SITE INVESTIGATION REPORT
STEELCOTE FACILITY
ST. LOUIS, MISSOURI

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St. Louis, Missouri

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St. Louis, Missouri

September 30, 1993

Z-301

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September 29, 1993

Cynthia L. Hutchison
United States Environmental Protection Agency
Region VII
726 Minnesota Avenue
Kansas City, KS 66101

RE: Steelcote Facility - St. Louis, Missouri
Docket No. VII-91-H-0025

Dear Ms. Hutchison:

Pursuant to paragraph 26(g) of the above-referenced Administrative Order on Consent, I enclose the Final Report.

Please let me know if you have any questions. Otherwise, I will wait for you to contact me to discuss implementing the recommendations in the Report.

Very truly yours,

Alphonse McMahon

Alphonse McMahon

AM/fmp
Enclosure

cc: David A. Hoefer, Esq. (w/o encl.)
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STL-134473.1

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1.0 INTRODUCTION

1.1 Purpose and Content

This report is being submitted by Niedt Realty Company and Niedt Enterprises, Inc., f.k.a. Steelcote Manufacturing Company (together, "Steelcote") to the United States Environmental Protection Agency, Region VII ("USEPA"), pursuant to an Administrative Order on Consent, Docket No. VII-91-H-0025 ("AOC"). The purpose of this report is to present the information developed during the field work described in the Plan of Study including Addendums #1 and 2 to characterize Steelcote's facility (the "site") as required by Paragraph 26 of the AOC.

This report contains a description of the site, its location and history of land use, a description of the hazardous waste concerns, a presentation of previously existing and relevant information, data generated during this investigation, conclusions, and recommendations.

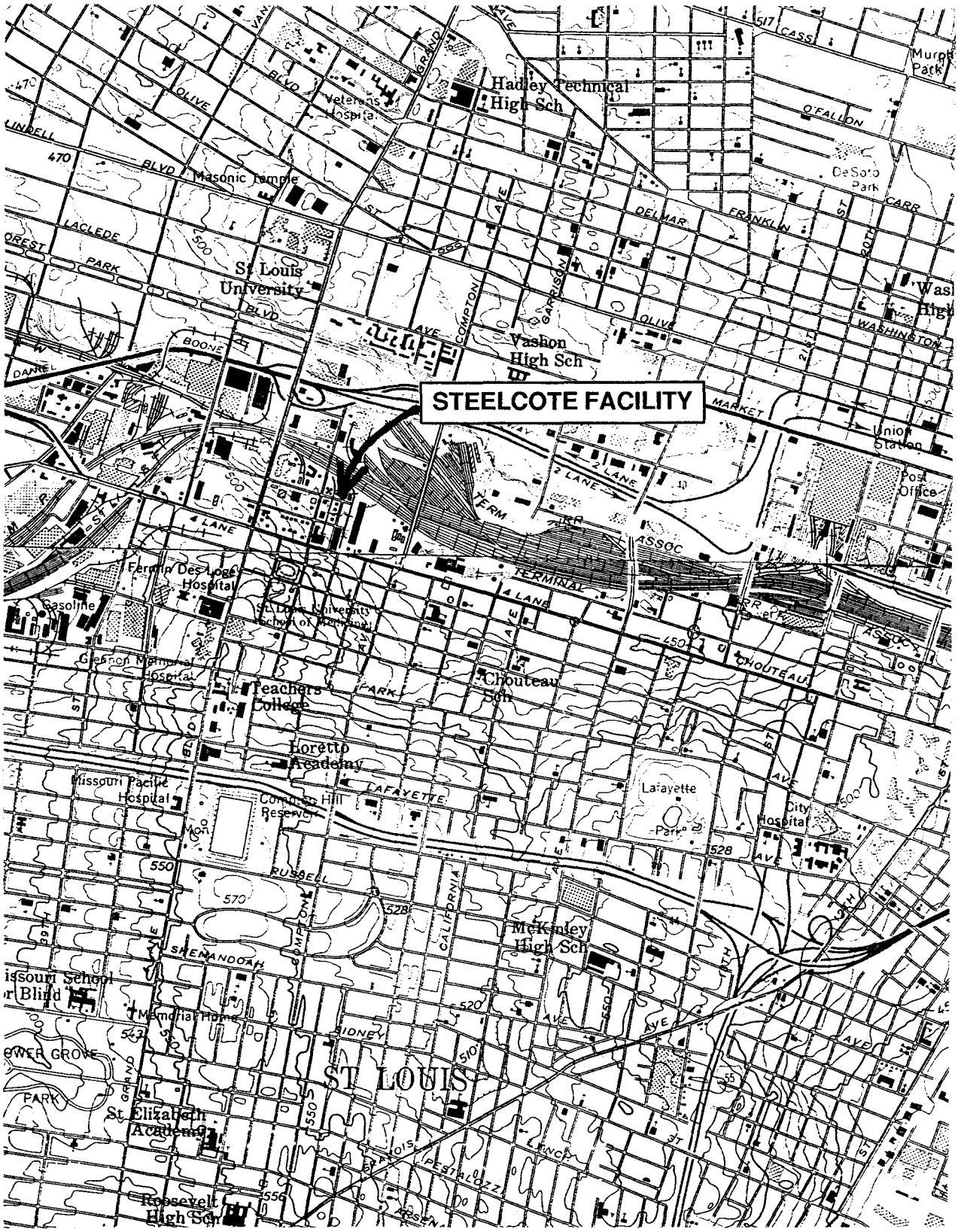
1.2 Site Description

1.2.1 Facility

The site is located along the south side of Mill Creek Valley and bounded by several streets including Gratiot, Steelcote Square, and Papin and the Missouri Pacific Railroad Right of Way. The site location is indicated in the map provided in Figure 1 and the layout of the site is shown in Figure 2.

Site development for current operations began in the early 1920's. In 1926, construction started on the varnish plant at the corner of Gratiot and Edwin Streets (now known as Steelcote Square). Buildings were constructed to house varnish cookers, a boiler, storage tanks for raw materials and finished varnish, varnish reducing tanks and an office. The products made were varnishes based on naturally occurring products, including tung, linseed, and soya oils. Later, Steelcote installed a small 500-gallon reactor to manufacture alkyd resins for in-house use. This building suffered a fire in the reactor in about 1970, and production was stopped at that time.

In 1926, construction started on the first part of Steelcote's factory at One Steelcote Square, immediately south of the varnish plant. The first phase included three floors and a basement. In 1934, two more floors were added to give the plant its present configuration.



SOURCE: U.S.G.S. 7.5 min. QUADRANGLES
GRANITE CITY AND CAHOKIA, DATED 1954

NORTH

SCALE: 1"=2000'

SITE LOCATION

Z-301-01 STEELCOTE FACILITY

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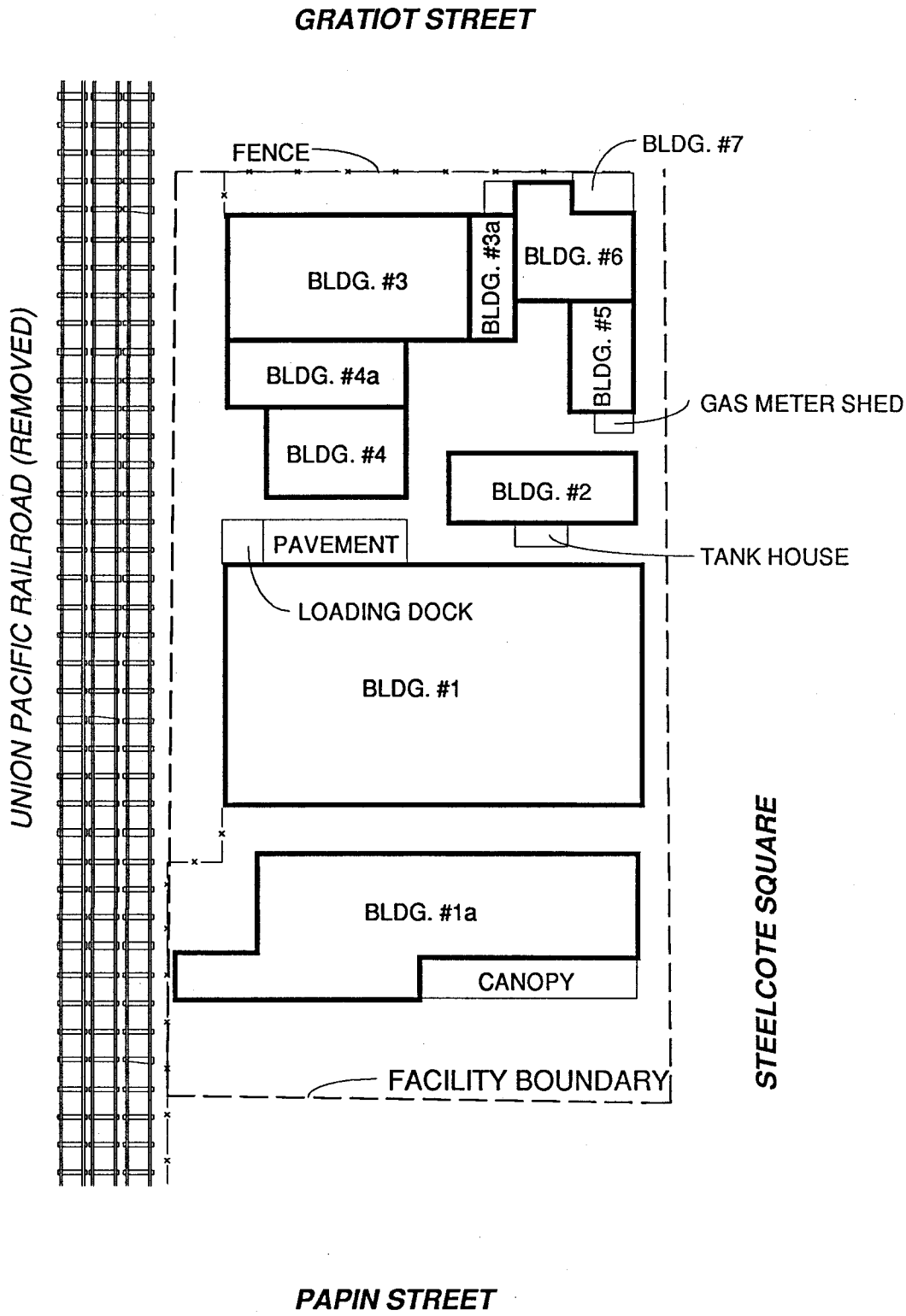
FIGURE 1



SOURCE: STEELCOTE MANUFACTURING COMPANY, 1991

NORTH

0 20 40 80
SCALE, in feet

Z-301-01 STEELCOTE FACILITY

SITE LAYOUT

SHANNON & WILSON, INC.
Geotechnical Consultants

FIGURE 2

In the 1960's, the property south (steel shed) of the Steelcote plant was purchased. Steelcote used the storage shed and the north portion of the courtyard south of the storage shed for packaged raw materials. Empty drums were stored outside the shed prior to pick-up for return or recycling.

Also, two Missouri Pacific Railroad spurs ran through the property. One spur (which ran along the east side of the warehouse) was never used by Steelcote. The spur was used by Grocers Warehouse Building, which is located south of the Steelcote warehouse, for incoming food products, and was subsequently used by other owners. These tracks were all removed in 1989-1990 by Union Pacific Railroad, which bought out Missouri Pacific Railroad. The other spur ran just west of the varnish plant and main factory. A section of this line was used by Steelcote to off-load tank cars of solvents and vegetable oils, e.g. linseed, soya, and tung, to the on-site storage tanks.

Steelcote started at its present site making asphalt roof coatings, putties, caulks, and enamels from natural raw materials. In 1926, Steelcote started using natural rubber in its enamels as a plasticizer. In 1938, Damp-Tex Enamel was introduced as a wet surface, mold and mildew resistant enamel.

In the 1950's, plastic resins became available and Steelcote started to use vinyl latex, polyamide epoxies, and polysulfide sealants. In the 1960's and 1970's, Steelcote utilized 100 percent solids type epoxy mastics, moisture cured urethanes, two-part polyurethanes, polyamide water-borne epoxies, 100 percent solids flooring compounds, and 100 percent solids, low temperature epoxies.

In recent years, until Steelcote ceased manufacturing operations in March 1992, Steelcote manufactured a wide range of Low VOC and water-borne epoxies, (to comply with more recently established air emission standards set by other states), alkyd based wet surface enamels, single component (moisture-cured) and two-part polyurethanes, polysulfide sealants, 100 percent solids epoxy linings for tanks and containment areas, and 100 percent solids epoxy flooring compounds. The site currently is almost completely covered with buildings. As is indicated on the layout, approximately eighty percent of the areal extent of the site is occupied either by buildings or concrete paving. A description of the buildings follow:

Building 1

Building 1 is a five-story building which includes a basement that was used for hazardous waste storage and that provided filling access for mixers present on the first floor. The first floor contained mixers, three-500-gallon process tanks, and was also used for raw material storage and satellite storage for hazardous waste. The second floor housed the Quality Assurance/Quality Control Laboratory and was used for labeling and packaging. Note that no printing was performed at the site. The third floor housed ball mills for grinding of pigments and three reduction tanks. It should be noted that the reduction tanks were emptied through the second floor. Operations on the fourth floor included grinding, mixing, solvent blending and drying. The solvent blending operation consisted of two small 100-gallon tanks. Drying operations employed a drying oven which consisted of a 15 x 25 foot room heated with a water jacket and which was used for drying powders used in moisture-cured urethanes. The fifth floor housed a research and development lab and was also used as a mixing area. In addition, there are two penthouses on this building. The penthouse located on the east side was a paint spray booth and on the west side are 40 tanks with a capacity of approximately 100 gallons each used for gravity feed to various operations within the building. The contents of these tanks included raw vegetable oil, refined vegetable oil, naphtha, toluene, xylene, oleum and Hi-sol (a blend of toluene and xylene).

Building 1A

Building 1A is a raised tin shed which originally belonged to the Columbia Oil Company and was used by Steelcote for raw material storage including dry materials, resins, and solvents in drums.

Building 2

Building 2 was used to house several operations. From east to west the building consists of a small office; two empty rooms used for storage; and, an area which houses a valve control for storage tanks.

Building 3

Building 3 was used for storage of vegetable oils and varnishes. At one time, it housed tanks which have since been removed, as well as materials contained in 55-gallon drums. This operation was closed in 1971. An inert gas generator (nitrogen) in the form of a vertical tank is present along the outside of the north wall of Building #3. This generator has never been used.

Building 3A

Adjacent to Building 3 is Building 3A in which there is an operating boiler that is fired by natural gas.

Building 4

Building 4 is actually a stone and reinforced concrete platform on which there are located six 10,000-gallon above ground tanks. These tanks were used for storage of fuel oil, Hi-sol, soya oil, xylene, toluene, and oleum. Buried underneath these six vertical tanks is an 8,000-gallon tank that had been used for storage of tung oil. This tank is still present, but no longer in use. There are three 2000-gallon above ground horizontal tanks along the south side of Building #4 and one such tank on the north side of Building #4. These tanks were used to store xylene, Hi-sol and butanol.

Building 4A

Immediately north of building 4, shown as Building 4A on the layout, was an 8000-gallon tank used for Hi-sol storage which was removed in 1990. East of building 4A and south of building 3A is a buried tank which was used for storage of bunker (#6) oil. The capacity of the tank is reported to be 15,000 gallons.

Building 5

Building 5 was used for hazardous waste storage. Earlier, the building was used for sandblasting. In addition, there is a compressor present in the building and attached to the south side of the building is a gas meter shed.

Building 6

Building 6 houses a varnish distillation reactor which is no longer in use. Within this building there are three burners with stacks previously used for cooking varnish. This operation which is no longer in service was fueled by fuel oil.

Building 7

Building 7 is a varnish reducing unit which is no longer in service.

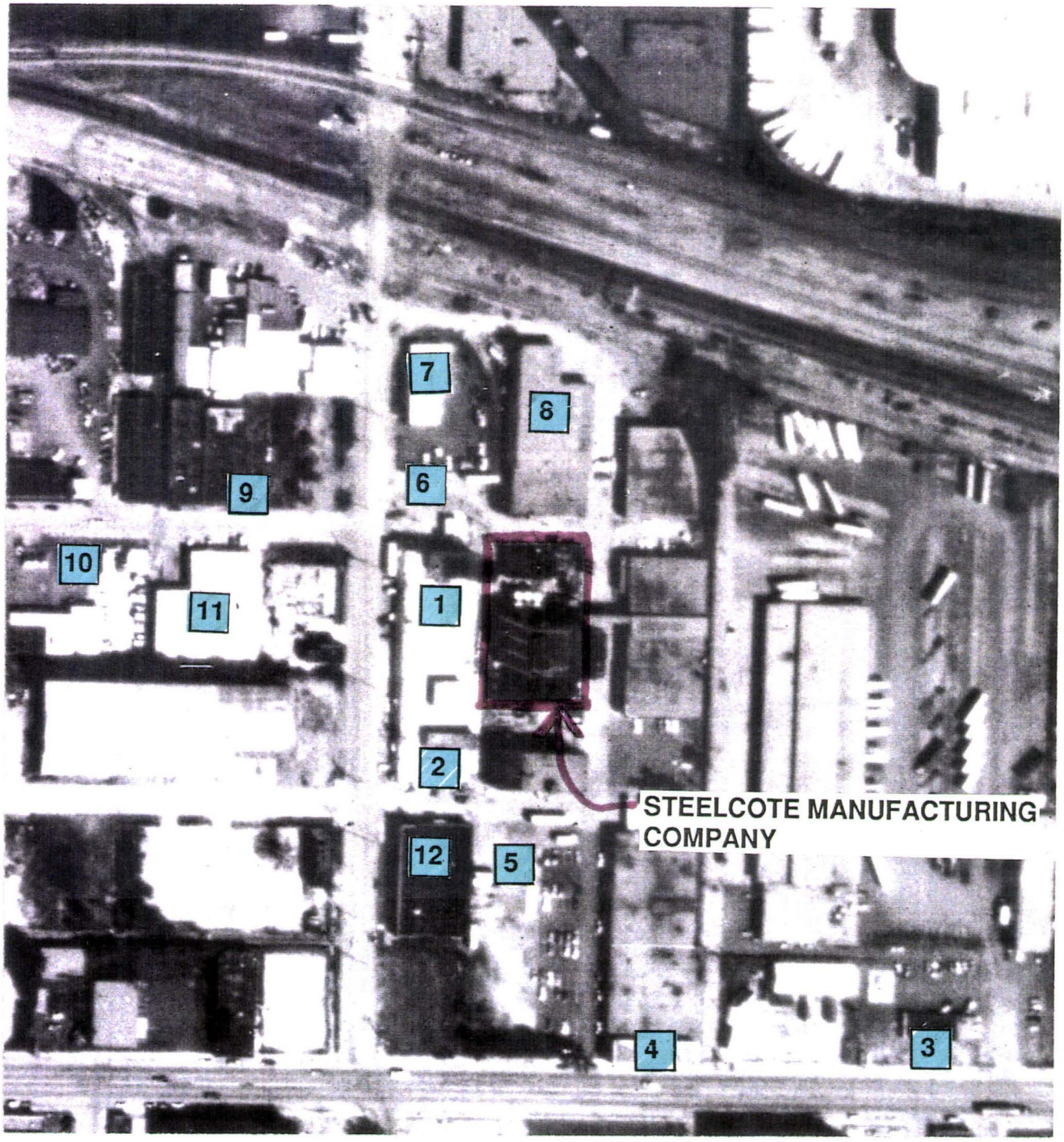
1.2.2 Land Use and Physical Setting

Most of the area surrounding the Steelcote facility is industrialized (See Figure 3). In fact, the Mill Creek Valley was one of the first areas industrialized within St. Louis and has a history of industrial development which predates the Civil War. The Steelcote site, prior to the establishment of the company, had been occupied by a number of operations, including a railroad line and a stock yard.

The development of Mill Creek Valley included establishment of railroad lines parallel to the creek, and the creek has been realigned as necessary to accommodate industrial development. At the present time, site drainage is accomplished by storm sewers which are located beneath and adjacent to the railroad lines and by ditches which parallel the railroad lines. The area has been subject to grading and placement fill. Much of the fill placed at Mill Creek has been of industrial origin, including power plant ash, demolition debris and waste products.

Surface drainage (See Figure 5) in the area reflects surface contours and flows northeast across the site. Surface water is drained by the Metropolitan Sewer District System and hydraulic overloading results in the pooling of surface water along Mill Creek and includes back water, some of which results from hydraulic discharge from storm sewers at the Steelcote facility.

Large portions of the surface at the facility are either paved or occupied by buildings. Surface materials that are exposed consist of fill, underlain by glacial deposits, residual soil and Mississippi-age limestone. Depth to bedrock in this area is on the order of 40 to 70 feet. However, this depth can vary significantly because of the irregular erosional surface of the bedrock and the fact that the site is located near the upstream limits of Chouteau's Pond, which



1. INVENTORY SALES CO.
2. INVENTORY SALES CO.
3. CAN MAN
4. WILKES DIRECT MAIL
5. WILKES DIRECT MAIL
6. COMMERICAL MOBILE CLEANING
7. COMMERICAL MOBILE CLEANING
8. VACANT
9. CORRIGAN COMPANY
10. SIMCO
11. JULIUS SEIDEL & CO.
12. WILKES DIRECT MAIL

SOURCE: SURDEX, INC. 1991

NORTH

SCALE: 1"=200'

AERIAL PHOTOGRAPH

Z-301-01 STEELCOTE FACILITY

SHANNON & WILSON, INC.
Geotechnical Consultants

FIGURE 3

was drained prior to the Civil War. In addition, sink holes may be present along Mill Creek, in addition to clay and construction stone quarries. These material works were common along the Mill Creek Valley prior to and just after the Civil War and some of the locations of such works, which have since been backfilled, are not documented.

The uppermost aquifer in the area consists of the unconsolidated sediments along Mill Creek. Ground water drainage is closely related to surface drainage relative to direction of flow and ground water elevations. As can be expected in such situations, water elevations are likely to fluctuate in response to local precipitation and runoff events. Ground water can be expected to be encountered within 25 feet of the surface at the facility. However, given the nature of the unconsolidated materials, it is likely that perched water systems are present above the static water table.

1.3 Hazardous Waste Concerns

Steelcote notified EPA that it generated hazardous wastes and was assigned an EPA Identification Number for the facility. In 1989 and 1991, EPA conducted Compliance Evaluation Inspections at the facility. Based on these inspections, EPA concluded that hazardous waste was present or had been released from the facility.

Hazardous waste concerns at the site are the result of the presence and use of various chemicals which are referred to in this document as contaminants of concern (COCs). The initial group of COCs, which are listed in Table 1, was developed by reviewing records made available by Steelcote and comparing such information to hazardous waste lists at 40 CFR Part 261. The failure to detect many of the initial COCs during the first quarterly sample allowed the list of COCs to be reduced (see Table 2). Toluene and formaldehyde have since been removed because they were not detected in subsequent quarterly sampling. All of the eliminations from the COC list are in accordance with the AOC.

TABLE 1

CONTAMINANTS OF CONCERN (Initial)

List Name	Synonyms	CAS #
Xylene	Dimethylbenzene; xylol	1330-20-7
Ethyl Acetate	Acetic acid ethyl ester	141-78-6
1-Butanol	Butyl alcohol:propyl carbinol	71-36-3
Methyl Ethyl Ketone	2-Butanone; MEK; Ethyl Methyl Ketone	78-93-3
Barium Sulfate		7727-43-7
Toluene	Methyl Benzene;Toluol; Phenylmethane;Methacide	108-88-3
Methyl Isobutyl Ketone	MIBK	108-10-1
Butyl Benzyl Phthalate	1,2-Benzenedicarboxylic acid, butyl phenyl methyl ester	85-68-7
Basic Lead Silico Chromate		11113-70-5
Lead		7439-92-1
Dibutyl Phthalate	n-Butyl Phthalate; 1,2-Benzenedicarboxylic acid,dibutyl ester; phthalic acid dibutyl ester; DBP	84-74-2
Lead Peroxide	Lead Dioxide	1309-60-0
Lead Chromate		7758-97-6
Zinc Chromate		13530-65-9
Chromium		7440-47-3
2-Ethoxyethanol	Ethylene glycol monoethyl ether	110-80-5

List Name	Synonyms	CAS #
Cyclohexanone	Ketohexamethylene	108-94-1
Insoluble Nickel Compounds		7440-02-0
Methanol	Methyl alcohol;carbinol	67-56-1
Chromium Trioxide		1333-82-0
Barium Metaborate Monohydrate		13701-59-02
Carbon Tetrachloride	Tetrachloromethane	56-23-5
Molybdated Lead Chromate		12656-85-8
Chromium Oxide		1308-38-8
Lead Monoxide		1317-36-8
Di(2-Ethylhexyl)Phthalate	Bis(2-Ethylhexyl) Phthalate; 1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester; DEHP	117-81-7
Phenol		108-95-2
Lead-Sulfo-Chromate		51899-02-6
Barium-Insoluble Compounds		7440-39-3
2-Methyl-1-propanol	Isobutyl Alcohol; Isobutanol; IBA; Isobutyl carbinol	78-83-1
Nickel Compounds		12607-70-4
Formaldehyde	Gas: Methyl Aldehyde; Methanal Solid: Formalin; Formol	50-00-0
Toluene-2,4-Diisocyanate	TDI	584-84-9

List Name	Synonyms	CAS #
Benzene	Benzol; Phene; Cyclohexatriene	71-43-2
Cadmium		7440-43-9
Methylene Chloride	Dichloromethane	75-09-2
Nitrosoimino Diethanol	N-Nitrosodiethanolamine: 2,2'-(Nitrosoimino)-bisethanol 2,2'-nitrosoiminodiethanol	1116-54-7
Epichlorohydrin	Chloromethyloxirane; dl-α-epichlorohydrin; 1-chloro-2,3-epoxypropane	106-89-8
Bisphenol A/Epichlorohydrin		25068-38-0
Cumene	(1-Methylethyl)benzene;cumol	98-82-8
Naphthalene		91-20-3

TABLE 2

CONTAMINANTS OF CONCERN AFTER FIRST QUARTER

Xylene
Di(2-ethylhexyl) phthalate
Barium
Chromium
Lead
Toluene
Formaldehyde

2.0 PLAN OF STUDY AND IMPLEMENTATION

2.1 Components and Addendum

The Plan of Study (POS) consisted of a work plan, a Quality Assurance/Quality Control (QA/QC) Plan and a Health Assessment and Safety Plan. This plan was submitted to the USEPA for approval and was approved on April 3, 1992 after satisfactory response to the USEPA's comments. These responses constitute Addendum #1. After implementation of the POS began, it became apparent that additional work, not described in the POS, was desirable. The additional work is described in Addendum #2, which was approved by USEPA, and implemented; the results are included in this report. The POS and Addendums #1 and #2 are incorporated into this report by reference.

Table 3 presents a chronology of events which occurred after the approval of the POS and Addendum #1 by USEPA. As is apparent, modifications to the plan were necessary as information from site work was developed.

The initial phase of the field work was completed in April and May, 1992. The work consisted of making soil borings, collecting soil samples, conducting physical and chemical analyses of the soil samples, converting several soil borings to ground water monitoring wells, developing the wells and surveying locations and elevations of both the soil borings and ground water monitoring wells. After the wells stabilized, they were subjected to level measurements and slug tests. Subsequent work at the site included quarterly sampling and analyses of ground water samples, and analyses of storm water samples.

After the initial water level measurements indicated anomalous ground water levels, a letter was sent to USEPA (September 1992) describing the situation and presenting proposed actions to resolve/explain the situation. Non field activities described in the letter were implemented. In March, 1993 the USEPA responded to the letter and approved the proposed reverse slug testing which was accomplished in June, 1993.

In April, 1993, a meeting was held with USEPA to discuss the use of Cone Penetrometer Testing (CPT) at the site in order to provide more information on the lithology of unconsolidated materials above bedrock, depth to bedrock and any man made or natural features which may be affecting ground water levels and flow at the site. A technical procedure was developed,

TABLE 3

CHRONOLOGY OF EVENTS OCCURRING DURING IMPLEMENTATION OF THE PLAN OF STUDY

DATE	EVENT/ACTIVITY
Sept. 91	Administrative Order of Consent signed by both parties.
Oct. 91	Plan of Study submitted to USEPA.
Feb. 92	Comments on the Plan of Study received from USEPA.
Mar. 92	Addendum #1 submitted to USEPA and oral approval of the POS was received.
Apr. 92	Approval by USEPA of the POS and Addendum #1.
Apr. 92	Mobilization of equipment for making soil borings and installing ground water monitoring wells begun.
May 92	Soil borings and ground water monitoring well installations completed; soil samples submitted to laboratory for chemical and physical testing; slug tests completed and first quarter ground water samples collected.
Aug. 92	Second quarter ground water samples collected and storm water sampling completed.
Sept. 92	Letter submitted to USEPA regarding apparent anomalous conditions in ground water levels.
Nov. 92	Third quarter ground water samples collected.
Feb. 93	Fourth quarter ground water samples collected.
Mar. 93	Response to Sept. 92 letter received from USEPA including permission to proceed with reverse slug testing.
Apr. 93	Meeting held with USEPA regarding cone penetrometer testing at the site. Technical procedures for cone penetrometer testing were submitted as Addendum #2 and verbally approved by USEPA. Also, a more sensitive analytical method for measuring concentration of Di(2-Ethylhexyl) phthalate was incorporated into the POS.
May 93	Fifth Quarter ground water samples collected.
June 93	Reverse slug testing and cone penetrometer testing completed.
Aug. 93	Report on the results of slug testing and cone penetrometer testing submitted to USEPA and sixth quarter ground water samples collected.

submitted to and approved by USEPA in April, 1993, and implemented along with the reverse slug testing as a second phase of field work in June, 1993.

In August, 1993, a report, incorporated into this report by reference, on the results of the CPT and reverse slug testing was submitted to USEPA ("Results of Cone Penetrometer Tests and Reverse Slug Tests, Steelcote Facility, St. Louis, Missouri"). Verbal approval of the report from EPA was also received in August 1993.

2.2 Schedule

The original schedule under the AOC required the report be completed and submitted to the USEPA within 15 months of approval of the POS. Hence, the original due date for the report was July 3, 1993. However, because of the implementation of additional site investigation work, the AOC was amended to reschedule the due date for September 30, 1993.

3.0 RESULTS

3.1 Field Activities

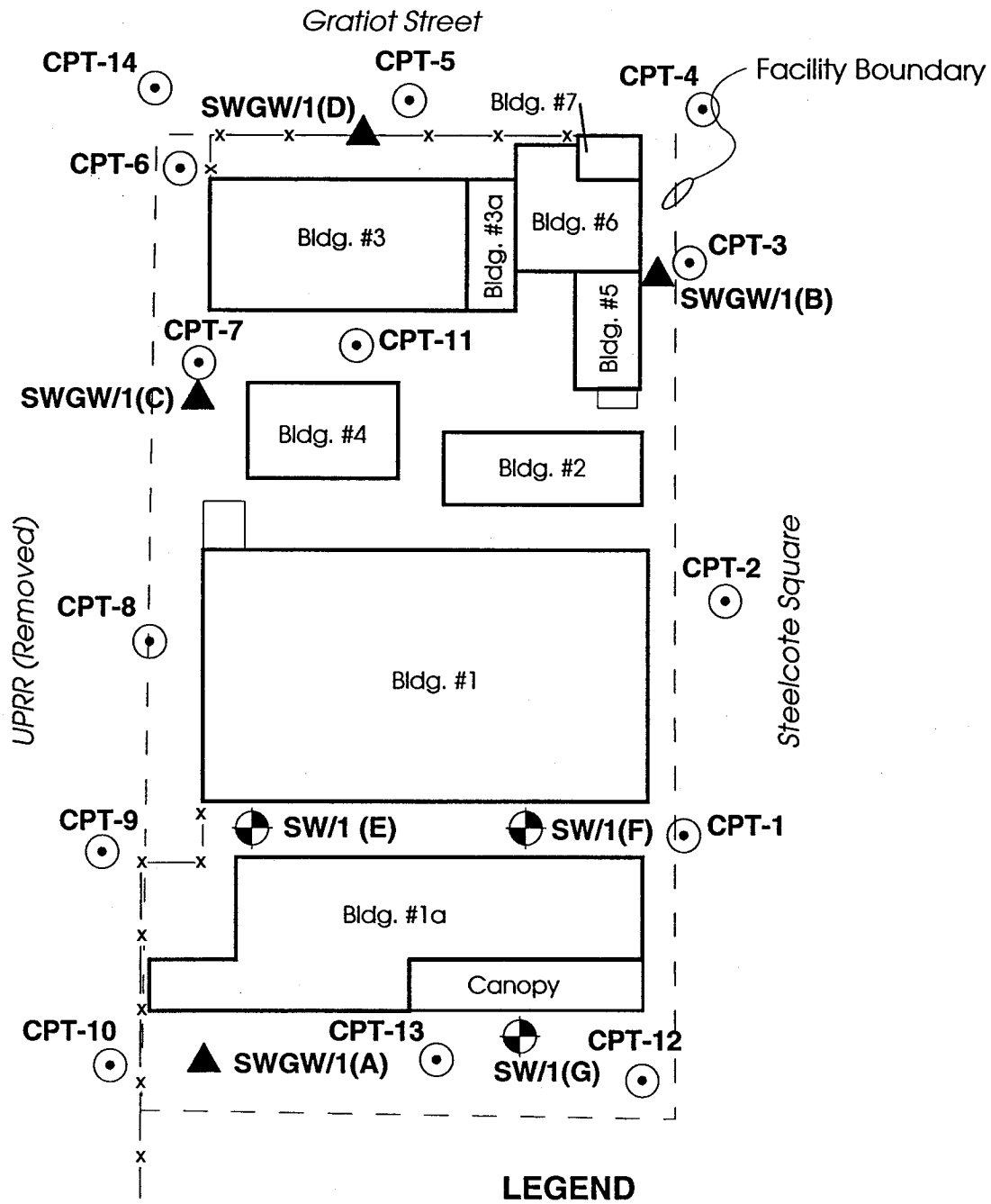
All field activities are documented with field notes which are presented in Appendix 1. This includes copies of field notes for the initial and second phase of field work. Other data resulting from field activities are discussed in the following sections and are presented in subsequent Appendices. Sample locations for all field work are shown in Figure 4.

3.2 Soil Boring/Soil Sample Analyses

Seven borings were made, and have been designated as SW/1(A), SW/1(B), SW/1(C), SW/1(D), SW/1(E), SW/1(F), and SW/1(G), respectively. The location of the soil samples are shown in Figure 4. Soil borings were advanced with a soil auger drill in accordance with Technical Procedure #1 (Soil Boring/Rock Coring and Sampling). Soil samples were also collected in accordance with Technical Procedure #1 via continuous soil sampler for samples to be submitted to chemical analyses and thin wall sampler for those soil samples to be subjected to physical testing. Selected soil samples were submitted to the laboratory for chemical analyses and physical testing.

Soil Boring Logs and soil sample physical test data are presented in Appendices 2 and 3, respectively. As is indicated, soils other than fill at the site consisted of silts and clays with some sand lenses. Laboratory-derived permeabilities ranged from 10^{-5} to 10^{-9} cm/sec. These observations are consistent with the visual observations of the soil cores. Because of the lithologic complexity of the site, the soil borings alone were not adequate to determine cross correlations until the soil log and physical testing information was augmented with CPT data. After acquisition of CPT data, these data were used in combination with slug testing, reverse slug testing and CPT analyses to help characterize soil, bedrock and ground water conditions.

Chemical analyses of soil samples are presented in Appendix 4 and Table 4, in summary fashion. This information, in combination with ground water quality and flow information, was used to determine background concentrations of COCs and to help determine potential sources of contamination. As previously noted, the list of parameters constituting the COCs was reduced as a result of not detecting a majority of the parameters.



Papin Street

LEGEND

- Approx. Boring Location
- Approx. Ground Water Monitoring Well Location
- Approx. CPT location

NORTH

0 20 40 80
Scale, in feet

SITE LAYOUT AND TEST LOCATIONS
STEELCOTE FACILITY
ST. LOUIS, MISSOURI

Z-301

SHANNON & WILSON, INC.

FIGURE 4

TABLE 4

SOIL SAMPLE ANALYSES

SAMPLE DESIGNATION VERTICAL INTERVAL (FROM SURFACE IN FEET) COC'S DETECTED	BACKGROUND A	BACKGROUND AA	SW 1 (A) D
	SURFACE	SURFACE	6.1- 6.9
Methylene Chloride (UG/KG)	--	7	--
Xylene (UG/KG)	--	--	--
Toluene (UG/KG)	--	--	--
Methyl Ethyl Ketone (UG/KG)	--	--	--
Benzene (UG/KG)	--	--	--
Naphthalene (UG/KG)	--	93	--
Dibutyl Phthalate (UG/KG)	--	--	--
Di(2-Ethylhexyl) Phthalate (UG/KG)	--	--	--
Formaldehyde (UG/KG)	9021	6026	72000
Barium (MG/KG)	172	163	243
Chromium (MG/KG)	17.0	15.5	23.0
Cadmium (MG/KG)	2.3	2.5	0.74
Lead (MG/KG)	443	323	675
Nickel (MG/KG)	33.5	34.9	30.4
Barium/TCLP (UG/L)	1150	1230	1280
Chromium/TCLP (UG/L)	8.8	9.4	4.4
Cadmium/TCLP (UG/L)	4.7	7.2	4.5
Lead/TCLP (UG/L)	17.3	24.0	184
Nickel/TCLP (UG/L)	--	9.9	66

-- = Not detected

TABLE 4

SOIL SAMPLE ANALYSES
(Continued)

SAMPLE DESIGNATION VERTICAL INTERVAL (FROM SURFACE IN FEET) COC'S DETECTED	SW 1 (A) C	SW 1 (B) D	SW 1 (B) C
	19.0- 61.0	11.0- 12.0	14.0- 19.0
Methylene Chloride (UG/KG)	--	260	5
Xylene (UG/KG)	--	--	--
Toluene (UG/KG)	--	--	--
Methyl Ethyl Ketone (UG/KG)	--	--	--
Benzene (UG/KG)	--	--	--
Naphthalene (UG/KG)	--	--	--
Dibutyl Phthalate (UG/KG)	--	--	--
Di(2-Ethylhexyl) Phthalate (UG/KG)	180	--	--
Formaldehyde (UG/KG)	97000	39000	23000
Barium (MG/KG)	107	186	110
Chromium (MG/KG)	19.5	19.2	15.3
Cadmium (MG/KG)	--	0.62	--
Lead (MG/KG)	15.5	19.8	18.4
Nickel (MG/KG)	19.7	22.0	16.9
Barium/TCLP (UG/L)	1620	1170	1230
Chromium/TCLP (UG/L)	--	--	--
Cadmium/TCLP (UG/L)	6.2	5.2	3.0
Lead/TCLP (UG/L)	5.2	17.1	1.2
Nickel/TCLP (UG/L)	37.6	34.7	32.9

-- = Not detected

TABLE 4

SOIL SAMPLE ANALYSES
(Continued)

SAMPLE DESIGNATION VERTICAL INTERVAL (FROM SURFACE IN FEET) COC'S DETECTED	SW 1 (B) D	SW 1 (B) C	SW 1 (C) D
	19.0-21.3	24.0-59.0	8.5-9.0
Methylene Chloride (UG/KG)	3	--	--
Xylene (UG/KG)	--	--	45,000
Toluene (UG/KG)	--	--	12,000
Methyl Ethyl Ketone (UG/KG)	--	--	--
Benzene (UG/KG)	--	--	--
Naphthalene (UG/KG)	--	--	8,300
Dibutyl Phthalate (UG/KG)	--	--	--
Di(2-Ethylhexyl) Phthalate (UG/KG)	--	--	--
Formaldehyde (UG/KG)	11,000	100,000	31,000
Barium (MG/KG)	123	131	118
Chromium (MG/KG)	23.4	23.4	19.1
Cadmium (MG/KG)	0.57	--	1.8
Lead (MG/KG)	20.6	17.2	539
Nickel (MG/KG)	27.7	25.0	30.0
Barium/TCLP (UG/L)	8450	1530	1060
Chromium/TCLP (UG/L)	--	2.2	7.1
Cadmium/TCLP (UG/L)	5.5	--	3.9
Lead/TCLP (UG/L)	4.7	17.2	1420
Nickel/TCLP (UG/L)	16.5	88.3	53.8

-- = Not detected.

TABLE 4

SOIL SAMPLE ANALYSES
(Continued)

SAMPLE DESIGNATION VERTICAL INTERVAL (FROM SURFACE IN FEET) COC'S DETECTED	SW 1 (C) C	SW 1 (C) C	SW 1 (C) C
	9.0- 14.0	19.0- 24.0	24.0- 64.5
Methylene Chloride (UG/KG)	5	2	--
Xylene (UG/KG)	--	--	--
Toluene (UG/KG)	--	--	--
Methyl Ethyl Ketone (UG/KG)	11	--	--
Benzene (UG/KG)	--	--	--
Naphthalene (UG/KG)	--	--	--
Dibutyl Phthalate (UG/KG)	--	--	--
Di(2-Ethylhexyl) Phthalate (UG/KG)	--	--	270
Formaldehyde (UG/KG)	104,000	17,000	39,000
Barium (MG/KG)	165	173	118
Chromium (MG/KG)	27.1	33.5	18.7
Cadmium (MG/KG)	0.7	1.1	0.63
Lead (MG/KG)	47.1	27.4	15.3
Nickel (MG/KG)	25.2	46.8	23.7
Barium/TCLP (UG/L)	1660	2280	1400
Chromium/TCLP (UG/L)	--	2.3	--
Cadmium/TCLP (UG/L)	3.4	--	--
Lead/TCLP (UG/L)	12.2	13.9	8.9
Nickel/TCLP (UG/L)	38.5	61.0	8.2

-- = Not detected.

TABLE 4

SOIL SAMPLE ANALYSES
(Continued)

SAMPLE DESIGNATION VERTICAL INTERVAL (FROM SURFACE IN FEET) COC'S DETECTED	SW 1 (D) D	SW 1 (D) D	SW 1 (D) D
	6.5- 9.0	11.5- 12.5	14.0- 15.9
Methylene Chloride (UG/KG)	--	--	4
Xylene (UG/KG)	130	430,000	77
Toluene (UG/KG)	--	--	--
Methyl Ethyl Ketone (UG/KG)	--	--	14
Benzene (UG/KG)	3	--	--
Naphthalene (UG/KG)	--	22,000	--
Dibutyl Phthalate (UG/KG)	--	--	--
Di(2-Ethylhexyl) Phthalate (UG/KG)	--	--	--
Formaldehyde (UG/KG)	103,000	25,000	27,000
Barium (MG/KG)	192	174	138
Chromium (MG/KG)	21.7	20.3	19.1
Cadmium (MG/KG)	--	--	--
Lead (MG/KG)	38.3	16.7	15.0
Nickel (MG/KG)	26.5	20.7	20.3
Barium/TCLP (UG/L)	1730	1330	1820
Chromium/TCLP (UG/L)	--	--	--
Cadmium/TCLP (UG/L)	--	--	--
Lead/TCLP (UG/L)	9.4	5.3	6.8
Nickel/TCLP (UG/L)	85.9	29.1	44.7

-- = Not detected.

TABLE 4

SOIL SAMPLE ANALYSES
(Continued)

SAMPLE DESIGNATION VERTICAL INTERVAL (FROM SURFACE IN FEET) COC'S DETECTED	SW 1 (D) C	SW 1 (E) D	SW 1 (E) C
	19.0- 58.0	0.6- 2.6	2.6- 7.6
Methylene Chloride (UG/KG)	--	--	--
Xylene (UG/KG)	4	190,000	27,000
Toluene (UG/KG)	--	1,000	650
Methyl Ethyl Ketone (UG/KG)	180	--	--
Benzene (UG/KG)	--	--	--
Naphthalene (UG/KG)	--	3500	390
Dibutyl Phthalate (UG/KG)	--	120	--
Di(2-Ethylhexyl) Phthalate (UG/KG)	--	570	160
Formaldehyde (UG/KG)	63,000	44,000	54,000
Barium (MG/KG)	118	168	101
Chromium (MG/KG)	17.7	16.0	23.2
Cadmium (MG/KG)	0.73	1.3	0.55
Lead (MG/KG)	12.3	90.9	21.8
Nickel (MG/KG)	26.5	21.6	23.6
Barium/TCLP (UG/L)	1280	1510	1580
Chromium/TCLP (UG/L)	2.2	3.2	--
Cadmium/TCLP (UG/L)	--	--	--
Lead/TCLP (UG/L)	10.8	49.3	21.3
Nickel/TCLP (UG/L)	81.6	56.9	55.2

-- = Not detected.

TABLE 4

SOIL SAMPLE ANALYSES
(Continued)

SAMPLE DESIGNATION VERTICAL INTERVAL (FROM SURFACE IN FEET) COC'S DETECTED	SW 1 (F) C	SW 1 (G) D	
	2.5- 10.5	5.0- 8.0	
Methylene Chloride (UG/KG)	6	300	--
Xylene (UG/KG)	--	--	--
Toluene (UG/KG)	--	--	--
Methyl Ethyl Ketone (UG/KG)	--	--	--
Benzene (UG/KG)	--	--	--
Naphthalene (UG/KG)	--	--	--
Dibutyl Phthalate (UG/KG)	--	--	--
Di(2-Ethylhexyl) Phthalate (UG/KG)	--	--	--
Formaldehyde (UG/KG)	17,000	14,000	--
Barium (MG/KG)	209	106	--
Chromium (MG/KG)	17.5	12.8	--
Cadmium (MG/KG)	0.6	0.99	--
Lead (MG/KG)	175	105	--
Nickel (MG/KG)	22.9	17.2	--
Barium/TCLP (UG/L)	1800	863	--
Chromium/TCLP (UG/L)	2.0	4.8	--
Cadmium/TCLP (UG/L)	--	3.6	--
Lead/TCLP (UG/L)	63.6	19.2	--
Nickel/TCLP (UG/L)	73.6	37.7	--

-- = Not detected.

3.3 Well Installation/Ground Water Monitoring

3.3.1 Well Installation and Sampling

The four soil borings (SW/1(A), SW/1(B), SW/1(C), and SW/1(D) (See Figure 4) were converted to ground water monitoring wells in accordance with Technical Procedure #2 (Monitoring Well Design and Installation) and are designated as SWGW/1(A), SWGW/1(B), SWGW/1(C), and SWGW/1(D), respectively. The "as built" construction logs for each well are presented in Appendix 5.

The wells consist of 2-inch inside diameter PVC placed during the retraction of 6.25-inch inside diameter hollow stem augers used to make the soil borings. The entire saturated section above bedrock was screened and the annulus adjacent to the screens was backfilled with sand. The remainder of the annulus was sealed with bentonite and grout from the top of the screened sections to the surface.

After development of the wells in accordance with Technical Procedure #3 (Monitoring Well Development), physical testing of ground water monitoring wells was performed to determine in situ permeability (Appendix 6). Summaries of ground water level and slug and reverse slug testing results are presented in Tables 5 and 6, respectively. This information was used to help characterize ground water movement, the hydraulic characteristics of the soils and potential contaminant sources at the site.

Slug tests were conducted in accordance with Technical Procedure #5 (Field Permeability Testing). Standard slug testing was conducted on the four wells installed at the Steelcote Facility. Since the placement of the screen extended into the unsaturated zone, slug withdrawal techniques were applied. The data developed during testing were converted into a format for reduction and analysis of aquifer conductivity. The data were plotted to verify that adequate data were collected. The values for hydraulic conductivity were determined using the Hvorslev (1951) solution method and compared to solutions using data reduction techniques formulated by Bouwer and Rice (1976).

Initial data for well SWGW/1(D) were questioned because of the small amount of water displacement achieved due to the slug size and fast recovery of the well. This well was re-tested on June 5, 1992 and the data have been analyzed and plotted. Hydraulic characteristics ranged

TABLE 5

GROUND WATER LEVELS

WELL	1ST QTR (DATE)	2ND QTR	3RD QTR	4TH QTR	5TH QTR	6TH QTR
SWGW/1(A)	15.50	14.80	15.45	15.20	14.70	12.40
SWGW/1(B)	33.95	33.65	32.40	42.00	33.30	29.7
SWGW/1(C)	42.00	43.70	40.08	44.20	34.60	27.9
SWGW/1(D)	14.30	14.05	13.08	13.90	12.90	13.0

TABLE 6

SLUG (REVERSE) TESTING

WELL	SLUG TEST	REVERSE SLUG TEST
SWGW/1(A)	3.5×10^{-5} cm/sec	3.9×10^{-5} cm/sec
SWGW/1(B)	3.1×10^{-5} cm/sec	3.2×10^{-5} cm/sec
SWGW/1(C)	4.8×10^{-5} cm/sec	2.1×10^{-5} cm/sec
SWGW/1(D)	1.5×10^{-4} cm/sec	2.9×10^{-5} cm/sec
SWGW/1(D) REPEAT	1.9×10^{-5}	

from 4.8 x 10^{-5} to 1.9 x 10^{-5} cm/sec. The computer plots for permeability (including a plot of the questionable data for SWGW/1(D)) are included in Appendix 6.

Reverse slug tests were conducted during June 1993 on each of the four wells at the site to see if the anomalous ground water conditions observed previously were caused by improperly constructed/developed wells. The tests were conducted in accordance with the protocol presented in Technical Procedure #9 in Addendum #2 to the POS and results of the tests indicate that the wells were functioning properly.

The time-drawdown data tended to plot in a straight line, as expected, with some deviation observed in Well SWGW 1(A). The data suggest that the combined response of the filter pack and formation at the outset of the test shifted to reflect more the influence of the formation. The hydraulic conductivity values calculated for the wells ranged from 3.20 x 10^{-6} to 2.11 x 10^{-5} cm/sec.

Ground water monitoring wells were purged and initial samples were collected on May 8, 1992, and submitted to the laboratory for chemical analyses. Subsequent sampling and analyses were conducted quarterly.

Ground water quality analyses are presented in Appendix 7 and a summary of the results are presented in Table 7. This information was used to help determine contaminant presence, character, movement and potential sources at the site. As previously noted, the list of COCs has been reduced several times as specified in the AOC because many were not detected.

3.4 Storm Water Sampling and Analyses

Storm water samples were obtained in accordance with 40 CFR 122 from the locations indicated in Figure 5, which also presents an analysis of surface flow routing at the site. Chemical analyses of the surface water samples are presented in Appendix 8 and, in summary form, in Table 8.

The plan for storm water sampling was based upon a visual analysis of a moderate rainfall event and discussions with plant personnel concerning man-made drainage features. This analysis, along with the locations for sampling, is presented in Figure 5. Note that this figure

TABLE 7

QUARTERLY GROUND WATER ANALYTICAL RESULTS[1]

WELL SWGW/1(A)	May 1992	Aug 1992	Nov 1992	Feb 1993	May 1993	Aug 1993
PARAMETER	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	5th Qtr	6th Qtr
Xylene	ND	ND	ND	23	ND	ND
Toluene	ND	ND	ND	11	ND	ND[2]
Phthalate	3	ND	9	5	3	ND
Barium	398	348	401	463	410	407
Chromium	4.0	ND	ND	ND	4.6	ND
Lead	2.2	2.3	ND	6.9	1.6	ND
Formaldehyde	800	50	54	25.3	ND	[2]

WELL SWGW/1(B)						
PARAMETER	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	5th Qtr	6th Qtr
Xylene	ND	ND	ND	3	ND	ND
Toluene	ND	ND	ND	ND	ND	ND[2]
Phthalate	11	ND	11	6	ND	3
Barium	470	500	512	736	680	584
Chromium	4.6	ND	ND	ND	7.7	ND
Lead	ND	6.6	ND	4.6	48	15.7
Formaldehyde	170	22	12	39.4	ND	[2]

(1) Concentrations are reported in ug/l
(2) Removed From COC List

ND = Not detected.

TABLE 7

QUARTERLY GROUND WATER ANALYTICAL RESULTS[1]
(Continued)

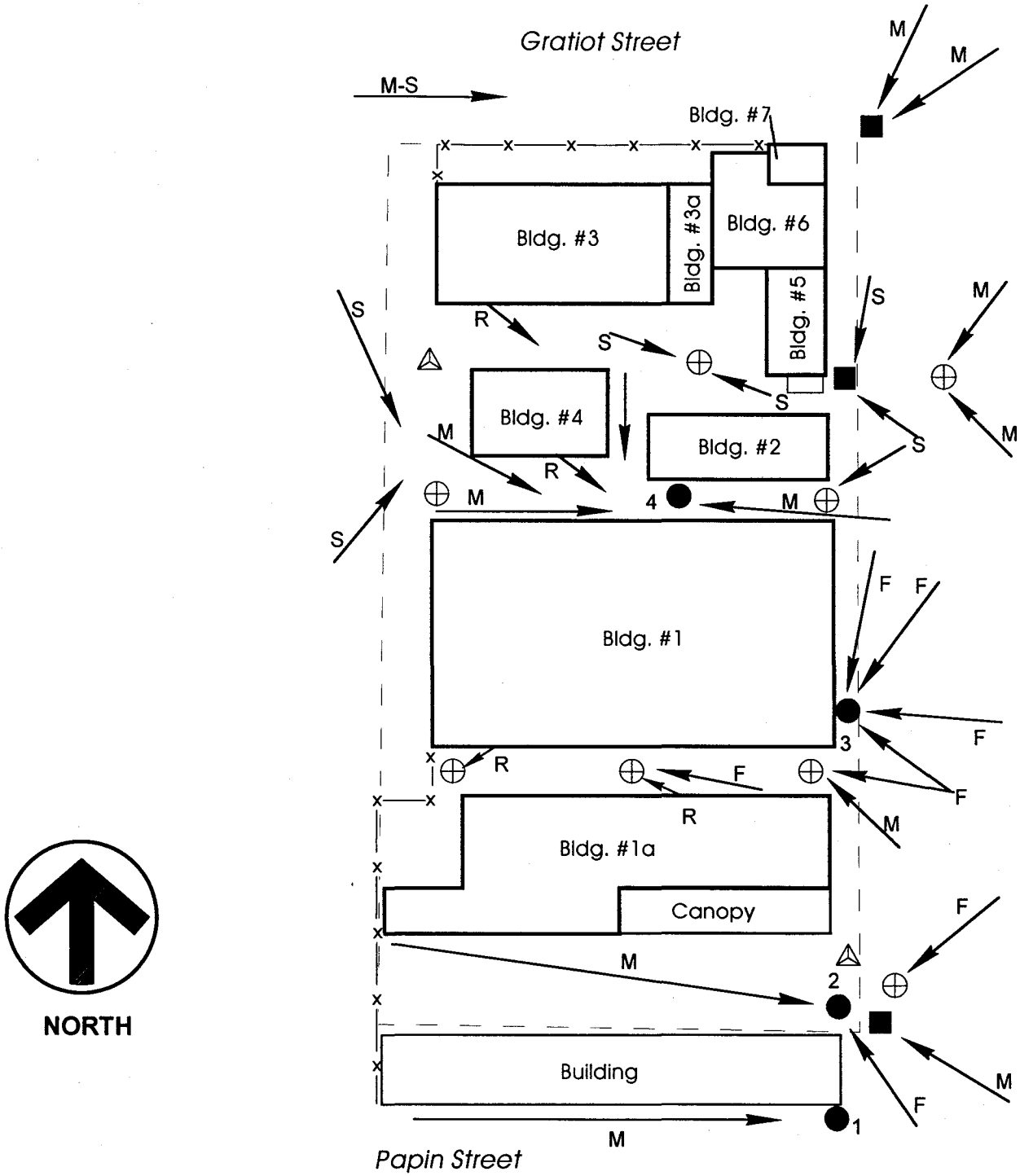
WELL SWGW/1(C)	May 1992	Aug 1992	Nov 1992	Feb 1993	May 1993	Aug 1993
PARAMETER	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	5th Qtr	6th Qtr
Xylene	10	12	730	47	4	2100
Toluene	50	ND	2000	ND	620	ND[2]
Phthalate	4	ND	5	4	3	2
Barium	420	468	376	488	287	223
Chromium	5.3	ND	ND	ND	5.8	ND
Lead	2.5	2.6	ND	5.8	7.4	ND
Formaldehyde	380	31	83.3	52.7	ND	[2]

WELL SWGW/1(D)						
PARAMETER	1st Qtr	2nd Qtr	3rd Qtr	4th Qtr	5th Qtr	6th Qtr
Xylene	2	2	7	1	5	14
Toluene	ND	ND	ND	ND	ND	ND[2]
Phthalate	72	ND	9	5	ND	3
Barium	658	392	644	562	511	710
Chromium	4.8	ND	ND	ND	5.3	8.8
Lead	1.4	2.3	ND	7.7	4.6	32.7
Formaldehyde	1100	25	41	41.8	ND	[2]

[1] Concentrations are reported in ug/l

[2] Removed From COC List

ND = Not detected.



LEGEND

⊕	GRATE OVER STORM SEWER	
■	CONCRETE LID OVER STORM SEWER OPENING	
△	RAIN GUAGE	
●	STORMWATER SAMPLE LOCATION	
S	SLOW STORMWATER MOVEMENT NOTED, RELATIVE	
M	MODERATE	"
F	FAST	"
R	ROOF DRAINAGE	"

STEELCOTE STORMWATER SAMPLING LOCATIONS
STEELCOTE FACILITY
ST. LOUIS, MISSOURI

Z-301-05

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FIGURE 5

TABLE 8

STORM WATER SAMPLE ANALYSES

PARAMETER DETECTED	STATION LOCATION			
	SWSF/1	SWSF/2	SWSF/3	SWSF/4
Methylene Chloride (UG/L)	7	--	10	6
Toluene (UG/L)	1	--	--	--
Benzene (UG/L)	1	--	--	--
Butyl Benzyl Phthalate (UG/L)	--	--	4	--
Formaldehyde (UG/L)	138	117	158	120
Barium (UG/L)	72.7	21.7	95.7	126
Chromium (UG/L)	5.0	--	11.5	9.7
Cadmium (UG/L)	3.1	--	7.2	3.3
Lead (UG/L)	389	53.7	280	417
Nickel (UG/L)	11.7	--	--	--

-- = Not detected.

indicates storm water flow patterns, relative velocities, rain gauge locations and the four sample locations.

The background sample location on Papin Street is designated as Sample Point 1. Water flowing to this location is flowing onto the site.

Sample Point 2 is located in the fenced storage yard on the south side of the facility. This point is topographically low and receives moderate storm water flowing east from the storage yard.

Sample Point 3 is located near the southeast corner of building #1. This location receives relatively rapid runoff which flows along the east side of the building and warehouses.

Sample Point 4 is located in the "alley-like" area north of the warehouse and is the center of three storm drains located in the alley. It receives moderate storm water flow from much of the non-building area at the facility.

Storm water sample analyses did not indicate that water runoff over the site resulted in water quality degradation for COCs. In fact, it appears that lead content in storm water may be higher for water entering the site than that leaving the site which suggests an off site source. Sample analyses of water from Sample Points 2, 3 and 4 leaving the site appears to be within the range of that entering the site (Sample Point 1) for the other COCs.

3.5 Cone Penetrometer Testing

Cone penetrometer testing (see Appendix 8) was conducted June, 1993, at the 14 locations shown in Figure 4. Two of the proposed locations on the north and south perimeter of Building #1 were not tested due to inaccessibility. CPT work was conducted using a truck-mounted rig for pushing the rods and instrumented probe into the subsurface, which was connected to the portable field computer for data collection. The testing was done in accordance with Technical Procedure #10 presented in Addendum #2 to the POS.

Parameters recorded during each test included depth, tip resistance, sleeve resistance or local friction, pore pressure, probe inclination, and temperature during the pushing of the probe. Once the probe had reached refusal, pore pressure dilation was recorded until the pore pressure had equilibrated; at that point, testing ended at that location. It should be noted that pore

pressure equilibration was slow and did not allow for readings at discrete intervals because it would have required slowing the advance rate of the rods below minimum specifications.

The data generated during the cone penetrometer testing were reduced to tip resistance, local friction, pore pressure and interpreted CPT profile. (See Appendix 9). Such data, in tabular and graphical form, aided in the interpretation of site hydrology and geology. They also permitted determination of apparent top of bedrock via probe refusal.

4.0 CONCLUSION

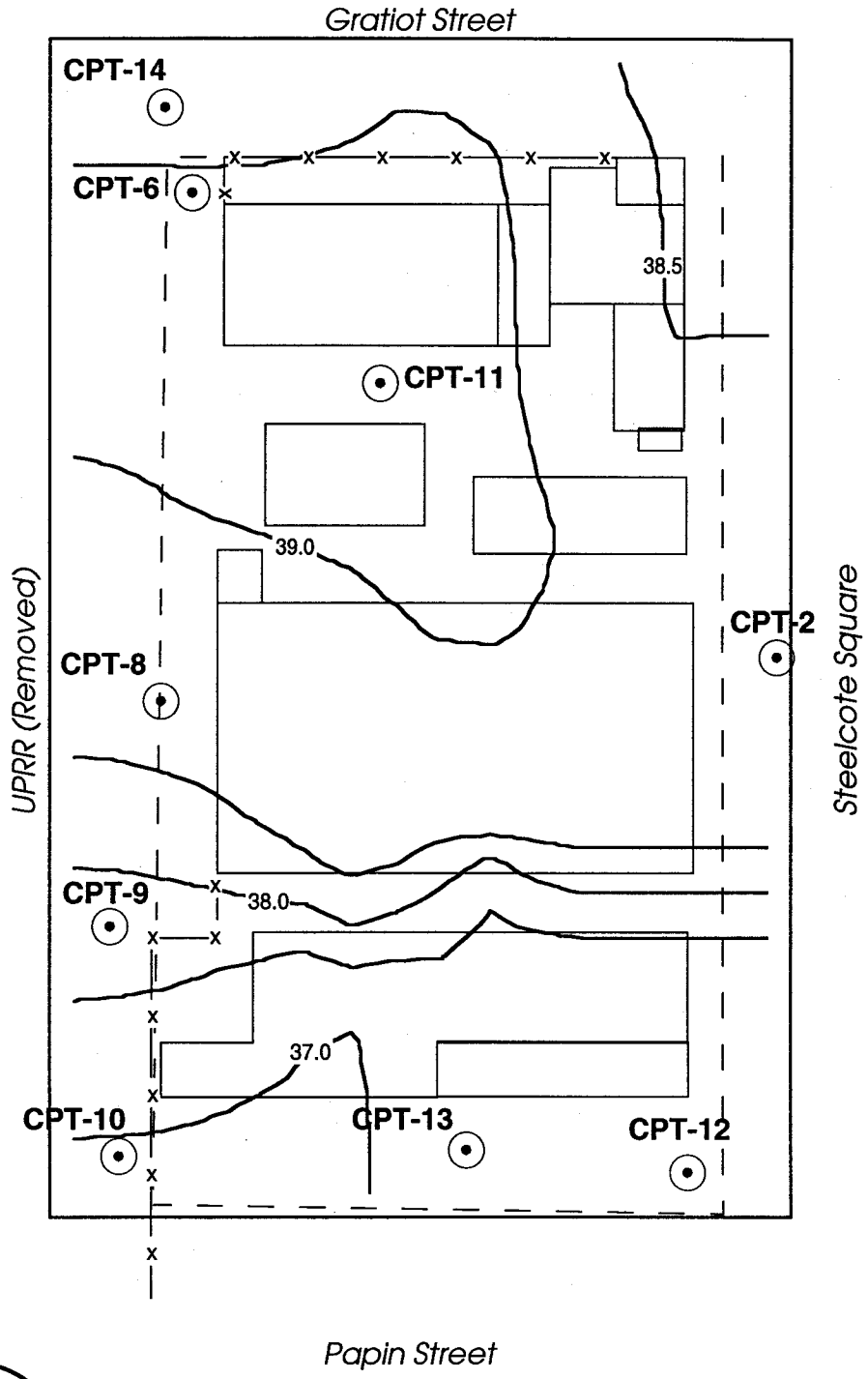
4.1 Site Characterization

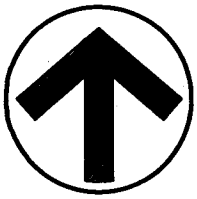
Soil boring logs and CPT data indicate silty clay and clay to be present to depths of 30-35 feet. Below 35 feet there is variation, however the overall trend is for the soil to be more silty and locally trace to slightly sandy. At about 40 feet and extending to about 45 feet, the soil is predominantly sandy silt and silty sand in the northern portions of the site. The southern portion of the site at this depth interval appears to be more clayey silt to silty clay with trace sand. Note that this interval appears to be the primary water-transmitting strata at the site. Below 45 feet, the data indicates variation from sandy silt to silty clay and clayey silt.

The apparent depth to bedrock, based upon drill refusal and resistance to further penetration by the CPT probe, varies from approximately 60 to 65 feet below the ground surface. A contour map of the depth to bedrock at the site is presented in Figure 6. Generalized geologic cross sections are shown in Figures 7 and 8. CPT probes and boring logs indicate that there is some weathering on top of bedrock. However, there is no evidence of bedrock structural influence on ground water flow direction. The relatively even contours of top of bedrock and the absence of significant weather zones indicates that structural features such as sink holes, fracture zones, depressions, etc. are not present or sufficiently developed to influence ground water flow rate and direction.

The soil behavior types identified with the CPT work are consistent with the information generated during the Spring 1992 drilling and sampling program. The CPT work also indicates the presence of isolated and possibly perched water. Soil logs and CPT data indicate the presence of silts and clays with occasional stringers of sandy silts. Horizontal correlation of these stringers is difficult but there appears to be a zone of preferential flow at a depth of 40 to 45 feet from the surface.

The pore pressure data provide an interpretation of the water level for the ground water across the site. The data did not indicate water to be restricted to a particular soil type and there was a high degree of variability in the ground water elevations which is consistent with conditions previously observed. Water levels expressed as depth below ground surface varied between approximately 24 to 47 feet. A ground water contour map is presented in Figure 9.





NORTH

0 20 40 80

Scale, in feet

LEGEND

⊙ **Approx. CPT location used for top of bedrock determination**

BEDROCK CONTOURS
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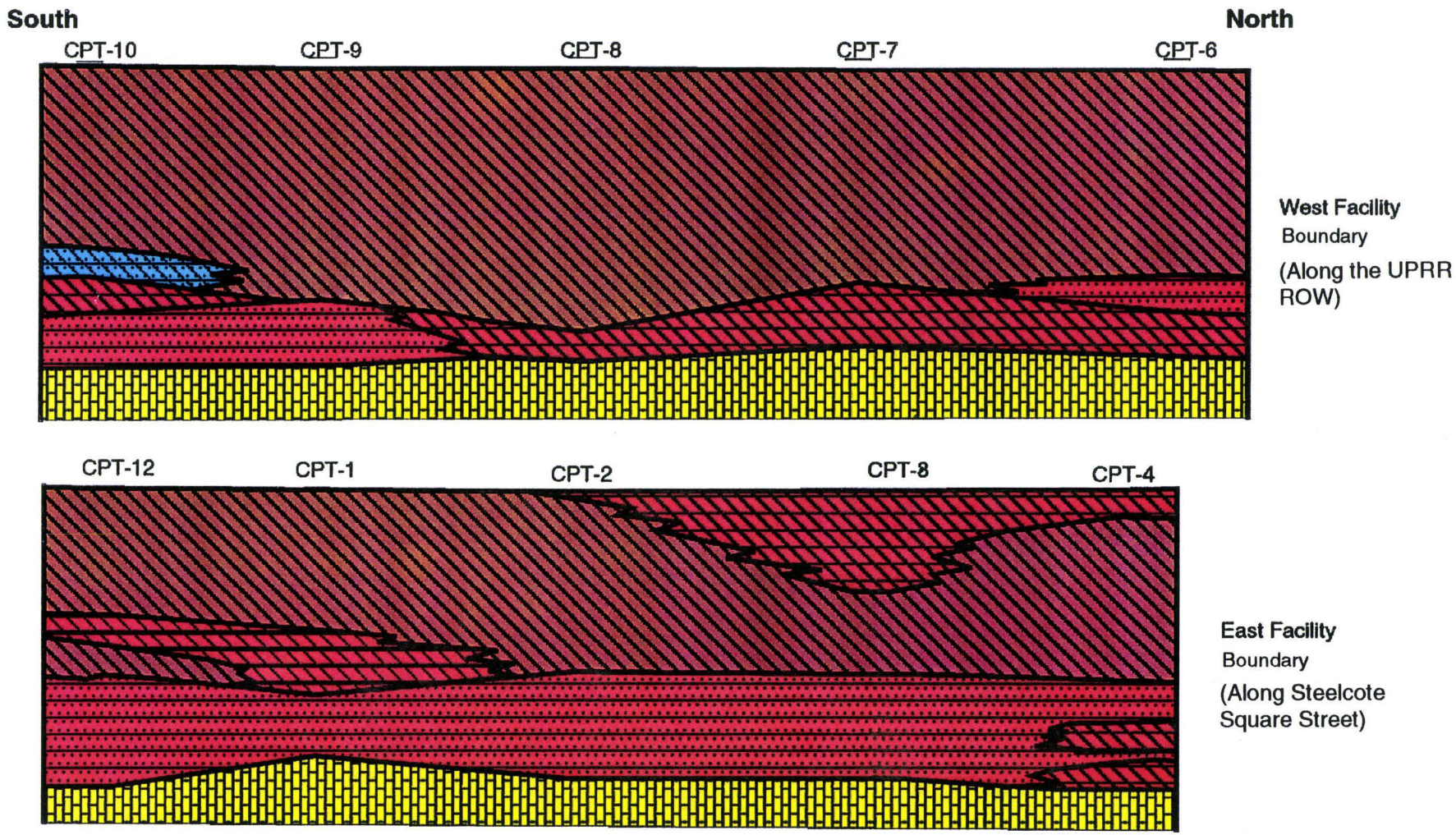
FIGURE 6

Z-301-05



LEGEND

- sandy SILT
- clayey SILT
- silty CLAY
- sandy, silty CLAY
- Bedrock
- CLAY

Horizontal Scale: 1" = 30'
Vertical Scale: 1" = 30'

Note: Top of cross sections represents approximate existing grade.

GENERALIZED NORTH-SOUTH CROSS SECTION
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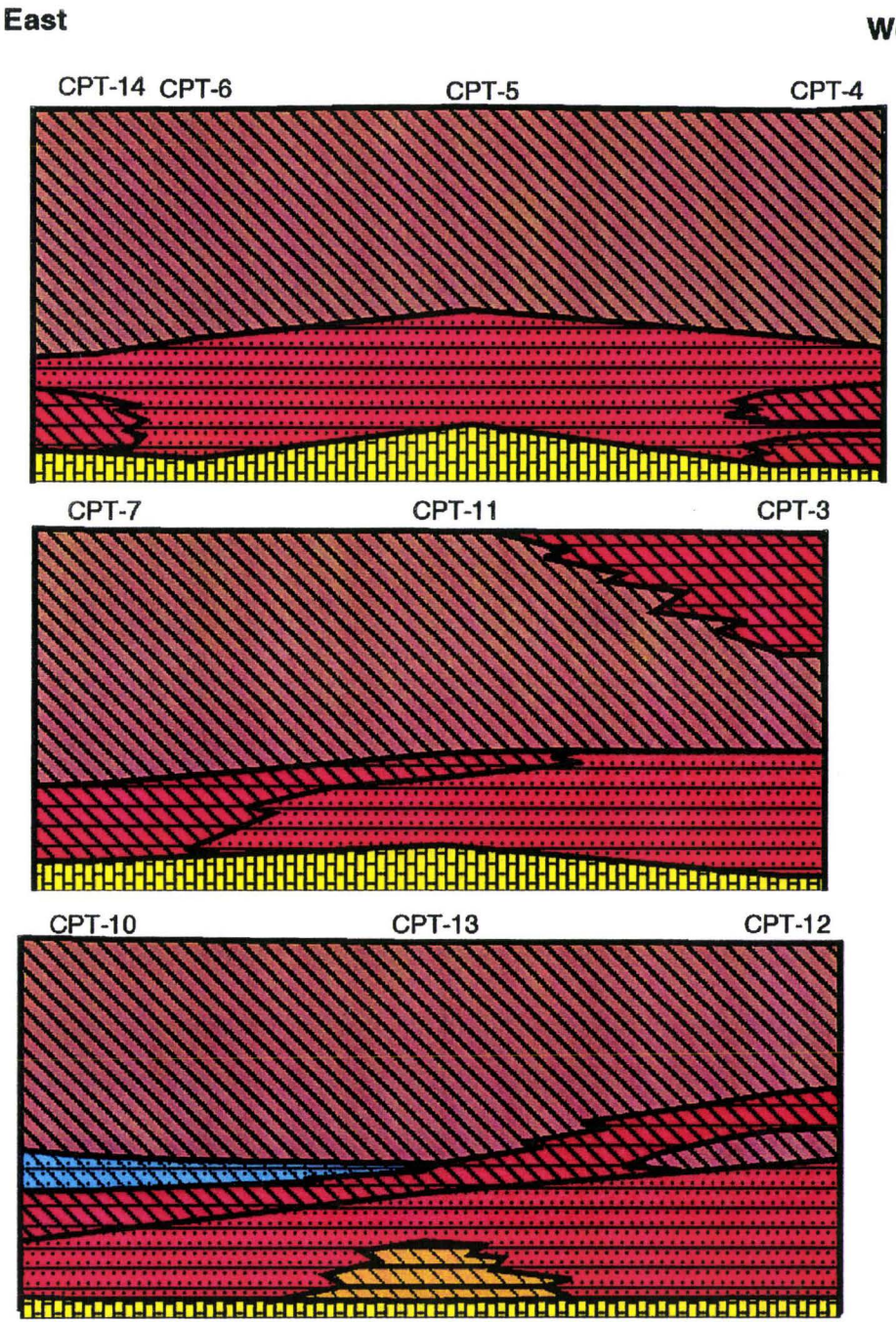
FIGURE 7

Z-301-05



North Facility Boundary (Along Gratiot Street)

Central Facility Area

South Facility Boundary (Along Papin Street)

LEGEND

- sandy SILT
- clayey SILT
- silty CLAY
- sandy, silty CLAY
- Bedrock
- CLAY

Note: Top of cross sections represents approximate existing grade.

Horizontal Scale: 1" = 30'
Vertical Scale: 1" = 30'

GENERALIZED EAST-WEST CROSS SECTION
STEELCOTE FACILITY
ST. LOUIS, MISSOURI

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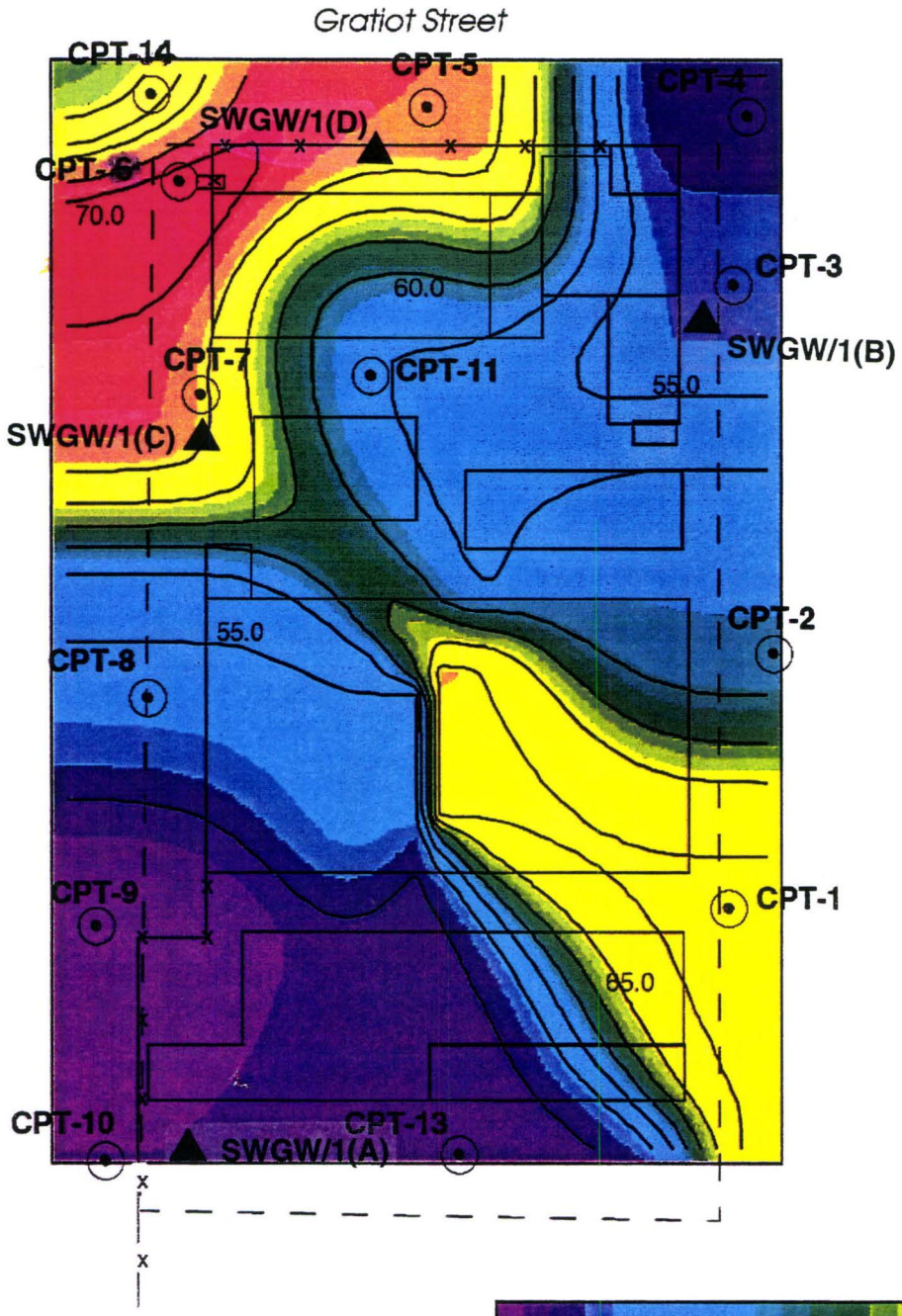
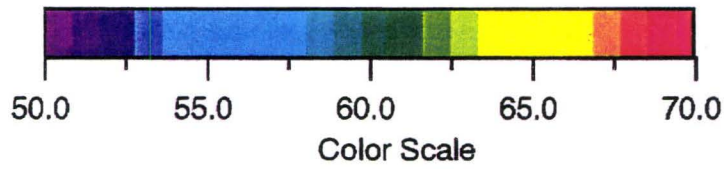
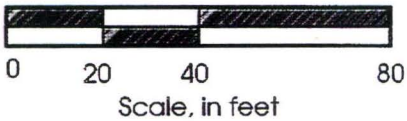
FIGURE 8





NORTH



LEGEND

⊙ Approx. CPT location

WATER LEVEL CONTOURS
STEELCOTE FACILITY
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FIGURE 9

The data indicate water levels consistent with those measured previously and currently in the existing monitoring wells and a contoured plot of the ground water elevations (Figure 9) indicates the apparent ground water flow pattern at the site.

The plot indicates ground water highs at the northwest and southeast ends of the site and ground water lows at the northeast and southwest areas of the site. The apparent direction of ground water flow is complex with indications that a ground water divide is present trending northwest-southeast. It suggests that water in the northeast portion of the site flows southerly or easterly and eventually toward the northeast off the site and that ground water in the southeast portion of the site flows north. Ground water in the northwest portion of the site appears to flow south and east and ultimately flows to the west off the site. In the far northwest corner, flow appears to include a northerly component. Ground water in the southwest portion of the site appears to flow north to northwest and ultimately flows to the west off the site. These conditions may also be, in part, the result of surface and subsurface structures. Nevertheless, the general pattern of ground water flow appears to be consistent with the apparent ground water flow direction determined by the monitoring wells.

The pore pressure data from CPT locations 6 and 14, which are within 20 feet of each other, indicate water levels of approximately 24 feet and 36 feet from the ground surface. Note also that the water levels determined in CPT locations 11 and 14 are also consistent with each other. This difference in water level in such a short distance suggests that at least two different water bearing zones are present, with the different level possibly representing either an isolated or perched ground water condition.

Normally, ground water velocities are calculated using Darcy's relationships in order to determine flow rates and, thus, the behavior of contaminant plumes. In this case, Darcy's relationship would be misleading and, because of the large gradients, significantly over estimate the rate of flow. Darcy's relationship assumes homogeneous materials through which water may flow with equal resistance in all directions. This is not the case at the site.

4.2 Waste Characterization

4.2.1 Contaminants of Concern

The remaining contaminants of concern (those which have not been eliminated due to non detection) are:

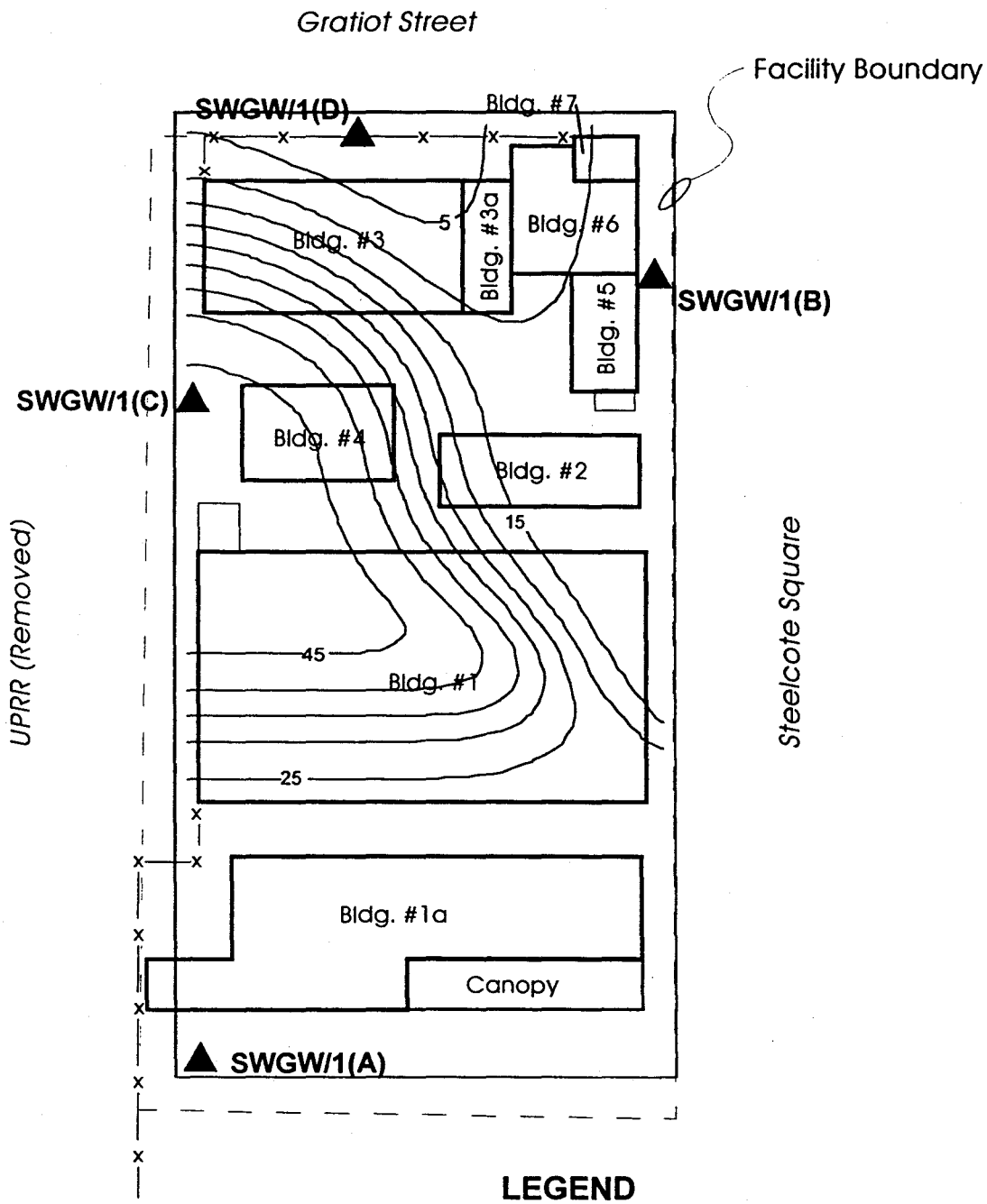
Xylene
Di (2-ethylhexyl) Phthalate
Barium
Chromium
Lead

Isoconcentration maps for ground water sample analyses were difficult to develop because of the limited number of data points. Only those quarters and parameters for which there were four data sets were plotted (note that non-detect was not included as a data point). Hence, only the fourth quarter for xylene; second and fourth quarters for lead; and third and fourth quarters for phthalate were plotted. No plots were made for toluene, barium or chromium.

It should also be noted that the contours do not consider ground water movement. Given the complex ground water system, the contour configurations have limited value relative to and probably south and east determining the location(s) of potential source(s).

Though xylene was detected in the upgradient well, significantly higher concentrations were detected in Well SWGW 1(C); that is, concentrations up to two orders of magnitude greater than in the upgradient well but an order of magnitude less than the MCL. Concentrations detected in the other wells were of lower concentration than detected in the upgradient well. An isoconcentration map (See Figure 10) for xylene in ground water was produced. The map indicates the highest concentrations are in the vicinity and probably south and east of monitoring well SWGW/1(C).

Phthalates were detected in soil samples and sporadically at low levels at all of the wells including the upgradient well. Third and fourth quarter contours (Figure 11 and 12) show a concentration pattern similar to that for xylene. A more sensitive analytical method was used for the fifth and sixth quarter analyses; however, phthalate concentrations were generally less



LEGEND

▲ **Approx. Ground Water Monitoring Well Location**

NORTH

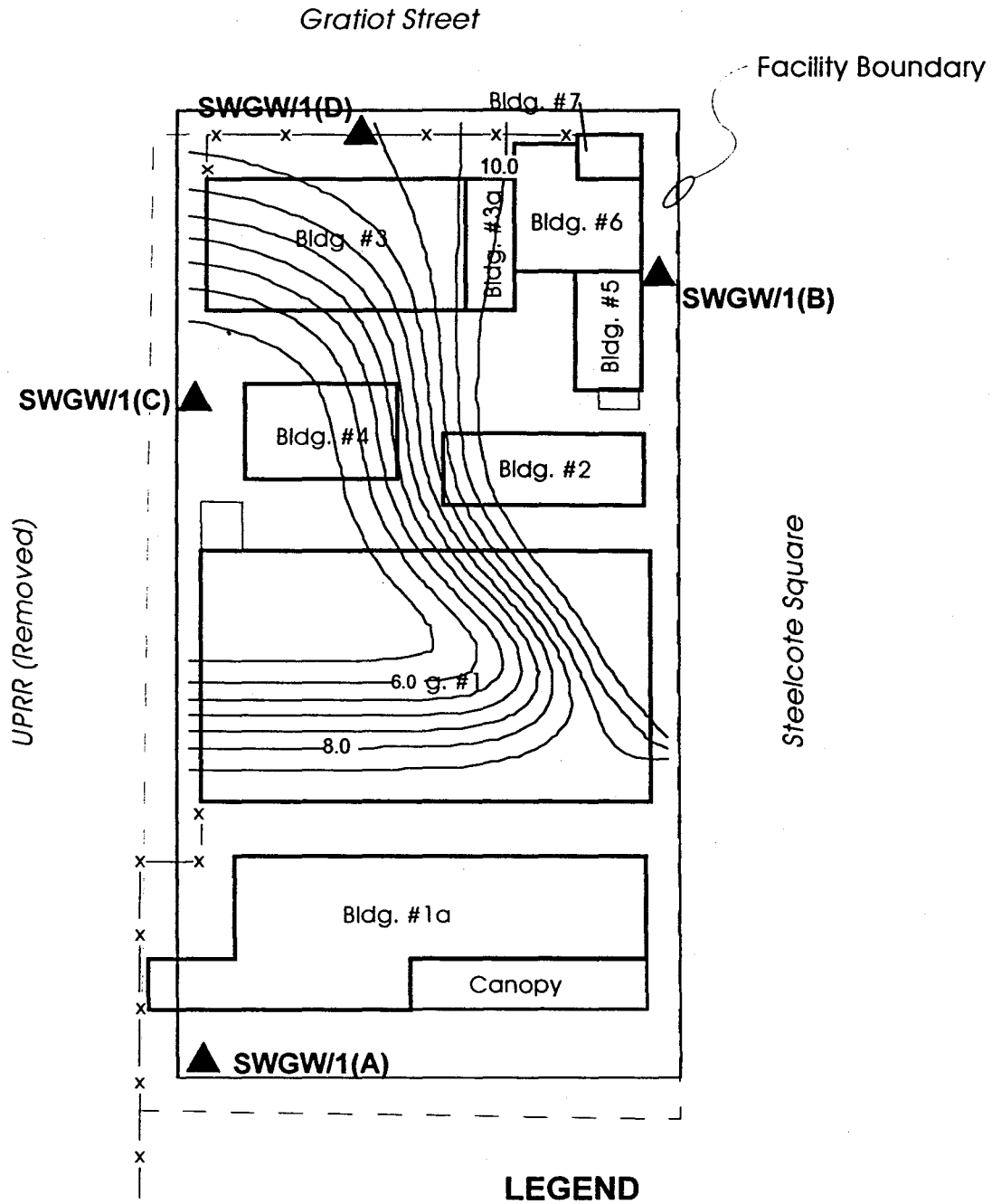
0 20 40 80
Scale, in feet

FOURTH QUARTER XYLENE CONCENTRATIONS
STEELCOTE FACILITY
ST. LOUIS, MISSOURI

Z-301

SHANNON & WILSON, INC.

FIGURE 10



LEGEND

▲ **Approx. Ground Water Monitoring Well Location**

NORTH

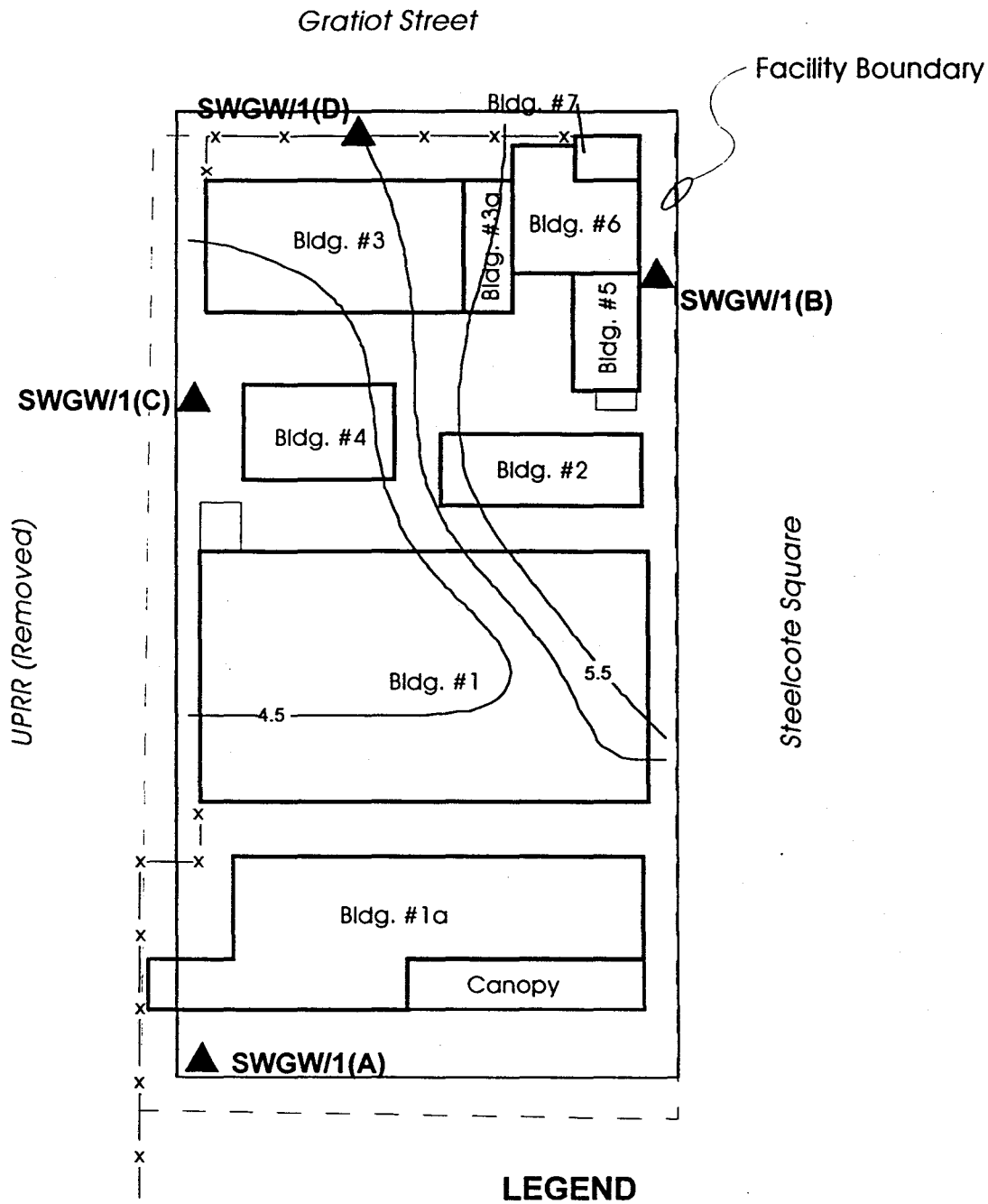
0 20 40 80
Scale, in feet

THIRD QUARTER PHTHALATE CONCENTRATIONS
STEELCOTE FACILITY
ST. LOUIS, MISSOURI

Z-301

SHANNON & WILSON, INC.

FIGURE 11



LEGEND

Papin Street

▲ **Approx. Ground Water Monitoring Well Location**

NORTH

0 20 40 80
Scale, in feet

FOURTH QUARTER PHTHALATE CONCENTRATIONS
STEELCOTE FACILITY
ST. LOUIS, MISSOURI

Z-301

SHANNON & WILSON, INC.

FIGURE 12

than those detected in previous quarters. For this reason, and the fact that phthalates are ubiquitous, phthalates should be eliminated as a COC.

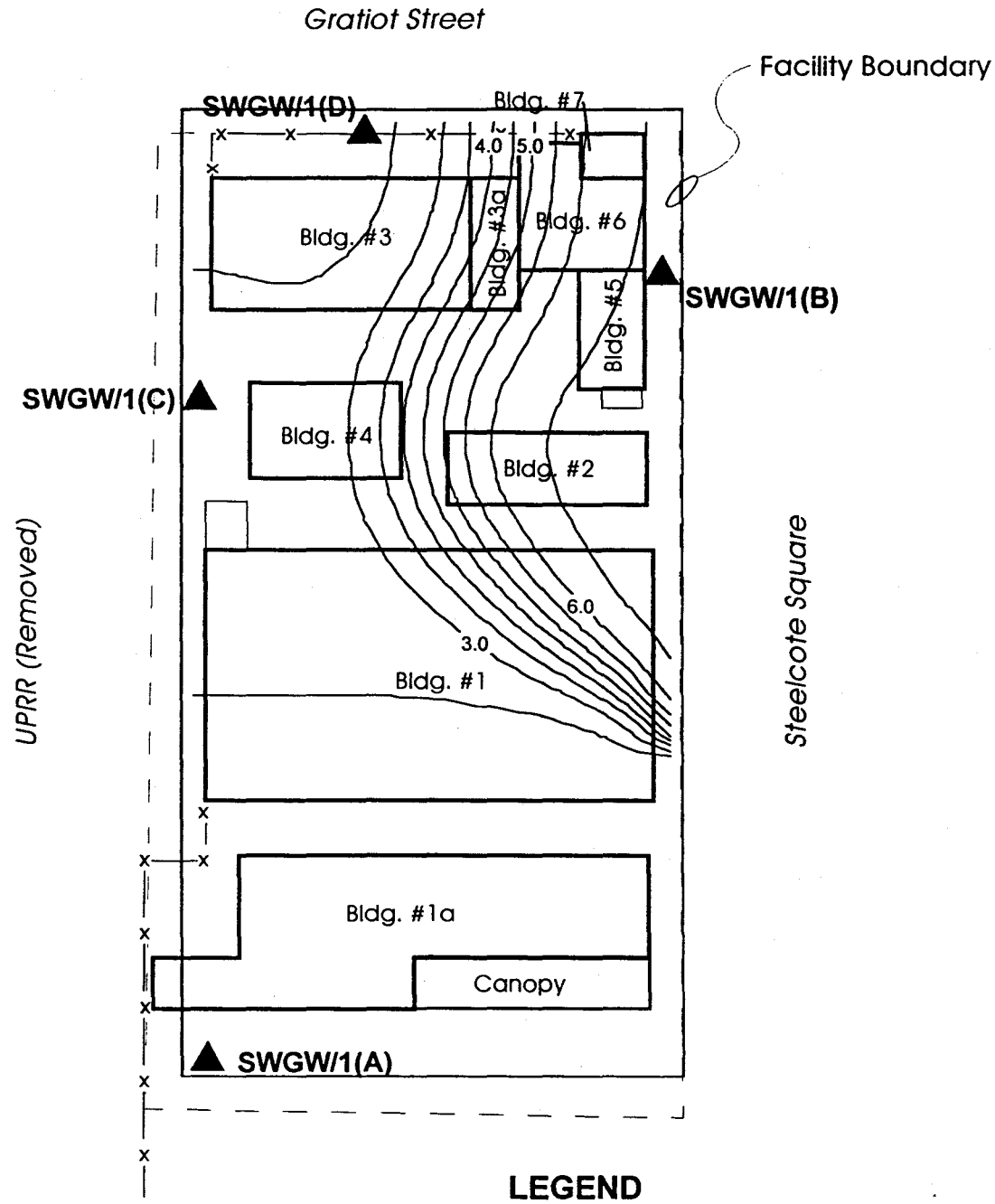
Barium and chromium are ubiquitous throughout the site. Both parameters in both soil and ground water samples were present at the same relative concentrations as was detected in background and upgradient samples. Also, concentrations detected were below MCLs. For these reasons, barium and chromium should be removed as COCs.

Lead is present in soil samples at concentrations similar to or less than those detected in background samples. Lead also is present in down gradient ground water samples, at concentrations relatively equal to or lower than that detected in the upgradient well, with three exceptions. The exceptions are analyses of samples obtained from well SWGW 1(B) (48 ug/l-5th quarter and 15.7 ug/l-6th quarter) and SWGW 1(D) (32.7 ug/l-6th quarter). Given the previous low readings, it is likely that these are incorrect results; however, storm water sample analyses indicate that there may be an off-site source which is contributing to levels above background. This observation is supported by isoconcentration maps for second and fourth quarter analyses (See Figures 13 and 14) which indicate increasing concentrations of lead east of the facility.

4.2.2 Potential Source

The only substantiated source of contaminants identified is a UST which was removed in 1990 from an area near CPT test locations 7 and 11 indicated on Figure 2 as Building 4A. The UST was removed and decommissioned. However, no contaminated soil was removed and the excavation was backfilled. Prior to backfilling, soil samples were collected and analyzed. The resulting analyses, which are presented in Appendix 10, indicated the presence of toluene (12mg/kg), ethylbenzene (108 mg/kg) and xylenes (405 mg/kg), total petroleum hydrocarbons (750 mg/kg) and unknown alkyl benzenes (228 mg/kg). Methylene chloride, which was also detected, was present in the method blank.

The results of soil analyses presented in Appendix 10 are consistent with the detection of xylene and toluene above background levels in Well SWGW 1(C). In addition, ground water flow direction also indicates that the occurrence of these contaminants in this well is



LEGEND

▲ **Approx. Ground Water Monitoring Well Location**

NORTH

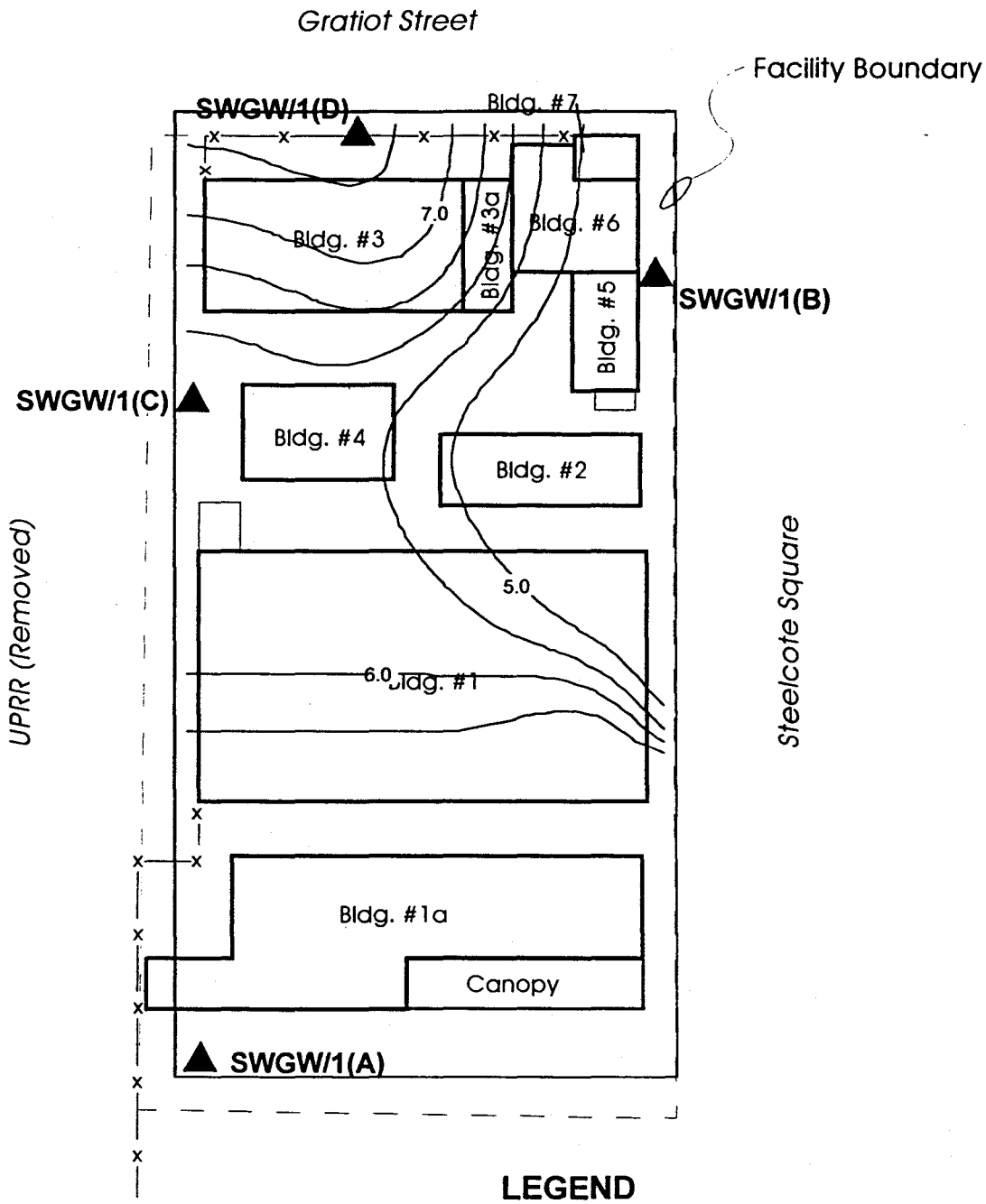
0 20 40 80
Scale, in feet

SECOND QUARTER LEAD CONCENTRATIONS
STEELCOTE FACILITY
ST. LOUIS, MISSOURI

Z-301

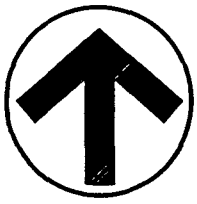
SHANNON & WILSON, INC.

FIGURE 13

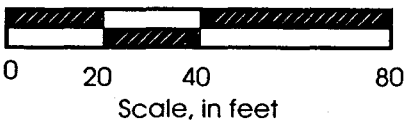


LEGEND

▲ **Approx. Ground Water Monitoring Well Location**



NORTH



FOURTH QUARTER LEAD CONCENTRATIONS
STEELCOTE FACILITY
ST. LOUIS, MISSOURI

Z-301

SHANNON & WILSON, INC.

FIGURE 14

consistent with the location of the UST. It should be noted that the preferential flow strata described in Section 4.1 lies directly below the UST site and is intersected by the well.

The only other COC is lead which does not appear to have an on-site source.

5.0 RECOMMENDATIONS

The following recommendations focus on additional monitoring to determine if any remediation is necessary at the facility. Recommendations include modification of the COC list, continued ground water monitoring and future action, if necessary.

- Quarterly ground water analyses should be continued for an additional two quarters. The results of analyses, as discussed in the following paragraphs, should dictate future actions at the facility.
- Analyses of ground water samples collected quarterly should continue for xylene and lead. Barium, chromium and phthalates should be excluded from the list because soil and ground water analyses indicate that they are present at background levels. Xylene or lead should be removed from the list if either is not detected in any of the wells for any quarter as per the AOC.
- If after two quarters, xylene is still detected but is detected at levels less than the MCLs, it should be removed from the list of COCs. If after two quarters, lead is still detected but is detected at levels less than the MCLs or, the distribution of lead indicates that it is background or originating from an off site source, it should also be removed from the list of COCs.
- If both lead and xylene meet the criteria listed in the preceding paragraph for removal, the ground water monitoring wells should be properly abandoned and no further action should take place at the facility.
- If either lead and/or xylene remain on the COC list after two quarters, the work plan should be amended to facilitate additional work at the site. The additional work may include additional investigation, remediation or any combination of these activities.

6.0 LIMITATIONS

The analyses, conclusions, and recommendations contained in this report are based on information provided through the client, the observed site conditions, personnel interviews, sampling and analysis, and other conditions described herein and further assume that the conditions observed are representative of the surface and subsurface conditions observed throughout the site. If conditions different from those described in the report are encountered, we should be advised at once so that we can review these conditions and reconsider our conclusions and recommendations where necessary.

If there is a substantial lapse in time between the submittal of this report and the start of work at the site, or if conditions or site layout have changed due to natural causes or operations at or adjacent to the site, we recommend this report be reviewed to determine the applicability of conclusions and recommendations considering the changed conditions and time lapse.

This report was prepared for the exclusive use of the client and his representatives for evaluating the site as it relates to the environmental aspects herein.

INITIAL FIELD INVESTIGATION NOTES

4/22/92 WED
L. Rosen
T. Crank
C. Hekel

Sunny ~80°

13:00 Burlington on site to begin set-up of decon pad and pre-drilling decontamination of tooling and the rig.

~15:00 St. Louis City Water representative arrives to clear the utilities for drilling on site. He said their mains are in the street and would not interfere with the drilling planned for this project. He would check their drawings to see if there are line off the main.

~16:00 Pad is operational; augers decorned.

~16:30 Ops completed for the day. Plan to start 0800 Thursday on the upgradient well. Crews depart.

Thursday 4/23/92
L. Rosen
T. Crank
C. Hebel

Weather @ 0800 Clear to partly cloudy ~72°
Slight breeze @ times

0745 LCR on site
0800 UE lineman arrive to check overhead line @ SW/1(A). Drill crew arrives. Set up for first boring @ SW/1(A) upgradient location.
0835 Personnel set to start. Step to discuss health & safety plan
St. Louis Water representative on-site checking private water line in alley
0840 Start H&S meeting; discuss route to hospital, general site operating procedures
0900 Start drilling. Photo 1 (Roll 1) of start of drilling
0920 Photo 2 Sample run # 2
0935 Photo 3 " run # 3
09:50 Photo 4 " " # 4
10:30 Photo 5 Run # 6 Top of run to right of picture (24-29')
10:50 Photo 6 Run 7 Close-up of shells @ ~32.5'
Photo 7 " " Top of run @ left
11:20 Photo 8 Run 8 " " "
11:35 Photo 9 Run 9 Top to left - close up of bio organics in upper 1.5'
12:05 Photo 10 Run 10 " " "
12:15 Lunch (Light, short duration drizzle)
12:45 Suit up for work; start drilling run 11 (49-54')

4/23/92

13:30 Photo 11 Run #11 Top to Left 49-54.0

14:20 Photo 12 Run #13 Top to Right Blade pointing to top of bedrock @ 60.0'

Crew calls office to arrange for more screen and sand. Break down AW rods and secure hole for the night. Collected composite sample

15:15 Crew draining water from tank prior to leaving site.

Collected 4 samples SW/1 (A) D 6.1-6.9 A

SW/1 (A) D 34.0-36.0 P

SW/1 (A) D 54.0-56.0 P

SW/1 (A) C 19.0-61.0 A

16:00 Delivered samples to ATAS for analytical testing

16:20 Took shelby tube samples to physical lab @ S:W.

FRIDAY
4/24/92

Weather ~55° Overcast, Wind 5-10 mph

S:W { L. Rosen
Burlington { T. Crank
C. Hebel

0745 Burlington crew arrives. Suits up, measures groundwater @ 48.1'.

0800 LCR arrives. Gives instructions for well installation. Set 1' sand prior to installing screen & casing.

0830 Starting to place sand. Stopped to put end cap on screen and they wouldn't thread. Tried 3 different caps. Tim Crank calls his office to explain situation. Had Sch 80 rather than 40 caps.

0850 Burlington having different caps sent to site. Will go over pay sheets from previous days.

0930 New caps arrive. Start placing screen in hole through the augers.

12:10 Stop for lunch. Used 8½ bags of sand (Colorado Silica 10/20). Have pulled 3 augers sections to this point.

12:35 Resumed setting filter pack.

13:50 Filter pack @ 28.3' below grade. Used 15 bags of sand.

14:25 " " @ 18.9' " " " 20 " " "

14:55 " " @ 13.0' ~24.5 " " ". Sand pack completed. Prepare to place bentonite pellet seal. Began placement.

15:45 Bentonite seal @ 10.4'. Used 1.75 pails of ¼" pellets. Augers pulled when seal @ 11.5 due to bridging in augers. Set up equipment to mix grout. Note that ~2.5' of pellets were bridged inside lead augers.

4/24/92

16:15 Note that pellets for seal were placed through a column of water present in the annular space. No water was added and the pellets appeared to have adequately swelled to form a seal. Grout was mixed (Used 3 bags of portland cement and ~10 lbs of bentonite powder to ~30 gallons of water) and placed via tremie into annular space. Boring was grouted to the surface.
Note Kip & Mel Kohl were on site; that is, the former Columbia Gas portion of the property.

16:30 Burlington crew secured the well/borehole by placing a clean 55 gal barrel over the top to prevent accumulation of water while grout settled. Burlington removed trash and departed site

16:50 LCR departs site.

MONDAY
4/27/92
L. Rosen
T. Crank
K. O'Brien

WEATHER: Overcast 50° @ 0730

0730 Burlington crew onsite to begin decon ops. New helper is Kevin

0745 Rig sprayed down. Moved support truck over to SWGW/1(A) to move barrels.

0800 Begin handling barrels to move onto truck and then to pallets provided by Steelcote. Winch strips out after 1 barrel.

0845 Kevin begins steam cleaning, Tim completes flush mount on SWGW/1(A). Tim calls Kelvin Yount regarding winch. Jim Moore talked to Mozel & they will provide a forklift to help move barrels from second site. Used 2 bags Pre Mix for surface mount

0915 Flush mount completed. Decon still being conducted. Photovac Tip II calibrated and ready for use.

0930 Decon completed. Prepare to move to SW/1(B) @ NE end of the facility along Steelcote Square

0945 Move to SW/1(B). Begin set-up. Photo 13 of location looking to the north.

10:20 Start drilling SW/1(B)

10:30 Stopped during first run due to concern that drill had encountered a sewer, rather than just rubble fill. Set back up after poking hole w/ an iron rod & finding only brick and concrete rubble.

10:45 Photo 14 Run #1 Top to right

10:50 Photo 15 Run #2 Top to right

4/27/92

Photo 16 Run 3 Top to right
Photo 17 Run 4 Top to ~~rig~~ left
Photo 18 Lost
11:45 Photo 19 Run 5 Top to left
12:30 Photo 20 Run 6 " " " (24.0-29.0
Crew stopped for lunch @ ~12:15 while I finished logging and sampling. Pete Johnson & Al McMahon stopped by briefly to ask questions about generic drilling
12:45 Crew cleans tubes to prepare for drilling. Water in augers @ 23.2'.
13:20 Photo 21 Run 7 (29-34') Top is to right
13:30 Photo 22 Run 8 (34-39') " " " "
13:35 Photo 23 Run 9 Exiting hole
13:40 Photo 24 Run 9 (39-44') Top is to right.
14:00 Photo 25 Run 10 (44-49) Top is to left
14:02 Photo 1 Roll 2 " " " " " "
14:25 Did not have full tube on Run 11. Suspect some fell out. Driller sent next tube down the augers to confirm/deny. Some had fallen out.
Photo 2 Run 11 (49-54') Top is to right
15:05 Photo 3 Run 12 (54-59) " " " "
15:10 Auger refusal @ 60.5. Crew starts to break AW rods as they pull the last 5' tube out of the hole
15:25 Photo 4 (59-60.5') Top is to left

4/27/92

15:45 Barrels moved via forklift provided by Mizer to fenced area. Rig & rails also moved for security reasons.

16:00 Site/area around SW/1(B) secured. Left augers head bolted to augers. Drillers drain their tank.

16:15 Depart site. Gate locked.

16:45 Arrive @ ATAS w/ samples for chemical analyses.

17:00 Drop off Shelby Tube @ S&W physical lab.

Collected five samples today

SW/1(B) D 11.0-12.0 A

SW/1(B) C 14.0-19.0 A

SW/1(B) D 19.0-20.3 A

SW/1(B) C 24.0-29.0 A

SW/1(B) D 29.0-31.0 P (Shelby Tube for physical testing)

WEATHER CLEAR - PT SUNNY 50° 4/28/92

L. Rosen

0730 LCR on site T. Crank

0745 Burlington crew arrives. Hooks up trailer and moves equipment back to SW/1(B) K. O'Brien

0800 Check water level on SWGW/1 (A). Measures @ 14.4'. Water has come up significantly.

0810 Rig is back over hole and crew is setting up to begin installation of SWGW/1(B).

0820 Water level in SW/1(B) is ~48' in the augers. It has risen some since last night.

0830 Start setting well in augers. Target bottom of well is 59.5'. Used 5 10' screens, 1 10' riser, 1 end cap, 1 top plug. Sanding/placement of sand filter pack initiated. Placed ~1 foot below the screen.

0845 Spoke w/ Kelvin Yount via phone regarding having a second crew out here to drill the soil borings. I said I would need another person here to log and sample and would have to get back to him. He also wants to obtain compensation/payment for the extra cost associated w/ the wells - his cost did not reflect having the amount of screened interval in the well as we have used. I said our plan of study indicated that our wells would be installed as we have done in the field and that I could not offer him anything. I suggested a formal letter to Don McQueen which we would review and discuss with our client.

4/25/92

09:15 Placement of filter pack progressing. Based on the water level in SWGW/1(A), the screened interval was extended to 50' from 45' used in SWGW/1(A). The screen in SWGW/1(B) is ~59.5-9.5' and will be confirmed following completion.

09:45 Sand pack @ 48.4'. Used 6½ bags of sand so far.

10:20 Sand pack @ ~38.5. Used 9 bags of sand. Note that only one bag of sand was used to go five feet (~43.5-38.5). This interval corresponds roughly to the logged interval of sand encountered during drilling.

10:45 Pulled another 5' of augers w/o adding sand. Taping indicated sand in the augers up to 2.5'. Would not shake out and did not actually bridge (i.e. pull the well up as augers are pulled up) with augers pulled such that bottom of the cutting end was @ ~33', sand was in the augers @ ~28'. I approved the use of water in the augers to break up the sand. Used ~20 gallons injected under pressure against the sand. This dispersed the sand and it fell out of the augers. The tape indicated the hole was open to ~37'. Sand was then added as before.

11:35 Filter pack now @ 23.6'. Used 15.5 bags of sand. Placement is going smoothly.

12:00 Filter pack @ 18.7; used 16.5 bags. Break for lunch.

12:30 Resume placing filter pack

13:20 Filter pack @ 7.5'. Used 22 bags (21.5) of sand. Started placing bentonite seal w/ pellets. Dry inside augers.

Weather: Clear ~70° 4/28/92

13:40 Seal placed. Pull augers up to remove section. Wet seal w/ water. Pulled remaining lead auger out of ground and loaded up trailer. Used ~1.75 pails of pellets

14:10 Moved trailer to decon pad.

14:25 Started deconning augers

14:30 Started mixing grout for SW94/1(B). Used ~15 lb bentonite powder, 3 94# bags of portland, and ~24 gallons of water.

14:40 Placed grout via tremie to surface to allow for settlement. Took ~15 gallons. Remaining grout poured into a hole in floor in one of Steelcote's bldg to patch floor.

~15:50 Decon of augers and rig nearly completed. Pumping water to drums. To date, 3 drums of decon water, 7 drums of soil from SW/1(A), 6 drums from SW/1(B). Asked Steelcote to order 5 more 17E and 5 17H drums.

16:20 Burlington departs.

16:25 CCE departs

4/29/82

Weather: Overcast 55°
Wind 5-10 mph
Scattered Showers

S.W. { L. Rosen, T. Hippensteel
Burlington { K. O'Brien, T. Crank

07:30 LCR on site
07:45 T. Hippensteel & drill crew arrive. Start set up for SW/1(C
08:00 Dan McQ
08:15 Drizzling, scattered lightening
0900 Start drilling SW/1(C)
0910 Photo 5 Roll 2 Run #1 Top to right
0915 Photo 6 Run # 2 (4.0-9.0) " " " SW/1(C) 08.5-9.0 A
09:35 Photo 7 Run 3 (9.0-14.0) " " " SW/1(C) C 9.0-14.0 A
09:45 Dave Ellis and Quentin Nowack arrive. TH goes to arrange for ramp removal
10:00 Photo 8 Run 4 (14-19.) Top to right
10:15 Photo 9 Run 5 (19-24) " " " SW/1(C) C 19.0-24.0 A
10:30 Photo 10 Run 6 (24-29) " " "
10:35 Had safety meeting for Burlington new people & TH.
10:50 Photo 11 Run 7 (29-34') Top to right
11:05 Photo 12 Run 8 (34-39') " " "
11:15 Push tube (Shelby) sampler 39.0-41.0. Ramp e east side of alley where soil borings will be drilled has been removed
11:30 Second ramp moved
11:35 Photo 13 Run 9 (39-44') Top to right

4/29/92

~11:45 Start coring concrete for soil borings

11:50 Photo 14 Run 10 (44-49') Top to right

12:00 Lunch

1230 Start up again. 2nd crew resumes coring. Rig starts run 11

12:50 Dave Ellis informed me that core barrel bit is not penetrating. I approved completion of this hole w/ jack hammer if necessary. I said a coring bit has to be obtained for the second borehole. Dave is contacting rental company via mobile phone for a replacement barrel. Note that 2nd crew was on standby for 1½ hours (9:45-11:30 less 15 min for safety meeting) while ramps were moved.

13:15 Rental company arrives w/ replacement bit

13:20 Photo 15 Run 11 (49-54') Top to right

13:35 Photo 16 Run 12 (54-59) Top to left

13:50 Photo 17 Run 13 (59-61.5) Top to right. Driller pulled AW rods. Prepare to set well

~14:15 Lay out materials

~14:20 Start assembling well and placing down hole.

~14:30 Start placing gravel pack w/ Colorado Silica Sand 10-20.

15:00 Pulled off first auger section. Used 4 bags of sand. TH says SW1(E) had auger refusal @ 7.5'; bent split spoon shoe.

~15:25 2nd crew starts coring 2nd hole. Photo 18 coring hole.

15:45 SWGW1(C) has filter pack @ ~43'

4/29/12

15:50 4 augers out of ground. Sand @ ~40'. Used 10 bags so far

16:05 Pulled of SWGW/1(C) and moved over to SWGW/1(B) and completed well protection - flush mount.

16:30 SWGW/1(B) completed. Used 2 bags Pree-Mix (80lb) to set well protection. SW/1(E) "grouted" w/ Hole Plug (bentonite chips), then Pree-Mix. Used about ½ bag of each.

SW/1(E) 4" Pavement 7.5' drilling 4 split spoons.

SW/1(F) 6" Pavement.

Talked w/ Kelvin regarding standby time. Agreed to accept 1 hr standby time @ reg rate as per bid sheet (i.e. $110/hr). Regarding rate for drilling & sampling soil borings w/ Beaver. Suggested using the continuous sampling 4¼ rate or the no sampling plus split spoons rate. Will talk about it again to finalize.

17:00 Left site. Took samples to ATAS

17:45 Dropped samples @ ATAS. Mistakenly wrote "relinquish time" as 16:47 rather than 17:47. Corrected my copy and called Rich Henry to alert him and correct his page.

1800 Dropped off Shelby Tube @ S.W.

Samples collected today SW/1(C) D 8.5-9.0 A

SW/1(C) C 9.0-14.0 A

SW/1(C) C 19.0-24.0 A

SW/1(C) C 24.0-61.5 A

SW/1(C) D 39.0-41.0 P

SW/1(E) D 0.6-2.6 A

SW/1(E) C 2.6-7.6 A

Weather: Clear 60° AM — 4/30/92

Light breeze — S:W { L. Rosen, T. Hippensteel

Burlington { D. Ellis, T. Crank; Q. Nowack, K. O'Brien

0730 Arrived LCR onsite. T. Crank & K. O'Brien just arrived and found that the locked area where equipment is stored overnight had been broken into and equipment stolen

~0740 Place call to police

0745 T.H. arrives.

~0800 Officer Fosheze (sp?) arrives to write-up report. Missing items include, coring machine & bit, electric jackhammer, Little Beaver auger machine and tools off the drill rig. Drill rig driver rear window broken & all locks cut off. Thieves entered via alley and cut through the chain link fence. Burlington crew contacts their people to report it.

~08:30 Ellis & Nowack arrive

~08:45 Officer Leglard from the Crime Technician Section arrives to check for prints or other usable evidence.

0915 Rig crew moves rig and support truck & trailer over to SWGW/1(C) to set up to continue filter pack placement. TH attempting to see if S:W's "Beaver" can be used.

~11:10 Mark Hoffman from S:W drops off S:W's Beaver. It appears it can be used. Need a means to drive the samplers.

11:15 D. Ellis calls rental company, finds out they have a hammer & leaves to pick it up. Mark Hoffman leaves.

Weather: ~75° Sunny @11:30 ~85° @16:00 4/30/92

Mod Breeze

11:20 Due to vandalism, Burlington is going to have drill rig taken off site each night. Augers @ ~25', 17 bags of sand used.

11:30 Photo 19 - crew stripping clay off augers

12:00 Drill rig crew breaks for lunch. 2nd crew returns w/ hammer and starts augering SW/1(E)

12:30 Resume sand pack ops on SWGW/1(C). Augers @ 15'.

12:50 Photo 20 looking east. 2nd crew driving split spoon.

13:00 Sand pack @ 8'. 23 bags total used. Start placing bentonite pellet seal

13:15 SW/1(E) hits refusal @ 10.5'. Rods suggest water @ 8'. Seal on SWGW/1(C) set. Used 5 gals of water to activate pellets. Seal @ 6.0'

13:25 All augers out of hole. Start cleaning up around the site. 2nd crew deconning.

14:00 Grout for SWGW/1(C) mixed. Used ~15-18 gallons water, ~10 lb bentonite powder, 2 94# bags Portland Type I cement.

14:15 Hole grouted. Pull rig & support equipment off drill location & take to decon pad. 2nd crew done w/ decon - loading up to leave

14:20 2nd crew leaves. Drill rig backed into decon pad. Decon ops

16:15 Decon completed. Rig & Support truck depart

16:20 LCR departs. Take sample to ATAS

17:00 Drops sample @ ATAS. Goes to S:W.

17:15 Drop Shelby tube @ S:W soils lab.

Weather 65° Clear light wind @ 07:45 — 5/1/92

L. Rosen

0735 Drill crew arrived — T. Crank

0740 L.R arrived. Load up equipment for next — K. O'Brien
boring SW/1(D). Set up for drilling

0825 Start set up of augers & first tube

0830 Start turning augers

0845 Photo 21 (Roll 2) Run 1 (0-4') Top to right

Photo 22 Run 2 (4-9') " " "

Photo 23 Run 3 (9-14') Top to right

Photo 24 Run 4 (14-19') Top to right — Took sample from 14.0-15.9 for Matrix Spike, MSD

Photo 25 (19-24') Top to right Run 5

10:20 Photo 1 Roll 3 (24.0-29.0') Top to right Run 6

10:45 Photo 2 Run 7 (29-34') " " " Water @ 33.7' in augers

11:00 Photo 3 Run 8 (34-39') " " "

Crew takes short break. Gets barrels

11:15 Resume drilling

11:30 Photo 4 Run 9 Top to right (39-44')

11:40 Photo 5 Run 10 " " " (44-49')

Note A. McMahon & P. Johnson present from ~ 10:30-11:00

11:50 Break for lunch

12:20 Resume work.

12:50 Photo 6 Run 11 (49-54') Top to right

13:00 Reached bedrock/augers refusal @ 58.0'. Roller start to break
SW rods burying out sample

Weather 80+° Windy 5/1/92

1315 Photo 7 Run 12 (54-58') Took composite sample SW/1(D)C 18.0-58.0 A

13:30 Area around SW/1(D) secured. Crew went to SW/1(C) and put on surface mount protection.

1350 Moved off SW/1(D). Took rig & support truck/trailer to decon pad

14:00 Trailer emptied. Start draining water tank. Arranged to have Mazel's forklift help move barrels from drill locations.

14:15 Start moving barrels from SWGW/1(C). New winch on Burlington's support truck strips out. Forklift is able to put drums not on a pallet onto back of truck.

14:50 Barrels moved into fenced area. Site secured. Drill crew departs

15:00 LCK departs. Soil samples transported to ATAS.

15:40 Arrive @ ATAS, relinquish samples. Return to S:W to place Shelby Tube sample in soils lab.

1555 Shelby Tube delivered to soils lab. Samples collected today include : SW/1(D)D 6.5-9.0 A

SW/1(D)D 11.5-12.5 A

SW/1(D)D 14.0-15.9 A

SW/1(D)D 14.0-15.9 AMS (Matrix Spike)

SW/1(D) 14.0-15.9 AMSD (Matrix Spike Duplicate)

SW/1(D)C 19.0-58.0 A

SW/1(D)D 19.0-21.0 P (Shelby Tube)

Weather: Clear & Pt Cloudy 55° AM 5/4/92

S.W. { L. Rosen
Burlington { T. Crank
R.

0735 LCR arrives.

0755 Crew arrives. Gathers equipment from Staging area to take over to SWGW1(D).

0810 Move to SWGW1(D) Set up rig and equipment

0830 Stop work for safety meeting

0840 Resume work

0845 Set well casing down the hole. Hole was open to 58.0'. Will set the well @ 57.0'. 45' of screen used.

0900 Start setting sand pack

11:55 Lunch Break. Well filter pack @ ~18.5 feet bgs. Used 21 bag of sand (Colorado Silica 10-20. 100# sacks)

12:30 Resume filter pack installation

13:00 Well filter pack completed to 10' (2' above top of screen). Used a total of 25½ bags of sand. Place bentonite seal w/ 3/8" pellets.

1320 Filter pack completed to 8' used a little more than 1¾ pail.

14:00 Start mixing grout after having cleaned up around rig and pulled last two flights. Used 3 bags of Portland, 21 gals of water, ~940 lbs bentonite powder.

14:15 Place grout in borehole w/ tremie. Note: used 5 gallons of water to hydrate seal.

14:30 Moved equipment over to decon pad. Steam cleaned AW rods and CME tubes in preparation for SW1(G) drilling.

14:45 Backed drill rig up to location.

WEATHER: Pt Cloudy 65° PM 5-4-92

15:10 Start drilling

15:30 No recovery from 3.0 - 13.0. Move off hole. Upgrade to level C during pullout. ~~while~~ Will remain in Level C to completion of SW/1(G). Moved up 2 feet (south) and went down to 8' w/ adequate sample recovery. Ended hole @ 8' due to encountering water. Used hole plug to partially fill holes (5 bags)

Out of Level C @ 16:15. Collected SW/1(G)25.0-8.0 A

Changes: 3' Level D sampling
5' Level C sampling
10' Level D No sampling
Grout in Level D total 21'

16:30 Rig boom down. Move off location SW/1(G). Close up drums Secure site

16:50 Gate locked. Depart site. LCR to ATAS

17:20 Leave sample @ ATAS. Collected SW/1(G)25.0-8.0 A.

Tuesday
5-5-92

L. Rosen
T. Crank
R.

Weather Clear - Pt Cloudy 45° AM

08:10 130 arrives. Drill crew waits w/ 2 support trucks. Completed placing Hole-Plug in SW/1(G) and placed Preemix on top. Used 3 bags Hole Plug, 1 Preemix

08:20 Completed surface well protection on SW/1(D). Used 1 bag Preemix.

08:30 Start decon of augers etc. Move barrels from location SWGW/1(A) and SW/1(G)

10:00 Completed moving barrels. Set up to develop SWGW/1(A)

10:30 Rod pump system being inserted into well SWGW/1(A). Calibrated pH & conductivity meters. Measured 14.5' to water from TOC and 58.5' to sediment (~6" of sediment). ~~Calculate~~ Calculate 7.26 gals in well casing → ~36 gals is five well volumes.

10:50 Photo 9 Roll 3 Development of SWGW/1(A) Initial readings 1365 µS cond., 16.7°TC; 6.6 pH. Intermediate values recorded on development log

11:25 Removed ~50-52 gallons. Water still has sediment. Parameters appear stable. Photo 10 of water @ end of development prior to sediment settling out. Water level @ 20.4' below TOC. Bottom of well 58.6' from TOC.

11:40 Photo 11. Sample of water from SWGW/1(A) after 15 minutes. Start decon of rod pump.

11:50 Lunch

12:20 Set-up to develop SWGW/1(B)

WEATHER CLEAR ~60° Breezy 5-5-92

12:30 Water level in SWGW/1(C) @ 36.1 from TOC. Measure 57.2 to sediment. Start surging well.

13:00 Initial reading 18.0°C T, 6.65 pH, 1057 µmhos.

14:05 Final readings 16.3°C T, 6.70 pH, 1090 µmhos. Crew removes hand pump from well. Photo 12 of water taken @ end of development. Water is brown gray turbid w/ suspended silt/clay.

14:15 Water level @ 49.2 and bottom of well @ 58.5 for SWGW/1(B). Removed 55 gallons. Loaded barrel of water & went to decon pad.

14:30 Decon completed. Set up on SWGW/1(C). Water level @ 40.1' below TOC. Bottom @ 59.9' - bottom solid, little or no sediment. Begin surging. Photo 13 after sediment settled / ~~Note well went dry~~ for SWGW/1(B)

15:20 Development completed. Removed ~55 gal. Water level @ 44.9' from TOC. Detail in development log. Photo 14 of water @ end of development. Note: well SWGW/1(B) went dry during development and would partially recharge to the point where pumping could resume. Typically 3-5 minute at most. ~~Photo~~

15:30 Photo 15 of SWGW/1(C) after 10 minutes of settlement. Note less sediment. Crew take barrel to staging area. Decon equipment and load out of all unnecessary equipment

16:00 Gate locked. Crew training water, double checking equipment.

16:05 Depart site.

Weather Clear Breezy 60°F

5-6-92
T. Crank
R. Dresser
L. Rosen

~13:00 Crew arrives and starts to demobilize.
~13:05 LCR arrive. Crew dismantling decon pad
14:00 Set up on surge 1 (D) to develop w/ hand pump. Water level @ 14.8' below TOC.
15:20 Finished development removed ~90 gallons. See development log for details
15:30 Hand pump out of hole, barrels picked up, taken to staging area. Photo 16 of water @ end of development.
15:35 Photo 17 of water after settling for 15 minutes.
16:00 Burlington demobilized, departs site
16:10 LCR depart for ATAS.

5/7/92

13:45 LCR onsite

14:00 W.L. @ SWGW/1(A) is 16.75' below TOC

14:10 WL @ SWGW/1(B) is 32.90' below TOC

14:15 W.L @ SWGW/1(C) is 42.0' " "

14:20 W.L. @ SWGW/1(D) is 15.1' " "

Weather: Clear ~75° 5/8/92

L. Rosen

09:30 Arrive @ site. Set up equipment for purging and sampling wells.

10:10 Start measurements on SWGW/1(B). Water level @ 15.50' below TOC

11:20 Complete purging. Took samples.

11:35 Sampling completed. Details contained in water sampling log sheet. Sample identified @ SWGW/1(A)(5/8/92). Moved equipment to next well.

12:10 Started purging SWGW/1(B). Water level @ 33.95' below TOC.

13:20 Purge completed. Took sample.

13:40 Sampling completed. Sample identified as SWGW/1(B)(5/8/92). Details recorded on water sampling log sheet. Moved equipment

14:00 Started purging SWGW/1(C). Water level @ 42.00' below TOC.

15:00 Purging completed - started sampling. Collected SWGW/1(B)(5/8/92, Details recorded on water sampling log sheet

15:10 Completed sampling. Moved to last well.

15:30 Began purging SWGW/1(D). Water level @ 14.30' below TOC.

16:40 Purge completed. Took samples SWGW/1(D)(5/8/92), SWGW/1(D)(5/8/92) MS and SWGW/1(D)(5/8/92)MSD.

17:00 Sampling completed. Write up labels and chain of custody

17:45 Report site for ATAS.

18:15 Samples relinquished to ATAS.

Overcast - 75° 5-22-92

RW Schwab & MC Meierhoff on-site

Met Jim Moore to open gate

Slug tested SW~~B~~W-1(A) from 1015 - 1130. Used bailer for drawdown

Doug Niedt on-site ~ 1000

DTM on-site 1115 - 1130

FID headspace survey of all 4 wells 0940 - 1015

A = Full-scale response. GC run indicate many peaks, including 19, 20, 39, 75, 142, & 181 sec. Many other peaks during backflush.

B = Little to no response (<20 ppm)

C = Full scale response (>1000 ppm) w/ immed. flame out. GC run indicated only one peak, w/ off-scale (>1000 ppm) response from 6-26 sec (CH_4). No other peaks noted up to 120 sec or during backflush.

D = Full scale response (>1000 ppm) GC run indicated only one peak, w/ off-scale (>1000 ppm) response from 12-19 sec (CH_4). No other peaks noted.

(27)

Obstruction in (A) noted dur
bailing, @ ~15' below TOC. Ba
only submerged ~ 1/2 length (5')
off-set joint ?? Bailed water
turbid, w/ no odor or sheen

~1200 Slug test in (B). Bailed o
3½' to 4'. Water clear bu
milky whitish layer on top ~

~1330 Slug test in (D) yielded poo
to unusable results. Baile
will not pass into screen -
large dia. (1.66"). Pneumatic
method cannot be used since
water level is below top of scr
Slug used does not displace
sufficient water (6' x 1.25" coppe

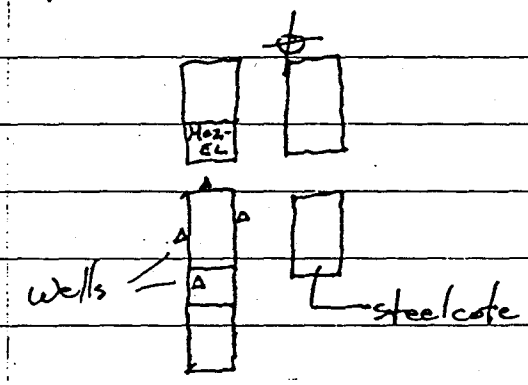
~1530 Bailer into (C), removed 5 volumes

MCM/RWS 5-22-92

Survey data

SWGW-1 (D) TOC = 6.41'
SW GW - 1 (B) TOC - 7.24'
BM (NW Corner - W. Load Dock) 4.02 4.02'
setup 2 BS - SW GW - D 5.44'
SWGW-C 5.80'
setup 3 BS - BM 3.13'
SWGW-A 6.24'

Diesel spill noted one block north of site. Spill reportedly occurred 5-21-92. ~~the~~ Clean-up by Superior Solvents. Sketch below:



Removed at least six tandem loads of contam. soil

29.

5-28-92 MLH

On-site ~1100 to pick up the Little Beaver power auger and spare supplies left by LCR.

Weather Mostly Sunny 78°

LL/

MLM/

15:00 On site to completed permeability testing on SWGW/1(D).

Water level @ 14.1' below TOC. Bailed ~2½ gallons before running test. Data/test rejected. Repeated test a 2nd time, data still poor. Repeated test again. Data looked better; decided to accept and plot @ office

~16:15 Left site. Note that background samples of soil collected on 5/14/92 were not recorded in this book. Samples were collected south of the site from vegetated hillside.

Weather: Overcast, humid ~82°
@08:30

June 14, 1993

Personnel

Brotcke: Jeff, Scott, Stan, Mike

S.W: Lawrence Rosen
Russell Schwab

08:45 Safety meeting

0920 Set up on first location

Continued CPT Testing the rest of day.

Completed Location 1, 2. First test @ 3 (near well B) was questioned due to inclination >7°. Tried "3A" but generator cut out during test. Stopped work @ ~4pm due to generator and completed grouting.

~17:00 Depart Site

Weather: Clear ~70° @ 07:30 June 15, 1993

LCR

07:30 Onsite - Bratche & crew present for CPT work. Set up @ location #5 near well D. Work continued through the day w/ completion of locations 5 thru 10.

~17:00 Grouting and cleanup completed.

17:15 Left site

Weather: Clear ~70° @ 07:30 June 16, 1990

0730 LCK arrives. Brotche crew present for CPT work

0800 Begin first CPT location (#11). Continued work through the day and completed (in order) locations 11, 12, 13, 3B, 14, and 4.

5-16:00 Completed #4. Grouted and took down decon pad.

16:45 Site cleared up and secure. Departed.

Partly Sunny 80° 9AM June 28 1993

0900 Onsite - LCR & JLB. Start w/ taking water levels @ each well

			(Max)
SWGW/1 (A)	15.22	PID	14 ppm
SWGW/1 (B)	39.00	PID	160 ppm
SWGW/1 (C)	~~13.25~~ 40.5	PID	114 ppm
SWGW/1 (D)	13.25	PID	125 ppm

09:45 Begin slug test on SWGW/1(B). Water level @ 39.1' below TOC. Need to bring water up to ~9.5' below TOC. Have ~29.6' to fill with water - need ~120 gals*. Will fill the well with the available water (105 gals Absquare Distilled Water) and measure the water level. * assumes 100% void space

~10:30 Was nearing 10' below TOC when water level indicator stopped working - apparently the battery failed. Stopped test. Had placed 59.5 gals down the well. Cleaned up site and prepared to leave.

10:50 Site secured.

10:55 Departed site.

Partly Cloudy ~84° 6/30/93

09:15 LCR-JLB on site. Checked water level in well B. It was ~33.5' which is 5.5' feet higher than yesterday. Does not seem attributable to overnight rains since Well C is @ 39.81 relative to 40.5' yesterday. Therefore, 'B' will not be done today.

09:45 Set up on 'C'. Water level @ 39.81' below TOC. To bring water to 10' below TOC will need ~121 gallons assuming the annulus is void. Since it isn't assume ~50% void space. Therefore anticipate between 55 and 60 gals to raise water level to desired height to start test. Added 80.75 gallons

10:30 Start Test

Time	Reading	Time	Reading	Time	Reading
:05	12.2	1.00	14:42	3:30	20.6
:00	12.51	1:10		3:45	21.0
:05		1:20	15.33	4:00	21.35
:20	12.75	1:30	15.6	4:15	21.45
:25		1:45	16.0	4:30	23.4
:30	13.0	2:00	16.6	4:45	23.65
:35	~~13.3~~	2:15	17.95	5:00	24.51
:40	13.3	2:30	18:23	5:15	24.95
:45		2:45	19:4	5:30	25.25
:50	13.4	3:00	19.6	5:45	25.65
:55		3:15	20.1	6:00	25.90

6/30/93

Time	Reading	Time	Reading	Time	Reading
6:15	26.85	12:15	34.0	23:00	37.43
6:30	27.30	12:30	34.35	24:00	37.62
6:45	27.60	12:45	34.44	25:00	37.78
7:00	27.80	13:00	34.55	27:00	37.95
7:15	28.10	13:15	34.68	29:00	38.02
7:30	28.40	13:30	34.78	31:00	38.15
7:45	29.16	13:45	34.85	~~33:00~~	
8:00	29.35	14:00	34.95	35:00	38.27
8:15	29.70	14:15	35.02	40:00	38.33
8:30	30.15	14:30	35.20	45:00	38.40
8:45	30.50	14:45	35.40	End of test	
9:00	30.81	15:00	35.45		
9:15	31.15	15:30	35.55		
9:30	31.4	16:00	35.65		
9:45	31.6	16:30	35.80		
10:00	31.9	17:00	35.93		
10:15	32.25	17:30	36.03		
10:30	32.45	18:00	36.23		
10:45	32.70	18:30	36.40		
11:00	32.95	19:00	36.50		
11:15	33.20	19:30	36.63		
11:30	33.40	20:00	36.75		
11:45	33.60	21:00	37.00		
12:00	33.80	22:00	37.22		

9/30/93

11:15 Went to well 'D'. Water level @ 13.56 below TOC. Prepared to add water for slug test. Meter problems. Went to Well A

12:30 Well A @ 15.40 below TOC.

Time	Reading	Time	Reading	Time	Reading
0:05	7.1	1:45	9.5	4:50	12.65
0:10	7.35	1:50	9.6	5:00	12.95
0:15	7.56	1:55	9.75	5:10	13.35
0:20	7.65	2:00	9.8	5:20	13.60
0:25	7.80	2:10	9.95	5:30	13.85
0:30	7.95	2:20	10.05	5:40	14.25
0:35	8.00	2:30	10.15	5:50	14.45
0:40	8.10	2:40	10:25	6:00	14.65
0:45	8.20	2:50	10:4	6:15	
0:50	8.30	3:00	10.58	6:30	
0:55	8.40	3:10	10:70	6:45	
0:60	8.50	3:20	10:85	7:00	
1:05	8.62	3:30	10.85	7:15	
1:10	8.70	3:40	11.1	7:30	
1:15	8.80	3:50	11.3	7:45	
1:20	8.90	4:00	11.5	8:00	
1:25	9.1	4:10	11.75		
1:30	9.2	4:20	11.95	Operator error	
1:35	9.3	4:30	12:25	void test.	
1:40	9.4	4:40	12:45		

Partly Cloudy 85° July 2 1983

0900 LCR · JLB to complete slug tests on wells B, A & D.
0910 Water level in Well B is 35.95 below TOC. Began to add water (Absopure distilled) - 31 gallons
0920 Start test

Time	Reading	Time	Reading	Time	Reading
0:05	8.85	1:35	10.8	3:30	11.6
0:10		1:40	10.00	3:40	11.7
0:15		1:45	~~11.0~~	3:50	11.8
0:20	9.2	1:50	11.2	4:00	11.85
0:25	9.45	1:55		4:10	11.9
0:30	9.60	2:00	11.4	4:20	12.0
0:35	9.70	2:05	11.6	4:30	12.05
0:40	9.90	2:10	11.	4:40	12:15
0:45	10.0	2:15		4:50	12:20
0:50	10.1	2:20		5:00	12.25
0:55	10.2	2:25		5:10	12.3
0:60	10.35	2:30	11.5	5:20	12.40
1:05	10:45	2:45		5:30	12.45
1:10	10:50	2:50		5:40	12.50
1:15	10.60	2:55		5:50	12.60
1:20	10.65	3:00	11.3	6:00	12.65
1:25	10.70	3:10	11.45	6:10	12.71
1:30		3:20	11.5	6:20	12.80

9/2/93

Time	Reading	Time	Reading	Time	Reading
6:30	12.85	12:00	15.10	40:00	22.65
6:40	12.90	12:30	15.30	45:00	24.00
6:50	13.00	13:00	15.45	50:00	(25.40 @ 51:15) 25.20
7:00	13.10	13:30	15.60	55:00	26.15
7:15	13.20	14:00	15.80	60:00	27.20
7:30	13.30	14:30	15.95	65:00	28.10
7:45	13.40	15:00	16.10	70:00	28.75
8:00	13.50	16:00	16.45	end test	
8:15	13.60	17:00	16.75		
8:30	13.70	18:00	17.00		
8:45	13.80	19:00	17.30		
9:00	13.95	20:00	17:60		
9:15	—	21:00	17.95		
9:30	14:15	22:00	18.25		
9:45	14.25	23:00	18.50		
10:00	14.35	24:00	18.85		
10:15	14.45	25:00	19.15		
10:30	14.55	26:00	19.50		
10:45	14.65	27:00	19.75		
11:00	14.75	28:00	20.00		
11:15	14.85	29:00	20.30		
11:30	14.95	30:00	20.50		
11:45	15.00	35:00	21.75		

7/2/93

10:35 Set up on Well D. Water level @ 13.1 below TOC
Add water - 3 gallons
Start Test

Time	Reading	Time	Reading	Time	Reading
0:05	7.95	1:40	9:30	4:20	10.60
0:10	8.05	1:45	9:40	4:30	10.65
0:15	8.15	1:50	9:45	4:40	10.70
0:20	8.25	1:55	9:50	4:50	10.75
0:25	8.30	2:00	9:55	5:00	10.80
0:30	8.40	2:10	9.60	5:10	10.85
0:35	8.45	2:20	9.70	5:20	10.90
0:40	8.55	2:30	9.80	5:30	10.95
0:45	8.60	2:40	9.90	5:40	11.00
0:50	8.70	2:50	9.95	5:50	11.05
0:55	8.75	3:00	10.00	6:00	11.10
1:00	8.80	3:10	10.10	6:15	11.15
01:05	8.90	3:20	10.15	6:30	11.25
1:10	8.95	3:30	10.25	6:45	11.35
1:15	9.00	3:40	10.30	7:00	11:40
1:20	9.05	3:50	10.40	7:15	11:50
1:30	9.20	4:00	10.45	7:30	11:55
1:35	9:25	4:10	10:50	7:45	11.60

7/2/93

		Time	Reading	Time	Reading
8:00	11.65	8:45	11.85	17:00	12.46
8:15	11.70	9:00	11.88	18:00	—
8:30	11.80	9:15	11.90	19:00	—
		9:30	11.93	20:00	12.52
		9:45	—	21:00	—
		10:00	12.05	22:00	—
		10:15	—	23:00	—
		10:30	12.15	24:00	—
		10:45	—	25:00	12.62
		11:00	12.20	30:00	12.70
		11:15	—	35:00	12.80
		11:30	12.26	end test	
		11:45	—		
		12:00	12.35		
		12:30	—		
		13:00	12.36		
		13:30	—		
		14:00	12.39		
		14:30	—		
		15:00	12.41		
		15:30	—		
		16:00	12.44		
		16:30	—		

7/2/93

11:25 Set up on Well A. Water level @ 13.55 below TOC.
Added water ~ 3.6 gallons
Start Test

Time	Reading	Time	Reading	Time	Reading
0:05	8.05	1:45	9.70	5:15	11.35
0:10	8.15	1:50	9.80	5:30	11.42
0:15	8.30	1:55	9.85	5:45	11.50
0:20	8.45	2:00	9.90	6:00	11.56
0:25	8.50	2:10	10.00	~~6:15~~	—
0:30	8.60	2:20	10.10	6:30	11.70
0:35	8.70	2:30	10.20	6:45	—
0:40	8.80	2:40	10.30	7:00	11.80
0:45	8.90	2:50	10.40	7:30	11.90
0:50	8.95	3:00	10.50	8:00	12.00
0:55	9.05	3:10	10.55	8:30	12.08
1:00	9.15	3:20	10.65	9:00	12.15
1:05	9:20	3:30	10.70	9:30	12.21
1:10	9.30	3:40	10.80	10:00	12.29
1:15	9.35	3:50	10.85	11:00	12.39
1:20	9.40	4:00	10.95	12:00	12.48
1:25	9.50	4:15	11.00	15:00	12.67
1:30	9.55	4:30	11.10	20:00	12.87
1:35	9.60	4:45	11.20	25:00	13.00
1:40	9.65	5:00	11.30	30:00	13.04

end test

SOIL BORING LOGS

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY Lawrence Rosen
DRILL CONTRACTOR Burlington
DRILLER Tim Crank TYPE DRILL CME 75
SIZE & TYPE OF CASING 6 1/4" ID HSA

JOB STEELCOTE
BORING NO. SW/1(A) ELEV.
LOCATION
DATE 4/23/92 WEATHER 72° Partly Sunny

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH / NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
CME	0		1.2'	RUN	PID < 1	FILL - Brown silty CLAY w/ gravel; red brick, possible oil residue in upper 1'
5' TUBE	4.0		N/A	1		trace moisture in shoe of sampler
	4.0		1.8'	2	PID up 7.0	FILL Rusty orange brown clayey fill, dry to ~6.0; Gray to black clayey fill, moist to wet petroleum odor
	8.0		N/A		→	Collected SW/1(A) D 6.1-6.9
	9.0		3.0	3	PID < 1	FILL to ~9.5' Soft gray green silty clay to ~10.8 Stiff to v. stiff dark gray to black clay. Moist to sl. moist
	14.0		N/A			
	14.0		4.2	4	PID < 1.0	As above to ~17.6; Green gray med stiff silty clay w/ trace sand to 19.0; stiffer and darker @ 19.0
	19.0		N/A			
	19.0		5.3	5	PID < 1.0	Stiff dark gray green silty clay. Softer @ ~22-23 feet. Trace sand, wood fragments @ 19'. Sl. moist
	24.0		N/A			Start collecting composite sample
	24.0		5.1	6	PID < 1.0	Stiff dark gray to dark green gray silty clay to ~28'. Becomes med gray green & silttier to 29.0
	29.0		N/A			Softer, wet zones @ 26 & 27'
	29.0			7	PID < 1.0	Alternating ~1" beds of gray green silt & clay to ~30. Then clay w/ shells to 31.5. Alt beds to ~32.5 w/ more shells. Grayer & silttier to 34, saturated @ 34.2. Wet zones in silty layers
↓	34.0		N/A			

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING
0	9.5	FILL - Consists of med stiff brown silty clay mixed w/ gravel, red brick and becomes orange brown to 6', then gray to black in color. Petroleum hydrocarbon residue in upper foot. Moist to wet below 6' and faint petroleum odor
~9.5	~19.0	Predominantly stiff, moist dark gray to black silty clay w/ trace sand
~19	~28	Mainly stiff, sl moist-moist dark green gray silty clay w/ trace sand, plant fragments. Wet zones in siltier sections

REMARKS

HAMMER WT. STROKE
HAMMER LIFT SAMPLER
ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE

FOOTAGE DRILLED
NO. SAMPLES: ATTEMPTED RECOVERED

TIME DISTRIBUTION THIS HOLE
ON HOLE 0800 DONE DRILLING
DRILLING 0900 OFF HOLE

BORING NO. SW/1(A) SHEET 1 OF 3

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY L. Rosen
DRILL CONTRACTOR Burlington (Mathes D.v.)
DRILLER T. Crank TYPE DRILL CME 75
SIZE & TYPE OF CASING 6 1/4 ID HSA

JOB STEELCOTE
BORING NO. SW/1(A) ELEV.
LOCATION
DATE 4/23/92 WEATHER ~72 Cloudy

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH / NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
ST-8	34.0	PUSH	24"		PID <1.0	Dark gray sandy, silty CLAY; shells, wet
	36.0		24"			SW/1(A) D 34-36.0 P
5' TUBE	34.0		2.5'		RUN 8 PID <1.0	(2' To Shelby): Green gray sandy clayey SILT w/ shells, wood, other biorganics. Saturated to ~38.2; then stiffer & dry w/ sl more clay
	39.0		N/A			
	39.0		5.1'		RUN 9 PID <1.0	To 40.6 green gray sandy clay SILT w/ abundant plant/wood fragments, shells + other bio organics. 40.6 to 44.0 Gray green silty clay w/ stones. Possible till or glacial lake deposition. No strong layering observed. Wet zones present
	44.0		N/A			
	44.0		4.9'		RUN 10 PID <1.0	Gray green-green gray clayey sandy SILT to 46.0 ft; trace stones. To 46.1 woody layer. 46.1 to 49.0 Green gray clayey silt w/ trace stones, sand, shells. (Weakly developed layering in upper 2' of run; more massive below woody layer
	49.0		N/A			
	49.0		5.2'		RUN 11 PID <1.0	Sl sandy to 49.2. St-v. stiff green gray massive silty CLAY, tr sand, sl moist to dry. Possible aquitard
	54.0		N/A			
ST-12	54.0	PUSH	23"		PID <1.0	Very stiff gray silty clay to clayey SILT w/ tr sand, sl moist to dry
	56.0		23"			SW/1(A) D 54.0-56.0 P

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING
~28	40.6	Soft to med stiff green gray sandy silty CLAY alternating in thin (<1") beds w/ sandy clayey silt. Locally abundant plant fragments, or shells.
40.6	46.1	Med stiff - stiff gray green silty CLAY w/ stones. Possible till/glacugenic deposit
46.1	49.2	Med stiff gray green silty clay w/ trace stones, sand, shells.
49.2	58.5	Stiff - v. stiff, dry - sl moist, green gray massive silty CLAY, trace sand
58.5	60.0	Extremely weathered bedrock; v. stiff gray green silty CLAY w/ rock fragments
60	61	Very weathered bedrock - med to lt gray fine grained crystalline bedrock (limestone)
61		Bedrock - limestone

REMARKS

HAMMER WT. STROKE
HAMMER LIFT SAMPLER
ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE
22.3	11:00	4/23/92

FOOTAGE DRILLED
NO. SAMPLES: ATTEMPTED RECOVERED

TIME DISTRIBUTION THIS HOLE
ON HOLE DONE DRILLING
DRILLING OFF HOLE

BORING NO. SW/1(A) SHEET 2 OF 3

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY L. Rosen
DRILL CONTRACTOR Burlington
DRILLER T. Crank TYPE DRILL CME 75
SIZE & TYPE OF CASING 6 1/4" ID HSA

JOB Steelcote
BORING NO. SW/1(A) ELEV.
LOCATION
DATE 4/23/12 WEATHER 75° Sunny to 80° Partly Cloudy

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH / NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
5' CME	54.0				RUN 12	St-v. stiff gray to green gray silty clay w/ trace sand; slt moist. Rock frag marks to 3" from ~58.5 to 59. TILL ??
Tube	59.0				PID <1.0	
↓	59.0				RUN 13	As above to 60.0. Moderately to highly weathered med-lt grey fg limestone
	61.0				PID <1.0	
						Refusal on Limestone @ 61.0
						H_2O @ 53' @ 14:15

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING

REMARKS

HAMMER WT. STROKE
HAMMER LIFT SAMPLER
ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE

FOOTAGE DRILLED 61
NO. SAMPLES: ATTEMPTED 2 Shelby RECOVERED 2 Shelby

TIME DISTRIBUTION THIS HOLE
ON HOLE DONE DRILLING ~1/4/25
DRILLING OFF HOLE

BORING NO. SW/1(A) SHEET 3 OF 3

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY Lawrence Rosen
DRILL CONTRACTOR BURLINGTON
DRILLER T. Crenk TYPE DRILL CME 75
SIZE & TYPE OF CASING 6¼" ID HSA

JOB STEELCOTE
BORING NO. SW/1(B) ELEV.
LOCATION
DATE 4/27/92 WEATHER Overcast 50°F

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH / NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
CME	0		2.1'		Run #1	Fill: 0-0.4 soil w/ grass. 0.4-2.0 fill consisting of asphalt, concrete, red brick and clay.
5' TUBE	4.0		N/A		PID <1.0	
	4.0		4.2		Run 2	Fill to 4.8 as above. Med stiff moist yellow to orange brown mottled silty CLAY.
	9.0		N/A		PID <1.0	Possibly fill
	9.0		5.1		Run 3	Black med stiff stiff silty CLAY, odor moist. Took sample from 11-12' interval
	14.0		N/A		PID ~112	SW/1(B) 11.0-12.0 A. Water on tube @ ~13'*
	14.0		4.9		Run 4	Stiff dark gray green to black silty clay weak layering
	19.0		NA		PID ~11.0	Sample SW/1(B) C 14.0-19.0 A
	19.0		5.2		Run 5	To 20.7 as above but moist to wet. Yellow-orange brown silty clay to 21.3
	24.0		N/A		PID 2.0	Blue green to gray silty clay to 24.0. SW/1(B) 19.0-21.3 A. Water @ 27.3'
	24.0		5.1		Run 6	Stiff blue green to grey green silty CLAY no discernible stratification.
	29.0		N/A		PID<1.0	
ST-7	29.0	PUSH	22"		PID <1.0	Material as above
	31.0		22"			

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING
0	~4.8	FILL - Med stiff, sl. moist brown silty CLAY w/ asphalt, gravel, concrete and red brick
4.8	9.0	Med stiff moist yellow to orange brown silty CLAY (Possibly Fill)
9.0	~20.7	Med-stiff to stiff black to very dark gray green silty CLAY; locally weakly developed layering. Petroleum distillate odor & PID response. Becomes moist to wet around 20'
20.7	21.3	Med stiff yellow-orange brown silty CLAY
21.3	~28.0	Stiff blue gray green silty CLAY
29.0	~39.0	Med stiff dark green gray clayey SILT to silty CLAY w/ trace wood/plant fragments, local thin bedding (¼-½" thick beds), local sandy

REMARKS <1.0 on PID is equiv. to no response

HAMMER WT. STROKE
HAMMER LIFT SAMPLER
ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE
27.3	11:40	4/27/92
23.2	12:55	4/27/92

FOOTAGE DRILLED
NO. SAMPLES: ATTEMPTED RECOVERED

TIME DISTRIBUTION THIS HOLE
ON HOLE 10:00 DONE DRILLING
DRILLING 10:20 OFF HOLE

BORING NO. SW/1(B) SHEET 1 OF 3

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY Lawrence Rosen
DRILL CONTRACTOR BURLINGTON
DRILLER T. Crank TYPE DRILL CME 75
SIZE & TYPE OF CASING 6 1/4" ID HSA

JOB STEELCOTE
BORING NO. SW/1(B) ELEV.
LOCATION
DATE 4/27/92 WEATHER Overcast To Pt Cloudy 55°F

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH / NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
CME	29.0		5.2'		RUN 7 PID <1.0	Soft to med stiff dark green gray clay SILT w/ trace woody/vegetation fragments. Weak layering ~1/4-1/2" thick. Sandy in last 4"
5' TUBE	34.0		N/A			
	34.0		5.0		RUN 8 PID <1.0	Med Stiff-stiff dark gray fg sandy clayey SILT to silty CLAY to 35.5. Stiff blue green vs grey green silty CLAY w/ trace sand. Layering of clay rich vs silt rich ~1/4-1/2"
	39.0		N/A			
	39.0		3.6		RUN #9 PID <1.0	Sand mg-fg w/ trace shells to 41.8. Sandy clayey silt w/ sand beds to 43.2'. Mg-fg/green gray sand to 44.0'
	44.0		N/A			
	44.0		4.6'		RUN 10 PID <1.0	Sand continues to 45.1; Stiff brown silty clay to 45.6. V. Stiff gray silty CLAY w/ trace rock frags to 46.0; Med stiff vs soft green-brown clayey SILT w/ trace sand to 48.1; Med stiff-stiff gray green silty CLAY to clayey SILT w/ trace shell fragments
	49.0		N/A			
	49.0		3.7'		RUN 11 PID <1.0	As above to 52.8 but no shell frags; Stiff brown silty CLAY to 54.0 - transitional contact; trace stone frags
	54.0		N/A			
	54.0		4.4		RUN 12 PID <1.0	Grey Green stiff silty CLAY vs clay silt to 58.3 trace sand and rock fragments; stiffer w/ depth (TILL?) Weathered bitten bedrock @ 58.3'
	59.0		N/A			

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING
39.0	45.1	Mg-fg green gray silty sand to sandy SILT w/ trace shell fragments - wet
45.1	45.6	Stiff brown silty CLAY
45.6	46.0	Very Stiff gray silty CLAY w/ trace stones
46.0	51.5	Med stiff brown-green to gray green silty clay to clayey silt w/ trace shell fragments, sand
51.5	54.3	Stiff grey green silty CLAY w/ trace sand: rock fragments (TILL?)
58.3	59.6	Weathered lt gray fg limestone
59.6	60.2	Soft light brown/beige CLAY
60.2	60.5	Very stiff brown gray clay (residual)
60.5		Lt gray-white fg limestone bedrock.

REMARKS

HAMMER WT. STROKE
HAMMER LIFT SAMPLER
ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE

FOOTAGE DRILLED 60.5
NO. SAMPLES: ATTEMPTED RECOVERED

TIME DISTRIBUTION THIS HOLE
ON HOLE DONE DRILLING
DRILLING OFF HOLE

BORING NO. SW/1(B) SHEET 2 OF 3

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY L. Rohn
DRILL CONTRACTOR Burlington
DRILLER T. Crank TYPE DRILL CME 75
SIZE & TYPE OF CASING 6¼" ID HSA

JOB STEELCOTE
BORING NO. SW/1(B) ELEV.
LOCATION
DATE 4/27/92 WEATHER Pt Cloudy 55°F

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH / NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
CME	59.0		LS		Run 13	Weathered & gray to white limestone to 59.6';
5' TUBE	60.5		N/A		PID<1.0	Soft light brown CLAY to 60.2
						Very stiff brown gray residual clay to 60.5
						AUGER REFUSAL @ 60.5'

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING

REMARKS

HAMMER WT. STROKE
HAMMER LIFT SAMPLER
ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE

FOOTAGE DRILLED 60.5
NO. SAMPLES: ATTEMPTED 1 Shelby RECOVERED 1 Shelby

TIME DISTRIBUTION THIS HOLE
ON HOLE DONE DRILLING 15:30
DRILLING OFF HOLE

BORING NO. SW/1(B) SHEET 3 OF 3

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY L. Rosen
DRILL CONTRACTOR Burlington
DRILLER T. Crank TYPE DRILL CME 75
SIZE & TYPE OF CASING 6 1/4" ID HSA

JOB STEELCOTE
BORING NO. SW/1(C) ELEV.
LOCATION
DATE 4/29/92 WEATHER Overcast 55° Stray showers

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH / NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
CME	0		3.0		RUN 1	~0.5' of large limestone gravel and clay } FILL
5' TUBE	4.0		N/A		PID <1.0	~1.8' of clay, brick cinder fill } 0.5 of soft-med stiff brown silty clay }
	4.0		2.8		RUN #2	FILL - Mixture of brown silty clay, brick, cinders; moist
	9.0		N/A		PID ~125 ppm	wet appearance @ 8.2 SW/1(C)D 8.5-9.0 A PID had hits starting 8.5 TOOK SAMPLE
	9.0		5.1		RUN 3	9.0-9.5 Soft grey green silty clay, med stiff PID ~12 ppm
	14.0		N/A		PID 3-5 ppm	9.5-12.2 Soft moist gray green to brown green silty clay w clay bits PID < 3
	~~14.0~~		/			12.2-14.0 V. stiff dark gray to black silty clay PID
	~~19.0~~		/			Composite SW/1(C)C 9.0-14.0 A
	14.0		5.1		RUN 4	To ~17.0 Mottled soft to stiff, grey green brown, and gray silty clay w/ trace sand & plant roots, To 19.0 Stiff dark grey silty clay w/ trace sand, Soft, wet @ 17
	19.0		N/A		PID <1.0	To 21.2 As above
	19.0		5.2		RUN 5	21.2-24.0 Stiff-v. stiff blue green to grey green silty clay trace sand, shells
	24.0		N/A		PID to 5.0	SW/1(C)C 19.0-24.0 A
	24.0		5.4		RUN 6	As above to 27.8 w/ stretches of clay is silt bedding present. To 29.0 Stiff grey green silty clay to clayey SILT, up to 1" layers
	29.0		N/A		PID up to 3.5	

Start using spigot

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING
0	~8.5	FILL - Med stiff brown silty clay w/ gravel brick, cinders wet @ 8.2
8.5	~12.2	Soft-med stiff brown to gray green silty CLAY to clayey SILT - odor and strong PID response
12.2	14.0	V. Stiff dark gray to black silty CLAY
14.0	21.2	Soft-stiff, mottled, gray green to brown green silty CLAY w/ trace sand, plant roots
21.2	~29.0	Stiff-v stiff blue green to gray green silty CLAY; trace sand, shells
29.0	43.2	Soft to stiff, moist, green gray clayey SILT to silty CLAY w/ trace sand; thin layering locally

REMARKS

HAMMER WT. STROKE
HAMMER LIFT SAMPLER
ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE

FOOTAGE DRILLED
NO. SAMPLES: ATTEMPTED RECOVERED

TIME DISTRIBUTION THIS HOLE
ON HOLE 0815 DONE DRILLING
DRILLING 0900 OFF HOLE

BORING NO. SW/1(C) SHEET 1 OF 3

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY C. ROSEN
DRILL CONTRACTOR BURLINGTON
DRILLER T. Crank TYPE DRILL CME 75
SIZE & TYPE OF CASING 6¼" ID HSA

JOB
BORING NO. SW/1(c) ELEV.
LOCATION
DATE 4/29/92 WEATHER OVERCAST 55-60° Breezy 5-10 mph

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH / NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
CME	29.0		5.3		RUN 7	Soft-med stiff gray green silty CLAY TO 31.9
					PID TO 6.0	" CLAYEY SILT TO 34.1
5' TUBE	34.0		N/A			" SILTY CLAY w/ trace sand to 35.0
	34.0		4.7		RUN 8	to 36.2 V soft sandy clayey SILT, WET
					PID up to 10.0	to 39.0 Med stiff clayey SILT, moist, gray green
	39.0		N/A			PID TO 10 ppm
ST-9	39.0		26"			Gray sandy SILT TO SILTY SAND @ bottom of SHELBY TUBE
	41.0		26"			SW/1(c)D 39.0-41.0P
CME	39.0		4.6		RUN 9	Soft wet gray green to brown green clayey SILT w/ tr-minor sand to 41.0
5' TUBE	44.0		N/A		PID up to 2.0 ppm	Soft gr green to br green clayey SILT TO 43.2
						Med stiff-st gr green to br green silty CLAY w/ trace sand to 44.0
						Small stones @ 43.8
CME	44.0		2.6		RUN 10	Soft green gray clayey silt w/ tr fg sand WET to 47.3. Med stiff gr green to br green silty
5' TUBE	49.0		N/A		PID 2-3 ppm	CLAY to 49.0, clay in below 48 and stiffer
	49.0		4.9		RUN 11	Stiff-v. stiff gray green silty CLAY; moist massive
	54.0		N/A		PID up to 2-3 ppm	

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING
43.2	49.0	Soft-med stiff gray green to brown green silty CLAY w/ trace sand and small stones
49.0	59.0	Stiff to v. stiff gray green silty CLAY; mottled, massive; trace sand. Becomes sandier w/ depth.
59.0	61.5	Extremely weathered bedrock - lt gr brown to tan stiff CLAY w/ rock fragments (limestone)
61.5		Limestone bedrock

REMARKS

HAMMER WT. STROKE
HAMMER LIFT SAMPLER
ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE
~47'	~11:50	4/29/92

FOOTAGE DRILLED
NO. SAMPLES: ATTEMPTED RECOVERED

TIME DISTRIBUTION THIS HOLE
ON HOLE DONE DRILLING
DRILLING OFF HOLE

BORING NO. SW/1(c) SHEET 2 OF 3

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY L. Rosen
DRILL CONTRACTOR Burlington
DRILLER T. Crank TYPE DRILL CME 75
SIZE & TYPE OF CASING 6 1/4" ID HSA

JOB STEELCOTE
BORING NO. SW/1(C) ELEV.
LOCATION
DATE 4/29/92 WEATHER Pt Cloudy

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH / NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
CME	54.0		5.1		Run 12	To ~~54.0~~ 55.3 Stiff moist, mottled grey green
5' TUBE	54.0		N/A		PID to 2ppm	Sandy Silty CLAY. Sand gravel seldom to
	59.0		1.4		Run 13	55.5. Then more sandy Silty CLAY to 56.7
↓	60.5		N/A			is wet grey green sandy silty clay and
						weathered bedrock to 59.0
						Lt brown ~~or~~ to tan stiff clay w/ rock fragments
						if weathered limestone
						Auger refusal @ 60.5

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING

REMARKS

HAMMER WT. STROKE
HAMMER LIFT SAMPLER
ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE
48.5	14:14	4/29/92

FOOTAGE DRILLED 61.5
NO. SAMPLES: ATTEMPTED RECOVERED

TIME DISTRIBUTION THIS HOLE
ON HOLE DONE DRILLING 13:40
DRILLING OFF HOLE

BORING NO. SW/1(C) SHEET 3 OF 3

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY C. Rosen
DRILL CONTRACTOR Burlington
DRILLER T. Crank TYPE DRILL CME 75
SIZE & TYPE OF CASING 6 1/4" ID HSA

JOB STEELCOTE
BORING NO. SW/1(D) ELEV.
LOCATION
DATE 5/1/92 WEATHER Clear 65°

SAMPLE DATA

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH / NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
CME	0		1.9		RUN 1	FILL Dry dark brown to black asphalt, gravel cinders, rubble fill w/ or clay, some concrete
5' TUBE	4.0		N/A		PID<1.0	
	4.0		4.8		RUN 2	FILL Stiff dry brown SILTY CLAY to 6.0 Mottled grey green to black silty CLAY
	9.0		N/A		PID ~13 ppm	SW/1(D) @ 6.5-9.0 A
	9.0		5.0		RUN 3	9-10.0 As above 10-14.0 Dry dark gray brown to black silty CLAY
	14.0		N/A		PID >900 ppm	SW/1(D) @ 11.5-12.5 A
	14.0		5.1		RUN 4	As above becoming green to 15.9'
	19.0		N/A		PID > 800 to 15.9', then <4.0	Moist grey to brown green silt-med st silty CLAY SW/1(D) @ 14.0-16.9 A, MS, MSD*
ST-5	19.1				PID < 1.0	
	21.0					
CME	19.0		5.0		RUN 5	To 20.6 Stiff moist gray to brown mottled silty CLAY; TO 21.3 Moist to wet green gray clayey SILT; To 24.0 Stiff blue gray green silty clay / softer @ 23
5' TUBE	24.0		N/A		PID<1.0	
	24.0		5.1		RUN 6	Med stiff moist green gray silty CLAY. Siltier wet zones @ 26.8 ~ to 27.5
	29.2		N/A		PID<1.0	

spare coring

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING
0	~6.0	FILL - Stiff dark brown silty CLAY w/ gravel cinders, brick, concrete
6.0	~15.9	Stiff green black to dark gray brown silty CLAY w/ odor and high PID response
~15.9	21.3	Med stiff moist gray to brown green mottled silty CLAY
~21.3	39.0	Med. Stiff green gray to blue green gray silty CLAY to clayey SILT. Sandy ~31.0. Locally thinly bedded.
39.0	~45.0	Mg-cg dense gray silty sand w/ gravel seams
45.0	46.8	Med stiff gray sandy silty CLAY w/ gravel bed
46.8	48.4	Med stiff gray brown to black, peaty silty CLAY w/ some gravel

REMARKS * Matrix Spike and Matrix spike duplicate

HAMMER WT. STROKE
HAMMER LIFT SAMPLER
ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE

FOOTAGE DRILLED
NO. SAMPLES: ATTEMPTED RECOVERED

TIME DISTRIBUTION THIS HOLE
ON HOLE 0800 DONE DRILLING
DRILLING 0830 OFF HOLE

BORING NO. SW/1(D) SHEET 1 OF 2

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY L. Rosen
DRILL CONTRACTOR Burlington
DRILLER T. Crank TYPE DRILL CME 75
SIZE & TYPE OF CASING 6 1/4" ID HSA

JOB STEELCOTE
BORING NO. SW/1(D) ELEV.
LOCATION
DATE 5/1/92 WEATHER Clear ~80°

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH / NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
CME	29.0		5.2		RUN 7	Med stiff - stiff gray to green gray silty CLAY moist
5" TUBE	34.0		N/A		PID<1.0	
	34.0		5.0		RUN 8	As above to 34.6. Moist med stiff to stiff blue gray green silty CLAY. Sandy silty zones @ 36.0-36.3 and 38.0-38.5. Thin gravel layers throughout
	39.0		N/A		PID<1.0	
	39.0		2.4'		RUN 9	Loss occurred from bottom? 0.9 gravel bed @ bottom; sand, gravelly seams between sandy silty clay. Gravel to 2"; typically < 1/8"
	44.0		N/A		PID<1.0	
	44.0		3.9		RUN 11	Med-cs gravel w/ gray silt & sand to ~45.0. Sandy silty gray clay to 48.4 w/ gravel bed @ 46.8; Med stiff ~~stiff~~ brown to black, peaty silty CLAY TILL(?) 47-48.4? TRACE-some gravel
	49.0		N/A		PID<1.0	
	49.0		4.8		RUN 12	Soft-med stiff moist gray green sandy silty CLAY or clayey SILT to 51.5. Stiff green to brown silty CLAY to 54. (FG silty SAND 49.0-50.8)
	54.8		N/A		PID<1.0	
	54.0		3.8		RUN 13	Stiff slmoist, mottled brown; blue gray green silty CLAY to 56.8; weathered bedrock w/ silty CLAY and sand to 58.0. Rock frags are white and gray cherty limestone
	58.0		N/A		PID<1.0	
						Augers refusal @ 58.0'

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING
48.4	56.8	Med stiff mottled blue gray green to brown green silty CLAY
56.8	58.0	Extremely weathered bedrock w/ silty clay and white/gray cherty limestone fragments
58.0		Limestone

REMARKS

HAMMER WT. STROKE
HAMMER LIFT SAMPLER
ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE
33.7	10:35	5/1/92
49.1	13:00	5/1/92

FOOTAGE DRILLED 58'
NO. SAMPLES: ATTEMPTED 1 Shelby RECOVERED 1 Shelby

TIME DISTRIBUTION THIS HOLE
ON HOLE DONE DRILLING 13:00
DRILLING OFF HOLE

BORING NO. SW/1(D) SHEET 2 OF 2

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY Tim Hippensteel

DRILL CONTRACTOR Mathes

DRILLER Dave & Quentin TYPE DRILL Little Beaver w/ jackhammer

SIZE & TYPE OF CASING Na 2¼" ID HSA

JOB Z-301-05 / Steel core

BORING NO. E ELEV.

LOCATION Alley - West

DATE 4-29-92 WEATHER Rain / P.C.

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
	0			cored	80 ppm FID in hole	Concrete: cored 4" + 2" base (no sample)
	0.5					
SS	0.5				110 ppm FID max. sample meas.	0.5-1.0 black, med gravel fill; 1.0-2.0 blue gray silty clay; 2.0-2.5 green silty clay w/ med gravel fill
	2.5		2'			
	2.5				50-85 ppm FID over sample	black to olive green silty clay w/ some dk. gravel over the 1' sample
	4.5		1'			
	4.5				10-45 ppm FID over sample	0-1 Olive green silty clay w/ some black mottling; 1-1.5 Olive green clayey silt w/ some black mottling
	6.5		1.5'			
	6.5				5-10 ppm FID over sample	0-.5 olive green clayey silt; .5-1 dk. gray to black clayey silt; TOB
	7.6		1'	TOB		

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING
0	0.5	Concrete
0.5	1.0	Fill - black, med gravel fill
1.0	2.5	Blue gray to green gray silty CLAY

REMARKS

- refusal at 7.6'
- FID = 125 ppm in hole at TOB

HAMMER WT. STROKE

HAMMER LIFT SAMPLER

ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE
None		

FOOTAGE DRILLED 7.6'

NO. SAMPLES: ATTEMPTED 4 RECOVERED 4

TIME DISTRIBUTION THIS HOLE

ON HOLE 1345 DONE DRILLING 1500

DRILLING OFF HOLE

BORING NO. E SHEET 1 OF 1

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY TIM HIPPENSTEEL

DRILL CONTRACTOR Mathes

DRILLER Dave Quentin TYPE DRILL Little Beaver w/ jackhammer

SIZE & TYPE OF CASING NA

JOB Steelcote

BORING NO. F ELEV.

LOCATION Alley - East

DATE 4-30-92 WEATHER Sunny/clear

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
—	0			Cored (4-29-92)	2.5ppm PID in hole	concrete; cored 6"; no sample
—	0.5					
SS	0.5				2.5 ppm PID in hole	- dk brown, fine to med. gravel on cuttings - no sample recovered
	2.5		Ø			
	2.5				<1 ppm PID	0-.5 dk brown fine to med. gravel .5-1.5 brown silty clay w/ some black mottling; moist 1.5-2 olive green silty clay w/ some black
	4.5		2'			
	4.5				<1 ppm PID	0-.5 brown silty clay .5-2 olive green to gray silty clay; moist
	6.5		2'			
	6.5				<1 ppm PID	0-1.5 olive green to gray silty clay; very moist
	8.5		1.5			
	8.5				<1 ppm PID	0-1 olive green to gray silty clay; wet water at 8.5' TOB
	10.5		1'	TOB		

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING

REMARKS
- refusal at 10.5'
- PID = <1 in hole @ TOB

HAMMER WT. STROKE
HAMMER LIFT SAMPLER
ROD DIA. NO. OF TURNS

WATER LEVEL	TIME	DATE
8.5'	1315	4-30-92

FOOTAGE DRILLED 10.5'

NO. SAMPLES: ATTEMPTED 5 RECOVERED 4

TIME DISTRIBUTION THIS HOLE
ON HOLE 1200 DONE DRILLING 1330
DRILLING OFF HOLE

BORING NO. F SHEET 1 OF 1

SHANNON & WILSON, INC.
Geotechnical Consultants

FIELD LOG OF BORING

JOB NO. Z-301-05

LOGGED BY L. Rosen
DRILL CONTRACTOR Burlington
DRILLER T. Crank TYPE DRILL CME 75
SIZE & TYPE OF CASING 4 1/4" ID HSA

JOB STEELCOTE
BORING NO. SW/1(G) ELEV.
LOCATION
DATE 5-4-92 WEATHER Cloudy 60-65°

SAMPLE NO. / TYPE	DEPTH FROM / TO	DRIVING RESISTANCE BLOWS/6 IN.	LENGTH NO. SAVED	DRILL ACTION	CONTACTS/ GROUNDWATER	FIELD CLASSIFICATION
CME	0		2.1		RUN #1	FILL - 3-4" layers of black cinders material alternating with gray or tan brown fat clayey material
5' TUBE	3.0		N/A		PID ~ 10-12 ppm	PETROLEUM ODOR
	3.0		0		RUN 2	No recovery
	8.0		N/A		PID	
	4.0				RUN 3	No Recovery
	13.0					OFFSET AND REDRILL - Note TIP reading sufficient in breathing zone to warrant upgrade to Level C.
					2nd Attempt ↓	
	3.0		3.9		RUN 2	FILL - Mixed cinder, brick, gravel & clay
	8.0		N/A		PID 100-380 ppm	
						WATER @ 8'

DEPTH FROM	DEPTH TO	FIELD LOG OF BORING

REMARKS

HAMMER WT. _____ STROKE _____
HAMMER LIFT _____ SAMPLER _____
ROD DIA. _____ NO. OF TURNS _____

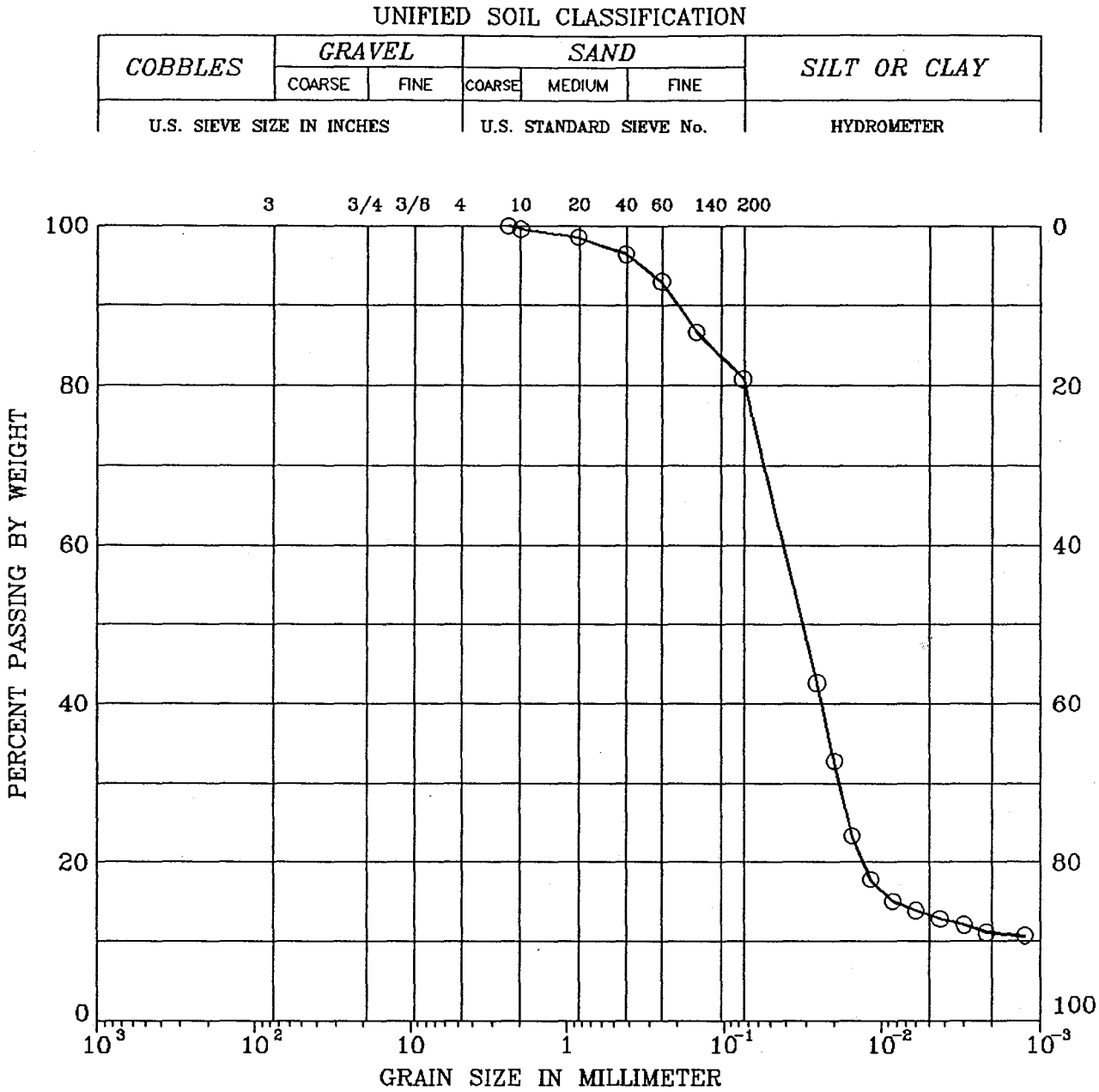
WATER LEVEL	TIME	DATE

FOOTAGE DRILLED _____
NO. SAMPLES: ATTEMPTED _____ RECOVERED _____

TIME DISTRIBUTION THIS HOLE
ON HOLE 15:00 DONE DRILLING 16:15
DRILLING 15:10 OFF HOLE _____

BORING NO. SW/1(G) SHEET 1 OF 1

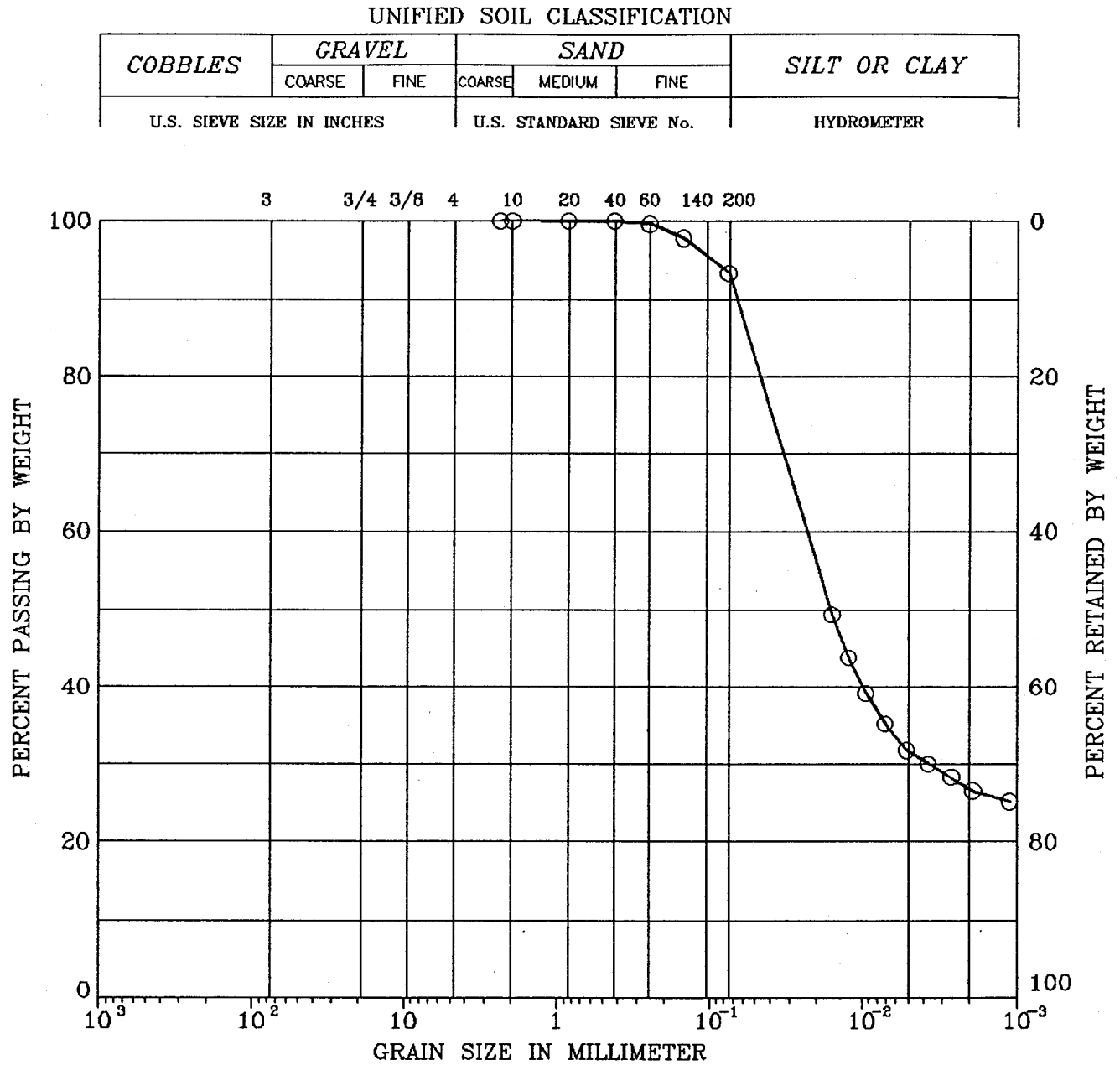
PHYSICAL SOIL TESTING LABORATORY REPORTS



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	SW/1 (A)	34.0-36			

Remark : 6/25/92

Z-301-05	STEELCOTE
Shannon & Wilson, Inc. Geotechnical Consultants	GRAIN SIZE DISTRIBUTION



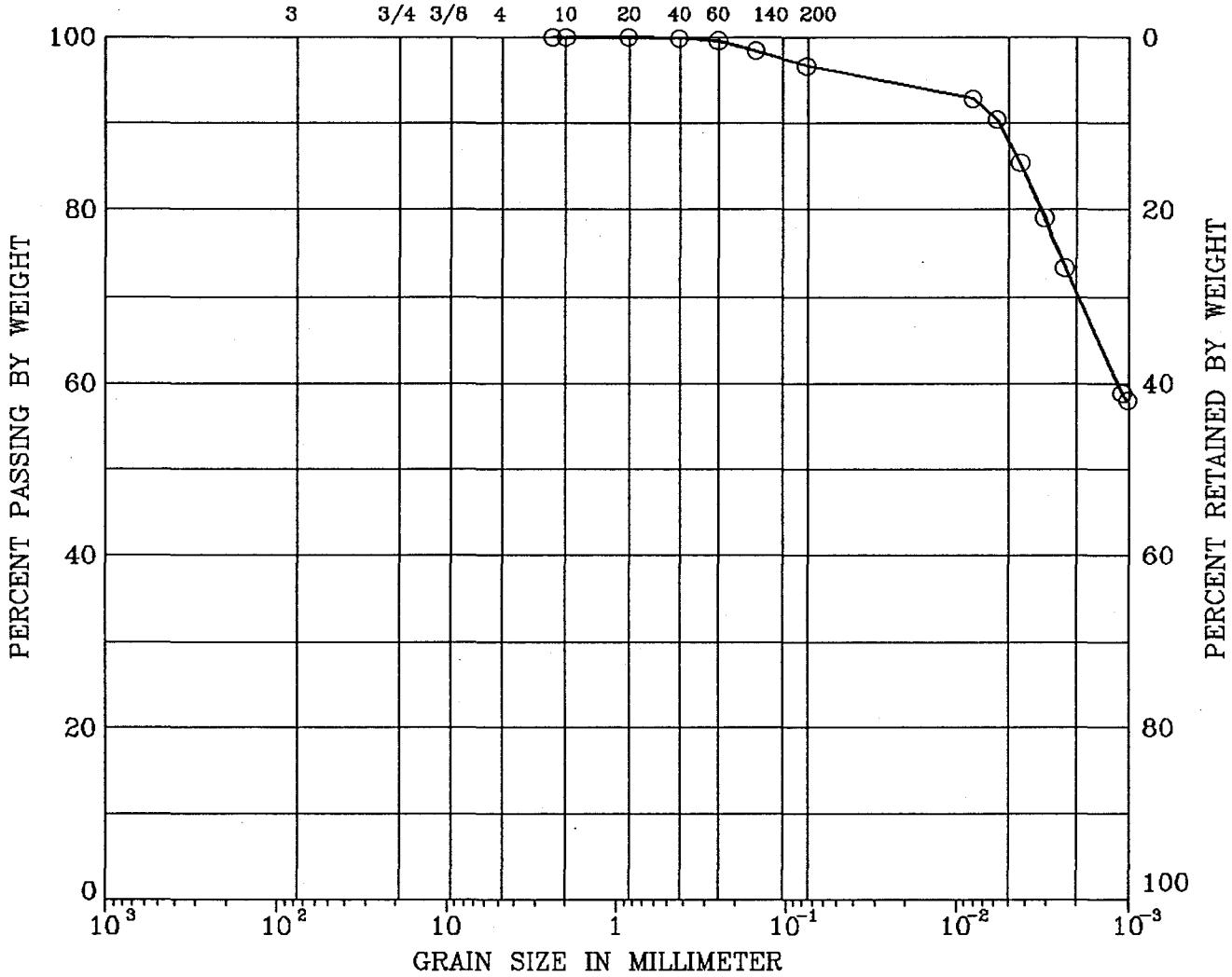
SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	SW/1 (A)	54.0-56			

Remark : 6/25/92

Z-301-05	STEELCOTE
Shannon & Wilson, Inc. Geotechnical Consultants	GRAIN SIZE DISTRIBUTION

UNIFIED SOIL CLASSIFICATION

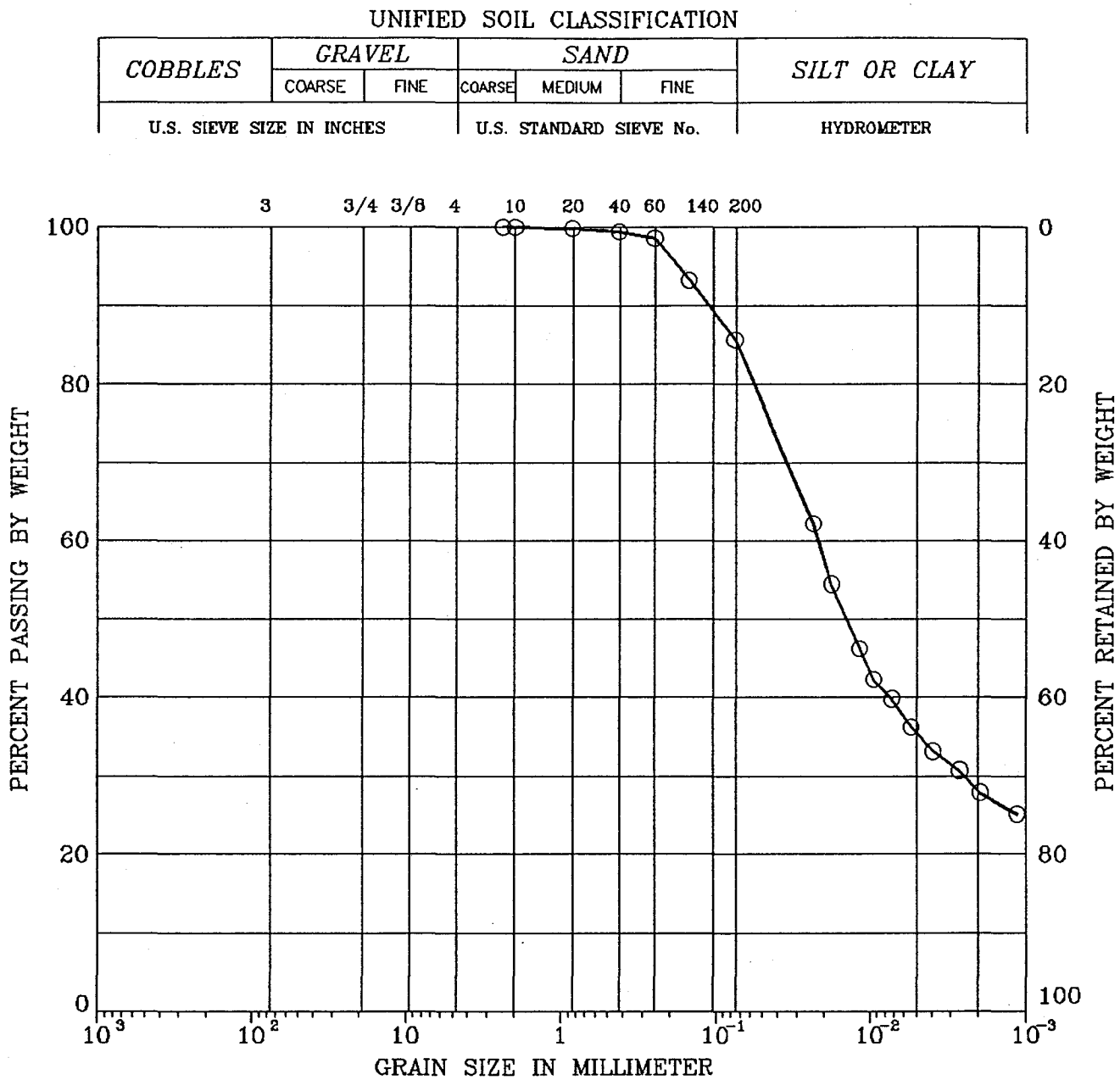
COBBLES	GRAVEL		SAND			SILT OR CLAY
	COARSE	FINE	COARSE	MEDIUM	FINE	
U.S. SIEVE SIZE IN INCHES			U.S. STANDARD SIEVE No.			HYDROMETER



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	SW/1 (B)	29.0-31			

Remark : 6/25/92

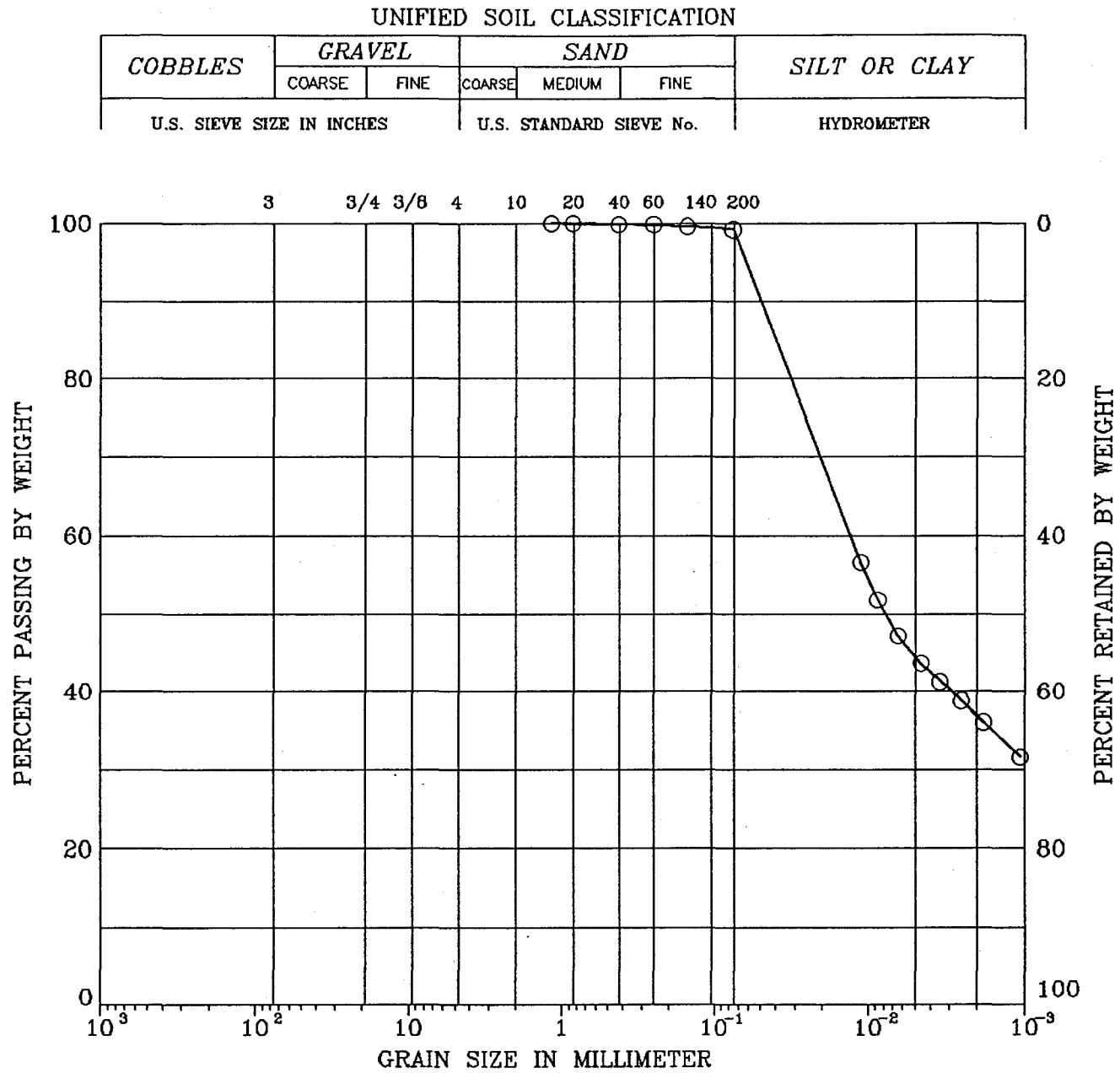
Z-301-05	STEELCOTE
Shannon & Wilson, Inc. Geotechnical Consultants	GRAIN SIZE DISTRIBUTION



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
O	SW/1 (C)	39.0-41			

Remark : 6/25/92

Z-301-05	STEELCOTE
Shannon & Wilson, Inc. Geotechnical Consultants	GRAIN SIZE DISTRIBUTION



SYMBOL	BORING	DEPTH (ft)	LL (%)	PI (%)	DESCRIPTION
○	SW/1 (D)	19.0-21			

Remark : 6/25/92

Z-301-05	STEELCOTE
Shannon & Wilson, Inc. Geotechnical Consultants	GRAIN SIZE DISTRIBUTION

ATTERBERG DETERMINATIONS

PROJECT STEELCOTE JOB NO. Z-301-05

BORING/ SAMPLE	TEST TYPE	BLOW COUNT	WET & TARE	DRY & TARE	TARE	LL	DELTA	FINAL VALUES	
	1							SW/1 (A)	
SW/1 (A)	LL	20	14.63	11.00	0.65	34.1		LL =	34.1
34-36	LL	21	17.19	12.92	0.65	34.1	0.1	PL =	26.7
	PL	--	6.78	5.49	0.65	26.7		PI =	7.4
	PL	--	7.14	5.77	0.65	26.8	0.1	USC =	
	2							SW/1 (A)	
SW/1 (A)	LL	27	18.32	13.89	0.65	33.8		LL =	33.6
54-56	LL	28	17.47	13.30	0.65	33.4	0.4	PL =	14.7
	PL	--	8.89	7.83	0.65	14.8		PI =	18.9
	PL	--	8.42	7.43	0.65	14.6	0.2	USC =	
	3							SW/1 (B)	
SW/1 (B)	LL	28	17.26	10.92	0.65	62.6		LL =	62.6
	LL	29	17.43	11.04	0.65	62.6	0.0	PL =	19.2
	PL	--	6.40	5.47	0.65	19.3		PI =	43.4
	PL	--	5.59	4.80	0.65	19.0	0.3	USC =	
	4							SW/1 (C)	
SW/1 (C)	LL	27	16.02	11.74	0.65	39.0		LL =	38.8
	LL	27	18.27	13.39	0.65	38.7	0.3	PL =	23.5
	PL	--	6.20	5.14	0.65	23.6		PI =	15.3
	PL	--	7.42	6.14	0.65	23.3	0.3	USC =	
	5							SW/1 (D)	
SW/1 (D)	LL	29	16.58	11.45	0.65	48.4		LL =	48.2
	LL	29	14.89	10.32	0.65	48.1	0.2	PL =	20.9
	PL	--	5.20	4.42	0.65	20.7		PI =	27.3
	PL	--	5.65	4.78	0.65	21.1	0.4	USC =	
	6								
	LL				0.65			LL =	
	LL				0.65			PL =	
	PL	--			0.65			PI =	
	PL	--			0.65			USC =	

TRIAXIAL PERMEABILITY DATA SHEET
SHANNON & WILSON, INC

Project STEELCOTE — Date 6/16/92

Job No. Z-301-05 — Test By KMI — Checked AGM 7-15-92

Boring — Sample SW/1 (A) 34-36 — Depth 35.5

Description Brown-gray clayey SILT, with some fine sand lenses

Preliminary Data:

Permeameter No. 7

	Inflow	Outflow
Standpipe Vol (cc/cm)	1.285	1.285

Water Content	Before	After
Tare No.	PT1	62
Tare Wt. (g)	0.96	81.24
Wet Soil + Tare (g)	38.45	627.78
Dry Soil + Tare (g)	28.83	498.55
Water Content (%)	34.5	31.0
Porosity	0.578	
Pore Volume (CC)	171.60	

Sample Diameter (in)	2.866
Sample Length (in)	2.809
Sample Area (cm^2)	41.62
Sample Volume (CC)	296.96
Sample Wt. (g)	451.91
Wet Density (pcf)	95.0
Dry Density (pcf)	70.6

Specific Gravity 2.68 (estimated)

Read Time day	hr	min	Pcell psi	Pin psi	Pout psi	Readings (cm) hin	hout	Inflow PV	Outflow PV	Storage PV	Total PV	i	K cm/s
1	6	57	30	25	23	56.00	46.00	---	---	---	---	21.1	---
1	7	36	30	25	23	55.15	46.90	-0.01	0.01	0.00	0.01	20.9	5.5E-07
1	9	33	30	25	23	52.60	49.50	-0.02	0.02	0.00	0.03	20.1	5.5E-07
1	16	39	30	25	23	44.20	57.90	-0.06	0.06	0.00	0.09	17.8	5.4E-07
2	6	52	30	25	23	54.00	43.00					21.3	
2	7	42	30	25	23	52.80	44.20	-0.01	0.01	0.00	0.10	20.9	5.9E-07
2	10	54	30	25	23	48.55	48.50	-0.03	0.03	0.00	0.13	19.7	5.6E-07
3	16	12	30	25	23	59.00	43.00					22.0	
4	6	13	30	25	23	41.20	60.75	-0.13	0.13	0.00	0.26	17.0	5.6E-07

TRIAXIAL PERMEABILITY DATA SHEET
SHANNON & WILSON, INC

Project STEELCOTE — Date 7/10/92

Job No. Z-301-05 — Test By KMI — Checked AGM 7-15-92

Boring — Sample SW/1 (A) 54-56 — Depth 55.3

Description Brown-gray CLAY, with some Fe staining

Preliminary Data:

Permeameter No. 8

	Inflow	Outflow
Standpipe Vol (cc/cm)	1.278	1.278

Sample Diameter (in)	2.875
Sample Length (in)	3.133
Sample Area (cm^2)	41.88
Sample Volume (CC)	333.29
Sample Wt. (g)	687.50
Wet Density (pcf)	128.7
Dry Density (pcf)	106.9
Specific Gravity	2.68 (estimated)

Water Content	Before	After
Tare No.	PT2	64
Tare Wt. (g)	0.96	84.90
Wet Soil + Tare (g)	45.50	772.53
Dry Soil + Tare (g)	37.96	657.97
Water Content (%)	20.4	20.0
Porosity	0.361	
Pore Volume (CC)	120.19	

Read Time day	hr	min	Pcell psi	Pin psi	Pout psi	Readings (cm) hin	hout	Inflow PV	Outflow PV	Storage PV	Total PV	i	K cm/s
1	6	53	35	30	28	55.00	40.00	---	---	---	---	19.6	---
1	16	40	35	30	28	54.50	40.60	-0.01	0.01	0.00	0.01	19.4	2.4E-08
2	14	34	35	30	28	53.20	41.70	-0.01	0.01	0.00	0.02	19.1	2.4E-08
3	6	3	35	30	28	52.30	42.50	-0.01	0.01	0.00	0.03	18.9	2.4E-08
4	6	54	35	30	28	50.90	43.80	-0.01	0.01	0.00	0.04	18.6	2.5E-08
5	6	20	35	30	28	49.65	44.95	-0.01	0.01	0.00	0.05	18.3	2.4E-08

TRIAXIAL PERMEABILITY DATA SHEET
SHANNON & WILSON, INC

Project STEELCOTE — Date 6/16/92

Job No. Z-301-05 — Test By KMI — Checked AGM 7-15-92

Boring — Sample SW/1 (B) 29.0-31.0 — Depth 30.4

Description Gray slightly silty CLAY

Preliminary Data:

Permeameter No. 11

Sample Diameter (in) 2.863

Sample Length (in) 2.766

Sample Area (cm^2) 41.53

Sample Volume (CC) 291.80

Sample Wt. (g) 532.40

Wet Density (pcf) 113.9

Dry Density (pcf) 83.4

Specific Gravity 2.68 (estimated)

	Inflow	Outflow
Standpipe Vol (cc/cm)	1.291	1.262

Water Content	Before	After
Tare No.	PT3	63
Tare Wt. (g)	0.96	84.73
Wet Soil + Tare (g)	60.76	612.60
Dry Soil + Tare (g)	44.78	476.49
Water Content (%)	36.5	34.7
Porosity	0.501	
Pore Volume (CC)	146.23	

Read Time day	hr	min	Pcell psi	Pin psi	Pout psi	Readings (cm) hin	hout	Inflow PV	Outflow PV	Storage PV	Total PV	i	K cm/s
1	7	1	32	27	25	56.00	46.00	---	---	---	---	21.4	---
1	7	37	32	27	25	55.80	46.35	0.00	0.00	0.00	0.00	21.4	1.8E-07
1	9	37	32	27	25	55.20	47.10	-0.01	0.01	0.00	0.01	21.2	1.4E-07
1	16	40	32	27	25	52.80	49.35	-0.02	0.02	0.00	0.03	20.5	1.4E-07
2	14	36	32	27	25	45.95	56.00	-0.06	0.06	0.00	0.09	18.6	1.3E-07
2	14	39	32	27	25	56.00	44.00					21.7	
3	6	13	32	27	25	50.90	49.25	-0.05	0.05	0.00	0.13	20.3	1.4E-07
3	6	15	32	27	25	57.00	45.00					21.7	
4	6	55	32	27	25	48.90	53.05	-0.07	0.07	0.00	0.20	19.4	1.4E-07
4	16	30	32	27	25	46.05	55.85	-0.03	0.02	0.00	0.23	18.6	1.3E-07

TRIAXIAL PERMEABILITY DATA SHEET
SHANNON & WILSON, INC

Project STEELCOTE Date 6/16/92

Job No. Z-301-05 Test By KMI Checked AGM 7-15-92

Boring Sample SW/1 (C) 39.0-41.0 Depth 40.7

Description Dark gray slightly clayey SILT

Preliminary Data:

Permeameter No. 12

	Inflow	Outflow
Standpipe Vol (cc/cm)	1.261	1.268

Sample Diameter (in)	2.846
Sample Length (in)	2.695
Sample Area (cm^2)	41.04
Sample Volume (CC)	280.94
Sample Wt. (g)	511.30
Wet Density (pcf)	113.6
Dry Density (pcf)	84.9
Specific Gravity	2.68 (estimated)

Water Content	Before	After
Tare No.	PT4	69
Tare Wt. (g)	0.96	85.06
Wet Soil + Tare (g)	46.65	583.26
Dry Soil + Tare (g)	35.10	461.71
Water Content (%)	33.8	32.3
Porosity	0.493	
Pore Volume (CC)	138.39	

Read Time day	hr	min	Pcell psi	Pin psi	Pout psi	Readings (cm) hin	hout	Inflow PV	Outflow PV	Storage PV	Total PV	i	K cm/s
1	7	3	30	25	23	57.00	44.00	---	---	---	---	22.4	---
1	7	13	30	25	23	53.80	50.00	-0.03	0.05	0.03	0.05	21.1	1.1E-05
1	7	38	30	25	23	44.70	59.10	-0.08	0.08	0.00	0.14	18.4	9.5E-06
1	7	40	30	25	23	58.00	46.00					22.3	
1	7	55	30	25	23	50.90	52.90	-0.06	0.06	0.00	0.20	20.3	1.1E-05
1	7	57	30	25	23	62.00	44.00					23.2	
1	8	18	30	25	23	52.40	53.40	-0.09	0.09	0.00	0.29	20.4	1.1E-05
1	8	50	30	25	23	42.00	63.70	-0.09	0.09	0.00	0.38	17.4	8.8E-06
2	14	36	30	25	23	54.00	35.00					23.3	
2	14	46	30	25	23	49.30	39.70	-0.04	0.04	0.00	0.43	22.0	1.1E-05
2	15	1	30	25	23	43.30	45.80	-0.05	0.06	0.00	0.48	20.2	9.8E-06
3	6	12	30	25	23	57.00	44.00					22.4	
3	6	19	30	25	23	53.95	47.00	-0.03	0.03	0.00	0.51	21.6	1.0E-05
4	7	45	30	25	23	61.00	45.00					22.9	
4	7	57	30	25	23	55.80	50.15	-0.05	0.05	0.00	0.56	21.4	1.0E-05
4	8	6	30	25	23	51.60	54.20	-0.04	0.04	0.00	0.59	20.2	1.1E-05

TRIAXIAL PERMEABILITY DATA SHEET
SHANNON & WILSON, INC

Project STEELCOTE — Date 7/10/92

Job No. Z-301-05 — Test By KMI — Checked AGM 7-15-92

Boring — Sample SW/1 (D) 19.0-21.0 — Depth 20.4

Description Gray slightly silty CLAY

Preliminary Data:

Permeameter No. 13

	Inflow	Outflow
Standpipe Vol (cc/cm)	1.268	1.272

Sample Diameter (in)	2.880
Sample Length (in)	2.800
Sample Area (cm^2)	42.03
Sample Volume (CC)	298.91
Sample Wt. (g)	510.24
Wet Density (pcf)	106.5
Dry Density (pcf)	71.4
Specific Gravity	2.68 (estimated)

Water Content	Before	After
Tare No.	PT5	67
Tare Wt. (g)	0.96	85.08
Wet Soil + Tare (g)	47.59	589.05
Dry Soil + Tare (g)	32.20	413.33
Water Content (%)	49.3	53.5
Porosity	0.573	
Pore Volume (CC)	171.35	

Read Time day	hr	min	Pcell psi	Pin psi	Pout psi	Readings (cm) hin	hout	Inflow PV	Outflow PV	Storage PV	Total PV	i	K cm/s
1	6	50	32	27	25	65.00	47.00	---	---	---	---	22.3	---
1	7	26	32	27	25	64.80	47.25	0.00	0.00	0.00	0.00	22.2	1.4E-07
1	16	39	32	27	25	62.60	49.45	-0.02	0.02	0.00	0.02	21.6	9.1E-08
2	14	35	32	27	25	57.40	54.50	-0.04	0.04	0.00	0.06	20.2	9.4E-08
2	14	40	32	27	25	57.40	45.00					21.5	
3	6	9	32	27	25	53.80	48.65	-0.03	0.03	0.00	0.08	20.5	9.4E-08
4	6	51	32	27	25	48.25	54.15	-0.04	0.04	0.00	0.12	18.9	9.5E-08
4	16	21	32	27	25	46.25	56.15	-0.01	0.01	0.00	0.14	18.4	9.5E-08

CHEMICAL ANALYSES OF SOIL SAMPLES

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 430901SW(110)

DATE : 06-08-92

SAMPLE MATRIX : SOIL
ATAS # : 4309.01
SAMPLE ID : SW/1(BACKGROUND)A

DATE SUBMITTED: 05-13-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	5	ug/Kg	ND	05-18-92	CLP VOA
CARBON TERTACHLORIDE	5	ug/Kg	ND	05-18-92	CLP VOA
XYLENE	5	ug/Kg	ND	05-18-92	CLP VOA
METHLY ISOBUTYL KETONE	11	ug/Kg	ND	05-18-92	CLP VOA
TOLUENE	5	ug/Kg	ND	05-18-92	CLP VOA
METHYL ETHYL KETONE	11	ug/Kg	ND	05-18-92	CLP VOA
BENZENE	5	ug/Kg	ND	05-18-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-18-92	CLP VOA TIC
CUMENE	*	ug/Kg	ND	05-18-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-18-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-18-92	CLP VOA TIC
-METHYL-1-PROPANOL	*	ug/Kg	ND	05-18-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 128**% BROMOFLUOROBENZENE(74-121) 94 % 1,2-DICHLOROETHANE-D4(70-121) 99 %

BUTYL BENZYL PHTHALATE	700	ug/Kg	ND	05-28-92	CLP SVOA
IBUTYL PHTHALATE	700	ug/Kg	ND	05-28-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	700	ug/Kg	ND	05-28-92	CLP SVOA
PHENOL	700	ug/Kg	ND	05-28-92	CLP SVOA
APHTHALENE	700	ug/Kg	ND	05-28-92	CLP SVOA
YCLOHEXANONE	*	ug/Kg	ND	05-28-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-28-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-28-92	CLP SVOA TIC
PICHLOROHYDRIN	*	ug/Kg	ND	05-28-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-28-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(23-120) 91 % TERPHENYL-d14(18-137) 79 % 2-FLUOROPHENOL(25-121) 78 %
-FLUOROBIPHENYL(30-115) 96 % PHENOL-d5(24-113) 80 % 2,4,6-TRIBROMOPHENOL(19-122) 63 %

METHANOL	2	ug/g	ND	05-20-92	GC/FID
FORMALDEHYDE	10951	ug/Kg	9021 B*,J	06-05-92	HPLC
RIUM	3.8	mg/Kg	172	05-23-92	CLP METALS
CHROMIUM	1.4	mg/Kg	17.0	05-23-92	CLP METALS
DMIUM	0.4	mg/Kg	2.3	05-23-92	CLP METALS
AD	0.2	mg/Kg	443	05-19-92	CLP METALS
NICKEL	1.6	mg/Kg	33.5	05-23-92	CLP METALS
RIUM (TCLP)	16	ug/L	1150	05-28-92	CLP METALS
DMIUM (TCLP)	2	ug/L	8.8	05-28-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	4.7	05-28-92	CLP METALS
AD (TCLP)	1	ug/L	17.3	05-29-92	CLP METALS
CKEL (TCLP)	8	ug/L	ND	05-28-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 430902SW(110)
DATE : 06-08-92

SAMPLE MATRIX : SOIL
ATAS # : 4309.02
SAMPLE ID : SW/1(BACKGROUND)AA

DATE SUBMITTED: 05-13-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	5	ug/Kg	7	05-18-92	CLP VOA
CARBON TERTACHLORIDE	5	ug/Kg	ND	05-18-92	CLP VOA
XYLENE	5	ug/Kg	ND	05-18-92	CLP VOA
METHLY ISOBUTYL KETONE	11	ug/Kg	ND	05-18-92	CLP VOA
TOLUENE	5	ug/Kg	ND	05-18-92	CLP VOA
METHYL ETHYL KETONE	11	ug/Kg	ND	05-18-92	CLP VOA
BENZENE	5	ug/Kg	ND	05-18-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-18-92	CLP VOA TIC
CUMENE	*	ug/Kg	ND	05-18-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-18-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-18-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-18-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 108 % BROMOFLUOROBENZENE(74-121) 84 % 1,2-DICHLOROETHANE-D4(70-121) 93 %

BUTYL BENZYL PHTHALATE	710	ug/Kg	ND	05-26-92	CLP SVOA
DIBUTYL PHTHALATE	710	ug/Kg	ND	05-26-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	710	ug/Kg	ND	05-26-92	CLP SVOA
PHENOL	710	ug/Kg	ND	05-26-92	CLP SVOA
NAPHTHALENE	710	ug/Kg	93 J	05-26-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-26-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-26-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-26-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-26-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-26-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(23-120) 50 % TERPHENYL-d14(18-137) 33 % 2-FLUOROPHENOL(25-121) 44 %
2-FLUOROBIPHENYL(30-115) 59 % PHENOL-d5(24-113) 42 % 2,4,6-TRIBROMOPHENOL(19-122) 30 %

METHANOL	2	ug/g	ND	05-20-92	GC/FID
FORMALDEHYDE	10804	ug/Kg	6026 B*,J	06-05-92	HPLC
BARIUM	3.8	mg/Kg	163	05-23-92	CLP METALS
CHROMIUM	1.4	mg/Kg	15.5	05-23-92	CLP METALS
CADMIUM	0.4	mg/Kg	2.5	05-23-92	CLP METALS
LEAD	0.2	mg/Kg	323	05-19-92	CLP METALS
NICKEL	1.6	mg/Kg	34.9	05-23-92	CLP METALS
BARIUM (TCLP)	16	ug/L	1230	05-28-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	9.4	05-28-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	7.2	05-28-92	CLP METALS
LEAD (TCLP)	1	ug/L	24.0	05-29-92	CLP METALS
NICKEL (TCLP)	8	ug/L	9.9	05-28-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

SW/1(A)

REPORT: 416601SW(107)

DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # : 4166.01
SAMPLE ID : SW/1(A)D 6.1-6.9 A

DATE SUBMITTED: 04-23-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	9	ug/Kg	ND	04-24-92	CLP VOA
CARBON TERTACHLORIDE	9	ug/Kg	ND	04-24-92	CLP VOA
XYLENE	9	ug/Kg	ND	04-24-92	CLP VOA
METHLY ISOBUTYL KETONE	18	ug/Kg	ND	04-24-92	CLP VOA
TOLUENE	9	ug/Kg	ND	04-24-92	CLP VOA
METHYL ETHYL KETONE	18	ug/Kg	ND	04-24-92	CLP VOA
BENZENE	9	ug/Kg	ND	04-24-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	04-24-92	CLP VOA TIC
CUMENE	*	ug/Kg	ND	04-24-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	04-24-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	04-24-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	04-24-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 107 % BROMOFLUOROBENZENE(74-121) 79 % 1,2-DICHLOROETHANE-D4(70-121) 100 %

BUTYL BENZYL PHTHALATE	35000	ug/Kg	ND	05-07-92	CLP SVOA
DIBUTYL PHTHALATE	35000	ug/Kg	ND	05-07-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	35000	ug/Kg	ND	05-07-92	CLP SVOA
PHENOL	35000	ug/Kg	ND	05-07-92	CLP SVOA
NAPHTHALENE	35000	ug/Kg	ND	05-07-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(23-120) 65 % TERPHENYL-d14(18-137) 100 % 2-FLUOROPHENOL(25-121) 69 %
2-FLUOROBIPHENYL(30-115) 78 % PHENOL-d5(24-113) 59 % 2,4,6-TRIBROMOPHENOL(19-122) 66 %

METHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	16399	ug/Kg	72000 B*	05-23-92	HPLC
BARIUM	3.8	mg/Kg	243	04-30-92	CLP METALS
CHROMIUM	1.4	mg/Kg	23.0	04-30-92	CLP METALS
CADMIUM	0.4	mg/Kg	0.74	04-30-92	CLP METALS
LEAD	0.2	mg/Kg	675	04-29-92	CLP METALS
NICKEL	1.6	mg/Kg	30.4	04-30-92	CLP METALS
BARIUM (TCLP)	16	ug/L	1280	05-11-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	4.4	05-11-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	4.5	05-11-92	CLP METALS
LEAD (TCLP)	1	ug/L	184	05-12-92	CLP METALS
NICKEL (TCLP)	8	ug/L	66	05-11-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 416602SW(107)
DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # : 4166.02
SAMPLE ID : SW/1(A)C 19.0-61.0 A

DATE SUBMITTED: 04-23-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	6	ug/Kg	ND	04-24-92	CLP VOA
CARBON TERTACHLORIDE	6	ug/Kg	ND	04-24-92	CLP VOA
XYLENE	6	ug/Kg	ND	04-24-92	CLP VOA
METHLY ISOBUTYL KETONE	13	ug/Kg	ND	04-24-92	CLP VOA
TOLUENE	6	ug/Kg	ND	04-24-92	CLP VOA
METHYL ETHYL KETONE	13	ug/Kg	ND	04-24-92	CLP VOA
BENZENE	6	ug/Kg	ND	04-24-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	04-24-92	CLP VOA TIC
CUMENE	*	ug/Kg	ND	04-24-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	04-24-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	04-24-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	04-24-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 104 % BROMOFLUOROBENZENE(74-121) 100 % 1,2-DICHLOROETHANE-D4(70-121) 112 %

BUTYL BENZYL PHTHALATE	850	ug/Kg	ND	05-06-92	CLP SVOA
DIBUTYL PHTHALATE	850	ug/Kg	ND	05-06-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	850	ug/Kg	180 BJ	05-06-92	CLP SVOA
PHENOL	850	ug/Kg	ND	05-06-92	CLP SVOA
NAPHTHALENE	850	ug/Kg	ND	05-06-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-06-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-06-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-06-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-06-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-06-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(23-120) 70 % TERPHENYL-d14(18-137) 110 % 2-FLUOROPHENOL(25-121) 80 %
2-FLUOROBIPHENYL(30-115) 79 % PHENOL-d5(24-113) 68 % 2,4,6-TRIBROMOPHENOL(19-122) 69 %

METHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	14267	ug/Kg	97000 B*	05-23-92	HPLC
BARIUM	3.8	mg/Kg	107	04-30-92	CLP METALS
CHROMIUM	1.4	mg/Kg	19.5	04-30-92	CLP METALS
CADMIUM	0.4	mg/Kg	ND	04-30-92	CLP METALS
LEAD	0.2	mg/Kg	15.5	04-29-92	CLP METALS
NICKEL	1.6	mg/Kg	19.7	04-30-92	CLP METALS
BARIUM (TCLP)	16	ug/L	1620	05-11-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	ND	05-11-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	6.2	05-11-92	CLP METALS
LEAD (TCLP)	1	ug/L	5.2	05-12-92	CLP METALS
NICKEL (TCLP)	8	ug/L	37.6	05-11-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 418801SW(107)

DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # : 4188.01
SAMPLE ID : SW/1(B)D 11.0-12.0 A

DATE SUBMITTED: 04-27-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	830	ug/Kg	260 J	05-07-92	CLP VOA
CARBON TERTACHLORIDE	33	ug/Kg	ND	05-06-92	CLP VOA
YLENE	33	ug/Kg	ND	05-06-92	CLP VOA
ETHLY ISOBUTYL KETONE	67	ug/Kg	ND	05-06-92	CLP VOA
TOLUENE	33	ug/Kg	ND	05-06-92	CLP VOA
ETHYL ETHYL KETONE	67	ug/Kg	ND	05-06-92	CLP VOA
ENZENE	33	ug/Kg	ND	05-06-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
UMENE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
-BUTANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

OLUENE-d8(81-117) 105 % BROMOFLUOROBENZENE(74-121) 115 % 1,2-DICHLOROETHANE-D4(70-121) 100 %

BUTYL BENZYL PHTHALATE	4400	ug/Kg	ND	05-14-92	CLP SVOA
IBUTYL PHTHALATE	4400	ug/Kg	ND	05-14-92	CLP SVOA
I(2-ETHYLHEXYL)PHTHALATE	4400	ug/Kg	ND	05-14-92	CLP SVOA
HENOL	4400	ug/Kg	ND	05-14-92	CLP SVOA
NAPHTHALENE	4400	ug/Kg	ND	05-14-92	CLP SVOA
YCLOHEXANONE	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
OLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
PICHLOROHYDRIN	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
ISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-14-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

ITROBENZENE-d5(23-120) 34 % TERPHENYL-d14(18-137) 56 % 2-FLUOROPHENOL(25-121) 37 %
2-FLUOROBIPHENYL(30-115) 48 % PHENOL-d5(24-113) 40 % 2,4,6-TRIBROMOPHENOL(19-122) 32 %

ETHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	13333	ug/Kg	39000 B*	05-23-92	HPLC
ARIUM	3.8	mg/Kg	186	05-06-92	CLP METALS
HROMIUM	1.4	mg/Kg	19.2	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	0.62	05-06-92	CLP METALS
EAD	0.2	mg/Kg	19.8	05-07-92	CLP METALS
ICKEL	1.6	mg/Kg	22.0	05-06-92	CLP METALS
ARIUM (TCLP)	16	ug/L	1170	05-11-92	CLP METALS
ADMIUM (TCLP)	2	ug/L	ND	05-11-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	5.2	05-11-92	CLP METALS
LEAD (TCLP)	1	ug/L	17.1	05-12-92	CLP METALS
ICKEL (TCLP)	8	ug/L	34.7	05-11-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 418802SW(107)

DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # : 4188.02
SAMPLE ID : SW/1(B)C 14.0-19.0 A

DATE SUBMITTED: 04-27-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	6	ug/Kg	5 J	05-08-92	CLP VOA
CARBON TERTACHLORIDE	6	ug/Kg	ND	05-08-92	CLP VOA
YLENE	6	ug/Kg	ND	05-08-92	CLP VOA
METHLY ISOBUTYL KETONE	13	ug/Kg	ND	05-08-92	CLP VOA
TOLUENE	6	ug/Kg	ND	05-08-92	CLP VOA
ETHYL ETHYL KETONE	13	ug/Kg	ND	05-08-92	CLP VOA
ENZENE	6	ug/Kg	ND	05-08-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-08-92	CLP VOA TIC
UMENE	*	ug/Kg	ND	05-08-92	CLP VOA TIC
-BUTANOL	*	ug/Kg	ND	05-08-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-08-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-08-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

OLUENE-d8(81-117) 88 % BROMOFLUOROBENZENE(74-121) 106 % 1,2-DICHLOROETHANE-D4(70-121) 99 %

BUTYL BENZYL PHTHALATE	840	ug/Kg	ND	05-14-92	CLP SVOA
IBUTYL PHTHALATE	840	ug/Kg	ND	05-14-92	CLP SVOA
I(2-ETHYLHEXYL)PHTHALATE	840	ug/Kg	ND	05-14-92	CLP SVOA
HENOL	840	ug/Kg	ND	05-14-92	CLP SVOA
NAPHTHALENE	840	ug/Kg	ND	05-14-92	CLP SVOA
YCLOHEXANONE	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
OLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
PICHLOROHYDRIN	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
ISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-14-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

ITROBENZENE-d5(23-120) 33 % TERPHENYL-d14(18-137) 34 % 2-FLUOROPHENOL(25-121) 31 %
2-FLUOROBIPHENYL(30-115) 30 % PHENOL-d5(24-113) 30 % 2,4,6-TRIBROMOPHENOL(19-122) 24 %

ETHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	12692	ug/Kg	23000 B*,J	05-23-92	HPLC
ARIUM	3.8	mg/Kg	110	05-06-92	CLP METALS
CHROMIUM	1.4	mg/Kg	15.3	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	ND	05-06-92	CLP METALS
EAD	0.2	mg/Kg	18.4	05-07-92	CLP METALS
ICKEL	1.6	mg/Kg	16.9	05-06-92	CLP METALS
ARIUM (TCLP)	16	ug/L	1230	05-11-92	CLP METALS
ADMIUM (TCLP)	2	ug/L	ND	05-11-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	3.0	05-11-92	CLP METALS
EAD (TCLP)	1	ug/L	1.2	05-12-92	CLP METALS
ICKEL (TCLP)	8	ug/L	32.9	05-11-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 418803SW(107)

DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # : 4188.03
SAMPLE ID : SW/1(B)D 19.0-21.3 A

DATE SUBMITTED: 04-27-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	7	ug/Kg	3 J	05-08-92	CLP VOA
CARBON TERTACHLORIDE	7	ug/Kg	ND	05-08-92	CLP VOA
[illegible]LENE	7	ug/Kg	ND	05-08-92	CLP VOA
METHLY ISOBUTYL KETONE	14	ug/Kg	ND	05-08-92	CLP VOA
TOLUENE	7	ug/Kg	ND	05-08-92	CLP VOA
ETHYL ETHYL KETONE	14	ug/Kg	ND	05-08-92	CLP VOA
BENZENE	7	ug/Kg	ND	05-08-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-08-92	CLP VOA TIC
CUMENE	*	ug/Kg	ND	05-08-92	CLP VOA TIC
[illegible]-BUTANOL	*	ug/Kg	ND	05-08-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-08-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-08-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 100 % BROMOFLUOROBENZENE(74-121) 116 % 1,2-DICHLOROETHANE-D4(70-121) 108 %

BUTYL BENZYL PHTHALATE	890	ug/Kg	ND	05-14-92	CLP SVOA
DIBUTYL PHTHALATE	890	ug/Kg	ND	05-14-92	CLP SVOA
[illegible](2-ETHYLHEXYL)PHTHALATE	890	ug/Kg	ND	05-14-92	CLP SVOA
PHENOL	890	ug/Kg	ND	05-14-92	CLP SVOA
NAPHTHALENE	890	ug/Kg	ND	05-14-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-14-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(23-120) 60 % TERPHENYL-d14(18-137) 75 % 2-FLUOROPHENOL(25-121) 62 %
2-FLUOROBIPHENYL(30-115) 60 % PHENOL-d5(24-113) 60 % 2,4,6-TRIBROMOPHENOL(19-122) 54 %

ETHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	13569	ug/Kg	11000 B*,J	05-23-92	HPLC
BARIUM	3.8	mg/Kg	123	05-06-92	CLP METALS
CHROMIUM	1.4	mg/Kg	23.4	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	0.57	05-06-92	CLP METALS
LEAD	0.2	mg/Kg	20.6	05-07-92	CLP METALS
NICKEL	1.6	mg/Kg	27.7	05-06-92	CLP METALS
BARIUM (TCLP)	16	ug/L	845	05-11-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	ND	05-11-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	5.5	05-11-92	CLP METALS
LEAD (TCLP)	1	ug/L	4.7	05-12-92	CLP METALS
NICKEL (TCLP)	8	ug/L	16.5	05-11-92	CLP METALS

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CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 418804SW(107)

DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # : 4188.04
SAMPLE ID. : SW/1(B)C 24.0-59.0 A

DATE SUBMITTED: 04-27-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	6	ug/Kg	ND	05-06-92	CLP VOA
CARBON TERTACHLORIDE	6	ug/Kg	ND	05-06-92	CLP VOA
YLENE	6	ug/Kg	ND	05-06-92	CLP VOA
ETHLY ISOBUTYL KETONE	13	ug/Kg	ND	05-06-92	CLP VOA
TOLUENE	6	ug/Kg	ND	05-06-92	CLP VOA
ETHYL ETHYL KETONE	13	ug/Kg	ND	05-06-92	CLP VOA
ENZENE	6	ug/Kg	ND	05-06-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
UMENE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
-BUTANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
-ETHOXYETHANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

OLUENE-d8(81-117) 92 % BROMOFLUOROBENZENE(74-121) 102 % 1,2-DICHLOROETHANE-D4(70-121) 98 %

BUTYL BENZYL PHTHALATE	850	ug/Kg	ND	05-14-92	CLP SVOA
DIBUTYL PHTHALATE	850	ug/Kg	ND	05-14-92	CLP SVOA
I(2-ETHYLHEXYL)PHTHALATE	850	ug/Kg	ND	05-14-92	CLP SVOA
HENOL	850	ug/Kg	ND	05-14-92	CLP SVOA
NAPHTHALENE	850	ug/Kg	ND	05-14-92	CLP SVOA
YCLOHEXANONE	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
OLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
PICHLOROHYDRIN	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
ISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-14-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

ITROBENZENE-d5(23-120) 46 % TERPHENYL-d14(18-137) 61 % 2-FLUOROPHENOL(25-121) 46 %
2-FLUOROBIPHENYL(30-115) 46 % PHENOL-d5(24-113) 44 % 2,4,6-TRIBROMOPHENOL(19-122) 42 %

ETHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	12853	ug/Kg	100000 B*	05-23-92	HPLC
ARIUM	3.8	mg/Kg	131	05-06-92	CLP METALS
HROMIUM	1.4	mg/Kg	23.4	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	ND	05-06-92	CLP METALS
EAD	0.2	mg/Kg	17.2	05-07-92	CLP METALS
ICKEL	1.6	mg/Kg	25.0	05-06-92	CLP METALS
ARIUM (TCLP)	16	ug/L	1530	05-11-92	CLP METALS
ADMIUM (TCLP)	2	ug/L	2.2	05-11-92	CLP METALS
HROMIUM (TCLP)	3	ug/L	ND	05-11-92	CLP METALS
LEAD (TCLP)	1	ug/L	17.2	05-12-92	CLP METALS
ICKEL (TCLP)	8	ug/L	88.3	05-11-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 420301SW(107)

DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # : 4203.01
SAMPLE ID : SW/1(C)D 8.5-9.0 A

DATE SUBMITTED: 04-29-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	1000	ug/Kg	ND	05-06-92	CLP VOA
CARBON TERTACHLORIDE	1000	ug/Kg	ND	05-06-92	CLP VOA
XYLENE	1000	ug/Kg	45000	05-06-92	CLP VOA
METHLY ISOBUTYL KETONE	2000	ug/Kg	ND	05-06-92	CLP VOA
TOLUENE	1000	ug/Kg	1200	05-06-92	CLP VOA
METHYL ETHYL KETONE	2000	ug/Kg	ND	05-06-92	CLP VOA
BENZENE	1000	ug/Kg	ND	05-06-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
CUMENE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 95 % BROMOFLUOROBENZENE(74-121) 88 % 1,2-DICHLOROETHANE-D4(70-121) 93 %

BUTYL BENZYL PHTHALATE	32000	ug/Kg	ND	05-14-92	CLP SVOA
DIBUTYL PHTHALATE	32000	ug/Kg	ND	05-14-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	32000	ug/Kg	ND	05-14-92	CLP SVOA
PHENOL	32000	ug/Kg	ND	05-14-92	CLP SVOA
NAPHTHALENE	32000	ug/Kg	8300 J	05-14-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-14-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(23-120) 93 % TERPHENYL-d14(18-137) 125 % 2-FLUOROPHENOL(25-121) 85 %
2-FLUOROBIPHENYL(30-115) 92 % PHENOL-d5(24-113) 84 % 2,4,6-TRIBROMOPHENOL(19-122) 64 %

METHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	15896	ug/Kg	31000 B*	05-23-92	HPLC
BARIUM	3.8	mg/Kg	118	05-06-92	CLP METALS
CHROMIUM	1.4	mg/Kg	19.1	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	1.8	05-06-92	CLP METALS
LEAD	0.2	mg/Kg	539	05-07-92	CLP METALS
NICKEL	1.6	mg/Kg	30.0	05-06-92	CLP METALS
BARIUM (TCLP)	16	ug/L	1060	05-11-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	7.1	05-11-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	3.9	05-11-92	CLP METALS
LEAD (TCLP)	1	ug/L	1420	05-12-92	CLP METALS
NICKEL (TCLP)	8	ug/L	53.8	05-11-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 420302SW(107)

DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # : 4203.02
SAMPLE ID : SW/1(C)C 9.0-14.0 A

DATE SUBMITTED: 04-29-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	7	ug/Kg	5 J	05-06-92	CLP VOA
CARBON TERTACHLORIDE	7	ug/Kg	ND	05-06-92	CLP VOA
XYLENE	7	ug/Kg	ND	05-06-92	CLP VOA
METHLY ISOBUTYL KETONE	13	ug/Kg	ND	05-06-92	CLP VOA
TOLUENE	7	ug/Kg	ND	05-06-92	CLP VOA
METHYL ETHYL KETONE	13	ug/Kg	11 J	05-06-92	CLP VOA
BENZENE	7	ug/Kg	ND	05-06-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
CUMENE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 82 % BROMOFLUOROBENZENE(74-121) 101 % 1,2-DICHLOROETHANE-D4(70-121) 115 %

BUTYL BENZYL PHTHALATE	870	ug/Kg	ND	05-07-92	CLP SVOA
DIBUTYL PHTHALATE	870	ug/Kg	ND	05-07-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	870	ug/Kg	ND	05-07-92	CLP SVOA
PHENOL	870	ug/Kg	ND	05-07-92	CLP SVOA
NAPHTHALENE	870	ug/Kg	ND	05-07-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(23-120) 77 % TERPHENYL-d14(18-137) 112 % 2-FLUOROPHENOL(25-121) 56 %
2-FLUOROBIPHENYL(30-115) 85 % PHENOL-d5(24-113) 80 % 2,4,6-TRIBROMOPHENOL(19-122) 79 %

METHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	13245	ug/Kg	104000 B*	05-23-92	HPLC
BARIUM	3.8	mg/Kg	165	05-06-92	CLP METALS
CHROMIUM	1.4	mg/Kg	27.1	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	0.7	05-06-92	CLP METALS
LEAD	0.2	mg/Kg	47.1	05-07-92	CLP METALS
NICKEL	1.6	mg/Kg	25.2	05-06-92	CLP METALS
BARIUM (TCLP)	16	ug/L	1660	05-11-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	ND	05-11-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	3.4	05-11-92	CLP METALS
LEAD (TCLP)	1	ug/L	12.2	05-12-92	CLP METALS
NICKEL (TCLP)	8	ug/L	38.5	05-11-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 420303SW(107)
DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # : 4203.03
SAMPLE ID : SW/1(C)C 19.0-24.0 A

DATE SUBMITTED: 04-29-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	7	ug/Kg	2 J	05-06-92	CLP VOA
CARBON TERTACHLORIDE	7	ug/Kg	ND	05-06-92	CLP VOA
XYLENE	7	ug/Kg	ND	05-06-92	CLP VOA
METHLY ISOBUTYL KETONE	14	ug/Kg	ND	05-06-92	CLP VOA
TOLUENE	7	ug/Kg	ND	05-06-92	CLP VOA
METHYL ETHYL KETONE	14	ug/Kg	ND	05-06-92	CLP VOA
BENZENE	7	ug/Kg	ND	05-06-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
CUMENE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 94 % BROMOFLUOROBENZENE(74-121) 98 % 1,2-DICHLOROETHANE-D4(70-121) 121 %

BUTYL BENZYL PHTHALATE	930	ug/Kg	ND	05-07-92	CLP SVOA
DIBUTYL PHTHALATE	930	ug/Kg	ND	05-07-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	930	ug/Kg	ND	05-07-92	CLP SVOA
PHENOL	930	ug/Kg	ND	05-07-92	CLP SVOA
NAPHTHALENE	930	ug/Kg	ND	05-07-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(23-120) 87 % TERPHENYL-d14(18-137) 106 % 2-FLUOROPHENOL(25-121) 60 %
2-FLUOROBIPHENYL(30-115) 98 % PHENOL-d5(24-113) 71 % 2,4,6-TRIBROMOPHENOL(19-122) 87 %

METHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	14134	ug/Kg	12000 B*,J	05-23-92	HPLC
BARIUM	3.8	mg/Kg	173	05-06-92	CLP METALS
CHROMIUM	1.4	mg/Kg	33.5	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	1.1	05-06-92	CLP METALS
LEAD	0.2	mg/Kg	27.4	05-07-92	CLP METALS
NICKEL	1.6	mg/Kg	46.8	05-06-92	CLP METALS
BARIUM (TCLP)	16	ug/L	2280	05-11-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	2.3	05-11-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	ND	05-11-92	CLP METALS
LEAD (TCLP)	1	ug/L	13.9	05-12-92	CLP METALS
NICKEL (TCLP)	8	ug/L	61.0	05-11-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 420304SW(107)

DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # : 4203.04
SAMPLE ID : SW/1(C)C 24.0-64.5 A

DATE SUBMITTED: 04-29-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	7	ug/Kg	ND	05-06-92	CLP VOA
CARBON TERTACHLORIDE	7	ug/Kg	ND	05-06-92	CLP VOA
XYLENE	7	ug/Kg	ND	05-06-92	CLP VOA
METHLY ISOBUTYL KETONE	14	ug/Kg	ND	05-06-92	CLP VOA
TOLUENE	7	ug/Kg	ND	05-06-92	CLP VOA
METHYL ETHYL KETONE	14	ug/Kg	ND	05-06-92	CLP VOA
BENZENE	7	ug/Kg	ND	05-06-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
CUMENE	*	ug/Kg	***	05-06-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 93 % BROMOFLUOROBENZENE(74-121) 100 % 1,2-DICHLOROETHANE-D4(70-121) 104 %

BUTYL BENZYL PHTHALATE	920	ug/Kg	ND	05-07-92	CLP SVOA
DIBUTYL PHTHALATE	920	ug/Kg	ND	05-07-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	920	ug/Kg	270 J	05-07-92	CLP SVOA
PHENOL	920	ug/Kg	ND	05-07-92	CLP SVOA
NAPHTHALENE	920	ug/Kg	ND	05-07-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(23-120) 79 % TERPHENYL-d14(18-137) 101 % 2-FLUOROPHENOL(25-121) 57 %
2-FLUOROBIPHENYL(30-115) 95 % PHENOL-d5(24-113) 69 % 2,4,6-TRIBROMOPHENOL(19-122) 83 %

METHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	14646	ug/Kg	39000 B*	05-23-92	HPLC
BARIUM	3.8	mg/Kg	118	05-06-92	CLP METALS
CHROMIUM	1.4	mg/Kg	18.7	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	0.63	05-06-92	CLP METALS
LEAD	0.2	mg/Kg	15.3	05-07-92	CLP METALS
NICKEL	1.6	mg/Kg	23.7	05-06-92	CLP METALS
BARIUM (TCLP)	16	ug/L	1400	05-11-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	ND	05-11-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	3.3	05-11-92	CLP METALS
LEAD (TCLP)	1	ug/L	8.9	05-12-92	CLP METALS
NICKEL (TCLP)	8	ug/L	82	05-11-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 422601SW(109)

DATE : 06-05-92

SAMPLE MATRIX : SOIL
ATAS # : 4226.01
SAMPLE ID : SW/1(D) D 6.5-9.0 A

DATE SUBMITTED: 05-01-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	6	ug/Kg	ND	05-06-92	CLP VOA
CARBON TERTACHLORIDE	6	ug/Kg	ND	05-06-92	CLP VOA
XYLENE	6	ug/Kg	130	05-06-92	CLP VOA
METHLY ISOBUTYL KETONE	13	ug/Kg	ND	05-06-92	CLP VOA
TOLUENE	6	ug/Kg	ND	05-06-92	CLP VOA
METHYL ETHYL KETONE	13	ug/Kg	ND	05-06-92	CLP VOA
BENZENE	6	ug/Kg	3 J	05-06-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
CUMENE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 97 % BROMOFLUOROBENZENE(74-121) 98 % 1,2-DICHLOROETHANE-D4(70-121) 107 %

BUTYL BENZYL PHTHALATE	840	ug/Kg	ND	05-13-92	CLP SVOA
DIBUTYL PHTHALATE	840	ug/Kg	ND	05-13-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	840	ug/Kg	ND	05-13-92	CLP SVOA
PHENOL	840	ug/Kg	ND	05-13-92	CLP SVOA
NAPHTHALENE	840	ug/Kg	ND	05-13-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-13-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES #

NITROBENZENE-d5(23-120) 102 % TERPHENYL-d14(18-137) 79 % 2-FLUOROPHENOL(25-121) 80 %
2-FLUOROBIPHENYL(30-115) 90 % PHENOL-d5(24-113) 84 % 2,4,6-TRIBROMOPHENOL(19-122) 72 %

METHANOL	2	ug/g	ND	05-20-92	GC/FID
FORMALDEHYDE	12827	ug/Kg	103000 B*	05-23-92	HPLC
BARIUM	3.8	mg/Kg	192	05-06-92	CLP METALS
CHROMIUM	1.4	mg/Kg	21.7	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	ND	05-06-92	CLP METALS
LEAD	0.2	mg/Kg	38.3	05-07-92	CLP METALS
NICKEL	1.6	mg/Kg	26.5	05-06-92	CLP METALS
BARIUM (TCLP)	16	ug/L	1730	05-13-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	ND	05-13-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	ND	05-13-92	CLP METALS
LEAD (TCLP)	1	ug/L	9.4	05-13-92	CLP METALS
NICKEL (TCLP)	8	ug/L	85.9	05-13-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 422603SW(109)

DATE : 06-05-92

SAMPLE MATRIX : SOIL
ATAS # : 4226.03
SAMPLE ID : SW/1(D) D 11.5-12.5 A

DATE SUBMITTED: 05-01-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	8100	ug/Kg	ND	05-06-92	CLP VOA
CARBON TERTACHLORIDE	8100	ug/Kg	ND	05-06-92	CLP VOA
XYLENE	8100	ug/Kg	430000	05-06-92	CLP VOA
METHLY ISOBUTYL KETONE	16000	ug/Kg	ND	05-06-92	CLP VOA
TOLUENE	8100	ug/Kg	ND	05-06-92	CLP VOA
METHYL ETHYL KETONE	16000	ug/Kg	ND	05-06-92	CLP VOA
BENZENE	8100	ug/Kg	ND	05-06-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
CUMENE	*	ug/Kg	***	05-06-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 103 % BROMOFLUOROBENZENE(74-121) 77 % 1,2-DICHLOROETHANE-D4(70-121) 90 %

BUTYL BENZYL PHTHALATE	1700	ug/Kg	ND	05-13-92	CLP SVOA
DIBUTYL PHTHALATE	1700	ug/Kg	ND	05-13-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	1700	ug/Kg	ND	05-13-92	CLP SVOA
PHENOL	1700	ug/Kg	ND	05-13-92	CLP SVOA
NAPHTHALENE	1700	ug/Kg	22000	05-13-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-13-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES #

NITROBENZENE-d5(23-120) 107 % TERPHENYL-d14(18-137) 68 % 2-FLUOROPHENOL(25-121) 79 %
2-FLUOROBIPHENYL(30-115) 77 % PHENOL-d5(24-113) 85 % 2,4,6-TRIBROMOPHENOL(19-122) 70 %

METHANOL	2	ug/g	ND	05-20-92	GC/FID
FORMALDEHYDE	13099	ug/Kg	25000 B*	05-23-92	HPLC
BARIUM	3.8	mg/Kg	174	05-06-92	CLP METALS
CHROMIUM	1.4	mg/Kg	20.3	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	ND	05-06-92	CLP METALS
LEAD	0.2	mg/Kg	16.7	05-07-92	CLP METALS
NICKEL	1.6	mg/Kg	20.7	05-06-92	CLP METALS
BARIUM (TCLP)	16	ug/L	1330	05-13-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	ND	05-13-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	ND	05-13-92	CLP METALS
LEAD (TCLP)	1	ug/L	5.3	05-13-92	CLP METALS
NICKEL (TCLP)	8	ug/L	29.1	05-13-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 422605SW(109)

DATE : 06-05-92

SAMPLE MATRIX : SOIL
ATAS # : 4226.05
SAMPLE ID : SW/1(D) D 14.0-15.9 A

DATE SUBMITTED: 05-01-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	6	ug/Kg	4 J	05-08-92	CLP VOA
CARBON TERTACHLORIDE	6	ug/Kg	ND	05-08-92	CLP VOA
XYLENE	6	ug/Kg	77	05-08-92	CLP VOA
METHLY ISOBUTYL KETONE	12	ug/Kg	ND	05-08-92	CLP VOA
TOLUENE	6	ug/Kg	ND	05-08-92	CLP VOA
METHYL ETHYL KETONE	12	ug/Kg	14	05-08-92	CLP VOA
BENZENE	6	ug/Kg	ND	05-08-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-08-92	CLP VOA TIC
CUMENE	*	ug/Kg	ND	05-08-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-08-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-08-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-08-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 86 % BROMOFLUOROBENZENE(74-121) 113 % 1,2-DICHLOROETHANE-D4(70-121) 107 %

BUTYL BENZYL PHTHALATE	830	ug/Kg	ND	05-13-92	CLP SVOA
DIBUTYL PHTHALATE	830	ug/Kg	ND	05-13-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	830	ug/Kg	ND	05-13-92	CLP SVOA
PHENOL	830	ug/Kg	ND	05-13-92	CLP SVOA
NAPHTHALENE	830	ug/Kg	ND	05-13-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-13-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES #

NITROBENZENE-d5(23-120) 104 % TERPHENYL-d14(18-137) 83 % 2-FLUOROPHENOL(25-121) 79 %
2-FLUOROBIPHENYL(30-115) 85 % PHENOL-d5(24-113) 86 % 2,4,6-TRIBROMOPHENOL(19-122) 73 %

METHANOL	2	ug/g	ND	05-26-92	GC/FID
FORMALDEHYDE	12653	ug/Kg	27000 B*	05-24-92	HPLC
BARIUM	3.8	mg/Kg	138	05-06-92	CLP METALS
CHROMIUM	1.4	mg/Kg	19.1	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	ND	05-06-92	CLP METALS
LEAD	0.2	mg/Kg	15.0	05-07-92	CLP METALS
NICKEL	1.6	mg/Kg	20.3	05-06-92	CLP METALS
BARIUM (TCLP)	16	ug/L	1820	05-13-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	ND	05-13-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	ND	05-13-92	CLP METALS
LEAD (TCLP)	1	ug/L	6.8	05-13-92	CLP METALS
NICKEL (TCLP)	8	ug/L	44.7	05-13-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 422611SW(109)

DATE : 06-05-92

SAMPLE MATRIX : SOIL
ATAS # : 4226.11
SAMPLE ID : SW/1(D) C 19.0-58.0 A

DATE SUBMITTED: 05-01-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	6	ug/Kg	ND	05-11-92	CLP VOA
CARBON TERTACHLORIDE	6	ug/Kg	ND	05-11-92	CLP VOA
XYLENE	6	ug/Kg	4 J	05-11-92	CLP VOA
METHLY ISOBUTYL KETONE	12	ug/Kg	ND	05-11-92	CLP VOA
TOLUENE	6	ug/Kg	ND	05-11-92	CLP VOA
METHYL ETHYL KETONE	12	ug/Kg	180	05-11-92	CLP VOA
BENZENE	6	ug/Kg	ND	05-11-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-11-92	CLP VOA TIC
CUMENE	*	ug/Kg	ND	05-11-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-11-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-11-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-11-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 117 % BROMOFLUOROBENZENE(74-121) 89 % 1,2-DICHLOROETHANE-D4(70-121) 103 %

BUTYL BENZYL PHTHALATE	800	ug/Kg	ND	05-13-92	CLP SVOA
DIBUTYL PHTHALATE	800	ug/Kg	ND	05-13-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	800	ug/Kg	ND	05-13-92	CLP SVOA
PHENOL	800	ug/Kg	ND	05-13-92	CLP SVOA
NAPHTHALENE	800	ug/Kg	ND	05-13-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-13-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-13-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES #

NITROBENZENE-d5(23-120) 108 % TERPHENYL-d14(18-137) 63 % 2-FLUOROPHENOL(25-121) 80 %
2-FLUOROBIPHENYL(30-115) 102 % PHENOL-d5(24-113) 71 % 2,4,6-TRIBROMOPHENOL(19-122) 84 %

ETHANOL	2	ug/g	ND	05-20-92	GC/FID
FORMALDEHYDE	12855	ug/Kg	63000 B*	05-24-92	HPLC
BARIUM	3.8	mg/Kg	118	05-06-92	CLP METALS
CHROMIUM	1.4	mg/Kg	17.7	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	0.73	05-06-92	CLP METALS
LEAD	0.2	mg/Kg	12.3	05-07-92	CLP METALS
NICKEL	1.6	mg/Kg	26.5	05-06-92	CLP METALS
BARIUM (TCLP)	16	ug/L	1280	05-13-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	2.2	05-13-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	ND	05-13-92	CLP METALS
LEAD (TCLP)	1	ug/L	10.8	05-13-92	CLP METALS
NICKEL (TCLP)	8	ug/L	81.6	05-13-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 420305SW(107)
DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # : 4203.05
SAMPLE ID : SW/1(E)D 0.6-2.6 A

DATE SUBMITTED: 04-29-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	4000	ug/Kg	ND	05-06-92	CLP VOA
CARBON TERTACHLORIDE	4000	ug/Kg	ND	05-06-92	CLP VOA
XYLENE	7900	ug/Kg	190000	05-07-92	CLP VOA
METHLY ISOBUTYL KETONE	7900	ug/Kg	ND	05-06-92	CLP VOA
TOLUENE	4000	ug/Kg	1000 J	05-06-92	CLP VOA
METHYL ETHYL KETONE	7900	ug/Kg	ND	05-06-92	CLP VOA
BENZENE	4000	ug/Kg	ND	05-06-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
CUMENE	*	ug/Kg	***	05-06-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 105 % BROMOFLUOROBENZENE(74-121) 106 % 1,2-DICHLOROETHANE-D4(70-121) 102 %

BUTYL BENZYL PHTHALATE	840	ug/Kg	ND	05-07-92	CLP SVOA
DIBUTYL PHTHALATE	840	ug/Kg	120 J	05-07-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	840	ug/Kg	570 J	05-07-92	CLP SVOA
PHENOL	840	ug/Kg	ND	05-07-92	CLP SVOA
NAPHTHALENE	840	ug/Kg	3500	05-07-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-00-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(23-120) 19**% TERPHENYL-d14(18-137) 110 % 2-FLUOROPHENOL(25-121) 92 %
2-FLUOROBIPHENYL(30-115) 102 % PHENOL-d5(24-113) 17**% 2,4,6-TRIBROMOPHENOL(19-122) 99 %

METHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	12745	ug/Kg	44000 B*	05-23-92	HPLC
BARIUM	3.8	mg/Kg	168	05-06-92	CLP METALS
CHROMIUM	1.4	mg/Kg	16.0	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	1.3	05-06-92	CLP METALS
LEAD	0.2	mg/Kg	90.9	05-07-92	CLP METALS
NICKEL	1.6	mg/Kg	21.6	05-06-92	CLP METALS
BARIUM (TCLP)	16	ug/L	1510	05-11-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	3.2	05-11-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	ND	05-11-92	CLP METALS
LEAD (TCLP)	1	ug/L	49.3	05-12-92	CLP METALS
NICKEL (TCLP)	8	ug/L	56.9	05-11-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 420306SW(107)

DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # : 4203.06
SAMPLE ID : SW/1(E)C 2.6-7.6 A

DATE SUBMITTED: 04-29-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	1300	ug/Kg	ND	05-06-92	CLP VOA
CARBON TERTACHLORIDE	1300	ug/Kg	ND	05-06-92	CLP VOA
XYLENE	1300	ug/Kg	27000	05-06-92	CLP VOA
METHLY ISOBUTYL KETONE	2600	ug/Kg	ND	05-06-92	CLP VOA
TOLUENE	1300	ug/Kg	650 J	05-06-92	CLP VOA
METHYL ETHYL KETONE	2600	ug/Kg	ND	05-06-92	CLP VOA
BENZENE	1300	ug/Kg	ND	05-06-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-06-92	CLP VOA TIC
CUMENE	*	ug/Kg	***	05-06-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-06-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 93 % BROMOFLUOROBENZENE(74-121) 93 % 1,2-DICHLOROETHANE-D4(70-121) 94 %

BUTYL BENZYL PHTHALATE	840	ug/Kg	ND	05-07-92	CLP SVOA
DIBUTYL PHTHALATE	840	ug/Kg	ND	05-07-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	840	ug/Kg	160 J	05-07-92	CLP SVOA
PHENOL	840	ug/Kg	ND	05-07-92	CLP SVOA
NAPHTHALENE	840	ug/Kg	390 J	05-07-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(23-120) 56 % TERPHENYL-d14(18-137) 89 % 2-FLUOROPHENOL(25-121) 64 %
2-FLUOROBIPHENYL(30-115) 78 % PHENOL-d5(24-113) 72 % 2,4,6-TRIBROMOPHENOL(19-122) 71 %

METHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	12825	ug/Kg	54000 B*	05-23-92	HPLC
BARIUM	3.8	mg/Kg	101	05-06-92	CLP METALS
CHROMIUM	1.4	mg/Kg	23.2	05-06-92	CLP METALS
CADMIUM	0.4	mg/Kg	0.55	05-06-92	CLP METALS
LEAD	0.2	mg/Kg	21.8	05-07-92	CLP METALS
NICKEL	1.6	mg/Kg	23.6	05-06-92	CLP METALS
BARIUM (TCLP)	16	ug/L	1580	05-11-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	ND	05-11-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	ND	05-11-92	CLP METALS
LEAD (TCLP)	1	ug/L	21.3	05-12-92	CLP METALS
NICKEL (TCLP)	8	ug/L	55.2	05-11-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 422001SW(107)

DATE : 05-26-92

SAMPLE MATRIX : SOIL
ATAS # 4220.01
SAMPLE ID : SW/1(F)C 2.5-10.5 A

DATE SUBMITTED: 04-30-92
PROJECT : 1-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	6	ug/Kg	6 J	05-08-92	CLP VOA
CARBON TERTACHLORIDE	6	ug/Kg	ND	05-08-92	CLP VOA
YLENE	6	ug/Kg	ND	05-08-92	CLP VOA
ETHLY ISOBUTYL KETONE	13	ug/Kg	ND	05-08-92	CLP VOA
TOLUENE	6	ug/Kg	ND	05-08-92	CLP VOA
ETHYL ETHYL KETONE	13	ug/Kg	ND	05-08-92	CLP VOA
ENZENE	6	ug/Kg	ND	05-08-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-08-92	CLP VOA TIC
UMENE	*	ug/Kg	ND	05-08-92	CLP VOA TIC
-BUTANOL	*	ug/Kg	ND	05-08-92	CLP VOA TIC
-ETHOXYETHANOL	*	ug/Kg	ND	05-08-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-08-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

OLUENE-d8(81-117) 89 % BROMOFLUOROBENZENE(74-121) 110 % 1,2-DICHLOROETHANE-D4(70-121) 107 %

UTYL BENZYL PHTHALATE	420	ug/Kg	ND	05-07-92	CLP SVOA
IBUTYL PHTHALATE	420	ug/Kg	ND	05-07-92	CLP SVOA
(2-ETHYLHEXYL)PHTHALATE	420	ug/Kg	ND	05-07-92	CLP SVOA
ENOL	420	ug/Kg	ND	05-07-92	CLP SVOA
NAPHTHALENE	420	ug/Kg	ND	05-07-92	CLP SVOA
CLOHEXANONE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
LUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
ICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC
SPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-07-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

TROBENZENE-d5(23-120) 77 % TERPHENYL-d14(18-137) 103 % 2-FLUOROPHENOL(25-121) 78 %
2-FLUOROBIPHENYL(30-115) 109 % PHENOL-d5(24-113) 93 % 2,4,6-TRIBROMOPHENOL(19-122) 91 %

THANOL	2	ug/g	ND	05-11-92	GC/FID
ORMALDEHYDE	12992	ug/Kg	17000 B*	05-24-92	HPLC
RIUM	3.8	mg/Kg	209	05-06-92	CLP METALS
ROMIUM	1.4	mg/Kg	17.5	05-06-92	CLP METALS
ADMIUM	0.4	mg/Kg	0.6	05-06-92	CLP METALS
AD	0.2	mg/Kg	175	05-07-92	CLP METALS
CKEL	1.6	mg/Kg	22.9	05-06-92	CLP METALS
RIUM (TCLP)	16	ug/L	1800	05-11-92	CLP METALS
OMIUM (TCLP)	2	ug/L	2.0	05-11-92	CLP METALS
ROMIUM (TCLP)	3	ug/L	ND	05-11-92	CLP METALS
EAD (TCLP)	1	ug/L	63.6	05-12-92	CLP METALS
CKEL (TCLP)	8	ug/L	73.6	05-11-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 424301SW(108)

DATE : 06-01-92

SAMPLE MATRIX : SOIL
ATAS # : 4243.01
SAMPLE ID : SW/1(G)D5.0-8.0A

DATE SUBMITTED: 05-04-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	810	ug/Kg	300 J	05-07-92	CLP VOA
CARBON TERTACHLORIDE	810	ug/Kg	ND	05-07-92	CLP VOA
XYLENE	810	ug/Kg	ND	05-07-92	CLP VOA
METHLY ISOBUTYL KETONE	1600	ug/Kg	ND	05-07-92	CLP VOA
TOLUENE	810	ug/Kg	ND	05-07-92	CLP VOA
METHYL ETHYL KETONE	1600	ug/Kg	ND	05-07-92	CLP VOA
BENZENE	810	ug/Kg	ND	05-07-92	CLP VOA
ETHYL ACETATE	*	ug/Kg	ND	05-07-92	CLP VOA TIC
CUMENE	*	ug/Kg	ND	05-07-92	CLP VOA TIC
1-BUTANOL	*	ug/Kg	ND	05-07-92	CLP VOA TIC
2-ETHOXYETHANOL	*	ug/Kg	ND	05-07-92	CLP VOA TIC
2-METHYL-1-PROPANOL	*	ug/Kg	ND	05-07-92	CLP VOA TIC

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 91 % BROMOFLUOROBENZENE(74-121) 120 % 1,2-DICHLOROETHANE-D4(70-121) 92 %

BUTYL BENZYL PHTHALATE	86000	ug/Kg	ND	05-14-92	CLP SVOA
DIBUTYL PHTHALATE	86000	ug/Kg	ND	05-14-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	86000	ug/Kg	ND	05-14-92	CLP SVOA
PHENOL	86000	ug/Kg	ND	05-14-92	CLP SVOA
NAPHTHALENE	86000	ug/Kg	ND	05-14-92	CLP SVOA
CYCLOHEXANONE	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
TOLUENE-2,4-DIISOCYANATE	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
NITROSOIMINO DIETHANOL	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
EPICHLOROHYDRIN	*	ug/Kg	ND	05-14-92	CLP SVOA TIC
BISPHENOL A/EPICHLOROHYDRIN	*	ug/Kg	ND	05-14-92	CLP SVOA TIC

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(23-120) D % TERPHENYL-d14(18-137) D % 2-FLUOROPHENOL(25-121) D %
2-FLUOROBIPHENYL(30-115) D % PHENOL-d5(24-113) D % 2,4,6-TRIBROMOPHENOL(19-122) D %

METHANOL	2	ug/g	ND	05-11-92	GC/FID
FORMALDEHYDE	13774	ug/Kg	14000 B*	05-24-92	HPLC
BARIUM	3.8	mg/Kg	106	05-11-92	CLP METALS
CHROMIUM	1.4	mg/Kg	12.8	05-11-92	CLP METALS
CADMIUM	0.4	mg/Kg	0.99	05-11-92	CLP METALS
LEAD	0.2	mg/Kg	105	05-13-92	CLP METALS
NICKEL	1.6	mg/Kg	17.2	05-11-92	CLP METALS
BARIUM (TCLP)	16	ug/L	863	05-18-92	CLP METALS
CADMIUM (TCLP)	2	ug/L	4.8	05-18-92	CLP METALS
CHROMIUM (TCLP)	3	ug/L	3.6	05-18-92	CLP METALS
LEAD (TCLP)	1	ug/L	19.2	05-13-92	CLP METALS
NICKEL (TCLP)	8	ug/L	37.7	05-18-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 416601SW(107)

DATE : 05-26-92

DESCRIPTIONS OF FOOTNOTES

ND = NOT DETECTED
g/Kg = PARTS PER BILLION(PPB)
g/Kg = PARTS PER MILLION(PPM)
ug/g = PARTS PER MILLION(PPM)
ug/L = PARTS PER BILLION(PPB)
g/mL = PARTS PER MILLION(PPM)
TIC = TENTATIVELY IDENTIFIED COMPOUND
* = NO DETECTION LIMIT AVAILABLE
** = OUTSIDE QC ON BOTH ORIGINAL AND RERUN
*** = CUMENE OR ISOMERS OF CUMENE WERE IDENTIFIED IN THE SEMI-VOLATILE TIC's.
B = ANALYTE ALSO FOUND IN BLANK
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

OTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Page 1 of 1
Laboratory ATAS
Attn: R. MANUZ

Analysis Parameters/Sample Container Description
(Include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab/Discrete	VOA	SEMI VOA	METALS				Total Number of Containers	Remarks/Matrix
01 SW/1(A) D 6.1-6.9 A		09:25	4/23/92		X	✓	✓	✓				3	CLP per bid for
02 SW/1(A) C 19.0-61.0 A		15:00	4/23/92	X		✓	✓	✓				3	STEELCOTE Project
													for analytes of
													concern

Project Information	Sample Receipt	
Project Number: Z-301-05	Total Number of Containers	6
Project Name: STEELCOTE	COC Seals/Intact? Y/N/NA	
Contact: Lawrence Rosen	Received Good Cond./Cold	YES
Ongoing Project? Yes ☒ No ☐	Delivery Method: HAND DELIVERED (attach shipping bill, if any)	
Sampler: Lawrence Rosen		

Instructions

Requested Turn Around Time: Standard

Special Instructions:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Lawrence C. Rosen Time: 16:02	Signature: Time:	Signature: Time:
Printed Name: Lawrence C. Rosen Date: 4/23/92	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Lawton Massenberg Time: 16:04	Signature: Time:	Signature: Time:
Printed Name: LAWTON MASSENBERG Date: 4/23/92	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No. 11229

SHANNON & WILSON FAX TO PETER MARTIN 005/009

Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Laboratory ATAS
Attn: E. HANNZ

WD 4-28-92 2B2 SW10.8A

Analysis Parameters/Sample Container Description
(Include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	METALS TCLP	TOTAL ICE	SEMI VOA ICE	VOA ICE				Total Number of Containers	Remarks/Matrix
SW/1(B)D11.0-12.0A	4188.01	11:15	4/27/92		X	✓	✓	✓					3	Soil
SW/1(B)C 14.0-19.0A	02	11:30		X		✓	✓	✓					3	
SW/1(B)D19.0-21.3A	03	11:50			X	✓	✓	✓					3	
SW/1(B)C 24.0-59.0A	04	15:25		X		✓	✓	✓					3	
	4188.05 TCLP													Analyze per
	06													Steelcote bid
	07													
	4188.08													

Project Information	Sample Receipt	
Project Number: Z-301-65	Total Number of Containers	12
Project Name: STEELCOTE	COC Seals/Intact? Y/N/NA	NA
Contact: Lawrence Rosen	Received Good Cond./Cold	YES
Ongoing Project? Yes ☒ No ☐	Delivery Method: HAND DELIVERY (attach shipping bill, if any)	
Sampler: Lawrence Rosen		

Instructions

Requested Turn Around Time: Standard

Special Instructions:
Call if you have questions

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Lawrence C. Rosen Time: 16:45	Signature: Time:	Signature: Time:
Printed Name: Lawrence C. Rosen Date: 4/27/92	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Walter Dotson Time: 16:45	Signature: Time:	Signature: Time:
Printed Name: WALTER DOTSON Date: 4-27-92	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No. 11030

Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Laboratory ATAS
Attn: R. MANNZ

WD
4-30-92
2BZ
SW6.BA

Analysis Parameters/Sample Container Description
(Include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	(ECE) METALS TOTAL & TCLP	SEMI VOA	VOA				Total Number of Containers	Remarks/Matrix
SW/1(C)D 8.5-9.0 A		09:30	4/29/92		X	✓	✓	✓				3	SOIL 4203.01
SW/1(C)C 9.0-14.0 A		09:45	4/29/92	X		✓	✓	✓				3	02
SW/1(C)C 14.0-24.0 A		10:15	4/29/92	X		✓	✓	✓				3	03
SW/1(C)C 24.0-61.5 A		14:15	4/29/92	X		✓	✓	✓				3	04
SW/1(E)D 0.6-2.6 A		14:15	4/29/92		X	✓	✓	✓				3	05
SW/1(E)C 2.6-7.6 A		15:00	4/29/92	X		✓	✓	✓				3	06
													07 TCLP
													08 TCLP
													09 TCLP
													10 TCLP
													11 - TCLP
													4203.12 TCLP

Project Information	Sample Receipt	
Project Number: Z-301-05	Total Number of Containers	18
Project Name: STEELCOTE	COC Seals/Intact? Y/N/NA	
Contact: Lawrence Rosen	Received Good Cond./Cold	YES
Ongoing Project? Yes ☒ No ☐	Delivery Method: HAND DELIVERY (attach shipping bill, if any)	
Sampler: L. Rosen, T. Hippenstiel		

Instructions

Requested Turn Around Time: STANDARD

Special Instructions:
PER STEELCOTE B/D

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Lawrence C. Rosen Time: ~~16:42~~ 17:42	Signature: [illegible] 4/29/92 Time:	Signature: Time:
Printed Name: Lawrence C. Rosen Date: ~~4/29/92~~	Printed Name: Date:	Printed Name: Date:
Company: SHANNON & WILSON	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Lawton Massenberg Time: 17:45	Signature: Time:	Signature: Time:
Printed Name: LAWTON MASSENBERG Date: ~~17:45~~	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

No. 11231

Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Laboratory ATAS
Attn: R. MANNZ

Analysis Parameters/Sample Container Description
(Include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	ICE	METALS TOTAL ICE	SEMI VOA ICE	VOA				Total Number of Containers	Remarks/Matrix
Sw/1(F)C2.5-10.5A		13:10	4/30/92	X		1							3	Soil 4220.01
														↓ .02

LM 5-1-92 1A1-BA

Project Information		Sample Receipt	
Project Number: 2-301-05		Total Number of Containers	3
Project Name: STEELCOTE		COC Seals/Intact? Y/N/NA	
Contact: Lawrence Rosen		Received Good Cond./Cold	YES
Ongoing Project? Yes ☒ No ☐		Delivery Method: HAND DELIVERED (attach shipping bill, if any)	
Sampler: L. Rosen, T. Hjerpsteel			

Instructions

Requested Turn Around Time: STANDARD

Special Instructions:
PER STEELCOTE BID

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Lawrence C. Rosen Time: 17:00	Signature: Time:	Signature: Time:
Printed Name: Lawrence C. Rosen Date: 4/30/92	Printed Name: Date:	Printed Name: Date:
Company: SHANNON & WILSON	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Lawton Massenberg Time: 17:00	Signature: Time:	Signature: Time:
Printed Name: LAWTON MASSENBERG Date: 5/7:00	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No 11030

Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Page 1 of 1
Laboratory ATAS
Attn: R. MANNZ

Analysis Parameters/Sample Container Description
(Include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	(COLD) VOA	(COLD) SEMI VOA	(COLD) Metals TOTAL & TCLP				Total Number of Containers	Remarks/Matrix
SW/1(D) D6.5-9.0 A		09:00	5/1/92		x	✓	✓	✓				3	Soil 4226.01-02 (T
SW/1(D) D11.5-12.5 A		09:15	↓		x	✓	✓	✓				3	.03-04 (T
SW/1(D) D14.0-15.9 A		09:50			x	✓	✓	✓				3	.05-06 (T
SW/1(D) D14.0-15.9 AMS		09:50			x	✓	✓	✓				3	.07-08 (T
SW/1(D) D14.0-15.9 AMSD		09:50			x	✓	✓	✓				3	.09-10 (T
SW/1(D) C 19.0-58.0 A		13:50	↓	x		✓	✓	✓				3	↓ .11-12 (T

LM 5-2-92 IAI-BA

Project Information		Sample Receipt	
Project Number: Z-301-05		Total Number of Containers	18
Project Name: STEELCOTE		COC Seals/Intact? Y/N/NA	
Contact: Lawrence Rosen		Received Good Cond./Cold	YES
Ongoing Project? Yes ☒ No ☐		Delivery Method: HAND DELIVERED (attach shipping bill, if any)	
Sampler: Lawrence Rosen			

Instructions

Requested Turn Around Time: STANDARD

Special Instructions: Analyze per STEELCOTE BID

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Lawrence C. Rosen Time: 15:40	Signature: Time:	Signature: Time:
Printed Name: Lawrence C. Rosen Date: 5/1/92	Printed Name: Date:	Printed Name: Date:
Company: SHANNON & WILSON	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Walter Dotson Time: 15:42	Signature: Time:	Signature: Time:
Printed Name: WALTER DOTSON Date: 5-1-92	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No. 11233

Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Page 1 of 1
Laboratory ATAS
Attn: R. MANNZ

WO
5-5-92
2B3
SWLO.BA

Analysis Parameters/Sample Container Description
(Include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	VOA (COLD)	SEMI VOA (COLD)	TCLP METALS TOTAL				Total Number of Containers	Remarks/Matrix
SW/1(G)DS:0-8.0A	4243.01	16:10	5-4-92		b	✓	✓	✓				3	SOIL
	4243.02TCLP												

Project Information	Sample Receipt	
Project Number: Z-301-05	Total Number of Containers	3
Project Name: STEELCOTE	COC Seals/Intact? Y/N/NA	
Contact: Lawrence Rosen	Received Good Cond./Cold	YES
Ongoing Project? Yes ☒ No ☐	Delivery Method: HAND DELIVERY (attach shipping bill, if any)	
Sampler: Lawrence Rosen		

Instructions

Requested Turn Around Time: STANDARD TURNAROUND

Special Instructions:

PER STEELCOTE BID

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Lawrence C. Rosen Time: 17:20	Signature: Time:	Signature: Time:
Printed Name: Lawrence C. Rosen Date: 5-4-92	Printed Name: Date:	Printed Name: Date:
Company: SHANNON & WILSON	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Walt Dotson Time: 17:20	Signature: Time:	Signature: Time:
Printed Name: WALTER DOTSON Date: 5-4-92	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No. 11234

Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Page 1 of 1
Laboratory ATAS
Attn: R. MANNI

Analysis Parameters/Sample Container Description
(include preservative if used)

LM 5/14/92 IAG-BA

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	VOA COLD	SEMI VOA COLD	METALS TOTAL COLD				Total Number of Containers	Remarks/Matrix
SW/1 (BACKGROUND) A		14:00	5/13/92		X	✓	✓	✓				3	SOIL 4309.01
SW/1 (BACKGROUND) AA		14:00	5/13/92		X	✓	✓	✓				3	SOIL .02
													.03
													.04

Project Information	Sample Receipt	
Project Number: Z-301-05	Total Number of Containers	6
Project Name: STEELCOTE	COC Seals/Intact? Y/N/NA	
Contact: Lawrence Rosen	Received Good Cond./Cold	YES
Ongoing Project? Yes ☒ No ☐	Delivery Method: HAND DELIVERY (attach shipping bill, if any)	
Sampler: L. ROSEN		

Instructions
Requested Turn Around Time: STANDARD
Special Instructions: PER STEELCOTE BID SPECS

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Lawrence C. Rosen Time: 15:10	Signature: Time:	Signature: Time:
Printed Name: Lawrence C. Rosen Date: 5/13/92	Printed Name: Date:	Printed Name: Date:
Company: SHANNON & WILSON	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Walter Dotson Time: 15:10	Signature: Time:	Signature: Time:
Printed Name: WALTER DOTSON Date: 5-13-92	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

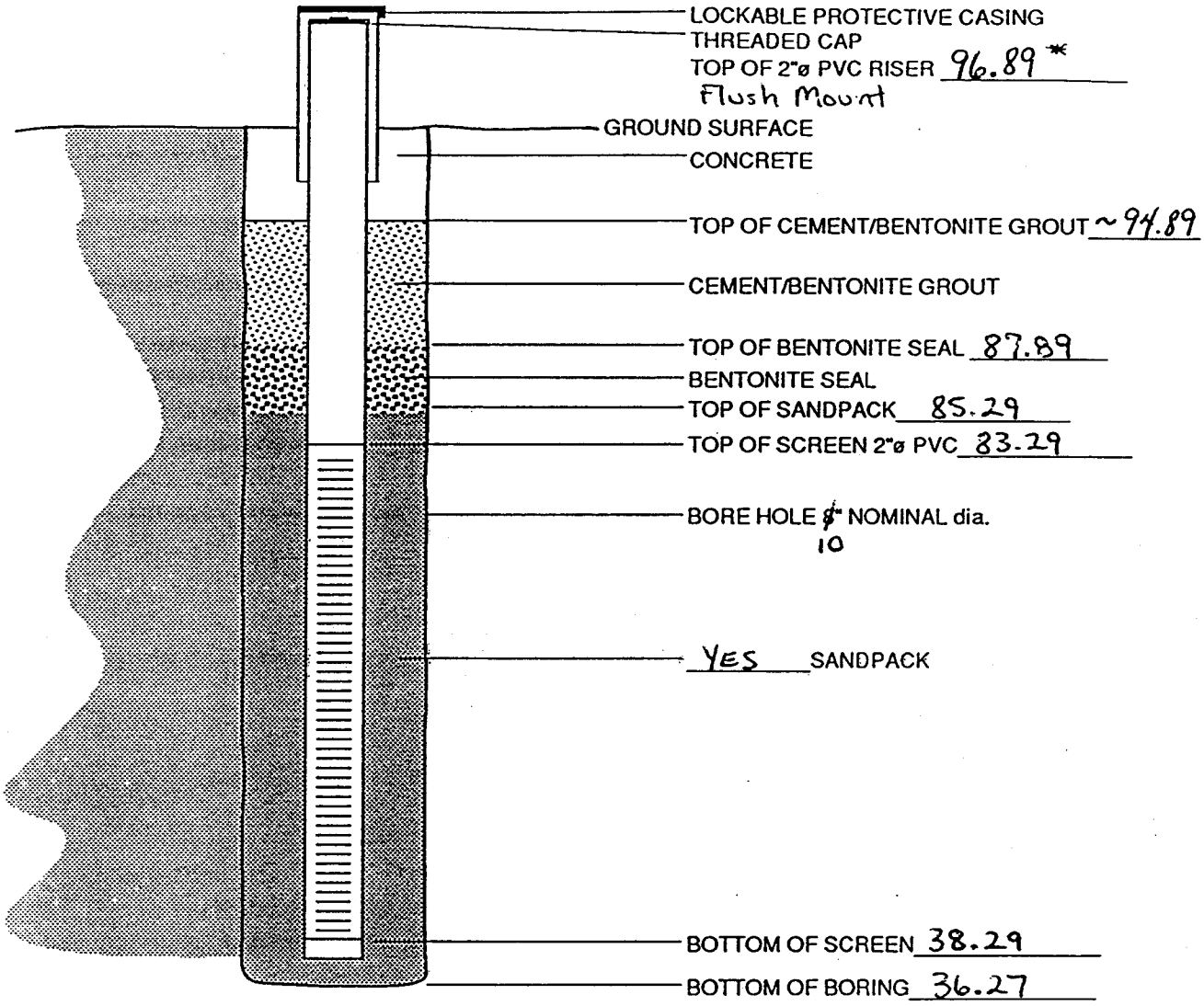
Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No. 11235

WELL CONSTRUCTION LOGS AND DEVELOPMENT DATA

SWGW/1(A)



WELL COMPONENTS

SCREEN 2"ø PVC #10 continuous slot (45')

RISER PIPE 2"ø PVC

GROUT Cement-Bentonite

BENTONITE SEAL 3/8" Bentonite Pellets

SANDPACK Colorado Silica Sand 10-20

PROTECTIVE CASING Robco Flush Mount

* Ground Surface @ 97.27, Top of protective plate @ 97.27.

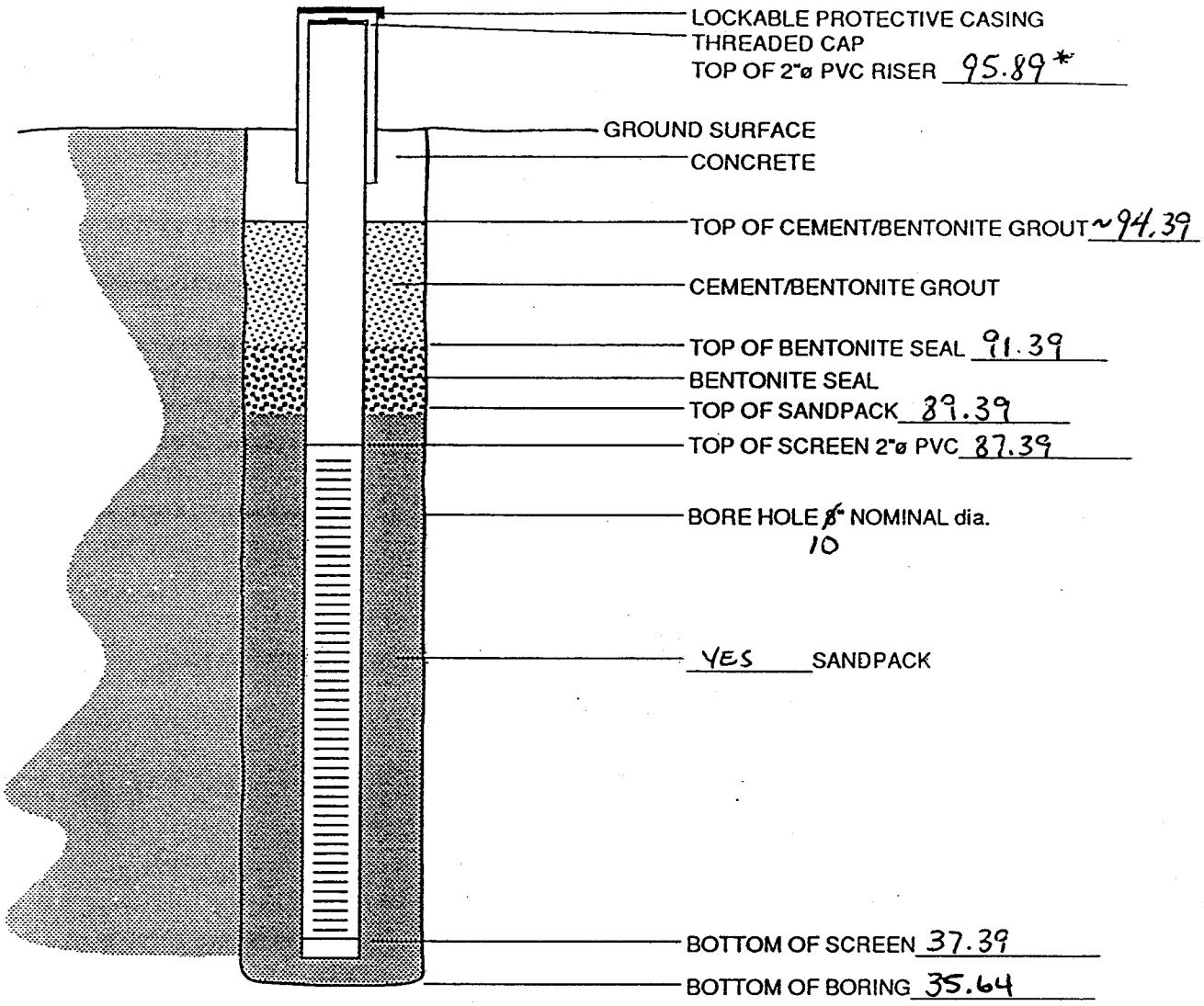
Z-301-01 STEELCOTE FACILITY

WELL CONSTRUCTION LOG

SHANNON & WILSON, INC.
Geotechnical Consultants

FIGURE 7

SWGW/1(B)



WELL COMPONENTS

SCREEN 2" ϕ PVC #10 slotted (50')

RISER PIPE 2" ϕ PVC

GROUT Cement - Bentonite

BENTONITE SEAL 3/8" Bentonite Pellets

SANDPACK Colorado Silica Sand

PROTECTIVE CASING Robco Flush Mount

* Ground Surface @ 95.89; top of protective plate @ 96.14.

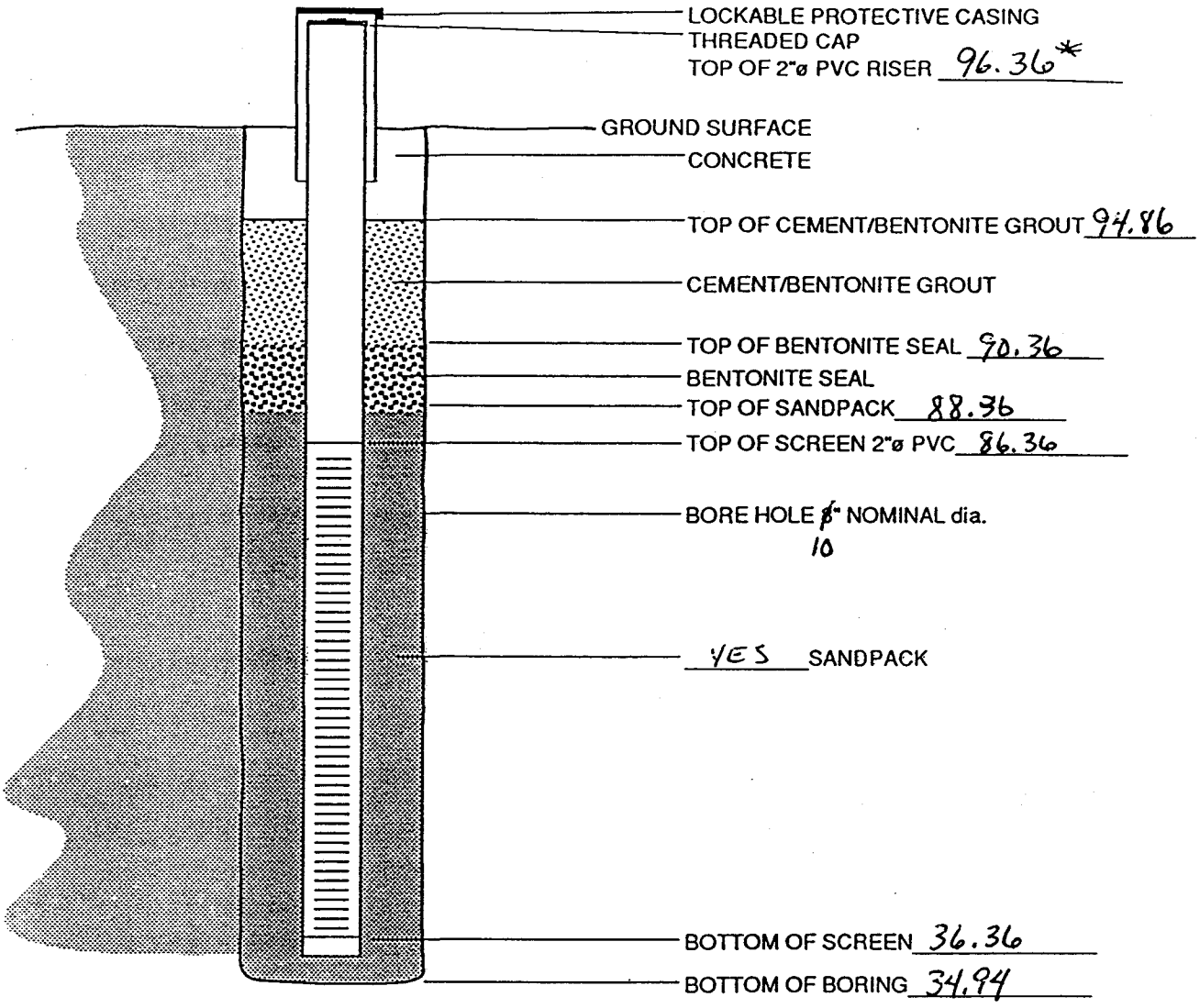
WELL CONSTRUCTION LOG

Z-301-01 STEELCOTE FACILITY

SHANNON & WILSON, INC.
Geotechnical Consultants

FIGURE 7

SWGW/1(C)



WELL COMPONENTS

SCREEN 2" ϕ PVC #10 slotted (50')

RISER PIPE 2" ϕ PVC

GROUT Cement - Bentonite

BENTONITE SEAL 3/8" Bentonite Pellets

SANDPACK Colorado Silica Sand 10-20

PROTECTIVE CASING Robco Flush Mount

* Ground surface @ 96.44, top of protective plate @ 96.65.

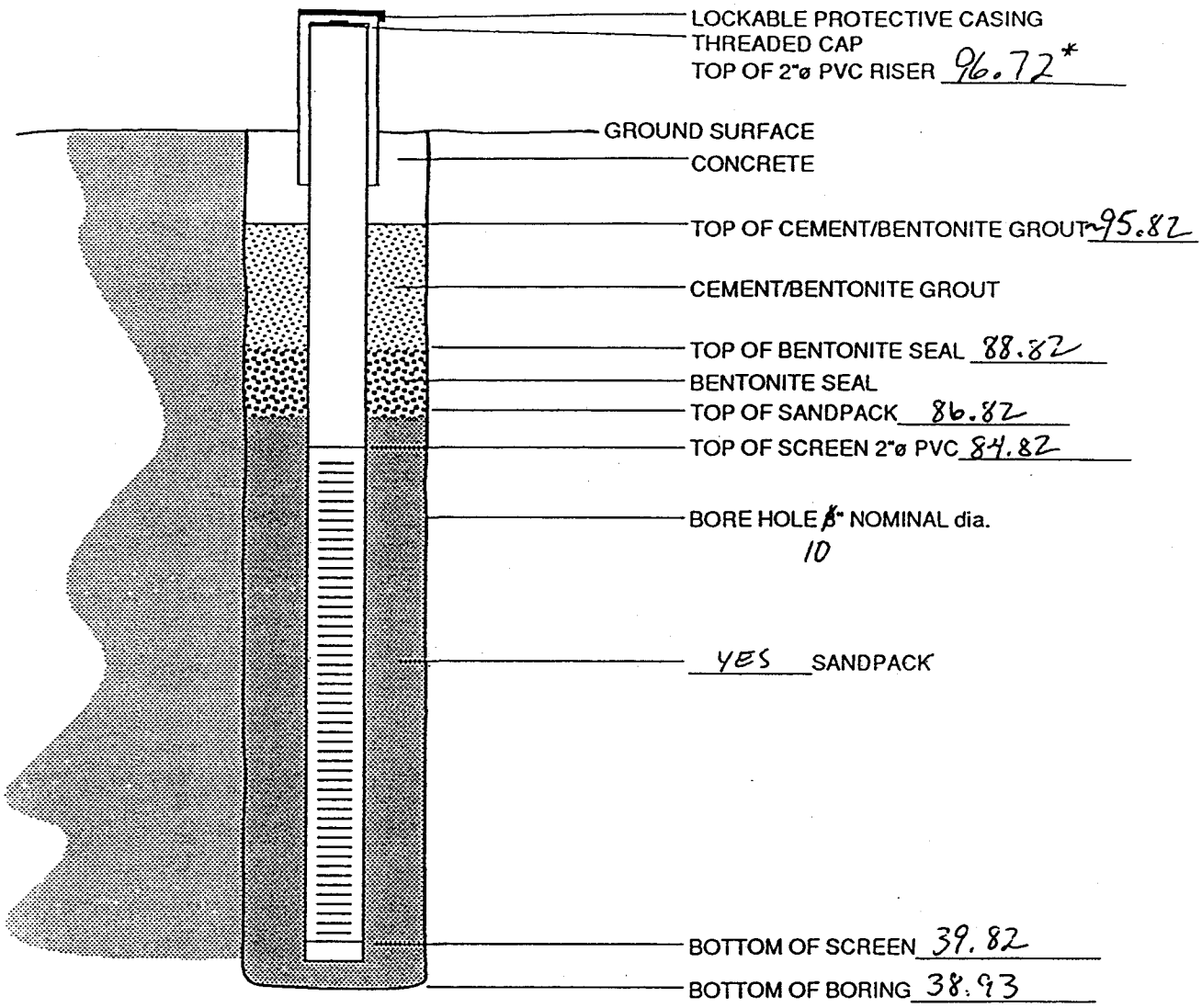
WELL CONSTRUCTION LOG

Z-301-01 STEELCOTE FACILITY

SHANNON & WILSON, INC.
Geotechnical Consultants

FIGURE 7

SWGW/1(D)



WELL COMPONENTS

SCREEN 2" ϕ PVC #10 slot (45')

RISER PIPE 2" ϕ PVC

GROUT Cement-Bentonite

BENTONITE SEAL 3/8" Bentonite Pellets

SANDPACK Colorado Silica Sand 10-20

PROTECTIVE CASING Robco

* Ground surface @ 96.93, top of protective plate @ 97.01

WELL CONSTRUCTION LOG

Z-301-01 STEELCOTE FACILITY

SHANNON & WILSON, INC.
Geotechnical Consultants

FIGURE 7

JOB NAME STEELCOTE JOB NO. Z-301-05

BY L. ROSEN DATE 5-5-92 SHEET 1 OF 1

WELL DEVELOPMENT DATA

1. Well No. SWGW/1(A)
2. Date of Installation 4-24-92
3. Date of Development 5-5-92
4. Static Water Level: Before Dev. 14.5 Ft.; 20.4' @ 11:30 5/4/92 24 Hours After 17.9 Ft.
5. Quantity of Water Loss During Drilling, If Used Ø Gal.
6. Quantity of Standing Water in Well and Annulus Before Dev. 7.26 in well Gal.

	Start	During		End
7. Specific Conductance (μmhos/c)	1365	1214	1009	1116
Temperature (c)	16.7	16.3	15.8	15.7
pH (s.u.)	6.60	6.65	6.60	6.60

8. Depth from Top of Well Casing to Bottom of Well 58.6 Ft.
9. Screen Length 45 Ft.
10. Depth to Top of Sediment: Before Dev. 58.5 Ft.; After Dev. 58.6 Ft.
11. Physical Character of Water: Initial - turbid, lt gray color, some c fines
12. Type and Size of Well Development Equipment: 1 7/8" OD Rod Pump / Hand Pump
13. Description of Surge Technique, If Used: Raised and lowered rod pump in screened interval
14. Height of Well Casing Above Ground Surface: ~ -0.5 Ft.
15. Quantity of Water Removed: ~ 50-52 Ga.
16. 1-Pint Water Sample Collected: 11:20 (Time)

* Development Conditions:

(1) Well Water is Reasonably Clear

(2) Sediment Thickness <5% of Screen Length ✓

(3) Removal of 5 Well Volumes, ~~Including Saturated Filter Annulus~~

(4) Stabilization of Specific Conductance and Water Temperature

17. After Final Development of the well, water from each well will be placed into the 1 liter clear glass container and photographed as a 35 mm. color slide to be submitted as part of the well log.
18. QA/QC: Development Performed by: Tim Crank / L. Rosen

Site Manager: Lawrence C. Rosen

WELL DEVELOPMENT LOG

Z-301-01 STEELCOTE FACILITY

JOB NAME STEELCOTE JOB NO. Z-301-05

BY L. Rosen DATE 5-5-92 SHEET 1 OF 1

WELL DEVELOPMENT DATA

1. Well No. SWGW/1(3)
2. Date of Installation 4/28/92
3. Date of Development 5/5/92 49.2 @ 14:05 5/5/92
4. Static Water Level: Before Dev. 36.1 Ft.; 24 Hours After 36.4 Ft.
5. Quantity of Water Loss During Drilling, If Used ~ 10 Gal.
6. Quantity of Standing Water in Well ~~and Annulus~~ Before Dev. 3.8 Gal.

	Start	During		End
7. Specific Conductance (μmhos/c)	1057	1056	1073	1090
Temperature (c)	18.0	16.8	16.3	16.3
pH (s.u.)	6.65	6.75	6.70	6.70

8. Depth from Top of Well Casing to Bottom of Well 59.5 Ft.
9. Screen Length 50 Ft.
10. Depth to Top of Sediment: Before Dev. 57.2 Ft.; After Dev. (None) 58.5 Ft.
11. Physical Character of Water: Turbid brown gray initially
12. Type and Size of Well Development Equipment: 1 1/8" OD Hand Pump
13. Description of Surge Technique, If Used: Surge block at end of mine rods caused lowered in screened interval prior to pumping
14. Height of Well Casing Above Ground Surface: ~0.2 Ft.
15. Quantity of Water Removed: ~54-55 Ga.
16. 1-Pint Water Sample Collected: 14:05 (Time)

* Development Conditions:

(1) Well Water is Reasonably Clear

(2) Sediment Thickness <5% of Screen Length

(3) Removal of 5 Well Volumes, Including Saturated Filter Annulus

(4) Stabilization of Specific Conductance and Water Temperature

17. After Final Development of the well, water from each well will be placed into the 1 liter clear glass container and photographed as a 35 mm. color slide to be submitted as part of the well log.
18. QA/QC: Development Performed by: Tim Crook / L. Rosen

Site Manager: Lawrence C. Rosen

WELL DEVELOPMENT LOG

Z-301-01 STEELCOTE FACILITY

JOB NAME STEELCOTE JOB NO. Z-301-05

BY L. Rosen DATE 5-5-92 SHEET 1 OF 1

WELL DEVELOPMENT DATA

1. Well No. SWGW1, (c)
2. Date of Installation 4-30-92
3. Date of Development 5-5-92 44.9' @ 15:20 5-5-92
4. Static Water Level: Before Dev. 40.1 Ft.; 24 Hours After 41.8 Ft.
5. Quantity of Water Loss During Drilling, If Used NONE Gal.
6. Quantity of Standing Water in Well and Annulus Before Dev. -19.8' -> 3.2 Gal.

	Start	During		End
7. Specific Conductance (μmhos/c)	1149	1236	1297	1195
Temperature (c)	16.4	15.3	15.2	15.2
pH (s.u.)	6.70	6.65	6.65	6.70

8. Depth from Top of Well Casing to Bottom of Well 60.0 Ft.
9. Screen Length 50 Ft.
10. Depth to Top of Sediment: Before Dev. 59.9 -> No sediment? Ft.; After Dev. 60.0 Ft.
11. Physical Character of Water: Turbid, gray brown; cleared up slightly during removal of last 20 gallons
12. Type and Size of Well Development Equipment: ~1 5/8" OD Hand Pump
13. Description of Surge Technique, If Used: Surge block, raised and lowered in the screened interval
14. Height of Well Casing Above Ground Surface: ~ -0.25 Ft.
15. Quantity of Water Removed: ~54-55 Ga.
16. 1-Pint Water Sample Collected: 15:15 (Time)

* Development Conditions:

(1) Well Water is Reasonably Clear

(2) Sediment Thickness <5% of Screen Length

(3) Removal of 5 Well Volumes, Including Saturated Filter Annulus

(4) Stabilization of Specific Conductance and Water Temperature

17. After Final Development of the well, water from each well will be placed into the 1 liter clear glass container and photographed as a 35 mm. color slide to be submitted as part of the well log.
18. QA/QC: Development Performed by: T. Grant / R. Dresser

Site Manager: Lawrence C. Rose

WELL DEVELOPMENT LOG

JOB NAME STEELCOTE JOB NO. Z-301-05

BY L. ROSEN DATE 5-6-92 SHEET 1 OF 1

WELL DEVELOPMENT DATA

1. Well No. SWGW1(D)
2. Date of Installation 5-4-92
3. Date of Development 5-6-92 46.3 @15:20 5/6/92
4. Static Water Level: Before Dev. 14.8 Ft.; 24 Hours After 15.1 Ft.
5. Quantity of Water Loss During Drilling, If Used Ø Gal.
6. Quantity of Standing Water in Well ~~and Annulus~~ Before Dev. 6.9 Gal.

	Start	During		End		
7. Specific Conductance (μmhos/c)	575	622	645	668	726 859	895
Temperature (c)	17.9	17.4	16.9	16.8	16.6 16.8	16.4
pH (s.u.)	6.65	7.05	7.00	7.25	7.15 7.10	7.10

8. Depth from Top of Well Casing to Bottom of Well 56.9 Ft.
9. Screen Length 45 Ft.
10. Depth to Top of Sediment: Before Dev. 56.7 Ft.; After Dev. 56.9 Ft.
11. Physical Character of Water: Turbid from suspended sediment, no odor or sheen
12. Type and Size of Well Development Equipment: 1 5/8" OD Hand Pump
13. Description of Surge Technique, If Used: Raise & lower hand pump in screened interval
14. Height of Well Casing Above Ground Surface: ~ -0.4 Ft.
15. Quantity of Water Removed: ~90 Ga.
16. 1-Pint Water Sample Collected: 15:20 (Time)

* Development Conditions:

(1) Well Water is Reasonably Clear

(2) Sediment Thickness <5% of Screen Length

(3) Removal of 5 Well Volumes, Including Saturated Filter Annulus

(4) Stabilization of Specific Conductance and Water Temperature

17. After Final Development of the well, water from each well will be placed into the 1 liter clear glass container and photographed as a 35 mm. color slide to be submitted as part of the well log.
18. QA/QC: Development Performed by: T. Crank / R. Dresser

Site Manager: Lawrence C. Rosen

WELL DEVELOPMENT LOG

Z-301-01 STEELCOTE FACILITY

SLUG TESTS AND REVERSE SLUG TESTS

SE2000
Environmental Logger
05/22 16:52

Unit# HANSON_1 Test 0

Setups:	INPUT 1
Type	Level (F)
Mode	TOC
I.D.	SWGW-A
Reference	0.000
SG	1.000
Linearity	0.000
Scale factor	20.002
Offset	0.000
Delay mSEC	50.000

Step 0 05/22 10:57:25

Elapsed Time	INPUT 1
0.0000	0.411
0.0083	0.499
0.0166	1.130
0.0250	1.446
0.0333	1.036
0.0416	0.657
0.0500	0.707
0.0583	1.023
0.0666	1.143
0.0750	0.928
0.0833	0.745
0.1000	0.960
0.1166	0.859
0.1333	0.834
0.1500	0.890
0.1666	0.796
0.1833	0.853
0.2000	0.796
0.2166	0.808
0.2333	0.796
0.2500	0.777
0.2666	0.783
0.2833	0.758
0.3000	0.764
0.3166	0.752
0.3333	0.739
0.4166	0.707
0.5000	0.669
0.5833	0.638
0.6666	0.613
0.7500	0.587
0.8333	0.562
0.9166	0.537
1.0000	0.512
1.0833	0.493
1.1666	0.474
1.2500	0.455
1.3333	0.436
1.4166	0.423
1.5000	0.404
1.5833	0.392
1.6666	0.379
1.7500	0.360
1.8333	0.354
1.9166	0.341
2.0000	0.328
2.5000	0.259
3.0000	0.215
3.5000	0.177
4.0000	0.152
4.5000	0.126
5.0000	0.114
5.5000	0.101
6.0000	0.089
6.5000	0.076
7.0000	0.070
7.5000	0.063
8.0000	0.057
8.5000	0.057
9.0000	0.051
9.5000	0.051
10.0000	0.044
11.0000	0.038
12.0000	0.038
13.0000	0.038
14.0000	0.032
15.0000	0.032
16.0000	0.025
17.0000	0.013
18.0000	0.013
19.0000	0.013
20.0000	0.006
21.0000	0.006
22.0000	0.006
23.0000	0.006
24.0000	0.000
25.0000	0.006
26.0000	0.000
27.0000	0.000
28.0000	0.000
29.0000	0.000
30.0000	0.006
31.0000	0.013
32.0000	0.006
33.0000	0.006
34.0000	0.006
35.0000	0.006
36.0000	0.006
37.0000	0.000
38.0000	0.006
39.0000	0.000
40.0000	0.000
41.0000	0.000
42.0000	0.000
43.0000	0.000
44.0000	0.000

END

SE2000
Environmental Logger
05/22 16:54

Unit# HANSON_1 Test 1

Setups:	INPUT 1
Type	Level (F)
Mode	TOC
I.D.	SWGW-B
Reference	0.000
SG	1.000
Linearity	0.000
Scale factor	20.002
Offset	0.000
Delay mSEC	50.000

Step 0 05/22 12:11:15

Elapsed Time	INPUT 1
0.0000	4.300
0.0083	4.319
0.0166	4.319
0.0250	4.306
0.0333	4.331
0.0416	4.274
0.0500	4.262
0.0583	4.268
0.0666	4.287
0.0750	4.325
0.0833	4.262
0.1000	4.262
0.1166	4.249
0.1333	4.243
0.1500	4.237
0.1666	4.230
0.1833	4.218
0.2000	4.218
0.2166	4.199
0.2333	4.199
0.2500	4.186
0.2666	4.180
0.2833	4.173
0.3000	4.167
0.3166	4.161
0.3333	4.154
0.4166	4.129
0.5000	4.091
0.5833	4.060
0.6666	4.035
0.7500	4.003
0.8333	3.965
0.9166	3.933
1.0000	3.902
1.0833	3.870
1.1666	3.845
1.2500	3.807
1.3333	3.782
1.4166	3.750
1.5000	3.719
1.5833	3.687
1.6666	3.656
1.7500	3.630
1.8333	3.599
1.9166	3.574
2.0000	3.542
2.5000	3.353
3.0000	3.169
3.5000	3.005
4.0000	2.847
4.5000	2.696
5.0000	2.557
5.5000	2.418
6.0000	2.292
6.5000	2.165
7.0000	2.052
7.5000	1.944
8.0000	1.837
8.5000	1.742
9.0000	1.648
9.5000	1.553
10.0000	1.471
11.0000	1.319
12.0000	1.180
13.0000	1.048
14.0000	0.934
15.0000	0.833
16.0000	0.738
17.0000	0.656
18.0000	0.581
19.0000	0.517
20.0000	0.454
21.0000	0.404
22.0000	0.360
23.0000	0.315
24.0000	0.277
25.0000	0.246
26.0000	0.214
27.0000	0.195
28.0000	0.170
29.0000	0.145
30.0000	0.132
31.0000	0.120
32.0000	0.107
33.0000	0.088
34.0000	0.082
35.0000	0.075
36.0000	0.063
37.0000	0.056
38.0000	0.050
39.0000	0.038
40.0000	0.031
41.0000	0.025
42.0000	0.019
43.0000	0.019
44.0000	0.019
45.0000	0.012
46.0000	0.012
47.0000	0.012
48.0000	0.012
49.0000	0.006
50.0000	0.006
51.0000	0.000
52.0000	0.006
53.0000	0.006
54.0000	0.006
55.0000	0.000
56.0000	0.000
57.0000	0.000
58.0000	0.000
59.0000	0.000
60.0000	-0.007
61.0000	-0.007
62.0000	0.000
63.0000	0.000
64.0000	0.000

END

SE2000
Environmental Logger
05/22 16:56

Unit# HANSON_1 Test 3

Setups:	INPUT 1
Type	Level (F)
Mode	TOC
I.D.	SWGW-C
Reference	0.000
SG	1.000
Linearity	0.000
Scale factor	20.002
Offset	0.000
Delay mSEC	50.000

Step 0 05/22 14:50:34

Elapsed Time	INPUT 1
0.0000	1.610
0.0083	1.648
0.0166	1.597
0.0250	1.528
0.0333	1.635
0.0416	1.452
0.0500	1.597
0.0583	1.521
0.0666	1.572
0.0750	1.521
0.0833	1.597
0.1000	1.584
0.1166	1.565
0.1333	1.483
0.1500	1.464
0.1666	1.477
0.1833	1.483
0.2000	1.483
0.2166	1.490
0.2333	1.477
0.2500	1.471
0.2666	1.464
0.2833	1.464
0.3000	1.458
0.3166	1.458
0.3333	1.452
0.4166	1.433
0.5000	1.420
0.5833	1.408
0.6666	1.389
0.7500	1.376
0.8333	1.357
0.9166	1.344
1.0000	1.332
1.0833	1.319
1.1666	1.300
1.2500	1.281
1.3333	1.269
1.4166	1.250
1.5000	1.237
1.5833	1.224
1.6666	1.212
1.7500	1.193
1.8333	1.180
1.9166	1.168
2.0000	1.155
2.5000	1.073
3.0000	1.003
3.5000	0.921
4.0000	0.858
4.5000	0.801
5.0000	0.745
5.5000	0.694
6.0000	0.644
6.5000	0.593
7.0000	0.543
7.5000	0.505
8.0000	0.473
8.5000	0.435
9.0000	0.404
9.5000	0.372
10.0000	0.353
11.0000	0.303
12.0000	0.265
13.0000	0.227
14.0000	0.195
15.0000	0.164
16.0000	0.138
17.0000	0.113
18.0000	0.101
19.0000	0.082
20.0000	0.063
21.0000	0.050
22.0000	0.044
23.0000	0.031
24.0000	0.018
25.0000	0.018
26.0000	0.012
27.0000	0.000
28.0000	0.006

END

SE2000
Environmental Logger
05/22 16:57

Unit# HANSON_1 Test 2

Setups:	INPUT 1
Type	Level (F)
Mode	TOC
I.D.	SWGW-D
Reference	0.000
SG	1.000
Linearity	0.000
Scale factor	20.002
Offset	0.000
Delay mSEC	50.000

Step 3 05/22 14:17:39

Elapsed Time	INPUT 1
0.0000	0.442
0.0083	0.158
0.0166	0.631
0.0250	0.499
0.0333	0.202
0.0416	0.044
0.0500	0.208
0.0583	0.246
0.0666	0.139
0.0750	0.057
0.0833	0.107
0.1000	0.113
0.1166	0.082
0.1333	0.095
0.1500	0.069
0.1666	0.076
0.1833	0.063
0.2000	0.069
0.2166	0.057
0.2333	0.057
0.2500	0.057
0.2666	0.057
0.2833	0.050
0.3000	0.050
0.3166	0.050
0.3333	0.050
0.4166	0.044
0.5000	0.038
0.5833	0.038
0.6666	0.031
0.7500	0.031
0.8333	0.031
0.9166	0.025
1.0000	0.025
1.0833	0.025
1.1666	0.019
1.2500	0.019
1.3333	0.019
1.4166	0.019
1.5000	0.019
1.5833	0.019
1.6666	0.012
1.7500	0.012
1.8333	0.012
1.9166	0.012
2.0000	0.012
2.5000	0.006
3.0000	0.006
3.5000	0.006
4.0000	0.000

END

SE2000
Environmental Logger
05/22 16:59

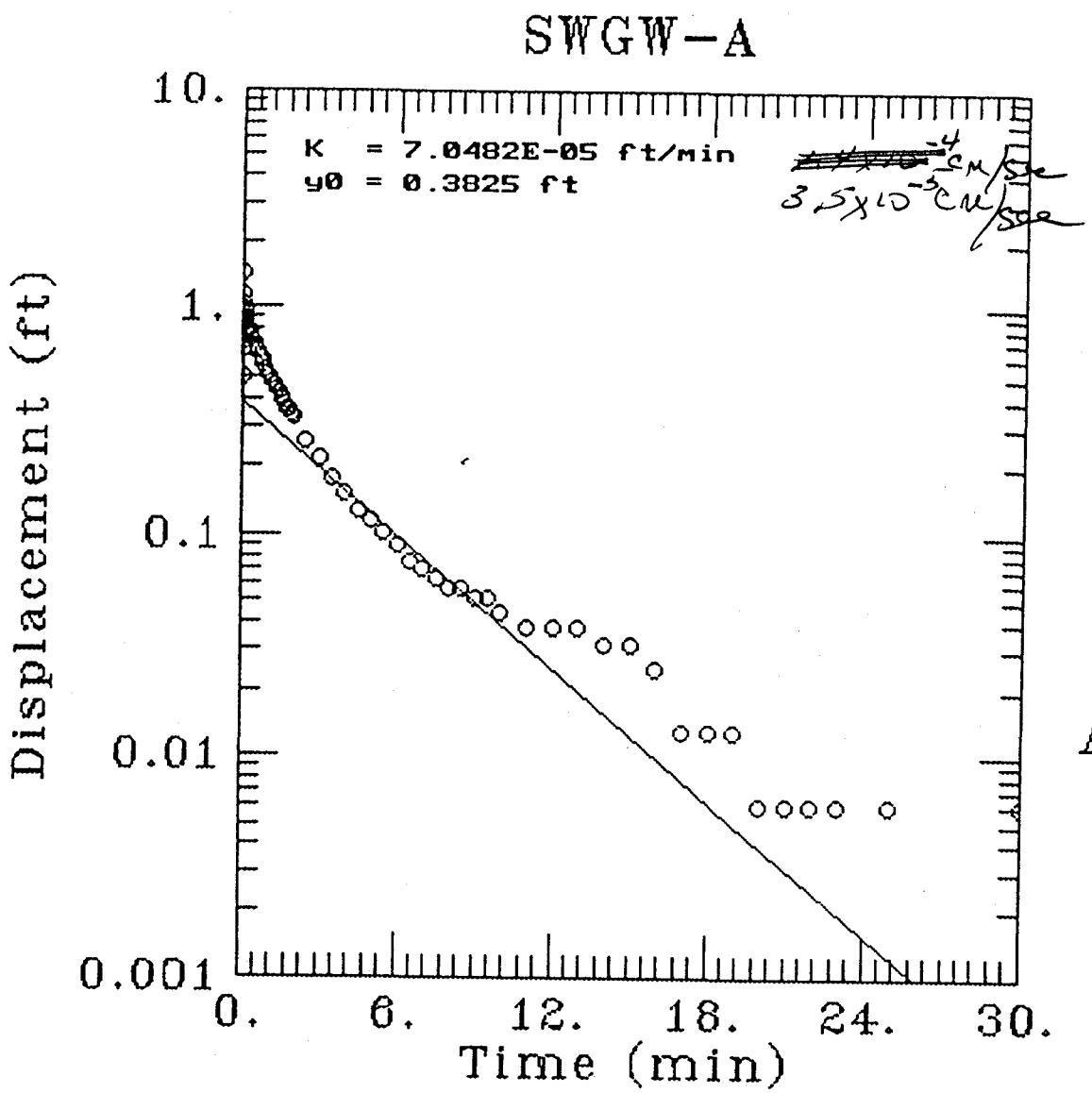
Unit# HANSON_1 Test 2

Setups:	INPUT 1
Type	Level (F)
Mode	TOC
I.D.	SWGW-D
Reference	0.000
SG	1.000
Linearity	0.000
Scale factor	20.002
Offset	0.000
Delay mSEC	50.000

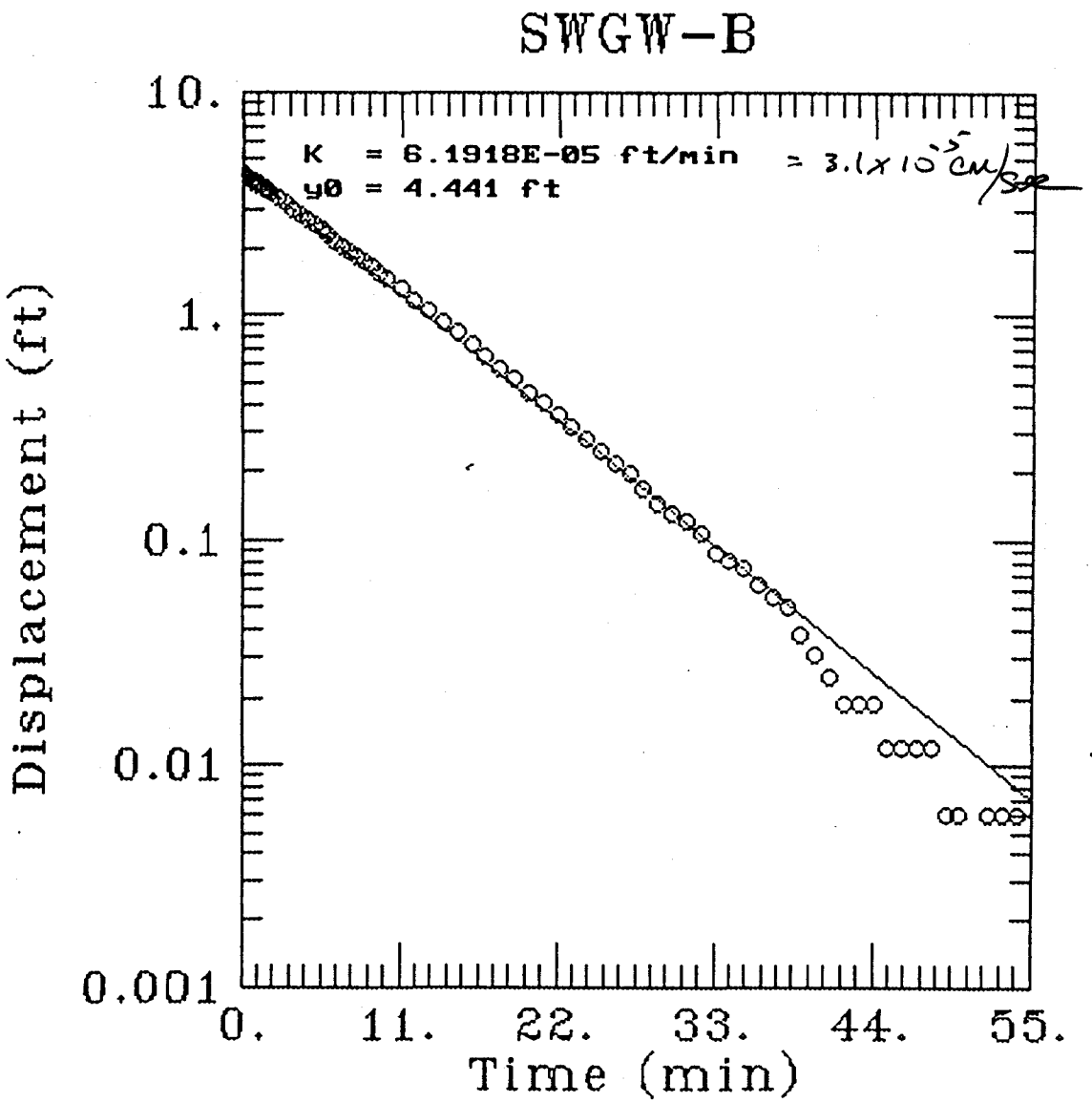
Step 1 05/22 13:56:42

Elapsed Time	INPUT 1
0.0000	0.297
0.0083	-0.076
0.0166	0.228
0.0250	0.316
0.0333	0.158
0.0416	-0.012
0.0500	0.070
0.0583	0.152
0.0666	0.108
0.0750	0.026
0.0833	0.044
0.1000	0.089
0.1166	0.044
0.1333	0.070
0.1500	0.044
0.1666	0.057
0.1833	0.044
0.2000	0.051
0.2166	0.044
0.2333	0.044
0.2500	0.044
0.2666	0.044
0.2833	0.038
0.3000	0.038
0.3166	0.038
0.3333	0.038
0.4166	0.032
0.5000	0.032
0.5833	0.032
0.6666	0.026
0.7500	0.026
0.8333	0.019
0.9166	0.019
1.0000	0.019
1.0833	0.019
1.1666	0.019
1.2500	0.019
1.3333	0.013
1.4166	0.013
1.5000	0.013
1.5833	0.013
1.6666	0.013
1.7500	0.013
1.8333	0.013
1.9166	0.013
2.0000	0.013
2.5000	0.013
3.0000	0.013
3.5000	0.007
4.0000	0.013
4.5000	0.007
5.0000	0.007
5.5000	0.007
6.0000	0.007
6.5000	0.007
7.0000	0.007
7.5000	0.000

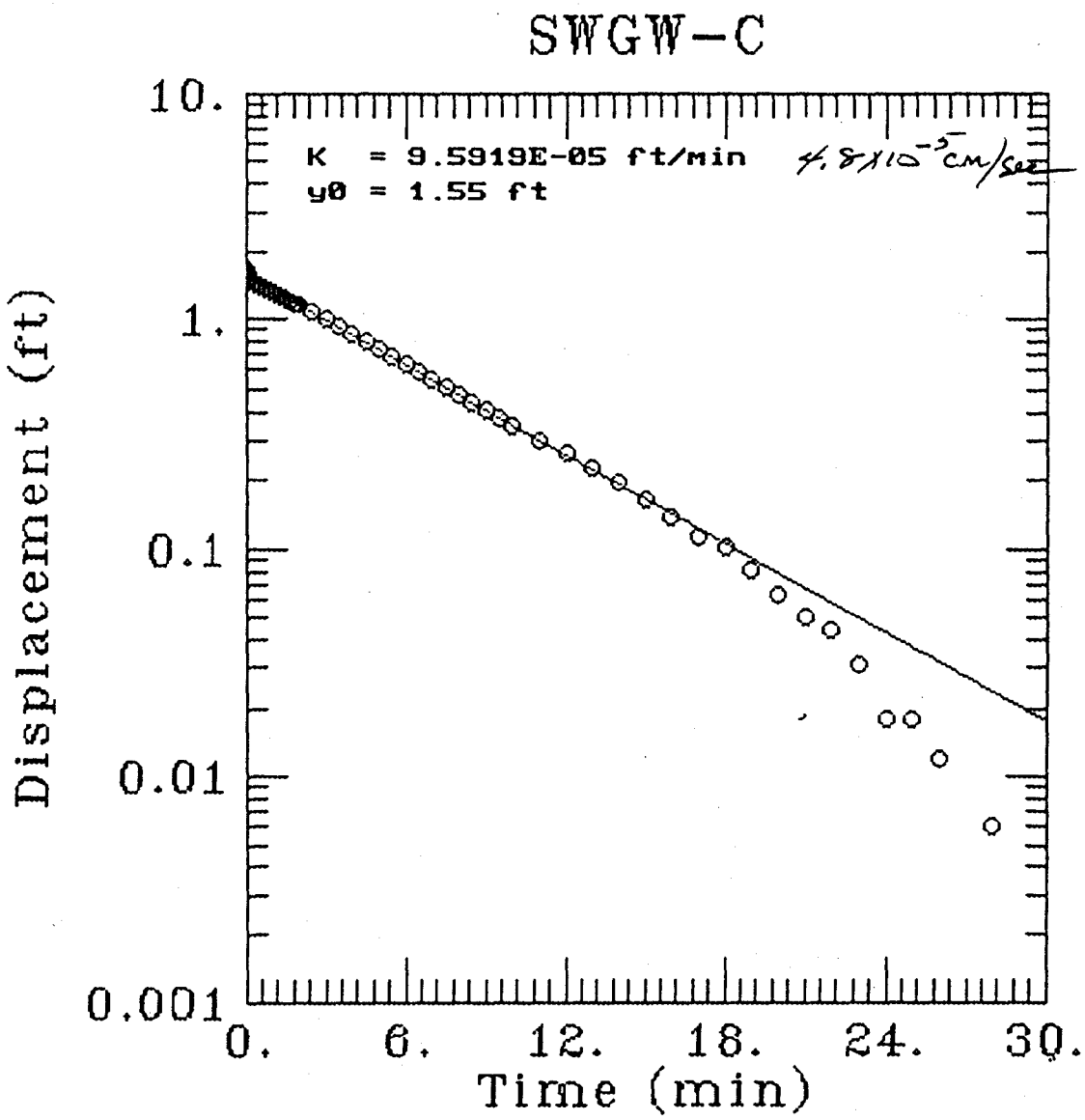
END


SWGW-A
K = 7.0482E-05 ft/min
y0 = 0.3825 ft
3.5x10^-5 cm/sec
10.
1.
0.1
0.01
0.001
Displacement (ft)
0.
6.
12.
18.
24.
30.
Time (min)

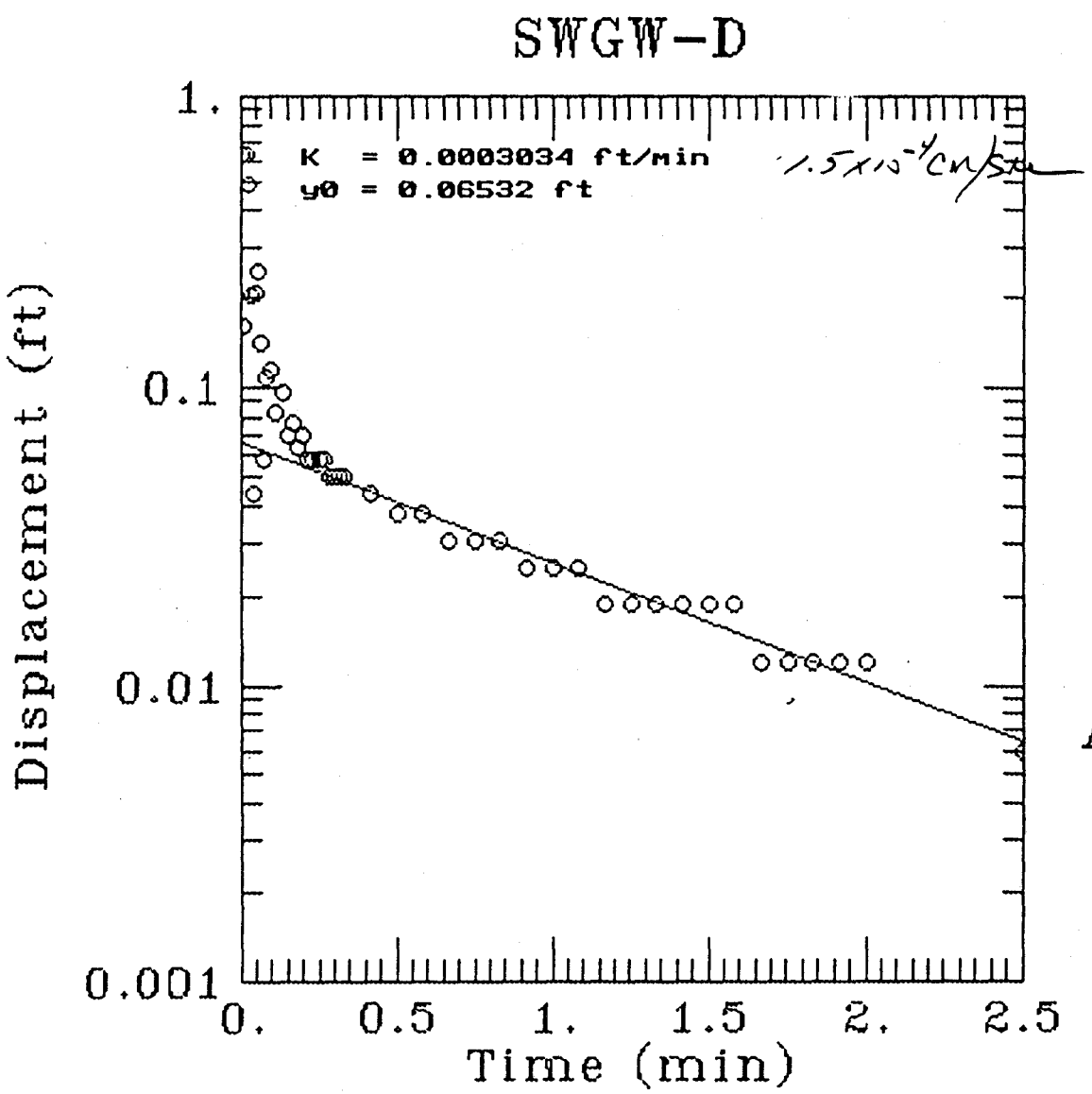
AQTESOLV


SWGW-B
K = 6.1918E-05 ft/min = 3.1x10^-5 cm/sec
y0 = 4.441 ft
10.
1.
0.1
0.01
0.001
Displacement (ft)
0.
11.
22.
33.
44.
55.
Time (min)

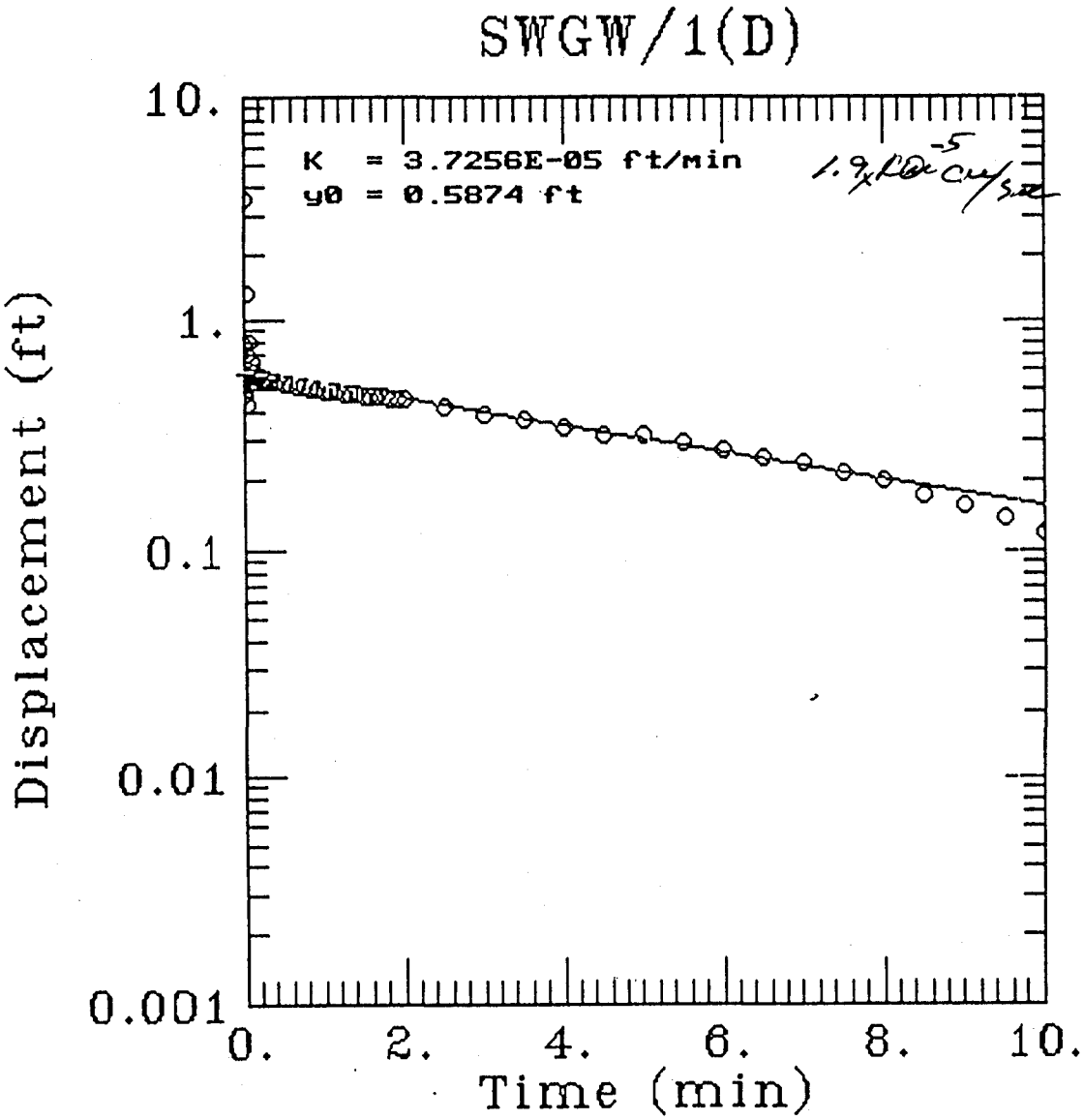
AQTESOLV


SWGW-C
K = 9.5919E-05 ft/min
y0 = 1.55 ft
4.8x10^-5 cm/sec
10.
1.
0.1
0.01
0.001
Displacement (ft)
0.
6.
12.
18.
24.
30.
Time (min)

AQTESOLV


SWGW-D
K = 0.0003034 ft/min
y0 = 0.06532 ft
1.5x10^-4 cm/sec
Displacement (ft)
1.
0.1
0.01
0.001
0.
0.5
1.
1.5
2.
2.5
Time (min)

AQTESOLV


SWGW/1(D)
K = 3.7256E-05 ft/min
y0 = 0.5874 ft
1.9x10^-5 cm/sec
Displacement (ft)
10.
1.
0.1
0.01
0.001
0.
2.
4.
6.
8.
10.
Time (min)

AQTESOLV

Reverse Slug Test Data
Steelcote Facility

Well SWGW/1(A)		Well SWGW/1(B)		Well SWGW/1(C)		Well SWGW/1(D)		
Time (min)	Depth (ft)	Time (min)	Depth (ft)	Time (min)	Depth (ft)	Time (min)	Depth (ft)	
0.083	8.05	0.083	8.85	0.083	12.2	0.083	7.95	
0.167	8.15	0.333	9.2	0.167	12.51	0.167	8.05	
0.25	8.3	0.417	9.45	0.333	12.75	0.25	8.15	
0.333	8.45	0.5	9.6	0.5	13	0.333	8.25	
0.417	8.5	0.583	9.7	0.667	13.3	0.417	8.3	
0.5	8.6	0.667	9.9	0.833	13.4	0.5	8.4	
0.583	8.7	0.75	10	1	14.42	0.583	8.45	
0.667	8.8	0.833	10.1	1.333	15.33	0.667	8.55	
0.75	8.9	0.917	10.2	1.5	15.6	0.75	8.6	
0.833	8.95	1	10.35	1.75	16	0.833	8.7	
0.917	9.05	1.083	10.45	2	16.6	0.917	8.75	
1	9.15	1.167	10.5	2.25	17.95	1	8.8	
1.083	9.2	1.25	10.6	2.5	18.23	1.083	8.9	
1.167	9.3	1.333	10.65	2.75	19.4	1.167	8.95	
1.25	9.35	1.417	10.7	3	19.6	1.25	9	
1.333	9.4	1.583	10.8	3.25	20.1	1.333	9.05	
1.417	9.5	1.667	11	3.5	20.6	1.417	9.2	
1.5	9.55	1.833	11.2	3.75	21	1.5	9.25	
1.583	9.6	2	11.4	4	21.35	1.583	9.3	
1.667	9.65	2.083	11.6	4.25	21.45	1.667	9.4	
1.75	9.7	2.5	11.5	4.5	23.4	1.75	9.45	
1.833	9.8	3	11.3	4.75	23.65	1.833	9.5	
1.917	9.85	3.167	11.45	5	24.51	2	9.55	
2	9.9	3.333	11.5	5.25	24.95	2.167	9.6	
2.167	10	3.5	11.6	5.5	25.25	2.333	9.7	
2.333	10.1	3.667	11.7	5.75	25.65	2.5	9.8	
2.5	10.2	3.833	11.8	6	25.9	2.667	9.9	
2.667	10.3	4	11.85	6.25	26.85	2.833	9.95	
2.833	10.4	4.167	11.9	6.5	27.3	3	10	
3	10.5	4.333	12	6.75	27.6	3.167	10.1	
3.167	10.55	4.5	12.05	7	27.8	3.333	10.15	
3.333	10.65	4.667	12.15	7.25	28.1	3.5	10.25	
3.5	10.7	4.833	12.2	7.5	28.4	3.667	10.3	
3.667	10.8	5	12.25	7.75	29.1	3.833	10.4	
3.833	10.85	5.167	12.3	8	29.35	4	10.45	
4	10.95	5.333	12.4	8.25	29.7	4.167	10.5	
4.25	11	5.5	12.45	8.5	30.15	4.333	10.6	
4.5	11.1	5.667	12.5	8.75	30.5	4.5	10.65	
4.75	11.2	5.833	12.6	9	30.81	4.667	10.7	
5	11.3	6	12.65	9.25	31.15	4.833	10.75	
5.25	11.35	6.167	12.71	9.5	31.4	5	10.8	
5.5	11.42	6.333	12.8	9.75	31.6	5.167	10.85	
5.75	11.5	6.5	12.85	10	31.9	5.333	10.9	
6	11.56	6.667	12.9	10.25	32.25	5.5	10.95	
6.5	11.7	6.833	13	10.5	32.45	5.667	11	
7	11.8	7	13.1	10.75	32.7	5.833	11.05	
7.5	11.9	7.25	13.2	11	32.95	6	11.1	

Reverse Slug Test Data
Steelcote Facility

Well SWGW/1(A)		Well SWGW/1(B)		Well SWGW/1(C)		Well SWGW/1(D)		
Time (min)	Depth (ft)	Time (min)	Depth (ft)	Time (min)	Depth (ft)	Time (min)	Depth (ft)	
8	12	7.5	13.3	11.25	33.2	6.25	11.15	
8.5	12.08	7.75	13.4	11.5	33.4	6.5	11.25	
9	12.15	8	13.5	11.75	33.6	6.75	11.35	
9.5	12.21	8.25	13.6	12	33.8	7	11.4	
10	12.28	8.5	13.7	12.25	34	7.25	11.5	
11	12.39	8.75	13.8	12.5	34.35	7.5	11.55	
12	12.48	9	13.95	12.75	34.44	7.75	11.6	
15	12.67	9.5	14.15	13	34.55	8	11.65	
20	12.87	9.75	14.25	13.25	34.68	8.25	11.7	
25	13	10	14.35	13.5	34.78	8.5	11.8	
30	13.04	10.25	14.45	13.75	34.85	8.75	11.85	
		10.5	14.55	14	34.95	9	11.88	
		10.75	14.65	14.25	35.02	9.25	11.9	
		11	14.75	14.5	35.2	9.5	11.93	
		11.25	14.85	14.75	35.4	10	12.05	
		11.5	14.95	15	35.45	10.5	12.15	
		11.75	15	15.5	35.55	11	12.2	
		12	15.1	16	35.65	11.5	12.26	
		12.5	15.3	16.5	35.8	12	12.35	
		13	15.45	17	35.93	13	12.36	
		13.5	15.6	17.5	36.03	14	12.39	
		14	15.8	18	36.23	15	12.41	
		14.5	15.95	18.5	36.4	16	12.44	
		15	16.1	19	36.5	17	12.46	
		16	16.45	19.5	36.63	20	12.52	
		17	16.75	20	36.75	25	12.62	
		18	17	21	37	30	12.7	
		19	17.3	22	37.22	35	12.8	
		20	17.6	23	37.43			
		21	17.95	24	37.62			
		22	18.25	25	37.78			
		23	18.5	27	37.95			
		24	18.85	29	38.02			
		25	19.15	31	38.15			
		26	19.5	35	38.27			
		27	19.75	40	38.33			
		28	20	45	38.4			
		29	20.3					
		30	20.5					
		35	21.75					
		40	22.65					
		45	24					
		51.25	25.4					
		55	26.15					
		60	27.2					
		65	28.1					
		70	28.75					

Reverse Slug Test Data
Steelcote Facility

Time (min)	A h/h0	Time (min)	B h/h0	Time (min)	C h/h0	Time (min)	D h/h0	
0.083	1	0.083	1	0.083	1	0.083	1	
0.167	0.9818182	0.333	0.9870849	0.167	0.9887722	0.167	0.9805825	
0.25	0.9545455	0.417	0.9778598	0.333	0.9800797	0.25	0.961165	
0.333	0.9272727	0.5	0.9723247	0.5	0.971025	0.333	0.9417476	
0.417	0.9181818	0.583	0.9686347	0.667	0.9601594	0.417	0.9320388	
0.5	0.9	0.667	0.9612546	0.833	0.9565375	0.5	0.9126214	
0.583	0.8818182	0.75	0.9575646	1	0.9195943	0.583	0.9029126	
0.667	0.8636364	0.833	0.9538745	1.333	0.8866353	0.667	0.8834951	
0.75	0.8454545	0.917	0.9501845	1.5	0.8768562	0.75	0.8737864	
0.833	0.8363636	1	0.9446494	1.75	0.8623687	0.833	0.8543689	
0.917	0.8181818	1.083	0.9409594	2	0.8406375	0.917	0.8446602	
1	0.8	1.167	0.9391144	2.25	0.7917421	1	0.8349515	
1.083	0.7909091	1.25	0.9354244	2.5	0.7816009	1.083	0.815534	
1.167	0.7727273	1.333	0.9335793	2.75	0.7392249	1.167	0.8058252	
1.25	0.7636364	1.417	0.9317343	3	0.7319812	1.25	0.7961165	
1.333	0.7545455	1.583	0.9280443	3.25	0.7138718	1.333	0.7864078	
1.417	0.7363636	1.667	0.9206642	3.5	0.6957624	1.417	0.7572816	
1.5	0.7272727	1.833	0.9132841	3.75	0.6812749	1.5	0.7475728	
1.583	0.7181818	2	0.9059041	4	0.6685983	1.583	0.7378641	
1.667	0.7090909	2.083	0.898524	4.25	0.6649765	1.667	0.7184466	
1.75	0.7	2.5	0.902214	4.5	0.5943499	1.75	0.7087379	
1.833	0.6818182	3	0.9095941	4.75	0.5852952	1.833	0.6990291	
1.917	0.6727273	3.167	0.904059	5	0.554147	2	0.6893204	
2	0.6636364	3.333	0.902214	5.25	0.5382108	2.167	0.6796117	
2.167	0.6454545	3.5	0.898524	5.5	0.5273452	2.333	0.6601942	
2.333	0.6272727	3.667	0.8948339	5.75	0.5128577	2.5	0.6407767	
2.5	0.6090909	3.833	0.8911439	6	0.503803	2.667	0.6213592	
2.667	0.5909091	4	0.8892989	6.25	0.4693951	2.833	0.6116505	
2.833	0.5727273	4.167	0.8874539	6.5	0.4530967	3	0.6019417	
3	0.5545455	4.333	0.8837638	6.75	0.4422311	3.167	0.5825243	
3.167	0.5454545	4.5	0.8819188	7	0.4349873	3.333	0.5728155	
3.333	0.5272727	4.667	0.8782288	7.25	0.4241217	3.5	0.5533981	
3.5	0.5181818	4.833	0.8763838	7.5	0.4132561	3.667	0.5436893	
3.667	0.5	5	0.8745387	7.75	0.3879029	3.833	0.5242718	
3.833	0.4909091	5.167	0.8726937	8	0.3788482	4	0.5145631	
4	0.4727273	5.333	0.8690037	8.25	0.3661717	4.167	0.5048544	
4.25	0.4636364	5.5	0.8671587	8.5	0.3498732	4.333	0.4854369	
4.5	0.4454545	5.667	0.8653137	8.75	0.3371967	4.5	0.4757282	
4.75	0.4272727	5.833	0.8616236	9	0.3259689	4.667	0.4660194	
5	0.4090909	6	0.8597786	9.25	0.3136545	4.833	0.4563107	
5.25	0.4	6.167	0.8575646	9.5	0.3045998	5	0.4466019	
5.5	0.3872727	6.333	0.8542435	9.75	0.297356	5.167	0.4368932	
5.75	0.3727273	6.5	0.8523985	10	0.2864904	5.333	0.4271845	
6	0.3618182	6.667	0.8505535	10.25	0.2738138	5.5	0.4174757	
6.5	0.3363636	6.833	0.8468635	10.5	0.2665701	5.667	0.407767	
7	0.3181818	7	0.8431734	10.75	0.2575154	5.833	0.3980583	
7.5	0.3	7.25	0.8394834	11	0.2484607	6	0.3883495	
8	0.2818182	7.5	0.8357934	11.25	0.239406	6.25	0.3786408	

Reverse Slug Test Data
Steelcote Facility

Time (min)	A h/h0	Time (min)	B h/h0	Time (min)	C h/h0	Time (min)	D h/h0	
8.5	0.2672727	7.75	0.8321033	11.5	0.2321623	6.5	0.3592233	
9	0.2545455	8	0.8284133	11.75	0.2249185	6.75	0.3398058	
9.5	0.2436364	8.25	0.8247232	12	0.2176748	7	0.3300971	
10	0.2309091	8.5	0.8210332	12.25	0.210431	7.25	0.3106796	
11	0.2109091	8.75	0.8173432	12.5	0.1977544	7.5	0.3009709	
12	0.1945455	9	0.8118081	12.75	0.1944947	7.75	0.2912621	
15	0.16	9.5	0.804428	13	0.1905107	8	0.2815534	
20	0.1236364	9.75	0.800738	13.25	0.1858022	8.25	0.2718447	
25	0.1	10	0.797048	13.5	0.1821804	8.5	0.2524272	
30	0.0927273	10.25	0.7933579	13.75	0.1796451	8.75	0.2427184	
		10.5	0.7896679	14	0.1760232	9	0.2368932	
		10.75	0.7859779	14.25	0.1734879	9.25	0.2330097	
		11	0.7822878	14.5	0.1669685	9.5	0.2271845	
		11.25	0.7785978	14.75	0.1597247	10	0.2038835	
		11.5	0.7749077	15	0.1579138	10.5	0.184466	
		11.75	0.7730627	15.5	0.1542919	11	0.1747573	
		12	0.7693727	16	0.15067	11.5	0.1631068	
		12.5	0.7619926	16.5	0.1452372	12	0.1456311	
		13	0.7564576	17	0.1405288	13	0.1436893	
		13.5	0.7509225	17.5	0.1369069	14	0.1378641	
		14	0.7435424	18	0.1296632	15	0.1339806	
		14.5	0.7380074	18.5	0.123506	16	0.1281553	
		15	0.7324723	19	0.1198841	17	0.1242718	
		16	0.7195572	19.5	0.1151757	20	0.1126214	
		17	0.7084871	20	0.1108294	25	0.0932039	
		18	0.699262	21	0.1017747	30	0.0776699	
		19	0.6881919	22	0.0938066	35	0.0582524	
		20	0.6771218	23	0.0862007			
		21	0.6642066	24	0.0793191			
		22	0.6531365	25	0.0735241			
		23	0.6439114	27	0.0673669			
		24	0.6309963	29	0.0648316			
		25	0.6199262	31	0.0601231			
		26	0.6070111	35	0.0557769			
		27	0.597786	40	0.0536038			
		28	0.5885609	45	0.0510685			
		29	0.5774908					
		30	0.5701107					
		35	0.5239852					
		40	0.4907749					
		45	0.4409594					
		51.25	0.3892989					
		55	0.3616236					
		60	0.3228782					
		65	0.2896679					
		70	0.2656827					

Reverse Slug Test
Well SWGW/1(A)

Depth (ft) vs. Time (min)

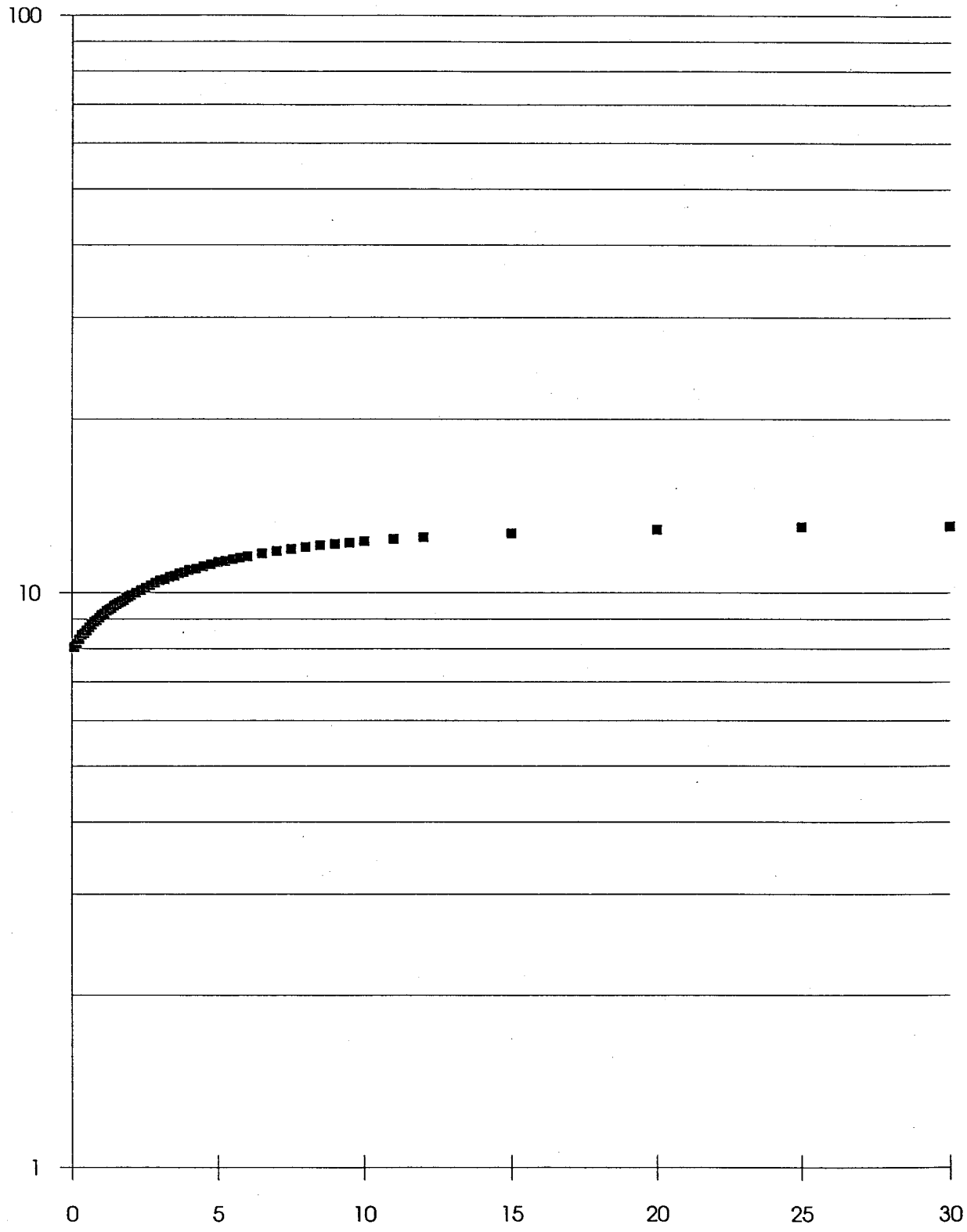


FIGURE C-1

Reverse Slug Test
Well SWGW/1(B)

Depth (ft) vs. Time (min)

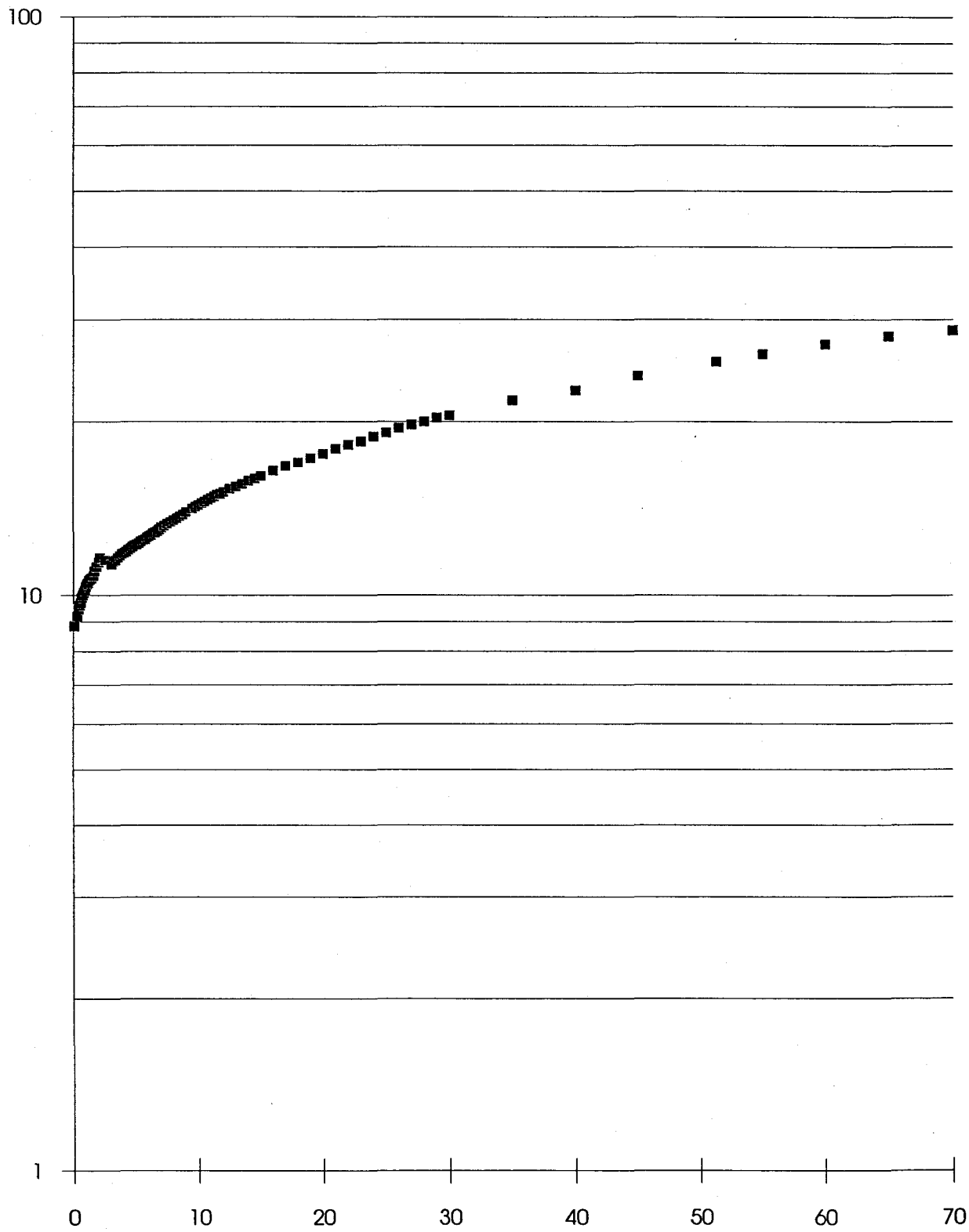


FIGURE C-2

Reverse Slug Test
Well SWGW/1(C)

Depth (ft) vs. Time (min)

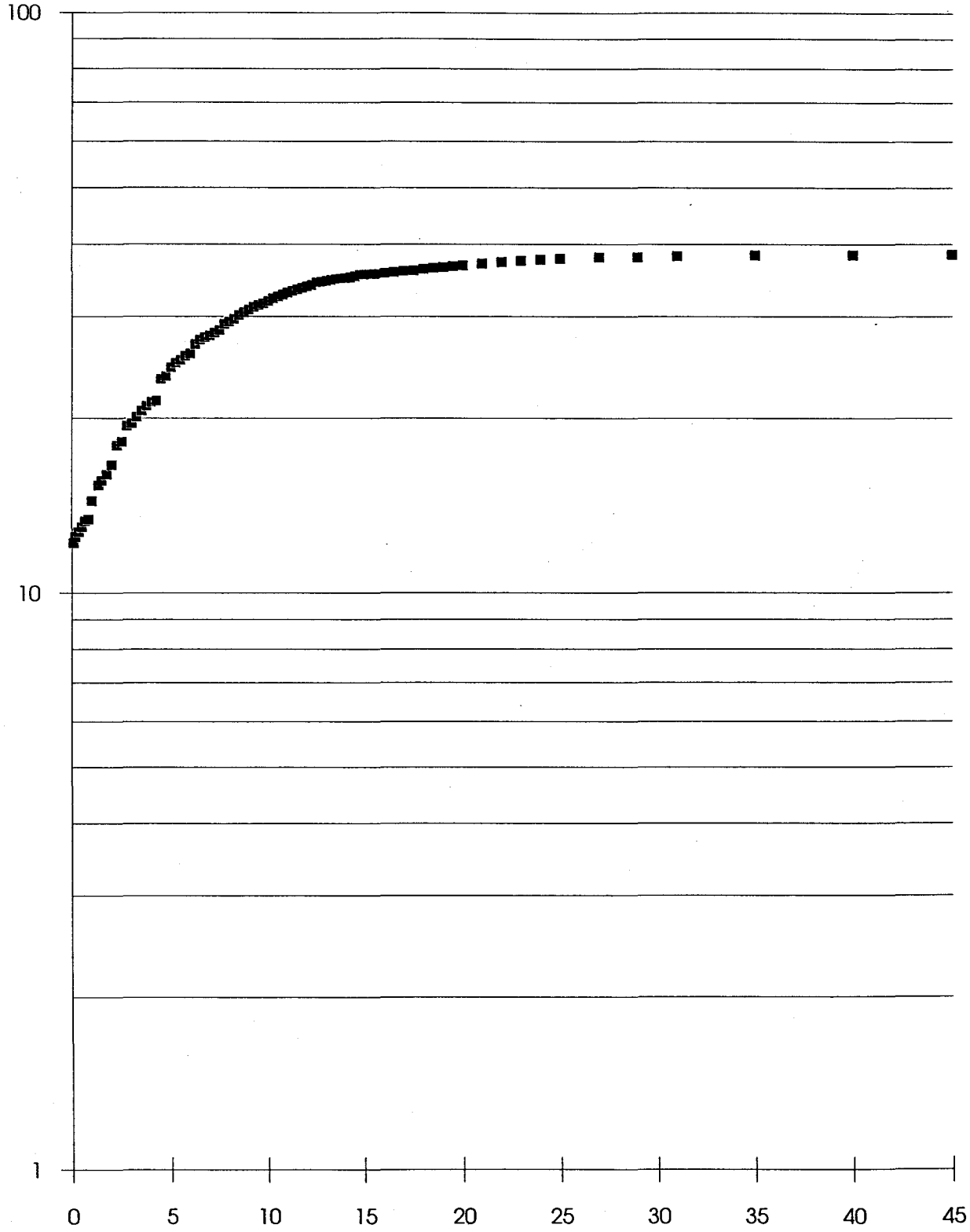


FIGURE C-3

Reverse Slug Test
Well SWGW/1(D)

Depth (ft) vs. Time (min)

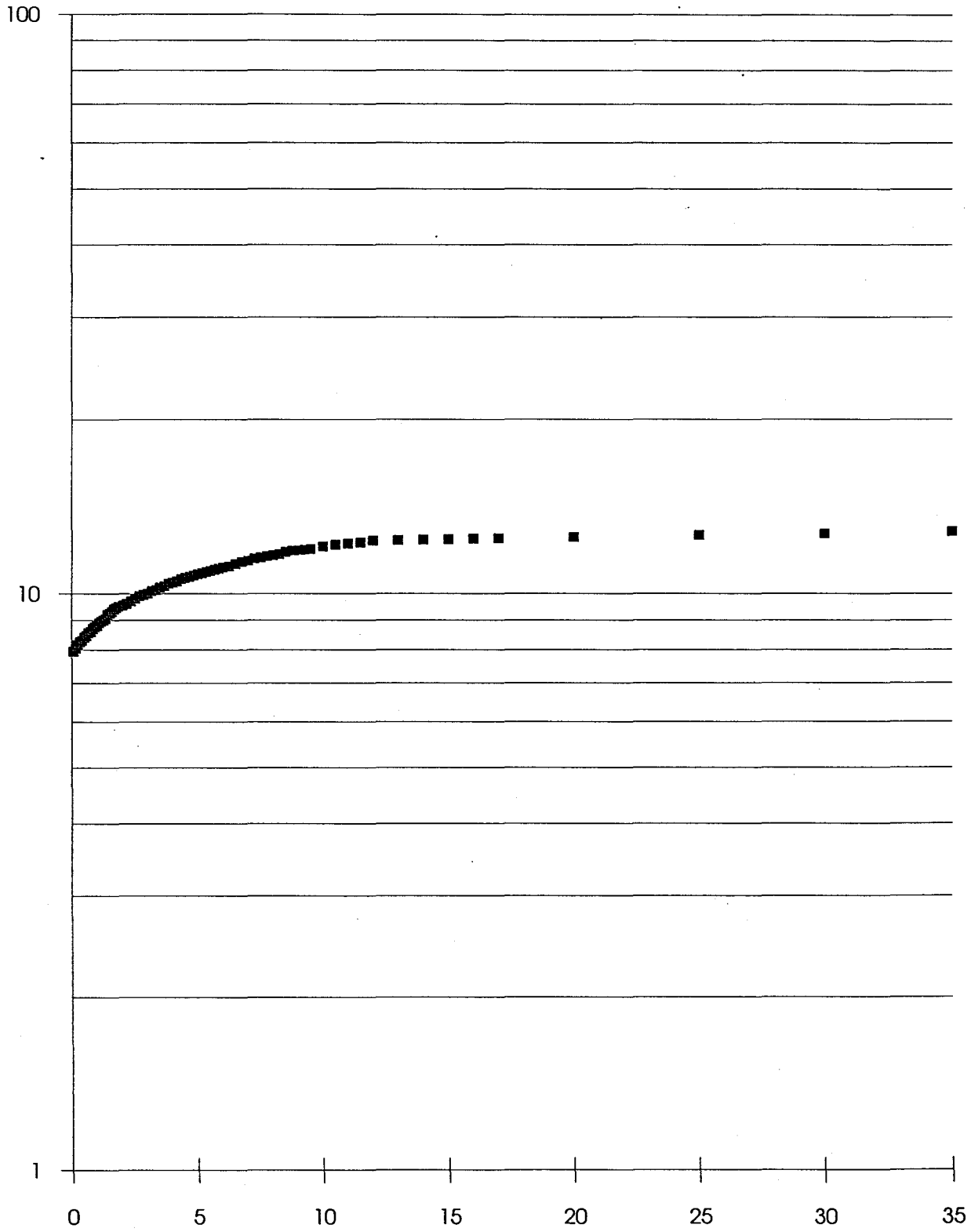


FIGURE C-4

Reverse Slug Test
Well SWGW/1(A)

Head Ratio (h/h0)
Versus
Time (min)

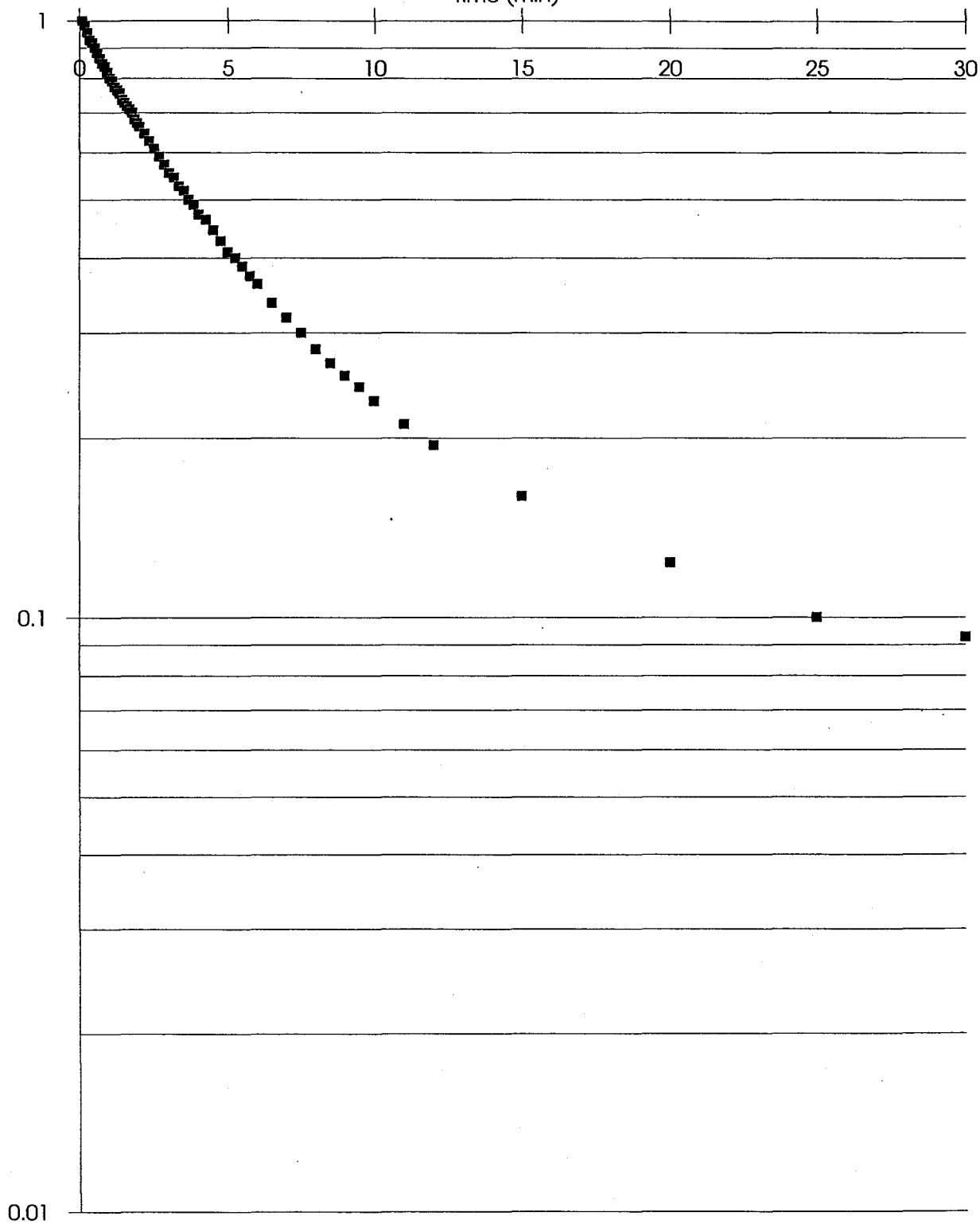


FIGURE C-5

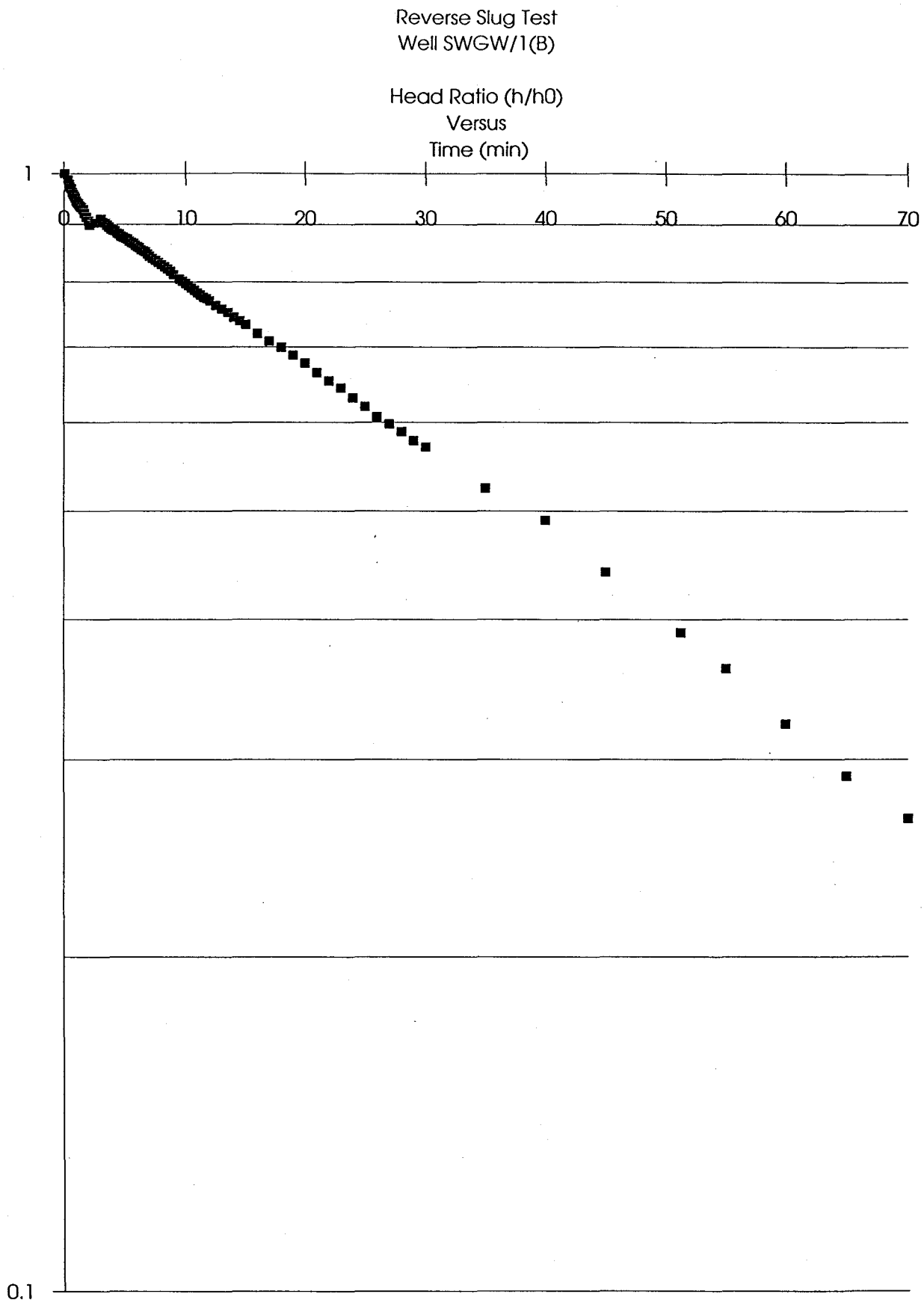

Reverse Slug Test
Well SWGW/1(B)
Head Ratio (h/h0)
Versus
Time (min)
1
0.1
0
10
20
30
40
50
60
70

FIGURE C-6

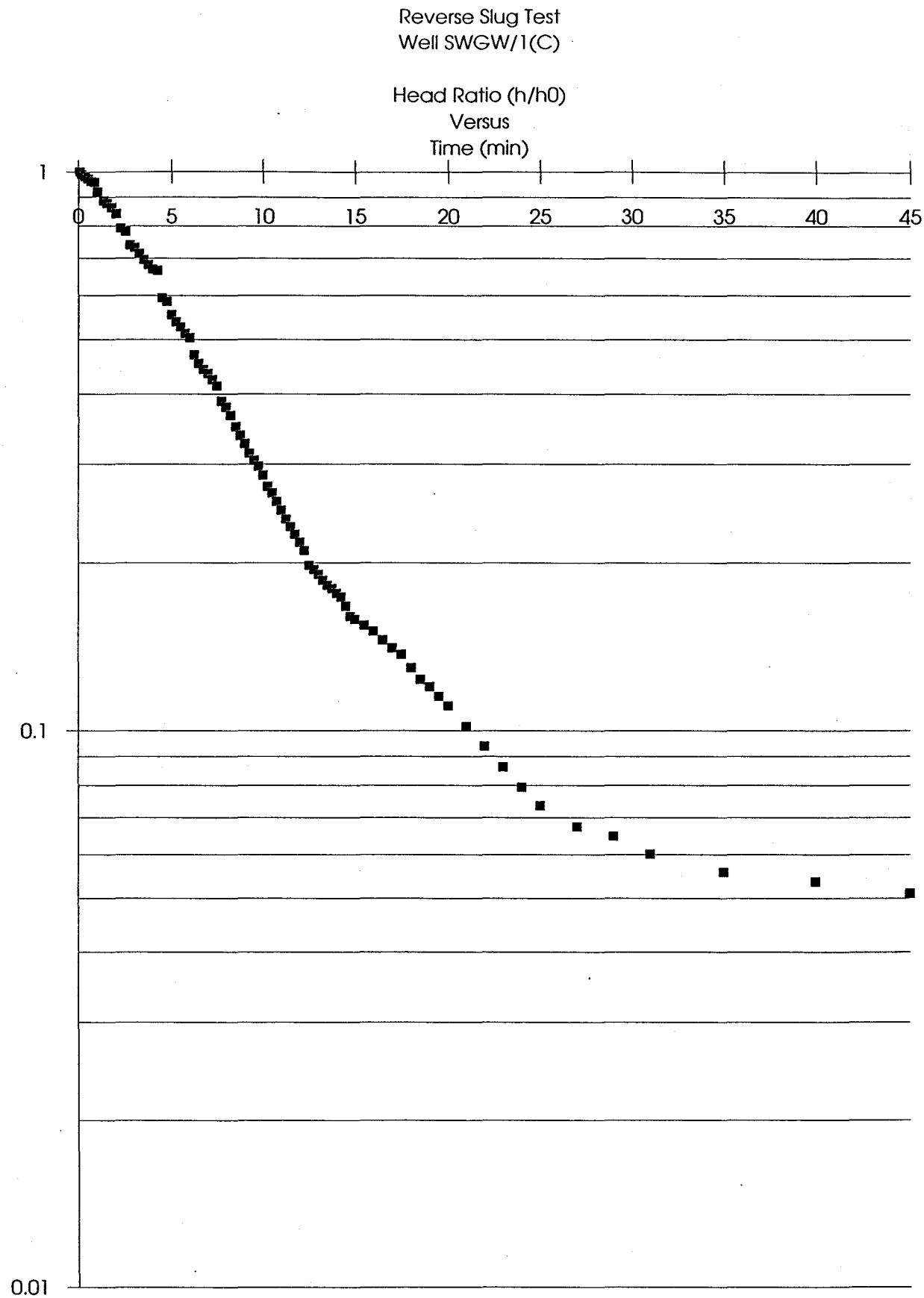

Reverse Slug Test
Well SWGW/1(C)
Head Ratio (h/h0)
Versus
Time (min)
1
0.1
0.01
0
5
10
15
20
25
30
35
40
45

FIGURE C-7

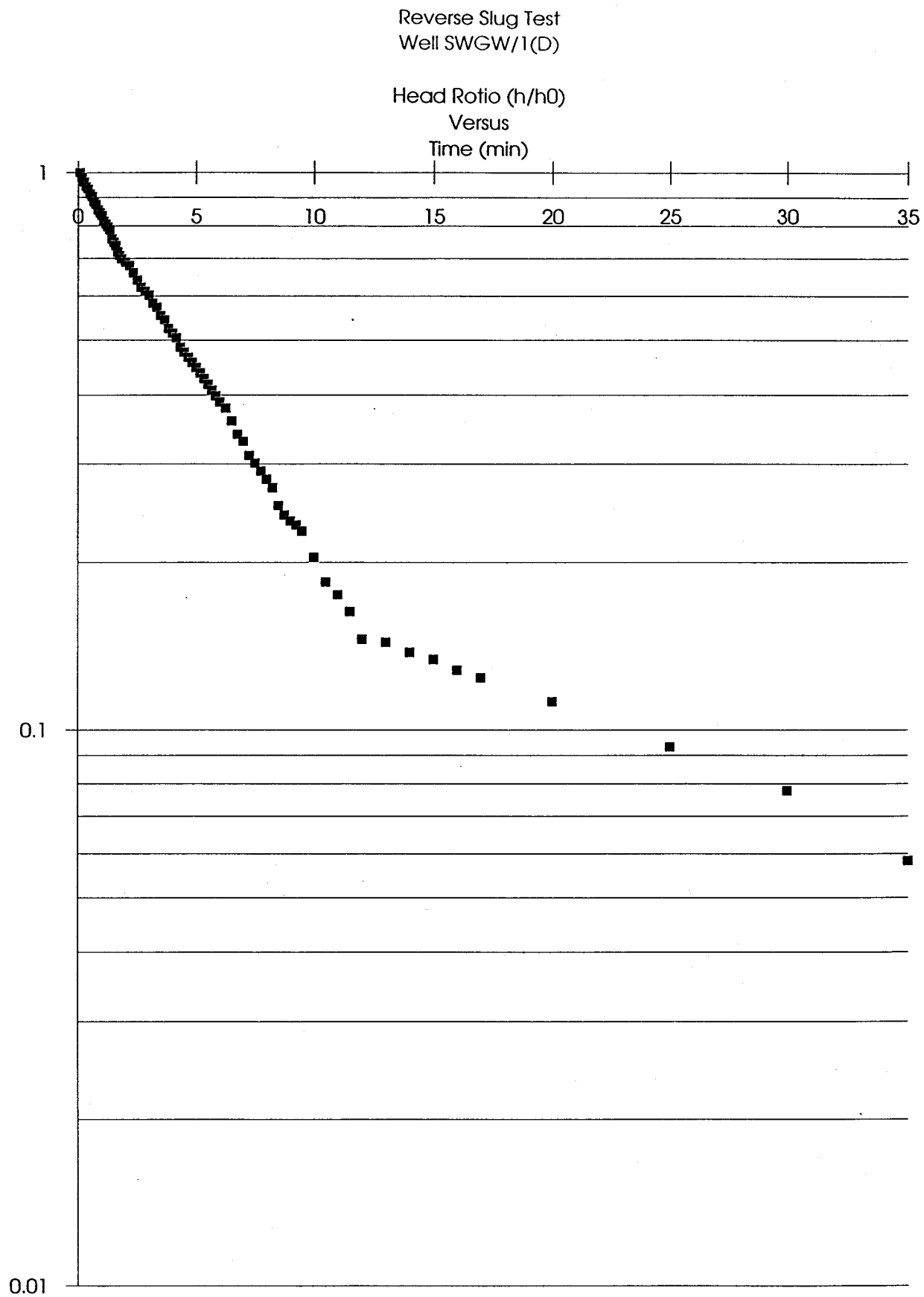

Reverse Slug Test
Well SWGW/1(D)
Head Rotio (h/h0)
Versus
Time (min)
1
0.1
0.01
0
5
10
15
20
25
30
35

FIGURE C-8

GROUND WATER SAMPLE RECORDS AND CHEMICAL ANALYSES

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. 2-302-05
Page 1 of 1

Owner / Location Steelcote Date 5/8/92

Well No. SWGW/1(C) Sample No. SWGW/1(C)(5/8/92 Time Started 1400

Weather Clear 80°

Well Site Conditions

SAMPLING DATA

Time Started 14:00 Water Column in Well 18.0

PID Head Space Up to 20 ppm - ave ~ 12-15 Casing Diameter 2.0"

Total Depth of Well Below MP 60.0' Gallons per Foot 0.163

DTW Below MP 42.0' Gallons in Well 2.93

	Yes	No	Sample
Light-Phase Immiscibles	☐	☑ NOT OBSERVED	☐
Heavy-Phase Immiscibles	☐	☑	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
1	16.4	7.25	1175		14:10
4	16.5	7.25	1184		14:25
8	16.4	7.30	1135		14:35
12	16.1	7.25	1109		14:45
15	16.1	7.25	1099		14:55
After Sampling	16.1	7.25	1088		15:10

Evacuation Method Bailer

Water Quality Slightly turbid, no observed sheen or odor

Sampling Method Bailer Time Started 15:00

Sampling Personnel L. Rosen

Remarks

Time Completed 15:10

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z-301-05
Page 1 of 1

Owner / Location STEELCOTE Date 5/8/92

Well No. SWGW/1(D) Sample No. SWGW/1(D)(5/8/92) Time Started 15:30

Weather Clear 80°

Well Site Conditions

SAMPLING DATA

Time Started 15:30 Water Column in Well 42.3

PID Head Space 3-5 ppm then ~1 or less Casing Diameter 2.0"

Total Depth of Well Below MP 56.9 Gallons per Foot 0.163

DTW Below MP 14.3 Gallons in Well 6.8

	Yes	No	Sample
Light-Phase Immiscibles	☐	☒ NOT OBSERVED	☐
Heavy-Phase Immiscibles	☐	☒	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
1	16.3	7.15	1230		15:35
10	16.4	7.10	1188		15:50
20	17.1	7.10	1232		16:05
30	17.1	7.10	1233		16:20
34	17.1	7.10	1246		16:30
After Sampling	17.2	7.10	1253		17:00

Evacuation Method Bailer

Water Quality Very fine grained suspended material - slightly turbid, no sheen or odor

Sampling Method Bailer Time Started 16:40

Sampling Personnel L. Rosen

Remarks

Time Completed 17:00

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 427501SW(108)

DATE : 06-01-92

SAMPLE MATRIX : WATER
ATAS # : 4275.01
SAMPLE ID : SWGW/1(A)(5/8/92

DATE SUBMITTED: 05-08-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	5	ug/L	ND	05-13-92	CLP VOA
CARBON TERTACHLORIDE	5	ug/L	ND	05-13-92	CLP VOA
XYLENE	5	ug/L	ND	05-13-92	CLP VOA
METHLY ISOBUTYL KETONE	10	ug/L	ND	05-13-92	CLP VOA
TOLUENE	5	ug/L	ND	05-13-92	CLP VOA
ETHYL ETHYL KETONE	10	ug/L	ND	05-13-92	CLP VOA
BENZENE	5	ug/L	ND	05-13-92	CLP VOA
ETHYL ACETATE	*	ug/L	ND	05-13-92	CLP VOA LS
CUMENE	*	ug/L	ND	05-13-92	CLP VOA LS
N-BUTANOL	*	ug/L	ND	05-13-92	CLP VOA LS
2-ETHOXYETHANOL	*	ug/L	ND	05-13-92	CLP VOA LS
2-METHYL-1-PROPANOL	*	ug/L	ND	05-13-92	CLP VOA LS

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 99 % BROMOFLUOROBENZENE(86-115) 102 % 1,2-DICHLOROETHANE-D4(76-114) 105 %

BUTYL BENZYL PHTHALATE	10	ug/L	ND	05-22-92	CLP SVOA
DIBUTYL PHTHALATE	10	ug/L	ND	05-22-92	CLP SVOA
BIS(2-ETHYLHEXYL)PHTHALATE	10	ug/L	3 J	05-22-92	CLP SVOA
PHENOL	10	ug/L	ND	05-22-92	CLP SVOA
NAPHTHALENE	10	ug/L	ND	05-22-92	CLP SVOA
CYCLOHEXANONE	*	ug/L	ND	05-22-92	CLP SVOA LS
TOLUENE-2,4-DIISOCYANATE	*	ug/L	ND	05-22-92	CLP SVOA LS
NITROSOIMINO DIETHANOL	*	ug/L	ND	05-22-92	CLP SVOA LS
EPICHLOROHYDRIN	*	ug/L	ND	05-22-92	CLP SVOA LS
BISPHENOL A/EPICHLOROHYDRIN	*	ug/L	ND	05-22-92	CLP SVOA LS

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 64 % TERPHENYL-d14(33-141) 86 % 2-FLUOROPHENOL(21-100) 56 %
2-FLUOROBIPHENYL(43-116) 61 % PHENOL-d5(10-94) 55 % 2,4,6-TRIBROMOPHENOL(10-123) 76 %

ETHANOL	1	ug/mL	ND	05-20-92	GC/FID
FORMALDEHYDE	50	ug/L	800 B*	05-23-92	HPLC
BARIUM	16	ug/L	398	05-18-92	CLP METALS
CHROMIUM	3	ug/L	4.0	05-18-92	CLP METALS
CADMIUM	2	ug/L	ND	05-18-92	CLP METALS
LEAD	1	ug/L	2.2	05-14-92	CLP METALS
NICKEL	8	ug/L	ND	05-18-92	CLP METALS

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CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 427502SW(108)

DATE : 06-01-92

SAMPLE MATRIX : WATER
ATAS # : 4275.02
SAMPLE ID : SWGW/1(B)(5/8/92

DATE SUBMITTED: 05-08-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	5	ug/L	ND	05-13-92	CLP VOA
RBON TERTACHLORIDE	5	ug/L	ND	05-13-92	CLP VOA
LENE	5	ug/L	ND	05-13-92	CLP VOA
ETHLY ISOBUTYL KETONE	10	ug/L	ND	05-13-92	CLP VOA
TOLUENE	5	ug/L	ND	05-13-92	CLP VOA
THYL ETHYL KETONE	10	ug/L	ND	05-13-92	CLP VOA
NZENE	5	ug/L	ND	05-13-92	CLP VOA
ETHYL ACETATE	*	ug/L	ND	05-13-92	CLP VOA LS
MENE	*	ug/L	ND	05-13-92	CLP VOA LS
BUTANOL	*	ug/L	ND	05-13-92	CLP VOA LS
2-ETHOXYETHANOL	*	ug/L	ND	05-13-92	CLP VOA LS
2-METHYL-1-PROPANOL	*	ug/L	ND	05-13-92	CLP VOA LS

QA/QC SURROGATE RECOVERIES

LUENE-d8(88-110) 101 % BROMOFLUOROBENZENE(86-115) 100 % 1,2-DICHLOROETHANE-D4(76-114) 99 %

BUTYL BENZYL PHTHALATE	10	ug/L	ND	05-19-92	CLP SVOA
BUTYL PHTHALATE	10	ug/L	ND	05-19-92	CLP SVOA
(2-ETHYLHEXYL)PHTHALATE	10	ug/L	11	05-19-92	CLP SVOA
ENOL	10	ug/L	ND	05-19-92	CLP SVOA
NAPHTHALENE	10	ug/L	ND	05-19-92	CLP SVOA
CLOHEXANONE	*	ug/L	ND	05-19-92	CLP SVOA LS
LUENE-2,4-DIISOCYANATE	*	ug/L	ND	05-19-92	CLP SVOA LS
NITROSOIMINO DIETHANOL	*	ug/L	ND	05-19-92	CLP SVOA LS
ICHLOROHYDRIN	*	ug/L	ND	05-19-92	CLP SVOA LS
SPHENOL A/EPICHLOROHYDRIN	*	ug/L	ND	05-19-92	CLP SVOA LS

QA/QC SURROGATE RECOVERIES

TROBENZENE-d5(35-114) 92 % TERPHENYL-d14(33-141) 107 % 2-FLUOROPHENOL(21-100) 107 % **
2-FLUOROBIPHENYL(43-116) 35**% PHENOL-d5(10-94) 90 % 2,4,6-TRIBROMOPHENOL(10-123) 91 %

THANOL	1	ug/mL	ND	05-20-92	GC/FID
FORMALDEHYDE	50	ug/L	170 B*	05-23-92	HPLC
RIUM	16	ug/L	470	05-18-92	CLP METALS
CHROMIUM	3	ug/L	4.6	05-18-92	CLP METALS
CADMIUM	2	ug/L	ND	05-18-92	CLP METALS
AD	1	ug/L	ND	05-14-92	CLP METALS
CKEL	8	ug/L	ND	05-18-92	CLP METALS

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CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 427503SW(108)

DATE : 06-01-92

SAMPLE MATRIX : WATER
ATAS # : 4275.03
SAMPLE ID : SWGW/1(C)(5/8/92

DATE SUBMITTED: 05-08-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	5	ug/L	ND	05-13-92	CLP VOA
ARBON TERTACHLORIDE	5	ug/L	ND	05-13-92	CLP VOA
LENE	5	ug/L	10	05-13-92	CLP VOA
METHLY ISOBUTYL KETONE	10	ug/L	ND	05-13-92	CLP VOA
TOLUENE	5	ug/L	50	05-13-92	CLP VOA
THYL ETHYL KETONE	10	ug/L	ND	05-13-92	CLP VOA
ENZENE	5	ug/L	ND	05-13-92	CLP VOA
ETHYL ACETATE	*	ug/L	ND	05-13-92	CLP VOA LS
UMENE	*	ug/L	ND	05-13-92	CLP VOA LS
-BUTANOL	*	ug/L	ND	05-13-92	CLP VOA LS
2-ETHOXYETHANOL	*	ug/L	ND	05-13-92	CLP VOA LS
2-METHYL-1-PROPANOL	*	ug/L	ND	05-13-92	CLP VOA LS

QA/QC SURROGATE RECOVERIES

LUENE-d8(88-110) 100 % BROMOFLUOROBENZENE(86-115) 103 % 1,2-DICHLOROETHANE-D4(76-114) 104 %

BUTYL BENZYL PHTHALATE	13	ug/L	ND	05-22-92	CLP SVOA
BUTYL PHTHALATE	13	ug/L	ND	05-22-92	CLP SVOA
(2-ETHYLHEXYL)PHTHALATE	13	ug/L	4 J	05-22-92	CLP SVOA
PHENOL	13	ug/L	ND	05-22-92	CLP SVOA
NAPHTHALENE	13	ug/L	ND	05-22-92	CLP SVOA
CLOHEXANONE	*	ug/L	ND	05-22-92	CLP SVOA LS
LUENE-2,4-DIISOCYANATE	*	ug/L	ND	05-22-92	CLP SVOA LS
NITROSOIMINO DIETHANOL	*	ug/L	ND	05-22-92	CLP SVOA LS
ICHLOROHYDRIN	*	ug/L	ND	05-22-92	CLP SVOA LS
SPHENOL A/EPICHLOROHYDRIN	*	ug/L	ND	05-22-92	CLP SVOA LS

QA/QC SURROGATE RECOVERIES

ITROBENZENE-d5(35-114) 68 % TERPHENYL-d14(33-141) 91 % 2-FLUOROPHENOL(21-100) 60 %
2-FLUOROBIPHENYL(43-116) 60 % PHENOL-d5(10-94) 60 % 2,4,6-TRIBROMOPHENOL(10-123) 67 %

THANOL	1	ug/mL	ND	05-20-92	GC/FID
FORMALDEHYDE	50	ug/L	380 B*	05-23-92	HPLC
RIUM	16	ug/L	420	05-18-92	CLP METALS
CHROMIUM	3	ug/L	5.3	05-18-92	CLP METALS
CADMIUM	2	ug/L	ND	05-18-92	CLP METALS
AD	1	ug/L	2.5	05-14-92	CLP METALS
ICKEL	8	ug/L	ND	05-18-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 427504SW(108)

DATE : 06-01-92

SAMPLE MATRIX : WATER
ATAS # : 4275.04
SAMPLE ID : SWGW/1(D)(5/8/92

DATE SUBMITTED: 05-08-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	5	ug/L	ND	05-13-92	CLP VOA
ARBON TERTACHLORIDE	5	ug/L	ND	05-13-92	CLP VOA
YLENE	5	ug/L	2 J	05-13-92	CLP VOA
METHLY ISOBUTYL KETONE	10	ug/L	ND	05-13-92	CLP VOA
TOLUENE	5	ug/L	ND	05-13-92	CLP VOA
ETHYL ETHYL KETONE	10	ug/L	ND	05-13-92	CLP VOA
ENZENE	5	ug/L	ND	05-13-92	CLP VOA
ETHYL ACETATE	*	ug/L	ND	05-13-92	CLP VOA LS
UMENE	*	ug/L	ND	05-13-92	CLP VOA LS
-BUTANOL	*	ug/L	ND	05-13-92	CLP VOA LS
2-ETHOXYETHANOL	*	ug/L	ND	05-13-92	CLP VOA LS
-METHYL-1-PROPANOL	*	ug/L	ND	05-13-92	CLP VOA LS

QA/QC SURROGATE RECOVERIES

OLUENE-d8(88-110) 96 % BROMOFLUOROBENZENE(86-115) 102 % 1,2-DICHLOROETHANE-D4(76-114) 103 %

BUTYL BENZYL PHTHALATE	10	ug/L	ND	05-19-92	CLP SVOA
BUTYL PHTHALATE	10	ug/L	ND	05-19-92	CLP SVOA
(2-ETHYLHEXYL)PHTHALATE	10	ug/L	72	05-19-92	CLP SVOA
HENOL	10	ug/L	ND	05-19-92	CLP SVOA
APHTHALENE	10	ug/L	ND	05-19-92	CLP SVOA
YCLOHEXANONE	*	ug/L	ND	05-19-92	CLP SVOA LS
OLUENE-2,4-DIISOCYANATE	*	ug/L	ND	05-19-92	CLP SVOA LS
NITROSOIMINO DIETHANOL	*	ug/L	ND	05-19-92	CLP SVOA LS
PICHLOROHYDRIN	*	ug/L	ND	05-19-92	CLP SVOA LS
ISPHENOL A/EPICHLOROHYDRIN	*	ug/L	ND	05-19-92	CLP SVOA LS

QA/QC SURROGATE RECOVERIES

ITROBENZENE-d5(35-114) 105 % TERPHENYL-d14(33-141) 102 % 2-FLUOROPHENOL(21-100) 20 %**
2-FLUOROBIPHENYL(43-116) 48 % PHENOL-d5(10-94) 24 % 2,4,6-TRIBROMOPHENOL(10-123) 20 %

THANOL	1	ug/mL	ND	05-20-92	GC/FID
FORMALDEHYDE	50	ug/L	1100 B*	05-23-92	HPLC
ARIUM	16	ug/L	658	05-18-92	CLP METALS
CHROMIUM	3	ug/L	4.8	05-18-92	CLP METALS
CADMIUM	2	ug/L	ND	05-18-92	CLP METALS
EAD	1	ug/L	1.4	05-14-92	CLP METALS
ICKEL	8	ug/L	ND	05-18-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 424301SW(108)

DATE : 06-01-92

DESCRIPTIONS OF FOOTNOTES

ND = NOT DETECTED
ug/Kg = PARTS PER BILLION(PPB)
mg/Kg = PARTS PER MILLION(PPM)
ug/g = PARTS PER MILLION(PPM)
ug/L = PARTS PER BILLION(PPB)
TIC = TENTATIVELY IDENTIFIED COMPOUND
* = NO DETECTION LIMIT AVAILABLE
** = OUTSIDE QC ON BOTH ORIGINAL AND RERUN
*** = CUMENE OR ISOMERS OF CUMENE WERE IDENTIFIED IN THE SEMI-VOLATILE TIC's.
B = ANALYTE ALSO FOUND IN BLANK
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)
D = SURROGATES DILUTED OUT

NOTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

AMERICAN TECHNICAL & ANALYTICAL SERVICES, INC.

SDG2 IWS 5/11/92

CHAIN OF CUSTODY RECORD

PROJ. NO.: 7-301-05

ATAS CLIENT NAME: Stanwood and Wilson

FORM COMPLETED BY: L. Rosen

LOCATION:

ANALYSIS: WD 5-11-92 1132.ZB SW10.BA

SAMPLE ID	DATE	TIME	MATRIX	GRAB	COMP	PRES	NO. OF CONTAINERS	VOA's	SEMI-VOAS	METALS	REMARKS	LAB NO.
wgw/1(A)(5/8/92)	5/8/92	11:20	WATER	x		HCL COLD	5	X	X	X	PER STEELCOTE	4275.01
wgw/1(B)(5/8/92)		13:30					5				BID	02
wgw/1(C)(5/8/92)		15:00					7				FILTER METALS!	03
wgw/1(D)(5/8/92)		1700					7				Call MONDAY AM	04
wgw/1(D)(5/8/92)	MS	1700					7					4275.05
wgw/1(D)(5/8/92)	MSD	1700					7					

Methanol & Formaldehyde also requested per Larry Rosen 5/11/92 RLWhite

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME	RELINQUISHED BY:	DATE/TIME	RECEIVED BY:	DATE/TIME
Lawrence C. Rosen	5/8/92 18:15	Lawton Massenberg	5/8/92 18:15				

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z-301-05
Page 1 of 1

Owner / Location STEELCOTE Date 8-7-92

Well No. SWGW/1(A) Sample No. SWGW/1(A)(8-7-92) Time Started 10:15

Weather Overcast ~80°

Well Site Conditions

SAMPLING DATA

Time Started 10:15 Water Column in Well 43.8

PID Head Space Casing Diameter 2" ϕ

Total Depth of Well Below MP 58.6 Gallons per Foot 0.16

DTW Below MP 14.8' Gallons in Well ~7 gallons

	Yes	No	Sample
Light-Phase Immiscibles	☐	☒	☐
Heavy-Phase Immiscibles	☐	☒	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
~35					
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started 11:10

Sampling Personnel L. Rosen

Remarks

Time Completed 11:15

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. 2-301-05
Page 1 of 1

Owner / Location SESECOFE Date 8-7-92

Well No. SWGW/1(B) Sample No. SWGW/1(B)(8-7-92) Time Started 12:00

Weather Overcast - 80°

Well Site Conditions

SAMPLING DATA

Time Started 12:00 Water Column in Well 25.85

PID Head Space Casing Diameter 2" Ø

Total Depth of Well Below MP 59.5 Gallons per Foot 0.16

DTW Below MP 33.65 Gallons in Well ~4

	Yes	No	Sample
Light-Phase Immiscibles	☐	☐	☐
Heavy-Phase Immiscibles	☐	☐	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
~20					
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started 13:00

Sampling Personnel L. Rosen

Remarks

Time Completed

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z-317-01
Page _____ of _____

Owner / Location STEELCOTE Date 8-7-92

Well No. SWGW/1(c) Sample No. SWGW/1(c)(8-7-92) Time Started _____

Weather Overcast ~85° Intermittent Light rain

Well Site Conditions _____

SAMPLING DATA

Time Started _____ Water Column in Well 16.30

PID Head Space _____ Casing Diameter 2" ø

Total Depth of Well Below MP 60.0 Gallons per Foot 0.16

DTW Below MP 43.70 Gallons in Well ≈2.6

	Yes	No	Sample
Light-Phase Immiscibles	☐	☒	☐
Heavy-Phase Immiscibles	☐	☒	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
~14					
After Sampling					

Evacuation Method Bailer

Water Quality _____

Sampling Method Bailer Time Started 1500

Sampling Personnel L. Rosen

Remarks _____

Time Completed _____

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z-317-01
Page 1 of 1

Owner / Location _____ Date 8-7-92

Well No. SWGW/1(D) Sample No. SWGW/1(D)(8-7-92) Time Started 15:40

Weather _____

Well Site Conditions _____

SAMPLING DATA

Time Started 15:40 Water Column in Well 42.85

PID Head Space _____ Casing Diameter 2" Ø

Total Depth of Well Below MP 56.9 Gallons per Foot 0.16

TOW Below MP 14.05 Gallons in Well ~6.8

	Yes	No	Sample
Light-Phase Immiscibles	☐	☒	☐
Heavy-Phase Immiscibles	☐	☒	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
~35					
After Sampling					

Evacuation Method Bailer

Water Quality _____

Sampling Method Bailer Time Started ~1630

Sampling Personnel L. Rosen, T. Hoppensteel

Remarks _____

Time Completed ~17:00

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

LIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 495101SW(126)

DATE : 09-02-92

SAMPLE MATRIX : WATER
ATAS # : 4951.01
DATE SUBMITTED: 08-07-92
SAMPLE ID : SWGW/1(A)(8-7-92)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	5	ug/L	ND	08-18-92	CLP VOA
TOLUENE	5	ug/L	ND	08-18-92	CLP VOA

QA/QC SURROGATE RECOVERIES

OLUENE-d8(88-110) 102 % BROMOFLUOROBENZENE(86-115) 93 % 1,2-DICHLOROETHANE-D4(76-114) 98 %

SEMI-VOLATILE ORGANIC					
BIS(2-ETHYLHEXYL)PHTHALATE	10	ug/L	ND	08-14-92	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 85 % TERPHENYL-d14(33-141) 72 % 2-FLUOROPHENOL(21-100) 49 %
2-FLUOROBIPHENYL(43-116) 81 % PHENOL-d5(10-94) 58 % 2,4,6-TRIBROMOPHENOL(10-123) 82 %

METALS					
BARIUM	14	ug/L	348	08-17-92	CLP METALS
CHROMIUM	3	ug/L	ND	08-17-92	CLP METALS
LEAD	1	ug/L	2.3	08-16-92	CLP METALS

MISCELLANEOUS					
FORMALDEHYDE	10	ug/L	50 B*	08-28-92	HPLC

ND = NOT DETECTED
ug/L = PARTS PER BILLION(PPB)
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

NOTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

LIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 495102SW(126)

DATE : 09-02-92

SAMPLE MATRIX : WATER
ATAS # : 4951.02
DATE SUBMITTED: 08-07-92
SAMPLE ID : SWGW/1(B)(8-7-92)
PROJECT : Z-301-05 STEELCOTE

ARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
YLENE	5	ug/L	ND	08-19-92	CLP VOA
TOLUENE	5	ug/L	ND	08-19-92	CLP VOA

QA/QC SURROGATE RECOVERIES

OLUENE-d8(88-110) 105 % BROMOFLUOROBENZENE(86-115) 104 % 1,2-DICHLOROETHANE-D4(76-114) 105 %

EMI-VOLATILE ORGANIC					
I(2-ETHYLHEXYL)PHTHALATE	10	ug/L	ND	08-14-92	CLP SVOA

QA/QC SURROGATE RECOVERIES

ITROBENZENE-d5(35-114) 80 % TERPHENYL-d14(33-141) 73 % 2-FLUOROPHENOL(21-100) 47 %
2-FLUOROBIPHENYL(43-116) 75 % PHENOL-d5(10-94) 53 % 2,4,6-TRIBROMOPHENOL(10-123) 76 %

ETALS					
BARIUM	14	ug/L	500	08-17-92	CLP METALS
CHROMIUM	3	ug/L	ND	08-17-92	CLP METALS
EAD	1	ug/L	6.6	08-16-92	CLP METALS
ISCELLANEOUS					
FORMALDEHYDE	10	ug/L	22 B*	08-28-92	HPLC

ND = NOT DETECTED
ug/L = PARTS PER BILLION(PPB)
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

NOTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

LIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 495103SW(126)

DATE : 09-02-92

SAMPLE MATRIX : WATER
ATAS # : 4951.03
DATE SUBMITTED: 08-07-92
SAMPLE ID : SWGW/1(C)(8-7-92)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
LENE	5	ug/L	12	08-18-92	CLP VOA
TOLUENE	5	ug/L	ND	08-18-92	CLP VOA

QA/QC SURROGATE RECOVERIES

OLUENE-d8(88-110) 109 % BROMOFLUOROBENZENE(86-115) 107 % 1,2-DICHLOROETHANE-D4(76-114) 109 %

EMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	ND	08-14-92	CLP SVOA

QA/QC SURROGATE RECOVERIES

TROBENZENE-d5(35-114) 79 % TERPHENYL-d14(33-141) 71 % 2-FLUOROPHENOL(21-100) 55 %
2-FLUOROBIPHENYL(43-116) 78 % PHENOL-d5(10-94) 57 % 2,4,6-TRIBROMOPHENOL(10-123) 77 %

METALS					
RIUM	14	ug/L	468	08-17-92	CLP METALS
CHROMIUM	3	ug/L	ND	08-17-92	CLP METALS
AD	1	ug/L	2.6	08-16-92	CLP METALS
SCELLANEOUS					
FORMALDEHYDE	10	ug/L	31 B*	08-28-92	HPLC

ND = NOT DETECTED
g/L = PARTS PER BILLION(PPB)
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

OTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

IENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 495104SW(126)

DATE : 09-02-92

SAMPLE MATRIX : WATER
ATAS # : 4951.04
DATE SUBMITTED: 08-07-92
SAMPLE ID : SWGW/1(D)(8-7-92)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
LENE	5	ug/L	2 J	08-19-92	CLP VOA
TOLUENE	5	ug/L	ND	08-19-92	CLP VOA

QA/QC SURROGATE RECOVERIES

LUENE-d8(88-110) 104 % BROMOFLUOROBENZENE(86-115) 103 % 1,2-DICHLOROETHANE-D4(76-114) 103 %

MI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	ND	08-14-92	CLP SVOA

QA/QC SURROGATE RECOVERIES

TROBENZENE-d5(35-114) 79 % TERPHENYL-d14(33-141) 72 % 2-FLUOROPHENOL(21-100) 49 %
2-FLUOROBIPHENYL(43-116) 78 % PHENOL-d5(10-94) 56 % 2,4,6-TRIBROMOPHENOL(10-123) 80 %

METALS					
RIUM	14	ug/L	392	08-17-92	CLP METALS
CHROMIUM	3	ug/L	ND	08-17-92	CLP METALS
AD	1	ug/L	ND	08-16-92	CLP METALS
SCELLANEOUS					
FORMALDEHYDE	10	ug/L	25 B*	08-28-92	HPLC

ND = NOT DETECTED
g/L = PARTS PER BILLION(PPB)
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

TE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Laboratory ATAS
Attn: R. MANNZ

Analysis Parameters/Sample Container Description
(Include preservative if used)

WD
8-10-92
SWLD.BA

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	VOA-COLD/HCL 40 ml vial	SEMI VOA-COLD 1/2 gallon amber	FORMALDEHYDE-COLD 8 oz NM Glass	METALS-COLD 500 ml Plastic			Total Number of Containers	Remarks/Matrix
SWGW/1(A)(8-7-92)	4951.01	11:15	8-7-92		X	✓	✓	✓	✓			5	Water
SWGW/1(B)(8-7-92)	02	13:00	8-7-92		X	✓	✓	✓	✓			5	"
SWGW/1(C)(8-7-92)	03	15:00	8-7-92		X	✓	✓	✓	✓			5	"
SWGW/1(D)(8-7-92)	04	17:00	8-7-92		X	✓	✓	✓	✓			5	"
SWGW/1(D)(8-7-92)MS	05	17:00	8-7-92		X	✓	✓	✓	✓			5	"
SWGW/1(D)(8-7-92)MSD	06	17:00	8-7-92		X	✓	✓	✓	✓			5	"

Project Information	Sample Receipt	
Project Number: Z-301-05	Total Number of Containers	30
Project Name: STEELCOTE	COC Seals/Intact? Y/N/NA	N/A
Contact: Lawrence Rosen	Received Good Cond./Cold	Y
Ongoing Project? Yes ☒ No ☐	Delivery Method: HAND DELIVERY (attach shipping bill, if any)	
Sampler: L. Rosen		

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Lawrence C. Rosen Time: 1800	Signature: Time:	Signature: Time:
Printed Name: Lawrence C. Rosen Date: 8/7/92	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Instructions
Requested Turn Around Time: STANDARD
Special Instructions: CALL TO CONFIRM ANALYSES

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Lawton Massenberg Time: 18:00	Signature: Time:	Signature: Time:
Printed Name: LAWTON MASSENBERG Date: 8/7/92	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No. 11239

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z-301-05
Page 1 of 1

Owner / Location STEZZCCTE Date 11/16/92

Well No. SWGW-A Sample No. SWGW-A (11/16/92) Time Started 10:00 am

Weather Clear, Sunny 43°(TEMP) Light Wind 0-5 MPH

Well Site Conditions

SAMPLING DATA

Time Started 10:00

Water Column in Well 43.15

PID Head Space 2.1 PPM (microTIP)

Casing Diameter 2.0" ID

Total Depth of Well Below MP 58.6

Gallons per Foot 0.16"

DTW Below MP 15.45

Gallons in Well 6.9

	Yes	No	Sample
Light-Phase Immiscibles	☐	☒	☐
Heavy-Phase Immiscibles	☐	☒	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	~~TDS~~	Time
2	15.3	7.05	1565		10:30
4.5	15.8	7.05	~~1528~~ 1394		10:50
8.5	15.9	7.05	1325		11:15
12.5	15.9	7.05	1189		11:45
15.0	16.0	7.05	1180		12:10
After Sampling	16.0	7.05	1157		12:25

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started 12:30

Sampling Personnel Lawrence Rasen, Jackie Brooks

Remarks

Time Completed 12:45

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z 501-05
Page 1 of 1

Owner / Location STEEL COTE Date 11-16-92

Well No. SWGW-B Sample No. SWGW-B (11-16-92) Time Started 1300

Weather Clear Sunny 52° (TEMP) Light Wind - 6-8 MPH

Well Site Conditions

SAMPLING DATA

Time Started 1300 Water Column in Well 27.1

PID Head Space 170 PPM Casing Diameter 2.0" ID

Total Depth of Well Below MP 59.5 Gallons per Foot 0.16"

DTW Below MP 32.40 Gallons in Well 4.33

	Yes	No	Sample
Light-Phase Immiscibles	☐	☒	☐
Heavy-Phase Immiscibles	☐	☒	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	~~TDS~~	Time
2	16.6	7.05	916		1:50
4.7	16.4	7.05	910		2:10
8	16.6	7.05	898		2:30
10	16.7	7.05	894		2:47
After Sampling	16.6				

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started 1455

Sampling Personnel JACK L BROOKS

Remarks

Time Completed

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z 301-05
Page 1 of 1

Owner / Location STEEL COTE Date 11-16-92

Well No. SWGW C Sample No. SWGW 11-16-92 Time Started 4:15

Weather Clear Sunny 58 TEMP Light wind

Well Site Conditions

SAMPLING DATA

Time Started 4:15 Water Column in Well 19.2

PID Head Space 109 ppm Casing Diameter 2.0 ID

Total Depth of Well Below MP 60.0' Gallons per Foot 0.163

DTW Below MP 40.08 Gallons in Well 3.1

	Yes	No	Sample
Light-Phase Immiscibles	☐	☑	☐
Heavy-Phase Immiscibles	☐	☑	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
1	17.0	7.05	932		
3	16.9	7.05	886		
6	16.7	7.05	918		
9	16.9	7.05	919		
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started 17:30

Sampling Personnel L. Rosso, J. Brooks

Remarks

Time Completed 17:45

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z 301-05
Page 1 of 1

Owner / Location STEEL COTE Date 11-16-92

Well No. SWGW-D Sample No. SWGWD (11-16-92) Time Started 3:20

Weather Clear Sunny 57° TEMP Light Wind 8-9 MPH

Well Site Conditions

SAMPLING DATA

Time Started 3:24 Water Column in Well 48.82

PID Head Space 170 PPM Casing Diameter 2.0

Total Depth of Well Below MP 56.9 Gallons per Foot 0.16

DTW Below MP 13.08 Gallons in Well 7.5

	Yes	No	Sample
Light-Phase Immiscibles	☐	☒	☐
Heavy-Phase Immiscibles	☐	☒	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
2	17.9	7.05			
After Sampling	16.9	6.80	1061		17:15

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started 17:20

Sampling Personnel L. Rosen, J. Brooks

Remarks

Time Completed 17:45

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 563401SW(145)

DATE : 12-14-92

SAMPLE MATRIX : WATER
ATAS # : 5634.01
DATE SUBMITTED: 11-17-92
SAMPLE ID : SWGW/A(11-16-92)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	5	ug/L	ND	11-20-92	CLP VOA
TOLUENE	5	ug/L	ND	11-20-92	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 100 % BROMOFLUOROBENZENE(86-115) 100 % 1,2-DICHLOROETHANE-D4(76-114) 104 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	9 BJ	11-25-92	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 67 % TERPHENYL-d14(33-141) 67 % 2-FLUOROPHENOL(21-100) 54 %
2-FLUOROBIPHENYL(43-116) 46 % PHENOL-d5(10-94) 36 % 2,4,6-TRIBROMOPHENOL(10-123) 48 %

METALS					
BARIUM	7	ug/L	401	11-20-92	CLP METALS
CHROMIUM	4	ug/L	ND	11-20-92	CLP METALS
LEAD	2	ug/L	ND	11-23-92	CLP METALS
MISCELLANEOUS					
FORMALDEHYDE	10	ug/L	54 B*	11-25-92	HPLC

ND = NOT DETECTED
ug/L = PARTS PER BILLION(PPB)
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

NOTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 563402SW(145)

DATE : 12-14-92

SAMPLE MATRIX : WATER
ATAS # : 5634.02
DATE SUBMITTED: 11-17-92
SAMPLE ID : SWGW/B(11-16-92)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	5	ug/L	ND	11-20-92	CLP VOA
TOLUENE	5	ug/L	ND	11-20-92	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 98 % BROMOFLUOROBENZENE(86-115) 99 % 1,2-DICHLOROETHANE-D4(76-114) 104 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	11 B	11-25-92	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 70 % TERPHENYL-d14(33-141) 71 % 2-FLUOROPHENOL(21-100) 57 %
2-FLUOROBIPHENYL(43-116) 61 % PHENOL-d5(10-94) 41 % 2,4,6-TRIBROMOPHENOL(10-123) 54 %

METALS					
BARIUM	7	ug/L	512	11-20-92	CLP METALS
CHROMIUM	4	ug/L	ND	11-20-92	CLP METALS
LEAD	2	ug/L	ND	11-23-92	CLP METALS
MISCELLANEOUS					
FORMALDEHYDE	10	ug/L	12 B*	11-25-92	HPLC

ND = NOT DETECTED
ug/L = PARTS PER BILLION(PPB)
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

NOTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 563403SW(145)

DATE : 12-14-92

SAMPLE MATRIX : WATER
ATAS # : 5634.03
DATE SUBMITTED: 11-17-92
SAMPLE ID : SWGW/C(11-16-92)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	84	ug/L	730	11-24-92	CLP VOA
TOLUENE	84	ug/L	2000	11-24-92	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 102 % BROMOFLUOROBENZENE(86-115) 105 % 1,2-DICHLOROETHANE-D4(76-114) 97 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	5 BJ	11-25-92	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 51 % TERPHENYL-d14(33-141) 85 % 2-FLUOROPHENOL(21-100) 34 %
2-FLUOROBIPHENYL(43-116) 71 % PHENOL-d5(10-94) 33 % 2,4,6-TRIBROMOPHENOL(10-123) 42 %

METALS					
BARIUM	7	ug/L	376	11-20-92	CLP METALS
CHROMIUM	4	ug/L	ND	11-20-92	CLP METALS
LEAD	2	ug/L	ND	11-23-92	CLP METALS
MISCELLANEOUS					
FORMALDEHYDE	10	ug/L	83 B*	11-25-92	HPLC

ND = NOT DETECTED
ug/L = PARTS PER BILLION(PPB)
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

NOTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

LIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 563404SW(145)

DATE : 12-14-92

SAMPLE MATRIX : WATER
ATAS # : 5634.04
DATE SUBMITTED: 11-17-92
SAMPLE ID : SWGW/D(11-16-92)
PROJECT : Z-301-05 STEELCOTE

ARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
YLENE	5	ug/L	7	11-23-92	CLP VOA
TOLUENE	5	ug/L	ND	11-23-92	CLP VOA

QA/QC SURROGATE RECOVERIES

OLUENE-d8(88-110) 97 % BROMOFLUOROBENZENE(86-115) 101 % 1,2-DICHLOROETHANE-D4(76-114) 92 %

EMI-VOLATILE ORGANIC					
I(2-ETHYLHEXYL)PHTHALATE	10	ug/L	9 BJ	11-25-92	CLP SVOA

QA/QC SURROGATE RECOVERIES

ITROBENZENE-d5(35-114) 67 % TERPHENYL-d14(33-141) 72 % 2-FLUOROPHENOL(21-100) 53 %
2-FLUOROBIPHENYL(43-116) 43 % PHENOL-d5(10-94) 36 % 2,4,6-TRIBROMOPHENOL(10-123) 45 %

ETALS					
ARIUM	7	ug/L	644	11-20-92	CLP METALS
CHROMIUM	4	ug/L	ND	11-20-92	CLP METALS
EAD	2	ug/L	ND	11-23-92	CLP METALS

ISCELLANEOUS					
ORMALDEHYDE	10	ug/L	41 B*	11-25-92	HPLC

ND = NOT DETECTED
ug/L = PARTS PER BILLION(PPB)
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

NOTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Page 1 of 1
Laboratory ATAS
Attn: R. HANNZ

Analysis Parameters/Sample Container Description
(include preservative if used)

WD 11-17-92 BA

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	(HCL, COLD)	VOA (COLD)	SEMI VOA (COLD)	METALS (COLD)	FORMALDEHYDE			Total Number of Containers	Remarks/Matrix
SWGW-A (11-16-92)	5634.01	12:30	11/16/92										5	water
SWGW-B (11-16-92)	02	15:00											5	
SWGW-C (11-16-92)	03	17:30											5	
SWGW-D (11-16-92)	04	17:20											5	
SWGW-D (11-16-92) MS	05	17:20											5	
SWGW-D (11-16-92) MSD	06	17:20											5	

Project Information	Sample Receipt	
Project Number: Z-301-05	Total Number of Containers	30
Project Name: STEELCOTE	COC Seals/Intact? Y/N/NA	NA
Contact: L. Rosen	Received Good Cond./Cold	YES
Ongoing Project? Yes ☒ No ☐	Delivery Method: HAND DELIVERY (attach shipping bill, if any)	
Sampler: L. Rosen, J. Brooks		

Instructions

Requested Turn Around Time: STANDARD

Special Instructions: FILTER METALS, Preserve
Analyze per Steelcote specifications

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Jackie L Brooks Time: 9:02	Signature: Time:	Signature: Time:
Printed Name: JACKIE L BROOKS Date: 11-17-92	Printed Name: Date:	Printed Name: Date:
Company: SHANNON & WILSON INC	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Lawton Massenberg Time: 9:01	Signature: Time:	Signature: Time:
Printed Name: LAWTON MASSENBERG Date: 11/17/92	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

91/UR

No. 11255

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z-311-05
Page 1 of 1

Owner / Location STEELCITE Date 2/9/93

Well No. SWGW-A Sample No. SWGW-A (2-9-93) Time Started 13:20

Weather Overcast, Wind 5-10 mph ~40°

Well Site Conditions

SAMPLING DATA

Time Started 1330 Water Column in Well 43.4

PID Head Space Ø Casing Diameter 2" ID

Total Depth of Well Below MP 58.6 Gallons per Foot 0.16

DTW Below MP 15.2 Gallons in Well 7.0

	Yes	No	Sample
Light-Phase Immiscibles	☐	☒	☐
Heavy-Phase Immiscibles	☐	☒	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
5		6.7	540		13:46
10		6.6	540		13:54
15		6.7	540		14:10
18		6.6	540		14:29
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started

Sampling Personnel JLB

Remarks

Time Completed 14:50

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z-301-05
Page ____ of ____

Owner / Location STEELCOTE Date 2/9/93

Well No. SWGW-B Sample No. SWGW-B(2-9-93) Time Started 11:00

Weather Overcast

Well Site Conditions

SAMPLING DATA

Time Started 10:20 Water Column in Well 17.5

PID Head Space No response Casing Diameter 2" ID

Total Depth of Well Below MP 42.0 Gallons per Foot 0.16

DTW Below MP 59.5 Gallons in Well 2.8

	Yes	No	Sample
Light-Phase Immiscibles	☐	☒	☐
Heavy-Phase Immiscibles	☐	☒	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
3.0		6.9	500		11:00
5.0		6.9	540		11:08
8.0		7.0	520		11:15
11.5		6.9	540		11:25
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started

Sampling Personnel JLB

Remarks

Time Completed 11:40

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. 2-301-05
Page 1 of 1

Owner / Location STEELCOTE Date 2/9/93

Well No. SWGW-C Sample No. SWGW-C(2/9/93) Time Started 1201

Weather Overcast ~40-45°

Well Site Conditions

SAMPLING DATA

Time Started 1201 Water Column in Well 15.8

PID Head Space Ø Casing Diameter ~~0.16~~ 2" ID

Total Depth of Well Below MP 60.0 Gallons per Foot 0.16

DTW Below MP 44.2 Gallons in Well 2.5

	Yes	No	Sample
Light-Phase Immiscibles	☐	☒	☐
Heavy-Phase Immiscibles	☐	☒	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
3		6.8	520		12:23
6		6.9	500		12:31
10		6.9	500		12:39
12		6.9	500		12:51
After Sampling		6.9	500		

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started

Sampling Personnel JLB

Remarks

Time Completed 13:10

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z-301-05
Page 1 of 1

Owner / Location STEELCOTE Date 2/9/93

Well No. SWGW-D Sample No. SWGW-D (2/9/93 Time Started 15:07

Weather Overcast to Partly Cloudy

Well Site Conditions

SAMPLING DATA

Time Started 15:07 Water Column in Well 43.0

PID Head Space Ø Casing Diameter 2" ID

Total Depth of Well Below MP 56.9 Gallons per Foot 0.16

DTW Below MP 13.9 Gallons in Well 7.0

	Yes	No	Sample
Light-Phase Immiscibles	☐	☒	☐
Heavy-Phase Immiscibles	☐	☒	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
4.5		6.7	520		15:30
10		6.7	520		15:35
13.0		6.7	500		15:40
19.0		6.6	501		15:48
21.0		6.6	505		15:58
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started 15:13

Sampling Personnel JLB, LCR

Remarks

Time Completed 16:30

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 617901SW(158)

DATE : 03-02-93

SAMPLE MATRIX : WATER
ATAS # : 6179.01
DATE SUBMITTED: 02-09-93
SAMPLE ID : SWGW-A(2-9-93)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	5	ug/L	23	02-18-93	CLP VOA
TOLUENE	5	ug/L	11	02-18-93	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 100 % BROMOFLUOROBENZENE(86-115) 107 % 1,2-DICHLOROETHANE-D4(76-114) 87 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	5 J	02-18-93	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 50 % TERPHENYL-d14(33-141) 64 % 2-FLUOROPHENOL(21-100) 55 %
2-FLUOROBIPHENYL(43-116) 51 % PHENOL-d5(10-94) 45 % 2,4,6-TRIBROMOPHENOL(10-123) 49 %

METALS					
BARIUM	9	ug/L	463	02-18-93	CLP METALS
CHROMIUM	6	ug/L	ND	02-18-93	CLP METALS
LEAD	1	ug/L	6.9	02-15-93	CLP METALS
MISCELLANEOUS					
FORMALDEHYDE	10	ug/L	25.3 B*	02-19-93	HPLC

ND = NOT DETECTED
ug/L = PARTS PER BILLION(PPB)
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

NOTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 617902SW(158)

DATE : 03-02-93

SAMPLE MATRIX : WATER
ATAS # : 6179.02
DATE SUBMITTED: 02-09-93
SAMPLE ID : SWGW-B(2-9-93)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	5	ug/L	3 J	02-18-93	CLP VOA
TOLUENE	5	ug/L	ND	02-18-93	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 103 % BROMOFLUOROBENZENE(86-115) 111 % 1,2-DICHLOROETHANE-D4(76-114) 103 %

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	6 BJ	02-16-93	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 47 % TERPHENYL-d14(33-141) 100 % 2-FLUOROPHENOL(21-100) 42 %
2-FLUOROBIPHENYL(43-116) 35 %*PHENOL-d5(10-94) 43 % 2,4,6-TRIBROMOPHENOL(10-123) 64 %

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METALS					
BARIUM	9	ug/L	736	02-18-93	CLP METALS
CHROMIUM	6	ug/L	ND	02-18-93	CLP METALS
LEAD	1	ug/L	4.6	02-15-93	CLP METALS

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
MISCELLANEOUS					
FORMALDEHYDE	10	ug/L	39.4 B*	02-19-93	HPLC

ND = NOT DETECTED
ug/L = PARTS PER BILLION(PPB)
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

NOTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 617903SW(158)

DATE : 03-02-93

SAMPLE MATRIX : WATER
ATAS # : 6179.03
DATE SUBMITTED: 02-09-93
SAMPLE ID : SWGW-C(2-9-93)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	5	ug/L	47	02-18-93	CLP VOA
TOLUENE	5	ug/L	ND	02-18-93	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 108 % BROMOFLUOROBENZENE(86-115) 115 % 1,2-DICHLOROETHANE-D4(76-114) 103 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	4 J	02-18-93	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 74 % TERPHENYL-d14(33-141) 87 % 2-FLUOROPHENOL(21-100) 62 %
2-FLUOROBIPHENYL(43-116) 72 % PHENOL-d5(10-94) 44 % 2,4,6-TRIBROMOPHENOL(10-123) 66 %

METALS					
BARIUM	9	ug/L	488	02-18-93	CLP METALS
CHROMIUM	6	ug/L	ND	02-18-93	CLP METALS
LEAD	1	ug/L	5.8	02-15-93	CLP METALS
MISCELLANEOUS					
FORMALDEHYDE	10	ug/L	52.7 B*	02-19-93	HPLC

ND = NOT DETECTED
ug/L = PARTS PER BILLION(PPB)
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

NOTE: AVERAGE DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

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CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 617904SW(158)

DATE : 03-02-93

SAMPLE MATRIX : WATER
ATAS # : 6179.04
DATE SUBMITTED: 02-09-93
SAMPLE ID : SWGW-D(2-9-93)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	5	ug/L	1 J	02-18-93	CLP VOA
TOLUENE	5	ug/L	ND	02-18-93	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 106 % BROMOFLUOROBENZENE(86-115) 113 % 1,2-DICHLOROETHANE-D4(76-114) 98 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	5 J	02-18-93	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 68 % TERPHENYL-d14(33-141) 88 % 2-FLUOROPHENOL(21-100) 60 %
2-FLUOROBIPHENYL(43-116) 67 % PHENOL-d5(10-94) 46 % 2,4,6-TRIBROMOPHENOL(10-123) 62 %

METALS					
BARIUM	9	ug/L	562	02-18-93	CLP METALS
CHROMIUM	6	ug/L	ND	02-18-93	CLP METALS
LEAD	1	ug/L	7.7	02-15-93	CLP METALS
MISCELLANEOUS					
FORMALDEHYDE	10	ug/L	41.8 B*	02-19-93	HPLC

ND = NOT DETECTED
ug/L = PARTS PER BILLION(PPB)
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

NOTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

Shannon & Wilson, Inc.
400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Laboratory ATAS
Attn: Rick Mavilz

WD
2-10-93
1HZ-2A4

Analysis Parameters/Sample Container Description
(Include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	(HCL, COLD) VOA	(COLD) SEMI VOA	(COLD) METALS	(COLD) FORMALDEHYDE			Total Number of Containers	Remarks/Matrix
SWGW-A (2/9/93)	6179.01	14:40	2/9/93			X	X	X	X			5	Water
SWGW-B (2/9/93)	02	11:45				X	X	X	X			5	
SWGW-C (2/9/93)	03	12:50				X	X	X	X			5	
SWGW-D (2/9/93)	04	16:30				X	X	X	X			5	
SWGW-D (2/9/93) MS	05	16:30				X	X	X	X			5	
SWGW-D (2/9/93) MSD	06	16:30				X	X	X	X			5	

Project Information	Sample Receipt	
Project Number: Z-301-05	Total Number of Containers	30
Project Name:	COC Seals/Intact? Y/N/NA	YES
Contact: Lawrence Rosen	Received Good Cond./Cold	YES
Ongoing Project? Yes ☒ No ☐	Delivery Method: HAND DELIVERY (attach shipping bill, if any)	
Sampler: L. Rosen, J. Brooks		

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Jackie L Brooks Time: 17:35	Signature: Time:	Signature: Time:
Printed Name: JACKIE L BROOKS Date: 2/9/93	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson Inc	Company:	Company:

Instructions
Requested Turn Around Time: PER STEELCOTE CONTRACT
Special Instructions: Call if you have questions

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Lawton Massenberg Time: 17:25	Signature: Time:	Signature: Time:
Printed Name: LAWTON MASSENBERG Date: 2/9/93	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No. 11278

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z301-05
Page 1 of 1

Owner / Location STEELCOTE Date 5-13-93

Well No. SWGW-A Sample No. SWGW/A 5-13-93 Time Started 0850

Weather SUNNY 00/-47°

Well Site Conditions

SAMPLING DATA

Time Started 09:06 Water Column in Well 43.9

PID Head Space 1.4 Casing Diameter 2"

Total Depth of Well Below MP 58.6 Gallons per Foot 0.16

TW Below MP 14.7 Gallons in Well 7.0

	Yes	No	Sample
Light-Phase Immiscibles	☐	☒	☐
Heavy-Phase Immiscibles	☐	☒	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
3	14.7	7.1	1609		0901
7	14.2	7.2	1511		0912
12	14.7	7.2	1567		0920
18	14.8	7.2	1553		0926
22	14.8	7.2	1532		0940
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started 0950

Sampling Personnel Jackie Brooks

Remarks

Time Completed 10:06

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z 381-05
Page 1 of 1

Owner / Location STEELCOTE Date 5-13-93

Well No. SWGW-B Sample No. SWGW/B 5-13-93 Time Started 10:20

Weather SUNNY ≈ 52°

Well Site Conditions

SAMPLING DATA

Time Started 10:23 Water Column in Well 26.2

PID Head Space Q Casing Diameter 2" ID

Total Depth of Well Below MP 59.5 Gallons per Foot 0.16

DTW Below MP 33.3 Gallons in Well 4.1

	Yes	No	Sample
Light-Phase Immiscibles	☐	☐	☐
Heavy-Phase Immiscibles	☐	☐	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
3	17.5	7.2	1429		1035
6	17.1	7.1	1467		1043
9	16.8	7.2	1494		1056
12	16.8	7.2	1530		11:12
15	16.8	7.2	1513		11:26
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started 10:20

Sampling Personnel Jackie L Brooks

Remarks

Time Completed 11:30

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z 301-05
Page 1 of 1

Owner / Location SWGW - STEEL COTE (JLB) Date MAY 17 1993

Well No. SWGW/c Sample No. SWGW/c 05-17-93 Time Started 10:30

Weather Sunny ≈ 67°

Well Site Conditions

SAMPLING DATA

Time Started 10:40 Water Column in Well 25.4

PID Head Space X Casing Diameter 2" O ID

Total Depth of Well Below MP 60.0 Gallons per Foot 0.16

TW Below MP 34.6 Gallons in Well 40

	Yes	No	Sample
Light-Phase Immiscibles	☐	☐	☐
Heavy-Phase Immiscibles	☐	☐	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
3	14.7	7.2	1284		
5	14.4	7.2	1244		
7	13.8	7.2	1219		
10	13.8	7.2	1183		
12	13.8	7.2	1176		
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started 11:48

Sampling Personnel JACKIE L BROOKS

Remarks

Time Completed 12:26

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z 311-05
Page 1 of 3

Owner / Location STEEL COTE Date 5-13-93

Well No. SWGW D Sample No. SWGW/D 5-13-93 Time Started 1400

Weather Sunny ≈ 63°

Well Site Conditions

SAMPLING DATA

Time Started 1400 Water Column in Well 44.0

PID Head Space Ø Casing Diameter 2.0 ID

Total Depth of Well Below MP 56.9 Gallons per Foot 0.16

TW Below MP 12.9 Gallons in Well 7.0

	Yes	No	Sample
Light-Phase Immiscibles	☐	☐	☐
Heavy-Phase Immiscibles	☐	☐	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
4	14.9	7.0	1690		1404
7	15.3	7.0	1649		1410
11	16.2	7.0	1630		1421
16	16.2	7.1	1615		14:34
20	16.2	7.0	1575		2:47
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started 1453

Sampling Personnel Jackie Brooks

Remarks

Time Completed 1548

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z 301-05
Page 1 of 1

Owner / Location STEELCOTE Date 8-12-93

Well No. SWGW-A Sample No. SWGW /A 1 (8-12-93) Time Started 9:10

Weather OVERCAST SKIES ~ 71° Light Winds

Well Site Conditions

SAMPLING DATA

Time Started 9:15 Water Column in Well 46.2

PID Head Space Ø Casing Diameter 2'0"

Total Depth of Well Below MP 58.6 Gallons per Foot 0.16

DTW Below MP 12.4 Gallons in Well 7.3

	Yes	No	Sample
Light-Phase Immiscibles	☐	☑	☐
Heavy-Phase Immiscibles	☐	☐	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
3	15.8	7.0	1418		9:20
8	15.6	7.0	1549		930
13	15.6	7.0	1582		938
15	15.6	7.0	1564		945
21	15.5	7.0	1557		1000
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started

Sampling Personnel JACKIE BROOKS

Remarks

Time Completed 10:20

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z 301-05
Page 1 of 1

Owner / Location STEELCOTE Date 8-12-93

Well No. SWGW B Sample No. SWGW1 B (8-12-93) Time Started 1025

Weather Partly Cloudy ≈ 75° Light Winds

Well Site Conditions SOME WEEDS, NO DEBRIS.

SAMPLING DATA

Time Started 10:30 Water Column in Well 29.8

PID Head Space 101 PPM Casing Diameter 2'0"

Total Depth of Well Below MP 59.5 Gallons per Foot 0.16

DTW Below MP 29.7 Gallons in Well 4.7

	Yes	No	Sample
Light-Phase Immiscibles	✓	☐	☐
Heavy-Phase Immiscibles	☐	☐	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
3	18.0	7.1	1207		1045
6	18.1	7.1	1462		1053
10	18.0	7.2	1469		1105
12	17.9	7.2	1482		1108
14	18.0	7.1	1447		1115
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started

Sampling Personnel JACKIE BROOKS

Remarks

Time Completed 11:50

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. Z 301-05
Page 1 of 1

Owner / Location STEELCOTE Date 8-12-93

Well No. SWGW-D Sample No. SWGW 11 D (8-12-93) Time Started 1350

Weather Sunny ≈ 81°

Well Site Conditions Clear

SAMPLING DATA

Time Started 1355 Water Column in Well 43.9

PID Head Space 103 PPM Casing Diameter 2'0"

Total Depth of Well Below MP 56.9 Gallons per Foot 0.16

DTW Below MP 13.0 Gallons in Well 7.0

	Yes	No	Sample
Light-Phase Immiscibles	☐	☐	☐
Heavy-Phase Immiscibles	☑	☐	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
4	17.8	7.0	1379		1410
8	17.1	7.0	1461		1425
12	16.9	7.0	1490		1438
16	16.9	7.0	1523		1447
21	17.0	7.0	1500		1505
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started

Sampling Personnel JACKIE BROOKS

Remarks

Time Completed 1530

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

SHANNON & WILSON, INC.
Geotechnical Consultants

WATER SAMPLING LOG

Job No. 2 301-05
Page 1 of 1

Owner / Location STEELCOTE Date

Well No. SWGW-C Sample No. SWGW 1, c (8-12-93) Time Started 12:20

Weather Partly Sunny ≈ 75° Mild Winds

Well Site Conditions Clear

SAMPLING DATA

Time Started 12:35 Water Column in Well 32.1

PID Head Space 0 Casing Diameter 2'0"

Total Depth of Well Below MP 60'0 Gallons per Foot 0.16

DTW Below MP 27.9 Gallons in Well 5.1

	Yes	No	Sample
Light-Phase Immiscibles	☐	☑	☐
Heavy-Phase Immiscibles	☐	☐	☐

FIELD PARAMETERS

Gallons Bailed	Temperature, °C	pH	Sp. Conductivity µmhos/cm	TDS	Time
3	17.4	7.1	1198		1243
6	16.9	7.1	1192		1349
9	17.0	7.0	1208		1258
12	17.1	7.1	1190		1310
15	17.1	7.1	1169		1315
After Sampling					

Evacuation Method Bailer

Water Quality

Sampling Method Bailer Time Started

Sampling Personnel JACKIE BROOKS

Remarks

Time Completed 1345

WELL CASING VOLUMES

Gal/Ft 1-1/4"=0.077 2"=0.16 3"=0.37 4"=0.65
1-1/2"=0.10 2-1/2"=0.24 3-1/2"=0.50 6"=1.46

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 746301SW(175)

DATE : 09-03-93

SAMPLE MATRIX : WATER
ATAS # : 7463.01
DATE SUBMITTED: 08-12-93
SAMPLE ID : SWGW A
PROJECT : Z-301-05 STEELCOTE

PARAMETER	REPORT LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	1	ug/L	ND	08-16-93	CLP VOA
TOLUENE	1	ug/L	ND	08-16-93	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 97 % BROMOFLUOROBENZENE(86-115) 98 % 1,2-DICHLOROETHANE-D4(76-114) 100 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	1	ug/L	ND	08-18-93	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 66 % TERPHENYL-d14(33-141) 41 % 2-FLUOROPHENOL(21-100) 52 %
2-FLUOROBIPHENYL(43-116) 58 % PHENOL-d5(10-94) 64 % 2,4,6-TRIBROMOPHENOL(10-123) 71 %

METALS					
BARIUM	6	ug/L	407	08-21-93	CLP METALS
CHROMIUM	4	ug/L	ND	08-21-93	CLP METALS
LEAD	2	ug/L	ND	08-23-93	CLP METALS

ND = NOT DETECTED ABOVE REPORTING LIMIT
ug/L = PARTS PER BILLION(PPB)
B = ANALYTE DETECTED IN THE METHOD BLANK

NOTE: METALS REPORT LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 746302SW(175)

DATE : 09-03-93

SAMPLE MATRIX : WATER
ATAS # : 7463.02
DATE SUBMITTED: 08-12-93
SAMPLE ID : SWGW B
PROJECT : Z-301-05 STEELCOTE

PARAMETER	REPORT LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	1	ug/L	ND	08-16-93	CLP VOA
TOLUENE	1	ug/L	ND	08-16-93	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 96 % BROMOFLUOROBENZENE(86-115) 98 % 1,2-DICHLOROETHANE-D4(76-114) 103 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	1	ug/L	3	08-18-93	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 95 % TERPHENYL-d14(33-141) 35 % 2-FLUOROPHENOL(21-100) 52 %
2-FLUOROBIPHENYL(43-116) 49 % PHENOL-d5(10-94) 73 % 2,4,6-TRIBROMOPHENOL(10-123) 66 %

METALS					
BARIUM	6	ug/L	584	08-21-93	CLP METALS
CHROMIUM	4	ug/L	ND	08-21-93	CLP METALS
LEAD	2	ug/L	15.7	08-23-93	CLP METALS

ND = NOT DETECTED ABOVE REPORTING LIMIT
ug/L = PARTS PER BILLION(PPB)
B = ANALYTE DETECTED IN THE METHOD BLANK

NOTE: METALS REPORT LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 746303SW(175)

DATE : 09-03-93

SAMPLE MATRIX : WATER
ATAS # : 7463.03
DATE SUBMITTED: 08-12-93
SAMPLE ID : SWGW C
PROJECT : Z-301-05 STEELCOTE

PARAMETER	REPORT LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	50	ug/L	2100	08-16-93	CLP VOA
TOLUENE	50	ug/L	ND	08-16-93	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 95 % BROMOFLUOROBENZENE(86-115) 98 % 1,2-DICHLOROETHANE-D4(76-114) 105 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	1	ug/L	2	08-19-93	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 62 % TERPHENYL-d14(33-141) 37 % 2-FLUOROPHENOL(21-100) 56 %
2-FLUOROBIPHENYL(43-116) 56 % PHENOL-d5(10-94) 56 % 2,4,6-TRIBROMOPHENOL(10-123) 72 %

METALS					
BARIUM	6	ug/L	223	08-21-93	CLP METALS
CHROMIUM	4	ug/L	ND	08-21-93	CLP METALS
LEAD	2	ug/L	ND	08-23-93	CLP METALS

ND = NOT DETECTED ABOVE REPORTING LIMIT
ug/L = PARTS PER BILLION(PPB)
B = ANALYTE DETECTED IN THE METHOD BLANK

NOTE: METALS REPORT LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 746304SW(175)

DATE : 09-03-93

SAMPLE MATRIX : WATER
ATAS # : 7463.04
DATE SUBMITTED: 08-12-93
SAMPLE ID : SWGW D
PROJECT : Z-301-05 STEELCOTE

PARAMETER	REPORT LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	1	ug/L	14	08-16-93	CLP VOA
TOLUENE	1	ug/L	ND	08-16-93	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 94 % BROMOFLUOROBENZENE(86-115) 102 % 1,2-DICHLOROETHANE-D4(76-114) 105 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	1	ug/L	3	08-18-93	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 58 % TERPHENYL-d14(33-141) 35 % 2-FLUOROPHENOL(21-100) 52 %
2-FLUOROBIPHENYL(43-116) 60 % PHENOL-d5(10-94) 61 % 2,4,6-TRIBROMOPHENOL(10-123) 60 %

METALS					
BARIUM	6	ug/L	710	08-21-93	CLP METALS
CHROMIUM	4	ug/L	8.8	08-21-93	CLP METALS
LEAD	2	ug/L	32.7	08-26-93	CLP METALS

ND = NOT DETECTED ABOVE REPORTING LIMIT
ug/L = PARTS PER BILLION(PPB)
B = ANALYTE DETECTED IN THE METHOD BLANK

NOTE: METALS REPORT LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
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2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Page 1 of 1
Laboratory ATAS
Attn: WALTER.

WP 8/13/93 SWLO.BA

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	FORMALDEHYDE	METALS	VOA	SEMI VOA			Total Number of Containers	Remarks/Matrix
SWGW A	7463.01	10:05	8.12.93		✓	X	X	X	X			5	
SWGW B	02	11:15				X	X	X	X			5	
SWGW C	03	1330				X	X	X	X			5	
SWGW D	04	1445				X	X	X	X			5	
SWGW MS	05	1500				X	X	X	X			5	
SWGW MSD	06	1525				X	X	X	X			5	

Project Information	Sample Receipt	
Project Number: Z301-05	Total Number of Containers	30
Project Name:	COC Seals/Intact? Y/N/NA	NA
Contact: LARRY ROSEN	Received Good Cond./Cold	Y
Ongoing Project? Yes ☑ No ☐	Delivery Method: HAND DELIVERED (attach shipping bill, if any)	
Sampler: JLB		

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Jackie L Brooks Time: 16:05	Signature: Time:	Signature: Time:
Printed Name: JACKIE L BROOKS Date: 8.12.93	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Instructions
Requested Turn Around Time: SEE LARRY ROSEN
Special Instructions:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Walter Dotson Time: 1605	Signature: Time:	Signature: Time:
Printed Name: WALTER DOTSON Date: 8/12/93	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-9i/UR

No. 11325

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 676901SW(169)

DATE : 06-14-93

SAMPLE MATRIX : WATER
ATAS # : 6769.01
DATE SUBMITTED: 05-14-93
SAMPLE ID : SWGW/A(5-13-93)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	REPORT LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	1	ug/L	ND	05-17-93	CLP VOA
TOLUENE	1	ug/L	ND	05-17-93	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 104 % BROMOFLUOROBENZENE(86-115) 105 % 1,2-DICHLOROETHANE-D4(76-114) 91 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	1	ug/L	3	05-20-93	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 60 % TERPHENYL-d14(33-141) 44 % 2-FLUOROPHENOL(21-100) 45 %
2-FLUOROBIPHENYL(43-116) 55 % PHENOL-d5(10-94) 54 % 2,4,6-TRIBROMOPHENOL(10-123) 79 %

METALS					
BARIUM	4	ug/L	410	05-24-93	CLP METALS
CHROMIUM	4	ug/L	4.6	05-24-93	CLP METALS
LEAD	1	ug/L	1.6	05-23-93	CLP METALS
MISCELLANEOUS					
FORMALDEHYDE	10	ug/L	ND	05-29-93	HPLC

NOTE: AMOUNT FOUND IN SAMPLE WAS LOWER THAN AMOUNT FOUND IN THE BLANK.

ND = NOT DETECTED ABOVE REPORTING LIMIT
ug/L = PARTS PER BILLION(PPB)
B = ANALYTE DETECTED IN THE METHOD BLANK

NOTE: METALS REPORT LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 676902SW(169)

DATE : 06-14-93

SAMPLE MATRIX : WATER
ATAS # : 6769.02
DATE SUBMITTED: 05-14-93
SAMPLE ID : SWGW/B(5-13-93)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	REPORT LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	1	ug/L	ND	05-18-93	CLP VOA
TOLUENE	1	ug/L	ND	05-18-93	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 105 % BROMOFLUOROBENZENE(86-115) 105 % 1,2-DICHLOROETHANE-D4(76-114) 98 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	1	ug/L	ND	05-20-93	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 51 % TERPHENYL-d14(33-141) 59 % 2-FLUOROPHENOL(21-100) 44 %
2-FLUOROBIPHENYL(43-116) 42*% PHENOL-d5(10-94) 48 % 2,4,6-TRIBROMOPHENOL(10-123) 59 %

METALS					
BARIUM	4	ug/L	680	05-24-93	CLP METALS
CHROMIUM	4	ug/L	7.7	05-24-93	CLP METALS
LEAD	1	ug/L	48.0	05-23-93	CLP METALS
MISCELLANEOUS					
FORMALDEHYDE	10	ug/L	ND	05-29-93	HPLC

NOTE: AMOUNT FOUND IN SAMPLE WAS LOWER THAN AMOUNT FOUND IN THE BLANK.

ND = NOT DETECTED ABOVE REPORTING LIMIT
ug/L = PARTS PER BILLION(PPB)
B = ANALYTE DETECTED IN THE METHOD BLANK

NOTE: METALS REPORT LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 678501SW(169)

DATE : 06-14-93

SAMPLE MATRIX : WATER
ATAS # : 6785.01
DATE SUBMITTED: 05-18-93
SAMPLE ID : SWGW/C 5-17-93
PROJECT : Z-301-05 STEELCOTE

PARAMETER	REPORT LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	2	ug/L	4	05-20-93	CLP VOA
TOLUENE	2	ug/L	620	05-20-93	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 102 % BROMOFLUOROBENZENE(86-115) 93 % 1,2-DICHLOROETHANE-D4(76-114) 98 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	1	ug/L	3 B	05-21-93	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 58 % TERPHENYL-d14(33-141) 32*% 2-FLUOROPHENOL(21-100) 53 %
2-FLUOROBIPHENYL(43-116) 55 % PHENOL-d5(10-94) 58 % 2,4,6-TRIBROMOPHENOL(10-123) 74 %

METALS					
BARIUM	4	ug/L	287	05-24-93	CLP METALS
CHROMIUM	4	ug/L	5.8	05-24-93	CLP METALS
LEAD	1	ug/L	7.4	05-23-93	CLP METALS
MISCELLANEOUS					
FORMALDEHYDE	10	ug/L	ND	05-29-93	HPLC

NOTE: AMOUNT FOUND IN SAMPLE WAS LOWER THAN AMOUNT FOUND IN THE BLANK.

ND = NOT DETECTED ABOVE REPORTING LIMIT
ug/L = PARTS PER BILLION(PPB)
B = ANALYTE DETECTED IN THE METHOD BLANK

NOTE: METALS REPORT LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 676903SW(169)

DATE : 06-14-93

SAMPLE MATRIX : WATER
ATAS # : 6769.03
DATE SUBMITTED: 05-14-93
SAMPLE ID : SWGW/D(5-13-93)
PROJECT : Z-301-05 STEELCOTE

PARAMETER	REPORT LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
VOLATILE ORGANICS					
XYLENE	1	ug/L	5	05-17-93	CLP VOA
TOLUENE	1	ug/L	ND	05-17-93	CLP VOA

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 106 % BROMOFLUOROBENZENE(86-115) 107 % 1,2-DICHLOROETHANE-D4(76-114) 94 %

SEMI-VOLATILE ORGANIC					
DI(2-ETHYLHEXYL)PHTHALATE	1	ug/L	ND	05-20-93	CLP SVOA

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 54 % TERPHENYL-d14(33-141) 43 % 2-FLUOROPHENOL(21-100) 47 %
2-FLUOROBIPHENYL(43-116) 48 % PHENOL-d5(10-94) 50 % 2,4,6-TRIBROMOPHENOL(10-123) 56 %

METALS					
BARIUM	4	ug/L	511	05-24-93	CLP METALS
CHROMIUM	4	ug/L	5.3	05-24-93	CLP METALS
LEAD	1	ug/L	4.6	05-23-93	CLP METALS
MISCELLANEOUS					
FORMALDEHYDE	10	ug/L	ND	05-29-93	HPLC

NOTE: AMOUNT FOUND IN SAMPLE WAS LOWER THAN AMOUNT FOUND IN THE BLANK.

ND = NOT DETECTED ABOVE REPORTING LIMIT
ug/L = PARTS PER BILLION(PPB)
B = ANALYTE DETECTED IN THE METHOD BLANK

NOTE: METALS REPORT LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

Shannon & Wilson, Inc.

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(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Page 1 of 1
Laboratory ATAS
Attn:

LM
5/14/93
SWLO, BA

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	VOLATILE ORGANICS	METALS	FORMALDEHYDE	SEMI-VOA ORGANICS			Total Number of Containers	Remarks/Matrix
SWGW/A (5-13-93)		0950	5-13-93		X	X	X	X	X			5	6769.01
SWGW/B (5-13-93)		1130	5-13-93		X	X	X	X	X			5	02
SWGW/D (5-13-93)		1453	5-13-93		X	X	X	X	X			5	03
SWGW/D MS (5-13-93)		1453	5-13-93		X	X	X	X	X			5	04
SWGW/D MSD (5-13-93)		1453	5-13-93		X	X	X	X	X			5	05

Project Information		Sample Receipt	
Project Number:	Z 301-05	Total Number of Containers	25
Project Name:	STEELCOTE	COC Seals/Intact? Y/N/NA	NA
Contact:	LARRY ROSEN	Received Good Cond./Cold	YES
Ongoing Project?	Yes ☑ No ☐	Delivery Method:	HAND DELIVERED
Sampler:	Jackie L Brooks	(attach shipping bill, if any)	

Instructions

Requested Turn Around Time: STANDARD

Special Instructions:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Jackie L Brooks Time: 15:56	Signature: Time:	Signature: Time:
Printed Name: Jackie L Brooks Date: 5-14-93	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Walter Dotson Time: 8:56	Signature: Time:	Signature: Time:
Printed Name: WALTER DOTSON Date: 5/14/93	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No. 11309

Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Page 1 of 1
Laboratory ATAS
Attn:

LM
5/18/93
SWLO, BA

Analysis Parameters/Sample Container Description
(include preservative if used)

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	VOLATILE ORGANICS	METALS	FORMALDEHYDE	SEMI-VOA			Total Number of Containers	Remarks/Matrix
SWGW/c 5-17-93		1157	5-17-93		X	X	X	X	X			5	6785.01

Project Information		Sample Receipt	
Project Number:	Z301-05	Total Number of Containers	5
Project Name:	STEELCOTE	COC Seals/Intact? Y/N/NA	NA
Contact:	LARRY ROSEN	Received Good Cond./Cold	YES
Ongoing Project?	Yes ☑ No ☐	Delivery Method:	HAND DELIVERED
Sampler:	Jackie L Brooks	(attach shipping bill, if any)	

Instructions

Requested Turn Around Time: STANDARD

Special Instructions:

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Jackie L Brooks Time: 1037	Signature: Time:	Signature: Time:
Printed Name: Jackie L Brooks Date: 5-18-93	Printed Name: Date:	Printed Name: Date:
Company: Shannon & Wilson	Company:	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Walter Dotson Time: 1037	Signature: Time:	Signature: Time:
Printed Name: WALTER DOTSON Date: 5/18/93	Printed Name: Date:	Printed Name: Date:
Company: ATAS	Company:	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No. 11312

CHEMICAL ANALYSES OF STORM WATER SAMPLES

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 508901SW(129)

DATE : 09-22-92

SAMPLE MATRIX : WATER
ATAS # : 5089.01
SAMPLE ID : SWSF/1(8-26-92)

DATE SUBMITTED: 08-27-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	5	ug/L	7	09-02-92	CLP VOA
CARBON TERTACHLORIDE	5	ug/L	ND	09-02-92	CLP VOA
XYLENE	5	ug/L	ND	09-02-92	CLP VOA
METHLY ISOBUTYL KETONE	10	ug/L	ND	09-02-92	CLP VOA
TOLUENE	5	ug/L	1 J	09-02-92	CLP VOA
METHYL ETHYL KETONE	10	ug/L	ND	09-02-92	CLP VOA
BENZENE	5	ug/L	1 J	09-02-92	CLP VOA
ETHYL ACETATE	*	ug/L	ND	09-02-92	CLP VOA LS
CUMENE	*	ug/L	ND	09-02-92	CLP VOA LS
1-BUTANOL	*	ug/L	ND	09-02-92	CLP VOA LS
2-ETHOXYETHANOL	*	ug/L	ND	09-02-92	CLP VOA LS
2-METHYL-1-PROPANOL	*	ug/L	ND	09-02-92	CLP VOA LS

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 108 % BROMOFLUOROBENZENE(86-115) 88 % 1,2-DICHLOROETHANE-D4(76-114) 102 %

BUTYL BENZYL PHTHALATE	10	ug/L	ND	09-11-92	CLP SVOA
DIBUTYL PHTHALATE	10	ug/L	ND	09-11-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	ND	09-11-92	CLP SVOA
PHENOL	10	ug/L	ND	09-11-92	CLP SVOA
NAPHTHALENE	10	ug/L	ND	09-11-92	CLP SVOA
CYCLOHEXANONE	*	ug/L	ND	09-11-92	CLP SVOA LS
TOLUENE-2,4-DIISOCYANATE	*	ug/L	ND	09-11-92	CLP SVOA LS
NITROSOIMINO DIETHANOL	*	ug/L	ND	09-11-92	CLP SVOA LS
EPICHLOROHYDRIN	*	ug/L	ND	09-11-92	CLP SVOA LS
BISPHENOL A/EPICHLOROHYDRIN	*	ug/L	ND	09-11-92	CLP SVOA LS

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 66 % TERPHENYL-d14(33-141) 92 % 2-FLUOROPHENOL(21-100) 40 %
2-FLUOROBIPHENYL(43-116) 76 % PHENOL-d5(10-94) 32 % 2,4,6-TRIBROMOPHENOL(10-123) 69 %

METHANOL	1	ug/mL	ND	09-04-92	GC/FID
FORMALDEHYDE	10	ug/L	138 B*	09-12-92	HPLC
BARIUM	14	ug/L	72.7	09-02-92	CLP METALS
CHROMIUM	3	ug/L	5.0	09-02-92	CLP METALS
CADMIUM	2	ug/L	3.10	09-02-92	CLP METALS
LEAD	2	ug/L	389	09-01-92	CLP METALS
NICKEL	8	ug/L	11.9	09-02-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 508902SW(129)

DATE : 09-22-92

SAMPLE MATRIX : WATER
ATAS # : 5089.02
SAMPLE ID : SWSF/2(8-26-92)

DATE SUBMITTED: 08-27-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	5	ug/L	ND	09-02-92	CLP VOA
CARBON TERTACHLORIDE	5	ug/L	ND	09-02-92	CLP VOA
XYLENE	5	ug/L	ND	09-02-92	CLP VOA
METHLY ISOBUTYL KETONE	10	ug/L	ND	09-02-92	CLP VOA
TOLUENE	5	ug/L	ND	09-02-92	CLP VOA
METHYL ETHYL KETONE	10	ug/L	ND	09-02-92	CLP VOA
BENZENE	5	ug/L	ND	09-02-92	CLP VOA
ETHYL ACETATE	*	ug/L	ND	09-02-92	CLP VOA LS
CUMENE	*	ug/L	ND	09-02-92	CLP VOA LS
1-BUTANOL	*	ug/L	ND	09-02-92	CLP VOA LS
2-ETHOXYETHANOL	*	ug/L	ND	09-02-92	CLP VOA LS
2-METHYL-1-PROPANOL	*	ug/L	ND	09-02-92	CLP VOA LS

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 105 % BROMOFLUOROBENZENE(86-115) 96 % 1,2-DICHLOROETHANE-D4(76-114) 103 %

BUTYL BENZYL PHTHALATE	10	ug/L	ND	09-10-92	CLP SVOA
DIBUTYL PHTHALATE	10	ug/L	ND	09-10-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	ND	09-10-92	CLP SVOA
PHENOL	10	ug/L	ND	09-10-92	CLP SVOA
NAPHTHALENE	10	ug/L	ND	09-10-92	CLP SVOA
CYCLOHEXANONE	*	ug/L	ND	09-10-92	CLP SVOA LS
TOLUENE-2,4-DIISOCYANATE	*	ug/L	ND	09-10-92	CLP SVOA LS
NITROSOIMINO DIETHANOL	*	ug/L	ND	09-10-92	CLP SVOA LS
EPICHLOROHYDRIN	*	ug/L	ND	09-10-92	CLP SVOA LS
BISPHENOL A/EPICHLOROHYDRIN	*	ug/L	ND	09-10-92	CLP SVOA LS

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 54 % TERPHENYL-d14(33-141) 69 % 2-FLUOROPHENOL(21-100) 46 %
2-FLUOROBIPHENYL(43-116) 50 % PHENOL-d5(10-94) 50 % 2,4,6-TRIBROMOPHENOL(10-123) 65 %

METHANOL	1	ug/mL	ND	09-04-92	GC/FID
FORMALDEHYDE	10	ug/L	117.2 B*	09-12-92	HPLC
BARIUM	14	ug/L	21.7	09-02-92	CLP METALS
CHROMIUM	3	ug/L	ND	09-02-92	CLP METALS
CADMIUM	2	ug/L	ND	09-02-92	CLP METALS
LEAD	2	ug/L	53.7	09-01-92	CLP METALS
NICKEL	8	ug/L	ND	09-02-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 508903SW(129)

DATE : 09-22-92

SAMPLE MATRIX : WATER
ATAS # : 5089.03
SAMPLE ID : SWSF/3(8-26-92)

DATE SUBMITTED: 08-27-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	5	ug/L	10	09-02-92	CLP VOA
CARBON TERTACHLORIDE	5	ug/L	ND	09-02-92	CLP VOA
XYLENE	5	ug/L	ND	09-02-92	CLP VOA
METHLY ISOBUTYL KETONE	10	ug/L	ND	09-02-92	CLP VOA
TOLUENE	5	ug/L	ND	09-02-92	CLP VOA
METHYL ETHYL KETONE	10	ug/L	ND	09-02-92	CLP VOA
BENZENE	5	ug/L	ND	09-02-92	CLP VOA
ETHYL ACETATE	*	ug/L	ND	09-02-92	CLP VOA LS
CUMENE	*	ug/L	ND	09-02-92	CLP VOA LS
1-BUTANOL	*	ug/L	ND	09-02-92	CLP VOA LS
2-ETHOXYETHANOL	*	ug/L	ND	09-02-92	CLP VOA LS
2-METHYL-1-PROPANOL	*	ug/L	ND	09-02-92	CLP VOA LS

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 109 % BROMOFLUOROBENZENE(86-115) 98 % 1,2-DICHLOROETHANE-D4(76-114) 105 %

BUTYL BENZYL PHTHALATE	10	ug/L	4 J	09-10-92	CLP SVOA
DIBUTYL PHTHALATE	10	ug/L	ND	09-10-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	ND	09-10-92	CLP SVOA
PHENOL	10	ug/L	ND	09-10-92	CLP SVOA
NAPHTHALENE	10	ug/L	ND	09-10-92	CLP SVOA
CYCLOHEXANONE	*	ug/L	ND	09-10-92	CLP SVOA LS
TOLUENE-2,4-DIISOCYANATE	*	ug/L	ND	09-10-92	CLP SVOA LS
NITROSOIMINO DIETHANOL	*	ug/L	ND	09-10-92	CLP SVOA LS
EPICHLOROHYDRIN	*	ug/L	ND	09-10-92	CLP SVOA LS
BISPHENOL A/EPICHLOROHYDRIN	*	ug/L	ND	09-10-92	CLP SVOA LS

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 59 % TERPHENYL-d14(33-141) 74 % 2-FLUOROPHENOL(21-100) 52 %
2-FLUOROBIPHENYL(43-116) 51 % PHENOL-d5(10-94) 58 % 2,4,6-TRIBROMOPHENOL(10-123) 68 %

METHANOL	1	ug/mL	ND	09-04-92	GC/FID
FORMALDEHYDE	10	ug/L	158.2 B*	09-12-92	HPLC
BARIUM	14	ug/L	95.7	09-02-92	CLP METALS
CHROMIUM	3	ug/L	11.5	09-02-92	CLP METALS
CADMIUM	2	ug/L	7.2	09-02-92	CLP METALS
LEAD	2	ug/L	280	09-01-92	CLP METALS
NICKEL	8	ug/L	ND	09-02-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 508904SW(129)

DATE : 09-22-92

SAMPLE MATRIX : WATER
ATAS # : 5089.04
SAMPLE ID : SWSF/4(8-26-92)

DATE SUBMITTED: 08-27-92
PROJECT : Z-301-05

PARAMETER	DET LIMIT	UNITS	RESULTS	DATE ANALYZED	METHOD REFERENCE
METHYLENE CHLORIDE	5	ug/L	6	09-02-92	CLP VOA
CARBON TERTACHLORIDE	5	ug/L	ND	09-02-92	CLP VOA
XYLENE	5	ug/L	ND	09-02-92	CLP VOA
METHLY ISOBUTYL KETONE	10	ug/L	ND	09-02-92	CLP VOA
TOLUENE	5	ug/L	ND	09-02-92	CLP VOA
METHYL ETHYL KETONE	10	ug/L	ND	09-02-92	CLP VOA
BENZENE	5	ug/L	ND	09-02-92	CLP VOA
ETHYL ACETATE	*	ug/L	ND	09-02-92	CLP VOA LS
CUMENE	*	ug/L	ND	09-02-92	CLP VOA LS
1-BUTANOL	*	ug/L	ND	09-02-92	CLP VOA LS
2-ETHOXYETHANOL	*	ug/L	ND	09-02-92	CLP VOA LS
2-METHYL-1-PROPANOL	*	ug/L	ND	09-02-92	CLP VOA LS

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(88-110) 107 % BROMOFLUOROBENZENE(86-115) 92 % 1,2-DICHLOROETHANE-D4(76-114) 106 %

BUTYL BENZYL PHTHALATE	10	ug/L	ND	09-10-92	CLP SVOA
DIBUTYL PHTHALATE	10	ug/L	ND	09-10-92	CLP SVOA
DI(2-ETHYLHEXYL)PHTHALATE	10	ug/L	ND	09-10-92	CLP SVOA
PHENOL	10	ug/L	ND	09-10-92	CLP SVOA
NAPHTHALENE	10	ug/L	ND	09-10-92	CLP SVOA
CYCLOHEXANONE	*	ug/L	ND	09-10-92	CLP SVOA LS
TOLUENE-2,4-DIISOCYANATE	*	ug/L	ND	09-10-92	CLP SVOA LS
NITROSOIMINO DIETHANOL	*	ug/L	ND	09-10-92	CLP SVOA LS
EPICHLOROHYDRIN	*	ug/L	ND	09-10-92	CLP SVOA LS
BISPHENOL A/EPICHLOROHYDRIN	*	ug/L	ND	09-10-92	CLP SVOA LS

QA/QC SURROGATE RECOVERIES

NITROBENZENE-d5(35-114) 72 % TERPHENYL-d14(33-141) 94 % 2-FLUOROPHENOL(21-100) 64 %
2-FLUOROBIPHENYL(43-116) 69 % PHENOL-d5(10-94) 71 % 2,4,6-TRIBROMOPHENOL(10-123) 88 %

METHANOL	1	ug/mL	ND	09-04-92	GC/FID
FORMALDEHYDE	10	ug/L	120 B*	09-12-92	HPLC
BARIUM	14	ug/L	126	09-02-92	CLP METALS
CHROMIUM	3	ug/L	9.7	09-02-92	CLP METALS
CADMIUM	2	ug/L	3.3	09-02-92	CLP METALS
LEAD	2	ug/L	417	09-01-92	CLP METALS
NICKEL	8	ug/L	ND	09-02-92	CLP METALS

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: SHANNON & WILSON, INC.
11500 OLIVE BLVD. SUITE 276
ST. LOUIS, MO 63141
ATTN: LARRY ROSEN

REPORT: 508901SW(129)

DATE : 09-22-92

DESCRIPTIONS OF FOOTNOTES

ND = NOT DETECTED
ug/L = PARTS PER BILLION(PPB)
ug/mL = PARTS PER MILLION(PPM)
TIC = TENTATIVELY IDENTIFIED COMPOUND
* = NO DETECTION LIMIT AVAILABLE
** = OUTSIDE QC ON BOTH ORIGINAL AND RERUN
*** = CUMENE OR ISOMERS OF CUMENE WERE IDENTIFIED IN THE SEMI-VOLATILE TIC's.
B = ANALYTE ALSO FOUND IN BLANK
B* = AVERAGE CONCENTRATION AMOUNT FOUND IN THE METHOD BLANKS WAS SUBTRACTED FROM THE AMOUNT FOUND IN THE SAMPLE. USED ONLY FOR FORMALDEHYDE REPORTS.
J = ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION (ORGANICS ONLY)

NOTE: METALS DETECTION LIMITS ARE BASED ON ACTUAL INSTRUMENT DETECTION LIMITS

Shannon & Wilson, Inc.

400 N. 34th Street, Suite 100
Seattle, WA 98103
(206) 632-8020

11500 Olive Blvd., Suite 276
St. Louis, MO 63141
(314) 872-8170

2055 Hill Road
Fairbanks, AK 99707
(907) 479-0600

5430 Fairbanks Street, Suite 3
Anchorage, AK 99518
(907) 561-2120

Chain of Custody Record

Page 1 of
Laboratory ATAS
Attn: Rich Mainz

Analysis Parameters/Sample Container Description
(include preservative if used)

LM 8/27/92
~~243~~-112-B4

Sample Identity	Lab No.	Time	Date Sampled	Comp.	Grab	VOA cold (HCL)	SEMI VOA cold	METALS (HNO3) cold	FORMALDEHYDE cold	ALCOHOLS/METHANOL cold	Total Number of Containers	Remarks/Matrix
SWSF/1(8-26-92)		1800	8-26-92			✓	✓	✓	✓	✓	6	WATER 5089.01
SWSF/2 (8-26-92)		1800	8-26-92			✓	✓	✓	✓	✓	6	.02
SWSF/3 (8-26-92)		1800	8-26-92			✓	✓	✓	✓	✓	6	.03
SWSF/4 (8-26-92)		1800	8-26-92			✓	✓	✓	✓	✓	6	.04

Project Information	Sample Receipt	
Project Number: Z-301-05	Total Number of Containers	24
Project Name: STEELCOTE	COC Seals/Intact? Y/N/NA	NA
Contact: L. ROSEN	Received Good Cond./Cold	YES
Ongoing Project? Yes [X] No [ ]	Delivery Method: HAND DELIVERED (attach shipping bill, if any)	
Sampler: L. ROSEN		

Instructions

Requested Turn Around Time: STANDARD

Special Instructions:
PER protocols for STEELCOTE Project - call if you have questions.

Relinquished By: 1.	Relinquished By: 2.	Relinquished By: 3.
Signature: Lawrence C. Rosen Time: 0850	Signature: Kathleen M. Ivanhoff Time: 10:44	Signature: Time:
Printed Name: Lawrence C. Rosen Date: 8-27-92	Printed Name: KATHLEEN M. IVANHOFF Date: 8/27/92	Printed Name: Date:
Company: SHANNON & WILSON	Company: SHANNON & WILSON	Company:

Received By: 1.	Received By: 2.	Received By: 3.
Signature: Kathleen M. Ivanhoff Time: 0850	Signature: Walter Dotson Time: 10:43	Signature: Time:
Printed Name: KATHLEEN M. IVANHOFF Date:	Printed Name: WALTER DOTSON Date: 8-27-92	Printed Name: Date:
Company: SHANNON + WILSON	Company: ATAS	Company:

Distribution: White - w/shipment - returned to Shannon & Wilson w/ Laboratory report
Yellow - w/shipment - for consignee files
Pink - Shannon & Wilson - Job File

F-19-91/UR

No. 11241

CONE PENETROMETER TESTING DATA

Interpreted CPT Profile

Operator :s&w
On Site Loc:CPT-1
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 120 pcf

CPT Date :06/14/93 10:20
Cone Used :#1
Water table (feet) : 28.78576

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	9.07	0.19	2.06	0.03	clayey silt to silty clay	UNDFND	UNDFD	4	.6
2	16.90	0.14	0.81	0.09	sandy silt to clayey silt	UNDFND	UNDFD	6	1.1
3	4.17	0.05	1.20	0.15	sensitive fine grained	UNDFND	UNDFD	2	.2
4	11.65	0.32	2.77	0.22	silty clay to clay	UNDFND	UNDFD	7	.7
5	6.13	0.17	2.74	0.28	clay	UNDFND	UNDFD	6	.3
6	10.47	0.28	2.66	0.33	silty clay to clay	UNDFND	UNDFD	7	.6
7	5.15	0.18	3.47	0.39	clay	UNDFND	UNDFD	5	.3
8	7.97	0.24	2.97	0.45	silty clay to clay	UNDFND	UNDFD	5	.5
9	8.52	0.35	4.15	0.51	clay	UNDFND	UNDFD	8	.5
10	16.70	0.71	4.23	0.57	clay	UNDFND	UNDFD	16	1.0
11	10.45	0.33	3.20	0.63	silty clay to clay	UNDFND	UNDFD	7	.6
12	9.95	0.51	5.12	0.69	clay	UNDFND	UNDFD	10	.6
13	14.62	0.92	6.32	0.75	clay	UNDFND	UNDFD	14	.9
14	13.87	0.84	6.02	0.81	clay	UNDFND	UNDFD	13	.8
15	11.57	0.65	5.58	0.87	clay	UNDFND	UNDFD	11	.7
16	10.72	0.52	4.89	0.93	clay	UNDFND	UNDFD	10	.6
17	8.92	0.39	4.39	0.98	clay	UNDFND	UNDFD	9	.5
18	7.55	0.35	4.58	1.04	clay	UNDFND	UNDFD	7	.4
19	5.82	0.32	5.49	1.10	clay	UNDFND	UNDFD	6	.3
20	6.13	0.28	4.59	1.16	clay	UNDFND	UNDFD	6	.3
21	6.66	0.29	4.30	1.23	clay	UNDFND	UNDFD	6	.3
22	5.42	0.26	4.85	1.29	clay	UNDFND	UNDFD	5	.2
23	7.08	0.30	4.19	1.35	clay	UNDFND	UNDFD	7	.3
24	8.41	0.48	5.68	1.41	clay	UNDFND	UNDFD	8	.4
25	11.37	0.54	4.72	1.48	clay	UNDFND	UNDFD	11	.6
26	12.93	0.47	3.67	1.54	silty clay to clay	UNDFND	UNDFD	8	.7
27	10.48	0.43	4.07	1.59	clay	UNDFND	UNDFD	10	.5
28	9.00	0.28	3.07	1.65	silty clay to clay	UNDFND	UNDFD	6	.4
29	13.23	0.36	2.72	1.71	clayey silt to silty clay	UNDFND	UNDFD	6	.7
30	20.35	0.33	1.62	1.75	sandy silt to clayey silt	UNDFND	UNDFD	8	1.2
31	16.40	0.40	2.47	1.78	clayey silt to silty clay	UNDFND	UNDFD	8	.9
32	13.52	0.20	1.50	1.80	clayey silt to silty clay	UNDFND	UNDFD	6	.7
33	10.63	0.23	2.21	1.83	clayey silt to silty clay	UNDFND	UNDFD	5	.5
34	9.87	0.30	2.99	1.86	silty clay to clay	UNDFND	UNDFD	6	.5
35	14.48	0.23	1.61	1.89	clayey silt to silty clay	UNDFND	UNDFD	7	.8
36	11.23	0.23	2.02	1.92	clayey silt to silty clay	UNDFND	UNDFD	5	.6
37	10.10	0.31	3.07	1.95	silty clay to clay	UNDFND	UNDFD	6	.5
38	14.08	0.20	1.44	1.97	clayey silt to silty clay	UNDFND	UNDFD	7	.7
39	12.28	0.21	1.75	2.00	clayey silt to silty clay	UNDFND	UNDFD	6	.6
40	10.65	0.23	2.19	2.03	clayey silt to silty clay	UNDFND	UNDFD	5	.5
41	24.05	0.53	2.20	2.06	sandy silt to clayey silt	UNDFND	UNDFD	9	1.4
42	36.34	1.23	3.39	2.09	clayey silt to silty clay	UNDFND	UNDFD	17	2.2
43	55.77	1.67	2.99	2.12	sandy silt to clayey silt	UNDFND	UNDFD	21	3.5
44	51.80	1.24	2.39	2.15	sandy silt to clayey silt	UNDFND	UNDFD	20	3.2
45	35.11	1.01	2.87	2.18	sandy silt to clayey silt	UNDFND	UNDFD	13	2.1
46	43.55	1.47	3.38	2.21	clayey silt to silty clay	UNDFND	UNDFD	21	2.7
47	45.93	1.11	2.42	2.24	sandy silt to clayey silt	UNDFND	UNDFD	18	2.8
48	34.55	0.73	2.11	2.27	sandy silt to clayey silt	UNDFND	UNDFD	13	2.1
49	36.25	0.89	2.46	2.30	sandy silt to clayey silt	UNDFND	UNDFD	14	2.2
50	34.05	0.80	2.34	2.32	sandy silt to clayey silt	UNDFND	UNDFD	13	2.0
51	34.18	0.75	2.20	2.35	sandy silt to clayey silt	UNDFND	UNDFD	13	2.0
52	35.57	0.91	2.56	2.38	sandy silt to clayey silt	UNDFND	UNDFD	14	2.1
53	39.22	0.70	1.77	2.41	sandy silt to clayey silt	UNDFND	UNDFD	15	2.4

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

Operator :s&w
On Site Loc:CPT-2
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 120 pcf

CPT Date :06/14/93 12:10
Cone Used :#1
Water table (feet) : 37.19587

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	9.25	0.01	0.06	0.03	sensitive fine grained	UNDFND	UNDFD	4	.6
2	0.20	-0.00	-1.42	0.09	undefined	UNDFND	UNDFD	UDF	UNDEFINED
3	13.86	0.46	3.33	0.15	silty clay to clay	UNDFND	UNDFD	9	.9
4	12.67	0.45	3.54	0.22	silty clay to clay	UNDFND	UNDFD	8	.8
5	7.12	0.29	4.08	0.28	clay	UNDFND	UNDFD	7	.4
6	13.52	0.62	4.59	0.33	clay	UNDFND	UNDFD	13	.8
7	9.17	0.38	4.16	0.39	clay	UNDFND	UNDFD	9	.5
8	5.65	0.22	3.85	0.45	clay	UNDFND	UNDFD	5	.3
9	5.37	0.20	3.80	0.51	clay	UNDFND	UNDFD	5	.3
10	15.18	0.63	4.15	0.57	clay	UNDFND	UNDFD	15	.9
11	8.93	0.27	3.04	0.63	silty clay to clay	UNDFND	UNDFD	6	.5
12	8.20	0.29	3.50	0.69	clay	UNDFND	UNDFD	8	.5
13	7.80	0.30	3.87	0.75	clay	UNDFND	UNDFD	7	.4
14	6.55	0.25	3.80	0.81	clay	UNDFND	UNDFD	6	.3
15	6.00	0.23	3.90	0.87	clay	UNDFND	UNDFD	6	.3
16	4.62	0.29	6.19	0.93	clay	UNDFND	UNDFD	4	.2
17	4.07	0.23	5.65	0.98	clay	UNDFND	UNDFD	4	.2
18	4.32	0.22	4.99	1.04	clay	UNDFND	UNDFD	4	.2
19	7.78	0.30	3.84	1.10	clay	UNDFND	UNDFD	7	.4
20	6.82	0.18	2.69	1.16	silty clay to clay	UNDFND	UNDFD	4	.3
21	7.23	0.19	2.60	1.23	silty clay to clay	UNDFND	UNDFD	5	.4
22	5.95	0.22	3.68	1.29	clay	UNDFND	UNDFD	6	.3
23	6.10	0.27	4.37	1.35	clay	UNDFND	UNDFD	6	.3
24	9.47	0.37	3.95	1.41	clay	UNDFND	UNDFD	9	.5
25	11.58	0.30	2.62	1.48	silty clay to clay	UNDFND	UNDFD	7	.6
26	10.65	0.48	4.46	1.54	clay	UNDFND	UNDFD	10	.6
27	9.92	0.43	4.36	1.59	clay	UNDFND	UNDFD	9	.5
28	7.85	0.33	4.15	1.65	clay	UNDFND	UNDFD	8	.4
29	8.08	0.29	3.58	1.71	clay	UNDFND	UNDFD	8	.4
30	6.68	0.17	2.55	1.77	silty clay to clay	UNDFND	UNDFD	4	.3
31	5.95	0.14	2.33	1.83	silty clay to clay	UNDFND	UNDFD	4	.2
32	5.77	0.13	2.31	1.89	silty clay to clay	UNDFND	UNDFD	4	.2
33	5.92	0.11	1.88	1.95	silty clay to clay	UNDFND	UNDFD	4	.2
34	7.48	0.24	3.20	2.01	clay	UNDFND	UNDFD	7	.3
35	19.35	0.39	2.02	2.07	clayey silt to silty clay	UNDFND	UNDFD	9	1.1
36	31.70	0.39	1.22	2.13	silty sand to sandy silt	<40	30-32	10	UNDEFINED
37	29.85	0.33	1.09	2.18	silty sand to sandy silt	<40	<30	10	UNDEFINED
38	9.92	0.19	1.92	2.24	clayey silt to silty clay	UNDFND	UNDFD	5	.5
39	8.90	0.20	2.24	2.27	silty clay to clay	UNDFND	UNDFD	6	.4
40	12.78	0.27	2.13	2.29	clayey silt to silty clay	UNDFND	UNDFD	6	.6
41	40.57	0.58	1.42	2.32	silty sand to sandy silt	<40	30-32	13	UNDEFINED
42	38.90	0.81	2.07	2.35	sandy silt to clayey silt	UNDFND	UNDFD	15	2.4
43	50.40	0.98	1.94	2.38	sandy silt to clayey silt	UNDFND	UNDFD	19	3.1
44	70.10	0.80	1.14	2.41	silty sand to sandy silt	40-50	34-36	22	UNDEFINED
45	101.89	1.60	1.57	2.44	silty sand to sandy silt	50-60	36-38	33	UNDEFINED
46	79.53	1.47	1.85	2.47	silty sand to sandy silt	40-50	34-36	25	UNDEFINED
47	78.28	1.98	2.53	2.50	sandy silt to clayey silt	UNDFND	UNDFD	30	5.0
48	59.27	1.86	3.14	2.53	sandy silt to clayey silt	UNDFND	UNDFD	23	3.7
49	57.85	1.73	3.00	2.56	sandy silt to clayey silt	UNDFND	UNDFD	22	3.6
50	55.87	1.33	2.38	2.59	sandy silt to clayey silt	UNDFND	UNDFD	21	3.5
51	47.40	0.79	1.67	2.61	silty sand to sandy silt	<40	30-32	15	UNDEFINED
52	44.60	0.82	1.84	2.64	sandy silt to clayey silt	UNDFND	UNDFD	17	2.7
53	44.45	0.99	2.22	2.67	sandy silt to clayey silt	UNDFND	UNDFD	17	2.7
54	42.90	0.80	1.86	2.70	sandy silt to clayey silt	UNDFND	UNDFD	16	2.6
55	37.85	0.76	2.01	2.73	sandy silt to clayey silt	UNDFND	UNDFD	15	2.3
56	61.00	1.62	2.66	2.76	sandy silt to clayey silt	UNDFND	UNDFD	23	3.8
57	107.08	1.95	1.82	2.78	silty sand to sandy silt	50-60	36-38	34	UNDEFINED

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

Operator :s&w
On Site Loc:CPT-3B
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 120 pcf

CPT Date :06/16/93 12:15
Cone Used :#1
Water table (feet) : 41.50263

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	39.37	0.11	0.28	0.03	sand to silty sand	>90	>48	9	UNDEFINED
2	33.90	0.11	0.34	0.09	silty sand to sandy silt	70-80	46-48	11	UNDEFINED
3	31.80	0.03	0.09	0.15	silty sand to sandy silt	60-70	44-46	10	UNDEFINED
4	10.48	0.15	1.45	0.22	clayey silt to silty clay	UNDFND	UNDFD	5	.6
5	5.68	0.23	4.09	0.28	clay	UNDFND	UNDFD	5	.3
6	2.68	0.17	6.40	0.33	organic material	UNDFND	UNDFD	3	.1
7	10.83	0.29	2.71	0.39	silty clay to clay	UNDFND	UNDFD	7	.6
8	10.13	0.33	3.26	0.45	silty clay to clay	UNDFND	UNDFD	6	.6
9	5.13	0.15	2.93	0.51	clay	UNDFND	UNDFD	5	.3
10	5.85	0.17	2.90	0.57	clay	UNDFND	UNDFD	6	.3
11	11.80	0.37	3.14	0.63	silty clay to clay	UNDFND	UNDFD	8	.7
12	14.02	0.49	3.51	0.69	silty clay to clay	UNDFND	UNDFD	9	.8
13	11.28	0.39	3.48	0.75	silty clay to clay	UNDFND	UNDFD	7	.7
14	12.05	0.33	2.71	0.81	silty clay to clay	UNDFND	UNDFD	8	.7
15	9.63	0.21	2.17	0.87	clayey silt to silty clay	UNDFND	UNDFD	5	.5
16	7.58	0.19	2.46	0.93	silty clay to clay	UNDFND	UNDFD	5	.4
17	6.15	0.16	2.54	0.98	silty clay to clay	UNDFND	UNDFD	4	.3
18	11.78	0.38	3.24	1.04	silty clay to clay	UNDFND	UNDFD	8	.7
19	14.28	0.49	3.46	1.10	silty clay to clay	UNDFND	UNDFD	9	.8
20	9.53	0.20	2.10	1.16	clayey silt to silty clay	UNDFND	UNDFD	5	.5
21	5.13	0.16	3.21	1.23	clay	UNDFND	UNDFD	5	.2
22	8.68	0.23	2.68	1.29	silty clay to clay	UNDFND	UNDFD	6	.4
23	10.23	0.31	3.06	1.35	silty clay to clay	UNDFND	UNDFD	7	.5
24	10.70	0.44	4.10	1.41	clay	UNDFND	UNDFD	10	.6
25	7.92	0.35	4.37	1.48	clay	UNDFND	UNDFD	8	.4
26	7.27	0.30	4.10	1.54	clay	UNDFND	UNDFD	7	.3
27	8.98	0.31	3.40	1.59	clay	UNDFND	UNDFD	9	.4
28	8.12	0.21	2.61	1.65	silty clay to clay	UNDFND	UNDFD	5	.4
29	7.48	0.27	3.57	1.71	clay	UNDFND	UNDFD	7	.3
30	6.73	0.26	3.81	1.77	clay	UNDFND	UNDFD	6	.3
31	6.83	0.24	3.52	1.83	clay	UNDFND	UNDFD	7	.3
32	7.15	0.21	2.88	1.89	clay	UNDFND	UNDFD	7	.3
33	7.40	0.19	2.63	1.95	silty clay to clay	UNDFND	UNDFD	5	.3
34	9.17	0.21	2.32	2.01	silty clay to clay	UNDFND	UNDFD	6	.4
35	12.95	0.20	1.58	2.07	clayey silt to silty clay	UNDFND	UNDFD	6	.7
36	47.80	0.46	0.97	2.13	silty sand to sandy silt	<40	32-34	15	UNDEFINED
37	24.45	0.38	1.56	2.18	sandy silt to clayey silt	UNDFND	UNDFD	9	1.4
38	27.80	0.13	0.45	2.24	silty sand to sandy silt	<40	<30	9	UNDEFINED
39	26.92	0.21	0.78	2.30	silty sand to sandy silt	<40	<30	9	UNDEFINED
40	31.13	0.27	0.87	2.36	silty sand to sandy silt	<40	<30	10	UNDEFINED
41	25.23	0.38	1.50	2.42	sandy silt to clayey silt	UNDFND	UNDFD	10	1.5
42	86.43	0.57	0.66	2.48	sand to silty sand	40-50	34-36	21	UNDEFINED
43	52.32	0.81	1.55	2.52	silty sand to sandy silt	<40	30-32	17	UNDEFINED
44	18.22	0.32	1.77	2.55	sandy silt to clayey silt	UNDFND	UNDFD	7	1.0
45	21.07	0.31	1.46	2.58	sandy silt to clayey silt	UNDFND	UNDFD	8	1.2
46	13.65	0.10	0.70	2.61	sandy silt to clayey silt	UNDFND	UNDFD	5	.7
47	24.58	0.39	1.59	2.64	sandy silt to clayey silt	UNDFND	UNDFD	9	1.4
48	31.63	0.66	2.08	2.66	sandy silt to clayey silt	UNDFND	UNDFD	12	1.9
49	26.17	0.47	1.80	2.69	sandy silt to clayey silt	UNDFND	UNDFD	10	1.5
50	23.85	0.42	1.75	2.72	sandy silt to clayey silt	UNDFND	UNDFD	9	1.3
51	22.03	0.54	2.47	2.75	clayey silt to silty clay	UNDFND	UNDFD	11	1.2
52	23.02	0.54	2.33	2.78	clayey silt to silty clay	UNDFND	UNDFD	11	1.3
53	23.33	0.52	2.24	2.81	sandy silt to clayey silt	UNDFND	UNDFD	9	1.3
54	25.62	0.50	1.96	2.83	sandy silt to clayey silt	UNDFND	UNDFD	10	1.4
55	27.08	0.49	1.81	2.86	sandy silt to clayey silt	UNDFND	UNDFD	10	1.5
56	48.17	1.65	3.43	2.89	clayey silt to silty clay	UNDFND	UNDFD	23	2.9
57	159.33	4.34	2.72	2.92	silty sand to sandy silt	60-70	38-40	>50	UNDEFINED

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

Operator :s&w
On Site Loc:CPT-4
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 120 pcf

CPT Date :06/16/93 15:05
Cone Used :#1
Water table (feet) : 43.78937

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	16.07	0.04	0.25	0.03	sandy silt to clayey silt	UNDFND	UNDFD	6	1.0
2	62.68	0.12	0.19	0.09	sand to silty sand	80-90	>48	15	UNDEFINED
3	81.06	0.15	0.19	0.15	sand	80-90	46-48	16	UNDEFINED
4	16.97	0.02	0.11	0.22	silty sand to sandy silt	<40	38-40	5	UNDEFINED
5	4.22	0.20	4.77	0.28	clay	UNDFND	UNDFD	4	.2
6	3.02	0.27	8.87	0.33	undefined	UNDFND	UNDFD	UDF	UNDEFINED
7	2.40	0.31	13.04	0.39	undefined	UNDFND	UNDFD	UDF	UNDEFINED
8	12.60	0.51	4.08	0.45	clay	UNDFND	UNDFD	12	.8
9	9.47	0.42	4.42	0.51	clay	UNDFND	UNDFD	9	.5
10	9.35	0.32	3.45	0.57	clay	UNDFND	UNDFD	9	.5
11	8.70	0.26	3.00	0.63	silty clay to clay	UNDFND	UNDFD	6	.5
12	8.98	0.35	3.94	0.69	clay	UNDFND	UNDFD	9	.5
13	11.05	0.42	3.80	0.75	clay	UNDFND	UNDFD	11	.6
14	10.97	0.38	3.46	0.81	silty clay to clay	UNDFND	UNDFD	7	.6
15	11.67	0.42	3.60	0.87	silty clay to clay	UNDFND	UNDFD	7	.7
16	8.75	0.28	3.19	0.93	clay	UNDFND	UNDFD	8	.5
17	3.90	0.22	5.71	0.98	clay	UNDFND	UNDFD	4	.1
18	7.07	0.41	5.82	1.04	clay	UNDFND	UNDFD	7	.4
19	8.08	0.40	4.89	1.10	clay	UNDFND	UNDFD	8	.4
20	9.77	0.52	5.34	1.16	clay	UNDFND	UNDFD	9	.5
21	3.87	0.17	4.41	1.23	clay	UNDFND	UNDFD	4	.1
22	3.32	0.08	2.40	1.29	clay	UNDFND	UNDFD	3	.1
23	2.57	0.12	4.63	1.35	clay	UNDFND	UNDFD	2	8.1
24	7.01	0.35	5.04	1.41	clay	UNDFND	UNDFD	7	.3
25	7.60	0.28	3.71	1.48	clay	UNDFND	UNDFD	7	.4
26	7.20	0.18	2.50	1.54	silty clay to clay	UNDFND	UNDFD	5	.3
27	6.73	0.20	2.99	1.59	clay	UNDFND	UNDFD	6	.3
28	6.20	0.29	4.63	1.65	clay	UNDFND	UNDFD	6	.3
29	6.25	0.29	4.67	1.71	clay	UNDFND	UNDFD	6	.3
30	6.57	0.31	4.67	1.77	clay	UNDFND	UNDFD	6	.3
31	6.00	0.24	3.99	1.83	clay	UNDFND	UNDFD	6	.2
32	6.90	0.30	4.34	1.89	clay	UNDFND	UNDFD	7	.3
33	6.27	0.22	3.49	1.95	clay	UNDFND	UNDFD	6	.2
34	8.77	0.13	1.53	2.01	clayey silt to silty clay	UNDFND	UNDFD	4	.4
35	8.33	0.26	3.08	2.07	silty clay to clay	UNDFND	UNDFD	5	.4
36	8.25	0.20	2.47	2.13	silty clay to clay	UNDFND	UNDFD	5	.4
37	8.83	0.30	3.36	2.18	clay	UNDFND	UNDFD	8	.4
38	45.27	0.40	0.87	2.24	silty sand to sandy silt	<40	30-32	14	UNDEFINED
39	14.90	0.26	1.73	2.30	clayey silt to silty clay	UNDFND	UNDFD	7	.8
40	22.72	0.19	0.83	2.36	sandy silt to clayey silt	UNDFND	UNDFD	9	1.3
41	51.88	0.23	0.44	2.42	sand to silty sand	<40	32-34	12	UNDEFINED
42	69.39	0.46	0.67	2.48	sand to silty sand	40-50	34-36	17	UNDEFINED
43	33.42	0.61	1.82	2.55	sandy silt to clayey silt	UNDFND	UNDFD	13	2.0
44	92.78	0.99	1.07	2.61	sand to silty sand	50-60	34-36	22	UNDEFINED
45	64.47	0.77	1.19	2.65	silty sand to sandy silt	40-50	32-34	21	UNDEFINED
46	13.97	0.36	2.59	2.68	clayey silt to silty clay	UNDFND	UNDFD	7	.7
47	12.18	0.28	2.27	2.71	clayey silt to silty clay	UNDFND	UNDFD	6	.6
48	12.13	0.23	1.94	2.74	clayey silt to silty clay	UNDFND	UNDFD	6	.6
49	12.27	0.25	2.00	2.76	clayey silt to silty clay	UNDFND	UNDFD	6	.6
50	13.38	0.26	1.93	2.79	clayey silt to silty clay	UNDFND	UNDFD	6	.6
51	9.30	0.09	0.97	2.82	clayey silt to silty clay	UNDFND	UNDFD	4	.4
52	28.20	0.43	1.53	2.85	sandy silt to clayey silt	UNDFND	UNDFD	11	1.6
53	27.85	0.54	1.95	2.88	sandy silt to clayey silt	UNDFND	UNDFD	11	1.6
54	25.28	0.62	2.44	2.91	sandy silt to clayey silt	UNDFND	UNDFD	10	1.4
55	25.18	0.76	3.02	2.93	clayey silt to silty clay	UNDFND	UNDFD	12	1.4
56	26.07	0.92	3.54	2.96	clayey silt to silty clay	UNDFND	UNDFD	12	1.5
57	25.92	0.98	3.80	2.99	silty clay to clay	UNDFND	UNDFD	17	1.5
58	23.20	0.60	2.59	3.02	clayey silt to silty clay	UNDFND	UNDFD	11	1.3
59	34.17	0.87	2.55	3.05	sandy silt to clayey silt	UNDFND	UNDFD	13	2.0

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

Operator :&w
On Site Loc:CPT-5
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 120 pcf

CPT Date :06/15/93 8:00 s
Cone Used :#1
Water table (feet) : 28.03806

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	77.03	0.21	0.27	0.03	sand to silty sand	>90	>48	18	UNDEFINED
2	126.97	0.26	0.21	0.09	sand	>90	>48	24	UNDEFINED
3	13.46	0.61	4.51	0.15	clay	UNDFND	UNDFD	13	.8
4	7.52	0.42	5.64	0.22	clay	UNDFND	UNDFD	7	.4
5	6.87	0.38	5.50	0.28	clay	UNDFND	UNDFD	7	.4
6	6.62	0.25	3.77	0.33	clay	UNDFND	UNDFD	6	.4
7	28.70	0.99	3.47	0.39	clayey silt to silty clay	UNDFND	UNDFD	14	1.8
8	7.00	0.30	4.35	0.45	clay	UNDFND	UNDFD	7	.4
9	8.23	0.35	4.30	0.51	clay	UNDFND	UNDFD	8	.5
10	11.53	0.61	5.32	0.57	clay	UNDFND	UNDFD	11	.7
11	11.40	0.57	4.98	0.63	clay	UNDFND	UNDFD	11	.7
12	12.45	0.69	5.58	0.69	clay	UNDFND	UNDFD	12	.7
13	11.90	0.77	6.49	0.75	clay	UNDFND	UNDFD	11	.7
14	6.20	0.45	7.23	0.81	clay	UNDFND	UNDFD	6	.3
15	2.68	0.27	9.94	0.87	undefined	UNDFND	UNDFD	UDF	UNDEFINED
16	5.68	0.46	8.17	0.93	undefined	UNDFND	UNDFD	UDF	UNDEFINED
17	4.17	0.34	8.08	0.98	undefined	UNDFND	UNDFD	UDF	UNDEFINED
18	3.83	0.24	6.26	1.04	clay	UNDFND	UNDFD	4	.1
19	6.00	0.27	4.53	1.10	clay	UNDFND	UNDFD	6	.3
20	7.70	0.34	4.47	1.16	clay	UNDFND	UNDFD	7	.4
21	7.10	0.28	3.94	1.23	clay	UNDFND	UNDFD	7	.3
22	6.87	0.30	4.41	1.29	clay	UNDFND	UNDFD	7	.3
23	7.65	0.36	4.70	1.35	clay	UNDFND	UNDFD	7	.4
24	7.20	0.31	4.29	1.41	clay	UNDFND	UNDFD	7	.3
25	6.98	0.27	3.85	1.48	clay	UNDFND	UNDFD	7	.3
26	7.22	0.36	4.92	1.54	clay	UNDFND	UNDFD	7	.3
27	6.63	0.33	4.90	1.59	clay	UNDFND	UNDFD	6	.3
28	7.45	0.36	4.79	1.65	clay	UNDFND	UNDFD	7	.3
29	8.97	0.19	2.12	1.70	silty clay to clay	UNDFND	UNDFD	6	.4
30	8.28	0.20	2.47	1.72	silty clay to clay	UNDFND	UNDFD	5	.4
31	9.38	0.31	3.31	1.75	clay	UNDFND	UNDFD	9	.5
32	10.02	0.39	3.89	1.78	clay	UNDFND	UNDFD	10	.5
33	20.95	0.66	3.14	1.81	clayey silt to silty clay	UNDFND	UNDFD	10	1.2
34	20.75	0.51	2.46	1.84	clayey silt to silty clay	UNDFND	UNDFD	10	1.2
35	14.47	0.36	2.47	1.87	clayey silt to silty clay	UNDFND	UNDFD	7	.8
36	21.03	0.41	1.97	1.89	sandy silt to clayey silt	UNDFND	UNDFD	8	1.2
37	28.00	0.50	1.79	1.92	sandy silt to clayey silt	UNDFND	UNDFD	11	1.7
38	19.63	0.36	1.81	1.95	sandy silt to clayey silt	UNDFND	UNDFD	8	1.1
39	65.30	0.59	0.91	1.98	sand to silty sand	40-50	34-36	16	UNDEFINED
40	32.70	0.78	2.39	2.01	sandy silt to clayey silt	UNDFND	UNDFD	13	2.0
41	16.02	0.43	2.69	2.04	clayey silt to silty clay	UNDFND	UNDFD	8	.9
42	31.87	0.74	2.31	2.07	sandy silt to clayey silt	UNDFND	UNDFD	12	1.9
43	171.82	3.03	1.76	2.10	sand to silty sand	70-80	40-42	41	UNDEFINED
44	15.85	0.21	1.34	2.13	sandy silt to clayey silt	UNDFND	UNDFD	6	.8
45	12.57	0.19	1.48	2.16	clayey silt to silty clay	UNDFND	UNDFD	6	.6
46	13.58	0.22	1.65	2.19	clayey silt to silty clay	UNDFND	UNDFD	7	.7
47	18.47	0.49	2.68	2.22	clayey silt to silty clay	UNDFND	UNDFD	9	1.0
48	21.73	0.61	2.81	2.24	clayey silt to silty clay	UNDFND	UNDFD	10	1.2
49	21.93	0.72	3.30	2.27	clayey silt to silty clay	UNDFND	UNDFD	11	1.2
50	21.25	0.73	3.45	2.30	clayey silt to silty clay	UNDFND	UNDFD	10	1.2
51	22.13	0.85	3.82	2.33	silty clay to clay	UNDFND	UNDFD	14	1.2
52	21.03	0.88	4.16	2.36	silty clay to clay	UNDFND	UNDFD	13	1.1
53	25.42	0.91	3.58	2.39	clayey silt to silty clay	UNDFND	UNDFD	12	1.4

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

Operator :&w *
On Site Loc:CPT-6
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 120 pcf

CPT Date :06/15/93 9:35 s
Cone Used :#1
Water table (feet) : 24.24541

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	18.17	0.01	0.04	0.03	silty sand to sandy silt	60-70	>48	6	UNDEFINED
2	48.97	0.11	0.22	0.09	sand to silty sand	80-90	>48	12	UNDEFINED
3	46.09	0.11	0.24	0.15	sand to silty sand	70-80	44-46	11	UNDEFINED
4	21.38	0.07	0.34	0.22	silty sand to sandy silt	40-50	40-42	7	UNDEFINED
5	10.95	0.01	0.07	0.28	sandy silt to clayey silt	UNDFND	UNDFD	4	.7
6	3.40	0.01	0.16	0.33	sensitive fine grained	UNDFND	UNDFD	2	.2
7	3.02	0.13	4.15	0.39	clay	UNDFND	UNDFD	3	.1
8	5.85	0.23	3.88	0.45	clay	UNDFND	UNDFD	6	.3
9	4.78	0.14	2.98	0.51	clay	UNDFND	UNDFD	5	.2
10	2.68	0.25	9.35	0.57	undefined	UNDFND	UNDFD	UDF	UNDEFINED
11	2.20	0.19	8.66	0.63	undefined	UNDFND	UNDFD	UDF	UNDEFINED
12	4.38	0.26	5.82	0.69	clay	UNDFND	UNDFD	4	.2
13	2.03	0.21	10.16	0.75	undefined	UNDFND	UNDFD	UDF	UNDEFINED
14	1.37	0.15	11.11	0.81	undefined	UNDFND	UNDFD	UDF	UNDEFINED
15	3.92	0.18	4.52	0.87	clay	UNDFND	UNDFD	4	.2
16	4.12	0.44	10.67	0.93	undefined	UNDFND	UNDFD	UDF	UNDEFINED
17	4.38	0.40	9.07	0.98	undefined	UNDFND	UNDFD	UDF	UNDEFINED
18	5.82	0.34	5.81	1.04	clay	UNDFND	UNDFD	6	.3
19	5.10	0.37	7.20	1.10	clay	UNDFND	UNDFD	5	.2
20	4.87	0.32	6.51	1.16	clay	UNDFND	UNDFD	5	.2
21	5.00	0.36	7.27	1.23	clay	UNDFND	UNDFD	5	.2
22	4.32	0.32	7.35	1.29	clay	UNDFND	UNDFD	4	.2
23	7.33	0.38	5.24	1.35	clay	UNDFND	UNDFD	7	.3
24	10.26	0.49	4.78	1.41	clay	UNDFND	UNDFD	10	.5
25	7.52	0.47	6.29	1.46	clay	UNDFND	UNDFD	7	.4
26	7.05	0.32	4.57	1.49	clay	UNDFND	UNDFD	7	.3
27	8.37	0.32	3.85	1.52	clay	UNDFND	UNDFD	8	.4
28	5.72	0.34	5.97	1.55	clay	UNDFND	UNDFD	5	.2
29	5.08	0.24	4.64	1.58	clay	UNDFND	UNDFD	5	.2
30	5.10	0.24	4.61	1.61	clay	UNDFND	UNDFD	5	.2
31	5.42	0.28	5.15	1.63	clay	UNDFND	UNDFD	5	.2
32	6.30	0.33	5.19	1.66	clay	UNDFND	UNDFD	6	.2
33	7.15	0.22	3.02	1.69	clay	UNDFND	UNDFD	7	.3
34	6.12	0.19	3.09	1.72	clay	UNDFND	UNDFD	6	.2
35	6.77	0.20	2.98	1.75	clay	UNDFND	UNDFD	6	.3
36	5.98	0.19	3.25	1.78	clay	UNDFND	UNDFD	6	.2
37	4.83	0.14	2.85	1.80	clay	UNDFND	UNDFD	5	.1
38	6.55	0.17	2.53	1.83	silty clay to clay	UNDFND	UNDFD	4	.2
39	6.47	0.15	2.39	1.86	silty clay to clay	UNDFND	UNDFD	4	.2
40	9.68	0.28	2.86	1.89	silty clay to clay	UNDFND	UNDFD	6	.4
41	31.10	0.73	2.36	1.92	sandy silt to clayey silt	UNDFND	UNDFD	12	1.9
42	16.53	0.23	1.41	1.95	sandy silt to clayey silt	UNDFND	UNDFD	6	.9
43	36.82	0.37	1.01	1.98	silty sand to sandy silt	<40	30-32	12	UNDEFINED
44	32.60	0.25	0.77	2.01	silty sand to sandy silt	<40	30-32	10	UNDEFINED
45	16.06	0.27	1.70	2.04	clayey silt to silty clay	UNDFND	UNDFD	8	.8
46	59.38	0.67	1.13	2.07	silty sand to sandy silt	40-50	34-36	19	UNDEFINED
47	33.25	0.61	1.84	2.10	sandy silt to clayey silt	UNDFND	UNDFD	13	2.0
48	21.17	0.74	3.49	2.13	clayey silt to silty clay	UNDFND	UNDFD	10	1.2
49	18.60	0.54	2.89	2.15	clayey silt to silty clay	UNDFND	UNDFD	9	1.0
50	18.03	0.36	1.99	2.18	clayey silt to silty clay	UNDFND	UNDFD	9	1.0
51	18.60	0.52	2.78	2.21	clayey silt to silty clay	UNDFND	UNDFD	9	1.0
52	25.62	0.69	2.68	2.24	clayey silt to silty clay	UNDFND	UNDFD	12	1.5
53	25.18	0.71	2.83	2.27	clayey silt to silty clay	UNDFND	UNDFD	12	1.4
54	23.87	0.69	2.91	2.30	clayey silt to silty clay	UNDFND	UNDFD	11	1.3
55	23.80	0.78	3.26	2.32	clayey silt to silty clay	UNDFND	UNDFD	11	1.3
56	22.73	0.80	3.52	2.35	clayey silt to silty clay	UNDFND	UNDFD	11	1.2
57	23.75	0.65	2.75	2.38	clayey silt to silty clay	UNDFND	UNDFD	11	1.3

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

Operator :s&w
On Site Loc:CPT-7
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 120 pcf

CPT Date :06/15/93 11:20
Cone Used :#1
Water table (feet) : 27.11942

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	38.00	0.35	0.93	0.03	silty sand to sandy silt	80-90	>48	12	UNDEFINED
2	84.27	0.39	0.46	0.09	sand to silty sand	>90	>48	20	UNDEFINED
3	39.66	0.10	0.24	0.15	sand to silty sand	60-70	44-46	9	UNDEFINED
4	13.08	0.18	1.39	0.22	clayey silt to silty clay	UNDFND	UNDFD	6	.8
5	23.37	0.26	1.12	0.28	sandy silt to clayey silt	UNDFND	UNDFD	9	1.5
6	11.85	0.25	2.11	0.33	clayey silt to silty clay	UNDFND	UNDFD	6	.7
7	9.87	0.76	7.74	0.39	clay	UNDFND	UNDFD	9	.6
8	1.95	0.31	15.92	0.45	undefined	UNDFND	UNDFD	UDF	UNDEFINED
9	2.42	0.39	16.22	0.51	undefined	UNDFND	UNDFD	UDF	UNDEFINED
10	2.60	0.33	12.83	0.57	undefined	UNDFND	UNDFD	UDF	UNDEFINED
11	1.45	0.23	15.74	0.63	undefined	UNDFND	UNDFD	UDF	UNDEFINED
12	5.50	0.67	12.21	0.69	undefined	UNDFND	UNDFD	UDF	UNDEFINED
13	4.83	0.58	12.07	0.75	undefined	UNDFND	UNDFD	UDF	UNDEFINED
14	4.18	0.50	11.98	0.81	undefined	UNDFND	UNDFD	UDF	UNDEFINED
15	4.32	0.49	11.40	0.87	undefined	UNDFND	UNDFD	UDF	UNDEFINED
16	0.67	0.11	17.23	0.93	undefined	UNDFND	UNDFD	UDF	UNDEFINED
17	3.13	0.39	12.38	0.98	undefined	UNDFND	UNDFD	UDF	UNDEFINED
18	5.22	0.52	9.93	1.04	undefined	UNDFND	UNDFD	UDF	UNDEFINED
19	5.22	0.62	11.92	1.10	undefined	UNDFND	UNDFD	UDF	UNDEFINED
20	4.63	0.53	11.37	1.16	undefined	UNDFND	UNDFD	UDF	UNDEFINED
21	3.86	0.38	9.79	1.23	undefined	UNDFND	UNDFD	UDF	UNDEFINED
22	7.72	0.65	8.37	1.29	undefined	UNDFND	UNDFD	UDF	UNDEFINED
23	7.95	0.67	8.42	1.35	undefined	UNDFND	UNDFD	UDF	UNDEFINED
24	7.56	0.55	7.26	1.41	clay	UNDFND	UNDFD	7	.4
25	7.88	0.60	7.64	1.48	clay	UNDFND	UNDFD	8	.4
26	6.15	0.45	7.28	1.54	clay	UNDFND	UNDFD	6	.3
27	5.15	0.38	7.45	1.59	clay	UNDFND	UNDFD	5	.2
28	4.75	0.35	7.44	1.64	clay	UNDFND	UNDFD	5	.2
29	6.52	0.37	5.69	1.67	clay	UNDFND	UNDFD	6	.3
30	5.57	0.33	5.98	1.70	clay	UNDFND	UNDFD	5	.2
31	5.47	0.29	5.22	1.72	clay	UNDFND	UNDFD	5	.2
32	8.58	0.39	4.57	1.75	clay	UNDFND	UNDFD	8	.4
33	8.80	0.36	4.06	1.78	clay	UNDFND	UNDFD	8	.4
34	6.08	0.32	5.27	1.81	clay	UNDFND	UNDFD	6	.2
35	11.33	0.41	3.66	1.84	clay	UNDFND	UNDFD	11	.6
36	9.55	0.42	4.35	1.87	clay	UNDFND	UNDFD	9	.4
37	9.70	0.49	5.01	1.89	clay	UNDFND	UNDFD	9	.5
38	10.55	0.30	2.85	1.92	silty clay to clay	UNDFND	UNDFD	7	.5
39	7.87	0.35	4.49	1.95	clay	UNDFND	UNDFD	8	.3
40	6.98	0.40	5.76	1.98	clay	UNDFND	UNDFD	7	.3
41	9.38	0.40	4.29	2.01	clay	UNDFND	UNDFD	9	.4
42	92.24	1.99	2.16	2.04	silty sand to sandy silt	50-60	36-38	29	UNDEFINED
43	48.33	2.10	4.35	2.07	silty clay to clay	UNDFND	UNDFD	31	3.0
44	16.98	0.62	3.64	2.10	silty clay to clay	UNDFND	UNDFD	11	.9
45	20.00	0.57	2.86	2.13	clayey silt to silty clay	UNDFND	UNDFD	10	1.1
46	18.10	0.39	2.16	2.16	clayey silt to silty clay	UNDFND	UNDFD	9	1.0
47	21.45	0.74	3.47	2.19	clayey silt to silty clay	UNDFND	UNDFD	10	1.2
48	38.28	1.73	4.51	2.22	silty clay to clay	UNDFND	UNDFD	24	2.3
49	29.48	0.94	3.19	2.24	clayey silt to silty clay	UNDFND	UNDFD	14	1.7
50	27.12	0.96	3.55	2.27	clayey silt to silty clay	UNDFND	UNDFD	13	1.6
51	26.05	0.99	3.81	2.30	silty clay to clay	UNDFND	UNDFD	17	1.5
52	22.33	0.77	3.44	2.33	clayey silt to silty clay	UNDFND	UNDFD	11	1.2
53	22.00	0.58	2.63	2.36	clayey silt to silty clay	UNDFND	UNDFD	11	1.2
54	24.35	0.84	3.43	2.39	clayey silt to silty clay	UNDFND	UNDFD	12	1.4
55	26.53	0.74	2.78	2.41	clayey silt to silty clay	UNDFND	UNDFD	13	1.5

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

Operator :s&w
On Site Loc:CPT-8
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 123 pcf

CPT Date :06/15/93 13:00
Cone Used :#1
Water table (feet) : 41.84055

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	17.27	0.47	2.70	0.03	clayey silt to silty clay	UNDFND	UNDFD	8	1.1
2	28.37	0.40	1.43	0.09	sandy silt to clayey silt	UNDFND	UNDFD	11	1.8
3	16.24	0.37	2.29	0.16	clayey silt to silty clay	UNDFND	UNDFD	8	1.0
4	11.17	0.30	2.72	0.22	silty clay to clay	UNDFND	UNDFD	7	.7
5	6.07	0.22	3.62	0.28	clay	UNDFND	UNDFD	6	.3
6	5.10	0.19	3.81	0.34	clay	UNDFND	UNDFD	5	.3
7	3.72	0.19	5.15	0.40	clay	UNDFND	UNDFD	4	.2
8	11.80	0.77	6.54	0.46	clay	UNDFND	UNDFD	11	.7
9	6.75	0.57	8.47	0.52	undefined	UNDFND	UNDFD	UDF	UNDEFINED
10	3.88	0.38	9.76	0.59	undefined	UNDFND	UNDFD	UDF	UNDEFINED
11	2.22	0.32	14.56	0.65	undefined	UNDFND	UNDFD	UDF	UNDEFINED
12	4.38	0.57	12.97	0.71	undefined	UNDFND	UNDFD	UDF	UNDEFINED
13	5.08	0.63	12.35	0.77	undefined	UNDFND	UNDFD	UDF	UNDEFINED
14	2.92	0.36	12.46	0.83	undefined	UNDFND	UNDFD	UDF	UNDEFINED
15	3.80	0.56	14.76	0.89	undefined	UNDFND	UNDFD	UDF	UNDEFINED
16	5.13	0.64	12.48	0.95	undefined	UNDFND	UNDFD	UDF	UNDEFINED
17	4.95	0.66	13.36	1.01	undefined	UNDFND	UNDFD	UDF	UNDEFINED
18	4.45	0.56	12.63	1.07	undefined	UNDFND	UNDFD	UDF	UNDEFINED
19	4.53	0.52	11.54	1.13	undefined	UNDFND	UNDFD	UDF	UNDEFINED
20	3.92	0.38	9.72	1.19	undefined	UNDFND	UNDFD	UDF	UNDEFINED
21	3.97	0.39	9.76	1.26	undefined	UNDFND	UNDFD	UDF	UNDEFINED
22	3.78	0.37	9.68	1.32	undefined	UNDFND	UNDFD	UDF	UNDEFINED
23	5.03	0.53	10.49	1.38	undefined	UNDFND	UNDFD	UDF	UNDEFINED
24	4.81	0.46	9.58	1.45	undefined	UNDFND	UNDFD	UDF	UNDEFINED
25	10.57	0.85	8.08	1.51	undefined	UNDFND	UNDFD	UDF	UNDEFINED
26	13.70	0.96	7.01	1.57	clay	UNDFND	UNDFD	13	.8
27	11.48	0.90	7.81	1.63	clay	UNDFND	UNDFD	11	.6
28	10.10	0.73	7.20	1.69	clay	UNDFND	UNDFD	10	.5
29	8.57	0.68	7.96	1.76	clay	UNDFND	UNDFD	8	.4
30	6.27	0.54	8.59	1.82	undefined	UNDFND	UNDFD	UDF	UNDEFINED
31	5.43	0.43	8.00	1.88	undefined	UNDFND	UNDFD	UDF	UNDEFINED
32	5.67	0.42	7.38	1.94	clay	UNDFND	UNDFD	5	.2
33	6.78	0.33	4.87	2.00	clay	UNDFND	UNDFD	6	.3
34	8.10	0.38	4.66	2.06	clay	UNDFND	UNDFD	8	.4
35	5.60	0.32	5.72	2.12	clay	UNDFND	UNDFD	5	.2
36	13.33	0.57	4.25	2.18	clay	UNDFND	UNDFD	13	.7
37	7.83	0.38	4.90	2.24	clay	UNDFND	UNDFD	8	.3
38	7.60	0.43	5.60	2.30	clay	UNDFND	UNDFD	7	.3
39	6.42	0.40	6.20	2.36	clay	UNDFND	UNDFD	6	.2
40	24.90	0.62	2.47	2.42	clayey silt to silty clay	UNDFND	UNDFD	12	1.4
41	14.33	0.44	3.09	2.48	silty clay to clay	UNDFND	UNDFD	9	.7
42	8.29	0.31	3.73	2.55	clay	UNDFND	UNDFD	8	.3
43	7.18	0.31	4.25	2.59	clay	UNDFND	UNDFD	7	.3
44	18.65	0.87	4.69	2.62	clay	UNDFND	UNDFD	18	1.0
45	18.67	1.30	6.97	2.65	clay	UNDFND	UNDFD	18	1.0
46	28.78	1.85	6.43	2.69	clay	UNDFND	UNDFD	28	1.7
47	24.07	1.23	5.11	2.72	clay	UNDFND	UNDFD	23	1.4
48	24.37	1.21	4.97	2.75	clay	UNDFND	UNDFD	23	1.4
49	50.38	2.52	5.00	2.78	silty clay to clay	UNDFND	UNDFD	32	3.1
50	57.95	3.04	5.24	2.81	clay	UNDFND	UNDFD	>50	3.6
51	40.12	1.91	4.75	2.84	silty clay to clay	UNDFND	UNDFD	26	2.4
52	34.82	1.35	3.87	2.87	clayey silt to silty clay	UNDFND	UNDFD	17	2.1
53	36.32	1.34	3.68	2.90	clayey silt to silty clay	UNDFND	UNDFD	17	2.2
54	33.33	1.05	3.14	2.93	clayey silt to silty clay	UNDFND	UNDFD	16	2.0
55	30.78	0.97	3.15	2.95	clayey silt to silty clay	UNDFND	UNDFD	15	1.8
56	35.57	1.18	3.31	2.98	clayey silt to silty clay	UNDFND	UNDFD	17	2.1
57	81.25	1.88	2.31	3.01	silty sand to sandy silt	40-50	32-34	26	UNDEFINED
58	198.50	1.58	0.79	3.04	sand	70-80	38-40	38	UNDEFINED

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

Operator :s&w
On Site Loc:CPT-9
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 123 pcf

CPT Date :06/15/93 14:10
Cone Used :#1
Water table (feet) : 46.21391

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	25.63	0.35	1.37	0.03	sandy silt to clayey silt	UNDFND	UNDFD	10	1.7
2	46.07	0.38	0.82	0.09	silty sand to sandy silt	70-80	46-48	15	UNDEFINED
3	29.67	0.30	1.00	0.16	silty sand to sandy silt	50-60	42-44	9	UNDEFINED
4	13.02	0.17	1.31	0.22	clayey silt to silty clay	UNDFND	UNDFD	6	.8
5	5.75	0.28	4.85	0.28	clay	UNDFND	UNDFD	6	.3
6	4.87	0.29	5.91	0.34	clay	UNDFND	UNDFD	5	.3
7	10.63	0.56	5.30	0.40	clay	UNDFND	UNDFD	10	.6
8	7.17	0.30	4.14	0.46	clay	UNDFND	UNDFD	7	.4
9	2.92	0.33	11.19	0.52	undefined	UNDFND	UNDFD	UDF	UNDEFINED
10	1.43	0.21	14.85	0.59	undefined	UNDFND	UNDFD	UDF	UNDEFINED
11	2.35	0.34	14.40	0.65	undefined	UNDFND	UNDFD	UDF	UNDEFINED
12	6.73	0.73	10.89	0.71	undefined	UNDFND	UNDFD	UDF	UNDEFINED
13	7.48	0.73	9.72	0.77	undefined	UNDFND	UNDFD	UDF	UNDEFINED
14	8.37	0.74	8.83	0.83	undefined	UNDFND	UNDFD	UDF	UNDEFINED
15	7.00	0.60	8.59	0.89	undefined	UNDFND	UNDFD	UDF	UNDEFINED
16	6.55	0.54	8.28	0.95	undefined	UNDFND	UNDFD	UDF	UNDEFINED
17	4.95	0.48	9.68	1.01	undefined	UNDFND	UNDFD	UDF	UNDEFINED
18	5.87	0.48	8.22	1.07	undefined	UNDFND	UNDFD	UDF	UNDEFINED
19	3.38	0.32	9.59	1.13	undefined	UNDFND	UNDFD	UDF	UNDEFINED
20	5.83	0.44	7.49	1.19	clay	UNDFND	UNDFD	6	.3
21	4.73	0.38	8.05	1.26	undefined	UNDFND	UNDFD	UDF	UNDEFINED
22	4.67	0.37	7.93	1.32	organic material	UNDFND	UNDFD	4	.2
23	5.80	0.40	6.81	1.38	clay	UNDFND	UNDFD	6	.2
24	7.69	0.46	6.03	1.45	clay	UNDFND	UNDFD	7	.4
25	8.08	0.57	7.09	1.51	clay	UNDFND	UNDFD	8	.4
26	8.78	0.53	5.99	1.57	clay	UNDFND	UNDFD	8	.4
27	8.03	0.43	5.39	1.63	clay	UNDFND	UNDFD	8	.4
28	6.63	0.34	5.18	1.69	clay	UNDFND	UNDFD	6	.3
29	5.95	0.29	4.82	1.76	clay	UNDFND	UNDFD	6	.2
30	4.40	0.22	5.03	1.82	clay	UNDFND	UNDFD	4	.1
31	4.20	0.23	5.37	1.88	clay	UNDFND	UNDFD	4	.1
32	6.20	0.32	5.14	1.94	clay	UNDFND	UNDFD	6	.2
33	7.27	0.32	4.42	2.00	clay	UNDFND	UNDFD	7	.3
34	5.80	0.24	4.07	2.06	clay	UNDFND	UNDFD	6	.2
35	5.35	0.29	5.43	2.12	clay	UNDFND	UNDFD	5	.2
36	9.38	0.44	4.70	2.18	clay	UNDFND	UNDFD	9	.4
37	9.38	0.40	4.22	2.24	clay	UNDFND	UNDFD	9	.4
38	13.55	0.30	2.24	2.30	clayey silt to silty clay	UNDFND	UNDFD	6	.7
39	5.85	0.25	4.20	2.36	clay	UNDFND	UNDFD	6	.2
40	5.92	0.25	4.27	2.42	clay	UNDFND	UNDFD	6	.2
41	5.52	0.16	2.95	2.48	clay	UNDFND	UNDFD	5	.2
42	5.61	0.18	3.21	2.55	clay	UNDFND	UNDFD	5	.2
43	10.17	0.33	3.20	2.61	silty clay to clay	UNDFND	UNDFD	6	.5
44	14.83	0.84	5.66	2.67	clay	UNDFND	UNDFD	14	.8
45	80.90	3.22	3.99	2.74	clayey silt to silty clay	UNDFND	UNDFD	39	5.2
46	78.17	2.51	3.21	2.80	sandy silt to clayey silt	UNDFND	UNDFD	30	5.0
47	65.90	2.17	3.29	2.85	sandy silt to clayey silt	UNDFND	UNDFD	25	4.2
48	54.03	1.93	3.56	2.88	clayey silt to silty clay	UNDFND	UNDFD	26	3.4
49	38.85	1.61	4.14	2.91	silty clay to clay	UNDFND	UNDFD	25	2.3
50	31.72	1.00	3.15	2.94	clayey silt to silty clay	UNDFND	UNDFD	15	1.9
51	38.65	1.16	3.01	2.97	clayey silt to silty clay	UNDFND	UNDFD	19	2.3
52	26.08	0.49	1.88	3.00	sandy silt to clayey silt	UNDFND	UNDFD	10	1.5
53	29.90	0.61	2.04	3.03	sandy silt to clayey silt	UNDFND	UNDFD	11	1.7
54	33.10	0.75	2.28	3.06	sandy silt to clayey silt	UNDFND	UNDFD	13	1.9
55	30.80	0.82	2.66	3.09	sandy silt to clayey silt	UNDFND	UNDFD	12	1.8
56	30.15	0.74	2.46	3.12	sandy silt to clayey silt	UNDFND	UNDFD	12	1.7
57	30.15	0.67	2.23	3.15	sandy silt to clayey silt	UNDFND	UNDFD	12	1.7
58	35.35	0.76	2.15	3.18	sandy silt to clayey silt	UNDFND	UNDFD	14	2.1
59	48.15	1.57	3.25	3.21	clayey silt to silty clay	UNDFND	UNDFD	23	2.9

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

Operator :s&w
On Site Loc:CPT-10
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 123 pcf

CPT Date :06/15/93 15:25
Cone Used :#1
Water table (feet) : 45.76444

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	0.27	0.01	3.38	0.03	undefined	UNDFND	UNDFD	UDF	UNDEFINED
2	5.58	0.07	1.28	0.09	sensitive fine grained	UNDFND	UNDFD	3	.3
3	9.39	0.10	1.03	0.16	clayey silt to silty clay	UNDFND	UNDFD	4	.6
4	8.60	0.05	0.56	0.22	sensitive fine grained	UNDFND	UNDFD	4	.5
5	1.00	0.01	1.32	0.28	undefined	UNDFND	UNDFD	UDF	UNDEFINED
6	4.43	0.23	5.12	0.34	clay	UNDFND	UNDFD	4	.2
7	31.05	0.69	2.21	0.40	sandy silt to clayey silt	UNDFND	UNDFD	12	2.0
8	5.30	0.27	5.12	0.46	clay	UNDFND	UNDFD	5	.3
9	12.63	0.49	3.85	0.52	clay	UNDFND	UNDFD	12	.8
10	8.83	0.26	2.96	0.59	silty clay to clay	UNDFND	UNDFD	6	.5
11	3.55	0.11	3.03	0.65	clay	UNDFND	UNDFD	3	.1
12	5.08	0.20	3.87	0.71	clay	UNDFND	UNDFD	5	.2
13	7.38	0.58	7.88	0.77	clay	UNDFND	UNDFD	7	.4
14	6.38	0.56	8.73	0.83	undefined	UNDFND	UNDFD	UDF	UNDEFINED
15	5.53	0.44	7.97	0.89	clay	UNDFND	UNDFD	5	.3
16	5.47	0.38	7.03	0.95	clay	UNDFND	UNDFD	5	.3
17	5.85	0.34	5.87	1.01	clay	UNDFND	UNDFD	6	.3
18	6.60	0.38	5.81	1.07	clay	UNDFND	UNDFD	6	.3
19	6.60	0.38	5.78	1.13	clay	UNDFND	UNDFD	6	.3
20	6.67	0.40	5.94	1.19	clay	UNDFND	UNDFD	6	.3
21	6.96	0.35	5.01	1.26	clay	UNDFND	UNDFD	7	.3
22	5.30	0.29	5.39	1.32	clay	UNDFND	UNDFD	5	.2
23	3.83	0.20	5.10	1.38	clay	UNDFND	UNDFD	4	.1
24	4.97	0.17	3.39	1.45	clay	UNDFND	UNDFD	5	.2
25	6.17	0.36	5.84	1.51	clay	UNDFND	UNDFD	6	.3
26	3.67	0.34	9.20	1.57	undefined	UNDFND	UNDFD	UDF	UNDEFINED
27	4.65	0.22	4.65	1.63	clay	UNDFND	UNDFD	4	.2
28	5.48	0.12	2.27	1.69	silty clay to clay	UNDFND	UNDFD	4	.2
29	5.88	0.19	3.14	1.76	clay	UNDFND	UNDFD	6	.2
30	7.05	0.20	2.87	1.82	clay	UNDFND	UNDFD	7	.3
31	10.18	0.27	2.68	1.88	silty clay to clay	UNDFND	UNDFD	7	.5
32	6.38	0.14	2.16	1.94	silty clay to clay	UNDFND	UNDFD	4	.2
33	5.18	0.14	2.61	2.00	clay	UNDFND	UNDFD	5	.2
34	6.08	0.15	2.53	2.06	silty clay to clay	UNDFND	UNDFD	4	.2
35	8.15	0.26	3.13	2.12	clay	UNDFND	UNDFD	8	.4
36	22.28	0.67	3.00	2.18	clayey silt to silty clay	UNDFND	UNDFD	11	1.3
37	15.87	0.50	3.17	2.24	silty clay to clay	UNDFND	UNDFD	10	.9
38	33.95	0.76	2.23	2.30	sandy silt to clayey silt	UNDFND	UNDFD	13	2.1
39	12.60	0.38	3.03	2.36	silty clay to clay	UNDFND	UNDFD	8	.6
40	20.10	0.37	1.82	2.42	sandy silt to clayey silt	UNDFND	UNDFD	8	1.1
41	25.25	0.60	2.39	2.48	sandy silt to clayey silt	UNDFND	UNDFD	10	1.5
42	16.79	0.60	3.56	2.55	silty clay to clay	UNDFND	UNDFD	11	.9
43	13.07	0.38	2.93	2.61	silty clay to clay	UNDFND	UNDFD	8	.6
44	48.42	1.90	3.92	2.67	clayey silt to silty clay	UNDFND	UNDFD	23	3.0
45	60.06	2.27	3.77	2.74	clayey silt to silty clay	UNDFND	UNDFD	29	3.8
46	44.23	1.43	3.22	2.80	clayey silt to silty clay	UNDFND	UNDFD	21	2.7
47	36.73	1.42	3.86	2.84	clayey silt to silty clay	UNDFND	UNDFD	18	2.2
48	39.97	1.36	3.41	2.87	clayey silt to silty clay	UNDFND	UNDFD	19	2.4
49	21.82	0.44	2.01	2.90	sandy silt to clayey silt	UNDFND	UNDFD	8	1.2
50	21.80	0.45	2.06	2.93	sandy silt to clayey silt	UNDFND	UNDFD	8	1.2
51	26.58	0.54	2.03	2.96	sandy silt to clayey silt	UNDFND	UNDFD	10	1.5
52	26.95	0.49	1.82	2.99	sandy silt to clayey silt	UNDFND	UNDFD	10	1.5
53	24.17	0.50	2.07	3.02	sandy silt to clayey silt	UNDFND	UNDFD	9	1.3
54	22.02	0.44	2.02	3.05	sandy silt to clayey silt	UNDFND	UNDFD	8	1.2
55	26.37	0.54	2.04	3.08	sandy silt to clayey silt	UNDFND	UNDFD	10	1.5
56	27.07	0.55	2.05	3.11	sandy silt to clayey silt	UNDFND	UNDFD	10	1.5
57	30.53	0.57	1.85	3.14	sandy silt to clayey silt	UNDFND	UNDFD	12	1.8
58	30.98	0.58	1.86	3.17	sandy silt to clayey silt	UNDFND	UNDFD	12	1.8
59	30.35	0.53	1.74	3.20	sandy silt to clayey silt	UNDFND	UNDFD	12	1.7
60	38.63	1.19	3.08	3.23	clayey silt to silty clay	UNDFND	UNDFD	19	2.3

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

Operator :&w
On Site Loc:CPT-11
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 123 pcf

CPT Date :06/16/93 8:00 s
Cone Used :#1
Water table (feet) : 39.0748

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	4.07	0.15	3.75	0.03	clay	UNDFND	UNDFD	4	.2
2	22.15	0.55	2.48	0.09	clayey silt to silty clay	UNDFND	UNDFD	11	1.4
3	17.49	0.35	1.99	0.16	clayey silt to silty clay	UNDFND	UNDFD	8	1.1
4	16.70	0.21	1.25	0.22	sandy silt to clayey silt	UNDFND	UNDFD	6	1.0
5	4.60	0.23	4.98	0.28	clay	UNDFND	UNDFD	4	.2
6	2.63	0.19	7.22	0.34	organic material	UNDFND	UNDFD	3	.1
7	3.78	0.39	10.35	0.40	undefined	UNDFND	UNDFD	UDF	UNDEFINED
8	5.65	0.49	8.69	0.46	undefined	UNDFND	UNDFD	UDF	UNDEFINED
9	6.58	0.54	8.17	0.52	undefined	UNDFND	UNDFD	UDF	UNDEFINED
10	7.83	0.45	5.78	0.59	clay	UNDFND	UNDFD	8	.4
11	6.15	0.37	6.00	0.65	clay	UNDFND	UNDFD	6	.3
12	5.65	0.32	5.60	0.71	clay	UNDFND	UNDFD	5	.3
13	5.52	0.31	5.60	0.77	clay	UNDFND	UNDFD	5	.3
14	4.97	0.41	8.19	0.83	undefined	UNDFND	UNDFD	UDF	UNDEFINED
15	6.40	0.51	7.97	0.89	clay	UNDFND	UNDFD	6	.3
16	6.50	0.45	6.85	0.95	clay	UNDFND	UNDFD	6	.3
17	7.13	0.46	6.50	1.01	clay	UNDFND	UNDFD	7	.4
18	10.52	0.51	4.89	1.07	clay	UNDFND	UNDFD	10	.6
19	8.58	0.44	5.11	1.13	clay	UNDFND	UNDFD	8	.4
20	8.60	0.37	4.29	1.19	clay	UNDFND	UNDFD	8	.4
21	6.04	0.32	5.32	1.26	clay	UNDFND	UNDFD	6	.3
22	4.53	0.26	5.76	1.32	clay	UNDFND	UNDFD	4	.2
23	4.83	0.27	5.61	1.38	clay	UNDFND	UNDFD	5	.2
24	6.26	0.30	4.80	1.45	clay	UNDFND	UNDFD	6	.3
25	4.90	0.19	3.91	1.51	clay	UNDFND	UNDFD	5	.2
26	8.63	0.27	3.13	1.57	silty clay to clay	UNDFND	UNDFD	6	.4
27	5.50	0.17	3.14	1.63	clay	UNDFND	UNDFD	5	.2
28	7.23	0.18	2.47	1.69	silty clay to clay	UNDFND	UNDFD	5	.3
29	8.80	0.31	3.55	1.76	clay	UNDFND	UNDFD	8	.4
30	9.65	0.40	4.16	1.82	clay	UNDFND	UNDFD	9	.5
31	20.30	0.39	1.94	1.88	sandy silt to clayey silt	UNDFND	UNDFD	8	1.2
32	7.22	0.27	3.76	1.94	clay	UNDFND	UNDFD	7	.3
33	8.47	0.27	3.21	2.00	clay	UNDFND	UNDFD	8	.4
34	14.83	0.54	3.64	2.06	silty clay to clay	UNDFND	UNDFD	9	.8
35	17.98	0.35	1.92	2.12	clayey silt to silty clay	UNDFND	UNDFD	9	1.0
36	11.38	0.52	4.60	2.18	clay	UNDFND	UNDFD	11	.6
37	40.10	1.49	3.71	2.24	clayey silt to silty clay	UNDFND	UNDFD	19	2.5
38	23.28	0.82	3.51	2.30	clayey silt to silty clay	UNDFND	UNDFD	11	1.3
39	30.77	0.76	2.47	2.36	sandy silt to clayey silt	UNDFND	UNDFD	12	1.8
40	27.07	0.74	2.73	2.41	clayey silt to silty clay	UNDFND	UNDFD	13	1.6
41	29.73	0.61	2.06	2.44	sandy silt to clayey silt	UNDFND	UNDFD	11	1.8
42	15.69	0.25	1.59	2.47	sandy silt to clayey silt	UNDFND	UNDFD	6	.8
43	26.90	0.67	2.49	2.51	sandy silt to clayey silt	UNDFND	UNDFD	10	1.6
44	40.57	0.86	2.12	2.54	sandy silt to clayey silt	UNDFND	UNDFD	16	2.5
45	35.99	0.76	2.12	2.57	sandy silt to clayey silt	UNDFND	UNDFD	14	2.2
46	36.88	0.73	1.97	2.60	sandy silt to clayey silt	UNDFND	UNDFD	14	2.2
47	28.65	0.52	1.83	2.63	sandy silt to clayey silt	UNDFND	UNDFD	11	1.7
48	26.97	0.57	2.11	2.66	sandy silt to clayey silt	UNDFND	UNDFD	10	1.6
49	25.00	0.46	1.85	2.69	sandy silt to clayey silt	UNDFND	UNDFD	10	1.4
50	28.72	0.67	2.32	2.72	sandy silt to clayey silt	UNDFND	UNDFD	11	1.7
51	26.87	0.47	1.74	2.75	sandy silt to clayey silt	UNDFND	UNDFD	10	1.5
52	30.28	0.69	2.28	2.78	sandy silt to clayey silt	UNDFND	UNDFD	12	1.8

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

Operator :s&w
On Site Loc:CPT-12
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 123 pcf

CPT Date :06/16/93 09:15
Cone Used :#1
Water table (feet) : 39.0748

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	3.22	0.00	0.04	0.03	sensitive fine grained	UNDFND	UNDFD	2	.2
2	13.63	-0.01	-0.04	0.09	undefined	UNDFND	UNDFD	UDF	UNDEFINED
3	12.04	0.01	0.07	0.16	sandy silt to clayey silt	UNDFND	UNDFD	5	.7
4	18.00	0.33	1.84	0.22	sandy silt to clayey silt	UNDFND	UNDFD	7	1.1
5	11.93	0.05	0.38	0.28	sandy silt to clayey silt	UNDFND	UNDFD	5	.7
6	2.75	0.01	0.30	0.34	sensitive fine grained	UNDFND	UNDFD	1	.1
7	9.10	0.09	1.04	0.40	clayey silt to silty clay	UNDFND	UNDFD	4	.5
8	24.37	0.47	1.94	0.46	sandy silt to clayey silt	UNDFND	UNDFD	9	1.5
9	10.58	0.15	1.44	0.52	clayey silt to silty clay	UNDFND	UNDFD	5	.6
10	5.13	0.23	4.44	0.59	clay	UNDFND	UNDFD	5	.3
11	3.92	0.15	3.80	0.65	clay	UNDFND	UNDFD	4	.2
12	5.47	0.27	5.02	0.71	clay	UNDFND	UNDFD	5	.3
13	5.97	0.46	7.72	0.77	clay	UNDFND	UNDFD	6	.3
14	8.00	0.58	7.29	0.83	clay	UNDFND	UNDFD	8	.4
15	8.17	0.55	6.74	0.89	clay	UNDFND	UNDFD	8	.4
16	6.68	0.38	5.64	0.95	clay	UNDFND	UNDFD	6	.3
17	7.68	0.30	3.93	1.01	clay	UNDFND	UNDFD	7	.4
18	7.05	0.37	5.27	1.07	clay	UNDFND	UNDFD	7	.3
19	8.23	0.39	4.75	1.13	clay	UNDFND	UNDFD	8	.4
20	7.67	0.29	3.84	1.19	clay	UNDFND	UNDFD	7	.4
21	5.81	0.29	5.07	1.26	clay	UNDFND	UNDFD	6	.3
22	6.07	0.26	4.29	1.32	clay	UNDFND	UNDFD	6	.3
23	5.65	0.24	4.22	1.38	clay	UNDFND	UNDFD	5	.2
24	8.31	0.31	3.74	1.45	clay	UNDFND	UNDFD	8	.4
25	11.98	0.43	3.61	1.51	silty clay to clay	UNDFND	UNDFD	8	.6
26	12.72	0.49	3.82	1.57	clay	UNDFND	UNDFD	12	.7
27	11.32	0.35	3.07	1.63	silty clay to clay	UNDFND	UNDFD	7	.6
28	8.37	0.24	2.86	1.69	silty clay to clay	UNDFND	UNDFD	5	.4
29	8.85	0.19	2.11	1.76	silty clay to clay	UNDFND	UNDFD	6	.4
30	8.47	0.14	1.69	1.82	clayey silt to silty clay	UNDFND	UNDFD	4	.4
31	8.37	0.23	2.76	1.88	silty clay to clay	UNDFND	UNDFD	5	.4
32	7.33	0.22	3.05	1.94	clay	UNDFND	UNDFD	7	.3
33	7.07	0.24	3.43	2.00	clay	UNDFND	UNDFD	7	.3
34	6.87	0.21	3.08	2.06	clay	UNDFND	UNDFD	7	.3
35	7.12	0.22	3.12	2.12	clay	UNDFND	UNDFD	7	.3
36	7.30	0.25	3.45	2.18	clay	UNDFND	UNDFD	7	.3
37	23.73	0.30	1.28	2.24	sandy silt to clayey silt	UNDFND	UNDFD	9	1.4
38	26.45	0.35	1.34	2.30	sandy silt to clayey silt	UNDFND	UNDFD	10	1.6
39	35.85	0.31	0.86	2.36	silty sand to sandy silt	<40	30-32	11	UNDEFINED
40	15.88	0.20	1.27	2.41	sandy silt to clayey silt	UNDFND	UNDFD	6	.8
41	10.65	0.19	1.79	2.44	clayey silt to silty clay	UNDFND	UNDFD	5	.5
42	7.90	0.18	2.33	2.47	silty clay to clay	UNDFND	UNDFD	5	.3
43	13.68	0.28	2.01	2.51	clayey silt to silty clay	UNDFND	UNDFD	7	.7
44	19.17	0.50	2.59	2.54	clayey silt to silty clay	UNDFND	UNDFD	9	1.0
45	28.20	0.57	2.01	2.57	sandy silt to clayey silt	UNDFND	UNDFD	11	1.6
46	44.83	1.11	2.47	2.60	sandy silt to clayey silt	UNDFND	UNDFD	17	2.8
47	48.48	1.21	2.49	2.63	sandy silt to clayey silt	UNDFND	UNDFD	19	3.0
48	80.43	1.68	2.08	2.66	silty sand to sandy silt	40-50	34-36	26	UNDEFINED
49	31.82	0.67	2.12	2.69	sandy silt to clayey silt	UNDFND	UNDFD	12	1.9
50	31.47	0.67	2.14	2.72	sandy silt to clayey silt	UNDFND	UNDFD	12	1.8
51	26.47	0.41	1.56	2.75	sandy silt to clayey silt	UNDFND	UNDFD	10	1.5
52	22.72	0.43	1.89	2.78	sandy silt to clayey silt	UNDFND	UNDFD	9	1.3
53	22.75	0.50	2.19	2.81	sandy silt to clayey silt	UNDFND	UNDFD	9	1.3
54	23.93	0.46	1.93	2.84	sandy silt to clayey silt	UNDFND	UNDFD	9	1.3
55	24.92	0.43	1.71	2.87	sandy silt to clayey silt	UNDFND	UNDFD	10	1.4
56	27.53	0.56	2.03	2.90	sandy silt to clayey silt	UNDFND	UNDFD	11	1.6
57	26.63	0.44	1.64	2.93	sandy silt to clayey silt	UNDFND	UNDFD	10	1.5
58	80.82	1.84	2.27	2.96	silty sand to sandy silt	40-50	32-34	26	UNDEFINED
59	159.97	3.27	2.05	2.99	silty sand to sandy silt	60-70	36-38	>50	UNDEFINED

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

Operator :s&w
On Site Loc:CPT-13
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 123 pcf

CPT Date :06/16/93 10:55
Cone Used :#1
Water table (feet) : 44.78346

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	8.25	0.06	0.77	0.03	sensitive fine grained	UNDFND	UNDFD	4	.5
2	11.35	0.18	1.56	0.09	clayey silt to silty clay	UNDFND	UNDFD	5	.7
3	9.67	0.04	0.36	0.16	sandy silt to clayey silt	UNDFND	UNDFD	4	.6
4	7.72	0.05	0.66	0.22	sensitive fine grained	UNDFND	UNDFD	4	.4
5	1.25	0.03	2.29	0.28	organic material	UNDFND	UNDFD	1	6.4
6	17.48	0.11	0.63	0.34	sandy silt to clayey silt	UNDFND	UNDFD	7	1.1
7	17.52	0.29	1.68	0.40	sandy silt to clayey silt	UNDFND	UNDFD	7	1.1
8	11.83	0.28	2.39	0.46	clayey silt to silty clay	UNDFND	UNDFD	6	.7
9	11.97	0.33	2.75	0.52	silty clay to clay	UNDFND	UNDFD	8	.7
10	3.10	0.16	5.01	0.59	clay	UNDFND	UNDFD	3	.1
11	4.92	0.25	4.99	0.65	clay	UNDFND	UNDFD	5	.2
12	6.82	0.59	8.62	0.71	undefined	UNDFND	UNDFD	UDF	UNDEFINED
13	7.45	0.59	7.93	0.77	clay	UNDFND	UNDFD	7	.4
14	7.27	0.57	7.79	0.83	clay	UNDFND	UNDFD	7	.4
15	6.82	0.46	6.78	0.89	clay	UNDFND	UNDFD	7	.3
16	6.33	0.36	5.75	0.95	clay	UNDFND	UNDFD	6	.3
17	5.20	0.33	6.32	1.01	clay	UNDFND	UNDFD	5	.2
18	5.47	0.33	5.98	1.07	clay	UNDFND	UNDFD	5	.2
19	4.60	0.28	6.12	1.13	clay	UNDFND	UNDFD	4	.2
20	6.77	0.39	5.69	1.19	clay	UNDFND	UNDFD	6	.3
21	4.44	0.22	4.94	1.26	clay	UNDFND	UNDFD	4	.2
22	4.67	0.17	3.70	1.32	clay	UNDFND	UNDFD	4	.2
23	4.43	0.28	6.27	1.38	clay	UNDFND	UNDFD	4	.2
24	7.53	0.33	4.40	1.45	clay	UNDFND	UNDFD	7	.4
25	8.43	0.40	4.70	1.51	clay	UNDFND	UNDFD	8	.4
26	6.05	0.33	5.44	1.57	clay	UNDFND	UNDFD	6	.2
27	5.32	0.25	4.73	1.63	clay	UNDFND	UNDFD	5	.2
28	5.27	0.21	3.93	1.69	clay	UNDFND	UNDFD	5	.2
29	8.62	0.22	2.59	1.76	silty clay to clay	UNDFND	UNDFD	6	.4
30	8.47	0.19	2.30	1.82	silty clay to clay	UNDFND	UNDFD	5	.4
31	6.12	0.18	2.94	1.88	clay	UNDFND	UNDFD	6	.2
32	6.10	0.18	2.99	1.94	clay	UNDFND	UNDFD	6	.2
33	7.53	0.27	3.57	2.00	clay	UNDFND	UNDFD	7	.3
34	12.83	0.34	2.61	2.06	clayey silt to silty clay	UNDFND	UNDFD	6	.7
35	12.00	0.34	2.79	2.12	silty clay to clay	UNDFND	UNDFD	8	.6
36	9.13	0.30	3.32	2.18	clay	UNDFND	UNDFD	9	.4
37	84.73	1.48	1.75	2.24	silty sand to sandy silt	50-60	36-38	27	UNDEFINED
38	45.37	1.09	2.40	2.30	sandy silt to clayey silt	UNDFND	UNDFD	17	2.8
39	18.73	0.47	2.50	2.36	clayey silt to silty clay	UNDFND	UNDFD	9	1.0
40	14.33	0.29	2.05	2.42	clayey silt to silty clay	UNDFND	UNDFD	7	.7
41	14.33	0.34	2.36	2.48	clayey silt to silty clay	UNDFND	UNDFD	7	.7
42	80.79	1.73	2.14	2.55	silty sand to sandy silt	40-50	34-36	26	UNDEFINED
43	114.25	1.26	1.11	2.61	sand to silty sand	50-60	36-38	27	UNDEFINED
44	28.60	0.75	2.62	2.67	sandy silt to clayey silt	UNDFND	UNDFD	11	1.7
45	39.37	1.07	2.73	2.74	sandy silt to clayey silt	UNDFND	UNDFD	15	2.4
46	22.73	0.66	2.89	2.78	clayey silt to silty clay	UNDFND	UNDFD	11	1.3
47	15.15	0.57	3.78	2.81	silty clay to clay	UNDFND	UNDFD	10	.8
48	48.42	1.30	2.69	2.84	sandy silt to clayey silt	UNDFND	UNDFD	19	3.0
49	26.80	0.69	2.56	2.87	clayey silt to silty clay	UNDFND	UNDFD	13	1.5
50	20.88	0.42	2.01	2.90	sandy silt to clayey silt	UNDFND	UNDFD	8	1.1
51	19.68	0.47	2.41	2.93	clayey silt to silty clay	UNDFND	UNDFD	9	1.1
52	18.65	0.54	2.88	2.96	clayey silt to silty clay	UNDFND	UNDFD	9	1.0
53	19.97	0.51	2.54	2.99	clayey silt to silty clay	UNDFND	UNDFD	10	1.1
54	22.58	0.56	2.47	3.02	clayey silt to silty clay	UNDFND	UNDFD	11	1.2
55	25.30	0.68	2.68	3.05	clayey silt to silty clay	UNDFND	UNDFD	12	1.4
56	27.08	0.70	2.59	3.08	clayey silt to silty clay	UNDFND	UNDFD	13	1.5
57	26.32	0.72	2.73	3.11	clayey silt to silty clay	UNDFND	UNDFD	13	1.5
58	78.82	1.59	2.02	3.14	silty sand to sandy silt	40-50	32-34	25	UNDEFINED
59	34.75	1.80	5.19	3.17	clay	UNDFND	UNDFD	33	2.0
60	37.85	1.82	4.81	3.20	clay	UNDFND	UNDFD	36	2.2

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****

Interpreted CPT Profile

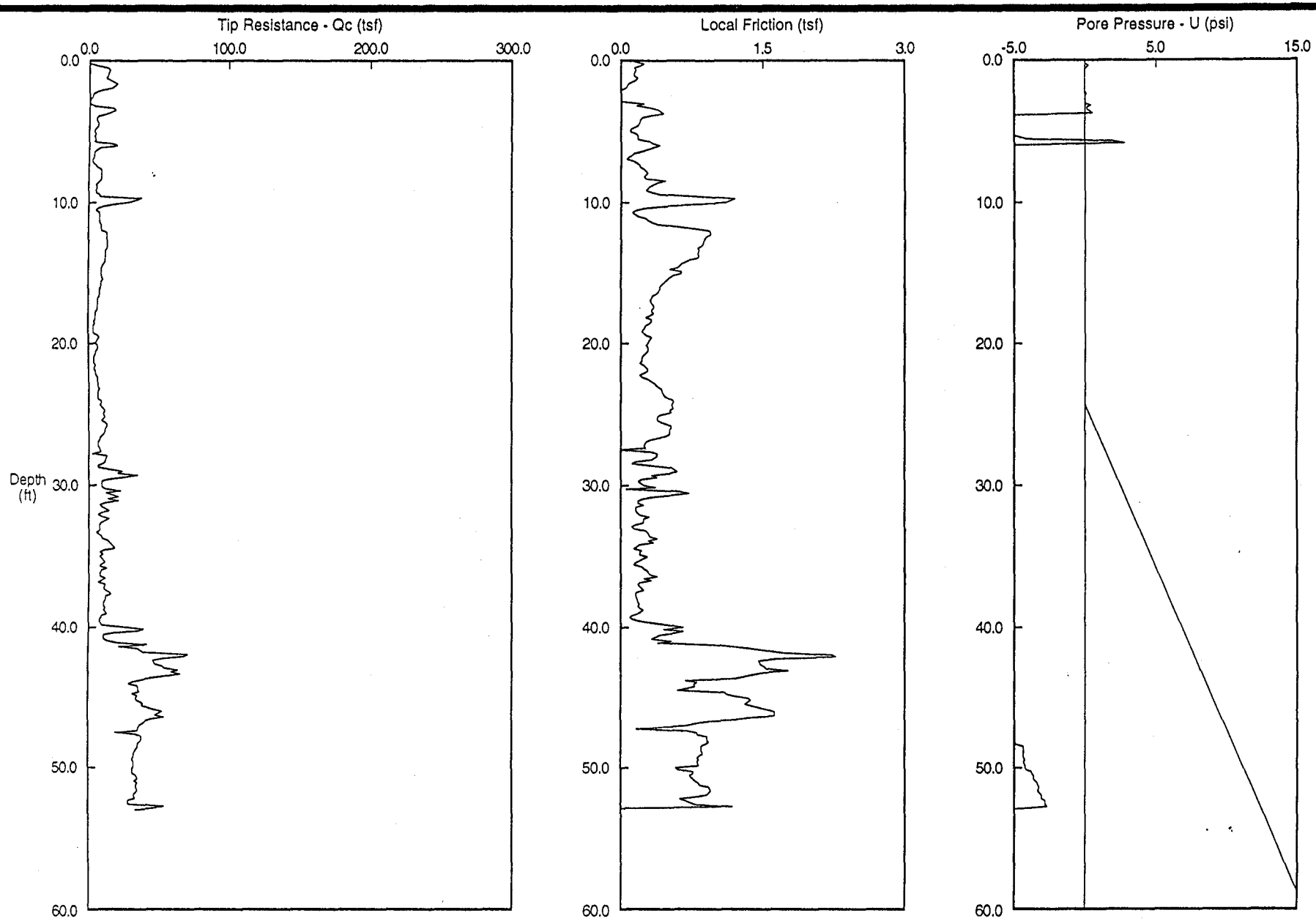
Operator :s&w
On Site Loc:CPT-14
Job No. :Z-301-05
Tot. Unit Wt. (avg) : 123 pcf

CPT Date :06/16/93 13:30
Cone Used :#1
Water table (feet) : 36.01378

DEPTH (feet)	Qc (avg) (tsf)	Fs (avg) (tsf)	Rf (avg) (%)	SIGV' (tsf)	SOIL BEHAVIOUR TYPE	Eq - Dr (%)	PHI deg.	SPT N	Su tsf
1	77.30	0.18	0.23	0.03	sand to silty sand	>90	>48	19	UNDEFINED
2	76.10	0.07	0.10	0.09	sand	>90	>48	15	UNDEFINED
3	17.44	0.09	0.51	0.16	sandy silt to clayey silt	UNDFND	UNDFD	7	1.1
4	7.87	-0.00	-0.06	0.22	undefined	UNDFND	UNDFD	UDF	UNDEFINED
5	2.82	0.07	2.64	0.28	clay	UNDFND	UNDFD	3	.1
6	7.90	0.30	3.79	0.34	clay	UNDFND	UNDFD	8	.5
7	7.15	0.30	4.23	0.40	clay	UNDFND	UNDFD	7	.4
8	8.08	0.39	4.82	0.46	clay	UNDFND	UNDFD	8	.5
9	3.67	0.24	6.65	0.52	clay	UNDFND	UNDFD	4	.2
10	8.03	0.26	3.18	0.59	clay	UNDFND	UNDFD	8	.4
11	6.05	0.24	3.93	0.65	clay	UNDFND	UNDFD	6	.3
12	5.63	0.26	4.65	0.71	clay	UNDFND	UNDFD	5	.3
13	12.00	0.77	6.41	0.77	clay	UNDFND	UNDFD	11	.7
14	11.65	0.70	5.99	0.83	clay	UNDFND	UNDFD	11	.7
15	9.92	0.58	5.89	0.89	clay	UNDFND	UNDFD	9	.6
16	7.35	0.37	5.00	0.95	clay	UNDFND	UNDFD	7	.4
17	7.43	0.43	5.82	1.01	clay	UNDFND	UNDFD	7	.4
18	4.83	0.28	5.86	1.07	clay	UNDFND	UNDFD	5	.2
19	9.38	0.35	3.77	1.13	clay	UNDFND	UNDFD	9	.5
20	8.08	0.29	3.60	1.19	clay	UNDFND	UNDFD	8	.4
21	6.64	0.21	3.13	1.26	clay	UNDFND	UNDFD	6	.3
22	8.20	0.26	3.19	1.32	clay	UNDFND	UNDFD	8	.4
23	8.37	0.36	4.33	1.38	clay	UNDFND	UNDFD	8	.4
24	9.10	0.32	3.55	1.45	clay	UNDFND	UNDFD	9	.5
25	9.03	0.39	4.36	1.51	clay	UNDFND	UNDFD	9	.5
26	9.33	0.37	3.93	1.57	clay	UNDFND	UNDFD	9	.5
27	8.15	0.19	2.28	1.63	silty clay to clay	UNDFND	UNDFD	5	.4
28	8.18	0.38	4.64	1.69	clay	UNDFND	UNDFD	8	.4
29	7.28	0.23	3.11	1.76	clay	UNDFND	UNDFD	7	.3
30	6.23	0.19	3.01	1.82	clay	UNDFND	UNDFD	6	.2
31	5.65	0.19	3.41	1.88	clay	UNDFND	UNDFD	5	.2
32	6.33	0.26	4.11	1.94	clay	UNDFND	UNDFD	6	.2
33	5.38	0.19	3.60	2.00	clay	UNDFND	UNDFD	5	.2
34	6.78	0.29	4.28	2.06	clay	UNDFND	UNDFD	6	.3
35	6.88	0.15	2.17	2.12	silty clay to clay	UNDFND	UNDFD	4	.3
36	8.52	0.28	3.30	2.18	clay	UNDFND	UNDFD	8	.4
37	13.05	0.37	2.82	2.23	silty clay to clay	UNDFND	UNDFD	8	.7
38	65.10	0.64	0.99	2.26	silty sand to sandy silt	40-50	34-36	21	UNDEFINED
39	36.23	0.41	1.13	2.29	silty sand to sandy silt	<40	30-32	12	UNDEFINED
40	17.65	0.36	2.02	2.32	clayey silt to silty clay	UNDFND	UNDFD	8	1.0
41	9.82	0.10	1.05	2.35	clayey silt to silty clay	UNDFND	UNDFD	5	.4
42	19.51	0.29	1.50	2.38	sandy silt to clayey silt	UNDFND	UNDFD	7	1.1
43	20.07	0.24	1.22	2.41	sandy silt to clayey silt	UNDFND	UNDFD	8	1.1
44	23.70	0.34	1.42	2.44	sandy silt to clayey silt	UNDFND	UNDFD	9	1.4
45	50.11	0.43	0.85	2.47	silty sand to sandy silt	<40	30-32	16	UNDEFINED
46	28.37	0.31	1.09	2.50	sandy silt to clayey silt	UNDFND	UNDFD	11	1.7
47	54.67	0.59	1.07	2.53	silty sand to sandy silt	<40	32-34	17	UNDEFINED
48	15.53	0.24	1.54	2.56	sandy silt to clayey silt	UNDFND	UNDFD	6	.8
49	15.08	0.26	1.72	2.59	clayey silt to silty clay	UNDFND	UNDFD	7	.8
50	14.28	0.29	2.01	2.62	clayey silt to silty clay	UNDFND	UNDFD	7	.7
51	12.28	0.20	1.66	2.65	clayey silt to silty clay	UNDFND	UNDFD	6	.6
52	10.22	0.19	1.83	2.68	clayey silt to silty clay	UNDFND	UNDFD	5	.4
53	16.97	0.25	1.50	2.71	sandy silt to clayey silt	UNDFND	UNDFD	7	.9
54	31.17	0.75	2.40	2.74	sandy silt to clayey silt	UNDFND	UNDFD	12	1.8
55	33.73	0.90	2.67	2.77	sandy silt to clayey silt	UNDFND	UNDFD	13	2.0
56	28.95	0.75	2.58	2.80	sandy silt to clayey silt	UNDFND	UNDFD	11	1.7
57	27.53	0.79	2.88	2.83	clayey silt to silty clay	UNDFND	UNDFD	13	1.6
58	25.55	0.57	2.21	2.86	sandy silt to clayey silt	UNDFND	UNDFD	10	1.4

Dr - All sands (Jamiolkowski et al. 1985) PHI - Robertson and Campanella 1983 Su: Nk= 15

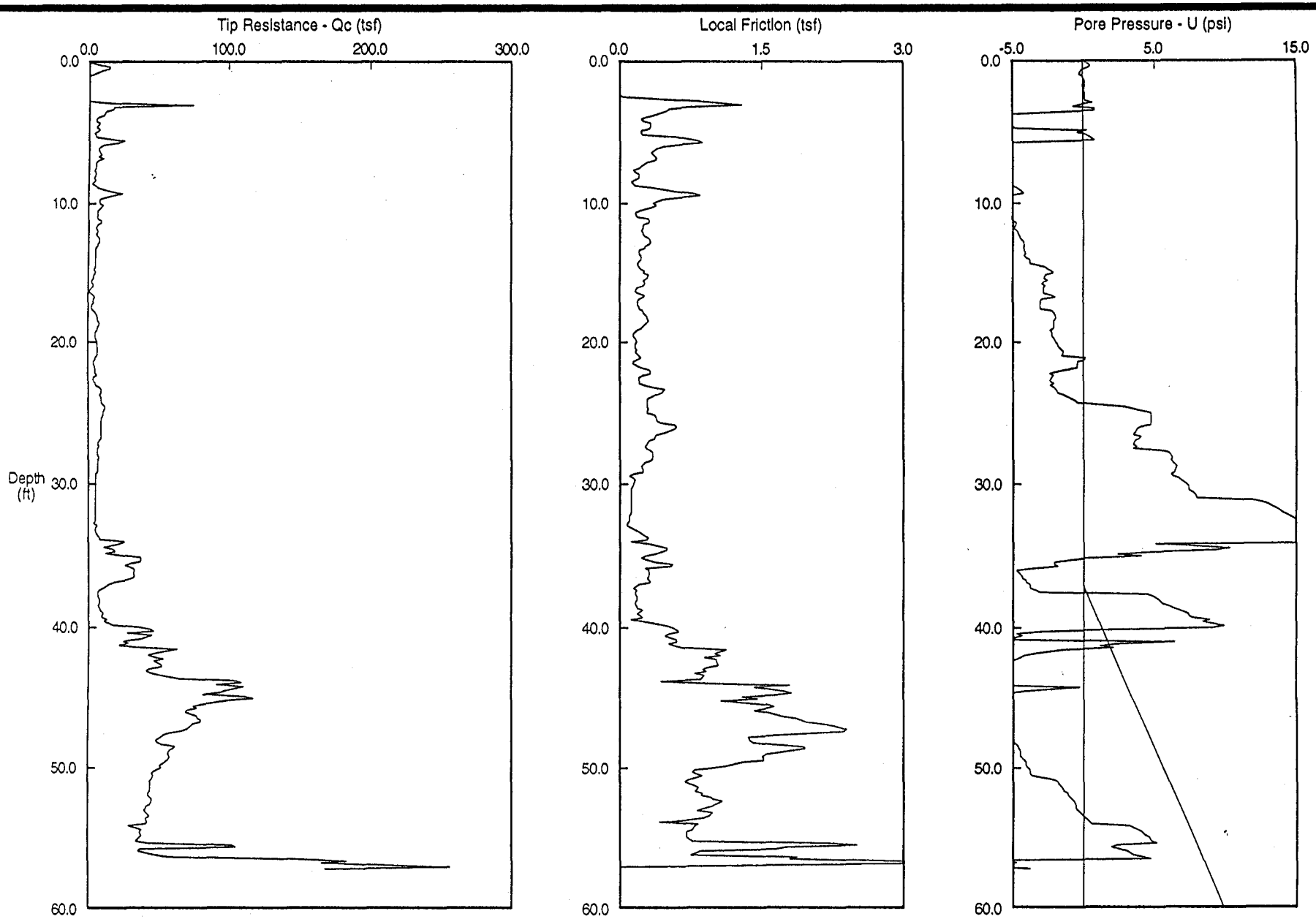
**** Note: For interpretation purposes the PLOTTED CPT PROFILE should be used with the TABULATED OUTPUT from CPTINTR1 (v 3.04) ****



PLOT OF CPT-1
Steelcote

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

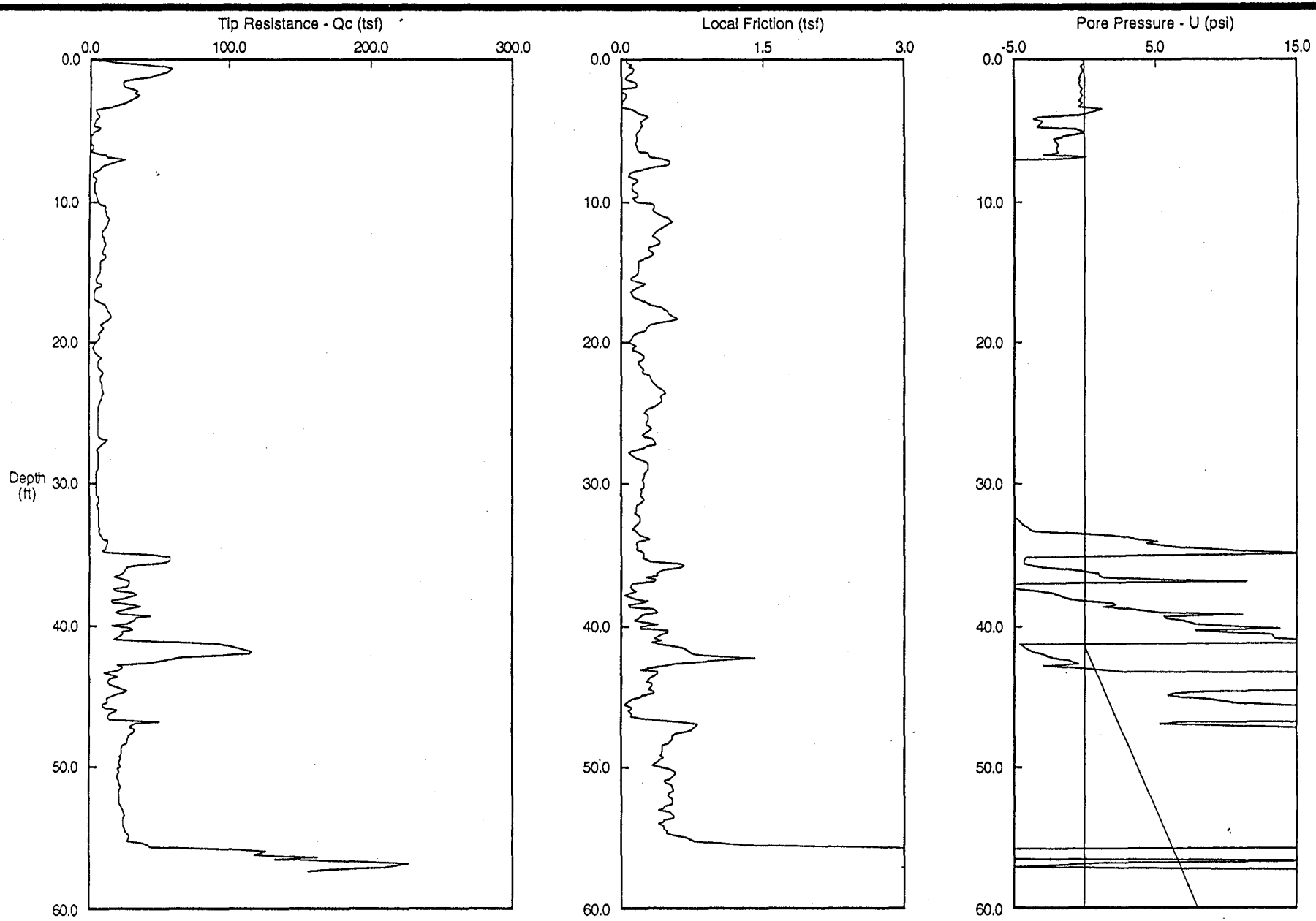
FIGURE B-1



PLOT OF CPT-2
Steelcote

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

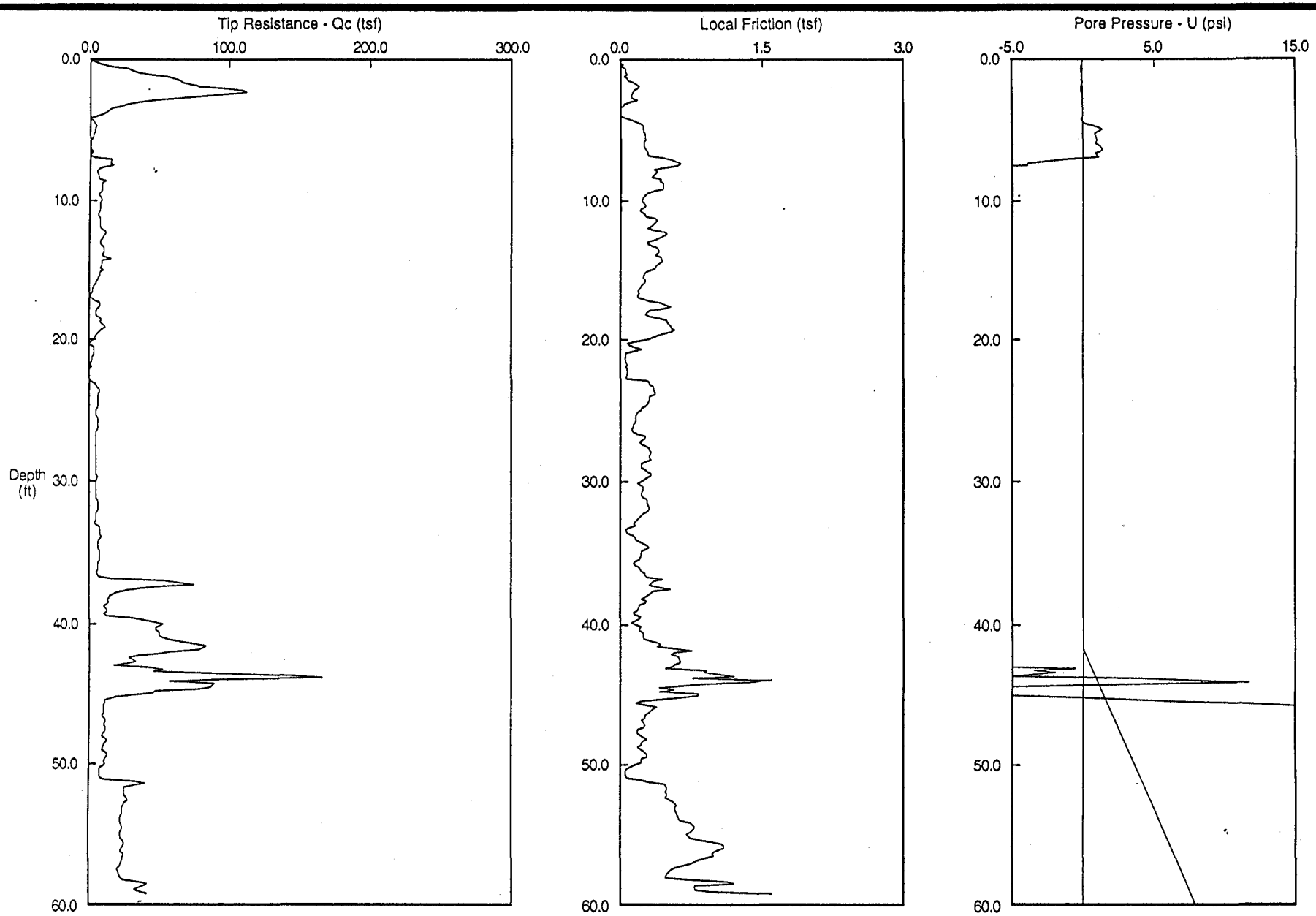
FIGURE B-2



PLOT OF CPT-3B
Steelcote

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

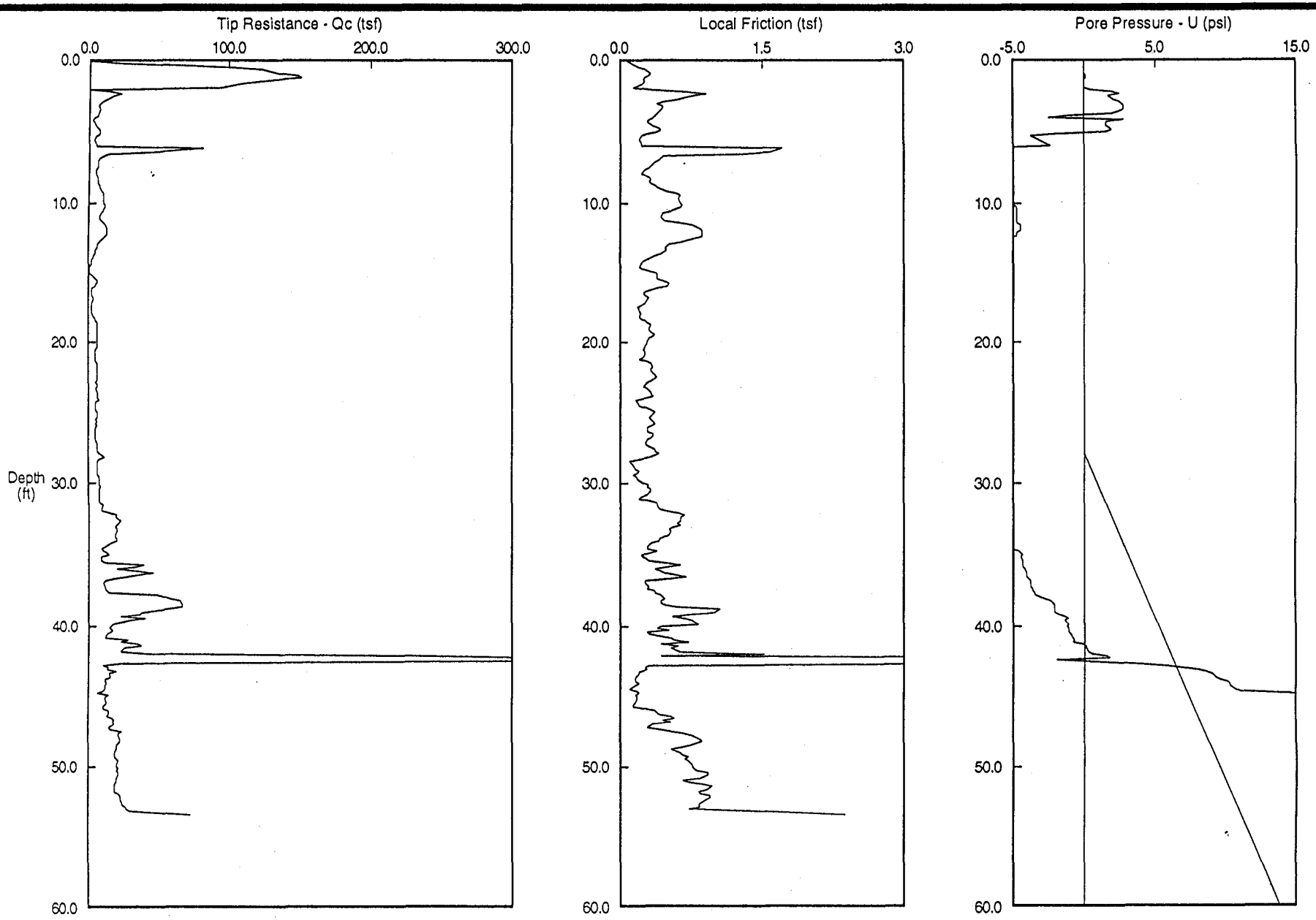
FIGURE B-3



PLOT OF CPT-4
Steelcote

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

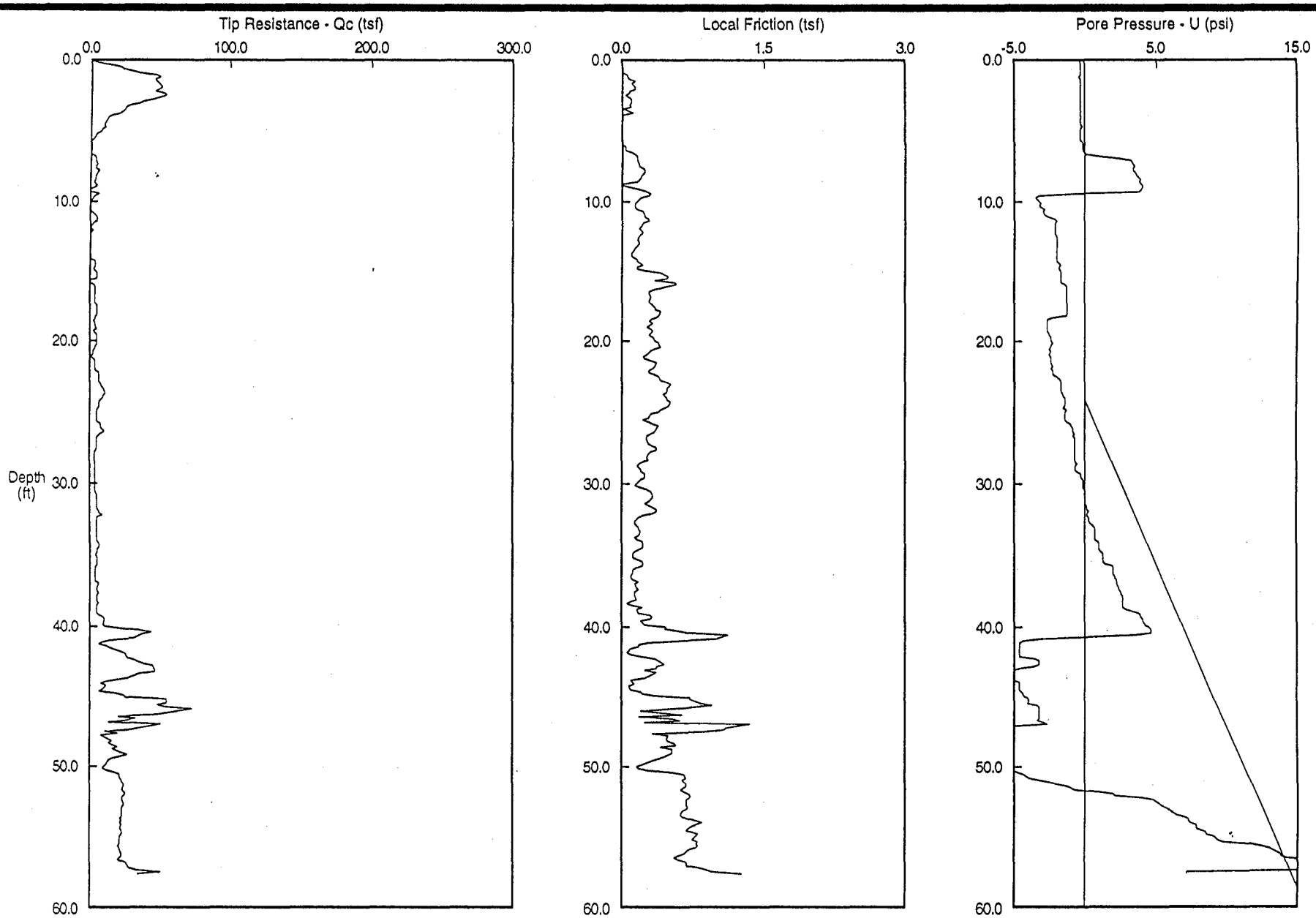
FIGURE B-4



PLOT OF CPT-5
Steelcote

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

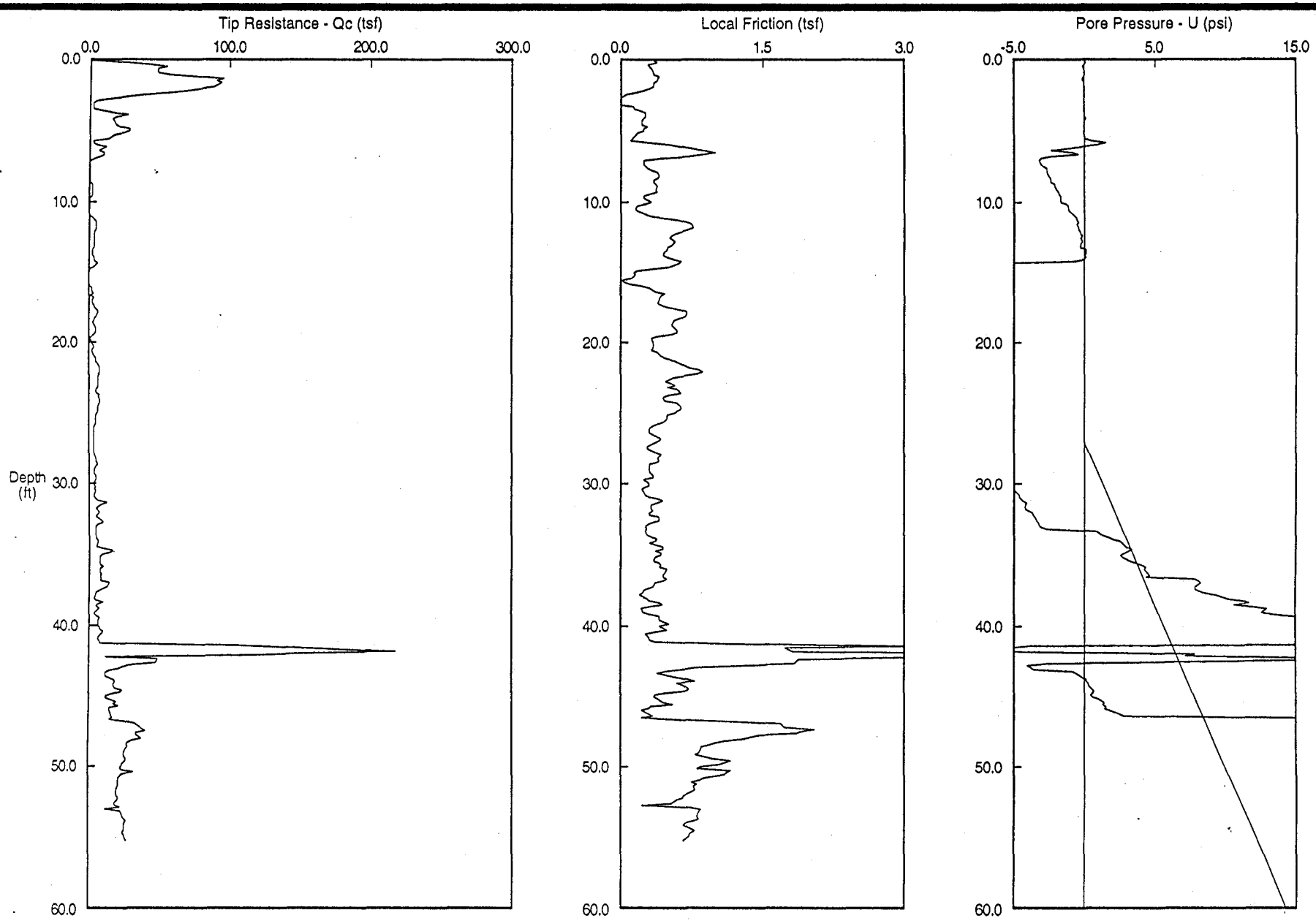
FIGURE B-5



PLOT OF CPT-6
Steelcote

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

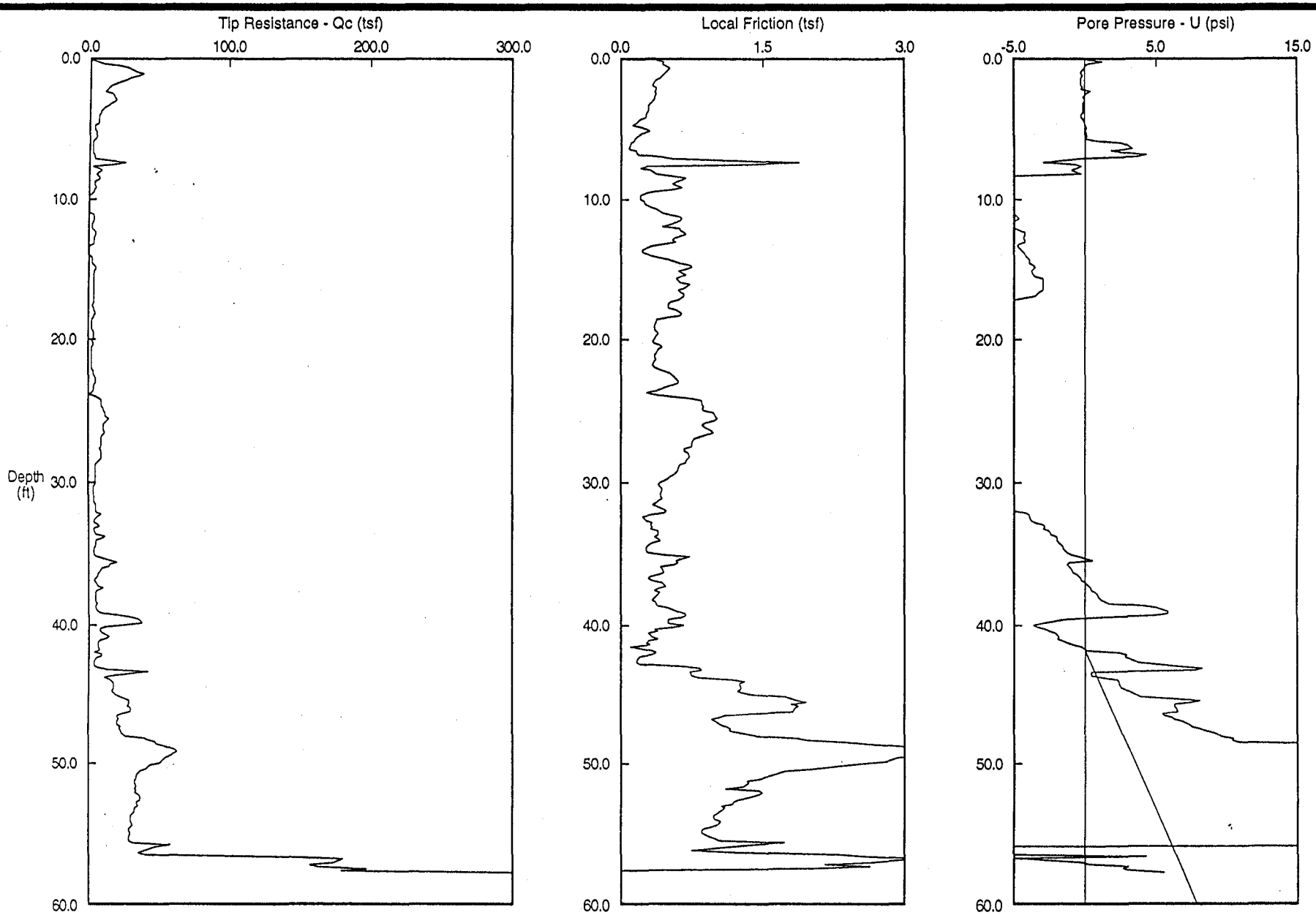
FIGURE B-6



PLOT OF CPT-7
Steelcote

SHANNON & WILSON, INC.

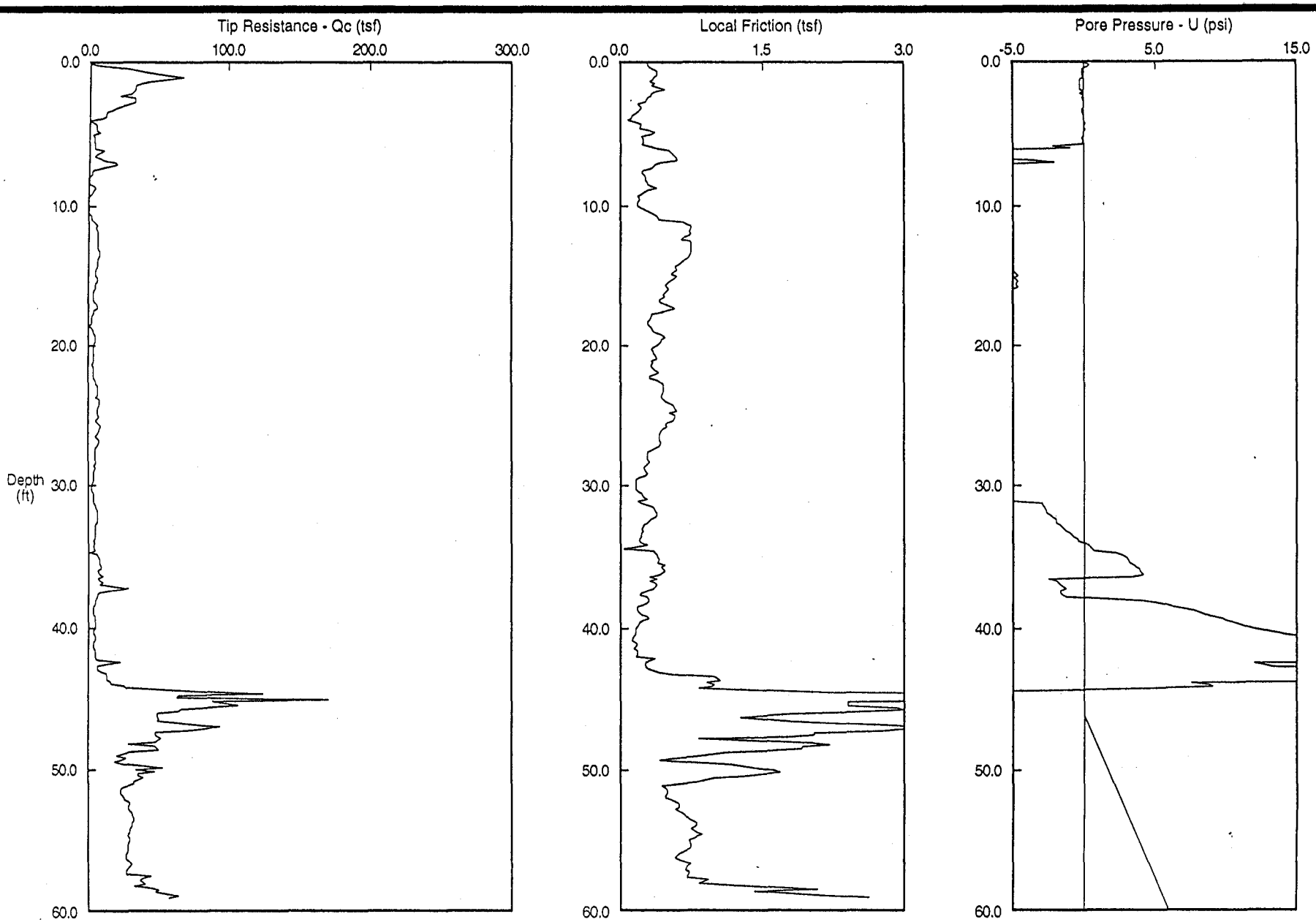
FIGURE B-7



PLOT OF CPT-8
Steelcote

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

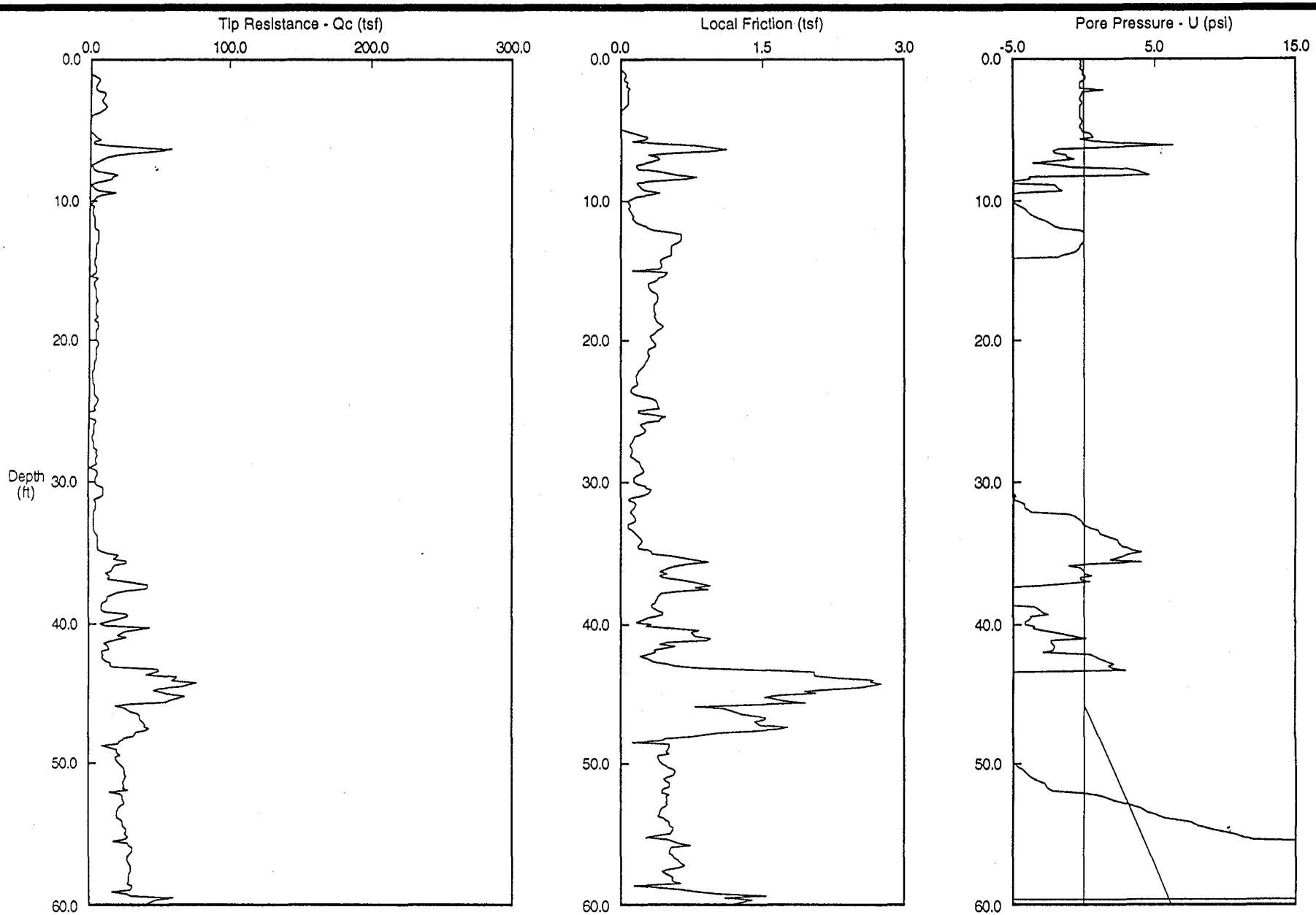
FIGURE B-8



PLOT OF CPT-9
Steelcote

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

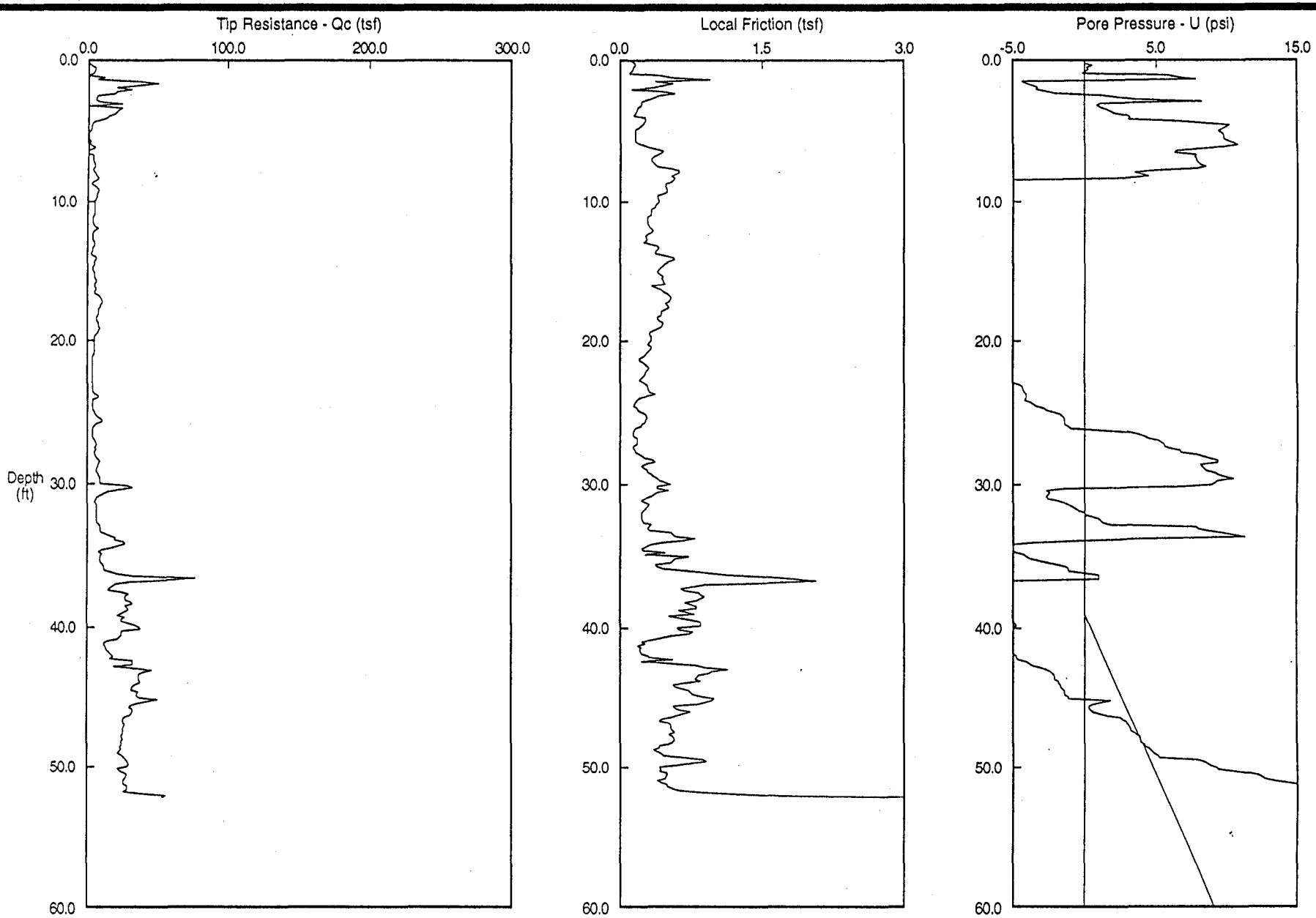
FIGURE B-9



PLOT OF CPT-10
Steelcote

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

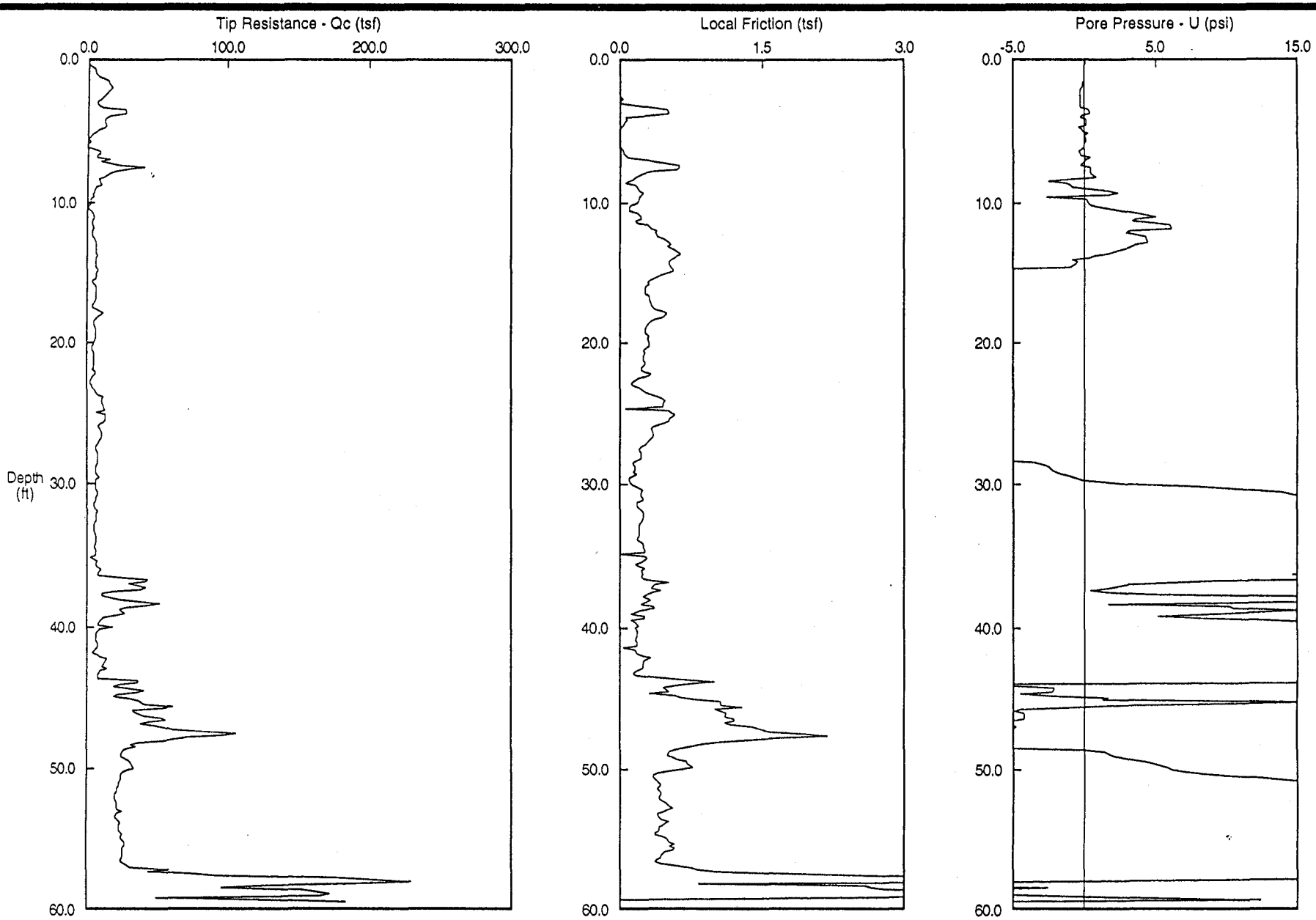
FIGURE B-10



PLOT OF CPT-11
Steelcote

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

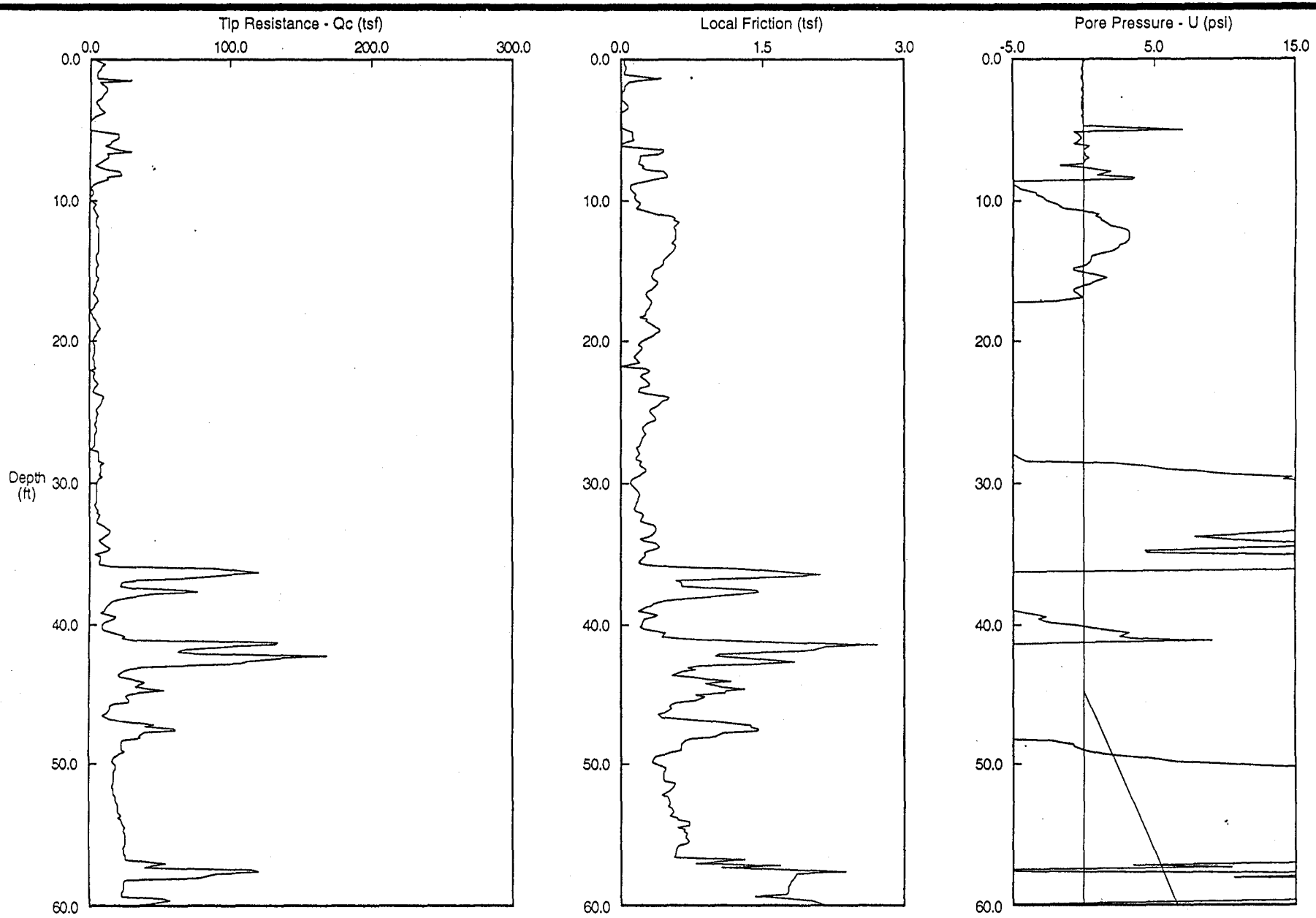
FIGURE B-11



PLOT OF CPT-12
Steelcote

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

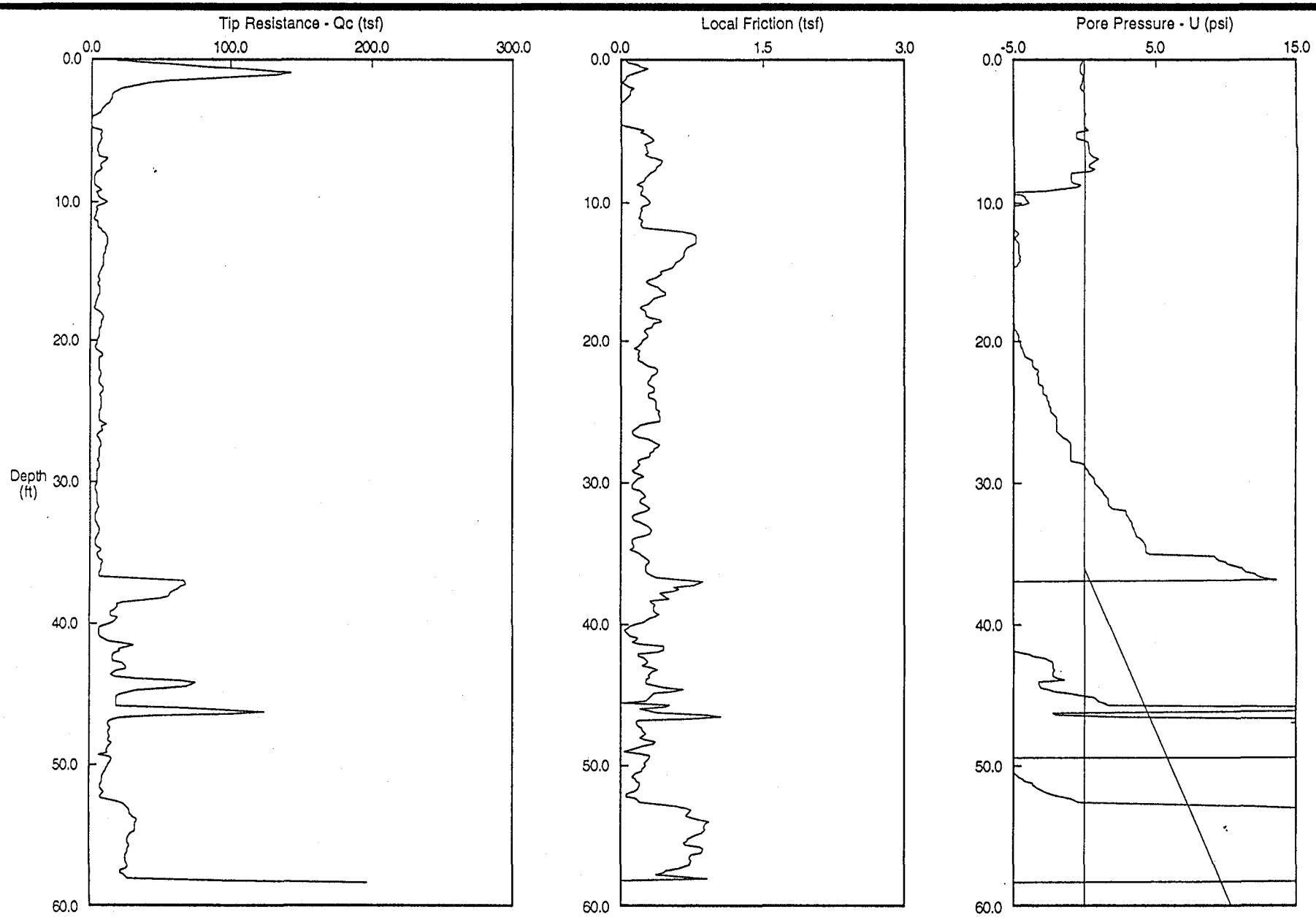
FIGURE B-12



PLOT OF CPT-13
Steelcote

SHANNON & WILSON, INC.

FIGURE B-13



PLOT OF CPT-14
Steelcote

SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

FIGURE B-14

UST REMOVAL RECORDS

AMERICAN TECHNICAL & ANALYTICAL SERVICES, INC.

875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 • FAX (314) 434-0080

12-14-90

December 13, 1990

Jay Maudlin
Environmental Remediation
P.O. Box 2038
St. Louis, MO 63043

RE: #9019

Dear Mr. Maudlin:

Enclosed are the analytical results for the samples received in our laboratory on December 8, 1990.

If, in your review, you should have any questions or require additional information, please call.

Thank you for choosing ATAS for your analytical needs.

Sincerely,

Richard H. Mannz

Richard H. Mannz
Vice President

Enclosures

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: ENVIRONMENTAL REMEDIATION
P.O. BOX 2038
ST. LOUIS, MO 63043
ATTN: JAY MAUDLIN

REPORT: 146501V(23)
DATE : 12-13-90

SAMPLE MATRIX : SOIL
ATAS # : 1465.01
DATE SUBMITTED: 12-08-90
DATE ANALYZED : 12-11-90
METHOD REF. : SW846-8240, EPA METHODOLOGY
PROJECT : #9019
SAMPLE ID : 9019-001

RESULTS REPORTED IN ug/Kg OR Parts Per Billion (PPB)

OLATILES	D.L.	RESULTS	VOLATILES	D.L.	RESULTS
CHLOROMETHANE	25000	ND	1,1,2,2-TETRACHLOROETHANE	12500	ND
ROMOMETHANE	25000	ND	1,2-DICHLOROPROPANE	12500	ND
NYL CHLORIDE	25000	ND	TRANS-1,3-DICHLOROPROPENE	12500	ND
HLOROETHANE	25000	ND	TRICHLOROETHENE	12500	ND
ETHYLENE CHLORIDE	12500	42000	DIBROMOCHLOROMETHANE	12500	ND
ETONE	25000	ND	1,1,2-TRICHLOROETHANE	12500	ND
ARBON DISULFIDE	12500	ND	BENZENE	12500	ND
1,1-DICHLOROETHENE	12500	ND	CIS-1,3-DICHLOROPROPENE	12500	ND
1-DICHLOROETHANE	12500	ND	2-CHLOROETHYLVINYLETHER	25000	ND
ANS-1,2-DICHLOROETHENE	12500	ND	BROMOFORM	12500	ND
HLOROFORM	12500	ND	2-HEXANONE	25000	ND
2-DICHLOROETHANE	12500	ND	4-METHYL-2-PENTANONE	25000	ND
BUTANONE	25000	ND	TETRACHLOROETHENE	12500	ND
,1,1-TRICHLOROETHANE	12500	ND	TOLUENE	12500	12000 J
ARBON TETRACHLORIDE	12500	ND	CHLOROBENZENE	12500	ND
NYL ACETATE	25000	ND	ETHYLBENZENE	12500	108000
OMODICHLOROMETHANE	12500	ND	STYRENE	12500	ND
			TOTAL XYLENES	12500	405000

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) D % BROMOFLUOROBENZENE(74-121) D %
1,2-DICHLOROETHANE-D4(70-121) D %

= SURROGATE DILUTED OUT DUE TO HIGH SAMPLE CONCENTRATIONS
= ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
= ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
= DETECTION LIMIT
) = NOT DETECTED ABOVE QUANTITATION LIMIT

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: ENVIRONMENTAL REMEDIATION
P.O. BOX 2038
ST. LOUIS, MO 63043
ATTN: JAY MAUDLIN

REPORT: 146501TC(23)
DATE : 12-13-90

SAMPLE MATRIX : SOIL
ATAS # : 1465.01
DATE SUBMITTED: 12-08-90
DATE ANALYZED : 12-11-90
METHOD REF. : SW846-8240, EPA METHODOLOGY
PROJECT : #9019
SAMPLE ID : 9019-001

RESULTS REPORTED IN ug/Kg OR Parts Per Billion (PPB)

VOLATILE

TENTATIVELY IDENTIFIED COMPOUNDS*	ESTIMATED CONCENTRATION
UNKNOWN ALKYL BENZENES	228000

entatively Identified Compound: Compound whose mass spectrum closely resembles the mass ectrum of a known compound from the National Bureau of Standards Library Spectra. Based n fit and purity criteria, one can indicate the presence of such a compound in the sample. confirmation analysis is required in order to identify such a compound with greater nfidence. The concentrations reported for such compounds are only estimated values. hese values are calculated by comparing the areas/heights of the peaks to the nearest nternal standard assuming a response factor of one.

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CLIENT: ENVIRONMENTAL REMEDIATION
P.O. BOX 2038
ST. LOUIS, MO 63043
ATTN: JAY MAUDLIN

REPORT: BLK1211V(23)
DATE : 12-13-90

SAMPLE MATRIX : SOIL
ATAS # : METHOD BLANK
DATE SUBMITTED: 12-08-90
DATE ANALYZED : 12-11-90
METHOD REF. : SW846-8240, EPA METHODOLOGY
PROJECT : #9019
SAMPLE ID : METHOD BLANK

RESULTS REPORTED IN ug/Kg OR Parts Per Billion (PPB)

VOLATILES	D.L.	RESULTS	VOLATILES	D.L.	RESULTS
CHLOROMETHANE	1250	ND	1,1,2,2-TETRACHLOROETHANE	625	ND
BROMOMETHANE	1250	ND	1,2-DICHLOROPROPANE	625	ND
VINYL CHLORIDE	1250	ND	TRANS-1,3-DICHLOROPROPENE	625	ND
CHLOROETHANE	1250	ND	TRICHLOROETHENE	625	ND
METHYLENE CHLORIDE	625	625	DIBROMOCHLOROMETHANE	625	ND
ACETONE	1250	ND	1,1,2-TRICHLOROETHANE	625	ND
CARBON DISULFIDE	625	ND	BENZENE	625	ND
1,1-DICHLOROETHENE	625	ND	CIS-1,3-DICHLOROPROPENE	625	ND
1,1-DICHLOROETHANE	625	ND	2-CHLOROETHYLVINYLETHER	1250	ND
TRANS-1,2-DICHLOROETHENE	625	ND	BROMOFORM	625	ND
CHLOROFORM	625	ND	2-HEXANONE	1250	ND
1,2-DICHLOROETHANE	625	ND	4-METHYL-2-PENTANONE	1250	ND
2-BUTANONE	1250	ND	TETRACHLOROETHENE	625	ND
1,1,1-TRICHLOROETHANE	625	ND	TOLUENE	625	ND
CARBON TETRACHLORIDE	625	ND	CHLOROBENZENE	625	ND
VINYL ACETATE	1250	ND	ETHYLBENZENE	625	ND
BROMODICHLOROMETHANE	625	ND	STYRENE	625	ND
			TOTAL XYLENES	625	ND

QA/QC SURROGATE RECOVERIES

TOLUENE-d8(81-117) 101% BROMOFLUOROBENZENE(74-121) 98%
1,2-DICHLOROETHANE-D4(70-121) 96%

= ANALYTE DETECTED IN BLANK AS WELL AS SAMPLE
= ESTIMATED VALUE: CONCENTRATION BELOW LIMIT OF QUANTITATION
= DETECTION LIMIT
D = NOT DETECTED ABOVE QUANTITATION LIMIT

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

CLIENT: ENVIRONMENTAL REMEDIATION
P.O. BOX 2038
ST. LOUIS, MO 63043
ATTN: JAY MAUDLIN

REPORT: 1465TPH(23)
DATE: 12-11-90

SAMPLE MATRIX : SOIL
ATAS EPISODE : # 1465
DATE SUBMITTED: 12-08-90
DATE ANALYZED : 12-11-90
PROJECT : #9019
METHOD REF. : 418.1

RESULTS REPORTED IN mg/Kg OR PARTS PER MILLION(PPM)

TOTAL PETROLEUM HYDROCARBONS

CLIENT ID	ATAS ID	DET. LIMIT	RESULTS
9019-002	1465.02	10.0	750

= NOT DETECTED ABOVE QUANTITATION LIMIT

ATAS 875 Fee Fee Road • Maryland Heights, MO 63043 • (314) 434-4570 - FAX (314) 434-0080

LABORATORY QUALITY CONTROL SEQUENCE

METHOD : EPA 418.1
SEQUENCE DATE : 12-11-90

LABORATORY BLANK

MATRIX : SOIL
SAMPLE ID : BLANK
SAMPLE AMOUNT : 30 g
ANALYSIS DATE : 12-11-90

DILUTION FACTOR: 1.00

COMPOUND	QUANTITATION LIMIT (PPM)	AMOUNT FOUND (PPM)
TOTAL PETROLEUM HYDROCARBON	10.0	ND

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

COMPOUND	SPIKE CONC. (PPM)	2115.04 SAMPLE CONC. (PPM)	2115.04 MS MATRIX SPIKE CONC.	PERCENT RECOVERY
TOTAL PETROLEUM HYDROCARBON	667	0	743	111.0 %

	2115.04 MATRIX SPIKE DUP. CONC. (PPM)	PERCENT RECOVERY	RECOVERY PERCENT DIFFERENCE
TOTAL PETROLEUM HYDROCARBON	744	112 %	0 %

CHAIN OF CUSTODY RECORD

PROJ. NO. 7019 ~~-001~~

SHIPPERS NAME ERS

SAMPLER (signature) [signature]

LOCATION

ANALYSIS WD 12-8-90 WD AATS, TU SWLO, BA

SAMPLE ID.	DATE	TIME	MATRIX	GRAB	COMP	PREV.	NO. OF CONTAINERS	Volatile Scan 8240	TPH IR	REMARKS	LAB NO.
7019-001	12/7			X		[illegible]	1	X		Method 8240	1465.01
7019-002	12/7			X		[illegible]	1		X		1465.02

RELINQUISHED BY:	DATE/TIME		RECEIVED BY:	DATE/TIME		RELINQUISHED BY:	DATE/TIME		RECEIVED BY:	DATE/TIME	
[signature]	12/8/90	11:00	[signature]	12/8/90	1100						