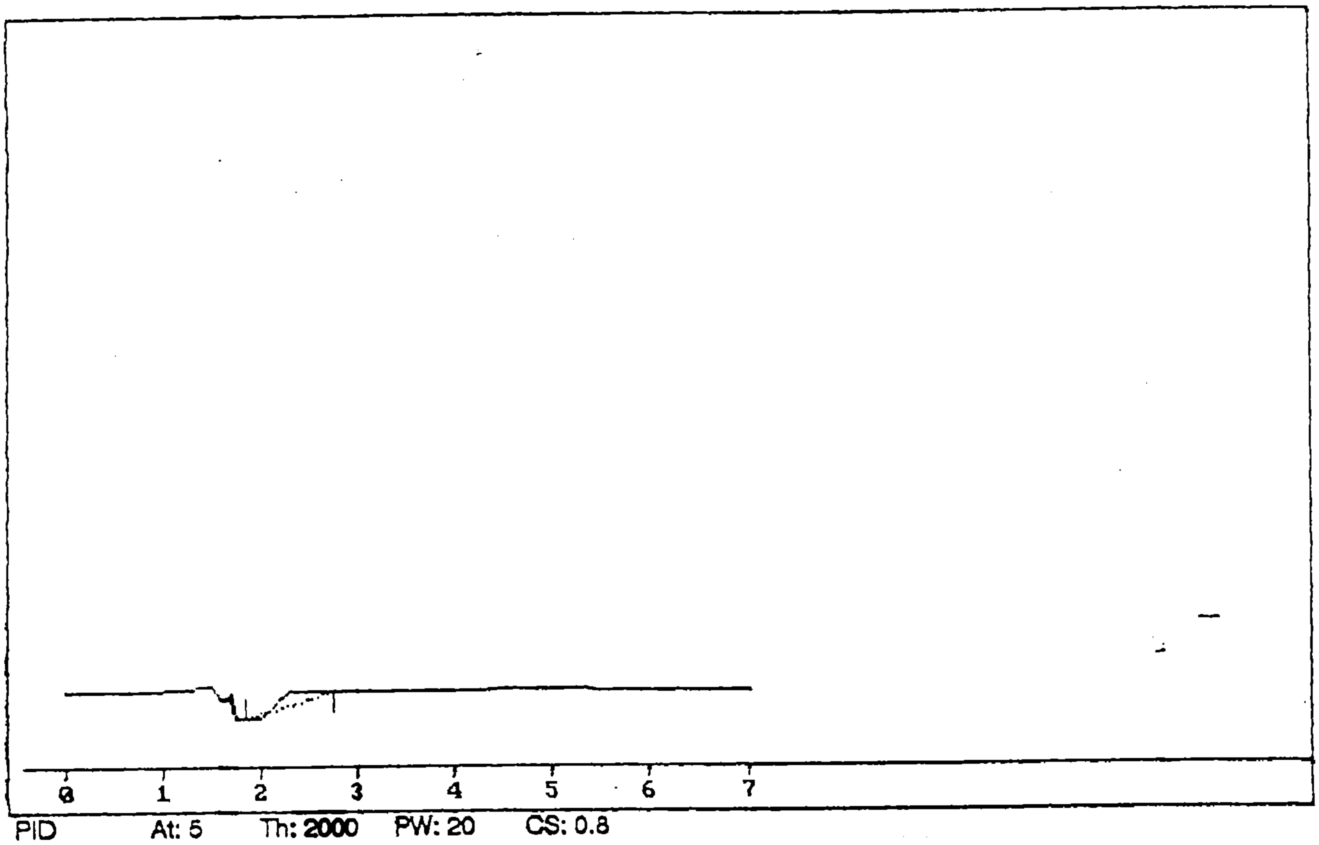
Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92

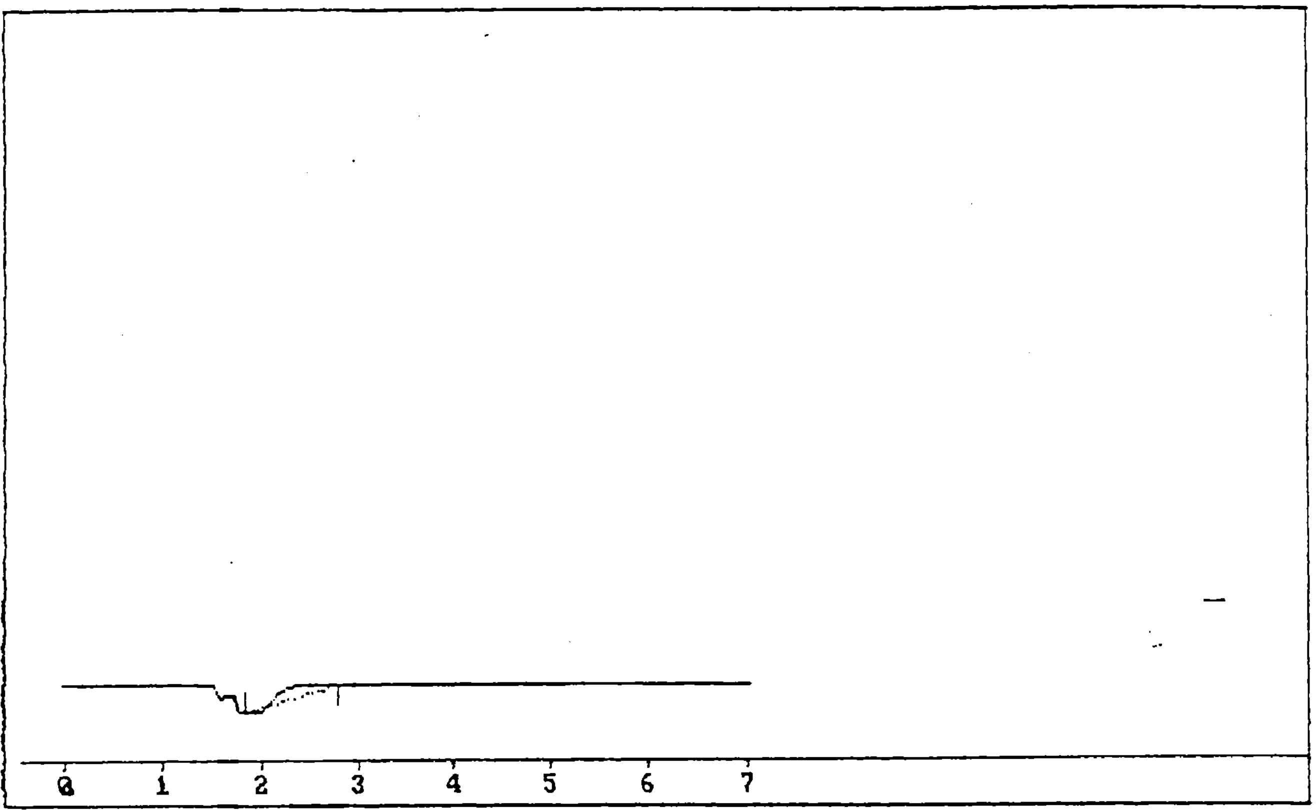
Sample remarks : SYRINGE NO. 2 AM BLANK RUN

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:03:13	1.202E+05	2.147E+03	CIS 12-DCE	-61.04



```
                         Peak Report
Time    21:17:14                       Date   4/15/1992
Data File: SYRING02
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92
Sample remarks : SYRINGE #2 BLANK AFTR MEOH CLEAN

                    Ch 1 Detector: PID


NUMBER   RET. TIME    AREA      HEIGHT    IDENTIFIER  CONCENTRATION

  1      00:02:30   7.418E+04  2.058E+03
```



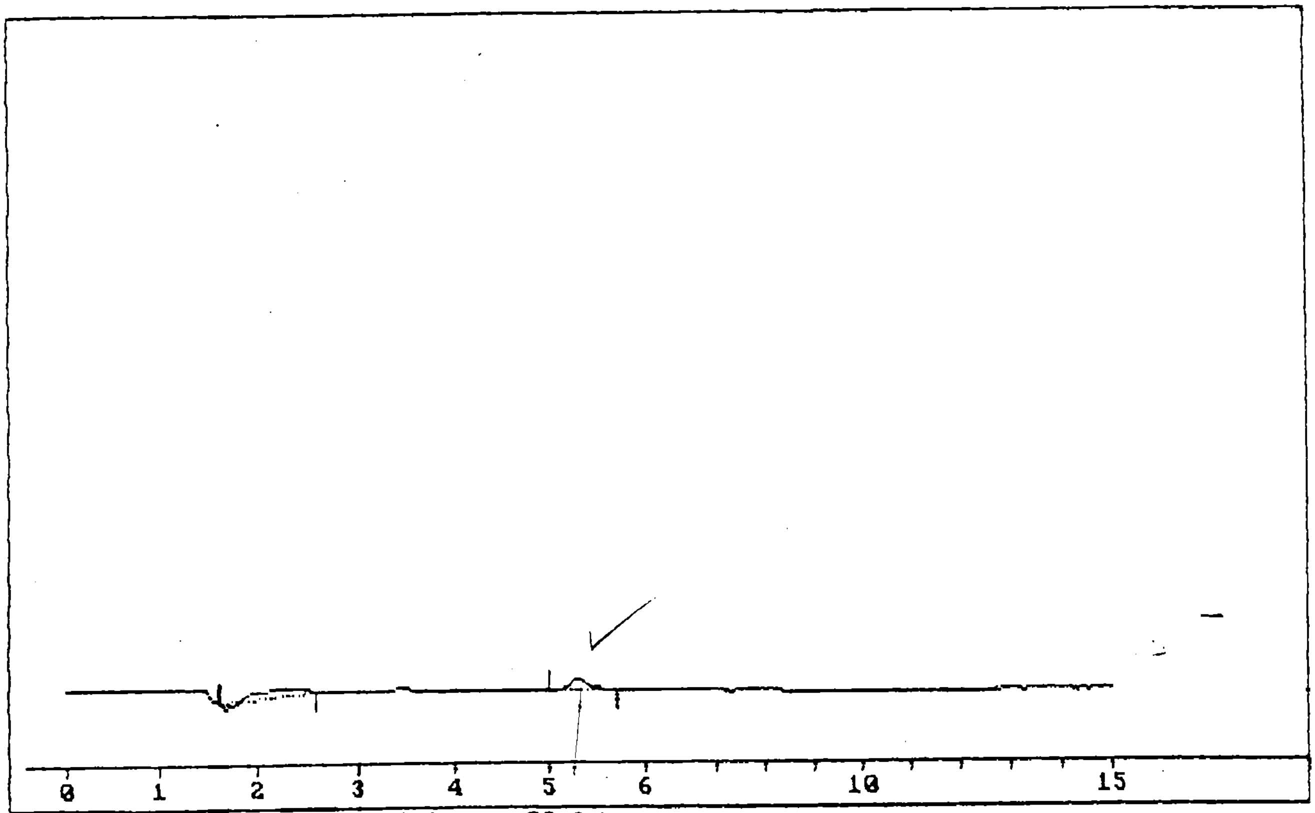
PID At: 5 Th: 2000 PW: 20 CS: 0.8

Peak Report

Time 21:28:26 Date 4/15/1992
Data File: SYRNG02A
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:31	6.918E+04	1.779E+03		



PID At: 5 Th: 2000 PW: 20 CS: 0.4

Peak Report

Time 23:09:31 Date 4/15/1992

Data File: DOWCF1

Method File: DOWCRAFT

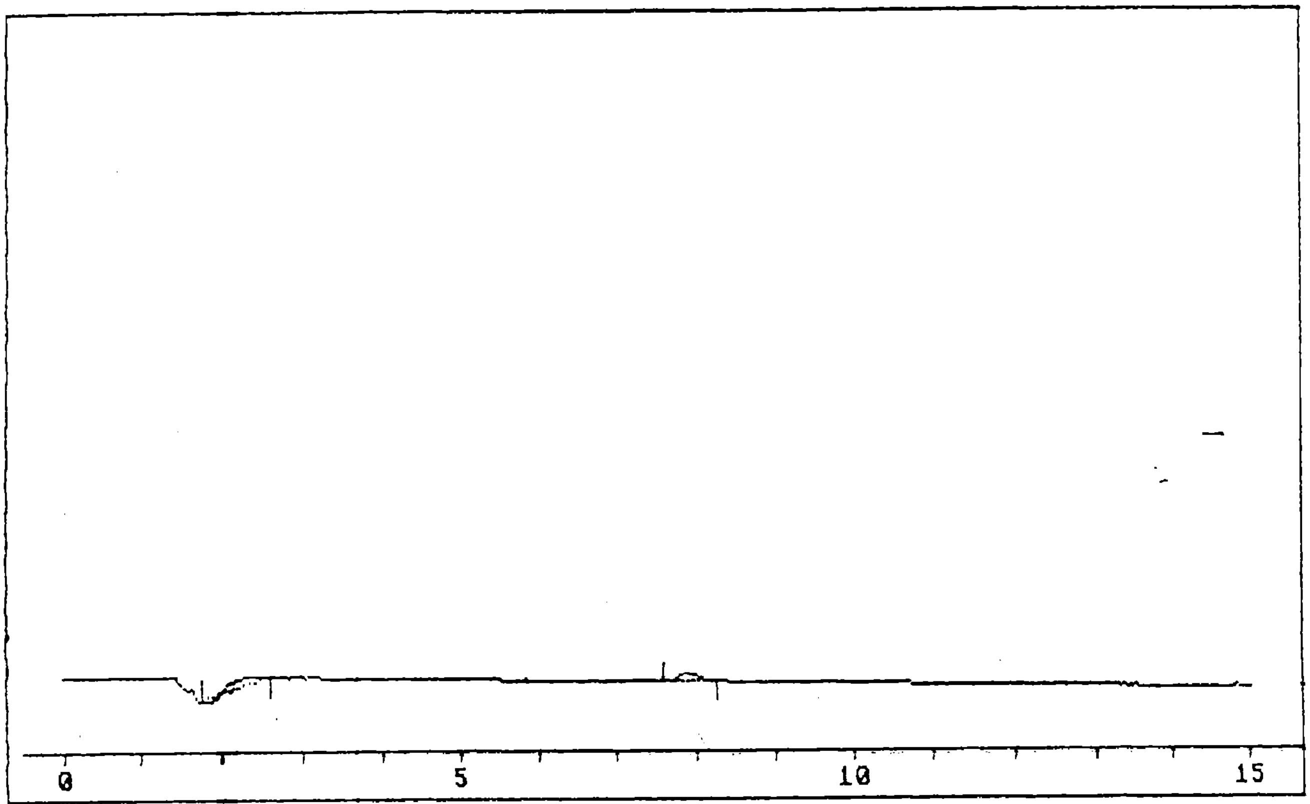
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92

Sample remarks : SAMPLE POINT #11 INSIDE PHOS ROOM

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:20	3.589E+04	9.779E+02	TRA 12-DCE	475.8
2	00:05:15	4.597E+04	3.716E+03	TCE	4.139

Time : 23:39:00 Date 4/15/1992
Data File : DOWCF2
Method File : DOWCRAFT
Sample Notes: SAMPLE PT #12 IN PHOS ROOM 2 MIN



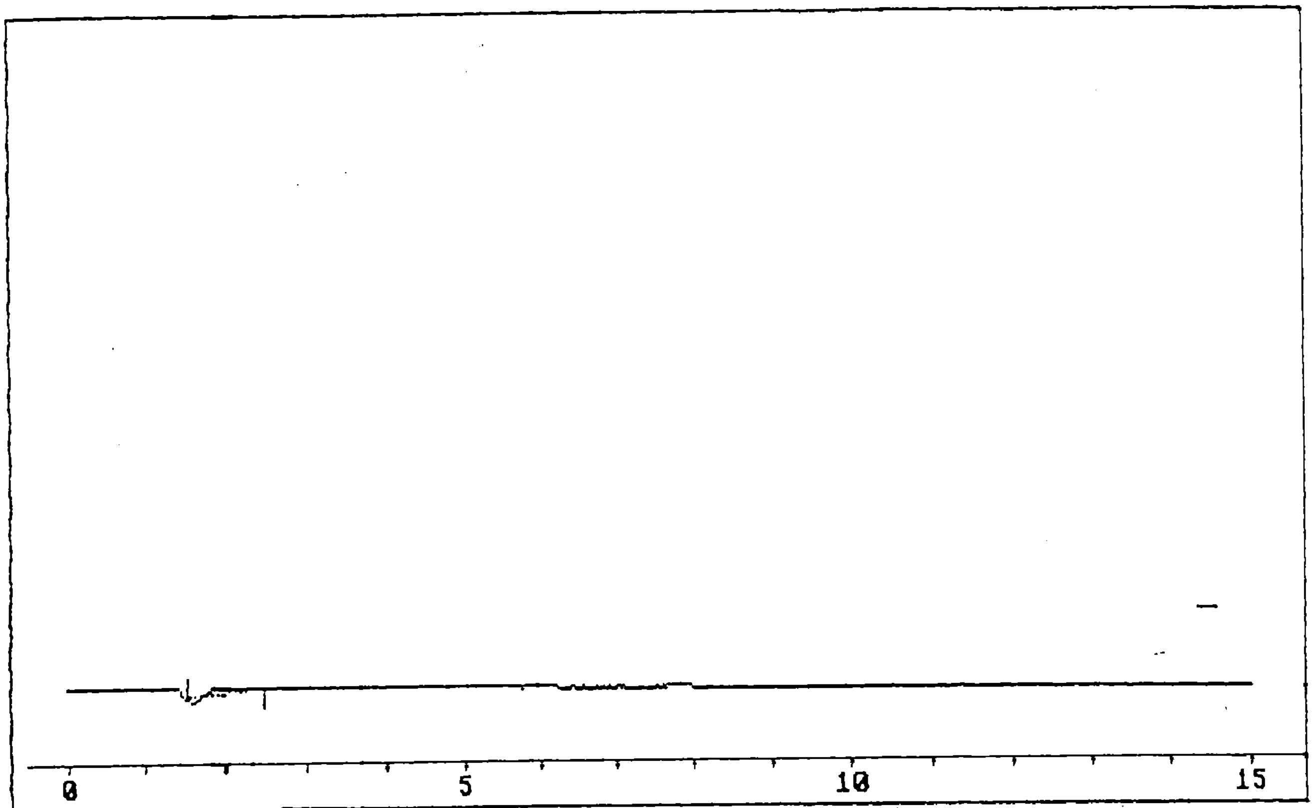
PID At: 5 Th: 2000 PW: 20 CS: 0.65

Peak Report

Time 23:39:00 Date 4/15/1992
Data File: DOWCF2
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92
Sample remarks : SAMPLE PT #12 IN PHOS ROOM 2 MIN

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:18	4.848E+04	2.040E+03	TRA 12-DCE	477.4
2	00:07:51	3.852E+04	2.897E+03	TOLUENE	0.6013



PID At: 5 Th: 2000 PW: 20 CS: 0.65

Peak Report

Time 00:01:59 Date 4/16/1992

Data File: DOWCF3

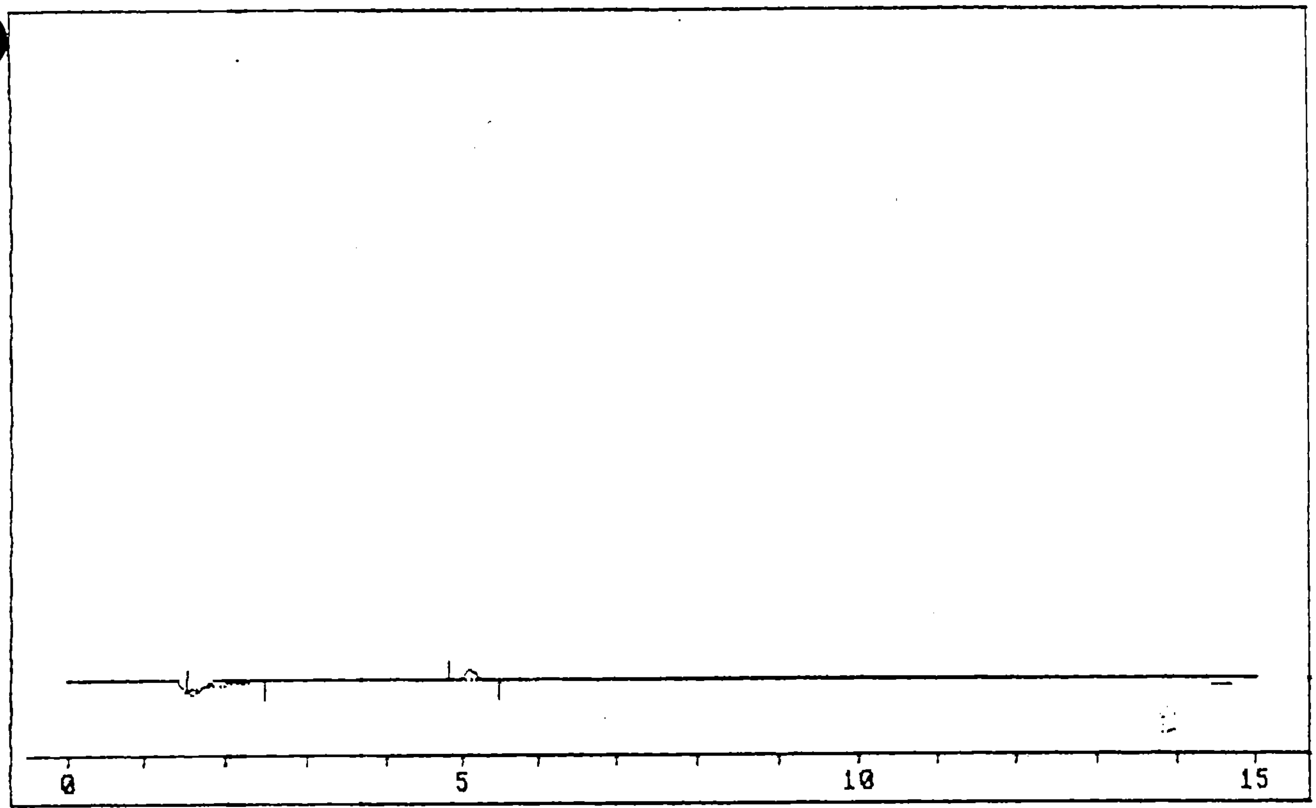
Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/18/92

Sample remarks : SAM PT 13 IN PHOS ROOM, 2 MIN

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:11	3.095E+04	9.688E+02	TRA 12-DCE	475.2



PID At: 5 Th: 2000 PW: 20 CS: 0.65

Peak Report

Time 00:36:28 Date 4/16/1992

Data File: DOWCRF1

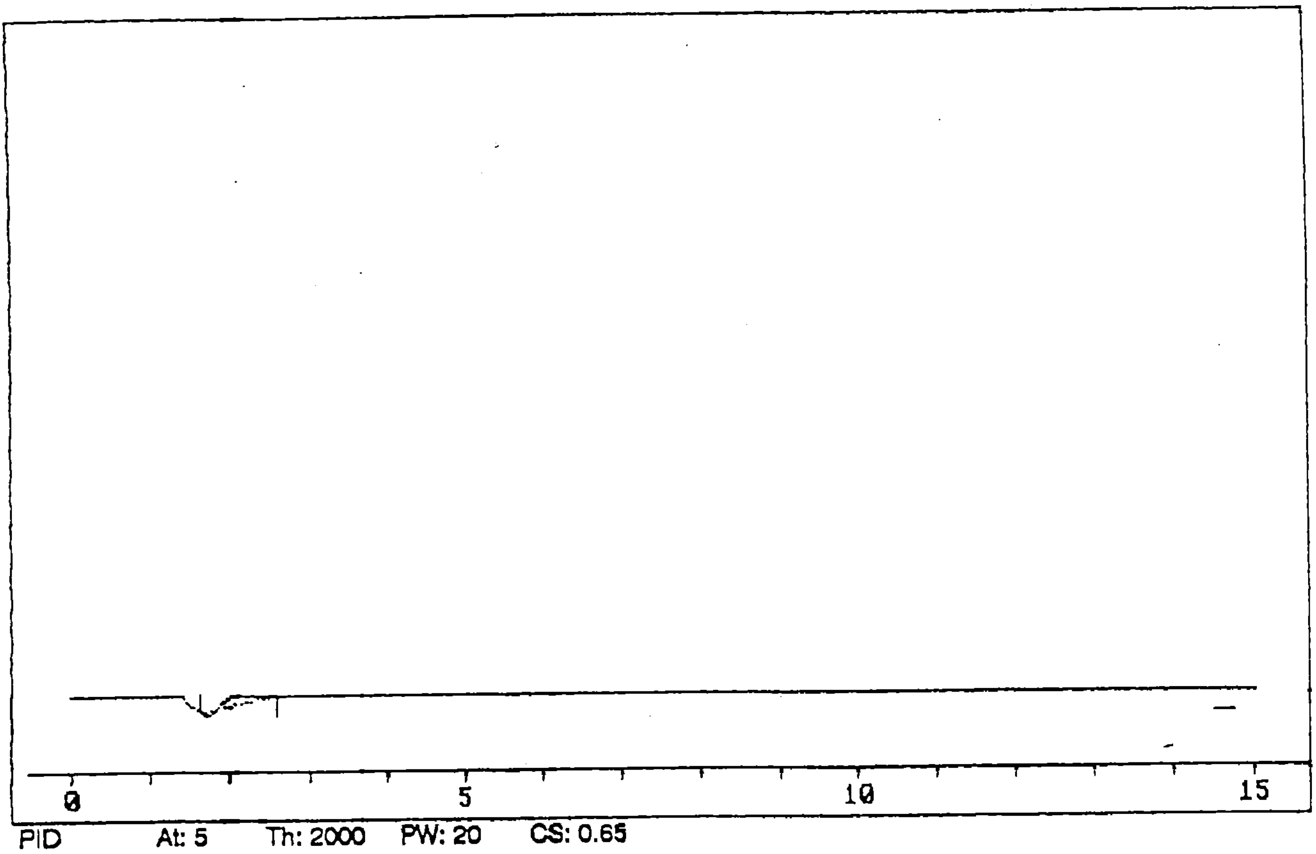
Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92

Sample remarks : SAMPLE PT 14 IN PROD ROOM, 2 MIN

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:12	2.742E+04	6.097E+02	TRA 12-DCE	474.7
2	00:05:03	3.685E+04	3.243E+03	TCE	3.298



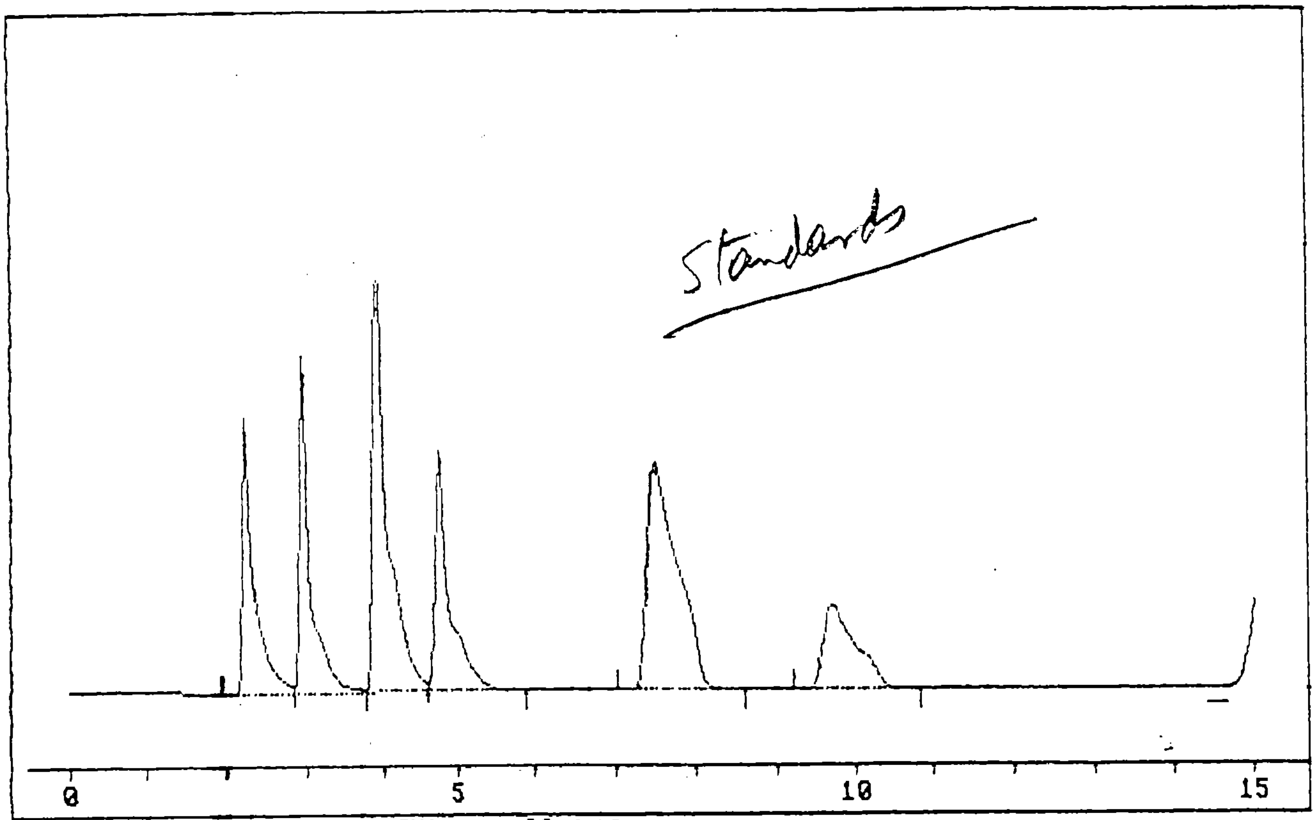
PID At: 5 Th: 2000 PW: 20 CS: 0.65

Peak Report

Time 00:58:39 Date 4/16/1992
Data File: DOWCRF2
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92
Sample remarks : SAMPLE PT #15 UNDER STAIRS, 2 MIN

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:16	3.872E+04	1.311E+03	TRA 12-DCE	476.1



Standards

PID At: 8 Th: 2000 PW: 20 CS: 0.65

Peak Report

Time 01:14:23 Date 4/16/1992

Data File: DOWCRF3

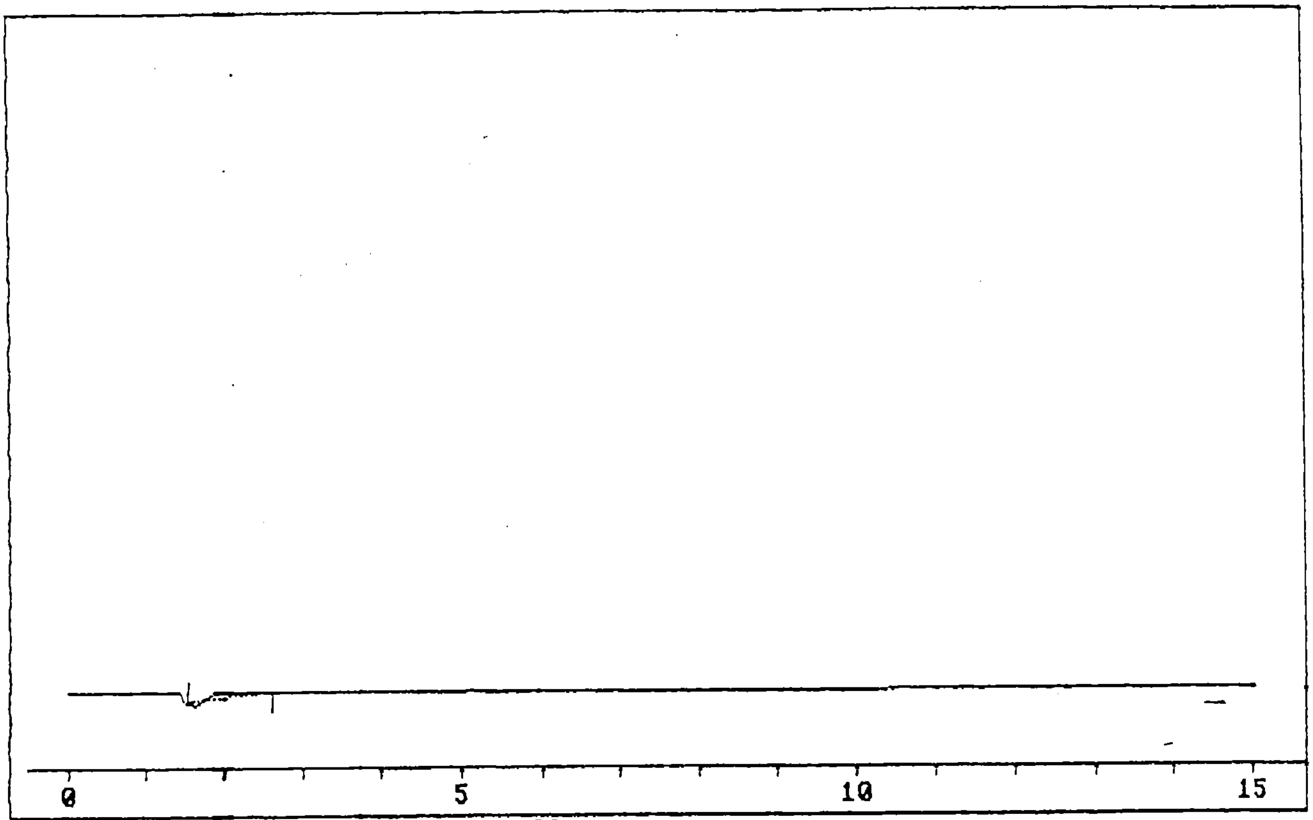
Method File: DOWCRAFT

Method remarks : EMPIRE-DOWCRAFT-SOIL-GAS-SURVEY 4/16/92

Sample remarks : AFTERNOON RETENTION CHECK W/STD

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:11	6.079E+06	5.968E+05	TRA 12-DCE	1237
2	00:02:55	6.550E+06	7.197E+05	CIS 12-DCE	943.8
3	00:03:53	1.244E+07	8.681E+05	BENZENE	753.5
4	00:04:42	6.874E+06	5.167E+05	TCE	707.3
5	00:07:28	1.280E+07	4.833E+05	TOLUENE	640.1
6	00:09:40	5.359E+06	1.821E+05	PCE	638



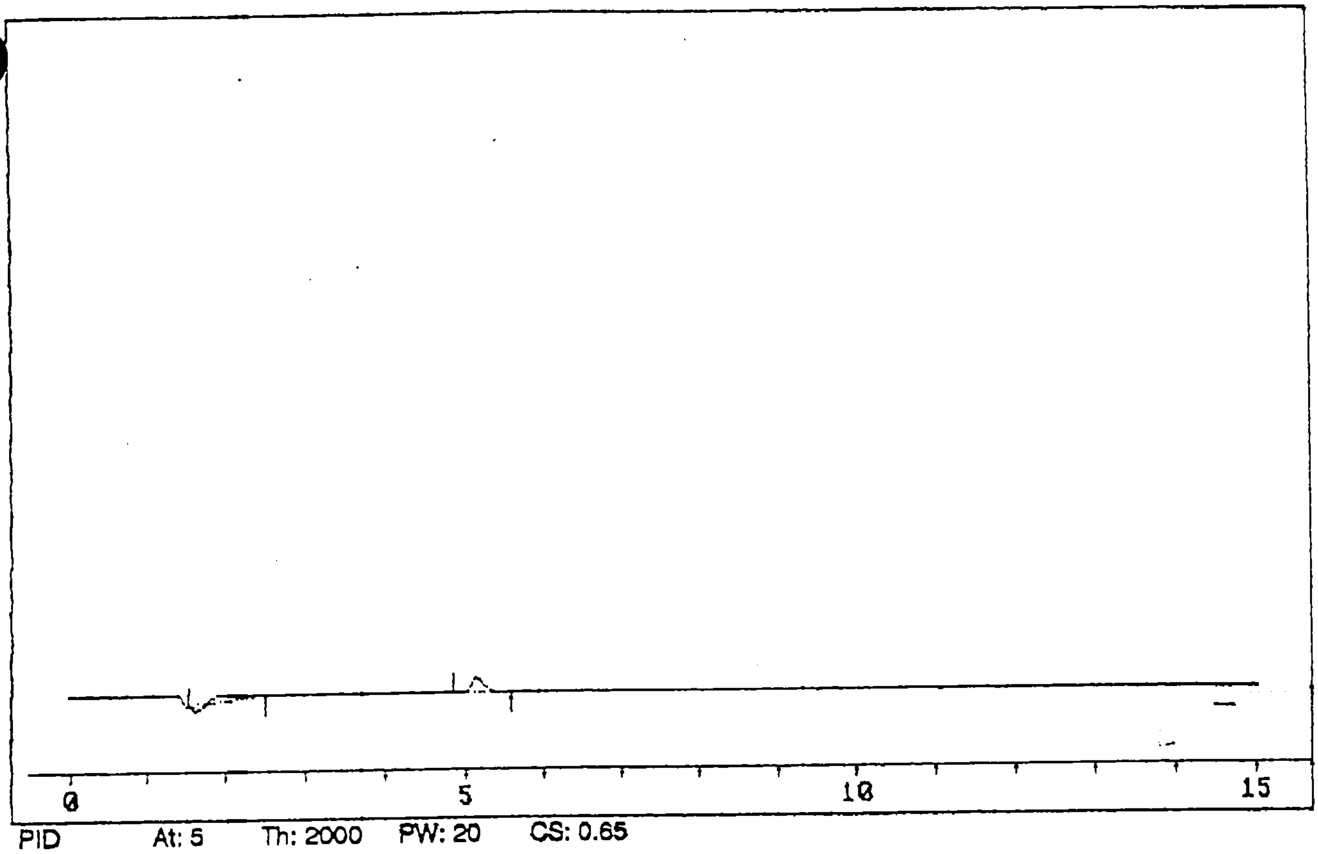
PID At: 5 Th: 2000 PW: 20 CS: 0.65

Peak Report

Time 02:48:44 Date 4/16/1992
Data File: DOWCRF4
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92
Sample remarks : SAMPLE PT #16 IN STOR ROOM, 2 MIN

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:17	3.610E+04	8.283E+02	TRA 12-DCE	475.8



PID At: 5 Th: 2000 PW: 20 CS: 0.65

Peak Report

Time 03:22:01 Date 4/16/1992

Data File: DOWCRF5

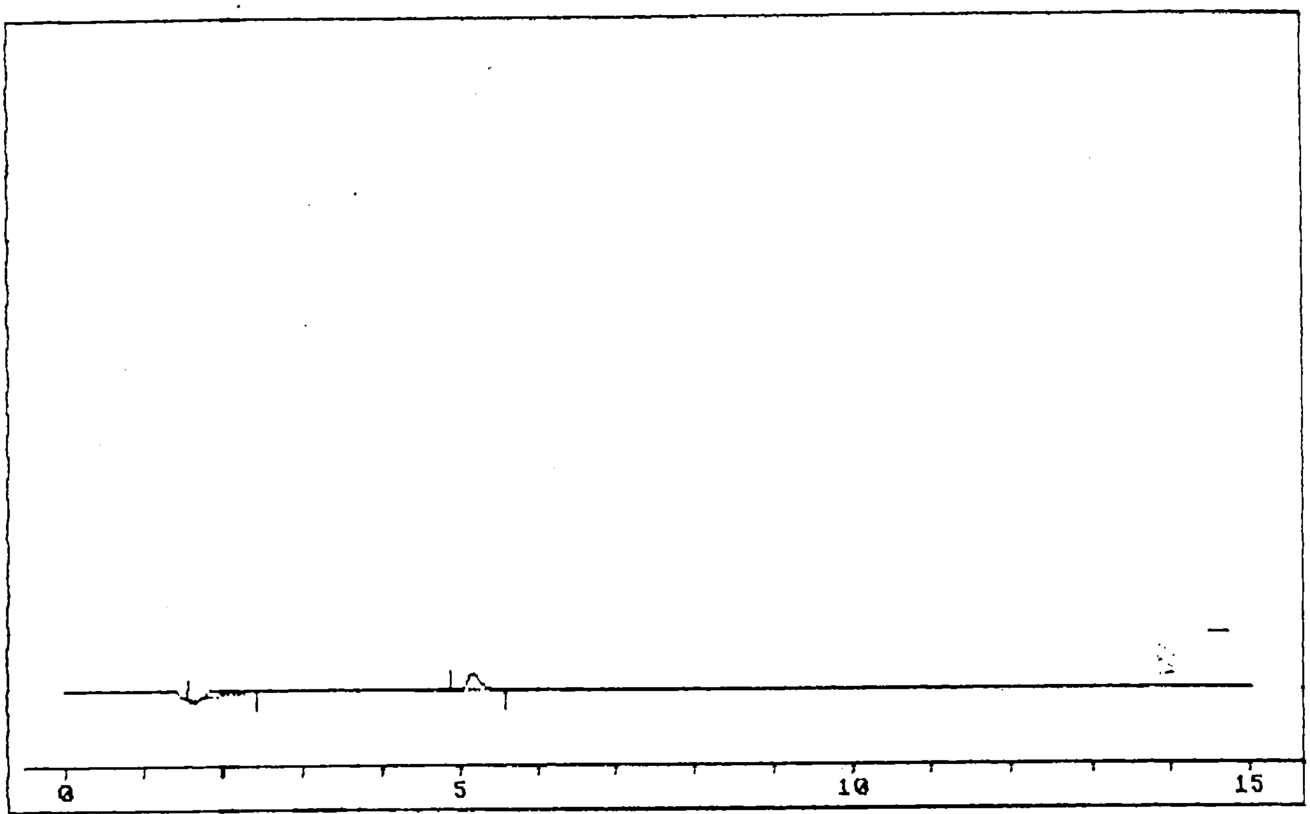
Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92

SAMPLE POINT # 17 NEAR VAPOR DEGREASER

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:12	2.821E+04	1.064E+03	TRA 12-DCE	474.8
2	00:05:05	4.938E+04	4.275E+03	TCE	4.454



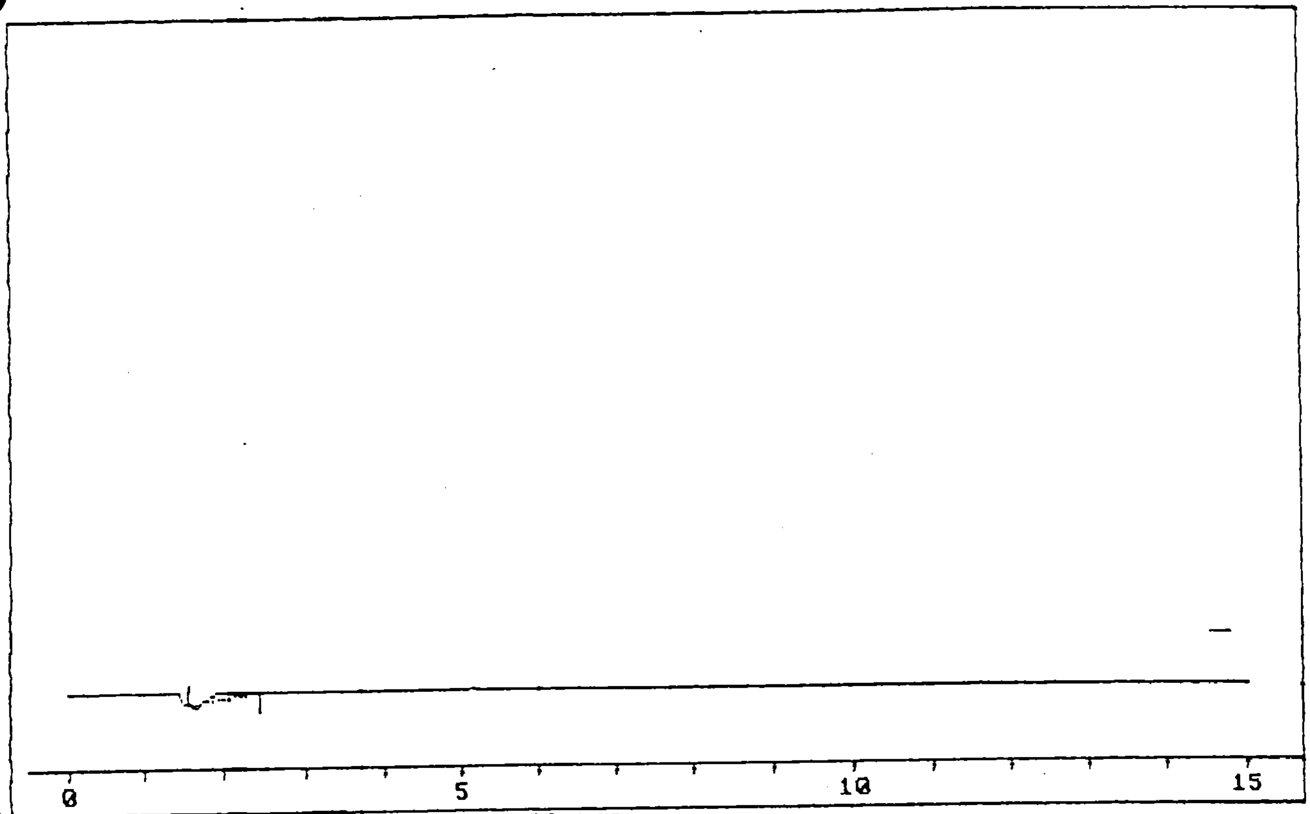
PID At: 5 Th: 2000 PW: 20 CS: 0.65

Peak Report

Time 04:00:07 Date 4/16/1992
Data File: DOWCRT1
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92
Sample remarks : SAMPLE PT #18 IN WAREHOUSE ROOM

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:12	2.591E+04	8.625E+02	TRA 12-DCE	474.5
2	00:05:07	5.379E+04	4.548E+03	TCE	4.862



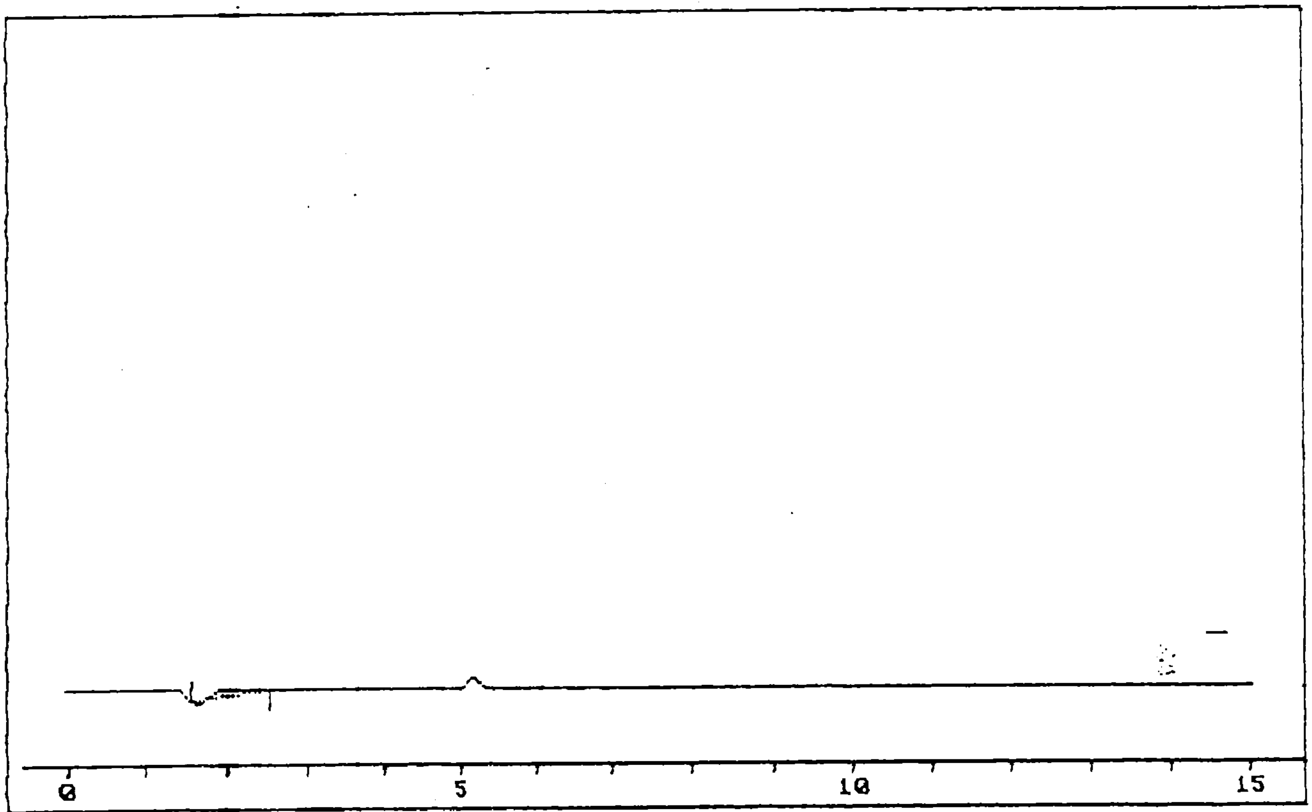
PID At: 5 Th: **2000** PW: 20 CS: 0.65

Peak Report

Time 04:18:44 Date 4/16/1992
Data File: DOWCRT2
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/18/92
Sample remarks : POINT #19 IN WAREHOUSE ROOM

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:11	2.681E+04	8.867E+02	TRA 12-DCE	474.8



PID At: 5 Th: 2000 PW: 20 CS: 0.65

Peak Report

Time 04:38:02 Date 4/16/1992

Data File: DOWCRT3

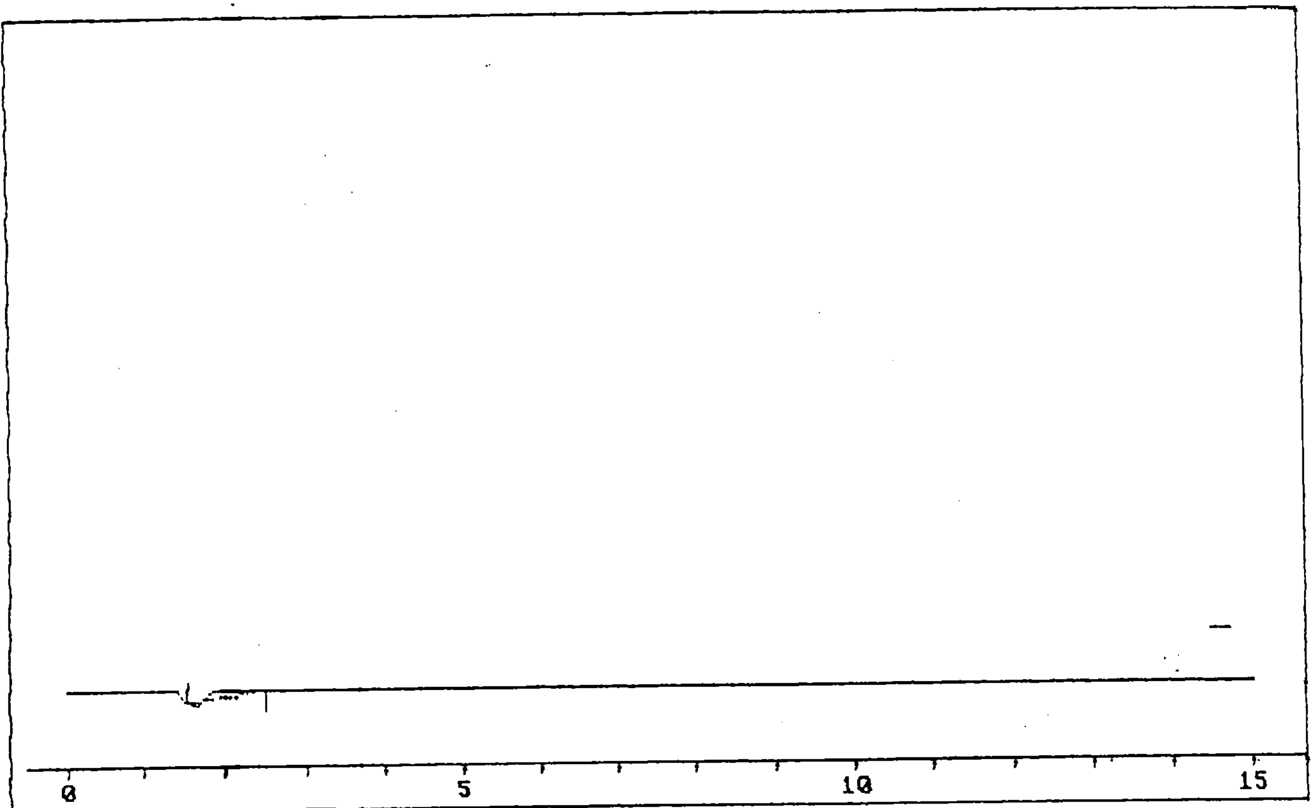
Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92

Sample remarks : SAMPLE PT 20 IN WAREHOUSE ROOM

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:14	3.163E+04	9.065E+02	TRA 12-DCE	475.2



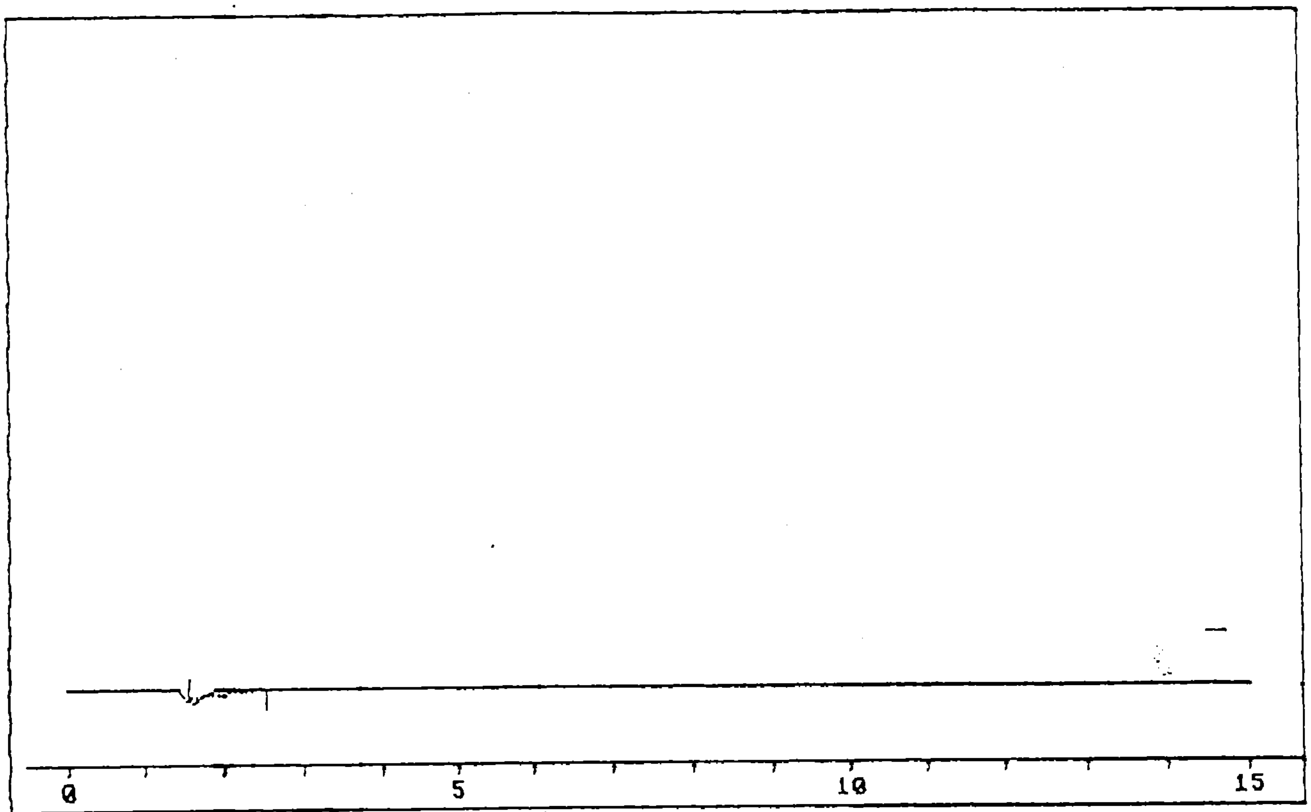
PID At: 5 Th: 2000 PW: 20 CS: 0.65

Peak Report

Time 04:59:30 Date 4/16/1992
Data File: DOWCRT4
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92
Sample remarks : SAMPLE PT 21 IN BOILER ROOM

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:12	3.116E+04	9.764E+02	TRA 12-DCE	475.2



PID At: 5 Th: 2000 PW: 20 CS: 0.65

Peak Report

Time 05:26:07 Date 4/16/1992

Data File: DOWCRT5

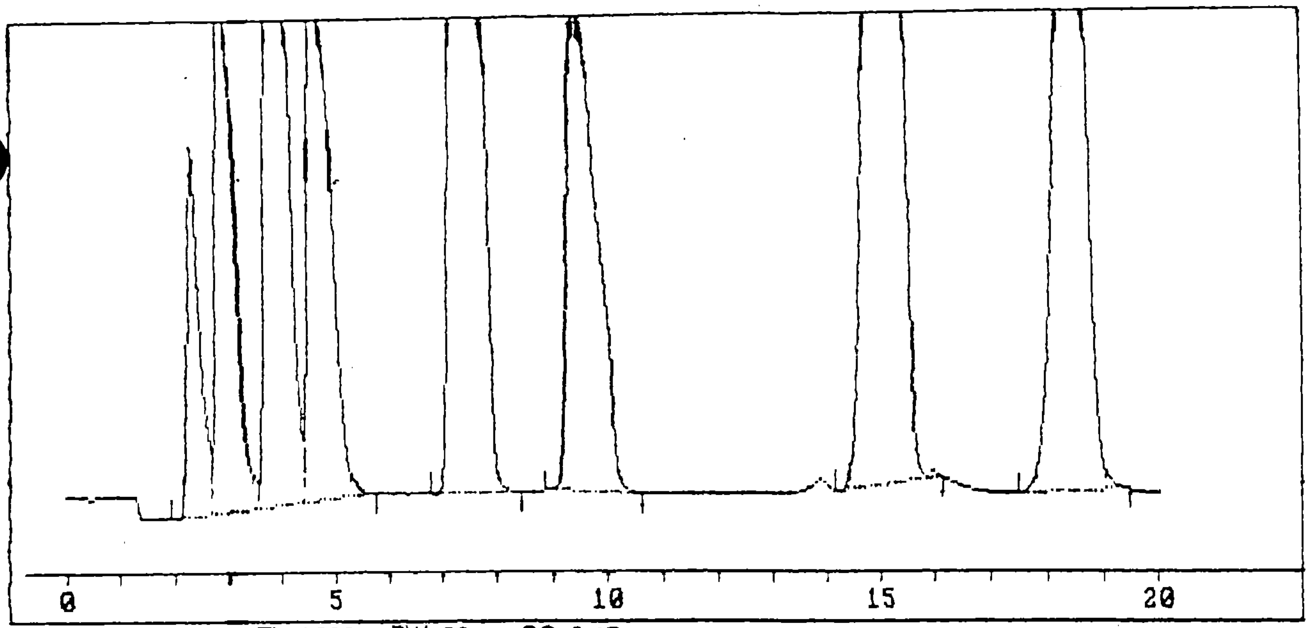
Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/16/92

Sample remarks : SAMPLE PT 22 OUTSIDE NEAR PALLETTS

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:14	3.141E+04	7.959E+02	TRA 12-DCE	475.2



PID At: 5 Th: 2000 PW: 20 CS: 0.45

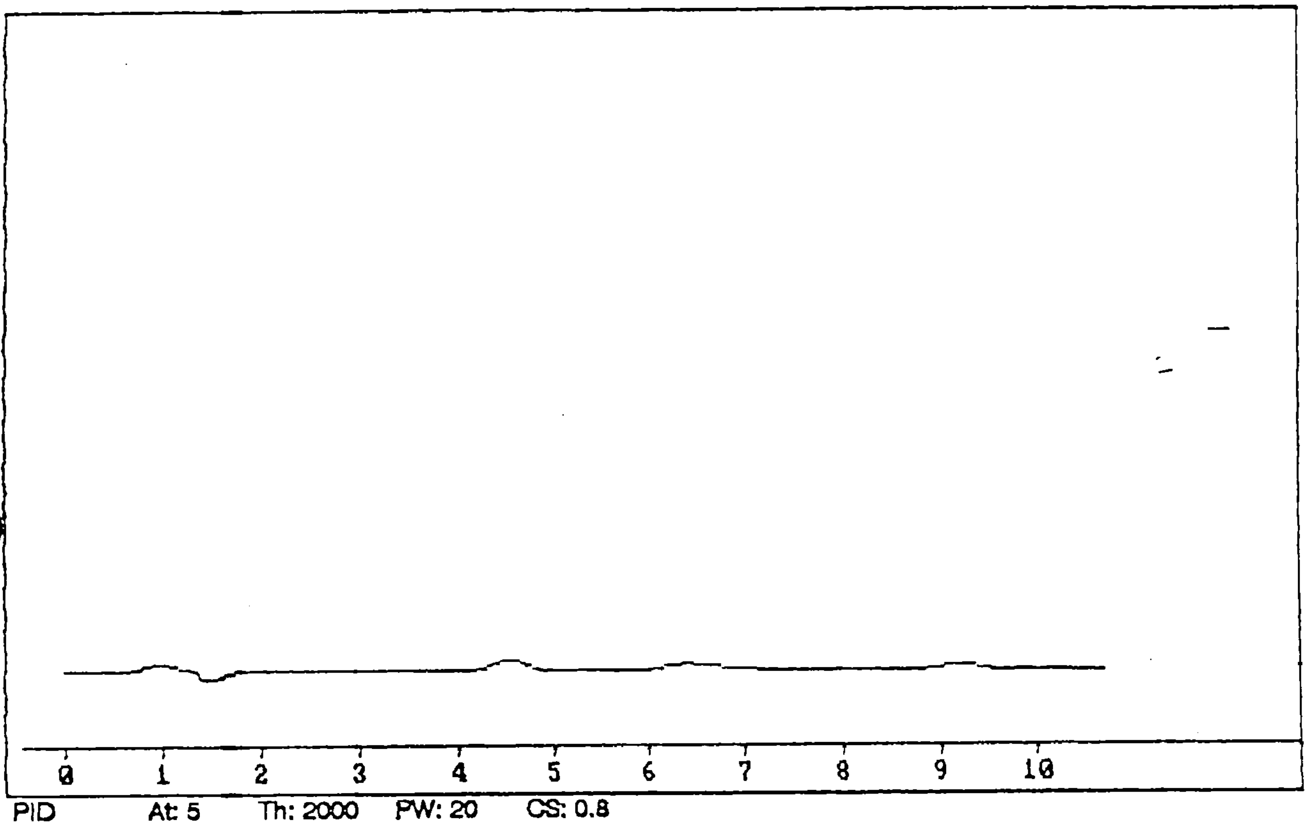
Peak Report

Time 08:01:23 Date 4/17/1992
Data File: DOWCT02
Method File: DOWCRAFT
Method remarks : EMPIRE-DOWCRAFT SOIL GAS SURVEY 4/17/92
Sample remarks : AM STANDARD RET CHECK RUN 2

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:12	1.672E+08	1.059E+05	TRA 12-DCE	681.7
2	00:02:44	8.745E+08	8.113E+05	CIS 12-DCE	974.2
3	00:03:41	1.228E+07	8.818E+05	BENZENE	742.3
4	00:04:29	7.131E+08	5.594E+05	TCE	734.5
5	00:07:12	1.317E+07	4.768E+05	TOLUENE	682.7
6	00:09:22	5.829E+08	1.851E+05	PCE	669.9
7	00:15:14	2.715E+07	8.558E+05	M,P-XYLENE	298.2
8	00:18:24	1.274E+07	4.889E+05		

Time : 08:22:57 Date 4/17/1992
Data File : DOWCT03
Method File : DOWCRAFT
Sample Notes: AM SYRINGE BLANK, SYR #1



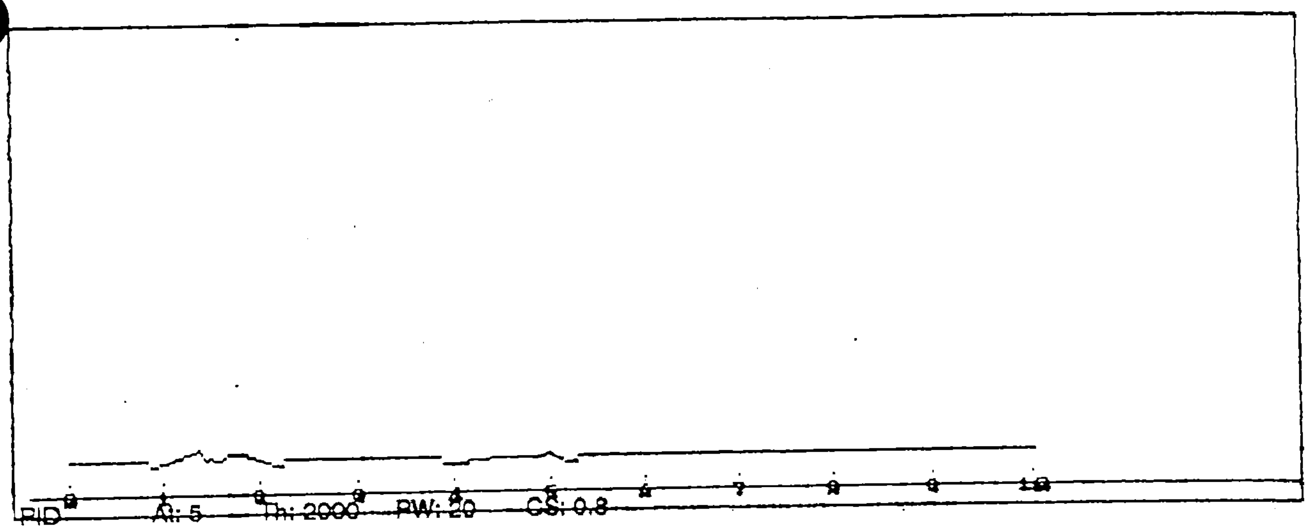
PID At: 5 Th: 2000 PW: 20 CS: 0.8

Peak Report
Time 08:22:57 Date 4/17/1992
Data File: DOWCT03
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/17/92
Sample remarks : AM SYRINGE BLANK, SYR #1

Ch 1 Detector: PID

NUMBER RET. TIME AREA HEIGHT IDENTIFIER CONCENTRATION

No peaks detected.



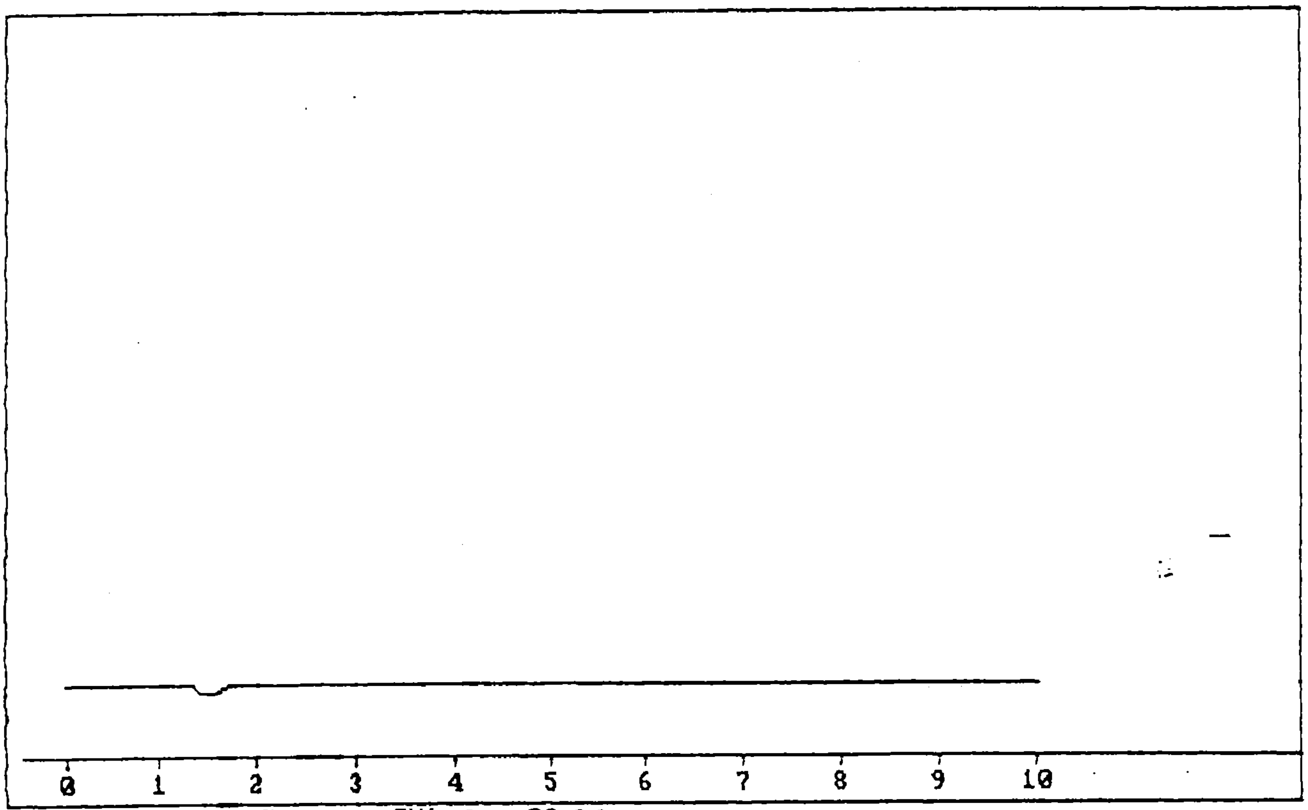
Time 08:43:57 Peak Report Date 4/17/1992
Data File: [illegible]CT04
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/17/92

Ch 1 Detector: PID

NUMBER RET. TIME AREA HEIGHT IDENTIFIER CONCENTRATION

No peaks detected.

SAMPLE PT # 23:
PKNG LOT



PID At: 5 Th: 2000 PW: 20 CS: 0.8

Peak Report

Time 09:19:45 Date 4/17/1992

Data File: DOWCT05

Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/17/92

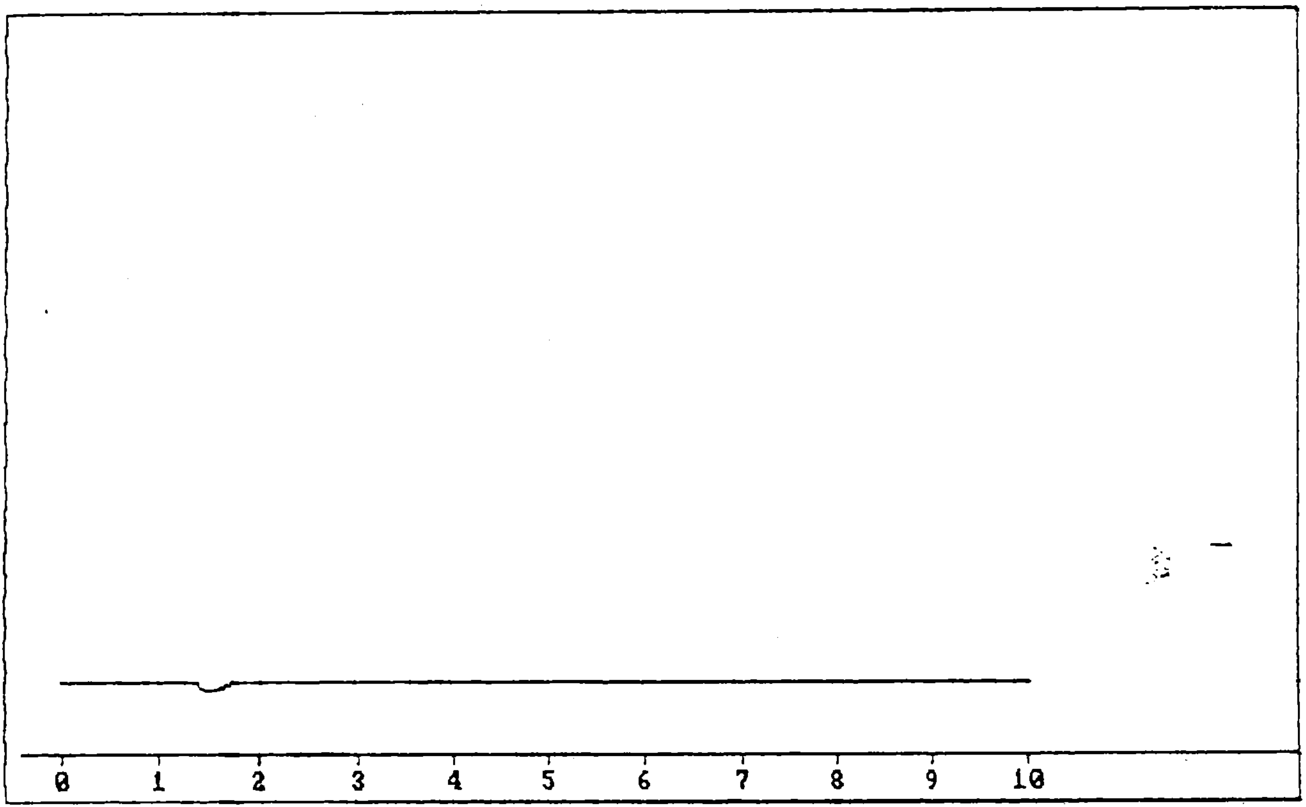
Sample remarks : SAMPLE PT 23 OUTSIDE IN PRKNG LOT

SG #10

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION

No peaks detected.



PID At: 5 Th: 2000 PW: 20 CS: 0.8

Peak Report

Time 09:37:42 Date 4/17/1992

Data File: DOWCT06

Method File: DOWCRAFT

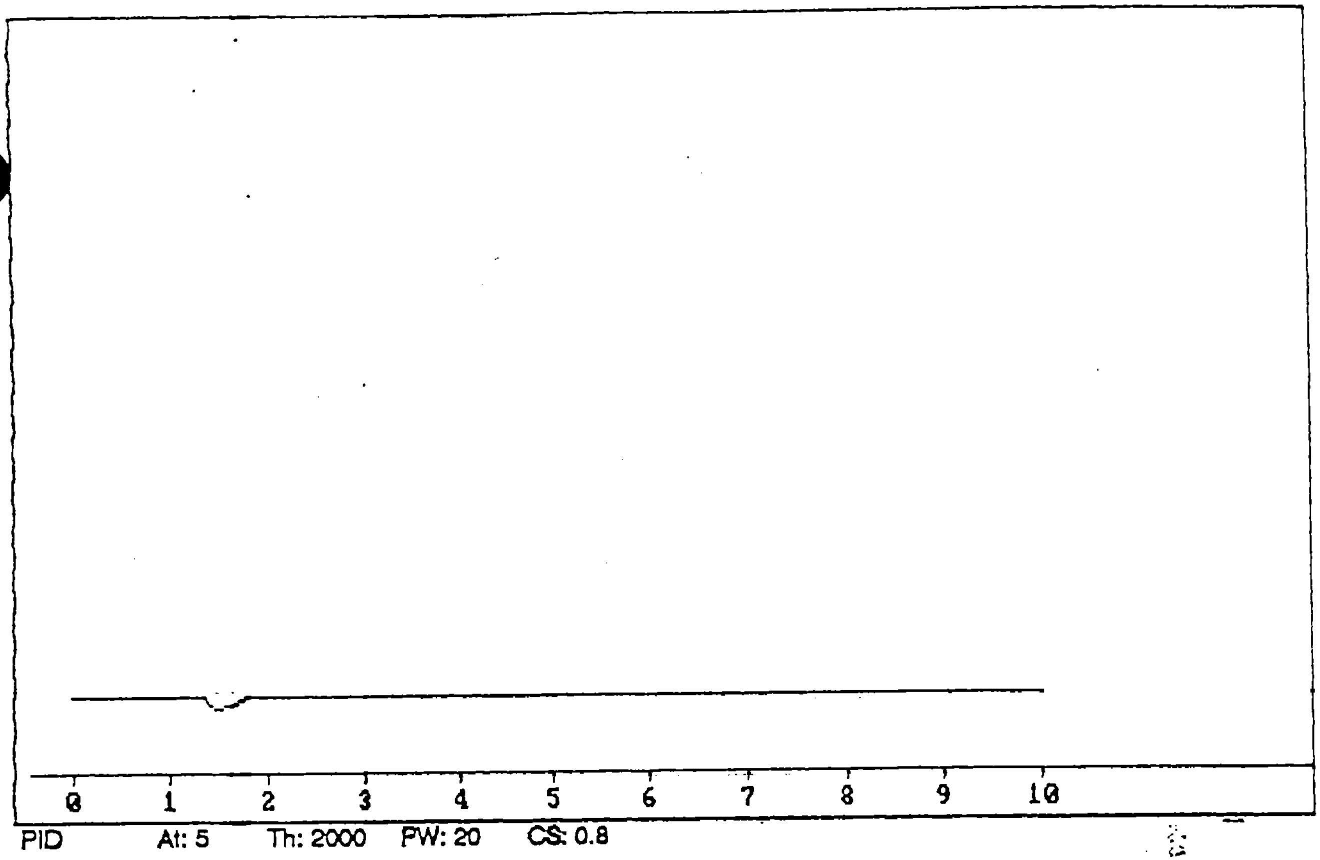
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/17/92

Sample remarks : SAM PT 25 NEAR TRASH COMPACTOR

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION

No peaks detected.



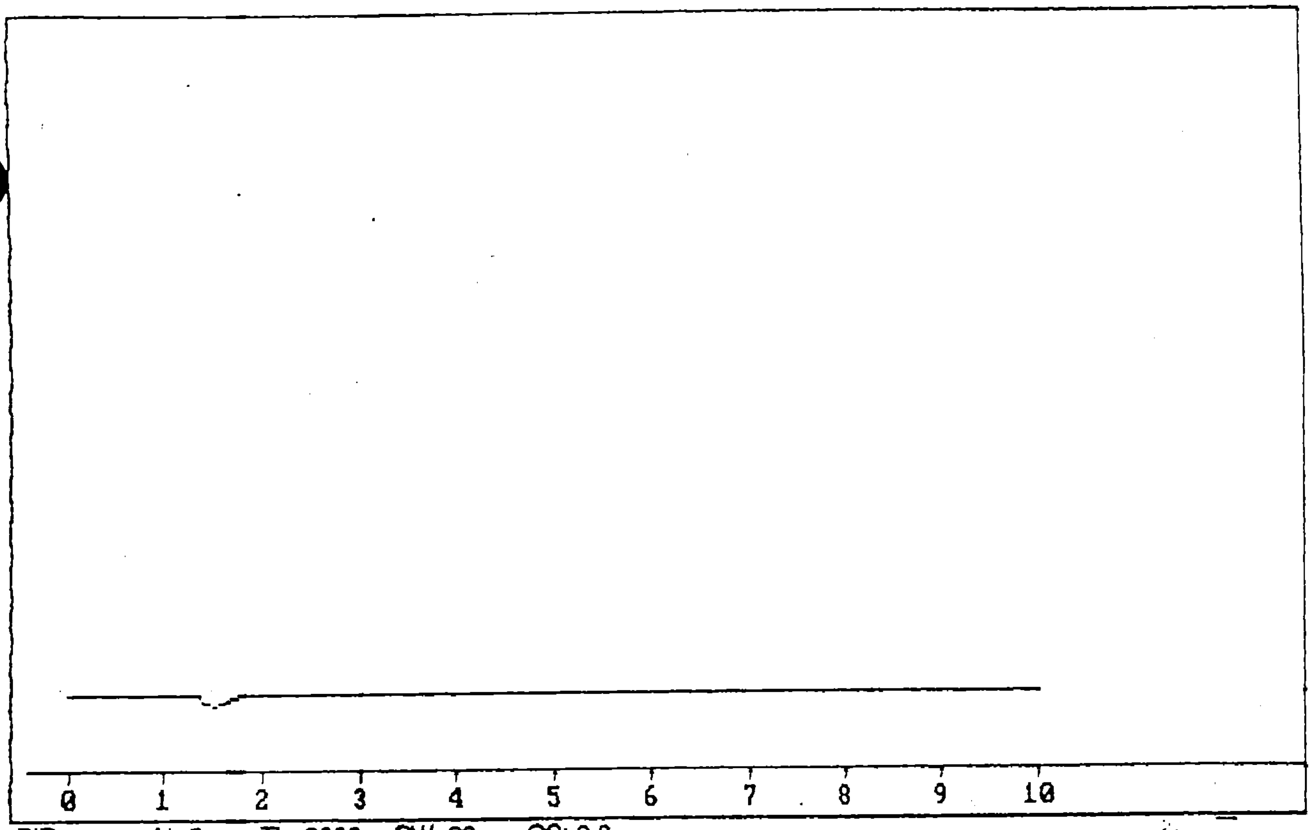
Peak Report

Time 09:52:40 Date 4/17/1992
Data File: DOWCT07
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/17/92
Sample remarks : SAMPLE PT 26 UNDER SHED NR WOOD

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION

No peaks detected.



PID At: 5 Th: 2000 PW: 20 CS: 0.8

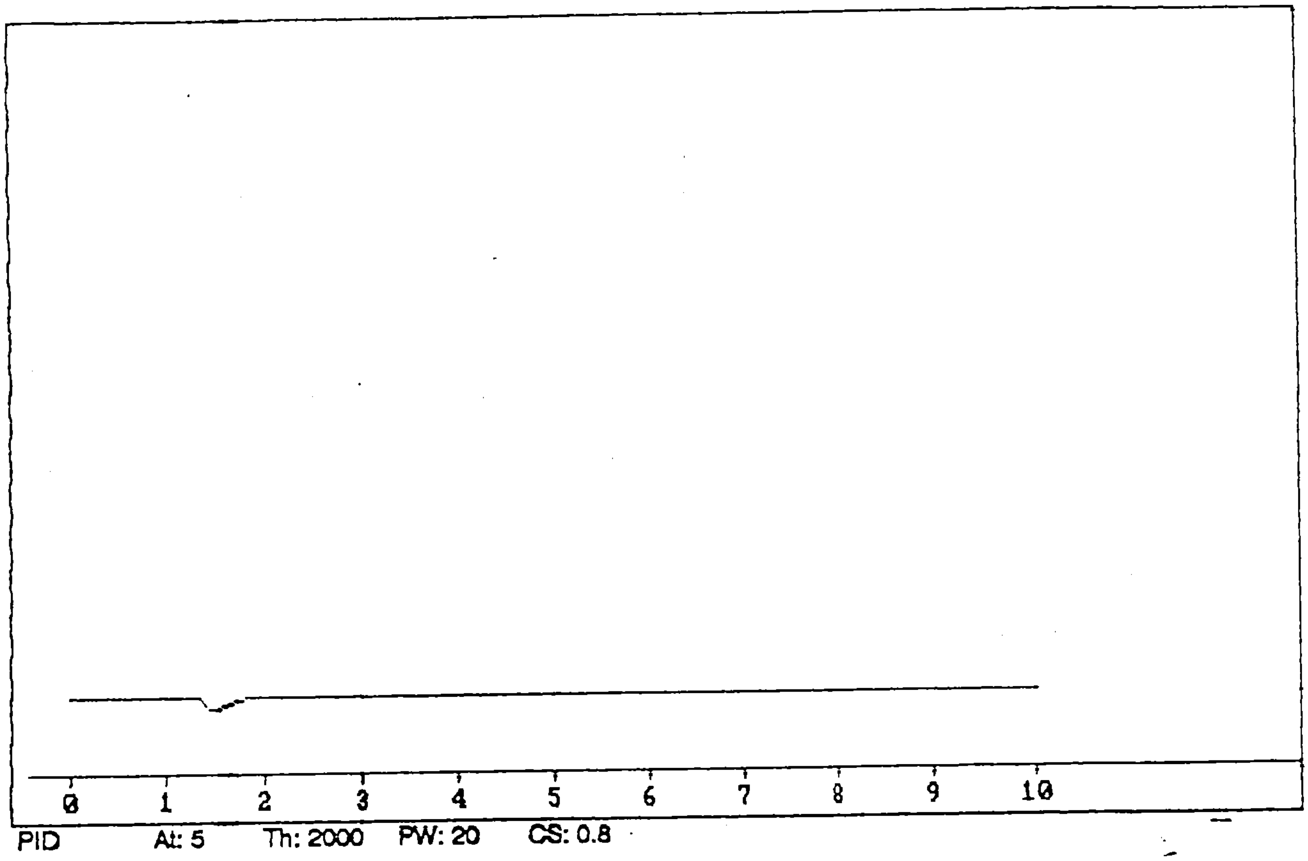
Peak Report

Time 10:05:48 Date 4/17/1992
Data File: DOWCT08
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/17/92
Sample remarks : SAMPLE PT 27 NEAR CHIMNEY BASE

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION

No peaks detected.



Peak Report

Time 10:25:16 Date 4/17/1992

Data File: DOWCT09

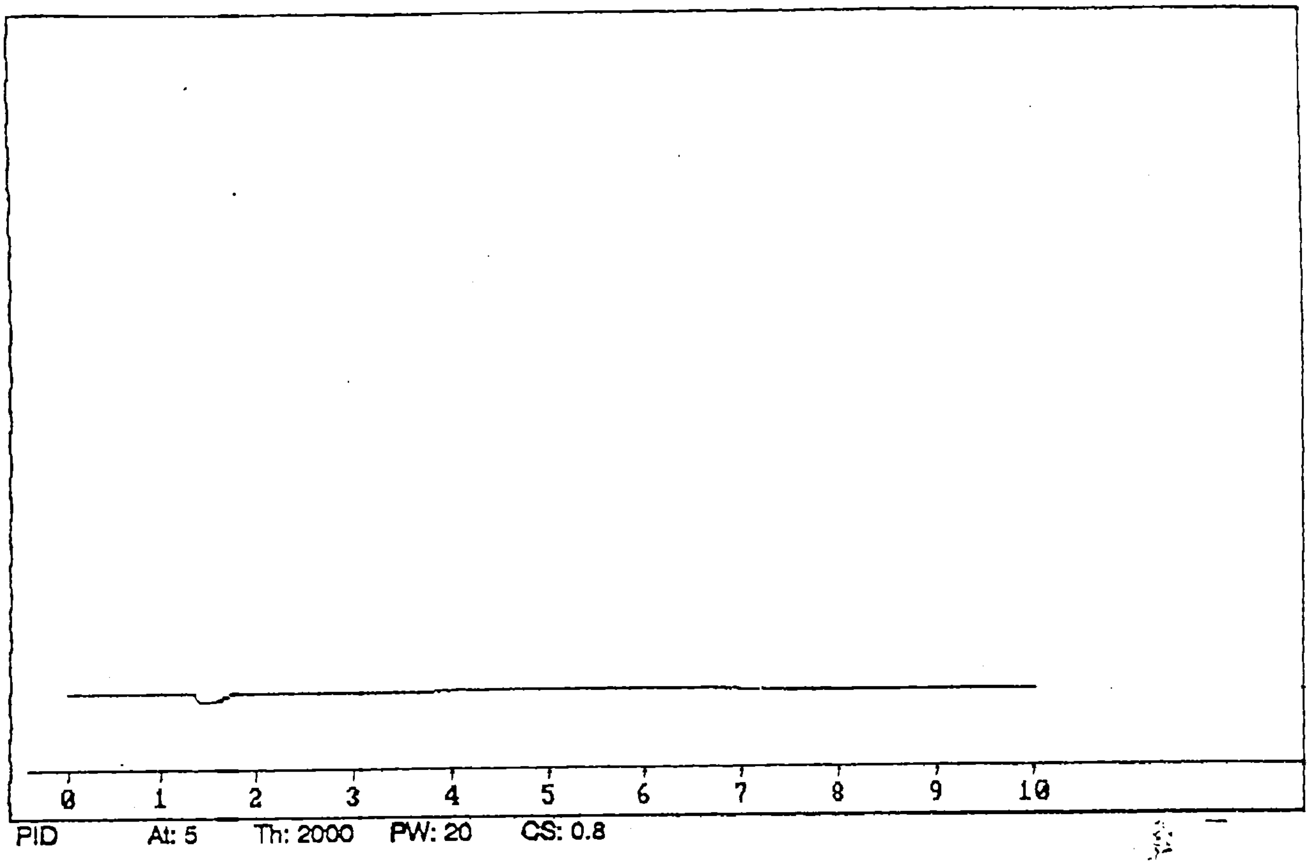
Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/17/92

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION

No peaks detected.



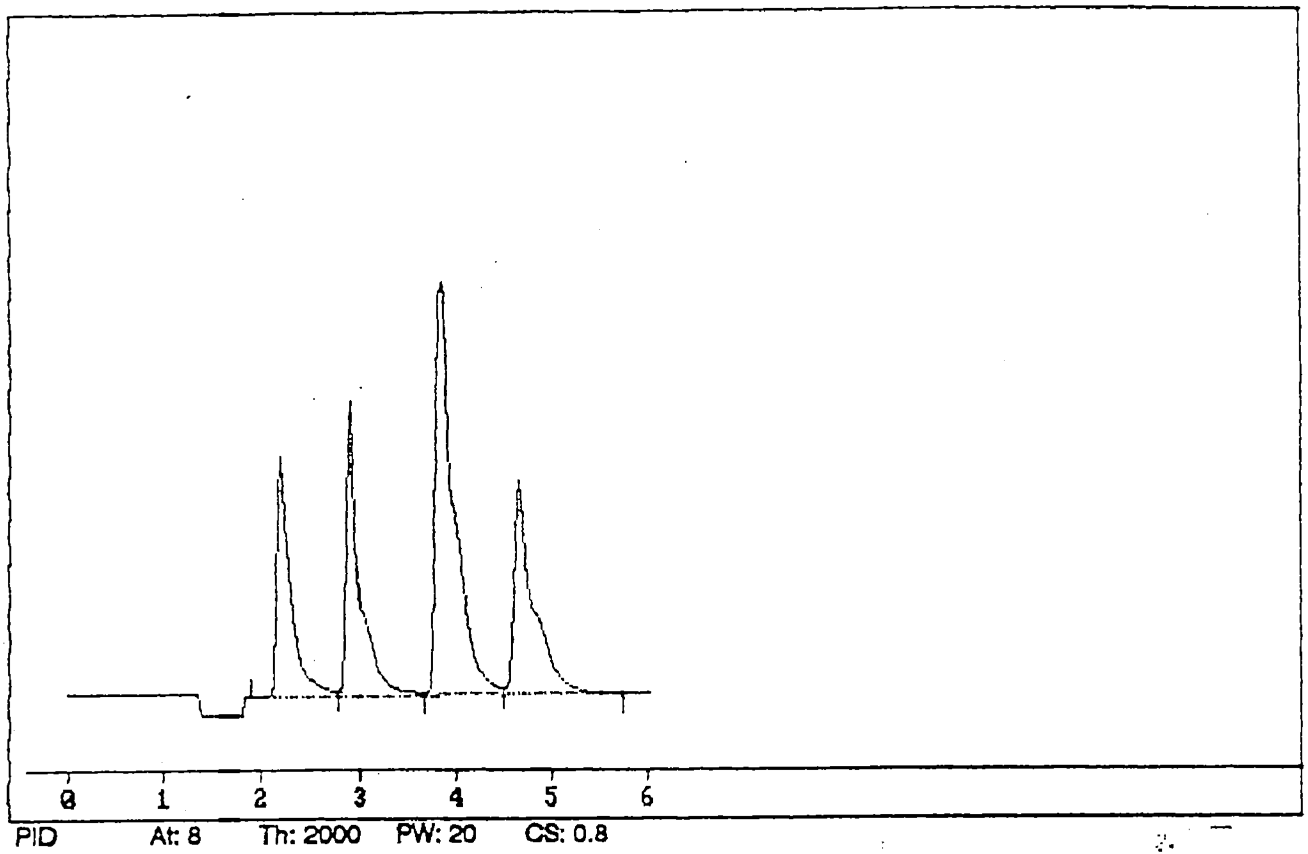
Peak Report

Time 10:37:33 Date 4/17/1992
Data File: DOWCT10
Method File: DOWCRAFT
Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/17/92
Sample remarks : SP NO 29 IN ALLEY ON JT CONT SIDE

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION

No peaks detected.



Peak Report

Time 10:49:17 Date 4/17/1992

Data File: DOWCT11

Method File: DOWCRAFT

Method remarks : EMPIRE DOWCRAFT SOIL GAS SURVEY 4/17/92

TM RETENTION CHECK

Ch 1 Detector: PID

NUMBER	RET. TIME	AREA	HEIGHT	IDENTIFIER	CONCENTRATION
1	00:02:09	4.879E+06	5.084E+05	TRA 12-DCE	1088
2	00:02:51	5.895E+06	6.329E+05	CIS 12-DCE	841.3
3	00:03:49	1.177E+07	8.612E+05	BENZENE	708.1
4	00:04:38	6.222E+06	4.460E+05	TCE	638.6

APPENDIX M

ADDITIONAL IRM MEMORANDA

CONESTOGA-ROVERS
& ASSOCIATES

651 Colby Drive, Waterloo, Ontario, Canada N2V 1C2
Telephone: (519) 884-0510 Fax: (519) 884-0525
www.CRAworld.com

MEMORANDUM

TO: Martin Doster
REF. NO.: 5020

FROM: Jim Kay/js/1
DATE: June 23, 2000

C.C.: G. Carlson, J. Charles, A. Kryzan, H. Nicholson, G. Pietraszek, C. Dunnigan

RE: **Summary of Additional IRM Field Activities**
Former Dowcraft Facility
Falconer, New York

The additional Interim Remedial Measure (IRM) at the Former Dowcraft Facility in Falconer, New York (Site), was initiated on May 17, 2000. The additional IRM consists of the injection of potassium permanganate for in situ chemical oxidation of the compounds of concern (COC) in groundwater at the Site. The additional IRM has been conducted in accordance with the procedures container in the New York State Department of Environmental Conservation (NYSDEC) approved "Additional IRM Work Plan", dated April 6, 2000.

The in situ treatment program is intended to introduce potassium permanganate into the primary area of COC presence in Site groundwater and to allow the potassium permanganate to come into contact with as much of the groundwater COC plume as possible. To accomplish this, an aqueous solution of potassium permanganate was injected into the area immediately adjacent to and the area hydraulically downgradient of the former trichloroethene (TCE) vapor degreaser pit. Upon contact, the potassium permanganate will significantly reduce the concentration of TCE in the groundwater in these areas. This memorandum presents a description of the field activities performed and the data collected to date.

<u>Potassium Permanganate Solution and Injection</u>: An aqueous solution of approximately 4 percent by weight potassium permanganate was injected into existing wells PW-1, PW-2, PW-3R, boreholes IBH-1 through IBH-5, and a trench excavated west of PW-3. Each injection borehole was installed to a depth of approximately 25 to 30 feet below ground surface (BGS). The boreholes were completed using perforated polyvinyl chloride (PVC) pipe, the lower 10 feet of which was perforated (3/8-inch diameter drilled holes). Each borehole was backfilled with "P" gravel. Draft stratigraphic and instrumentation logs for the injection boreholes are contained in Attachment A. The test trench was excavated by backhoe and was approximately 4 feet wide by 14 feet long by 10 feet deep. The test trench was left open until the injection activities were completed. The excavated spoils from the trench were stockpiled in the immediate area. Following completion of the injection activities, the empty potassium permanganate drums and mixing tank were cleaned using potable water and the rinsate was drained into the test trench. The trench was subsequently backfilled with the excavated soils replaced in the same order in which they had been removed. The locations of the injection points are shown on Figure 1.

The potassium permanganate solution was made in batches of 1,000 gallons. Each batch consisted of approximately 330 pounds of potassium permanganate (1 drum) and 1,000 gallons of potable water (a 4 percent solution by weight). After thorough mixing, the solution was pumped from the mixing tank into the injection port in use at the time.

Conestoga-Rovers & Associates (CRA) and NYSDEC representatives agreed in the field that approximately 30 percent of the total volume of potassium permanganate solution would be injected into the source area, 20 percent into the test trench, and 10 percent into PW-3R. A log of the volumes and rate of injection at each location is presented in Table 1.

Monitoring: The monitoring of the additional IRM consists of:

i) water level measurements before commencing injection and after injection was completed;

ii) weekly field measurement of pH and chloride in six monitoring wells within and downgradient of the treatment area (ESI-2, -3, -6, -10, -11, and -12) commencing 1 week following the completion of the injection activities and continuing for 4 weeks;

iii) 4 weeks following the completion of injection, grab sampling of the six monitoring wells listed in item ii) and PW-1 and PW-3R with analysis of the samples for potassium permanganate. This sampling is to continue on a monthly basis until it is demonstrated that the majority of the potassium permanganate has been consumed or for a maximum of 4 months;

iv) following completion of the sampling described in item iii), purging and sampling of wells ESI-2, -3, -6, -7, -10, -11, -12, -13R, PW-1, and PW-3R with analyses of the samples for the COCs (tetrachloroethene, TCE, 1,2-dichloroethene, and vinyl chloride) and potassium permanganate; and

v) 3 months following the completion of the sampling described in item iv), purging and sampling of ESI-7, -10, -11, -12, and -13R with analysis of the samples for the COCs and potassium permanganate.

The monitoring data collected to date are presented in the attached Tables 2 and 3. Also included in Table 3 are chloride and pH data collected prior to the injection program.

Observations: The hydraulic monitoring data show that the post-injection water level elevations in all wells are higher than the pre-injection levels while the level of the River is 0.13 foot lower. The fact that the water level elevations in background monitoring well ESI-9, which is outside the expected area of influence of injection, also increased suggests that the increases in water level elevation are reflective of local groundwater conditions and are not a result of the injection program.

Upcoming Work: Groundwater quality monitoring will continue. The first potassium permanganate grab sample collection is expected to be performed during the week of June 26, 2000.

A memorandum presenting the preliminary COC analytical data will be prepared and submitted to NYSDEC after the data are received. The memorandum will include recommended additional work, if any.

A detailed evaluation of in situ chemical oxidation will be presented in the Feasibility Study Report scheduled to be submitted in September 2000.

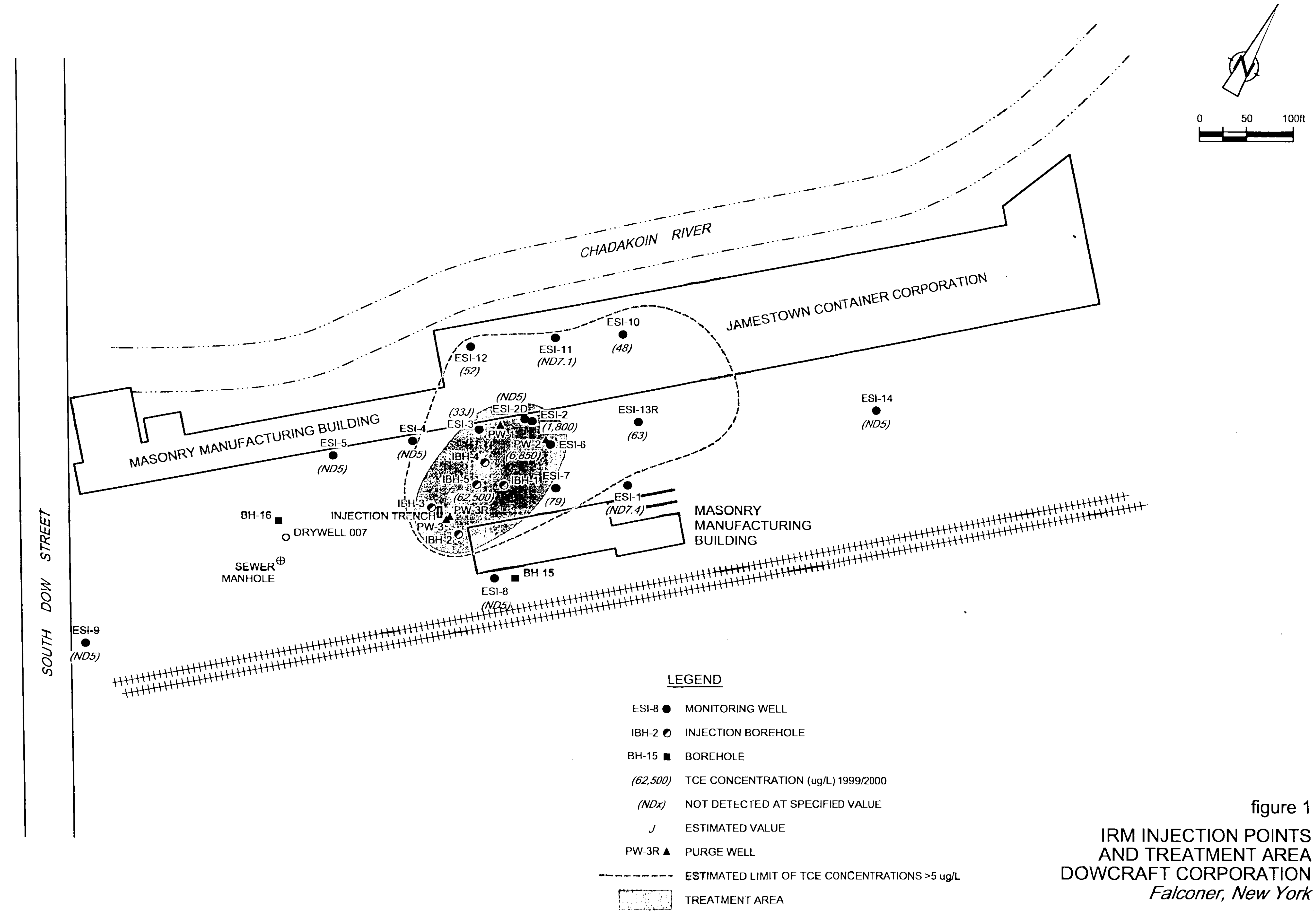


figure 1

IRM INJECTION POINTS
AND TREATMENT AREA
DOWCRAFT CORPORATION
Falconer, New York

CRA

05020-00(010)GN-NF008 SEP 08/2000

TABLE 1

LOG OF INJECTION VOLUMES AND RATES
ADDITIONAL IRM
FORMER DOWCRAFT FACILITY
FALCONER, NEW YORK

Location	*Date*	*Volume Injected (Gallons)*	*Maximum Injection Rate (GPM)*
IBH-1	05/19-20/00	1,600	38
IBH-2	05/18-19/00	1,600	33
IBH-3	05/18-19/00	1,600	50
IBH-4	05/19-20/00	1,600	46
IBH-5	05/19/00	1,600	71
PW-1	05/23/00	1,600	59
PW-2	05/23/00	1,600	15
PW-3R	05/22/00	1,600	9
Test Trench	05/17/00	3,400	51
	Total Volume Injected:	**16,200**	

TABLE 2

SUMMARY OF WATER LEVEL ELEVATIONS
ADDITIONAL IRM
FORMER DOWCRAFT FACILITY
FALCONER, NEW YORK

Well No.	*Date:*	*05/16/00* *Pre-Injection*	*06/09/00* *2 Weeks*
ESI-1		1254.57	1254.71
ESI-2		1254.65	1254.85
ESI-2D		NM	1255.23
ESI-3		1254.87	1255.04
ESI-4		1254.85	1255.02
ESI-5		1255.38	1255.55
ESI-6		1254.71	1254.85
ESI-7		1254.73	1254.86
ESI-8		1255.14	1255.34
ESI-9		1257.89	1258.01
ESI-10		1254.28	1254.35
ESI-11		1254.36	1254.44
ESI-12		1254.47	1254.50
ESI-13R		1254.38	1254.50
ESI-14		1254.37	1254.58
PW-1		1254.65	1254.80
PW-2		1254.66	1254.90
PW-3R		1255.00	1255.17
River		1257.23	1257.10

Notes:
All elevations based on National Geodetic Vertical Datum (NGVD).
NM Not Measured.

TABLE 3

SUMMARY OF FIELD MEASURED WATER QUALITY DATA
ADDITIONAL IRM
FORMER DOWCRAFT FACILITY
FALCONER, NEW YORK

One wk. following Treatment

Well No.	*Date*	*pH*	*Chloride (mg/L)*	*Appearance*
ESI-2	12/02/99	7.0	67.3	Cloudy, Colorless
	06/01/00	7.06	85	Cloudy, Gray, Sediment
	06/07/00	7.26	25	Brown, Cloudy, Sediment
	06/14/00	7.13	85	Cloudy, Gray, Sediment
	06/21/00	7.02	80	Cloudy, Brown, Gray, Sediment
ESI-3	12/02/99	6.7	NM	Clear and Colorless
	06/01/00	7.13	80	Cloudy, Gray, Sediment
	06/07/00	7.16	65	Cloudy, Brown, Sediment
	06/14/00	7.16	85	Cloudy, Brown/Gray, Sediment
	06/21/00	7.11	80	Cloudy, Brown/Gray, Sediment
ESI-6	06/01/00	6.81	95	Cloudy, Brown, Sediment
	06/07/00	7.06	80	Clear, Trace Brown Sediment
	06/14/00	7.14	90	Cloudy, Gray, Some Sediment
	06/21/00	7.18	65	Cloudy, Brown, Gray, Sediment
ESI-10	12/03/99	6.5	NM	Brown
	06/01/00	6.17	75	Slightly Cloudy, Rust Color
	06/07/00	6.37	65	Clear, Trace Rust Colored Sediment
	06/14/00	6.38	65	Slightly Cloudy, Rust Colored Sediment
	06/21/00	6.36	60	Clear, Slightly Cloudy, Rust Colored Sediment
ESI-11	12/03/99	6.7	NM	Clear, Colorless
	06/01/00	6.43	90	Cloudy, Brown, Sediment
	06/07/00	6.68	60	Cloudy, Rust Colored Sediment
	06/14/00	6.55	70	Cloudy, Rust Colored Sediment
	06/21/00	6.70	65	Clear, Slightly Cloudy, Rust Colored Sediment
ESI-12	12/03/99	6.8	NM	Clear, Colorless
	06/01/00	6.75	80	Clear, Colorless
	06/07/00	6.92	70	Clear, Trace Rust Colored Sediment
	06/14/00	6.69	75	Cloudy, Gray, Sediment
	06/21/00	6.79	70	Clear, Slightly Cloudy, Gray Sediment

Notes:
NM	Not Measured.

ATTACHMENT A

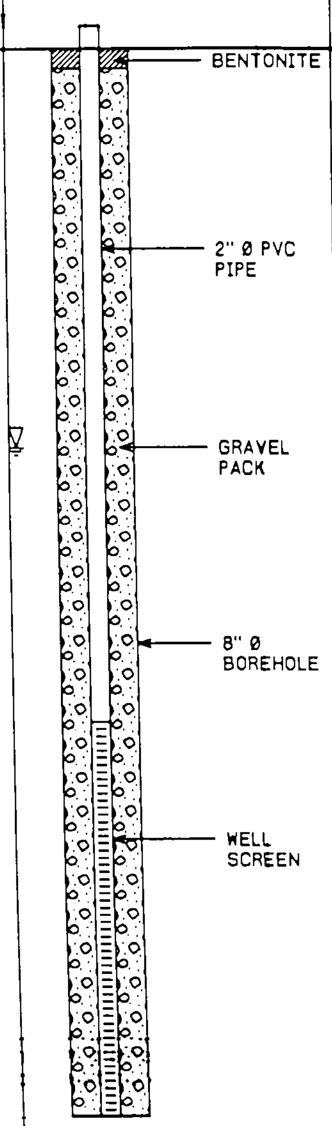
STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(WL-05)
Page 1 of 1

PROJECT NAME: **DOWCRAFT CORPORATION**
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: IBH-1
DATE COMPLETED: MAY 12, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*1265.3* *1265.11*					
	Augered without sampling						
-2.5							
-5.0							
-7.5							
-10.0							
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0	SW/GW-SAND and GRAVEL, medium grained sand, fine grained gravel, brown, wet, no odor	*1240.3*		1SS	☒		0.0
-27.5	END OF HOLE @ 27.0ft BGS	*1238.3*					
-30.0							
-32.5							



<u>SCREEN DETAILS</u>
Screened Interval:
17.0 to 27.0ft BGS
Length: 10.0ft
Diameter: 2"
Material: PVC

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

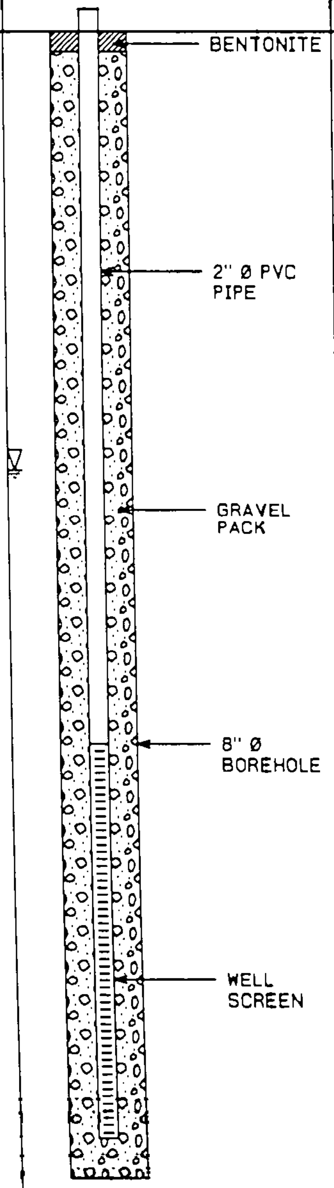
(WL-06)
Page 1 of 1

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: IBH-2
DATE COMPLETED: MAY 16, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	1265.4				
	REFERENCE POINT (Top of Riser)	1265.16				
	Augered without sampling					
-2.5						
-5.0						
-7.5						
-10.0						
-12.5						
-15.0						
-17.5						
-20.0						
-22.5						
-25.0						
		1238.4				
-27.5	SW/GW-SAND and GRAVEL, medium to fine grained sand, fine grained gravel	1237.4	1SS	☒		0.0
	ML-SILT, some very fine sand, brown/gray, wet, no odor	1236.4				
-30.0	END OF HOLE @ 29.0ft BGS					
-32.5						

MONITOR INSTALLATION



SCREEN DETAILS
Screened Interval:
18.0 to 28.0ft BGS
Length: 10.0ft
Diameter: 2"
Material: PVC

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

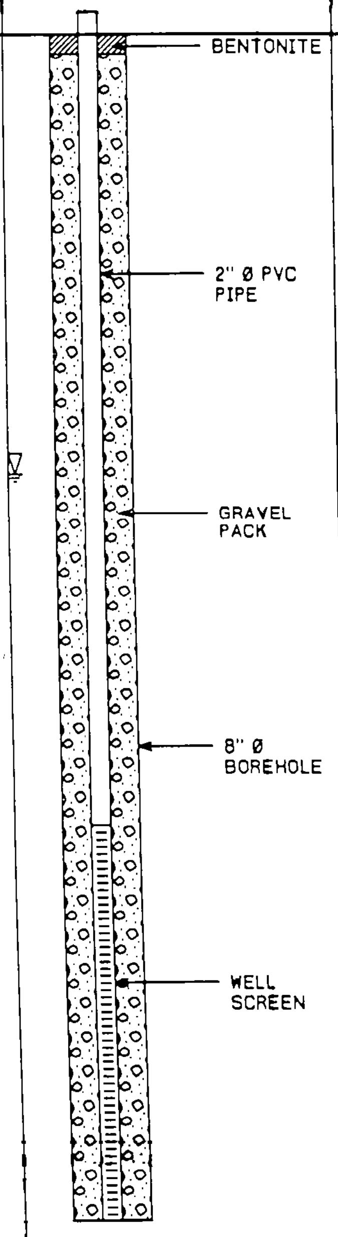
STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(WL-07)
Page 1 of 1

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: IBH-3
DATE COMPLETED: MAY 15, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*1265.5* *1265.27*					
	Augered without sampling						
-2.5							
-5.0							
-7.5							
-10.0							
-12.5							
-15.0							
-17.5							
-20.0							
-22.5							
-25.0							
-27.5		*1237.5*					
	SW/GW-SAND and GRAVEL, medium to fine grained sand, fine grained gravel			1SS	☒		0.0
-30.0	SM/ML-SAND and SILT, very fine grained sand, gray	*1235.5* *1235.5*					
	END OF HOLE @ 30.0ft BGS						
-32.5							



SCREEN DETAILS
Screened interval:
20.0 to 30.0ft BGS
Length: 10.0ft
Diameter: 2"
Material: PVC

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊻ STATIC WATER LEVEL ▼

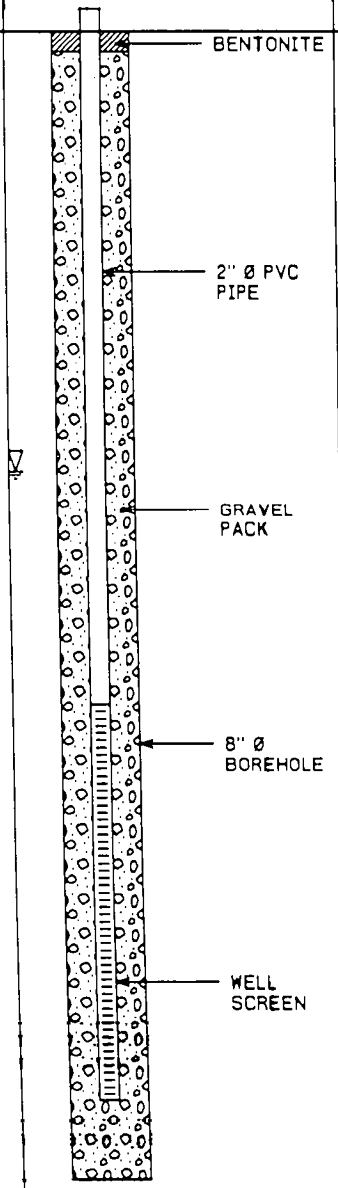
STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(WL-08)
Page 1 of 1

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: IBH-4
DATE COMPLETED: MAY 16, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE			
				NUMBER	STATE	'N' VALUE	PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*1265.4* *1265.21*					
	Augered without sampling						
2.5							
5.0							
7.5							
10.0							
12.5							
15.0							
17.5							
20.0							
22.5							
25.0	SW/GW-SAND and GRAVEL, medium to fine grained sand, fine grained gravel, brown, wet	*1240.4*		1SS	☒		0.0
27.5	ML-SILT, some very fine sand, dense, gray, wet, no odor	*1237.9*		2SS	☒		0.0
	END OF HOLE @ 29.0ft BGS	*1236.4*					
30.0							
32.5							



SCREEN DETAILS
Screened Interval:
17.0 to 27.0ft BGS
Length: 10.0ft
Diameter: 2"
Material: PVC

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL ▼

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

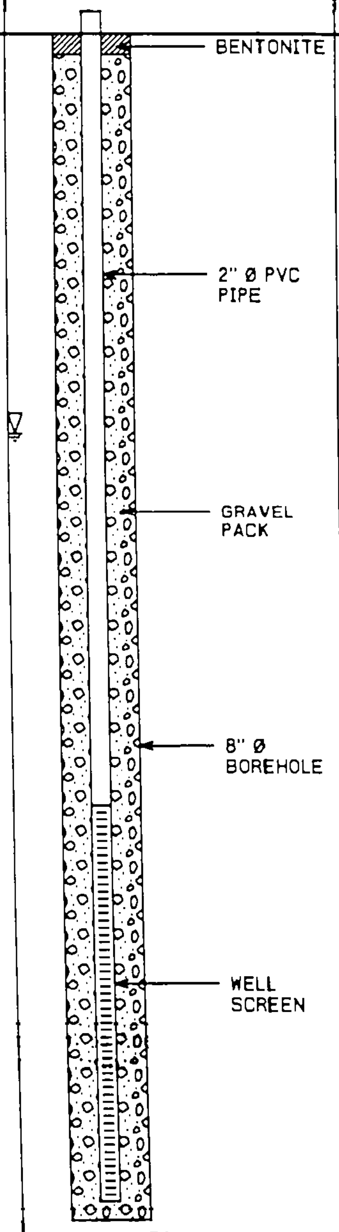
(WL-10)
Page 1 of 1

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: IBH-5
DATE COMPLETED: MAY 15, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*1265.4* *1265.28*				
	Augered without sampling					
-2.5						
-5.0						
-7.5						
-10.0						
-12.5						
-15.0						
-17.5						
-20.0						
-22.5						
-25.0	SW/GW-SAND and GRAVEL, medium to fine grained sand, fine grained gravel, brown, wet	*1240.4*	1SS	☒		0.0
-27.5			2SS	☒		0.0
		1235.7	3SS	☒		0.0
-30.0	ML-SILT, some very fine sand, dense, gray, wet, no odor	*1235.4*				
	END OF HOLE @ 30.0ft BGS					
-32.5						

MONITOR INSTALLATION



SCREEN DETAILS
Screened Interval:
18.5 to 28.5ft BGS
Length: 10.0ft
Diameter: 2"
Material: PVC

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL ▼

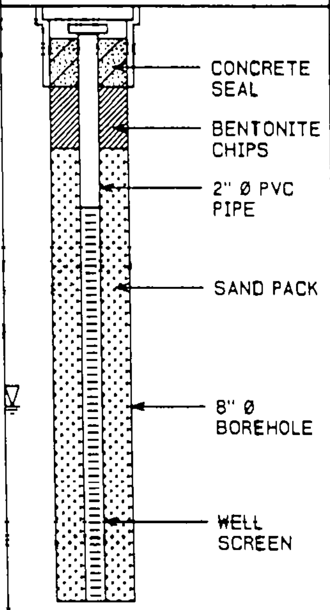
STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

(WL-04)
Page 1 of 1

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: EAST OF ESI-13R

HOLE DESIGNATION: ESI-14
DATE COMPLETED: MAY 8, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE REFERENCE POINT (Top of Riser)	1262.8 1262.58					
	FILL, medium gravel and cinders, brick fragments, loose, black, dry, coal-like odor			1SS	☒	18	0.0
-2.5				2SS	☒	8	0.0
	- gray silty sand						
-5.0				3SS	☒	2	0.0
	SM-SAND (NATIVE), some fine grained, some silt, trace clay, gray, moist, no odor	1256.8					
-7.5	- with fine grained, brown/gray			4SS	☒	5	0.0
				5SS	☒	11	0.0
-10.0	- wet		∇				
				6SS	☒	2	0.0
-12.5							
	SP-SAND, fine to medium grained, brown, no odor	1249.8		7SS	☒	2	0.0
	- running sands			8SS	☒	1	0.0
-15.0	END OF HOLE @ 15.0ft BGS	1247.8					
-17.5							
-20.0							
-22.5							
-25.0							
-27.5							
-30.0							
-32.5							



SCREEN DETAILS
Screened Interval:
5.0 to 15.0ft BGS
Length: 10.0ft
Diameter: 2"
Slot Size: #10
Material: PVC
Sand Pack:
3.5 to 15.0ft BGS
Material: 0 Morie Silica Sand

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL ▼

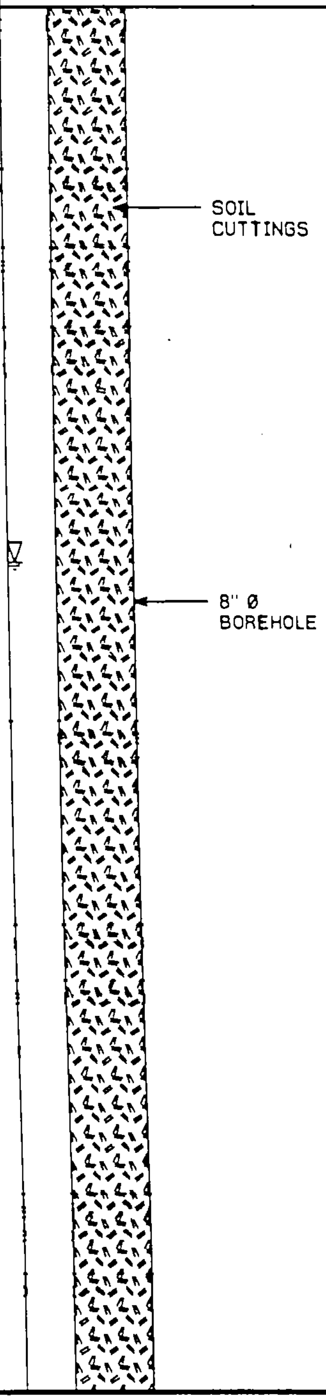
STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

(WL-11)
Page 1 of 2

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: BH-15
DATE COMPLETED: MAY 9, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL	MONITOR INSTALLATION	SAMPLE NUMBER	SAMPLE STATE	SAMPLE 'N' VALUE	SAMPLE PID (ppm)
	GROUND SURFACE	1268.2					
	FILL, gravel, sand, brick debris, black, dry, no odor			1SS	☒	>50	0.0
-2.5	No recovery			2SS	⧄	>50	0.0
-5.0	FILL, cement-like, hard, tan, dry, no odor	1264.2	SOIL CUTTINGS	3SS	☒	7	0.0
-7.5	FILL, sand and gravel, trace cinders, brown, dry, no odor	1262.2		4SS	☒	28	0.0
	GM-GRAVEL, some sand, trace silt, medium to fine grained, brown/tan, dry, no odor	1260.2		5SS	☒	22	0.0
-10.0	- moist			6SS	☒	13	0.0
-12.5				7SS	☒	10	0.0
	- more gravel, wet		∇				
-15.0			8" Ø BOREHOLE	8SS	☒	12	0.0
	No recovery			9SS	⧄	5	0.0
-17.5	SW-SAND, some fine gravel, trace silt, medium to fine grained sand, brown, wet, no odor	1250.2		10SS ▭	☒	8	0.0
-20.0	- wet			11SS ▭	☒	3	0.0
-22.5	SM-SAND, some silt, fine grained sand, brown, wet, no odor	1245.0		12SS	☒	3	0.0
-25.0	ML-SILT, trace sand and clay, brown, mottled, wet, no odor	1244.2		13SS	☒	5	0.0
	- trace fine grained sand, gray			14SS	☒	7	0.0
-27.5				15SS	☒	18	0.0
-30.0	ML-SILT, some fine sand, trace fine clay and fine gravel, gray, mottled, wet, no odor	1238.2		16SS	☒	47	0.0
-32.5	SM-SAND, some silt, trace to no clay	1236.2		17SS	☒	81	0.0
	- trace fine grained gravel			18SS	☒	15	0.0



NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

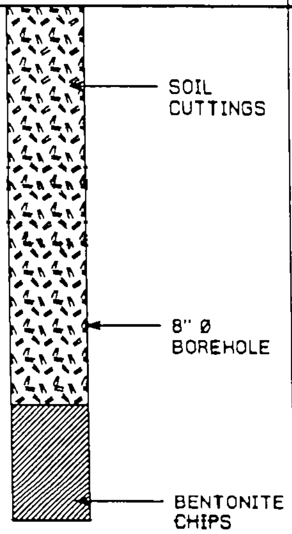
(WL-11)
Page 2 of 2

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: BH-15
DATE COMPLETED: MAY 9, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
-37.5		
	SW/GW-SAND and GRAVEL, fine to medium fine grained, gray, wet, no odor	1229.2
-40.0		1226.2
	ML-SILT, some sand, trace clay, fine grained sand	
-42.5		
-45.0		
-47.5		
	END OF HOLE @ 48.0ft BGS	1220.2
-50.0		
-52.5		
-55.0		
-57.5		
-60.0		
-62.5		
-65.0		
-67.5		

MONITOR INSTALLATION



SAMPLE			
NUMBER	STATE	'N' VALUE	PID (ppm)
18SS	☒	15	0.0
19SS	☒	14	0.0
20SS	☒	18	0.0
21SS	☒	43	0.0
22SS	☒	17	0.0
23SS	☒	27	0.0
24SS	☒	29	0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊻ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

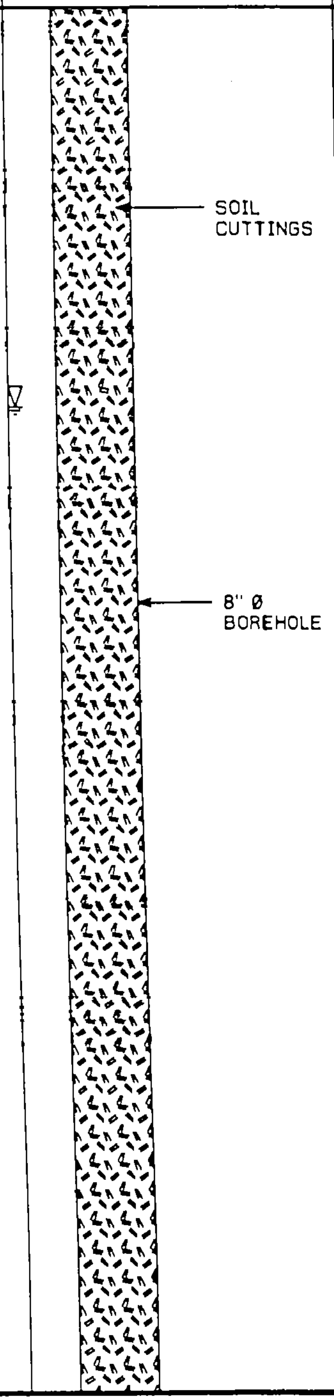
(WL-12)
Page 1 of 2

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: BH-16
DATE COMPLETED: MAY 11, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
	GROUND SURFACE	1265.0
-2.5	FILL, cinders, brick debris, gravel and sand, brown, dry, no odor	
		1261.0
-5.0 -7.5	FILL, medium to fine grained sand and medium grained gravel, brown, dry, no odor - moist	
		1257.0
-10.0	GM-GRAVEL (NATIVE), some silt and sand, brown/tan/gray	
		1253.0
-12.5 -15.0 -17.5	SM-SAND, with fine gravel, trace silt, fine grained sand, brown/tan, no odor - trace fine gravel, no odor	
		1247.5
-20.0 -22.5	ML-SILT, some fine sand, no odor - very fine sands and some silt, gray - no gravel, no odor - trace clay - no odor - trace clay throughout the interval, no odor	
		1240.0
-25.0 -27.5 -30.0 -32.5	GM/GC/SM-SAND and GRAVEL, some silt, trace clay, very fine grained sand, coarse gravel (1" Ø average), brown, no odor - brown - gray - more silt, trace to no clay - very fine sand and silt, no odor	

MONITOR INSTALLATION



SAMPLE			
NUMBER	STATE	'N' VALUE	PID (ppm)
1SS	☒	18	0.0
2SS	/	22	0.0
3SS	☒	23	0.0
4SS	☒	13	0.0
5SS	☒	5	0.0
6SS	☒	2	0.0
7SS	☒	4	0.0
8SS	☒	2	0.0
9SS	/	2	0.0
10SS	☒	3	0.0
11SS	☒	3	0.0
12SS	☒	4	0.0
13SS	☒	14	0.0
14SS	☒	15	0.0
15SS	☒	13	0.0
16SS	☒	13	0.0
17SS	☒	17	0.0
18SS	☒	23	0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ☐

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

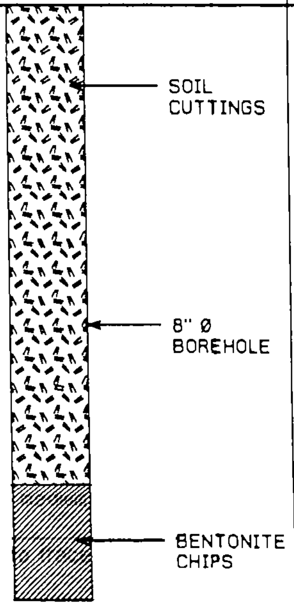
(WL-12)
Page 2 of 2

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: AS PER PLAN

HOLE DESIGNATION: BH-16
DATE COMPLETED: MAY 11, 2000
DRILLING METHOD: 4 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
-37.5		
-40.0		
	- trace to some clay	
-42.5		
	- more clay	
-45.0		
	CL-CLAY, some silt, with slight to medium plasticity, gray, no odor	*1218.0*
-47.5		
	CL-CLAY (TILL), some silt, some to trace fine gravel, gray, no odor	*1217.0*
-50.0	END OF HOLE @ 50.0ft BGS	*1215.0*
-52.5		
-55.0		
-57.5		
-60.0		
-62.5		
-65.0		
-67.5		

MONITOR INSTALLATION



SAMPLE			
NUMBER	STATE	'N' VALUE	PID (ppm)
18SS	☒	23	0.0
19SS	☒	25	0.0
20SS	☒	27	0.0
21SS	☒	32	0.0
22SS	☒	26	0.0
23SS	☒	18	0.0
24SS	☒	15	0.0
25SS	☒	44	0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ⊻ STATIC WATER LEVEL ▼
GRAIN SIZE ANALYSIS ▭

STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

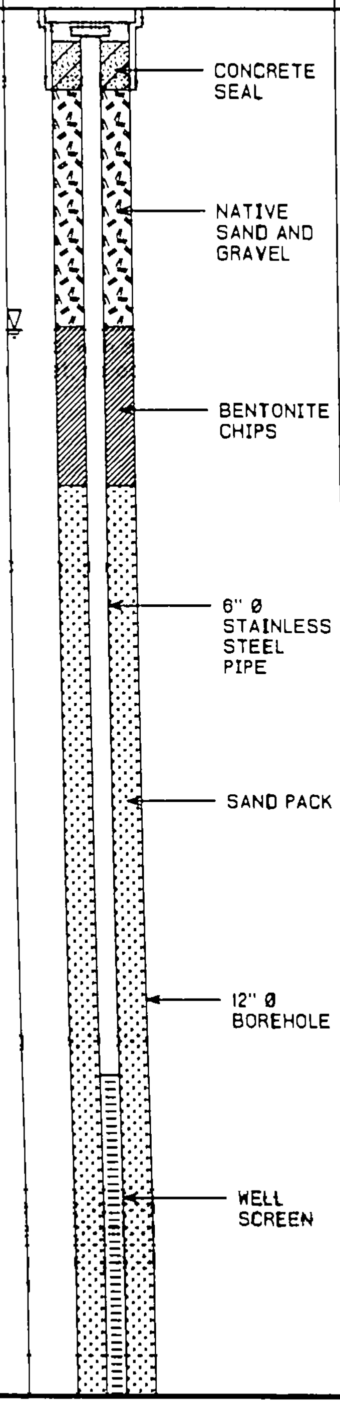
(WL-03)
Page 1 of 2

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: EAST OF PW-3

HOLE DESIGNATION: PW-3R
DATE COMPLETED: MAY 10, 2000
DRILLING METHOD: 8 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
	GROUND SURFACE REFERENCE POINT (Top of Riser)	*1265.3* *1265.04*
	Stratigraphy taken from borehole drilled 3.0ft to the north from PW-3R FILL, gravel, brick debris, red or red brown, dry, no odor	
-2.5		
	- more sand and gravel	
-5.0		
-7.5		
	GM-GRAVEL (NATIVE), some sand, with silt, medium to fine grained, brown, wet, no odor	*1257.3*
-10.0	- trace silt	
-12.5		
	- medium sand, fine gravel, brown/gray	
-15.0		
-17.5		
-20.0		
	- medium to coarse sand	
-22.5		
	- coarse sand	
-25.0		
	- fine sand, coarse (3/4") gravel, brown	
-27.5		
-30.0	GM-GRAVEL, trace silt, loose, fine to coarse grained, brown and gray, sheen, chemical odor	*1235.5* *1235.3*
	SM/ML-SAND and SILT, trace fine gravel, fine grained sand, gray and brown	
-32.5		
		1231.3

MONITOR INSTALLATION



SAMPLE			
NUMBER	STATE	'N' VALUE	PID (ppm)
1SS	☒	38	0.0
2SS	☒	32	0.0
3SS	☒	13	0.0
4SS	☒	25	0.6
5SS	☒	22	10.0
6SS	☒	12	0.8
7SS	☒	8	10.0
8SS	☒	6	2.0
9SS	☒	9	10.8
10SS	☒	7	10.8
11SS	☒	6	8.0
12SS	☒	16	14.5
13SS	☒	14	17.2
14SS	☒	8	24.0
15SS	☒	12	21.0
16SS	☒	47	211.0
17SS	☒	55	213.0
18SS	☒	18	384.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ∇ STATIC WATER LEVEL ▼

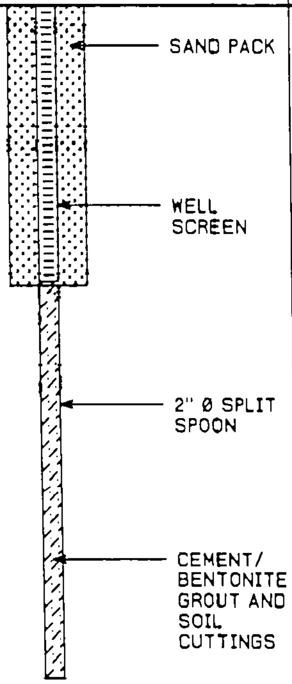
STRATIGRAPHIC AND INSTRUMENTATION LOG
(OVERBURDEN)

PROJECT NAME: DOWCRAFT CORPORATION
PROJECT NUMBER: 5020
CLIENT: DOWCRAFT CORPORATION
LOCATION: EAST OF PW-3

HOLE DESIGNATION: PW-3R
DATE COMPLETED: MAY 10, 2000
DRILLING METHOD: 8 ¼" ID HSA
CRA SUPERVISOR: D. STEINER

DEPTH ft. BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft. AMSL
	ML/GM-SILT and GRAVEL, some fine sand, fine gravel, chemical odor - black stained soils	
-37.5		1227.3
	SM/ML-SAND and SILT, very fine grained, gray/brown, slight chemical odor	
-40.0	- mostly gray, less odor	
		1223.6
-42.5	SM/GM-SAND and GRAVEL, fine grained sand, fine grained gravel, SILT, trace clay, hard	
		1221.3
-45.0	ML-SILT, some fine sand, trace clay, hard, gray, no odor	
	- dense	
-47.5		
-50.0	- no clay to trace clay	
		1213.3
	END OF HOLE @ 52.0ft BGS	
-52.5	NOTE: 1. PW-3R total depth is 42.0ft BGS. From 42.0 to 52.0ft BGS, stratigraphy taken from borehole drilled 3.0ft to the north of PW-3R.	
-55.0		
-57.5		
-60.0		
-62.5		
-65.0		
-67.5		

MONITOR INSTALLATION



SCREEN DETAILS
Screened interval:
26.9 to 41.9ft BGS
Length: 15.0ft
Diameter: 6"
Slot Size: #10
Material: Stainless Steel
Sand Pack:
11.9 to 42.0ft BGS
Material: 0 Morie Silica Sand

SAMPLE			
NUMBER	STATE	'N' VALUE	PID (ppm)
18SS	☒	18	394.0
19SS	☒	16	143.0
20SS	☒	20	20.0
21SS	☒	21	16.0
22SS	☒	29	6.0
23SS	☒	35	3.0
24SS	☒	32	2.2
25SS	☒	29	1.0
26SS	☒	32	0.0

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE
WATER FOUND ▽ STATIC WATER LEVEL ▼

CONESTOGA-ROVERS
& ASSOCIATES

2055 Niagara Falls Blvd., Suite #3
Niagara Falls, New York 14304
Telephone: (716) 297-6150 Fax: (716) 297-2265
www.CRAworld.com

MEMORANDUM

TO: Martin Doster

REF. NO.: 5020

FROM: Jim Kay/cfd/js/2 cfd

DATE: August 22, 2000

C.C.: G. Carlson, J. Charles, H. Nicholson, A. Kryzan, G. Pietraszek, C. Dunnigan

RE: **Preliminary Results - Additional IRM**
Former Dowcraft Facility
Falconer, New York

The additional Interim Remedial Measure (IRM) at the Former Dowcraft Facility in Falconer, New York (Site), was initiated on May 17, 2000. The additional IRM consists of the injection of potassium permanganate ($KMnO_4$) for in situ chemical oxidation of the compounds of concern (COCs) in groundwater at the Site. The additional IRM has been conducted in accordance with the procedures contained in the New York State Department of Environmental Conservation (NYSDEC) approved "Additional IRM Work Plan", dated April 6, 2000.

The in situ treatment program was intended to introduce $KMnO_4$ into the primary area of COC presence in Site groundwater and to allow the $KMnO_4$ to come into contact with as much of the groundwater COC plume as possible. To accomplish this, an aqueous solution of $KMnO_4$ was injected into the area immediately adjacent to and the area hydraulically downgradient of the former trichloroethene (TCE) vapor degreaser pit. Upon contact, the $KMnO_4$ reduced the concentration of TCE in groundwater in these areas.

A memo was prepared and submitted to NYSDEC on June 23, 2000 which presented a description of the field activities performed for the application of the $KMnO_4$ and the results of the field measured monitoring parameters. This memorandum presents the monitoring results for the Additional IRM and a technical evaluation of the effectiveness of the treatment.

Monitoring Data

The monitoring of the Additional IRM was designed to consist of:

i) hydraulic monitoring conducted on three occasions;

ii) weekly field measurement of pH and chloride in six monitoring wells within and downgradient of the treatment area (ESI-2, -3, -6, -10, -11, and -12) for 4 weeks following treatment June 1, 2000 through June 21, 2000;

iii) grab sampling of the six monitoring wells listed in item ii) and PW-1 and PW-3R on June 29, 2000 and July 18, 2000. These samples were analyzed for $KMnO_4$;

iv) purging and sampling of the wells listed in item iii) on July 18, 2000. These samples were analyzed for the COCs; and

v) purging and sampling of monitoring wells ESI-7, -10, -11, -12, and -13R 3 months following the sampling described in item iv) (on or about October 18, 2000).

The monitoring data collected to date are presented in the attached Tables 1 through 4. Also included in Tables 2 and 4, respectively, are chloride, pH and COC data collected prior to the injection program. The locations of the injection and monitoring points are shown on Figure 1.

Evaluation of Treatment Effectiveness

The reaction of $KMnO_4$ with TCE results in the cleavage of the TCE carbon-carbon double bond to yield carbon dioxide (CO_2). Manganese dioxide (MnO_2), potassium chloride (KCl) and hydrochloric acid (HCl) are produced in accordance with the following equation:

$$C_2Cl_3H + 2KMnO_4 \dashrightarrow CO_2 + 2MnO_2 + 2KCl + HCl$$

Stoichiometrically, 0.81 pounds of chloride are produced per pound of TCE oxidized. Therefore, chloride monitoring is considered a useful tool for the assessment of treatment effectiveness. Knowledge of the increase in chloride mass after $KMnO_4$ treatment can be used to determine the extent of TCE oxidation. Typically, a rapid increase in chloride is observed within the first two weeks after treatment. This increased chloride concentration then gradually decreases to background levels as it is diluted by dispersion in the groundwater.

The chloride ion concentrations measured at the Site before treatment (December 2, 1999) and 1 week following treatment (June 1, 2000) are summarized below:

Sampling Point #	*Chloride concentration (mg/L)*		
	Before Treatment	*After treatment*	*Change*
ESI-2	67.3	85	17.95
ESI-3	NM	80	12.95
ESI-6	NM	95	27.95
ESI-10	NM	75	7.95
ESI-11	NM	90	22.95
ESI-12	NM	80	12.95
PW-2	66.8	NM	NM

NM Not measured.

Based on the data provided above, the average concentration of chloride in the COC plume before treatment was 67.05 milligrams per liter (mg/L) and the average increase in chloride concentration as a result of the oxidation of TCE by $KMnO_4$ was 17.11 mg/L. The volume of the COC plume is estimated to be 4,400,000 gallons. This estimate assumes the following:

i) the radius of the plume is 150 feet;

ii) the water column is 28 feet in length; and

iii) the porosity of the sand and gravel is 30% (n=0.3).

The average increase in chloride concentration was used to estimate the total mass of chloride in the plume by multiplying the volume of the plume in liters by the chloride concentration:

Mass of Chloride = 4,400,000 gallons x 3.785 L/g x 17.11 mg/L
= 284.95 10^6 mg
= 284.94 kg
= 627 pounds

Using the 0.81 pounds of chloride per pound of TCE conversion factor described previously, 627 pounds of chloride can be converted to 774 pounds of TCE oxidized. Therefore, the increase in chloride concentration demonstrates that 774 pounds of TCE were oxidized through the application of $KMnO_4$.

Due to the non-discriminating oxidizing nature of $KMnO_4$ and its ability to react with a wide range of chemicals, an excess of $KMnO_4$ is always required to oxidize site-specific contaminants. The theoretical ratio of $KMnO_4$ consumed to TCE oxidized is 2.4:1. The excess $KMnO_4$ required to react with the other oxidizable species present is typically expected to be 6 to 10 times the amount that would theoretically be required. Based upon the amount of $KMnO_4$ injected (5,280 pounds) and the estimated volume of TCE treated (774 pounds), the $KMnO_4$ was consumed at a ratio of 6.8:1 ($KMnO_4$:TCE).

Based on this, the amount of $KMnO_4$ used at the Site was well within the expected range and the $KmnO_4$ was efficiently utilized.

Evaluation of Monitoring Data

The concentrations of TCE in the injection points, PW-1, PW-2, andPW-3, and monitoring well ESI-6 either decreased or remained essentially unchanged following treatment. The concentrations of TCE in the downgradient monitoring wells, ESI-2, -3, -10, -11, and -12, increased between December 1999 (the last pre-treatment monitoring event) and July 2000 following treatment. The increases in TCE concentration are expected to be a consequence of groundwater movement and the migration of residual TCE after the pumping system was turned off and hydraulic containment was lost. As shown by the COC analytical data presented in Table 4, with the exception of ESI-2 , the concentrations of TCE in the downgradient monitoring wells following treatment are 17 to 96 percent lower than the concentrations reported in 1992/1993, prior to startup of the extraction system.

Conclusions and Recommendations

In conclusion, the increase in chloride concentration in groundwater indicates that oxidation of 774 pounds of TCE occurred as a result of the Additional IRM.

It is recommended that no further monitoring or treatment activities be performed until after the completion of the Feasibility Study.

TABLE 1

SUMMARY OF HYDRAULIC MONITORING ATA
ADDITIONAL IRM
FORMER DOWCRAFT FACILITY
FALCONER, NEW YORK

Well No.	*Date:*	*05/16/00* *Pre-Injection*	*06/09/00* *2 Weeks*	*07/18/00* *7 Weeks*
ESI-1		1254.57	1254.71	1254.39
ESI-2		1254.65	1254.85	1254.57
ESI-2D		NM	1255.23	1255.08
ESI-3		1254.87	1255.04	1254.77
ESI-4		1254.85	1255.02	1254.71
ESI-5		1255.38	1255.55	1255.34
ESI-6		1254.71	1254.85	1254.50
ESI-7		1254.73	1254.86	1254.56
ESI-8		1255.14	1255.34	1255.13
ESI-9		1257.89	1258.01	1257.93
ESI-10		1254.28	1254.35	1254.05
ESI-11		1254.36	1254.44	1254.18
ESI-12		1254.47	1254.50	1254.26
ESI-13R		1254.38	1254.50	1254.19
ESI-14		1254.37	1254.58	1254.45
PW-1		1254.65	1254.80	1254.50
PW-2		1254.66	1254.90	1254.53
PW-3R		1255.00	1255.17	1254.89
River		1257.23	1257.10	1253.11

Notes:
All elevations based on National Geodetic Vertical Datum (NGVD).
NM Not Measured.

TABLE 2

SUMMARY OF FIELD MEASURED WATER QUALITY DATA
ADDITIONAL IRM
FORMER DOWCRAFT FACILITY
FALCONER, NEW YORK

Well No.	*Date*	*pH*	*Chloride (mg/L)*	*Appearance*
ESI-2	12/02/99	7.0	67.3	Cloudy, Colorless
	06/01/00	7.06	85	Cloudy, Gray, Sediment
	06/07/00	7.26	25	Brown, Cloudy, Sediment
	06/04/00	7.13	85	Cloudy, Gray, Sediment
	06/21/00	7.02	80	Cloudy, Brown, Gray, Sediment
ESI-3	12/02/99	6.7	NM	Clear and Colorless
	06/01/00	7.13	80	Cloudy, Gray, Sediment
	06/07/00	7.16	65	Cloudy, Brown, Sediment
	06/14/00	7.16	85	Cloudy, Brown/Gray, Sediment
	06/21/00	7.11	80	Cloudy, Brown/Gray, Sediment
ESI-6	06/01/00	6.81	95	Cloudy, Brown, Sediment
	06/07/00	7.06	80	Clear, Trace Brown Sediment
	06/14/00	7.14	90	Cloudy, Gray, Some Sediment
	06/21/00	7.18	65	Cloudy, Brown, Gray, Sediment
ESI-10	12/03/99	6.5	NM	Brown
	06/01/00	6.17	75	Slightly Cloudy, Rust Color
	06/07/00	6.37	65	Clear, Trace Rust Colored Sediment
	06/14/00	6.38	65	Slightly Cloudy, Rust Colored Sediment
	06/21/00	6.36	60	lear, Slightly Cloudy, Rust Colored Sediment
ESI-11	12/03/99	6.7	NM	Clear, Colorless
	06/01/00	6.43	90	Cloudy, Brown, Sediment
	06/07/00	6.68	60	Cloudy, Rust Colored Sediment
	06/14/00	6.55	70	Cloudy, Rust Colored Sediment
	06/21/00	6.70	65	lear, Slightly Cloudy, Rust Colored Sediment
ESI-12	12/03/99	6.8	NM	Clear, Colorless
	06/01/00	6.75	80	Clear, Colorless
	06/07/00	6.92	70	Clear, Trace Rust Colored Sediment
	06/14/00	6.69	75	Cloudy, Gray, Sediment
	06/17/00	6.79	70	Clear, Slightly Cloudy, Gray Sediment

Notes:
NM Not Measured.

TABLE 3

SUMMARY OF POTASSIUM PERMANGANATE ANALYTICAL DATA
ADDITIONAL IRM
FORMER DOWCRAFT FACILITY
FALCONER, NEW YORK

	Sampling Date:	*06/29/00*	*07/18/00*
Sample Number	*Units*		
ESI-2	mg/L	ND (5)	ND (5)
ESI-3	mg/L	ND (5)	ND (5)
ESI-6	mg/L	ND (5)	ND (5)
ESI-10	mg/L	ND (5)	ND (5)
ESI-11	mg/L	ND (5)	ND (5)
ESI-12	mg/L	ND (5)	ND (5)
PW-1	mg/L	18960	1002
PW-2	mg/L	ND (5)	ND (5)
PW-3R	mg/L	ND (5)	ND (5)

Notes:
ND(5) Not detected above the detection limit of 5 parts per million (ppm).

TABL

SUMMARY OF COCs DETECTED IN GROUNDWATER
ADDITIONAL IRM
DOWCRAFT CORPORATION
FALCONER. NEW YORK

	Location:	**ESI-2**					**ESI-3**			
	Sample Date:	*11/30/90*	*03/09/92*	*04/16/92*	*12/02/99*	*07/18/00*	*11/13/90*	*04/16/92*	*12/02/99*	*07/18/00*
Parameters	*Units*									
cis-1,2-Dichloroethene	µg/L	NA	NA	NA	210	1600	NA	NA	2.3J	11
Dichloroethene (total)	µg/L	230	390	58	NA	NA	ND 25	310	NA	NA
Trichloroethene	µg/L	1300	3100	340	1800	3400	180	2800	33J	120
Vinyl chloride	µg/L	ND 250	ND 100	ND 10	ND 100	ND 200	ND 50	ND 10	ND 10	ND 10
Tetrachloroethene	µg/L	ND 250	ND 50	ND 5	ND 50	ND 100	ND 25	ND 5	ND 5	ND 5

SUMMARY OF COCs DETECTED IN GROUNDWATER
ADDITIONAL IRM
DOWCRAFT CORPORATION
FALCONER. NEW YORK

Location:		***ESI-A/ESI-6***				***ESI-10***			***ESI-11***		
Sample Date:		***01/02/91***	***04/16/92***	***02/10/93***	***07/18/00***	***04/16/92***	***12/03/99***	***07/18/00***	***04/16/92***	***12/03/99***	***07/18/00***
Parameters	***Units***										
cis-1,2-Dichloroethene	µg/L	NA	NA	NA	400	NA	93	1100	NA	32	200
Dichloroethene (total)	µg/L	20	1900	1900	NA	590	NA	NA	620	NA	NA
Trichloroethene	µg/L	57	13000	14000	7300	87	48	73	590	ND 7.1	26
Vinyl chloride	µg/L	ND 1	100	36	ND 500	160	43	100	87	17	76
Tetrachloroethene	µg/L	ND 0.5	13	17	ND 500	ND 5	ND 5	ND 50	ND 5	ND 5	ND 10

SUMMARY OF COCs DETECTED IN GROUNDWATER
ADDITIONAL IRM
DOWCRAFT CORPORATION
FALCONER, NEW YORK

	Location:	***ESI-12***			***PW-1***		***PW-2***		
	Sample Date:	***04/16/92***	***12/03/99***	***07/18/00***	***02/09/93***	***07/18/00***	***02/10/93***	***12/02/99***	***07/18/00***
Parameters	*Units*								
cis-1,2-Dichloroethene	µg/L	NA	4.7J	51	NA	ND 5	NA	730 / 750	610
Dichloroethene (total)	µg/L	160	NA	NA	180	NA	410	NA / NA	NA
Trichloroethene	µg/L	650	52	200	5900	2.7J	22000	6600 / 7100	1100
Vinyl chloride	µg/L	ND 10	ND 10	ND 20	ND 10	ND 10	11	ND500 / ND500	110
Tetrachloroethene	µg/L	ND 5	ND 5	ND 10	ND 10	1.4J	76	ND250 / ND250	ND 50

TABLE

SUMMARY OF COCs DETECTED IN GROUNDWATER
ADDITIONAL IRM
DOWCRAFT CORPORATION
FALCONER, NEW YORK

		Location:	***PW-3/PW-3R***	
		Sample Date:		
		11/05/93	***05/15/00***	***07/18/00***
Parameters	***Units***			
cis-1,2-Dichloroethene	µg/L	ND 20000	1500J / 1700J	1300J / 1200J
Dichloroethene (total)	µg/L	NA	NA / NA	NA
Trichloroethene	µg/L	320000	58000 / 67000	79000 / 52000J
Vinyl chloride	µg/L	ND 20000	ND5000 / ND5000	ND 5000 / ND 5000
Tetrachloroethene	µg/L	ND 20000	ND2500 / ND2500	ND 2500 / ND 2500

Notes:

COCs	Chemicals of Concern.
J	Associated value is estimated.
NA	Not analyzed.
NDx	Non-detect at or above associated value.
µg/L	Micrograms per Liter.
100/110	Results of duplicate analyses.

N

APPENDIX N

COST ESTIMATE BACKUP

TABLE N.1

ESTIMATED COST - INSTITUTIONAL CONTROLS AND MONITORING

		Estimated Quantity	*Unit*	*Unit Cost*	*Total*
	Capital Costs				
1.	Administrative Cost to Implement Deed Restrictions	1	L.S.	$ 15,000	$ 15,000
			Sub-Total, Capital Cost:		$ 15,000
			Total Capital Cost:		**$ 15,000**
	Operation and Maintenance				
2.	Monitoring Well Maintenance	30	Annual	$ 2,000	$ 60,000
3	Site monitoring (15 wells)				
	• Sample Collection	30	Hours/Event	$ 55	$ 1,650
	• Sample Analyses (COCs)	20	Samples/Event	$ 120	$ 2,400
	• Data Validation and Reporting	1	Event	$ 1,200	$ 1,200
	• Disbursements	1	Event	$ 300	$ 300
			Sub-Total, Monitoring/Event:		$ 5,550

Notes:
Costs are in total present value.

TABLE N.2

ESTIMATED COSTS - COLLECTION, CONTAINMENT, AND TREATMENT

		Estimated Quantity	*Unit*	***Unit Cost***	***Total***
	Administrative Cost				
1.	Administrative cost to implement deed restrictions	1	L.S.	$ 15,000	$ 15,000
		Sub-Total, Administrative Cost:			**$ 15,000**
	Direct Capital Cost				
2.	Pre-design evaluation of air stripper	1	L.S.	$ 3,000	$ 3,000
3.	Installation of forcemain, pumps, and services	1	L.S.	$ 21,000	$ 21,000
4.	Assembly & reconditioning of air stripper incl. Shelter	1	L.S.	$ 17,000	$ 17,000
5.	Pumping & treatment systems instrumentation & controls	1	L.S.	$ 10,000	$ 10,000
6.	System startup	1	L.S.	$ 3,000	$ 3,000
		Sub-Total, Direct Capital Cost			**$ 54,000**
	Indirect Capital Costs				
7.	Design & engineering (assume 15% of capital cost)				$ 8,100
8.	Construction management (assume 10% of capital cost)				$ 5,400
9.	Contingency allowance (assume 20% of capital cost)				$ 10,800
		Sub-Total, Indirect Capital Cost:			**$ 24,300**
		Total Capital Cost:			**$ 93,300**
	Operation & Maintenance				
10.	Operation & maintenance				
	Monitoring Wells	30	Annual	$ 2,000	$ 60,000
	Extraction & Treatment Systems	30	Annual	$ 30,000	$ 900,000
11.	Site monitoring (15 wells)				
	• Sample Collection	30	Hours/Event	$ 55	$ 1,650
	• Sample Analyses (COCs)	20	Samples/Event	$ 120	$ 2,400
	• Data Validation & Reporting	1	Event	$ 1,200	$ 1,200
	• Disbursements	1	Event	$ 300	$ 300
		Sub-Total, Monitoring/Event:			**$ 5,550**
12.	Annual Reporting	1	Year	$ 2,500	$ 2,500

Notes:
Costs are in total present value.

Assumptions
i) Routine inspection and maintenance = 8 manhours/week
ii) Life of air stripper and is 10 years.
iii) Life of pumps is 5 years.
iv) No pretreatment or polishing treatments required.
v) No treatment of air emissions required.

TABLE N.3

ESTIMATED COSTS - IN SITU CHEMICAL OXIDATION

		Estimated Quantity	*Unit*	*Unit Cost*	*Total*
	Administrative Cost				
1	Administrative Cost to Implement Deed Restrictions	1	L.S.	$ 15,000	$ 15,000
	Sub-Total, Administrative Cost:				$ 15,000
	Direct Capital Costs				
2	Potassium Permanganate	26000	Pound	$ 2	$ 52,000
3	Installation of Additional Injection Points	6	Each	$ 500	$ 3,000
4	Mixing & Injection of Sol'n (2 events @ 5 days)	2	Event	$ 7,500	$ 15,000
	Sub-Total, Direct Capital Costs:				$ 70,000
	Indirect Capital Costs				
5	Design & Engineering (assume 15% of capital cost)				$ 10,500
6	Construction Management (assume 10% of capital cost)				$ 7,000
7	Contingency Allowance (assume 20% of capital cost)				$ 14,000
	Sub-Total, Indirect Capital Costs:				$ 31,500
	Total Capital Costs:				**$ 116,500**
	Operation & Maintenance				
8	Operation & maintenance Monitoring wells	3	Annual	$ 2,000	$ 6,000
9	Site monitoring (8 wells)				
	i) Sample collection	20	Hours/Event	$ 55	$ 1,100
	ii) Sample analyses (COCs)	10	Samples/Event	$ 120	$ 1,200
	iii) Data validation & reporting	1	Event	$ 1,000	$ 1,000
	iv) Disbursements	1	Event	$ 300	$ 300
	Sub-Total, Monitoring/Event:				$ 3,600
10	Final Report	1	L.S.	$ 2,500	$ 2,500

Notes:

Costs are in total present value.

TABLE N.4

ESTIMATED COSTS - AIR SPARGING

		Estimated Quantity	*Unit*	*Unit Cost*	*Total*
	Administrative Cost				
1.	Administrative Cost to Implement Deed Restrictions	1	L.S.	$ 15,000	$ 15,000
	Sub-Total, Administrative Cost:				$ 15,000
	Direct Capital Costs				
2.	Sparge Point Installation	10	Each	$ 700	$ 7,000
3.	Installation of Airline Pumps, and Services	1	L.S.	$ 5,000	$ 5,000
4.	Air Sparge System Instrumentation and Controls Including shelter	1	L.S.	$ 21,000	$ 21,000
5.	System Startup	1	L.S.	$ 5,000	$ 5,000
	Sub-Total, Direct Capital Costs:				$ 38,000
	Indirect Capital Costs				
6.	Design & Engineering (assume 15% of capital cost)				$ 5,700
7.	Construction Management (assume 10% of capital cost)				$ 3,800
8.	Contingency Allowance (assume 20% of capital cost)				$ 4,200
	Sub-Total, Indirect Capital Costs:				$ 13,700
	Total Capital Cost:				$ 66,700
	Operation & Maintenance				
9.	Operation & Maintenance				
	• Monitoring wells	7	Annual	$ 2,000	$ 14,000
	• Inspection and Maintenance	5	Annual	$ 25,000	$ 125,000
10.	Site monitoring (8 wells)				
	• Sample Collection	20	Hours/Event	$ 55	$ 1,100
	• Sample Analyses (COCs)	10	Samples/Event	$ 120	$ 1,200
	• Data Validation & Reporting	1	Event	$ 1,000	$ 1,000
	• Disbursements	1	Event	$ 300	$ 300
	Sub-Total, Monitoring/Event:				$ 3,600
11.	Annual Reporting	1	Annual	$ 2,500	$ 2,500

Notes:
Costs are in total present value.

Assumptions:
i) Sparge points are installed to 30 feet BGS on 30 foot centers within the treatment area shown on Fig. 9.2
ii) Routine inspection and maintenance = 8 manhours/week
iii) Life of components is 10 years and treatment duration is 5 years