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Westinghouse
Environmental Engineering

Bill Robertson

6/27/89

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I hope that the delay causes no problems.

Bill Robertson

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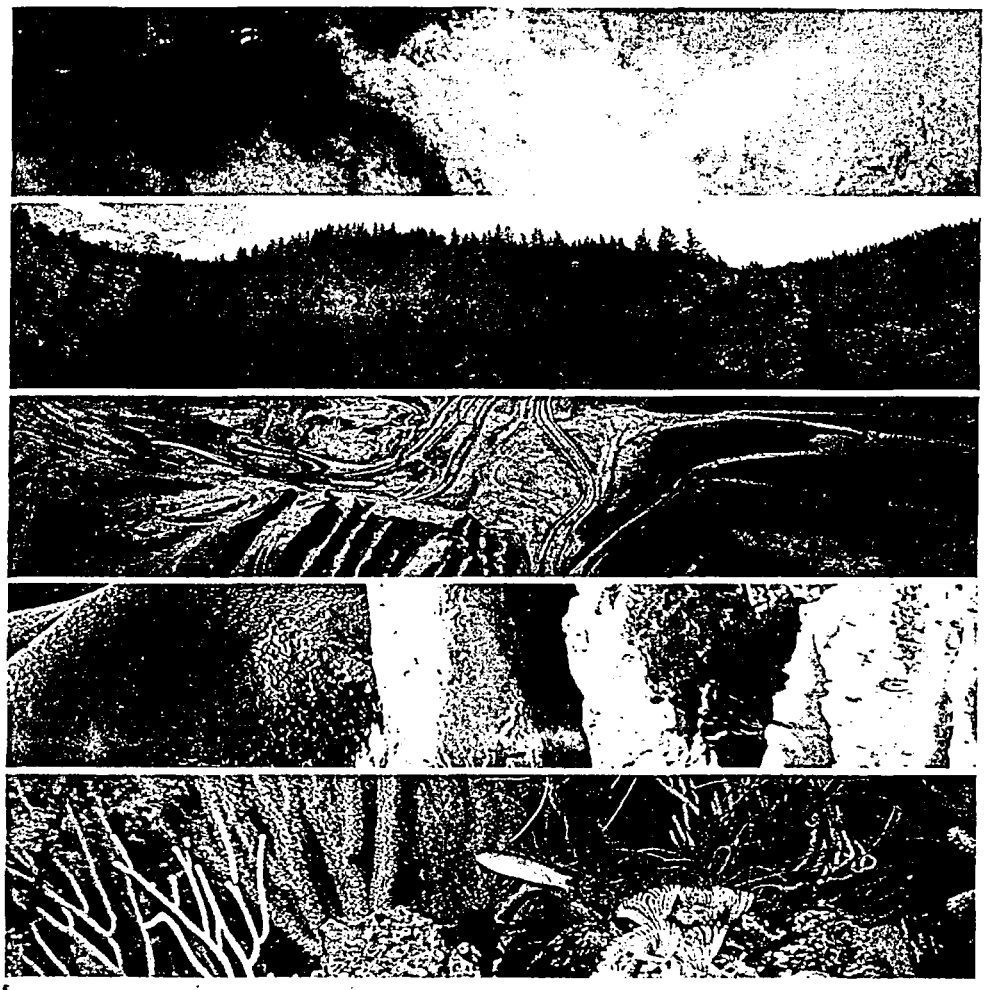

Dames & Moore

Bob Sullivan - Attorney

Springs

Springs Industries, Inc.
P. O. Box 70
Fort Mill, SC 29715
(803) 547-3650

October 12, 1988

Ms. Barbara Christian
NC Department of Natural Resources
and Community Development
P. O. Box 950
919 North Main St.
Mooresville, NC 28115

N. C. DEPT. OF NATURAL
RESOURCES AND
COMMUNITY DEVELOPMENT
OCT 1 3 1988
DIVISION OF ENVIRONMENTAL MANAGEMENT
MOORESVILLE REGIONAL OFFICE

RE: UNIGLASS INDUSTRIES, INC.
STATESVILLE, NC

Dear Ms. Christian:

Confirming our telephone conversation, Springs Industries, Inc. is reporting leaks from up to four (4) underground (diesel fuel) tanks located at the Uniglass Industries plant at Statesville, NC.

This plant was purchased by Springs from United Merchants & Manufacturers, Inc. (1407 Broadway, New York, NY 10018) on February 1, 1988. Our investigation lead us to believe that these leaks occurred while United Merchants was the owner of this facility.

Our reporting is based upon a pre-purchase audit and post-purchase preliminary investigation by Dames & Moore. As requested, a copy of Dames & Moore's report dated August 22, 1988, is attached.

Please note that the proposal section of this report (section 3.0. 4.0 and 5.0) outlines only one of a variety of sound alternatives to study and remediate the site. We have not concluded that this approach is the workplan that should be implemented at this site.

Please contact me if you need additional information.

Sincerely,

R. Nick Odom

R. Nick Odom, Jr.
Director, Environmental Services

Enclosure

cc: C. L. Abrams
C. S. Barnard

Site Investigation and Proposal for an
Expanded Site Investigation for
Springs Industries

Uniglass Industries Site
Statesville, North Carolina

Dames & Moore

7101 Wisconsin Avenue, Suite 700, Bethesda, Maryland 20814

August 22, 1988

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Appendix A Boring Logs and Well Diagrams
Appendix B Tank Testing Results
Appendix C Chemical Data
Appendix D Cost Estimates

SUMMARY

This document was prepared by Dames & Moore for Springs Industries regarding the Uniglass Industries Site in Statesville, North Carolina and reports the following:

- Preliminary site investigation findings;
- Proposal for expanded investigation;
- Tank removal cost estimates;
- Groundwater treatment cost estimates.

The preliminary site investigation included an environmental assessment of four sites at the plant. The four sites included:

- Four 30,000-gallon capacity underground storage tanks (UST's);
- One 10,000-gallon capacity UST;
- One 500-gallon capacity UST;
- Plant landfill.

The approximate locations of these sites with respect to the plant and surrounding areas is shown in Figure S-1.

Data collected from both the drilling and groundwater sampling activities conducted in the vicinity of the four 30,000-gallon UST's indicate that both soil and groundwater contamination has occurred. Analytical results of groundwater samples collected adjacent to the 10,000-gallon diesel tank indicate that this tank also leaked. Results of the pressure test on the one 500-gallon UST indicated that the tank was not leaking. The groundwater quality data from the landfill indicate that the landfill has degraded downgradient water quality.

Dames & Moore proposes a multiphase expanded investigation of the Uniglass Industries Site. The proposed investigation will include soil gas sampling, a groundwater sampling program, a soil sampling program, and aquifer tests. The proposed estimated costs of the multiphased project which will cover Dames & Moore's labor expenses, and handling fees is US$88,504.

The results of the preliminary site investigation indicate that the four 30,000-gallon UST's and the one 10,000-gallon UST has leaked in the past and may still be leaking. A preliminary estimate for the removal of the five UST's and contaminated soil is US$300,000. This estimate assumed the maximum scenario case with respect to soil contamination and takes into account proposed Federal regulations governing the removal of UST's which are due to be released in September 1988.

Total estimated capital costs for the groundwater remediation project is US$479,370 with annual operation and maintenance

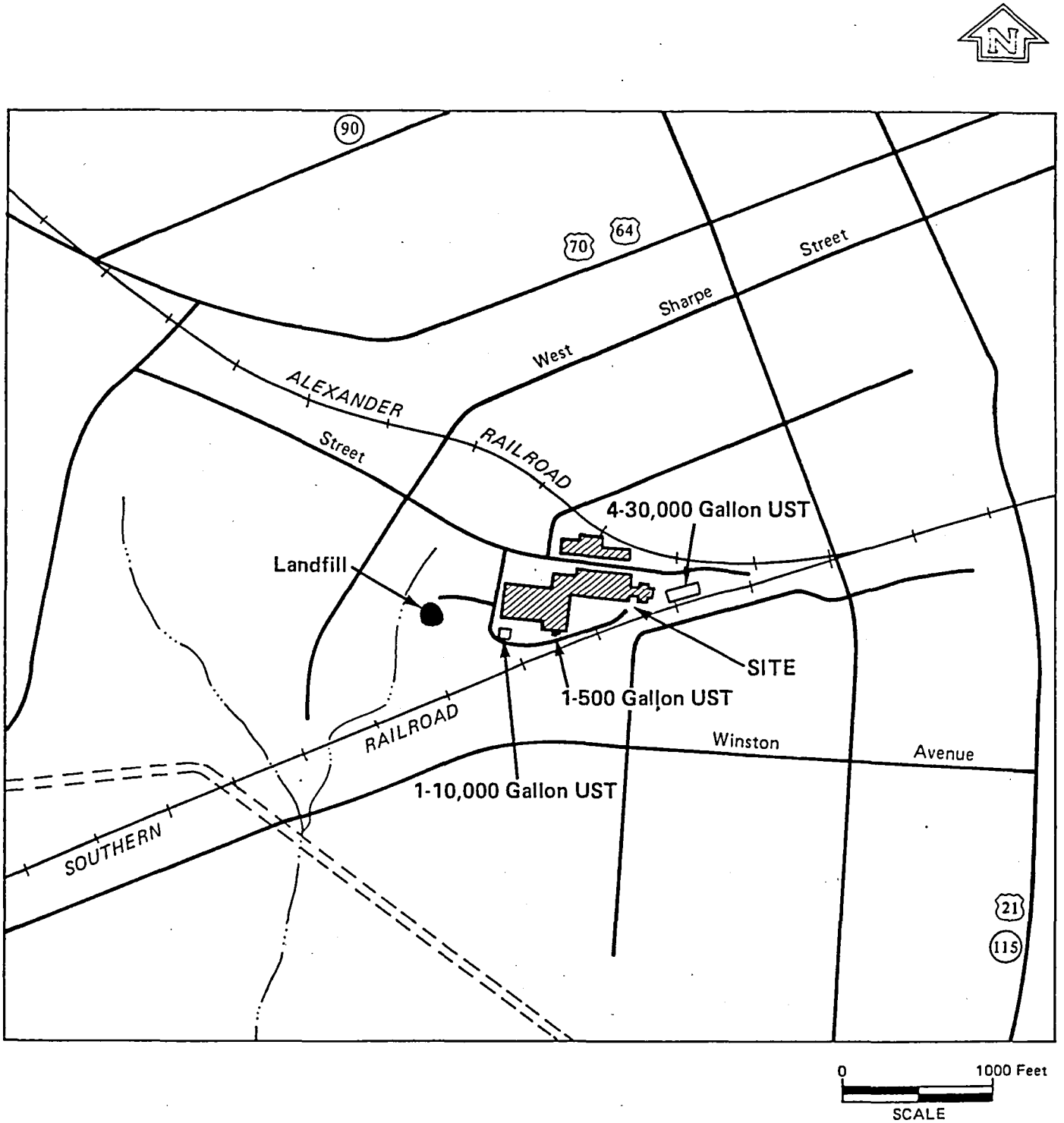


FIGURE S-1
APPROXIMATE LOCATIONS OF STUDY AREAS,
UNIGLASS INDUSTRIES PLANT,
STATESVILLE, NORTH CAROLINA, JULY 1988

costs of US$52,700. Net Present Value (NPV) costs for 5, 10, and 20 years assuming a 10% discount rate are shown below:

- NPV (5 year) - US$679,345
- NPV (10 year) - US$803,519
- NPV (20 year) - US$928,484

The cost estimates for both the tank removal and groundwater remediation are based on assumed maximum scenarios. Actual costs may vary depending upon conditions revealed by additional investigation.

1.0 INTRODUCTION

The Uniglass Industries fiberglass plant located in Statesville, North Carolina has been acquired by Springs Industries, Inc. Dames & Moore, as reported herein, has conducted a preliminary site investigation for Springs Industries. The purpose of this preliminary site investigation was to examine several sources of contaminant release to the subsurface soils and groundwater at the plant site to determine if plant operations prior to ownership by Springs Industries have resulted in contaminant release to the environment.

Our preliminary site investigation has indicated some release of contaminants to the subsurface soils and groundwater at the plant site. Consequently, a proposal for an expanded site investigation, a preliminary cost estimate for the removal of five underground storage tanks (UST's), and a preliminary estimate for groundwater treatment are included with this report.

2.0 PRELIMINARY SITE INVESTIGATION

2.1 Introduction

The potential sources of contamination investigated were determined in discussions with representatives of Springs Industries and Statesville plant personnel. These sources were considered to be the most likely origin of any contaminant release at the plant and are as follows:

1) Four UST's each of 30,000 gallon capacity

2) One UST of 10,000 gallon capacity

3) One UST of 500 gallon capacity

4) Plant landfill

One monitoring well was installed and one soil boring was drilled adjacent to the four 30,000 gallon-UST's. Two monitoring wells were installed near the 10,000 gallon-UST. The 500 gallon-UST was pressure tested. Four monitoring wells were installed around the landfill. Groundwater samples were taken from each of the monitoring wells and sent for chemical analyses. Tank notification records were also examined for compliance with state and federal regulations.

2.2 Findings

2.2.1 Drilling, Soil Sampling, and Well Installation

A total of seven 2-inch monitoring wells were installed at the site. Boring logs from the holes and well diagrams are presented in Appendix A. The Uniglass plant is located within the Piedmont Physiographic Province and underlying bedrock is composed of hornblende and mica gneisses (Stuckey and Conrad, 1958; Conrad, 1966). Soils encountered during the drilling program are derived from the physical and chemical weathering of the underlying bedrock. The soils on the site are composed primarily of silts, clays and silty sands. More clay was encountered in holes DM-1 and DM-2 located on a topographic high adjacent to the 30,000 gallon UST's. Samples recovered from each hole drilled indicated that the soil still contained original structure from the rock from which it was derived and is referred to as a saprolite. Small fragments of rock were also encountered during the drilling program.

During the drilling program soil samples were examined for visible fuel product. The sample taken from a depth of 13.5-15 feet during the drilling of hole DM-2 contained fuel product. The presence of the fuel product is interpreted to indicate that at least one of the 30,000 gallon UST's had leaked. Fuel product was also visible in the groundwater sample taken from well DM-1.

No visible product was observed in samples taken from holes DM-3 and DM-4 located adjacent to the 10,000 gallon UST. Discussions with plant personnel indicated that approximately seven years earlier the tank was filled with water to "float" an unknown amount (reported as approximately 400 gallons) of diesel fuel. Although the tank is no longer in service, a measurement of the amount of fluid remaining in the tank was made by Branum, Inc. of Paw Creek, North Carolina by inserting a measuring rod coated with paste which reacts (by color change) to water. The tank was measured to be 8 feet (96 inches) in diameter and contained 15.5 inches of water and 9 inches of fuel floating on top of the water. These measurements indicate that approximately 71.5 inches of fluid has presumably leaked as the tank is not in service. Plant personnel stated that the tank was once uplifted from the ground by buoyant forces during a period of heavy rain and that plant personnel forced it back underground. This action reportedly rotated the tank and changed the tank's orientation.

No visible fuel products were identified in samples recovered from holes drilled at the landfill.

2.2.2 Tank Testing

Branum, Inc. conducted a pressure test to determine the integrity of one in-service 500 gallon UST used to contain gasoline. The Petro-tite test method was used, and results from the test are presented in Appendix B. The test indicated that tank is not leaking.

2.2.3 Groundwater Sampling and Testing

Dames & Moore collected groundwater samples from the seven monitoring wells installed at the site. Samples were collected after a minimum of three well volumes were purged from each well. Samples were collected using dedicated bailers. These samples were sent to Radian Corporation for chemical analysis. Samples taken from the wells adjacent to the UST's were analyzed for purgeable aromatic hydrocarbons including xylene (EPA method 602). Samples taken from the landfill wells were analyzed for Volatile Organic Compounds (EPA method 624), Base, Neutral/Acid-Extractables (EPA method 625), Metals (EPA method 200.7), Ammonia (EPA method 350.2), Arsenic (EPA method 206.2) and Total Phenolics (EPA method 420.2). Records from the sampling effort and analytical data are presented in Appendix C.

During the groundwater sampling a strong fuel odor was noted in well DM-1 and a small amount of free product was observed in the sample taken from the well.

The analytical chemical data are presented in Appendix C. Table 2-1 presents a list of chemicals identified in the ground water samples. Ethylbenzene (17 ug/l), m-xylene (26 ug/l) and

Table 2-1

Summary of Chemicals Identified in Groundwater Samples at Uniglass Industries

Well No.	Parameter	Concentration (ug/l)
DM-1	Ethylbenzene	17
	m-xylene	26
	o-xylene	16
DM-3	Toluene	1.1
	Ethylbenzene	0.56
DM-4	Toluene	1.8
	m-xylene	4.1
DM-5	Toluene	8
	bis (2-ethylhexyl) phthalate	14
	Phenols	223.42
	Zinc	86
	Beryllium	2
DM-6	bis (2-ethylhexyl) phthalate	4
	Phenols	497.72
	Zinc	52
	Beryllium	2
	Cadmium	4
	Copper	10
	Nickel	20
	Ammonia, as Nitrogen	30
DM-7	bis (2-ethylhexyl) phthalate	6
	Phenols	153.85
	Zinc	230
	Beryllium	5
	Cadmium	6
	Chromium	15
	Copper	20
	Ammonia, as Nitrogen	50
DM-8	n-nitrosodiphenylamine	3
	Phenols	164.41
	Zinc	210
	Beryllium	9
	Cadmium	8
	Chromium	14
	Copper	10
	Ammonia, as Nitrogen	30
Method blank	n-nitrosodiphenylamine	2

o-xylene (16 ug/l) were identified in the groundwater sample taken from well DM-1 adjacent to the four 30,000-gallon UST's. Toluene was identified in samples DM-3 (1.1 ug/l) and DM-4 (1.8 ug/l) located adjacent to the 10,000-gallon UST. Ethylbenzene was identified in well DM-3 (0.56 ug/l) and m-xylene was identified in well DM-4 (4.1 ug/l).

Three priority pollutant organics were detected in groundwater samples at the landfill. Toluene, identified in well DM-5 at a concentration of 8 ug/l, was the only volatile organic compound identified at the landfill. Bis (2-ethylhexyl) phthalate, identified in DM-5, DM-6 and DM-7, is a common laboratory artifact and n-nitrosodiphenylamine, identified in well DM-8 (3 ug/l), is assumed to be a laboratory artifact as it was also detected in the method blank (2 ug/l).

Chemical data from samples taken from the wells surrounding the landfill indicate an increase in both the number of metals and the concentration of metals detected in the downgradient wells (DM-6, DM-7 and DM-8) as compared to the up gradient well DM-5. Zinc and beryllium were identified in well DM-5 at concentrations of 86 and 2 ug/l respectively. In the downgradient wells zinc and beryllium as well as cadmium, chromium, copper and nickel were identified. Cadmium was detected in wells DM-6 (4 ug/l), DM-7 (6 ug/l) and DM-8 (5 ug/l). Chromium was detected in wells DM-7 and DM-8 at concentrations of 15 ug/l and 14 ug/l respectively. Copper was found in all three downgradient wells at concentrations of 10 ug/l (DM-6), 20 Ug/l (DM-7) and 10 ug/l (DM-8). Nickel was identified in well DM-6 at a concentration of 20 ug/l.

Phenols were identified in all the wells surrounding the landfill. The highest concentration was in downgradient well DM-6 at a concentration of 497.72 ug/l. Downgradient wells DM-7 and DM-8 had concentrations of 153.85 ug/l and 164.41 ug/l, and upgradient well DM-5 had a concentration of 223.42 ug/l.

Ammonia was not identified in well DM-5; however it was detected in all downgradient wells: DM-6 (30 ug/l), DM-7 (50 ug/l), and DM-8 (30 ug/l).

2.2.4 Tank Notification

Federal law (Section 9002 of the Resource Conservation and Recovery Act (RCRA)) requires that notification be made to the North Carolina Division of Environmental Management/Groundwater Section of all underground storage tanks that have been used to store regulated substances since January 1, 1974. Copies of notification records provided by Springs Industries indicate that notification of the status of six UST's was made to the state by Uniglass Industries on April 24, 1986 approximately two weeks prior to the notification deadline date of May 8, 1986. State personnel confirmed the notification statement which stated that the status of the four 30,000-gallon diesel tanks as being

temporarily out of service and two No. 5 fuel oil UST's that were reportedly in-service.

No record of notification for the one 10,000-gallon diesel fuel tank or the 500-gallon in-service gasoline tank was provided to Dames & Moore. Nor was there a record of notification of a separate out-of-service 500-gallon UST which was reported by plant personnel to be beneath the finishing building. State personnel did not receive notification of the three above mentioned UST's. These three UST's do not appear to be exempted from the notification requirement since they both are buried underground, are assumed to have contained regulated substances since January 1, 1974 and do not meet the exclusion specifications as detailed in Section 9002 of the RCRA.

2.3 Contamination Assessment

2.3.1 Underground Storage Tanks

Data collected from both the drilling and groundwater sampling activities conducted around the four 30,000-gallon UST's indicate that both soil and groundwater contamination has occurred. The recovery of a soil sample from hole DM-2 that had a noticeable hydrocarbon odor and visible oil indicates that some leakage has occurred from the tanks. The groundwater sample taken and analyzed from well DM-1 had free floating fuel product on its surface at the time of sampling and indicates that the contamination has reached the water table.

Analytical results of groundwater samples collected adjacent to the 10,000-gallon diesel fuel tank support the reports that this tank leaks. The two wells adjacent to the tanks were intended to confirm or deny the release of fuel-related compounds. Since they have confirmed the release, an expanded investigation will be necessary to better evaluate the release of fuel product from this tank.

2.3.2 Landfill

The groundwater quality data from the landfill indicate that the landfill has degraded downgradient water quality. While none of the detected analytes exceeded drinking water standards, the potential discharge of contaminants to nearby surface water should be investigated as a conservative measure.

The preliminary investigation has confirmed the existence of contamination, but the extent and amount of groundwater and soil contamination is unknown. Other data gaps which should be addressed include the identification of background contaminant concentrations and the potential for contaminant migration off-site.

2.4 Recommendations

Since the leakage of UST's has been confirmed, it is required by state legislation that the Morrisville Office of the North Carolina Department of Natural Resources and Community Development be informed of the current status of the tanks and the current actions being taken to remediate the problem. Once a leaking tank has been identified, the state typically requires a program be designed to identify the vertical and horizontal extent of the contamination and following a review of the findings, will issue remediation requirements.

The three UST's that did not have a record of notification are in violation of Section 9002 of the RCRA and notification should be submitted to the Division of Environmental Management/GW Section which is a section of the North Carolina Department of Natural Resources and Community Development in Raleigh, North Carolina. Failure to comply with this Federal law subjects the site owner to a fine of up to $10,000 per unreported tank (X3 = $30,000).

If significant levels of contamination are found surrounding the UST's, it is recommended that the UST's and surrounding contaminated soil be removed and properly disposed.

Should significant levels of groundwater contamination be identified at the site, a groundwater remediation program should be undertaken.

As a conservative measure, it is recommended that surface water samples be collected from the stream adjacent to the landfill and analyzed to identify the potential for contaminants to be impacting the offsite environment.

3.0 PROPOSED EXPANDED INVESTIGATION

3.1 Introduction

This proposal addresses the activities to be conducted to assess more fully the extent of contamination identified during the preliminary site investigation conducted at the Uniglass Industries plant in Statesville, North Carolina. This proposal outlines a multiphased project initiated by a soil gas sampling program followed by the installation of a monitoring well system. A groundwater and soil sampling program is proposed to quantify the level and extent of contamination present at the site. Aquifer tests are also proposed to estimate the rate of contamination migration at the site and to aid in the design of remediation alternatives that may be deemed necessary.
Dames & Moore proposes to complete the expanded investigation in accordance with Dames & Moore's Standard Schedule of Charges and General Conditions. Our estimate of project costs is $US88,504, as detailed in the tables found in Appendix D. These costs cover Dames & Moore's labor, expenses, and handling fees.

3.2 Field Investigation

3.2.1 Soil Gas Sampling

A soil gas sampling plan is proposed as a cost effective method of preliminarily assessing the areal extent of contamination. The collection of approximately 30 soil gas samples will enable an evaluation of the extent of groundwater contamination at the site and will help to determine the location and/or need for the installation of monitoring wells. Soil gas sampling will occur in areas of known or suspected chemical releases and in areas where there is potential for contaminant migration.

Soil gas samples will be collected on a nominal 15-20 foot grid surrounding the UST's and will be skewed according to the assumed direction of groundwater flow. Figure 3-1 depicts the approximate locations of the soil gas sampling locations. Twenty sampling points will be collected around the 4-30,000 gallon UST's and 15 sample points will be collected around the 1-10,000 gallon UST.

Soil gas samples will be taken by driving a sampling probe 2 to 5 feet into the ground and evacuating soil gas with a vacuum pump. Samples may be obtained through asphalt or concrete as a small diameter hole is drilled through the pavement prior to the insertion of the probe. The collected samples shall be sent for chemical analysis (benzene, toluene, xylenes and total petroleum hydrocarbons) and the analytical results plotted on a base map. Prior to sample collection, sample locations shall be cleared for underground utilities and sample locations modified as necessary.

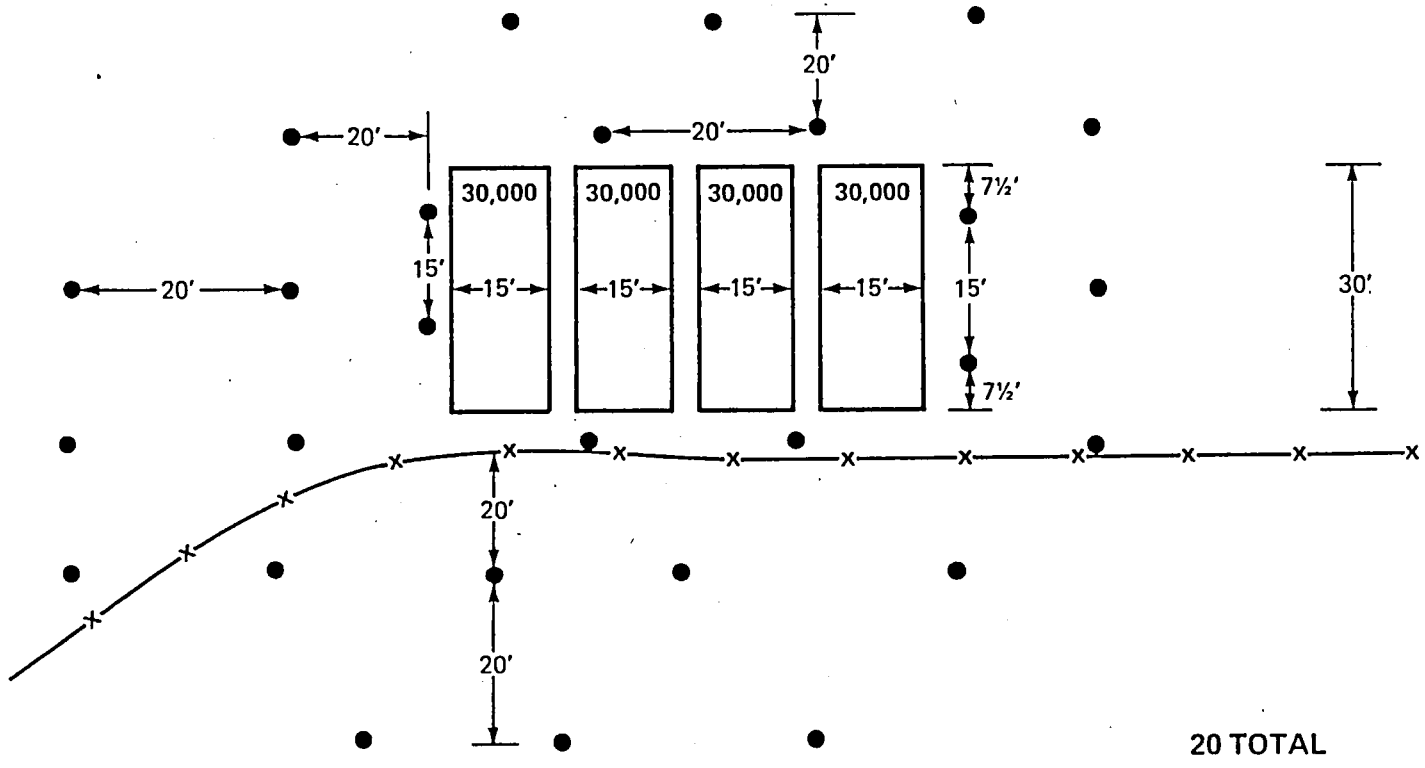


FIGURE 3-1A
PROPOSED SOIL GAS SAMPLING LOCATIONS

SKETCH OF SITE, NOT TO SCALE

Dames & Moore

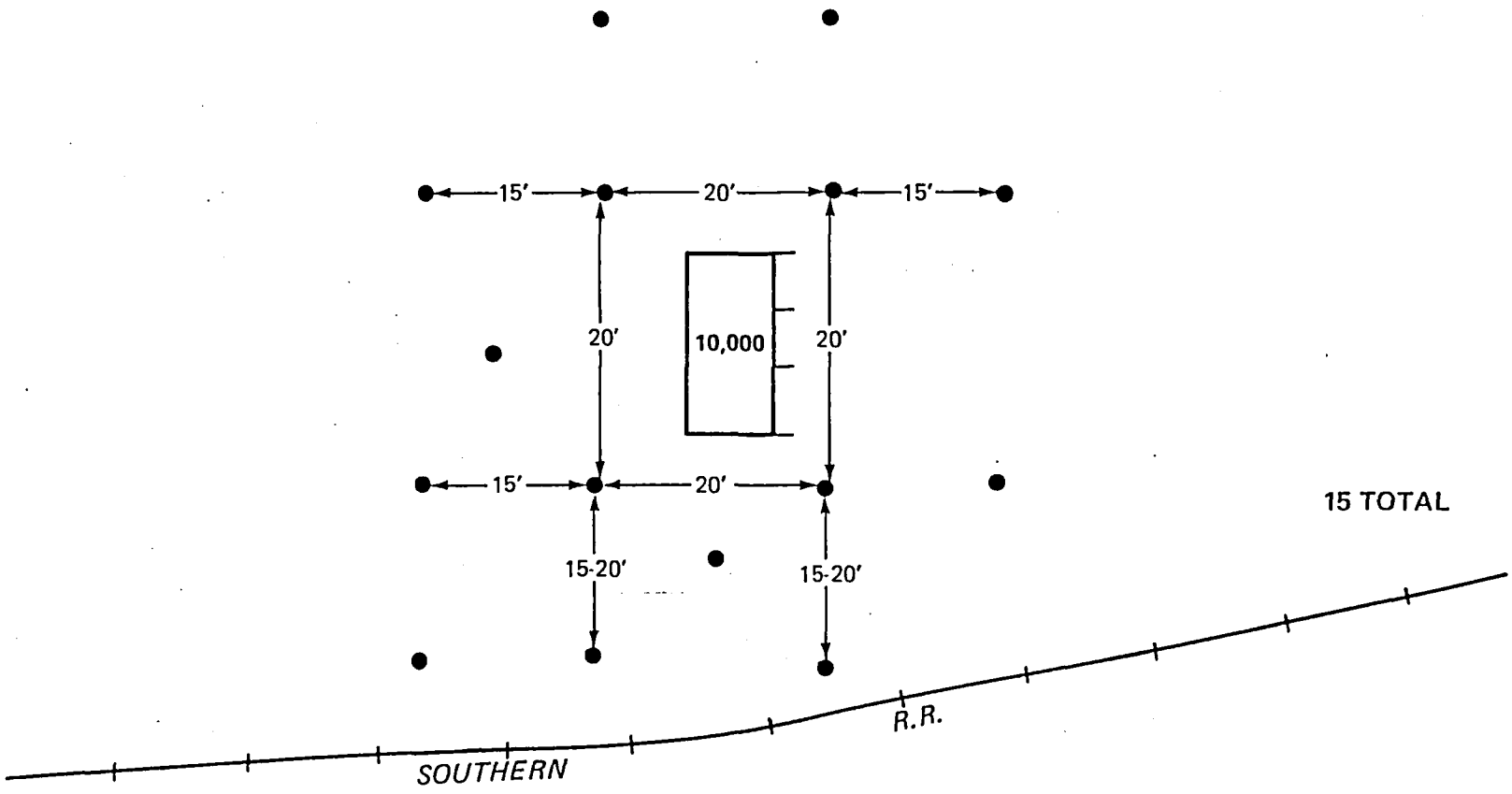


FIGURE 3-1B
PROPOSED SOIL GAS SAMPLING LOCATIONS

SKETCH OF SITE, NOT TO SCALE

Dames & Moore

Following the completion of the soil gas sampling and analysis, the data will be reviewed and interpretations of the extent and level of contamination migration will be completed.

3.2.2 Monitoring Well Installation

Following the completion and evaluation of the soil gas sampling program, it is assumed that up to five monitoring wells (the actual number of well may vary depending upon the soil gas results) be installed around the 4-30,000 gallon UST's and four monitoring wells be installed around the 1-10,000 gallon UST in order to determine the extent of groundwater contamination. Assumed monitoring well locations are presented in Figure 3-2 and are placed to collect samples representative of background and downgradient groundwater conditions. Locations may be altered following a review of the soil gas sampling program. If the soil gas survey does not indicate significant contaminant migration the number of downgradient wells may be reduced.

The proposed drilling and well installation activities will be observed by an experienced Dames & Moore geologist. The proposed monitoring wells will be constructed of Schedule 40 PVC with threaded couplings. The PVC screen will be approximately 10 feet in length with a slot size of 10 (0.010 inches). The screen section will be packed with sand to approximately one foot above the screen and a one foot thick bentonite seal composed of commercially available bentonite pellets will be placed above the sand pack. The remaining annulus will be cement grouted. All wells installed in areas of vehicle traffic will be completed with locked, water tight, flush mounted protective covers. Monitor wells located in non-traffic areas will be protected by a steel protective casing with a locking cap.

The well screens will be placed at a depth to intersect the water table where the highest constituent concentrations are anticipated as hydrocarbons "float" on the water table. The anticipated well depths are presented in Table 3-1.

Table 3-1

Well Number	Anticipated depth
DM-9	40 feet
DM-10	40 feet
DM-11	40 feet
DM-12	30 feet
DM-13	20 feet
DM-14	20 feet
DM-15	20 feet
DM-16	20 feet
DM-17	20 feet

The monitoring wells will be drilled with a 4 1/2-inch ID hollow stem auger. Split spoon samples will be collected using

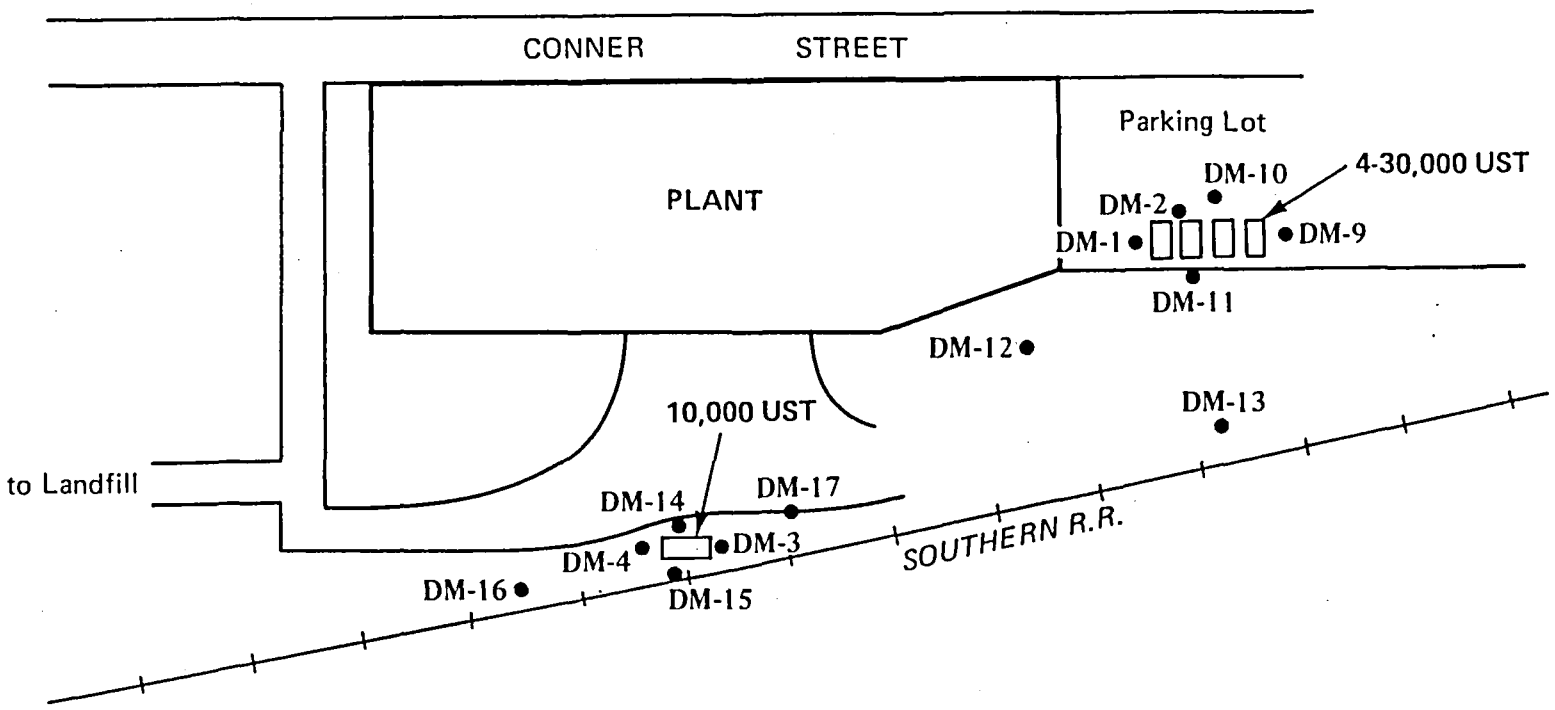


FIGURE 3-2
PROPOSED MONITORING WELL LOCATIONS

SKETCH OF SITE, NOT TO SCALE

Dames & Moore

the Standard Penetration Test (ASTM D-1586) continuously from the 0-10 foot interval and at 5 foot intervals at deeper depths. The Dames & Moore geologist will maintain a continuous detailed subsurface log by examining the samples and will maintain a daily field log to include such information as the progress of drilling operations, problems encountered, well installation procedures, etc.

The drill rig and all downhole sampling equipment will be decontaminated before the drilling of each well. The drill rig and equipment will by decontaminated by steam cleaning at a steam temperature of 220°F and pressure of 1,000 pounds per square inch. The steam cleaning site present at the Uniglass Industries plant site is the recommended location of the decontamination procedure.

All monitoring wells will be developed to assure a good hydraulic connection with the aquifer. The well will be bailed until discharging water is clear or a minimum 5 well volumes have been removed. Due to the silt and clay composition of the water bearing unit, it is anticipated that the water may remain cloudy as fine grained materials will pass through the sand pack and into the well when water is removed from the well.

3.2.3 Sampling

To quantify the soil and groundwater contaminants present on the site, it is proposed that 9 soil samples and 12 groundwater samples be collected and sent for chemical analysis. One soil sample from each monitoring well installed will be sent for analysis. Sample selection will be made by the Dames & Moore geologist who will select the sample from each bore hole that is anticipated to contain the highest concentrations of contaminants. Each sample removed from each bore hole will be scanned with a photoionization meter (HNu) and visually examined for potential contaminants, placed in an air tight jar and cooled to 4°C. Following the completion of each borehole the geologist will determine the sample to be sent for analysis. Samples will be analyzed for volatile aromatic organics (EPA method 8020) and for polynuclear aromatic hydrocarbons (EPA method 8100).

Following the installation and development of the monitoring wells groundwater samples will be collected from the 9 new wells and from three existing wells (DM-1, DM-3 and DM-4). Samples will be analyzed for volatile aromatic hydrocarbons including xylene (EPA method 602) and polynuclear aromatic hydrocarbons (EPA method 610).

For quality assurance and quality control purposes, it is proposed that one method blank, one duplicate sample and one trip blank be submitted as part of the groundwater sampling program. Including these samples the total number of water samples will be 15.

The groundwater samples will be collected by an experienced Dames & Moore geologist who will be assisted by an experienced field technician. Sample collection will follow Dames & Moore standard operating procedures for sample collection which includes the purging of a minimum of 3 well volumes prior to sampling, the recording of each sample's temperature, pH and conductivity at the time of sampling, maintaining a field journal to record readings and observations, preserving and cooling the samples to 4°C immediately after sampling and the overnight shipment of samples to the laboratory for analysis.

To identify potential degradation of the nearby surface water from migration of contaminants from the landfill, it is proposed that three surface water samples be taken from the stream flowing adjacent to the landfill. These samples will be collected by an experienced Dames & Moore geologist and analyzed for Priority Pollutant Metals EPA method 200.7), Total Phenolics (EPA method 420.2) Ammonia as Nitrate (EPA method 350.1) and Hardness (SM 314A).

3.2.4 Aquifer Tests

Hydrologic properties of the soil zone will be determined through the performance of aquifer tests in four monitoring wells. A slug test is the recommended method for the determination of hydraulic conductivity of the water bearing unit.
The slug test will consist of adding or removing water from a well and observing the change in water level with time as the water level returns to its static level.

Dames & Moore uses the following procedure to conduct a slug tests:

- Take an initial water level
- Connect a pressure transducer to a Metrosonic dl-701 data logger and place the transducer in the well below the anticipated water table drawdown depth.
- Record the initial water depth on the data logger
- Turn on the data logger to record changes in head
- Remove or add 3 to 10 feet of water from the well to create a hydraulic head change.
- Record water level recovery until the water level reaches 98 percent of the initial static water level
- Remove the pressure transducer from the well and download data from the data logger to a computer diskette

Data recorded on the data logger are recorded as feet of water above the pressure transducer and are reduced to changes in potentiometric head (in feet), relative to the initial water level as measured from the top of casing, and are recorded with their respective changes in time. The changes in head during the slug test are divided by the maximum change in head during this time and a semilogarithmic plot of the data is constructed. Two

points from the best straight lines segment of the plot are used in the following equation to determine hydraulic conductivity:

$$K = R^2 \ln(L/R) \ln(H_1/H_2) \;/\; 2L(t_2 - t^1)$$

for $L/R < 8$

where:	K	=	hydraulic conductivity (cm/sec)
	R	=	inside radius of well casing (cm)
	L	=	length of well screen (cm)
	t_1, t_2	=	elapsed time (sec)
	H_1, H_2	=	(H_2/H_1) at t_1 and t_2, respectively

4.0 TANK REMOVAL COST ESTIMATE

As evidence indicates that the 4-30,000 UST's and the 1-10,000 UST have leaked in the past and may still be leaking, a proposal documenting the costs of removing the 5 tanks is outlined. The cost of the tank removal is based upon an assumed maximum scenario case. The most significant assumption is that the soil contamination has spread 15 feet in all directions from the tanks and that the soil would have to be removed from the site upon removal. Another alternative would be to spread the contaminated soil on site and allowing any volatile organic compounds present to volatilize prior to either spreading the soil on site or removing it to a municipal landfill as a non-hazardous substance.

Federal regulations governing the removal of UST's are due to be released in early September, 1988. Dames & Moore's cost proposal for the UST removal is based on procedures and clean up levels expected to be included within the Federal regulations. Typical UST removal procedures include the removal and proper disposal of fluid and any sludge or solid material from the tank, aeration, removal of the tank and continued aeration prior to cleaning and disposal, the removal of the fill material surrounding the tank and the removal of approximately two feet of native soil. Following the removal of the native soil, soil samples are taken from beneath the UST's and analyzed for total petroleum hydrocarbons (TPHC's) as well as the type of fuel product stored in the tank. Generally, one soil sample is recommended for every 20 feet of UST length. The Federal clean up criterion is expected to be 100 ppm TPHC. Following confirmation from the laboratory of TPHC level less than 100 ppm, clean fill material is placed into the removal site and tamped to provide a stable ground surface.

The estimated cost of the removal of the UST's and contaminated soil including Dames & Moore charges is on the order of $US300,000.

5.0 GROUNDWATER TREATMENT COST ESTIMATE

Dames & Moore has prepared a cost estimate for a groundwater remediation program (Appendix D). It should be noted that a lack of site specific data have required numerous assumptions regarding the design and implementation of the treatment system and are based upon a best engineering judgement of the site and Dames & Moore's familiarity with similar remediation programs. The cost estimate may be considered an order of magnitude estimate as system design may be altered as data on site characteristics and conditions is gathered. This estimate is to be used for planning purposes only.

The groundwater remediation system design involves a groundwater pumping system, a product recovery system and a groundwater treatment system. The groundwater pumping system includes seven recovery wells that are continuously pumped over a long or indefinite period of time (Figure 5-1). The pumping system is designed to prevent the migration of waste constituents from the site by altering the immediate groundwater gradient and creating a cone of depression within which groundwater flow is toward the well. The pumping system also removes groundwater for treatment promoting aquifer restoration. It is suggested that the treated water be discharged to surface water as injection of groundwater is not permitted in North Carolina. The construction of an infiltration gallery on the plant site is not feasible due to the limited area available; and the Statesville waste water treatment facility will not accept waste water with trace hydrocarbon constituents due to the biological treatment process used at the treatment facility. Discharge to surface water will require a National Pollution Discharge Elimination System (NPDES) permit.

The groundwater treatment system involves two physical treatment technologies for the direct treatment of contaminated waste streams using differences in physical properties to separate components of a mixture. Differences in molecular size, solubility, concentration, density, and volatility between compounds allow the use of physical separation technologies for treatment. A two step treatment process was designed involving activated carbon treatment and air/steam stripping.

The process of adsorption onto activated carbon involves contacting a waste stream with the activated carbon, usually by flow through a series of packed beds. It is especially well suited to the removal of mixed organics from aqueous wastes; compounds that are polar and hydrophobic (insoluble) are most readily adsorbed. Carbon adsorption follow air stripping (aqueous or vapor streams) to remove residual organics. The adsorption step is usually used as a secondary unit process to minimize carbon usage and/or regeneration costs.

The air stripping process involves aerating the aqueous waste to remove VOC's. Usually a packed bed or tower configura-

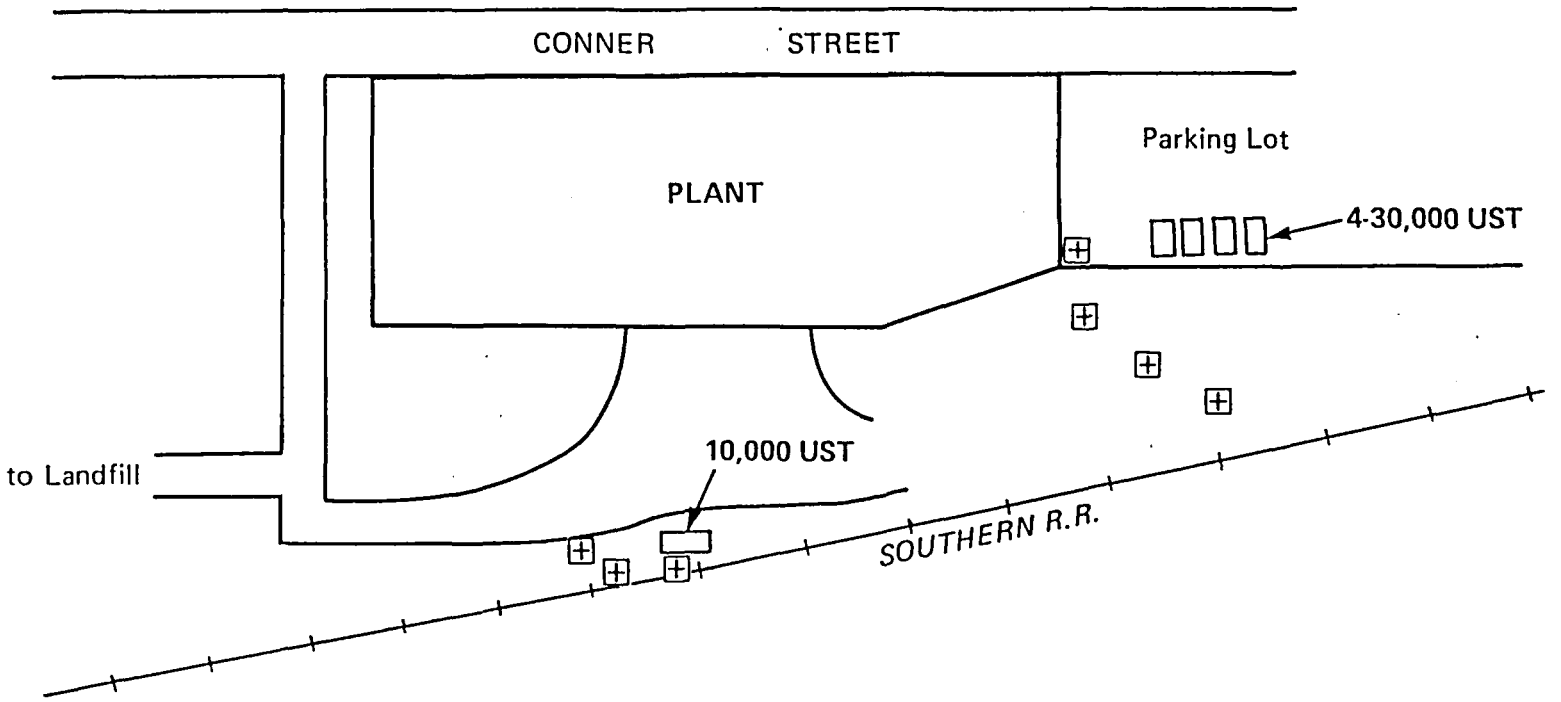


FIGURE 5-1
POTENTIAL RECOVERY WELL LOCATIONS

SKETCH OF SITE, NOT TO SCALE

Dames & Moore

tion is used, where the waste stream is trickled down from the top while air or steam is forced upward through the packing. Air stripping removes only volatiles and must be combined with some other technology to remove non-VOC's. This process has the potential to emit stripped organics to the atmosphere and may require some type of air pollution control (such as a vapor phase carbon filter). Air can be replaced by steam to enhance volatilization of compounds that are more refractory. Pilot plant or bench scale tests maybe needed to determine the actual physical properties of the mixed organic stream. These tests would also be used to determine if sufficient VOC's would be released to the atmosphere to require pollution control measures.

The broad based assumptions made in deriving the cost estimate for the pump and treatment system are as follows:

- The transmissivity of the groundwater bearing unit of the site is high enough to enable an adequate cone of depression to create a groundwater barrier to trap hydrocarbon migration
- The number of interceptor (extraction) wells is sufficient to capture the entire contamination plume
- Groundwater contamination has not spread off-site
- Free product recovery is a cost effective, feasible option
- On-site groundwater treatment is required
- Groundwater contaminants will be effectively treated by volatilization and carbon adsorption
- Treated effluent must be pumped off-site
- Air pollution control measures will not be needed
- Discharge effluent will meet state regulations

Estimations relating to the prediction of the extent of the cone of depression were determined by assuming a hydraulic conductivity of 10^{-4} cm/sec and estimating the area of influence of the cone of depression at various pumping rates. It was also determined that the drawdown in the pumping well should not exceed 30 feet. These predictions were estimated by using a groundwater flow model designed by W.C. Walton to simulate drawdowns in 1-layer aquifers assuming uniform properties derived from the Thesis analytical model (1935). The model does not account for horizontal flow to the pumping well and thus actual drawdown values may be less. Results of the model are presented in Table 5-1.

TABLE 5-1

Project Title: Uniglass Industries
*** Summary of input data ***

T = Aquifer Transmissivity (GPD/FT) = 55
S = Aquifer Storativity (DIM) = .2
C = NO. OF COLUMNS= 10
R = NO. OF ROWS= 10
G = GRID SPACING (FT)= 10
W = NO. OF WELLS= 1
Well no. = 1
L = XWELL (FT)= 55
L = YWELL (FT)= 55
L = WELL DISCHARGE (GPM)= 3
L = TIME(DAY)= 0
L = WELL DISCHARGE (GPM)= 3
L = TIME SINCE PUMPING BEGAN (DAYS) = 30

DRAWDOWNS AT OBSERVATION WELLS (FT):

0.76	1.08	1.46	1.85	2.18	2.38	2.38	2.18	1.85	1.46
1.08	1.58	2.18	2.84	3.42	3.78	3.78	3.42	2.84	2.18
1.46	2.18	3.11	4.19	5.24	5.93	5.93	5.24	4.19	3.11
1.85	2.84	4.19	5.93	7.83	9.25	9.25	7.83	5.93	4.19
2.18	3.42	5.24	7.83	11.28	14.68	14.68	11.28	7.83	5.24
2.38	3.78	5.93	9.25	14.68	24.47	24.47	14.68	9.25	5.93
2.38	3.78	5.93	9.25	14.68	24.47	24.47	14.68	9.25	5.93
2.18	3.42	5.24	7.83	11.28	14.68	14.68	11.28	7.83	5.24
1.85	2.84	4.19	5.93	7.83	9.25	9.25	7.83	5.93	4.19
1.46	2.18	3.11	4.19	5.24	5.93	5.93	5.24	4.19	3.11

6.0 CONCLUSION

This report has been prepared for the exclusive use of Trow, Dames & Moore and Springs Industries. This study has been completed in accordance with generally accepted standards in the environmental assessment profession. No other warranty expressed or implied is made.

The report is based on information made available to Dames & Moore by Springs Industries, Branum, Inc., Radian Corporation, state agencies and drilling information collected by Dames & Moore during the drilling and installation of monitoring wells by Subsurface Investigations, Inc. at the Uniglass Industries site.

In view of the rapidly changing legislation and technologies in the hazardous waste industry, it is important that an updating revision of this report be prepared if the report is to be used as the basis for major decisions more than six months from the date of the report.

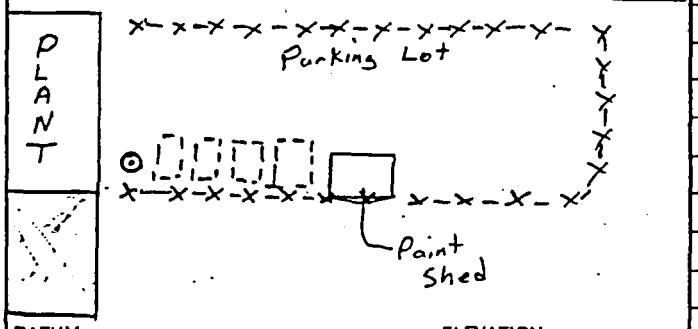
Since this report is directed specifically toward the situation and needs of Springs Industries, its utility or applicability for other companies would be minimal. As your consultant, we will not make this report, or parts thereof, available to others without your prior consent. Similarly, we request that you do not make the report or its contents available to others without our knowledge and consent (other than to United Merchants & Manufacturers, Inc., the previous owner of the Uniglass-Statesville, North Carolina plant).

APPENDIX A

Boring Logs and Well Diagrams

LOCATION OF BORING

N — Conner St.



JOB NO.	CLIENT	LOCATION
14631-013	Springs	Statesville, NC

DRILLING METHOD: ~~4¼~~ 2" I.D HSA

BORING NO. D+M-1

SHEET 1 OF 2

SAMPLING METHOD: SS; Standard Penetration Test (140 lb Hammer)

					DRILLING START	DRILLING FINISH
WATER LEVEL						
TIME					TIME 9:30	TIME 11:30
DATE					DATE 7-14-88	DATE 7-14-88
CASING DEPTH						

DATUM ELEVATION

SURFACE CONDITIONS: Gently sloping area in a paved parking lot

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH		
SS	18/9		1/0-1.5	2 2 4	(4)	0	SM	Yellowish-Red Silty Sand, little silty clay, micaceous	moist
						1			
SS	18/9		2/1.5-3.0	4 2 2	(4)	2		Yellowish-Red Silty Sand	
						3		Grading w/ Brownish yellow mottling & trace gravel	
SS	14/12		3/3-4.5	1 2 2	(4)	4			
SS	18/15		4/4.5-6	2 2 2	(4)	5		-Grading to	
						6	ML	Yellowish-Red Clayey Silt	moist
SS	18/16		5/6-7.5	2 4 5	(9)	7			
SS	18/16		6/7.5-9	2 2 4	(6)	8	CL	Yellowish-Red Silty Clay	moist
						9			
SS	18/16		7/9-10.5	3 6 6	(2)	10			
						1			
						2			
						3			
SS	18/18		8/13.5-15	4 8 8	(14)	4		Greenish-Gray Silty clay, trace fine to med sand	moist
						15			
						6			
						7			
						18	ML	-Grading to Brownish-yellow & Light Brown Mottled Clayey Silt	Moist
SS	18/18		9/18.5-20	3 5 5	(10)	9			
						20			

Investigations

DATE 7-14-88 CHK'D BY

628.1 (3) (REV. 11-80)

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LOCATION OF BORING	JOB NO.	CLIENT	LOCATION
See p #1	14631-013	Springs	Statesville NC

DRILLING METHOD: ~~4¼~~" ID HSA 2"	BORING NO. D+M-1
	SHEET 2 OF 2
SAMPLING METHOD: Split Spoon 140 lb Hammer	DRILLING

					START	FINISH
WATER LEVEL					TIME	TIME
TIME					930	1130
DATE					DATE	DATE
CASING DEPTH					7-14-88	7-14-88

DATUM ELEVATION

SURFACE CONDITIONS:

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	
						20		
						1		
						2		
						3	SM	
SS	18/18		10/23.5-25	4 7 8 (15)		4		Brownish yellow and yellowish-Red Silty Sand, little mica, MOIST
						25		
						6		
						7		
						8		
SS	18/18		11	5 5 6 (11)		9		Brown and Brownish-yellow Silty Sand visible weathered minerals - foliated MOIST SAPROLITE
						30		
						1		
						2	SM/SP	- Hit Groundwater @ 32.5'
SS	18/18		12/33-34.5	6 8 13 (21)		33		Brown + yellowish Red Silty Sand, WET
						4	SM	- Grading to MOIST, visible minerals Highly weathered
						5		
						6		
						7		
						38		
SS	18/18		13/38-39	5 9 9 (18)		9		Brownish-Gray Silty Sand, some mica orange iron stain running down center Moist to DRY
						40	BOH	

DATE 7-14-88 CHK'D BY

628.1 (3) (REV. 11-80)

LOCATION OF BORING	JOB NO.	CLIENT	LOCATION
1N Conner St	14631-013	Springs	Statesville NC

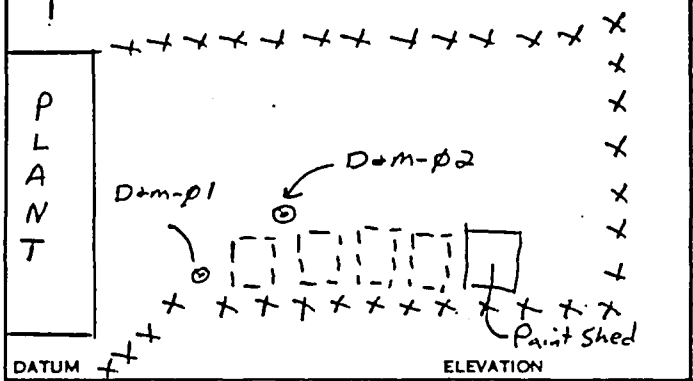
DRILLING METHOD: ~~4¼~~ " ID HSA 2"

SAMPLING METHOD: SS, SPT

BORING NO. D+m-p2

SHEET 1 OF 1

					DRILLING START TIME	DRILLING FINISH TIME
WATER LEVEL						
TIME					1500	1600
DATE					7-14-88	7-14-88
CASING DEPTH						



SURFACE CONDITIONS:

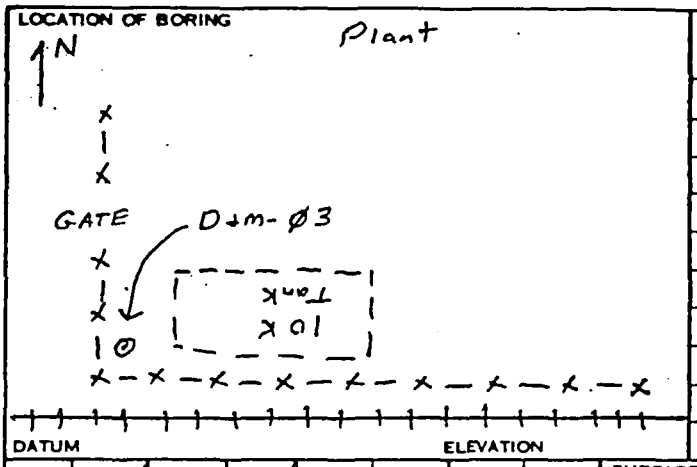
SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH		
SS	18/18		1 / 0-1.5	3 3 3 (8)		0	SP	Yellowish Red Sand, ~~trace mica~~ fine to med grained, trace mica trace gravel	MOIST Fill Material
						1			
SS	18/18		2 / 1.5-3	2 3 6 (5)		2			
						3			
SS	18/18		3 / 3-4.5	2 2 2 (4)		4			
SS	18/18		4 / 4.5-6	1 1 1 (2)		5			
						6			
SS	18/18		5 / 6-7.5	1 1 1 (2)		7			
SS	18/18		6 / 7.5-9	1 1 1 (2)		8			
						9		- moisture increasing	
SS	18/18		7 / 9-10.5	1 1 1 (2)		10			
SS	18/18		8 / 10.5-12	1 1 1 (2)		11			
						12			
SS	18/18		9 / 12-13.5	2 3 1 (4)		13			
SS	18/18		10 / 14	8 9 9 (9)		14		- 3"-4" zone of Petroleum Product on top of clay	GAS (Diesel)
						15	CL BOH	Light Greenish-Gray Silty Clay	
						16		Boring terminated @ 15.0'	
						17			
						18			
						19			
						20			

DRILLING CONTR. Investigations

NO. 03624

DATE 7-14-88 CHK'D BY

028.1 (3) (REV. 11-80)

LOCATION OF BORING	JOB NO.	CLIENT	LOCATION
	14631-013	Springs	Statesville, NC

DRILLING METHOD:	~~4 1/4" HSA~~ 2" ID HSA
SAMPLING METHOD:	SS, CPT
BORING NO.	D+m-03
SHEET	1 OF 1

						START	FINISH
WATER LEVEL						TIME	TIME
TIME						1650	1800
DATE						DATE 7-14-88	DATE 7-14-88
CASING DEPTH							

SURFACE CONDITIONS: Flat Paved area

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH		
SS	18/8		1/0-1.5	5 5 5 (15)		0	SP	DARK GRAY SAND, trace Mica	MOIST, Fill
						1	SM	Olive Gray Silty Sand, trace mica, trace gravel	MOIST
SS	18/12		2/1.5-3	5 3 3 (6)		2			
						3	CL	Yellowish-Red Silty Clay, little fine Sand, trace gravel	MOIST
SS	18/12		3/3-4.5	2 3 1 (4)		4			
SS	18/18		4/4.5-6	2 2 2 (4)		5		-Grading to Orangish, yellowish Red	MOIST Soft
						6			MOIST, soft
SS	18/5		5	1 1 1 (2)		7			
						8		-Increasing moisture	Soft, moist/wet
SS	18/18		6/7.5-9	1 1 1 (1)		9			
SS	18/18		7/9-10.5	2 4 2		10	ML	Olive Gray Clayey Silt, little sand, trace gravel, trace organics	moist/wet Soft
SS	18/18		8/10.5-12	2 4 2 (6)		1		-Increasing Sand, Saturated	WET
				1 1 1 (2)		12		No Recovery	
SS	18/0		9			3			
				4 4 5		4	SP	Brownish-yellow Sand, SAPROLITE	MOIST
SS	18/18		9	(9)		5	BOH	Boring terminated @ 15'	
						6			
						7			
						8			
						9			
						0			

DATE 7-14-88 CHK'D BY

GEO.1 (3) (REV. 11-80)

LOCATION OF BORING	JOB NO.	CLIENT	LOCATION
	14631-013	Springs	Statesville, NC

DRILLING METHOD: 2" ID HSA

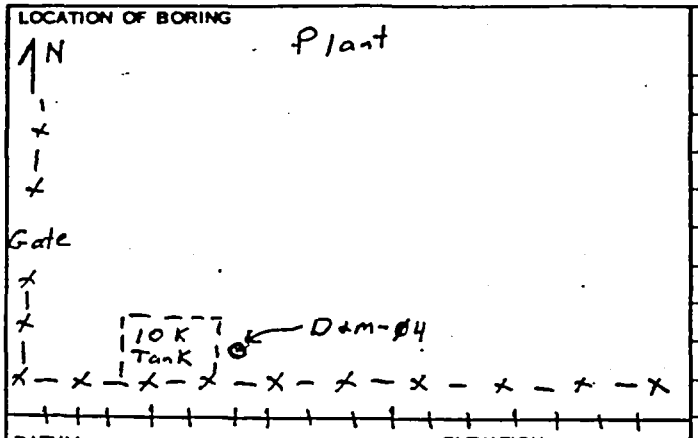
BORING NO. D+M-Ø4

SHEET 1 OF 1

SAMPLING METHOD: SPT

DRILLING

					START	FINISH
WATER LEVEL					TIME	TIME
TIME					955	1045
DATE					DATE 7-15-88	DATE 7-15-88
CASING DEPTH						



DATUM ELEVATION

SURFACE CONDITIONS: Flat Paved Area

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH		
SS	18/16		1/0-1.5	14	8 8 6	0	Fill	Olive Gray Gravelly Sand Fill	
						1	SP	Yellowish-Red Sand, trace mica	moist, Fill material
SS	18/4		2/1.5-3	13	7 5 8	2			moist, Fill
						3		- Grading with large gravel (trace)	moist, Fill
SS	18/16		3/3-4.5	4	3 2 2	4			
SS	18/18		4/4.5-6	4	2 2 2	5			Fill, moist
						6			
SS	18/18		5/6-7.5	2	1 1	7		- Groundwater @ ~7'	wet, Fill
SS	18/18		6/7.5-9	2	1 1 1	8			wet, Fill
					4	9			
SS	18/18		7/9-10.5	2	1 1	10			
SS	18/18		8/10.5-12	6	1 3 3	1			
						2	SM	Light Brown and Brownish Yellow Silty Sand, little gravel from decomposed rock	moist SAPROLITE
SS	18/18		9/12-13.5	28	6 12 16	3		→ Increasing density, Highly weathered rock.	
						4	BOH		
						5		Boring terminated @ 13.5'	
						6			
						7			
						8			
						9			
						0			

DATE 7-15-88 CHK'D BY

828.1 (3) (REV. 11-80)

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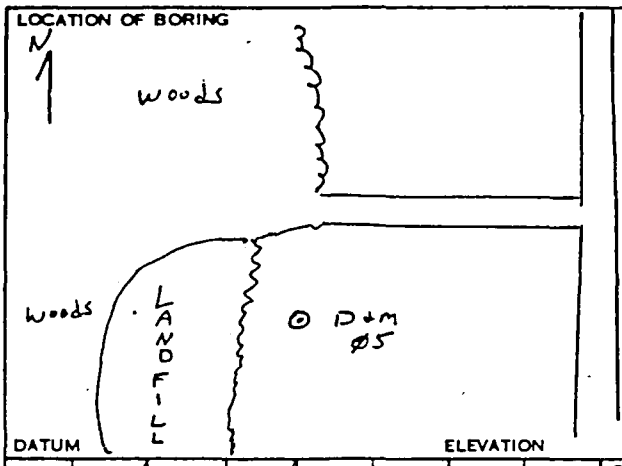
LOCATION OF BORING



DATUM ELEVATION

JOB NO.	CLIENT	LOCATION
14631-013	Springs	Statesville NC

DRILLING METHOD: 2" ID. HSA

SAMPLING METHOD: SPT

BORING NO. D+M-Ø5

SHEET 1 OF 2

					DRILLING START	DRILLING FINISH
WATER LEVEL						
TIME					TIME 1330	TIME 1430
DATE					DATE 7-15-88	DATE 7-15-88
CASING DEPTH						

SURFACE CONDITIONS: Flat Grassy Field

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH		
SS	18/6		1/0-15	20	14 10 10	0		Top Soil	
						1	ML	Yellowish-Red Clayey Silt, Chunk of concrete in sample	DRY
SS	18/16		2/1.5-3	14	7 7 7	2	SM	Brown-Brownish yellow Silty Sand, trace organics	DRY
						3	ML	Yellowish-Red Clayey Silt, trace sand, trace organics	MOIST
SS	18/14		3/3-4.5	23	9 11 12	4			
SS	18/18		4/4.5-6	23	6 11 12	5		-Grading with Brownish-yellow mottling	MOIST
						6			
SS	18/18		5	17	5 9 8	7			
SS	18/18		6	10	4 5 5	8	SM	Brownish yellow & Light Brown Mottled Silty Sand, visibly weathered Feldspars, Saprolite	MOIST
						9	ML	Light Brown + Brownish yellow Clayey Silt, micaceous	MOIST
SS	18/18		7	13		10			
						11			
						12			
						13			
SS	18/18		8	28	4 7 11	14		Light Brown & Light Brownish yellow Laminated Clayey Silt, Micaceous, Increasing Sand	MOIST
						15			
						16			
						17			
						18	SM	Light Brown & Light Brownish yellowish Silty Sand, Micaceous -Increasing Moisture	MOIST
SS	18/18		9	12	3 6 6	19			
						20			

DATE 7-15-88 CHK'D BY

Investigations

No. 00671

628.1 (3) (REV 11-80)

LOCATION OF BORING	JOB NO.	CLIENT	LOCATION
See p. #1	14631-013	Springs	Statesville NC

DRILLING METHOD: 2" ID HSA

SAMPLING METHOD: SPT

BORING NO. D+M-Ø5

SHEET 2 OF 2

					DRILLING START	DRILLING FINISH
WATER LEVEL						
TIME					TIME 1330	TIME 1430
DATE					DATE 7-15 88	DATE 7-15 88
CASING DEPTH						

DATUM ELEVATION

SURFACE CONDITIONS:

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH		
						20			
						1			
						2			
						3			
SS	18/18		10/23.5 23.5	(17)	5 8 9	4		-Grading to wet	WET
						25	SM	-Grading to moist	moist
						6			
						7			
						8			
SS	18/18		11/28.5 30	(19)	6 10 9	9		Brown And Brownish yellow laminated Silty Sand, Saprolite, zone of Feldspars @ 29.5	MOIST
						30	BOH	Boring terminated @ 30.0'	
						1			
						2			
						3			
						4			
						5			
						6			
						7			
						8			
						9			
						0			

DATE 7-15-88 CHK'D BY

828.1 (3) (REV. 11-80)

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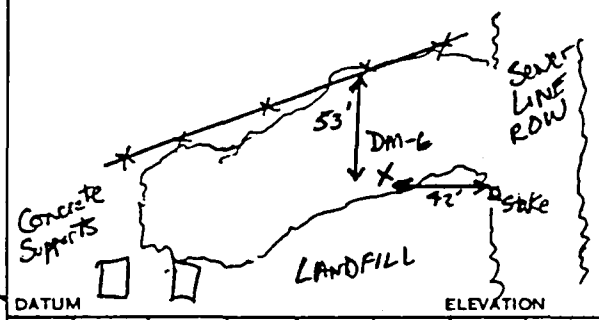
LOCATION OF BORING



DATUM ELEVATION

JOB NO.	CLIENT	LOCATION
14631-013	SPRINGS INDUSTRIES	STATESVILLE, NC.

DRILLING METHOD: 2" I.D. HSA w/ CME-45 mounted on Log Skidder

BORING NO. DM-6

SHEET 1 of 2

SAMPLING METHOD: Continuous SPT's 0-10', 5' centers down

					DRILLING START	DRILLING FINISH
WATER LEVEL	19.43'	19.67			TIME 9:05	TIME 10:04
TIME	~~4:17~~					
DATE	7/19/88	7/21/88			DATE 7/18/88	DATE 7/18/88
CASING DEPTH	—	—				

SURFACE CONDITIONS: Gently Sloping hillside w/ top soil Scraped away by bulldozer

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH		
						0		Lt. Brown to Orange silty clay and clayey silt w/ trace organics	
SS	18/9	—	1/0.3-0.8	7 9 9 (13)	—	1	ML		
SS	18/15	—	2/2.3-2.8	8 9 13 (11)	—	2		Grading w/ occasional stringers of white rock flour (silt) hard & dry	
SS	18/15	—	3/3.5-4	7 9 11	—	3			
						4		Grading w/ more white rock flour some fi. to M. sand size rock	
SS	18/15	—	4/5-5.5	10 11 13 (21)	—	5		Grading w/ more structure & harder (Saprolite)	
						6	ML		drilling harder
SS	18/18	—	5/6.5-7	7 9 9 (18)	—	7			
SS	18/7	—	6/7.5-8	6 7 7 (14)	—	8			
						9			
SS	18/18	—	7/10-10.5	3 5 8 8 (13)	—	10		Occasional layer of white hard decomposed rock (saprolite)	
						1			
						2	ML		
						3			
SS	18/16	—	8/14.5-14.8	8 8 9 9 (15)	—	4		Grading less competent w/ lenses black decomposed rock (rock flour)	
						5			
						6			
						7			
						8		Grading w/ more fi. sand (softer)	18.5' very moist
SS	18/15	—	9/19-19.5	2 3 4 4 (8)	—	9			
						20			

Buddy Stevens / Paul White

DATE 7/18/88 CHK'D BY

628.1 (3) (REV. 11-80)

Dames & Moore

.40

LOCATION OF BORING	JOB NO.	CLIENT	LOCATION
See Page # 1	14631-013	Springs Industries	Statesville, N.C.

DRILLING METHOD: 2¼ I.D. HSA w/ CME-45 Mounted on Cey Skidder

SAMPLING METHOD: Continuous SPT's 0-10', 5' centers down

BORING NO. DM-6

SHEET 2 of 2

WATER LEVEL	~~[illegible]~~	19.40' Toc			
TIME	~~[illegible]~~	15:03			
DATE	~~7/18/88~~	7/18/88			
Stick-Up/CASING DEPTH					

DRILLING	START	FINISH
TIME	9:05	10:04
DATE	7/18/88	7/18/88

DATUM ELEVATION

SURFACE CONDITIONS: See Page # 1

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	
						20		
						1	SC	Lt Brown to Orange Silty-clay and f. sand w/ some decomposed rock fragments (wet)
						2		
						3		
SS	18/18	—	10	4 5 9 (14)	—	4		
						5	ML	Lt. Brown to Orange Clayey-silt and decomposed rock fragments (rock flour / saprolite)
						6		
						7		
						8		Pull Augers 10:10 to 10:40
SS	18/18	—	11	3 7 9 (10)	—	9		
						30		Complete boring to a depth of 30.0' on 7/18/88. Encounter Groundwater at a depth of 18.5' on 7/18/88
						1		
						2		
						3		Set 2" I.D. flush jt. PVC casing w/ 10.0' of 10 slot screen to 30.0 ft. from the Surface on 7/18/88
						4		Backfill w/ 3 bags clean play sand to 16.0 ft below Surface ½-5gal. bucket bentonite pellets and concrete to the surface. Install 3" Square protective casing.
						5		
						6		Depth = 32.88 (Added Cap insert)
						7		H_2O level = 19.40' Stick-Up = 2.38'
						8		
						9		
						0		

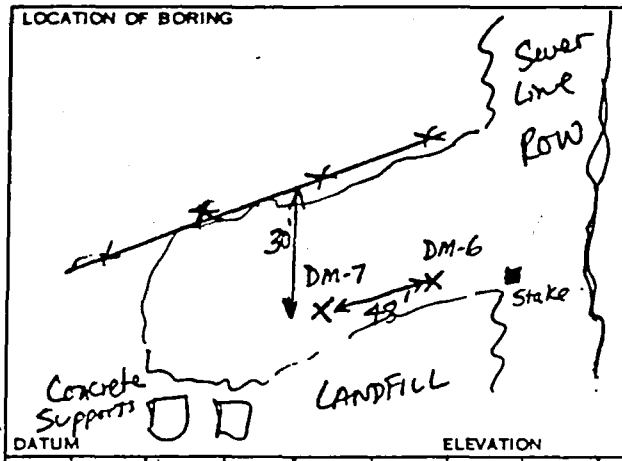
Buddy Stewart / Arthur White

No. 00865

DATE 7/17/88 CHK'D BY

025.1 (3) (REV. 11-80)

LOCATION OF BORING



DATUM ELEVATION

JOB NO.	CLIENT	LOCATION
14631-013	Springs Industries	Statesville, N.C.

DRILLING METHOD: 2" I.D. HSA w/

BORING NO. DM-7

SHEET 1 OF 2

SAMPLING METHOD: Continuous SPTs 0-10', 5' centers down

					DRILLING START	DRILLING FINISH
WATER LEVEL	16.83	17.03'			TIME 13:20	TIME 14:40
TIME	14:05					
DATE	7/19/88	7/21/88			DATE 7/18/88	DATE 7/18/88
CASING DEPTH	—	—				

SURFACE CONDITIONS: Gently sloping hillside w/ top soil scraped away by bulldozer

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	
						0		Dark Brown Clayey-silt w/ trace organics
SS	18/8	—	1/0.2-0.7	3 3 5 (8)	—	1		
SS	18/13	—	2/2-2.5	4 8 9 (12)	—	2	ML	Lt. Brown to Orange Clayey-silt w/ some fi Sand w/ trace white rock flower (hard and dry)
						3		
SS	18/15	—	3/3.8-4.3	6 11 12 (23)	—	4		
SS	18/14	-	4/5-5.5	4 10 15 (25)	—	5	ML	Grading harder w/ more F. to M Sand size rock fragments w/ some F. Gravel size Rock fragments
						6		
SS	18/18	—	5/7-7.5	13 12 10 (22)	—	7		Grading to Lt. Gray-Blue Rock Frag. Grading out
SS	18/16	—	6/8.5-8.8	6 9 12 (15)	—	8		Lt. Brown to Orange clayey-silt and silty-clay
						9	ML/CL	
SS	18/18	—	7/10-10.5	6 7 10 (13)	—	10		
						1		
						2	?	
						3		
SS	18/18	—	8/14-14.5	3 3 3 (6)	—	4	GW	Mottled Orange-White-Brown-Gray decomposed rock flour and F to C. Gravel w/ some silty-clay (moist)
						5		Moist!
						6		
						7		← Grd H_2O!
						8	GW	Gray grading out Saprolite
SS	18/18	—	9/19.5-20	3 4 9 (13)	—	9		
						10		

DRILLING CONTRACTOR Buddy Stevens / Paul White

DATE 7/18/88 CHK'D BY

No. 38

828.1 (3) (REV. 11-80)

Dames & Moore

LOCATION OF BORING	JOB NO.	CLIENT	LOCATION
See Page #1	14631-013	Springs Industries	Statesville, N.C.

DRILLING METHOD: 2" I.D HSA w/ CME -45 Mounted on Log skidder

SAMPLING METHOD: Continuous SPT's 0-10', 5' centers down

BORING NO.: DM-7

SHEET: 2 of 2

WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

DRILLING

START TIME	FINISH TIME
13:20	14:40
DATE 7/18/88	DATE 7/18/88

DATUM ELEVATION

SURFACE CONDITIONS: See Page #1

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH		
						20			
						1		grading w/ more clayey-silt (rock flour) more decomposed less structure	
						2			
						3	ML		
SS	18/18	—	10/13.9-14.4	5 5 6 (11)	—	4			
						5			
						6	ML		
						7			
						8			
SS	18/18	—	11/21.5-30	3 4 6 (10)	—	9			
						30			
						1		Boring completed to a depth of 30.0 ft. on 7/18/88. Groundwater encountered at a depth of 17.0 ft. on 7/18/88.	14:40-15:00 — Lightning-Wait for it to stop 15:00 — Pull Augers
						2			
						3		Set 2" I.D flush Jt. PVC casing w/ 10.0 ft. of 10 slot screen to 30.0 ft. from the Surface on 7/18/88. Backfill w/ 3 bags clean play sand to 16.5' below surface — 1/2-5 gal. bucket bentonite pellets to 13.5' below surface — concrete to surface. Install 3" Square protective casing!	
						4			
						5			
						6			
						7		Depth = 32.51'	
						8		H_2O level = 16.83' to TOC	
						9		Stick-Up = 2.51' (surface to TOC)	
						0			

DATE 7/18/88 CHK'D BY

Bobby Stevens / Paul White

No. 00865

628.1 (3) (REV. 11-80)

JOB NO.	CLIENT	LOCATION
14631-001	Springs Industries	Statesville, NC

DRILLING METHOD: 2¼" I.D. HSA w/ CME-45 Mounted on a Log Skidder

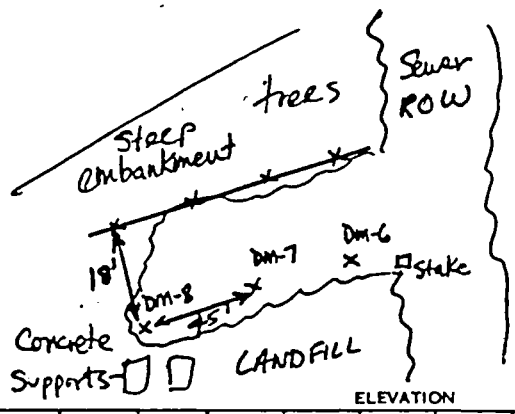
BORING NO. DM-8

SHEET 1 OF 2

SAMPLING METHOD: D-Continuous SPT's 0-10', 5' centers down

					DRILLING START TIME	DRILLING FINISH TIME
WATER LEVEL	16.84'	18.19'				
TIME	14:12	·			10:10	11:19
DATE	7/19/88	7/21/88			DATE 7/19/88	DATE 7/19/88
CASING DEPTH	—	—				

LOCATION OF BORING



DATUM ELEVATION

SURFACE CONDITIONS: Gently sloping hillside w/ top soil scraped away by bulldozer

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH	
SS	18/14	—	1/0.5-1.0	4 3 10 (11)	—	0–1	ML (Fill)	DK. Brown Clayey-silt w/ ~~some~~ little F. Sand trace organic's (Fill)
SS	18/15	—	2/2.3-2.8	10 10 11 (20)	—	2–3	ML	Lt. Brown to Orange clayey-silt w/ little F. Sand size rock fragments (rock flour)
SS	18/18	—	3/4-4.5	12 13 (25)	—	4		Grading w/ more F. to C. sand size
SS	18/15	—	4/5.5-5.5	10 12 12 (22)	—	5	GP	White rock fragments – beginning to see structure; softer zone w/ more F. sand
						6		F. Sand grading out – grading w/ more silty clay – Mottled white/red/brown
SS	18/18	—	5/7-7.5	8 10 9 (19)	—	7		Mottled red/white/gray/Brown clayey-silt w/ little F Sand (rock flour) — moist!
SS	18/15	—	6/8-8.5	4 4 5 (9)	—	8	ML	
						9		Grading w/ Structure (saprolite)
SS	18/18	—	7/10-10.5	4 6 6 (10)	—	10		grading w/ little silty-clay — Dry
						1		
						2		
						3		
SS	18/18	—	8/14.5-15	3 3 6 (6)	—	4–5	ML	grading w/ some silty-clay (more clay) moist — Alt. clayey and rocky layers moist
						6		
						7		← water!
						8		
SS	18/18	—	9/19.5-20	3 3 7 (6)	—	9–10		

DATE 7/19/88 CHK'D BY

Buddy Stevens / Paul White

628.1 (3) (REV. 11-80)

LOCATION OF BORING	JOB NO.	CLIENT	LOCATION
See Page #1	14631-013	Springs Industries	Statesville, N.C

DRILLING METHOD: 2¼" I.D HSA w/ CME-45 Mounted on a log skidder

SAMPLING METHOD: Continuous SPT's 0-10' 5' center down

BORING NO. DM-8

SHEET 2 OF 2

						START	FINISH
WATER LEVEL						DRILLING	
TIME						TIME 10:10	TIME 11:19
DATE						DATE 7/19/88	DATE 7/19/88
CASING DEPTH							

DATUM ELEVATION

SURFACE CONDITIONS: See Page #1

SAMPLER TYPE	INCHES DRIVEN / INCHES RECOVERED	DEPTH OF CASING	SAMPLE NO. / SAMPLE DEPTH	BLOWS/FT. SAMPLER	NUMBER OF RINGS	DEPTH IN FEET	SOIL GRAPH		
						20			
						1			
						2			
						3			
SS	18/18	—	10/24-24.5	4 3 3 (8)	—	4	ML		Very moist Wet
						5		grading w/ Alternating harder zones w/ platy structure (saprolite)	
						6			
						7			
						8			Wet
SS	18/18	—	11/29.5-30	4 6 7 (13)	—	9			
						30		Boring completed to a depth of 30.0 ft. on 7/19/88	
						1		Groundwater encountered at a depth of 17.0 ft. on 7/19/88.	
						2			
						3		Set 2" I.D flush joint PVC casing w/ 10.0' of 10 slot screen to 30.0 ft. from the surface on 7/19/88.	
						4		Backfill w/ 3 bags clean play sand to 16.0 ft below the surface	
						5		½-5 gallon buckets bentonite pellets to 13.0 ft. and concrete to the surface.	
						6			
						7		Install 3" Square Protective Casing ~ 3.0' high. Depth = 32.71' to TOC	
						8		Stick-Up (PVC) = 2.30' (Surface to TOC) H_2O level = 16.84' to TOC	
						9			
						0			

DRILLING CONTR. Shortstan Inc. Buddy Stevens / Pete White

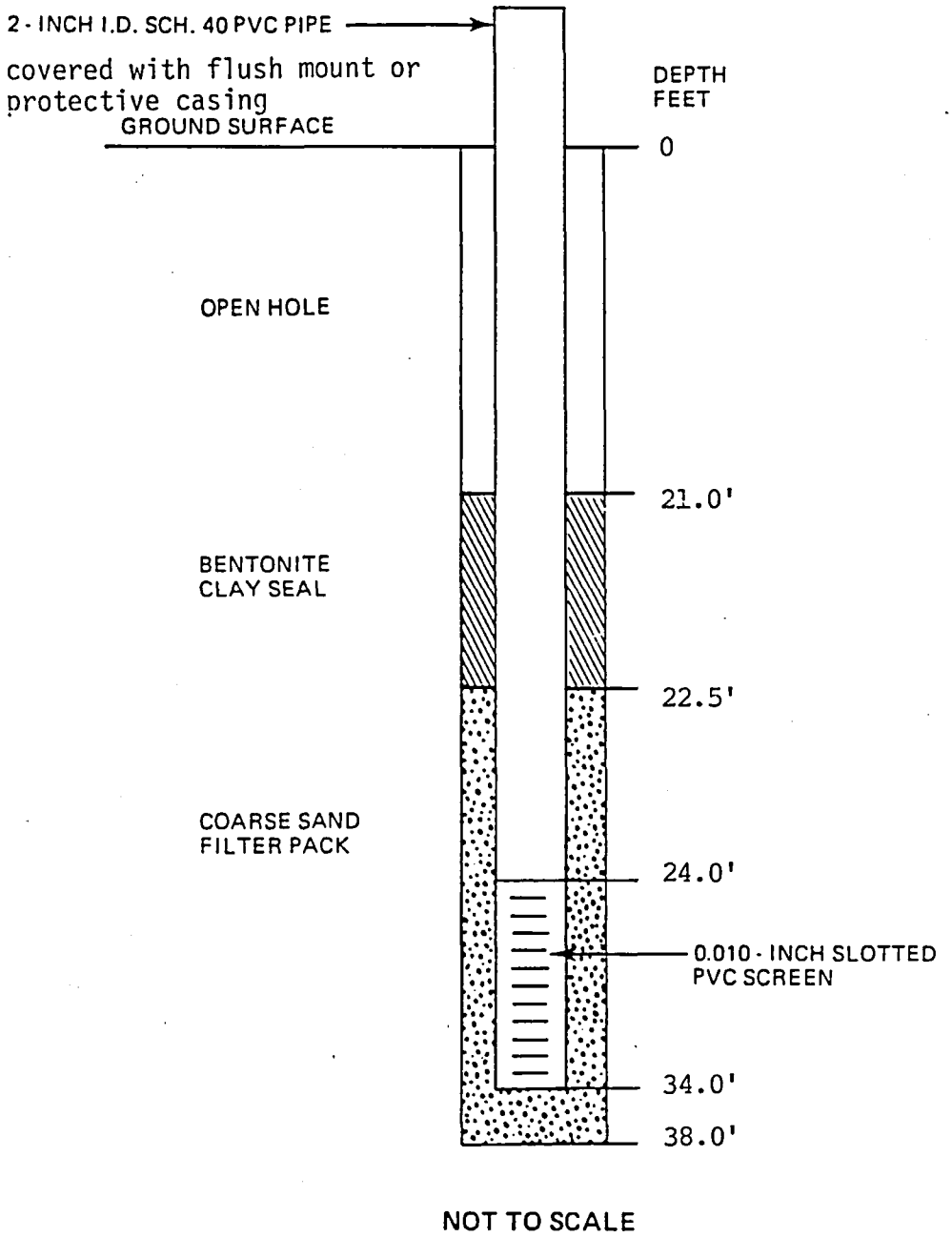
No. 88861

BY Carl L. Pitt DATE 7/19/88 CHK'D BY

628.1 (3) (REV 11-80)

MONITORING WELL INSTALLATION DIAGRAM
FOR SPRINGS INDUSTRIES
UNIGLASS INDUSTRIES SITE

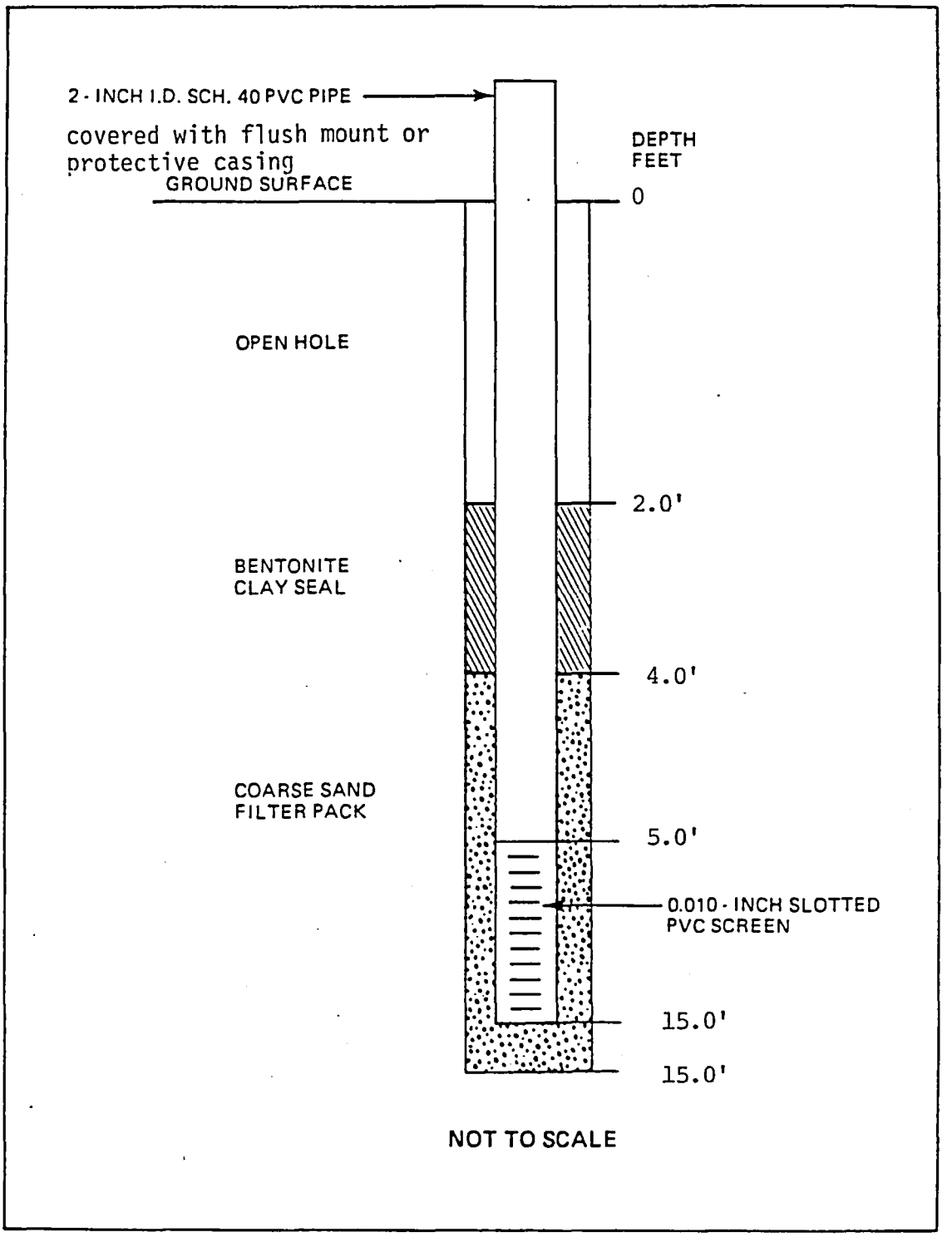
Location: DM-1
Installation Date: 7-14-88



Dames & Moore

MONITORING WELL INSTALLATION DIAGRAM
FOR SPRINGS INDUSTRIES
UNIGLASS INDUSTRIES SITE

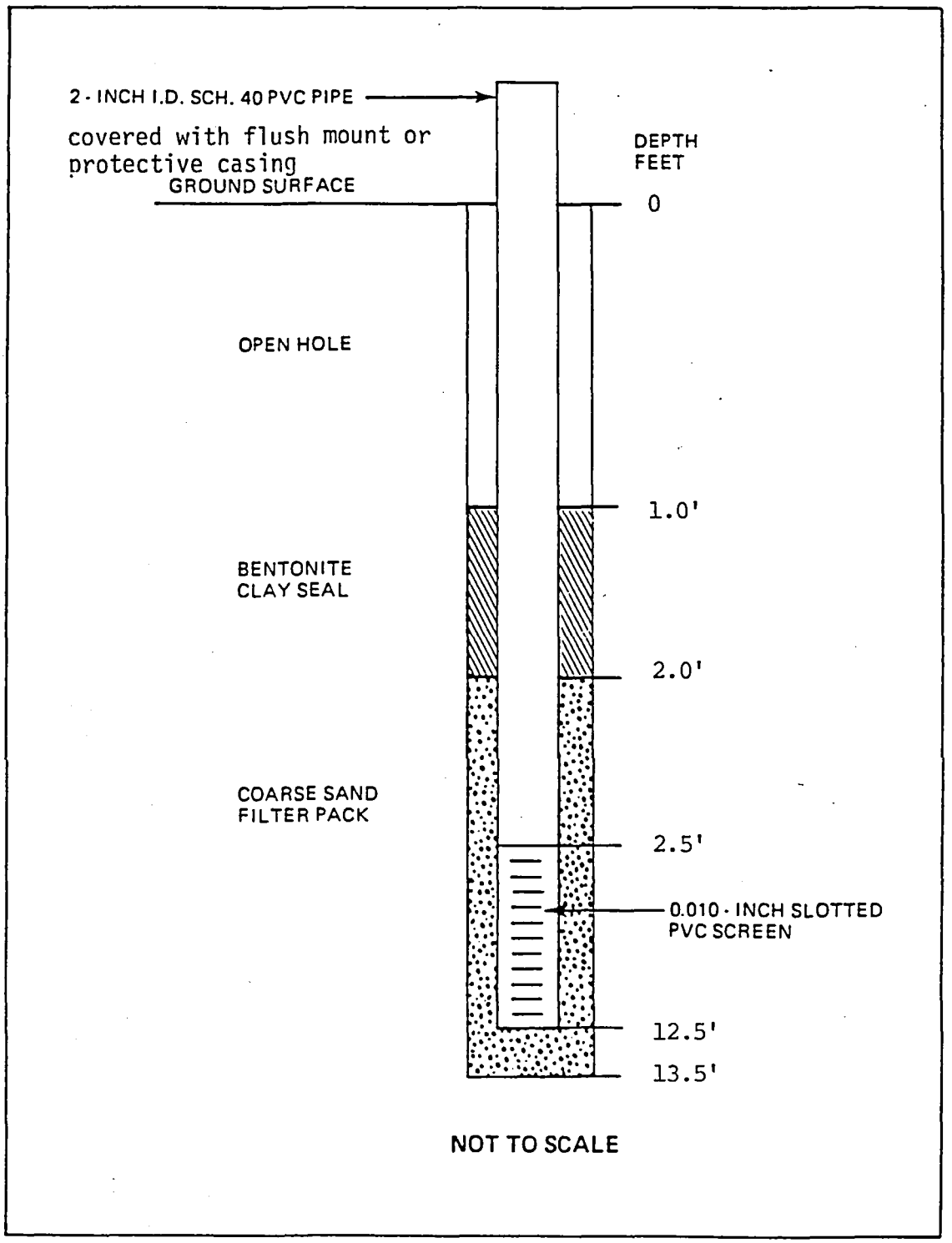
Location: DM-3
Installation Date: 7-14-88



Dames & Moore

MONITORING WELL INSTALLATION DIAGRAM
FOR SPRINGS INDUSTRIES
UNIGLASS INDUSTRIES SITE

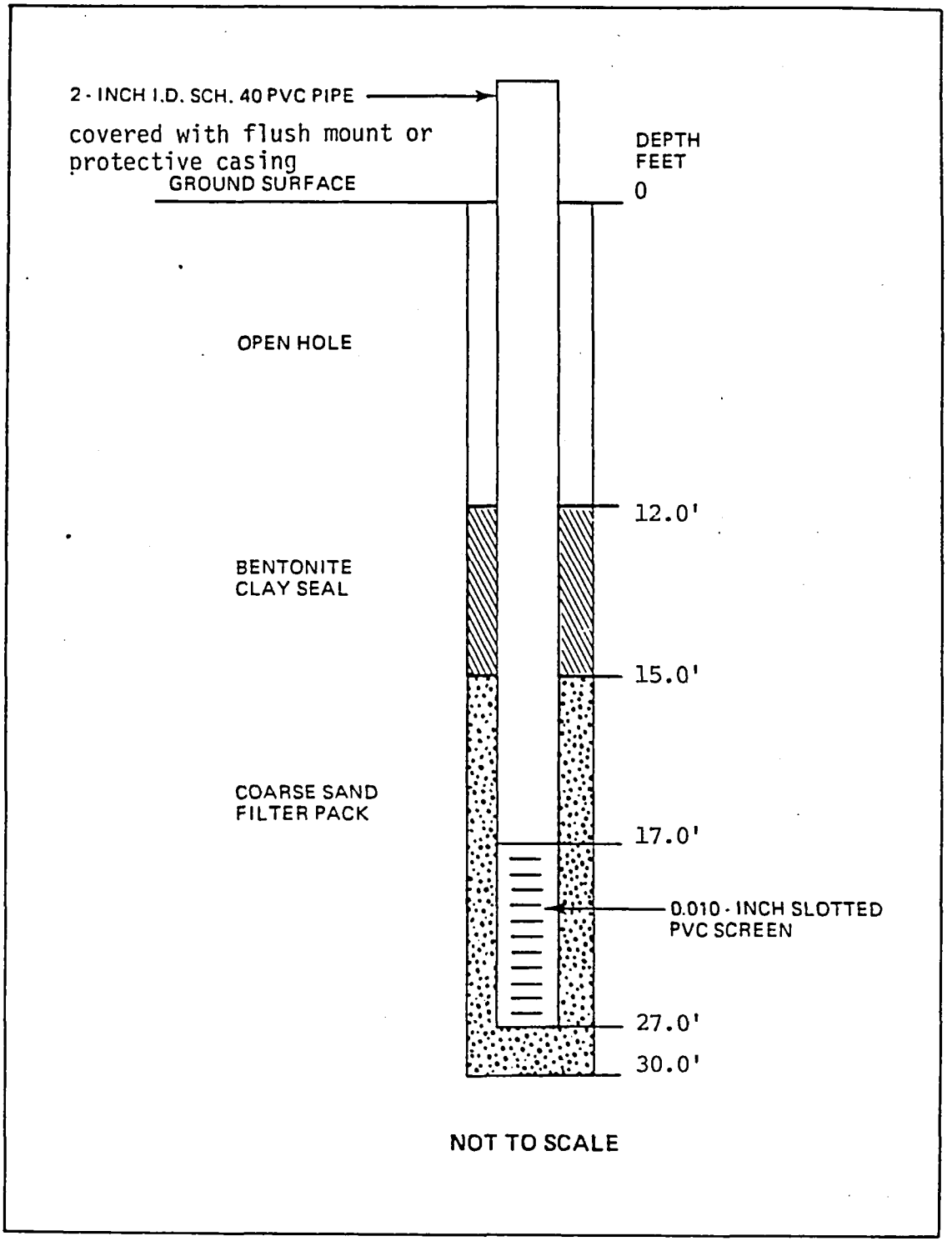
Location: DM-4
Installation Date: 7-15-88



Dames & Moore

MONITORING WELL INSTALLATION DIAGRAM
FOR SPRINGS INDUSTRIES
UNIGLASS INDUSTRIES SITE

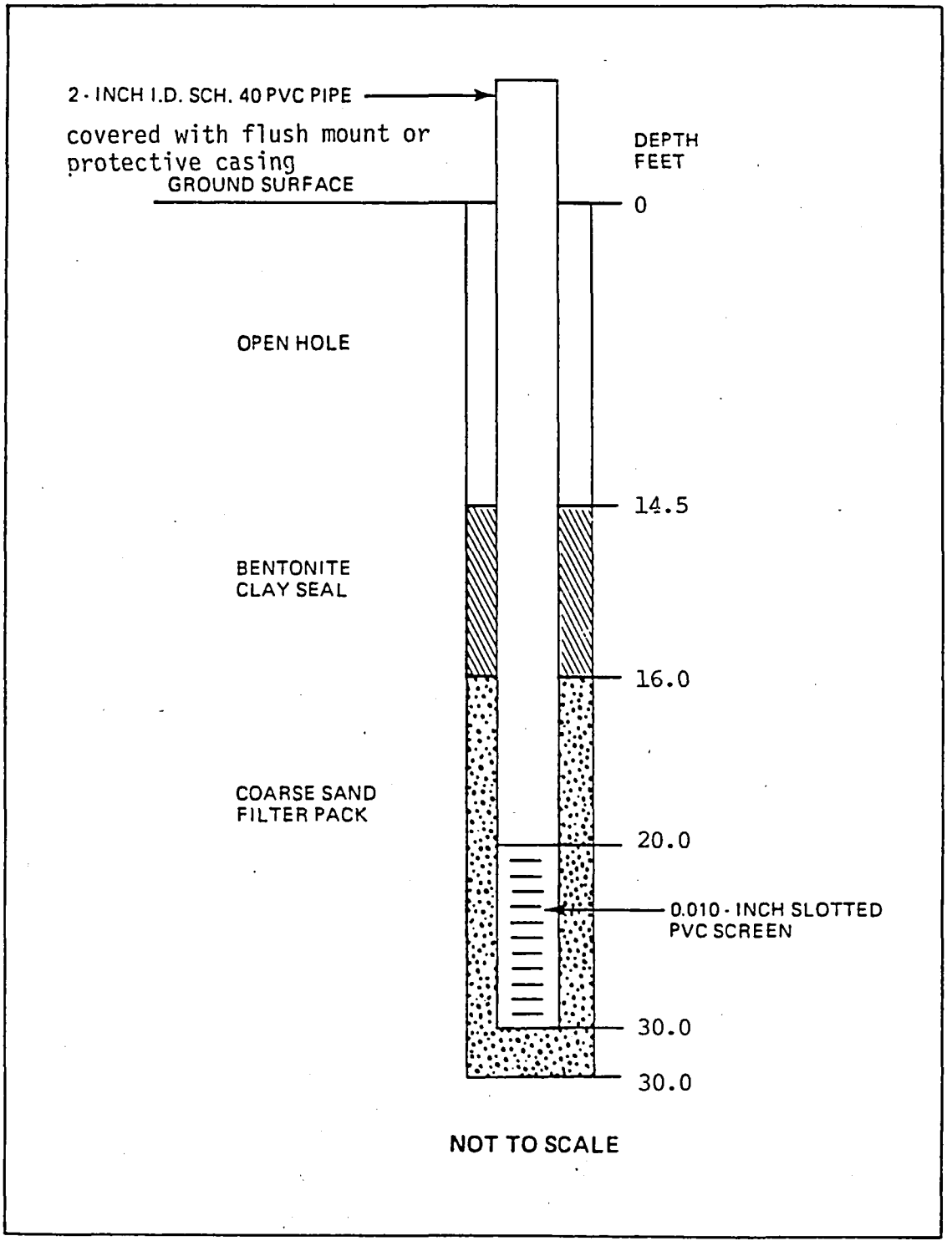
Location: DM-5
Installation Date: 7-15-88



Dames & Moore

MONITORING WELL INSTALLATION DIAGRAM
FOR SPRINGS INDUSTRIES
UNIGLASS INDUSTRIES SITE

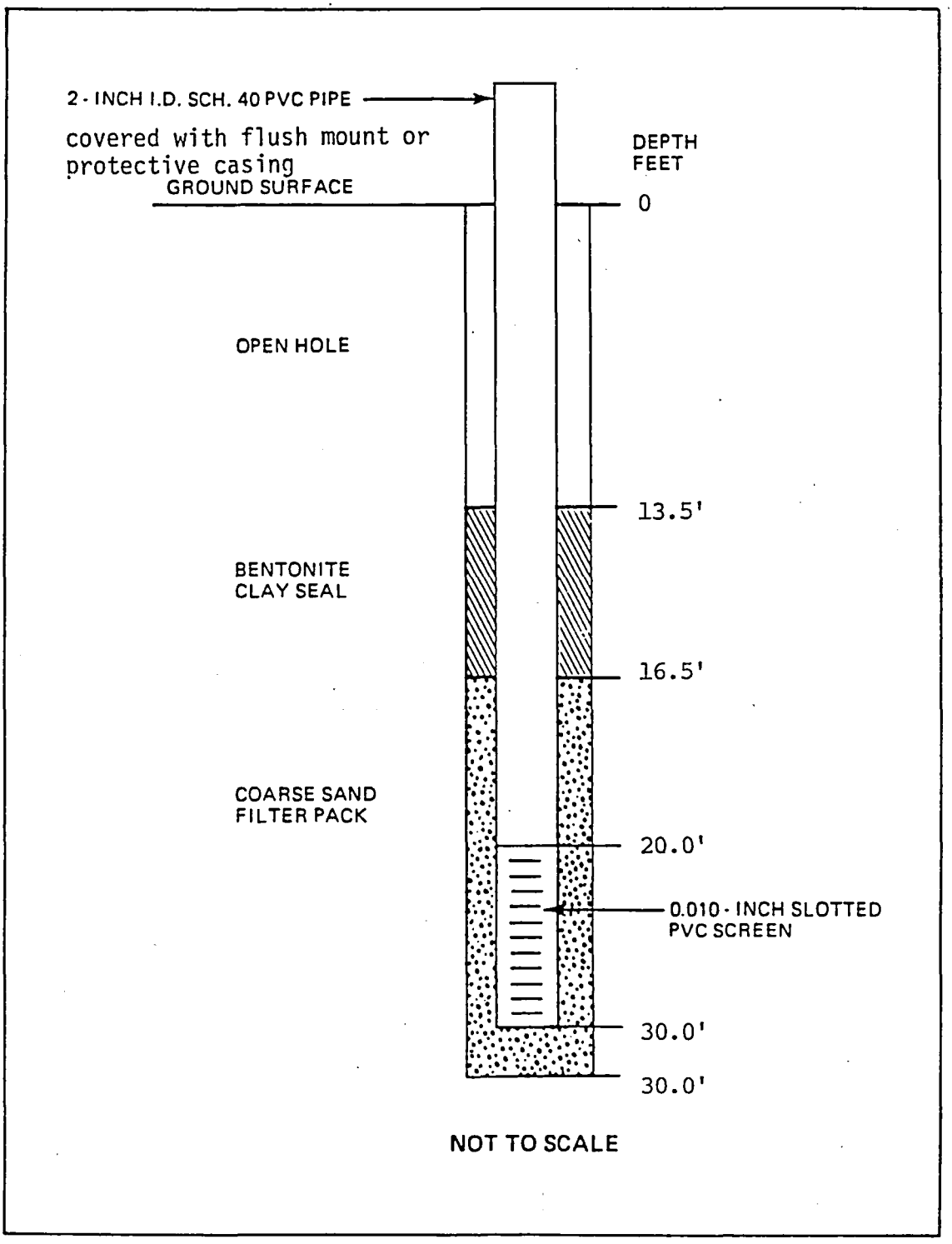
Location: DM-6
Installation Date: 7-18-88



Dames & Moore

MONITORING WELL INSTALLATION DIAGRAM
FOR SPRINGS INDUSTRIES
UNIGLASS INDUSTRIES SITE

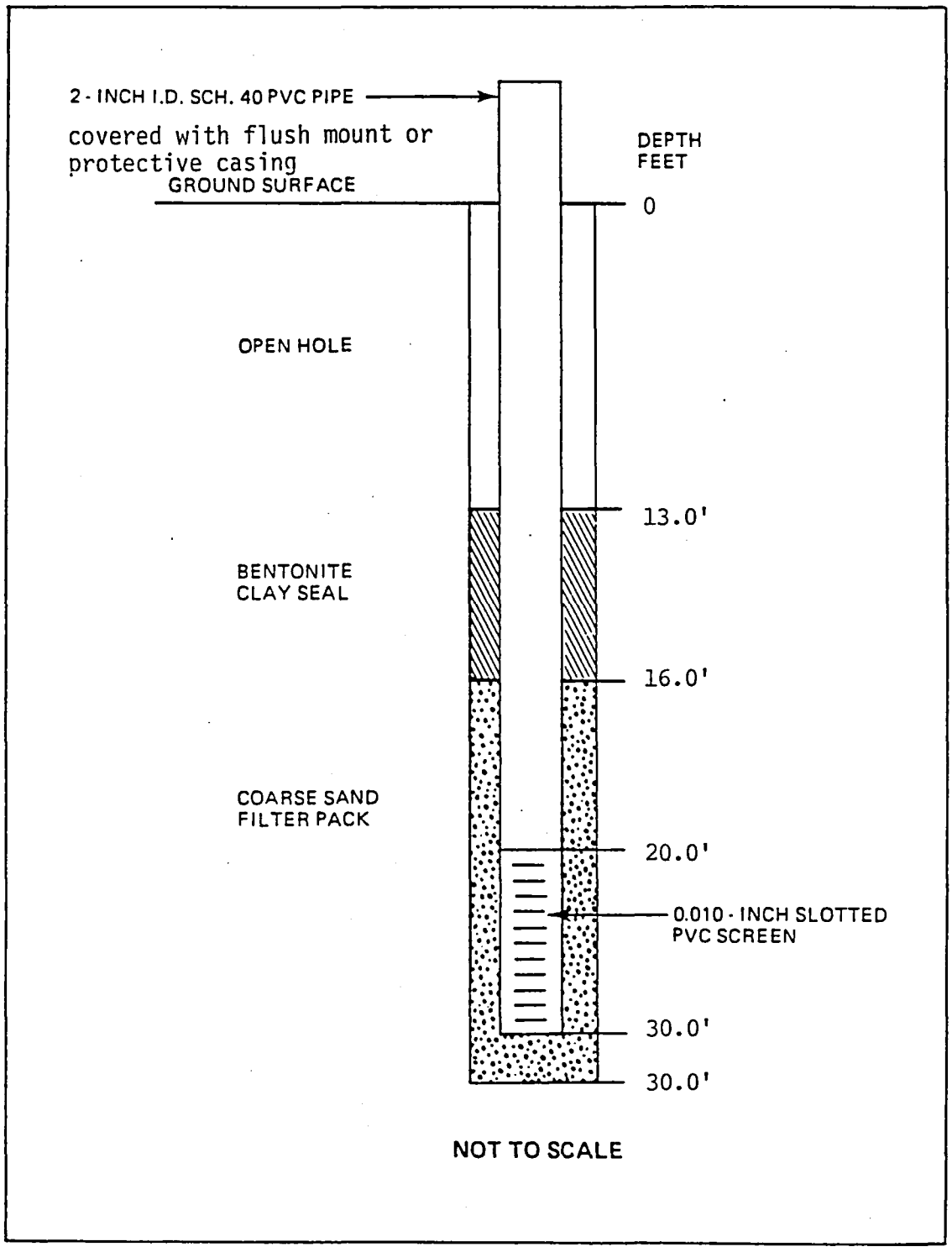
Location: DM-7
Installation Date: 7-18-88



Dames & Moore

MONITORING WELL INSTALLATION DIAGRAM
FOR SPRINGS INDUSTRIES
UNIGLASS INDUSTRIES SITE

Location: DM-8
Installation Date: 7-19--88



Dames & Moore

APPENDIX B

Tank Testing Results

Data Chart for Tank System Tightness Test

PLEASE PRINT

1. OWNER Property ☑ Tank(s) ☑

Name: UNIGLASS INDUSTRY Address: 535 CONNOR ST. STATESVILLE N.C. Representative: Telephone:

Name: DIVISION OF CLARK SCHWEBEL Address: Representative: Telephone:

2. OPERATOR

Name: UNIGLASS INDUSTIES Address: Telephone:

3. REASON FOR TEST (Explain Fully)

REQUESTED BY NICK ODOM AS PART OF PROPERTY EVALUATION

4. WHO REQUESTED TEST AND WHEN

Name: NICK ODOM Title: Company or Affiliation: SPRINGS INDUSTRIES Date:

Address: P.O. BOX 70, FORT MILL, S.C. 29715 Telephone: 803-547-3601

5. TANK INVOLVED

Use additional lines for manifolded tanks

Identify by Direction	Capacity	Brand/Supplier	Grade	Approx. Age	Steel/Fiberglass
GASOLINE TANK AT SHIPPING & RECEIVING AREA	550 GAL	EXXON	REGULAR	28 YRS. OLD	STEEL

6. INSTALLATION DATA

Location	Cover	Fills	Vents	Siphones	Pumps
SHIPPING AND RECEIVING DOCK	ASPHALT	4"	1½	NONE	SUCTION
North Inside driveway, Rear of station, etc.	Concrete, Black Top, Earth, etc.	Size, Tightfill make, Drop tubes, Remote Fills	Size, Manifolded	Which tanks?	Suction, Remote, Make if known

7. UNDERGROUND WATER

Depth to the Water table: BELOW TANK BOTTOM. Is the water over the tank? ☐ Yes ☑ No

8. FILL-UP ARRANGEMENTS

Tanks to be filled 10:00 hr. 7-18-88 Date. Arranged by BOB MARLOWE Name 704-872-7831 EXT-243 Telephone

Extra product to "top off" and run tank tester. How and who to provide? Consider NO Lead.

Terminal or other contact for notice or inquiry: MILSTEAD OIL Company. Name. Telephone.

9. CONTRACTOR, MECHANICS, any other contractor involved

BEANUM INC.
6730 FREEDOM DR.
CHARLOTTE, N.C.

10. OTHER INFORMATION OR REMARKS

Additional information on any items above. Officials or others to be advised when testing is in progress or completed. Visitors or observers present during test, etc.

11. TEST RESULTS

Tests were made on the above tank systems in accordance with test procedures prescribed for as detailed on attached test charts with results as follows:

Tank Identification	Tight	Leakage Indicated	Date Tested
GAS TANK AT LOADING & RECEIVING DOCK	YES	-.030 G.P.H.	7-13-88

12. SENSOR CERTIFICATION

NEW
Date

1627
Serial No. of Thermal Sensor

13 This is to certify that these tank systems were tested on the date(s) shown. Those indicated as "Tight" meet the criteria established by the National Fire Protection Association Pamphlet 329.

Technicians

1. MICHAEL W. LENTZ — BEANUM INC. — M.W. Lentz
Certification # 211412052 — Testing Contractor or Company. By: Signature

2. _____ — P.O. BOX 671, PAW CREEK N.C. 28130
Address

Certification # _____

PN6827

[redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted] [redacted]

Name of Supplier, Owner or Dealer	Address No. and Street(s)	City	State	Date of Test
CONGOLEUM INDUSTRIES	555 CORDOR ST	STATESVILLE	N.C.	7-13-88

15. TANK TO TEST

GAS TANK AT LOADING DOCK
Identity by position

EXXON REGULAR
Brand and Grade

15a. BRIEF DIAGRAM OF TANK FIELD

16. CAPACITY

Nominal Capacity ..... 550 Gallons

By most accurate capacity chart available ..... 560 Gallons

From
- [ ] Station Chart
- [ ] Tank Manufacturer's Chart
- [ ] Company Engineering Data
- [ ] Charts supplied with
- [x] Other MILSTEAD OIL Co.

17. FILL-UP FOR TEST

Stick Water Bottom before Fill-up ..... 0 in. to ¼" ..... 0 Gallons ..... 50" in. Tank Diameter

		Gallons	Total Gallons as Reading
Inventory	50"		560
	TOPOFF		+ 15
	50" +		575

Transfer total to line 25a

18. SPECIAL CONDITIONS AND PROCEDURES TO TEST THIS TANK

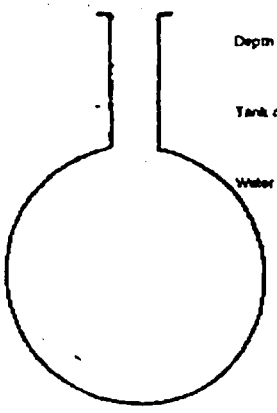
See manual sections applicable. Check below and record procedure in log (27).

- [x] Water in tank
- [x] Line(s) being tested with LVLLT
- [x] High water table in tank excavation

Use maximum allowable test pressure for all tests.
Four pound rule does not apply to double-walled tanks.

Complete section below

1. Is four pound rule required? Yes [ ] No [✓]
2. Height to 12" mark from bottom of tank ..... 150 in.
3. Pressure at bottom of tank ..... 3.752 P.S.I.
4. Pressure at top of tank ..... 2.652 P.S.I.



Depth of burial ..... 23" in.

Tank dia. ..... 50 in.

Water table ..... BELOW TANK BOTTOM in.

NOTES.

The above calculations are to be used for dry soil conditions to establish a positive pressure advantage, or when using the four pound rule to compensate for the presence of subsurface water in the tank area.

Refer to N.F.P.A. 30, Sections 2-3.2.4 and 2-7.2 and the tank manufacturer regarding allowable system test pressures.

19. TANK MEASUREMENTS FOR TSTT ASSEMBLY

Bottom of tank to grade* ..... 23" in.

Add 30" for "T" probe assy. ..... 30 in.

Total tubing to assemble — approximate ..... 103" in.

20. EXTENSION HOSE SETTING

Tank top to grade* ..... 23" in.

Extend hose on suction tube 6" or more below tank top ..... 6+" in.

*If Fill pipe extends above grade, use top of fill.

22. Thermal-Sensor reading after circulation ..... 19757 digits

82/83 °F Between

23. Digits per °F in range of expected change ..... 308 digits

COEFFICIENT OF EXPANSION (Complete after circulation)

24a. Corrected A.P.I. Gravity

Observed A.P.I. Gravity 58.4

Hydrometer employed ..... H

Observed Sample Temperature ..... 83° °F

Corrected A.P.I. Gravity @ 60°F, From Table A .....

Coefficient of Expansion for Involved Product From Table B .....

Transfer COE to Line 25b.

21. VAPOR RECOVERY SYSTEM [ ] ~~Yes~~ [ ] ~~No~~ NONE

24b. COEFFICIENT OF EXPANSION RECIPROCAL METHOD

Type of Product ..... REGULAR GASOLINE

Hydrometer Employed ..... 6 H

Temperature in Tank After Circulation ..... 82.8 °F

Temperature of Sample ..... 83 °F

Difference (+/-) ..... ±0 °F

Observed A.P.I. Gravity 58.4

Reciprocal 1482 Page # 62

575 Total quantity in full tank (16 or 17) ÷ 1482 Reciprocal = .387789203 Volume change in this tank per °F

Transfer to Line 26a.

24c. FOR TESTING WITH WATER see Table C & D

Water Temperature after Circulation Table C ..... N/A °F

Coefficient of Water Table D .....

Added Surfactant? [ ] Yes [ ] No Transfer COE to Line 25b

25. (a) .387789203 Total quantity in full tank (16 or 17) × (b) ..... Coefficient of expansion for involved product = (c) ..... Volume change in this tank per °F gallons

26. (a) .387789203 Volume change per °F (25 or 24b) ÷ 308 Digits per °F in test Range (23) = .001259705 Volume change per digit Compute to 4 decimal places. This is test factor (a) .0013

27. Sensor Calibration 16027, 16545

LOG OF TEST PROCEDURES

28. DATE / TIME (24 hr.)	Record details of setting up and running test. (Use full length of line if needed.)	29. Reading No.	30. HYDROSTATIC PRESSURE CONTROL: Standpipe Level in Inches: Beginning of Reading	Level to which Restored	31. VOLUME MEASUREMENTS (V) RECORD TO .004 GAL: 32. Product in Graduate: Before Reading	After Reading	33. Product Replaced (-): Product Recovered (+)	34. TEMPERATURE COMPENSATION USE FACTOR (a): 35. Thermal Sensor Reading	36. Change Higher - Lower - (c)	37. Computation (c) = (a) × Expansion + Contraction -	38. NET VOLUME CHANGING EACH READING: Temperature Adjustment: Volume Minus Expansion (+) or Contraction (-) (32(V) – 32(I))	39. ACCUMULATED CHANGE: At Low Level compute Change per Hour (NFPA criteria)
	LUNIGLASS INDUSTRIES										FACTOR A = .0013	
	535 CONNOR ST.											
	STATESVILLE N.C.											
	550 GALLON GASOLINE TANK											
	HIGH LEVEL TEST											
1130	BEGAN CIRCULATION											
1245	TOOK 1ST A.P.I. SAMPLE											
1310	TOOK 2ND A.P.I. SAMPLE											
1315	FIRST SENSOR READING	1		42				19757				
1330	BEGAN HIGH LEVEL TEST	2	41.8	42	.445	.430	-.015	19799	+42	+.055	-.070	
1345	HIGH LEVEL TEST CONTINUES	3	41.7	42	.430	.423	-.007	19838	+39	+.051	-.058	
1400	" " "	4	41.7	42	.423	.418	-.005	19877	+41	+.053	-.058	
1415	" " "	5	41.7	42	.418	.411	-.007	19918	+39	+.051	-.058	
1430	LAST HIGH LEVEL TEST	6	41.7	42	.411	.405	-.006	19961	+43	+.056	-.062	
1433	DROPPED STAND PIPE LEVEL											
	PREPARED FOR LOW LEVEL											
	TEST											

27. LOG OF TEST PROCEDURES (Supplemental)			30. HYDROSTATIC PRESSURE CONTROL		31. VOLUME MEASUREMENTS (V) RECORD TO .001 GAL			34. TEMPERATURE COMPENSATION USE FACTOR (a)			38. NET VOLUME CHANGING EACH READING	39. ACCUMULATED CHANGE
28. DATE / TIME (24 hr)	Record details of setting up and running test. (Use full length of line if needed)	29. Reading No.	Standpipe Level in Inches: Beginning of Reading	Standpipe Level in Inches: Level to which Restored	32. Product in Graduate: Before Reading	32. Product in Graduate: After Reading	33. Product Replaced (-) / Product Recovered (+)	35. Thermal Sensor Reading	36. Change Higher + Lower - (c)	37. Computation (c) + (a) + Expansion + Contraction -	Temperature Adjustment / Volume Minus Expansion (+) or Contraction (-) (3)(V) – (3)(T)	At Low Level compute Change per Hour (NFPA criteria)
	UNIGLASS INDUSTRIES										FACTOR A	= .0013
	535 CONNOR ST.											
	STATESVILLE N.C.											
	550 GASOLINE TANK											
	LOW LEVEL TEST											
1445	SENSOR READING	7		12				19996				
1500	BEGAN LOW LEVEL TEST	8	12.9	12	.177	.235	+.058	20043	+47	+.061	-.003	
1515	LOW LEVEL TEST CONTINUES	9	12.8	12	.235	.287	+.052	20095	+52	+.068	-.016	-.019
1530	" " "	10	12.8	12	.287	.337	+.050	20140	+45	+.059	-.009	-.025
1545	LAST TEST READING	11	12.8	12	.337	.390	+.053	20182	+42	+.055	-.002	-.030
												-.030
												G.P.H.

P-T Tank Test Data Chart
Additional Info

1. Net Volume Change at Conclusion of Precision Test ____ gph

Signature of Tester: Michael W. Lutz

Date: 7-13-88

2. Statement:

☒ Tank and product handling system has been tested tight according to the Precision Test Criteria as established by N.F.P.A. publication 329. This is not intended to indicate permission of a leak.

OR

☐ Tank and product handling system has failed the tank tightness test according to the Precision Test Criteria as established by N.F.P.A. publication 329.

It is the responsibility of the owner and/or operator of this system to immediately advise state and local authorities of any implied hazard and the possibility of any reportable pollution to the environment as a result of the indicated failure of this system. Health Consultants Incorporated does not assume any responsibility or liability for any loss of product to the environment.

Tank Owner/Operator _____

Date _____

APPENDIX C

Chemical Data

RADIAN
CORPORATION

Received 8/4/88 WDA

 RAS Perimeter REPORT Work Order # P8-07-053

Received: 07/21/88 07/28/88 13:55:47

REPORT TO: Dames and Moore
7101 Wisconsin Ave. Suite 700
Bethesda, MA 20814

ATTEN: Bill Adams

CLIENT: DAMES MOORE SAMPLES: 6
COMPANY: Dames and Moore
FACILITY: 7101 Wisconsin Ave. Suite 700
Bethesda, MA 20814

WORK ID: Springs Industries
TAKEN: David Woodward
TRANS: Fed Ex
TYPE: Water for 624 and 625
P.O. #:
INVOICE: under separate cover

PREPARED BY: Radian Analytical Services
Bldg. 900 Perimeter Park
Morrisville, NC 27560

ATTEN:
PHONE: 919-481-0212

CERTIFIED BY: J. F. M. Sff

CONTACT: M DAY

SAMPLE IDENTIFICATION

01 DM-5 (005)
02 DM-6 (006)
03 DM-7 (007)
04 DM-8 (008)
05 Trip Blank
06 Method Blank

TEST CODES and NAMES used on this report

624 Volatile Organics
SCREEN GC Screen Only

RADIAN
CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-053
Received: 07/21/88 Results By Test

TEST CODE default units	Sample 01 (entered units)	Sample 02 (entered units)	Sample 03 (entered units)	Sample 04 (entered units)
SCREEN date completed	07/26/88	07/26/88	07/26/88	07/26/88

RADIAN CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-053

Received: 07/21/88

Results By Test

SAMPLE Sample Id	Test: SCREEN date completed
01 DM-5 (005)	07/26/88
02 DM-6 (006)	07/26/88
03 DM-7 (007)	07/26/88
04 DM-8 (008)	07/26/88

RADIAN
CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-053
Received: 07/21/88 Results by Sample

SAMPLE ID DM-5 (005) SAMPLE # 01 FRACTIONS: A,B
Date & Time Collected 07/20/88 Category

SCREEN 07/26/88
date completed

RADIAN CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-053

Received: 07/21/88 Results by Sample

SAMPLE ID DM-5 (005) FRACTION 01A TEST CODE 624 NAME Volatile Organics

Date & Time Collected 07/20/88 Category

ORGANICS ANALYSIS REPORT
VOLATILES by METHOD 624

VERIFIED TB

ANALYST KUSEL EXTRCTD FILE # 5AAG391

INSTRMT 4500A INJECTD 07/27/88 UNITS ug/L

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	74-87-3	chloromethane	ND	5.0
	74-83-9	bromomethane	ND	5.0
	75-01-4	vinyl chloride	ND	5.0
	75-00-3	chloroethane	ND	5.0
	75-09-2	methylene chloride	ND	2.8
	107-02-8	acrolein	ND	2.8
	107-13-1	acrylonitrile	ND	2.8
	75-69-4	trichlorofluoromethane	ND	5.0
	75-35-4	1,1-dichloroethene	ND	4.7
	75-34-3	1,1-dichloroethane	ND	2.8
	156-60-5	trans-1,2-dichloroethene	ND	1.6
	67-66-3	chloroform	ND	1.6
	107-06-2	1,2-dichloroethane	ND	2.8
	71-55-6	1,1,1-trichloroethane	ND	3.8
	56-23-5	carbon tetrachloride	ND	2.8
	75-27-4	bromodichloromethane	ND	2.2
	78-87-5	1,2-dichloropropane	ND	6.0
	10061-01-5	cis-1,3-dichloropropene	ND	5.0
	79-01-6	trichloroethene	ND	1.9
	124-48-1	dibromochloromethane	ND	3.1
	79-00-5	1,1,2-trichloroethane	ND	5.0
	71-43-2	benzene	ND	4.4
	10061-02-6	trans-1,3-dichloropropene	ND	5.0
	110-75-8	2-chloroethylvinyl ether	ND	5.0
	75-25-2	bromoform	ND	4.7
	127-18-4	tetrachloroethene	ND	4.1

RADIAN CORPORATION

Received: 07/21/88

RAS Perimeter REPORT
Results by Sample

Work Order # P8-07-053
Continued From Above

SAMPLE ID DM-5 (005) FRACTION 01A TEST CODE 624 NAME Volatile Organics
Date & Time Collected 07/20/88 Category

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	79-34-5	1,1,2,2-tetrachloroethane	ND	6.9
	108-88-3	toluene	8 J	6.0
	108-90-7	chlorobenzene	ND	6.0
	100-41-4	ethylbenzene	ND	7.2
	106-46-7	1,4-dichlorobenzene	ND	5.0
	541-73-1	1,3-dichlorobenzene	ND	5.0
	95-50-1	1,2-dichlorobenzene	ND	5.0

SURROGATE RECOVERIES

SCAN	COMPOUND	RECOVERY
	d6-benzene	NR %
	d4-1,2-dichloroethane	103 %
	bromochloromethane	NR %
	p-bromofluorobenzene	100 %
	2-bromo-1-chloropropane	NR %
	d10-ethylbenzene	NR %
	d8-toluene	104 %
		%
		%

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.
E = extrapolated value; beyond calibration range.

RADIAN
CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-053
Received: 07/21/88 Results by Sample

SAMPLE ID DM-6 (006) SAMPLE # 02 FRACTIONS: A,B
Date & Time Collected 07/20/88 Category

SCREEN 07/26/88
date completed

RADIAN CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-053

Received: 07/21/88 Results by Sample

SAMPLE ID DM-6 (006) FRACTION 02A TEST CODE 624 NAME Volatile Organics

Date & Time Collected 07/20/88 Category

ORGANICS ANALYSIS REPORT
VOLATILES by METHOD 624

VERIFIED TB

ANALYST KUSEL EXTRCTD FILE # 5AAG392

INSTRMT 4500A INJECTD 07/27/88 UNITS ug/L

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	74-87-3	chloromethane	ND	5.0
	74-83-9	bromomethane	ND	5.0
	75-01-4	vinyl chloride	ND	5.0
	75-00-3	chloroethane	ND	5.0
	75-09-2	methylene chloride	ND	2.8
	107-02-8	acrolein	ND	2.8
	107-13-1	acrylonitrile	ND	2.8
	75-69-4	trichlorofluoromethane	ND	5.0
	75-35-4	1,1-dichloroethene	ND	4.7
	75-34-3	1,1-dichloroethane	ND	2.8
	156-60-5	trans-1,2-dichloroethene	ND	1.6
	67-66-3	chloroform	ND	1.6
	107-06-2	1,2-dichloroethane	ND	2.8
	71-55-6	1,1,1-trichloroethane	ND	3.8
	56-23-5	carbon tetrachloride	ND	2.8
	75-27-4	bromodichloromethane	ND	2.2
	78-87-5	1,2-dichloropropane	ND	6.0
	10061-01-5	cis-1,3-dichloropropene	ND	5.0
	79-01-6	trichloroethene	ND	1.9
	124-48-1	dibromochloromethane	ND	3.1
	79-00-5	1,1,2-trichloroethane	ND	5.0
	71-43-2	benzene	ND	4.4
	10061-02-6	trans-1,3-dichloropropene	ND	5.0
	110-75-8	2-chloroethylvinyl ether	ND	5.0
	75-25-2	bromoform	ND	4.7
	127-18-4	tetrachloroethene	ND	4.1

RADIAN CORPORATION

Received: 07/21/88

RAS Perimeter REPORT
Results by Sample

Work Order # P8-07-053
Continued From Above

SAMPLE ID DM-6 (006) FRACTION 02A TEST CODE 624 NAME Volatile Organics
Date & Time Collected 07/20/88 Category

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	79-34-5	1,1,2,2-tetrachloroethane	ND	6.9
	108-88-3	toluene	ND	6.0
	108-90-7	chlorobenzene	ND	6.0
	100-41-4	ethylbenzene	ND	7.2
	106-46-7	1,4-dichlorobenzene	ND	5.0
	541-73-1	1,3-dichlorobenzene	ND	5.0
	95-50-1	1,2-dichlorobenzene	ND	5.0

SURROGATE RECOVERIES

SCAN	COMPOUND	RECOVERY
	d6-benzene	NR %
	d4-1,2-dichloroethane	93 %
	bromochloromethane	NR %
	p-bromofluorobenzene	102 %
	2-bromo-1-chloropropane	NR %
	d10-ethylbenzene	NR %
	d8-toluene	96 %
		%
		%

NOTES AND DEFINITIONS FOR THIS REPORT.
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ND = not detected at specified detection limit
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.
E = extrapolated value; beyond calibration range.

RADIAN CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-053

Received: 07/21/88 Results by Sample

SAMPLE ID DM-7 (007) SAMPLE # 03 FRACTIONS: A,B

Date & Time Collected 07/20/88 Category

SCREEN 07/26/88
date completed

RADIAN CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-053

Received: 07/21/88 Results by Sample

SAMPLE ID DM-7 (007) FRACTION 03A TEST CODE 624 NAME Volatile Organics

Date & Time Collected 07/20/88 Category

ORGANICS ANALYSIS REPORT
VOLATILES by METHOD 624

VERIFIED TB

ANALYST KUSEL EXTRCTD FILE # 5AAG393

INSTRMT 4500A INJECTD 07/27/88 UNITS ug/L

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	74-87-3	chloromethane	ND	5.0
	74-83-9	bromomethane	ND	5.0
	75-01-4	vinyl chloride	ND	5.0
	75-00-3	chloroethane	ND	5.0
	75-09-2	methylene chloride	ND	2.8
	107-02-8	acrolein	ND	2.8
	107-13-1	acrylonitrile	ND	2.8
	75-69-4	trichlorofluoromethane	ND	5.0
	75-35-4	1,1-dichloroethene	ND	4.7
	75-34-3	1,1-dichloroethane	ND	2.8
	156-60-5	trans-1,2-dichloroethene	ND	1.6
	67-66-3	chloroform	ND	1.6
	107-06-2	1,2-dichloroethane	ND	2.8
	71-55-6	1,1,1-trichloroethane	ND	3.8
	56-23-5	carbon tetrachloride	ND	2.8
	75-27-4	bromodichloromethane	ND	2.2
	78-87-5	1,2-dichloropropane	ND	6.0
	10061-01-5	cis-1,3-dichloropropene	ND	5.0
	79-01-6	trichloroethene	ND	1.9
	124-48-1	dibromochloromethane	ND	3.1
	79-00-5	1,1,2-trichloroethane	ND	5.0
	71-43-2	benzene	ND	4.4
	10061-02-6	trans-1,3-dichloropropene	ND	5.0
	110-75-8	2-chloroethylvinyl ether	ND	5.0
	75-25-2	bromoform	ND	4.7
	127-18-4	tetrachloroethene	ND	4.1

RADIAN CORPORATION

Received: 07/21/88

RAS Perimeter REPORT
Results by Sample

Work Order # P8-07-053
Continued From Above

SAMPLE ID DM-7 (007) FRACTION 03A TEST CODE 624 NAME Volatile Organics
Date & Time Collected 07/20/88 Category

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	79-34-5	1,1,2,2-tetrachloroethane	ND	6.9
	108-88-3	toluene	ND	6.0
	108-90-7	chlorobenzene	ND	6.0
	100-41-4	ethylbenzene	ND	7.2
	106-46-7	1,4-dichlorobenzene	ND	5.0
	541-73-1	1,3-dichlorobenzene	ND	5.0
	95-50-1	1,2-dichlorobenzene	ND	5.0

SURROGATE RECOVERIES

SCAN	COMPOUND	RECOVERY
	d6-benzene	NR %
	d4-1,2-dichloroethane	103 %
	bromochloromethane	NR %
	p-bromofluorobenzene	100 %
	2-bromo-1-chloropropane	NR %
	d10-ethylbenzene	NR %
	d8-toluene	101 %
		%
		%

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.
E = extrapolated value; beyond calibration range.

RADIAN CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-053

Received: 07/21/88 Results by Sample

SAMPLE ID DM-8 (008) SAMPLE # 04 FRACTIONS: A,B

Date & Time Collected 07/20/88 Category

SCREEN 07/26/88
date completed

RADIAN CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-053

Received: 07/21/88 Results by Sample

SAMPLE ID DM-8 (008) FRACTION 04A TEST CODE 624 NAME Volatile Organics

Date & Time Collected 07/20/88 Category

ORGANICS ANALYSIS REPORT
VOLATILES by METHOD 624

VERIFIED TB

ANALYST KUSEL EXTRCTD FILE # 5AAG394

INSTRMT 4500A INJECTD 07/27/88 UNITS ug/L

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	74-87-3	chloromethane	ND	5.0
	74-83-9	bromomethane	ND	5.0
	75-01-4	vinyl chloride	ND	5.0
	75-00-3	chloroethane	ND	5.0
	75-09-2	methylene chloride	ND	2.8
	107-02-8	acrolein	ND	2.8
	107-13-1	acrylonitrile	ND	2.8
	75-69-4	trichlorofluoromethane	ND	5.0
	75-35-4	1,1-dichloroethene	ND	4.7
	75-34-3	1,1-dichloroethane	ND	2.8
	156-60-5	trans-1,2-dichloroethene	ND	1.6
	67-66-3	chloroform	ND	1.6
	107-06-2	1,2-dichloroethane	ND	2.8
	71-55-6	1,1,1-trichloroethane	ND	3.8
	56-23-5	carbon tetrachloride	ND	2.8
	75-27-4	bromodichloromethane	ND	2.2
	78-87-5	1,2-dichloropropane	ND	6.0
	10061-01-5	cis-1,3-dichloropropene	ND	5.0
	79-01-6	trichloroethene	ND	1.9
	124-48-1	dibromochloromethane	ND	3.1
	79-00-5	1,1,2-trichloroethane	ND	5.0
	71-43-2	benzene	ND	4.4
	10061-02-6	trans-1,3-dichloropropene	ND	5.0
	110-75-8	2-chloroethylvinyl ether	ND	5.0
	75-25-2	bromoform	ND	4.7
	127-18-4	tetrachloroethene	ND	4.1

RADIAN CORPORATION

Received: 07/21/88

RAS Perimeter REPORT
Results by Sample

Work Order # P8-07-053
Continued From Above

SAMPLE ID DM-8 (008) FRACTION 04A TEST CODE 624 NAME Volatile Organics
Date & Time Collected 07/20/88 Category

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	79-34-5	1,1,2,2-tetrachloroethane	ND	6.9
	108-88-3	toluene	ND	6.0
	108-90-7	chlorobenzene	ND	6.0
	100-41-4	ethylbenzene	ND	7.2
	106-46-7	1,4-dichlorobenzene	ND	5.0
	541-73-1	1,3-dichlorobenzene	ND	5.0
	95-50-1	1,2-dichlorobenzene	ND	5.0

SURROGATE RECOVERIES

SCAN	COMPOUND	RECOVERY
	d6-benzene	NR %
	d4-1,2-dichloroethane	89 %
	bromochloromethane	NR %
	p-bromofluorobenzene	107 %
	2-bromo-1-chloropropane	NR %
	d10-ethylbenzene	NR %
	d8-toluene	95 %
		%
		%

NOTES AND DEFINITIONS FOR THIS REPORT.
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ND = not detected at specified detection limit
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.
E = extrapolated value; beyond calibration range.

RADIAN CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-053

Received: 07/21/88 Results by Sample

SAMPLE ID Trip Blank FRACTION 05A TEST CODE 624 NAME Volatile Organics

Date & Time Collected not specified Category

ORGANICS ANALYSIS REPORT
VOLATILES by METHOD 624

VERIFIED TB

ANALYST KUSEL EXTRCTD FILE # 5AAG390

INSTRMT 4500A INJECTD 07/27/88 UNITS ug/L

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	74-87-3	chloromethane	ND	5.0
	74-83-9	bromomethane	ND	5.0
	75-01-4	vinyl chloride	ND	5.0
	75-00-3	chloroethane	ND	5.0
	75-09-2	methylene chloride	ND	2.8
	107-02-8	acrolein	ND	2.8
	107-13-1	acrylonitrile	ND	2.8
	75-69-4	trichlorofluoromethane	ND	5.0
	75-35-4	1,1-dichloroethene	ND	4.7
	75-34-3	1,1-dichloroethane	ND	2.8
	156-60-5	trans-1,2-dichloroethene	ND	1.6
	67-66-3	chloroform	ND	1.6
	107-06-2	1,2-dichloroethane	ND	2.8
	71-55-6	1,1,1-trichloroethane	ND	3.8
	56-23-5	carbon tetrachloride	ND	2.8
	75-27-4	bromodichloromethane	ND	2.2
	78-87-5	1,2-dichloropropane	ND	6.0
	10061-01-5	cis-1,3-dichloropropene	ND	5.0
	79-01-6	trichloroethene	ND	1.9
	124-48-1	dibromochloromethane	ND	3.1
	79-00-5	1,1,2-trichloroethane	ND	5.0
	71-43-2	benzene	ND	4.4
	10061-02-6	trans-1,3-dichloropropene	ND	5.0
	110-75-8	2-chloroethylvinyl ether	ND	5.0
	75-25-2	bromoform	ND	4.7
	127-18-4	tetrachloroethene	ND	4.1

RADIAN CORPORATION

Received: 07/21/88

RAS Perimeter REPORT
Results by Sample

Work Order # P8-07-053
Continued From Above

SAMPLE ID Trip Blank FRACTION 05A TEST CODE 624 NAME Volatile Organics
Date & Time Collected not specified Category

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	79-34-5	1,1,2,2-tetrachloroethane	ND	6.9
	108-88-3	toluene	ND	6.0
	108-90-7	chlorobenzene	ND	6.0
	100-41-4	ethylbenzene	ND	7.2
	106-46-7	1,4-dichlorobenzene	ND	5.0
	541-73-1	1,3-dichlorobenzene	ND	5.0
	95-50-1	1,2-dichlorobenzene	ND	5.0

SURROGATE RECOVERIES

SCAN	COMPOUND	RECOVERY
	d6-benzene	NR %
	d4-1,2-dichloroethane	89 %
	bromochloromethane	NR %
	p-bromofluorobenzene	103 %
	2-bromo-1-chloropropane	NR %
	d10-ethylbenzene	NR %
	d8-toluene	102 %
		%
		%

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.
E = extrapolated value; beyond calibration range.

RADIAN CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-053

Received: 07/21/88 Results by Sample

SAMPLE ID Method Blank FRACTION 06A TEST CODE 624 NAME Volatile Organics

Date & Time Collected not specified Category

ORGANICS ANALYSIS REPORT
VOLATILES by METHOD 624

VERIFIED TB

ANALYST KUSEL EXTRCTD FILE # 5AAG389

INSTRMT 4500A INJECTD 07/27/88 UNITS ug/L

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	74-87-3	chloromethane	ND	5.0
	74-83-9	bromomethane	ND	5.0
	75-01-4	vinyl chloride	ND	5.0
	75-00-3	chloroethane	ND	5.0
	75-09-2	methylene chloride	ND	2.8
	107-02-8	acrolein	ND	2.8
	107-13-1	acrylonitrile	ND	2.8
	75-69-4	trichlorofluoromethane	ND	5.0
	75-35-4	1,1-dichloroethene	ND	4.7
	75-34-3	1,1-dichloroethane	ND	2.8
	156-60-5	trans-1,2-dichloroethene	ND	1.6
	67-66-3	chloroform	ND	1.6
	107-06-2	1,2-dichloroethane	ND	2.8
	71-55-6	1,1,1-trichloroethane	ND	3.8
	56-23-5	carbon tetrachloride	ND	2.8
	75-27-4	bromodichloromethane	ND	2.2
	78-87-5	1,2-dichloropropane	ND	6.0
	10061-01-5	cis-1,3-dichloropropene	ND	5.0
	79-01-6	trichloroethene	ND	1.9
	124-48-1	dibromochloromethane	ND	3.1
	79-00-5	1,1,2-trichloroethane	ND	5.0
	71-43-2	benzene	ND	4.4
	10061-02-6	trans-1,3-dichloropropene	ND	5.0
	110-75-8	2-chloroethylvinyl ether	ND	5.0
	75-25-2	bromoform	ND	4.7
	127-18-4	tetrachloroethene	ND	4.1

RADIAN CORPORATION

Received: 07/21/88

RAS Perimeter REPORT
Results by Sample

Work Order # P8-07-053
Continued From Above

SAMPLE ID Method Blank FRACTION 06A TEST CODE 624 NAME Volatile Organics
Date & Time Collected not specified Category

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	79-34-5	1,1,2,2-tetrachloroethane	ND	6.9
	108-88-3	toluene	ND	6.0
	108-90-7	chlorobenzene	ND	6.0
	100-41-4	ethylbenzene	ND	7.2
	106-46-7	1,4-dichlorobenzene	ND	5.0
	541-73-1	1,3-dichlorobenzene	ND	5.0
	95-50-1	1,2-dichlorobenzene	ND	5.0

SURROGATE RECOVERIES

SCAN	COMPOUND	RECOVERY
	d6-benzene	NR %
	d4-1,2-dichloroethane	96 %
	bromochloromethane	NR %
	p-bromofluorobenzene	106 %
	2-bromo-1-chloropropane	NR %
	d10-ethylbenzene	NR %
	d8-toluene	105 %
		%
		%

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.
E = extrapolated value; beyond calibration range.

RADIAN CORPORATION

 RAS - Austin REPORT Work Order # 88-08-032

Received: 08/04/88 08/08/88 10:18:59 Work Not Complete

REPORT TO [illegible]ian

ATTEN [illegible]ady Spittler

CLIENT DAMES MOORE SAMPLES 4

COMPANY Dames and Moore

FACILITY

PREPARED BY Radian Analytical Services
8501 Mo-pac Bl.
PO Box 201088
Austin, TX 78720-1088

ATTEN

PHONE 512-454-4797

CERTIFIED BY

CONTACT DANIELS

Report copy to: Dames and Moore, 7101 Wisconsin Av., Suite 700, Bethesda, MD 20814, attn. Bill Adams

WORK ID Uniglass

TAKEN [illegible]B

TRANS Fed Ex

TYPE

P.O. # 253-005-01-01

INVOICE under separate cover

Footnotes and Comments

* Indicates a value less than 5 times the detection limit. Potential error for such low values ranges between 50 and 100%.

& Indicates that spike recovery for this analysis on the specific matrix was not within acceptable limits indicating an interferent present.

SAMPLE IDENTIFICATION

01	DM-5R
02	DM-6R
03	DM-7R
04	DM-8R

TEST CODES and NAMES used on this report

AG E	Silver, ICPES
AS E	Arsenic, ICPES
BE E	Beryllium, ICPES
CD E	Cadmium, ICPES
CR E	Chromium, ICPES
CU E	Copper, ICPES
DG6010	Digestion, method 6010
NH3	Nitrogen, Ammonia
NI E	Nickel, ICPES
PB E	Lead, ICPES
PHEN	Total phenolics
SB E	Antimony, ICPES
SE E	Selenium, ICPES
TL E	Thallium, ICPES
ZN E	Zinc, ICPES

AUG 08 '88 16:04 RADIAN AUS TX BLG 4 512/454-8307 P.2

RADIAN CORPORATION

Page 2 RAS - Austin REPORT Work Order # 88-08-032

Received: 08/04/88 Results By Test

Sample	SAMPLE	Test: AG E ug/ml	Test: AS E ug/ml	Test: BE E ug/ml	Test: CD E ug/ml	Test: CR E ug/ml
DM-5R	01	<0.009	<0.3	0.002*	<0.003	<0.009
DM-6R	02	<0.009	<0.3	0.002*	0.004*	<0.009
DM-7R	03	<0.009	<0.3	0.005	0.006*	0.015*
DM-8R	04	<0.009	<0.3	0.009	0.005*	0.014*

Sample	SAMPLE	Test: CU E ug/ml	Test: DG6010 date complete	Test: NH3 mg/L as N	Test: NI E ug/ml	Test: PB E ug/ml
DM-5R	01	<0.01	08/04/88	<0.02	<0.02	<0.05
DM-6R	02	0.01*	08/04/88	0.03*	0.02*	<0.05
DM-7R	03	0.02*	08/04/88	0.05*	<0.02	<0.05
DM-8R	04	0.01*	08/04/88	0.03*	<0.02	<0.05

Sample	SAMPLE	Test: PHEN mg/L as phenol	Test: SB E ug/ml	Test: SE E ug/ml	Test: TL E ug/ml	Test: ZN E ug/ml
DM-5R	01	no data	<0.06	<0.3	<0.09	0.086
DM-6R	02	no data	<0.06	<0.3	<0.09	0.052

Page 3 RAS - Austin REPORT Work Order # 88-08-032
Received: 8/04/88 Results By Test Continued From Above

Sample	SAMPLE	Test: PHEN mg/L as phenol	Test: SB E ug/ml	Test: SE E ug/ml	Test: TL E ug/ml	Test: ZN E ug/ml
DM-7R	03	no data	<0.06	<0.3	<0.09	0.23
DM-8R	04	no data	<0.06	<0.3	<0.09	0.21

	ppb	ppm
8808032-018	222.42	0.223
8808032-025	497.72	0.498
8808032-038	183.85	0.184
8808032-048	164.41	0.164 ← AVG.

08/08/88

RADIAN CORPORATION

 RAS Perimeter REPORT Work Order # P8-07-065

Received: 07/22/88 08/04/88 14:47:10

REPORT TO: Dames and Moore
7101 Wisconsin Ave. Siute 700
Bethesda, MA 20814

ATTEN: Bill Adams

CLIENT: DAMES MOORE SAMPLES: 5
COMPANY: Dames and Moore
FACILITY: 7101 Wisconsin Ave. Suite 700
Bethesda, MA 20814

WORK ID: Springs Industries #2
TAKEN: David Woodward
TRANS: Fed Ex
TYPE: Water for 625 (SV)
P.O. #:
INVOICE: under separate cover

PREPARED BY: Radian Analytical Services
Bldg. 900 Perimeter Park
Morrisville, NC 27560

ATTEN:
PHONE: 919-481-0212

CERTIFIED BY: J. F. McGill

CONTACT: M DAY

Analyzed on a DB-624 Megabore column, 30m x 0.53mm; PID & Hall detectors in series.
*-m/p xylene reported together.

SAMPLE IDENTIFICATION

01 DM-1
02 DM-3
03 DM-4
04 Trip Blank #2
05 Method Blank

TEST CODES and NAMES used on this report

601602 Purgeable Halocarbons

RAS Perimeter REPORT Work Order # P8-07-065

Received: 07/22/88

Results by Sample

SAMPLE ID DM-1 FRACTION 01A TEST CODE 601602 NAME Purgeable Halocarbons

Date & Time Collected 07/21/88 Category

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS by METHOD 601/602

ANALYST STEGER EXTRACTD FILE # D407 VERIFIED HK
INSTRMT PE4 INJECTD 07/27/88 UNITS ng/ml

CAS#	COMPOUND	RESULT	DET LIMIT
74-87-3	chloromethane	NR	0.58
74-83-9	bromomethane	NR	1.0
75-01-4	vinyl chloride	NR	0.20
75-00-3	chloroethane	NR	0.50
75-09-2	methylene chloride	NR	0.40
75-69-4	trichlorofluoromethane	NR	0.10
75-71-8	dichlorodifluoromethane	NR	0.10
75-34-3	1,1-dichloroethane	NR	0.10
156-60-5	trans-1,2-dichloroethene	NR	0.10
67-66-3	chloroform	NR	0.10
107-06-2	1,2-dichloroethane	NR	0.10
71-55-6	1,1,1-trichloroethane	NR	0.20
56-23-5	carbon tetrachloride	NR	0.20
75-27-4	bromodichloromethane	NR	0.10
78-87-5	1,2-dichloropropane	NR	0.10
10061-01-5	cis-1,3-dichloropropene	NR	0.40
124-48-1	dibromochloromethane	NR	0.20
79-00-5	1,1,2-trichloroethane	NR	0.20
10061-02-6	trans-1,3-dichloropropene	NR	0.40
100-75-8	2-chloroethylvinyl ether	NR	2.0
75-25-2	bromoform	NR	2.0
79-34-5	1,1,2,2-tetrachloroethane	NR	0.20
127-18-4	tetrachloroethene	NR	0.10
108-90-7	chlorobenzene	ND	0.20
541-73-1	1,3-dichlorobenzene	ND	0.50

SAMPLE ID DM-1 FRACTION 01A TEST CODE 601602 NAME Purgeable Halocarbons
Date & Time Collected 07/21/88 Category

CAS#	COMPOUND	RESULT	DET LIMIT
95-50-1	1,2-dichlorobenzene	ND	0.20
106-46-7	1,4-dichlorobenzene	ND	0.20
71-43-2	benzene	ND	0.10
108-88-3	toluene	ND	0.30
100-41-4	ethylbenzene	17	0.10
108-38-3	m-xylene	26	0.30
95-47-6	o-xylene	16	0.40
106-42-3	p-xylene	*	0.10
75-35-4	1,1-dichloroethene	NR	0.10
79-01-6	trichloroethene	NR	0.10

INTERNAL STANDARDS

540-36-3	1-4-difluorobenzene	75	% Recovery
460-00-4	1-bromo-4-fluorobenzene	100	% Recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

SAMPLE ID DM-3 FRACTION 02A TEST CODE 601602 NAME Purgeable Halocarbons
Date & Time Collected 07/21/88 Category

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS by METHOD 601/602

ANALYST STEGER EXTRACTD FILE # D407 VERIFIED HK
INSTRMT PE4 INJECTD 07/27/88 UNITS ng/ml

CAS#	COMPOUND	RESULT	DET LIMIT
74-87-3	chloromethane	NR	0.58
74-83-9	bromomethane	NR	1.0
75-01-4	vinyl chloride	NR	0.20
75-00-3	chloroethane	NR	0.50
75-09-2	methylene chloride	NR	0.40
75-69-4	trichlorofluoromethane	NR	0.10
75-71-8	dichlorodifluoromethane	NR	0.10
75-34-3	1,1-dichloroethane	NR	0.10
156-60-5	trans-1,2-dichloroethene	NR	0.10
67-66-3	chloroform	NR	0.10
107-06-2	1,2-dichloroethane	NR	0.10
71-55-6	1,1,1-trichloroethane	NR	0.20
56-23-5	carbon tetrachloride	NR	0.20
75-27-4	bromodichloromethane	NR	0.10
78-87-5	1,2-dichloropropane	NR	0.10
10061-01-5	cis-1,3-dichloropropene	NR	0.40
124-48-1	dibromochloromethane	NR	0.20
79-00-5	1,1,2-trichloroethane	NR	0.20
10061-02-6	trans-1,3-dichloropropene	NR	0.40
100-75-8	2-chloroethylvinyl ether	NR	2.0
75-25-2	bromoform	NR	2.0
79-34-5	1,1,2,2-tetrachloroethane	NR	0.20
127-18-4	tetrachloroethene	NR	0.10
108-90-7	chlorobenzene	ND	0.20
541-73-1	1,3-dichlorobenzene	ND	0.50

SAMPLE ID DM-3 FRACTION 02A TEST CODE 601602 NAME Purgeable Halocarbons
Date & Time Collected 07/21/88 Category

CAS#	COMPOUND	RESULT	DET LIMIT
95-50-1	1,2-dichlorobenzene	ND	0.20
106-46-7	1,4-dichlorobenzene	ND	0.20
71-43-2	benzene	ND	0.10
108-88-3	toluene	1.1	0.30
100-41-4	ethylbenzene	.56	0.10
108-38-3	m-xylene	ND	0.30
95-47-6	o-xylene	ND	0.40
106-42-3	p-xylene	*	0.10
75-35-4	1,1-dichloroethene	NR	0.10
79-01-6	trichloroethene	NR	0.10

INTERNAL STANDARDS

540-36-3	1-4-difluorobenzene	100	% Recovery
460-00-4	1-bromo-4-fluorobenzene	100	% Recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

SAMPLE ID DM-4 FRACTION 03A TEST CODE 601602 NAME Purgeable Halocarbons
Date & Time Collected 07/21/88 Category

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS by METHOD 601/602

ANALYST STEGER EXTRACTD FILE # D4072 VERIFIED HK
INSTRMT PE4 INJECTD 07/27/88 UNITS ng/ml

CAS#	COMPOUND	RESULT	DET LIMIT
74-87-3	chloromethane	NR	0.58
74-83-9	bromomethane	NR	1.0
75-01-4	vinyl chloride	NR	0.20
75-00-3	chloroethane	NR	0.50
75-09-2	methylene chloride	NR	0.40
75-69-4	trichlorofluoromethane	NR	0.10
75-71-8	dichlorodifluoromethane	NR	0.10
75-34-3	1,1-dichloroethane	NR	0.10
156-60-5	trans-1,2-dichloroethene	NR	0.10
67-66-3	chloroform	NR	0.10
107-06-2	1,2-dichloroethane	NR	0.10
71-55-6	1,1,1-trichloroethane	NR	0.20
56-23-5	carbon tetrachloride	NR	0.20
75-27-4	bromodichloromethane	NR	0.10
78-87-5	1,2-dichloropropane	NR	0.10
10061-01-5	cis-1,3-dichloropropene	NR	0.40
124-48-1	dibromochloromethane	NR	0.20
79-00-5	1,1,2-trichloroethane	NR	0.20
10061-02-6	trans-1,3-dichloropropene	NR	0.40
100-75-8	2-chloroethylvinyl ether	NR	2.0
75-25-2	bromoform	NR	2.0
79-34-5	1,1,2,2-tetrachloroethane	NR	0.20
127-18-4	tetrachloroethene	NR	0.10
108-90-7	chlorobenzene	ND	0.20
541-73-1	1,3-dichlorobenzene	ND	0.50

SAMPLE ID DM-4 FRACTION 03A TEST CODE 601602 NAME Purgeable Halocarbons
Date & Time Collected 07/21/88 Category

CAS#	COMPOUND	RESULT	DET LIMIT
95-50-1	1,2-dichlorobenzene	ND	0.20
106-46-7	1,4-dichlorobenzene	ND	0.20
71-43-2	benzene	ND	0.10
108-88-3	toluene	1.8	0.30
100-41-4	ethylbenzene	ND	0.10
108-38-3	m-xylene	4.1	0.30
95-47-6	o-xylene	ND	0.40
106-42-3	p-xylene	*	0.10
75-35-4	1,1-dichloroethene	NR	0.10
79-01-6	trichloroethene	NR	0.10

INTERNAL STANDARDS

540-36-3	1-4-difluorobenzene	100	% Recovery
460-00-4	1-bromo-4-fluorobenzene	100	% Recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

Received: 07/22/88 Results by Sample

SAMPLE ID Trip Blank #2 FRACTION 04A TEST CODE 601602 NAME Purgeable Halocarbons
Date & Time Collected 07/21/88 Category

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS by METHOD 601/602

ANALYST STEGER EXTRACTD FILE # D4072 VERIFIED HK
INSTRMT PE4 INJECTD 07/27/88 UNITS ng/ml

CAS#	COMPOUND	RESULT	DET LIMIT
74-87-3	chloromethane	NR	0.58
74-83-9	bromomethane	NR	1.0
75-01-4	vinyl chloride	NR	0.20
75-00-3	chloroethane	NR	0.50
75-09-2	methylene chloride	NR	0.40
75-69-4	trichlorofluoromethane	NR	0.10
75-71-8	dichlorodifluoromethane	NR	0.10
75-34-3	1,1-dichloroethane	NR	0.10
156-60-5	trans-1,2-dichloroethene	NR	0.10
67-66-3	chloroform	NR	0.10
107-06-2	1,2-dichloroethane	NR	0.10
71-55-6	1,1,1-trichloroethane	NR	0.20
56-23-5	carbon tetrachloride	NR	0.20
75-27-4	bromodichloromethane	NR	0.10
78-87-5	1,2-dichloropropane	NR	0.10
10061-01-5	cis-1,3-dichloropropene	NR	0.40
124-48-1	dibromochloromethane	NR	0.20
79-00-5	1,1,2-trichloroethane	NR	0.20
10061-02-6	trans-1,3-dichloropropene	NR	0.40
100-75-8	2-chloroethylvinyl ether	NR	2.0
75-25-2	bromoform	NR	2.0
79-34-5	1,1,2,2-tetrachloroethane	NR	0.20
127-18-4	tetrachloroethene	NR	0.10
108-90-7	chlorobenzene	ND	0.20
541-73-1	1,3-dichlorobenzene	ND	0.50

SAMPLE ID Trip Blank #2 FRACTION 04A TEST CODE 601602 NAME Purgeable Halocarbons
Date & Time Collected 07/21/88 Category

CAS#	COMPOUND	RESULT	DET LIMIT
95-50-1	1,2-dichlorobenzene	ND	0.20
106-46-7	1,4-dichlorobenzene	ND	0.20
71-43-2	benzene	ND	0.10
108-88-3	toluene	ND	0.30
100-41-4	ethylbenzene	ND	0.10
108-38-3	m-xylene	ND	0.30
95-47-6	o-xylene	ND	0.40
106-42-3	p-xylene	*	0.10
75-35-4	1,1-dichloroethene	NR	0.10
79-01-6	trichloroethene	NR	0.10

INTERNAL STANDARDS

540-36-3	1-4-difluorobenzene	100	% Recovery
460-00-4	1-bromo-4-fluorobenzene	100	% Recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

SAMPLE ID Method Blank FRACTION 05A TEST CODE 601602 NAME Purgeable Halocarbons
Date & Time Collected not specified Category

ORGANIC ANALYSIS DATA SHEET
VOLATILE COMPOUNDS by METHOD 601/602

ANALYST STEGER EXTRACTD FILE # D407 VERIFIED HK
INSTRMT PE4 INJECTD 07/27/88 UNITS ng/ml

CAS#	COMPOUND	RESULT	DET LIMIT
74-87-3	chloromethane	NR	0.58
74-83-9	bromomethane	NR	1.0
75-01-4	vinyl chloride	NR	0.20
75-00-3	chloroethane	NR	0.50
75-09-2	methylene chloride	NR	0.40
75-69-4	trichlorofluoromethane	NR	0.10
75-71-8	dichlorodifluoromethane	NR	0.10
75-34-3	1,1-dichloroethane	NR	0.10
156-60-5	trans-1,2-dichloroethene	NR	0.10
67-66-3	chloroform	NR	0.10
107-06-2	1,2-dichloroethane	NR	0.10
71-55-6	1,1,1-trichloroethane	NR	0.20
56-23-5	carbon tetrachloride	NR	0.20
75-27-4	bromodichloromethane	NR	0.10
78-87-5	1,2-dichloropropane	NR	0.10
10061-01-5	cis-1,3-dichloropropene	NR	0.40
124-48-1	dibromochloromethane	NR	0.20
79-00-5	1,1,2-trichloroethane	NR	0.20
10061-02-6	trans-1,3-dichloropropene	NR	0.40
100-75-8	2-chloroethylvinyl ether	NR	2.0
75-25-2	bromoform	NR	2.0
79-34-5	1,1,2,2-tetrachloroethane	NR	0.20
127-18-4	tetrachloroethene	NR	0.10
108-90-7	chlorobenzene	ND	0.20
541-73-1	1,3-dichlorobenzene	ND	0.50

SAMPLE ID Method Blank FRACTION 05A TEST CODE 601602 NAME Purgeable Halocarbons
Date & Time Collected not specified Category

CAS#	COMPOUND	RESULT	DET LIMIT
95-50-1	1,2-dichlorobenzene	ND	0.20
106-46-7	1,4-dichlorobenzene	ND	0.20
71-43-2	benzene	ND	0.10
108-88-3	toluene	ND	0.30
100-41-4	ethylbenzene	ND	0.10
108-38-3	m-xylene	ND	0.30
95-47-6	o-xylene	ND	0.40
106-42-3	p-xylene	*	0.10
75-35-4	1,1-dichloroethene	NR	0.10
79-01-6	trichloroethene	NR	0.10

INTERNAL STANDARDS

540-36-3	1-4-difluorobenzene	88	% Recovery
460-00-4	1-bromo-4-fluorobenzene	100	% Recovery

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

RAS Perimeter REPORT Work Order # P8-07-048

Received: 07/21/88 08/04/88 09:03:07

REPORT TO: Dames and Moore
7101 Wisconsin Ave. Suite 700
Bethesda, MA 20814

ATTEN: Bill Adams

CLIENT: DAMES MOORE SAMPLES: 6
COMPANY: Dames and Moore
FACILITY: 7101 Wisconsin Ave. Suite 700
Bethesda, MA 20814

WORK ID: Springs Industries #1
TAKEN: David Woodward
TRANS: Fed Ex
TYPE: Water for 625 (SV)
P.O. #:
INVOICE: under separate cover

PREPARED BY: Radian Analytical Services
Bldg. 540 Perimeter Park
Morrisville, NC 27560

ATTEN:
PHONE: 919-481-0712

CERTIFIED BY:

CONTACT: M DAY

SAMPLE IDENTIFICATION

01 DM-5 (005)
02 DM-6 (006)
03 DM-7 (007)
04 DM-8 (008)
05 Matrix Spike
06 Method Blank

TEST CODES and NAMES used on this report

625 Semivolatile Organics
EXT L Extraction for liquid

RAS Perimeter REPORT

Work Order # P8-07-048

Received: 07/21/88

Results By Test

TEST CODE default units	Sample 01 (entered units)	Sample 02 (entered units)	Sample 03 (entered units)	Sample 04 (entered units)	Sample 05 (entered units)
EXT_L date completed	07/22/88	07/22/88	07/22/88	07/22/88	07/22/88

TEST CODE default units	Sample 06 (entered units)
EXT_L date completed	07/22/88

PAS Perimeter REPORT Work Order # P8-07-048

Received: 07/21/88

Results By Test

SAMPLE Sample Id	Test: EXT L date completed
01	07/22/88
DM-5 (005) 02	07/22/88
DM-6 (006) 03	07/22/88
DM-7 (007) 04	07/22/88
DM-8 (008) 05	07/22/88
Matrix Spike 06	07/22/88
Method Blank	

Received. 07/21/88

RAS Perimeter REPORT
Results by Sample

Work Order # P8-07-048

SAMPLE ID DM-5 (005)

SAMPLE # 01 FRACTIONS: A

Date & Time Collected 07/20/88 Category

EXT L 07/22/88
date completed

RAS Perimeter REPORT Work Order # P8-07-048

Received: 07/21/88

Results by Sample

SAMPLE ID DM-5 (005) FRACTION Q1A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected 07/20/88 Category

ORGANICS ANALYSIS DATA SHEET
SEMIVOLATILE COMPOUNDS by METHOD 625

ANALYST CARLETON EXTRCTD 07/22/88 FILE # F681437 VERIFIED RP
INSTRMT [illegible] INJECTD 07/27/88 UNITS ug/L

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	62-75-9	n-nitrosodimethylamine	ND	10
	108-95-2	phenol	ND	1.5
	111-44-4	bis(2-chloroethyl) ether	ND	3.7
	95-57-8	2-chlorophenol	ND	3.3
	541-73-1	1,3-dichlorobenzene	ND	1.9
	106-46-7	1,4-dichlorobenzene	ND	4.4
	95-50-1	1,2-dichlorobenzene	ND	1.9
	108-60-1	bis(2-chloroisopropyl)ether	ND	5.7
	621-64-7	n-nitroso-di-n-propylamine	ND	12
	67-72-1	hexachloroethane	ND	1.6
	98-95-3	nitrobenzene	ND	1.9
	78-59-1	isophorone	ND	2.2
	88-75-5	2-nitrophenol	ND	3.6
	105-67-9	2,4-dimethylphenol	ND	2.7
	111-91-1	bis(2-chloroethoxy)methane	ND	3.3
	120-83-2	2,4-dichlorophenol	ND	2.7
	120-82-1	1,2,4-trichlorobenzene	ND	1.9
	91-20-3	naphthalene	ND	1.6
	87-68-3	hexachlorobutadiene	ND	0.90
	59-50-7	4-chloro-3-methylphenol	ND	3.0
	77-47-4	hexachlorocyclopentadiene	ND	6.0
	88-06-2	2,4,6-trichlorophenol	ND	2.7
	91-58-7	2-chloronaphthalene	ND	1.9
	131-11-3	dimethyl phthalate	ND	1.6
	208-96-8	acenaphthylene	ND	3.5
	83-32-9	acenaphthene	ND	1.9
	51-28-5	2,4-dinitrophenol	ND	42

Received: 07/21/88

RAS Perimeter REPORT

Results by Sample

Work Order # P8-07-048

Continued From Above

SAMPLE ID DM-5 (005) FRACTION 01A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected 07/20/88 Category

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	100-02-7	4-nitrophenol	ND	2.4
	606-20-2	2,6-dinitrotoluene	ND	1.9
	121-14-2	2,4-dinitrotoluene	ND	5.7
	84-66-2	diethylphthalate	ND	1.9
	7005-72-3	4-chlorophenyl-phenylether	ND	4.2
	86-73-7	fluorene	ND	1.9
	534-52-1	4,6-dinitro-2-methylphenol	ND	24
	86-30-6	n-nitrosodiphenylamine	ND	1.9
	101-55-3	4-bromophenyl-phenylether	ND	1.9
	118-74-1	hexachlorobenzene	ND	1.9
	87-86-5	pentachlorophenol	ND	3.6
	85-01-8	phenanthrene	ND	5.4
	120-12-7	anthracene	ND	1.9
	84-74-2	di-n-butylphthalate	ND	2.5
	206-44-0	fluoranthene	ND	2.2
	92-87-5	benzidine	ND	44
	129-00-0	pyrene	ND	1.9
	85-68-7	butylbenzylphthalate	ND	2.5
	91-94-1	3,3'-dichlorobenzidine	ND	17
	56-55-3	benzo(a)anthracene	ND	7.8
	117-81-7	bis(2-ethylhexyl)phthalate	14	2.5
	218-01-9	chrysene	ND	2.5
	117-84-0	di-n-octyl phthalate	ND	2.5
	205-99-2	benzo(b)fluoranthene	ND	4.8
	207-08-9	benzo(k)fluoranthene	ND	2.5
	50-32-8	benzo(a)pyrene	ND	2.5
	193-39-5	indeno(1,2,3-cd)pyrene	ND	3.7
	53-70-3	dibenz(a,h)anthracene	ND	2.5
	191-24-2	benzo(ghi)perylene	ND	4.1

RAS Perimeter REPORT

Work Order # P8-07-048

Received: 07/21/88

Results by Sample

Continued From Above

SAMPLE ID DM-5 (005) FRACTION 01A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected 07/20/88 Category

SURROGATE RECOVERIES

SCAN	COMPOUND	RECOVERY
	2-fluorophenol	44 %
	d5-phenol	45 %
	d5-nitrobenzene	62 %
	2-fluorobiphenyl	69 %
	2,4,6-tribromophenol	90 %
	d14-terphenyl	40 %

NOTES AND DEFINITIONS FOR THIS REPORT.

DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

RAS Perimeter REPORT

Work Order # P8-07-048

Received: 07/21/88

Results by Sample

SAMPLE ID DM-6 (006)

SAMPLE # 02 FRACTIONS: A

Date & Time Collected 07/20/88 Category

EXT L 07/22/88
date completed

RAS Perimeter REPORT Work Order # P8-07-048

Received: 07/21/88

Results by Sample

SAMPLE ID DM-6 (006) FRACTION 02A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected 07/20/88 Category

ORGANICS ANALYSIS DATA SHEET
SEMIVOLATILE COMPOUNDS by METHOD 625

ANALYST CARLETON EXTRCTD 07/22/88 FILE # F881434 VERIFIED RP
INSTRMT TS08 INJECTD 07/27/88 UNITS ug/L

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	62-75-9	n-nitrosodimethylamine	ND	10
	108-95-2	phenol	ND	1.5
	111-44-4	bis(2-chloroethyl) ether	ND	5.7
	95-57-8	2-chlorophenol	ND	3.3
	541-73-1	1,3-dichlorobenzene	ND	1.9
	106-46-7	1,4-dichlorobenzene	ND	4.4
	95-50-1	1,2-dichlorobenzene	ND	1.9
	108-60-1	bis(2-chloroisopropyl)ether	ND	5.7
	621-64-7	n-nitroso-di-n-propylamine	ND	12
	67-72-1	hexachloroethane	ND	1.6
	98-95-3	nitrobenzene	ND	1.9
	78-59-1	isophorone	ND	2.2
	88-75-5	2-nitrophenol	ND	3.6
	105-67-9	2,4-dimethylphenol	ND	2.7
	111-91-1	bis(2-chloroethoxy)methane	ND	5.3
	120-83-2	2,4-dichlorophenol	ND	2.7
	120-82-1	1,2,4-trichlorobenzene	ND	1.9
	91-20-3	naphthalene	ND	1.6
	87-68-3	hexachlorobutadiene	ND	0.90
	59-50-7	4-chloro-3-methylphenol	ND	3.0
	77-47-4	hexachlorocyclopentadiene	ND	6.0
	88-06-2	2,4,6-trichlorophenol	ND	2.7
	91-58-7	2-chloronaphthalene	ND	1.9
	131-11-3	dimethyl phthalate	ND	1.6
	208-96-8	acenaphthylene	ND	3.5
	83-32-9	acenaphthene	ND	1.9
	51-28-5	2,4-dinitrophenol	ND	42

SAMPLE ID DM-6 (006) FRACTION 02A TEST CODE 625 NAME Semivolatile Organics
Date & Time Collected 07/20/88 Category

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	100-02-7	4-nitrophenol	ND	2.4
	606-20-2	2,6-dinitrotoluene	ND	1.9
	121-14-2	2,4-dinitrotoluene	ND	5.7
	84-66-2	diethylphthalate	ND	1.9
	7005-72-3	4-chlorophenyl-phenylether	ND	4.2
	86-73-7	fluorene	ND	1.5
	534-52-1	4,6-dinitro-2-methylphenol	ND	24
	86-30-6	n-nitrosodiphenylamine	ND	1.9
	101-55-3	4-bromophenyl-phenylether	ND	1.9
	118-74-1	hexachlorobenzene	ND	1.9
	87-86-5	pentachlorophenol	ND	3.6
	85-01-8	phenanthrene	ND	5.4
	120-12-7	anthracene	ND	1.9
	84-74-2	di-n-butylphthalate	ND	2.5
	206-44-0	fluoranthene	ND	2.2
	92-87-5	benzidine	ND	44
	129-00-0	pyrene	ND	1.9
	85-68-7	butylbenzylphthalate	ND	2.5
	91-94-1	3,3'-dichlorobenzidine	ND	17
	56-55-3	benzo(a)anthracene	ND	7.8
	117-81-7	bis(2-ethylhexyl)phthalate	4 J	2.5
	218-01-9	chrysene	ND	2.5
	117-84-0	di-n-octyl phthalate	ND	2.5
	205-99-2	benzo(b)fluoranthene	ND	4.8
	207-08-9	benzo(k)fluoranthene	ND	2.5
	50-32-8	benzo(a)pyrene	ND	2.5
	193-39-5	indeno(1,2,3-cd)pyrene	ND	3.7
	53-70-3	dibenz(a,h)anthracene	ND	2.5
	191-24-2	benzo(ghi)perylene	ND	4.1

SAMPLE ID DM-6 (006) FRACTION 02A TEST CODE 625 NAME Semivolatile Organics
Date & Time Collected 07/20/88 Category

SURROGATE RECOVERIES

SCAN	COMPOUND	RECOVERY
	2-fluorophenol	47 %
	d5-phenol	43 %
	d5-nitrobenzene	65 %
	2-fluorobiphenyl	72 %
	2,4,6-tribromophenol	69 %
	d14-terphenyl	45 %

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

Received: 07/21/88

Results by Sample

SAMPLE ID DM-7 (007)

SAMPLE # 03 FRACTIONS: A

Date & Time Collected 07/20/88 Category

EXT L 07/22/88
date completed

RAS Perimeter REPORT

Work Order # P8-07-048

Received: 07/21/88

Results by Sample

SAMPLE ID DM-7 (007) FRACTION 03A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected 07/20/88 Category

ORGANICS ANALYSIS DATA SHEET
SEMIVOLATILE COMPOUNDS by METHOD 625

ANALYST CARLETON EXTRCTD 07/22/88 FILE # F881438 VERIFIED RP
INSTRMT 4500B INJECTD 07/27/88 UNITS ug/L

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	62-75-9	n-nitrosodimethylamine	ND	10
	108-95-2	phenol	ND	1.5
	111-44-4	bis(2-chloroethyl) ether	ND	5.7
	95-57-8	2-chlorophenol	ND	3.3
	541-73-1	1,3-dichlorobenzene	ND	1.9
	106-46-7	1,4-dichlorobenzene	ND	4.4
	95-50-1	1,2-dichlorobenzene	ND	1.9
	108-60-1	bis(2-chloroisopropyl)ether	ND	5.7
	621-64-7	n-nitroso-di-n-propylamine	ND	12
	67-72-1	hexachloroethane	ND	1.6
	98-95-3	nitrobenzene	ND	1.9
	78-59-1	isophorone	ND	2.2
	88-75-5	2-nitrophenol	ND	3.6
	105-67-9	2,4-dimethylphenol	ND	2.7
	111-91-1	bis(2-chloroethoxy)methane	ND	5.3
	120-83-2	2,4-dichlorophenol	ND	2.7
	120-82-1	1,2,4-trichlorobenzene	ND	1.9
	91-20-3	naphthalene	ND	1.6
	87-68-3	hexachlorobutadiene	ND	0.90
	59-50-7	4-chloro-3-methylphenol	ND	3.0
	77-47-4	hexachlorocyclopentadiene	ND	6.0
	88-06-2	2,4,6-trichlorophenol	ND	2.7
	91-58-7	2-chloronaphthalene	ND	1.9
	131-11-3	dimethyl phthalate	ND	1.6
	208-96-8	acenaphthylene	ND	3.5
	83-32-9	acenaphthene	ND	1.9
	51-28-5	2,4-dinitrophenol	ND	42

RAS Perimeter REPORT

Work Order # P8-07-048

Received: 07/21/88

Results by Sample

Continued From Above

SAMPLE ID DM-7 (007) FRACTION 03A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected 07/20/88 Category

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	100-02-7	4-nitrophenol	ND	2.4
	606-20-2	2,6-dinitrotoluene	ND	1.9
	121-14-2	2,4-dinitrotoluene	ND	5.7
	84-66-2	diethylphthalate	ND	1.9
	7005-72-3	4-chlorophenyl-phenylether	ND	4.2
	86-73-7	fluorene	ND	1.9
	534-52-1	4,6-dinitro-2-methylphenol	ND	24
	86-30-6	n-nitrosodiphenylamine	ND	1.9
	101-55-3	4-bromophenyl-phenylether	ND	1.9
	118-74-1	hexachlorobenzene	ND	1.9
	87-86-5	pentachlorophenol	ND	3.6
	85-01-8	phenanthrene	ND	5.4
	120-12-7	anthracene	ND	1.9
	84-74-2	di-n-butylphthalate	ND	2.5
	206-44-0	fluoranthene	ND	2.2
	92-87-5	benzidine	ND	44
	129-00-0	pyrene	ND	1.9
	85-68-7	butylbenzylphthalate	ND	2.5
	91-94-1	3,3'-dichlorobenzidine	ND	17
	56-55-3	benzo(a)anthracene	ND	7.8
	117-81-7	bis(2-ethylhexyl)phthalate	8	2.5
	218-01-9	chrysene	ND	2.5
	117-84-0	di-n-octyl phthalate	ND	2.5
	205-99-2	benzo(b)fluoranthene	ND	4.8
	207-08-9	benzo(k)fluoranthene	ND	2.5
	50-32-8	benzo(a)pyrene	ND	2.5
	193-39-5	indeno(1,2,3-cd)pyrene	ND	3.7
	53-70-3	dibenz(a,h)anthracene	ND	2.5
	191-24-2	benzo(ghi)perylene	ND	4.1

RAS Perimeter REPORT

Work Order # P8-07-048

Received: 07/21/88

Results by Sample

Continued From Above

SAMPLE ID DM-7 (007) FRACTION 03A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected 07/20/88 Category

SURROGATE RECOVERIES

SCAN	COMPOUND	RECOVERY
	2-fluorophenol	36 %
	d5-phenol	49 %
	d5-nitrobenzene	49 %
	2-fluorobiphenyl	56 %
	2,4,6-tribromophenol	81 %
	d14-terphenyl	24 %

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

Received: 07/21/88

Results by Sample

SAMPLE ID DM-8 (008) SAMPLE # 04 FRACTIONS: A

Date & Time Collected 07/20/88 Category

EXT L 07/22/88
date completed

RAS Perimeter REPORT

Work Order # P8-07-048

Received: 07/21/88

Results by Sample

SAMPLE ID DM-8 (008) FRACTION 04A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected 07/20/88 Category

ORGANICS ANALYSIS DATA SHEET
SEMIVOLATILE COMPOUNDS by METHOD 625

ANALYST CARLETON EXTRCTD 07/22/88 FILE # F881440 VERIFIED RP
INSTRMT 4500B INJECTD 07/27/88 UNITS ug/L

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	62-75-9	n-nitrosodimethylamine	ND	10
	108-95-2	phenol	ND	1.5
	111-44-4	bis(2-chloroethyl) ether	ND	5.7
	95-57-8	2-chlorophenol	ND	3.3
	541-73-1	1,3-dichlorobenzene	ND	1.9
	106-46-7	1,4-dichlorobenzene	ND	4.4
	95-50-1	1,2-dichlorobenzene	ND	1.9
	108-60-1	bis(2-chloroisopropyl)ether	ND	5.7
	621-64-7	n-nitroso-di-n-propylamine	ND	12
	67-72-1	hexachloroethane	ND	1.6
	98-95-3	nitrobenzene	ND	1.9
	78-59-1	isophorone	ND	2.2
	88-75-5	2-nitrophenol	ND	3.6
	105-67-9	2,4-dimethylphenol	ND	2.7
	111-91-1	bis(2-chloroethoxy)methane	ND	5.3
	120-83-2	2,4-dichlorophenol	ND	2.7
	120-82-1	1,2,4-trichlorobenzene	ND	1.9
	91-20-3	naphthalene	ND	1.6
	87-68-3	hexachlorobutadiene	ND	0.90
	59-50-7	4-chloro-3-methylphenol	ND	3.0
	77-47-4	hexachlorocyclopentadiene	ND	6.0
	88-06-2	2,4,6-trichlorophenol	ND	2.7
	91-58-7	2-chloronaphthalene	ND	1.9
	131-11-3	dimethyl phthalate	ND	1.6
	208-96-8	acenaphthylene	ND	3.5
	83-32-9	acenaphthene	ND	1.9
	51-28-5	2,4-dinitrophenol	ND	42

RAS Perimeter REPORT

Work Order # P8-07-048

Received: 07/21/88

Results by Sample

Continued From Above

SAMPLE ID DM-8 (008) FRACTION 04A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected 07/20/88 Category

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	100-02-7	4-nitrophenol	ND	2.4
	606-20-2	2,6-dinitrotoluene	ND	1.9
	121-14-2	2,4-dinitrotoluene	ND	5.7
	84-66-2	diethylphthalate	ND	1.9
	7005-72-3	4-chlorophenyl-phenylether	ND	4.2
	86-73-7	fluorene	ND	1.9
	534-52-1	4,6-dinitro-2-methylphenol	ND	24
	86-30-6	n-nitrosodiphenylamine	3 J	1.9
	101-55-3	4-bromophenyl-phenylether	ND	1.9
	118-74-1	hexachlorobenzene	ND	1.9
	87-86-5	pentachlorophenol	ND	3.6
	85-01-8	phenanthrene	ND	5.4
	120-12-7	anthracene	ND	1.9
	84-74-2	di-n-butylphthalate	ND	2.5
	206-44-0	fluoranthene	ND	2.2
	92-87-5	benzidine	ND	44
	129-00-0	pyrene	ND	1.9
	85-68-7	butylbenzylphthalate	ND	2.5
	91-94-1	3,3'-dichlorobenzidine	ND	17
	56-55-3	benzo(a)anthracene	ND	7.8
	117-81-7	bis(2-ethylhexyl)phthalate	ND	2.5
	218-01-9	chrysene	ND	2.5
	117-84-0	di-n-octyl phthalate	ND	2.5
	205-99-2	benzo(b)fluoranthene	ND	4.8
	207-08-9	benzo(k)fluoranthene	ND	2.5
	50-32-8	benzo(a)pyrene	ND	2.5
	193-39-5	indeno(1,2,3-cd)pyrene	ND	3.7
	53-70-3	dibenz(a,h)anthracene	ND	2.5
	191-24-2	benzo(ghi)perylene	ND	4.1

RAS Perimeter REPORT

Work Order # P8-07-048

Received: 07/21/88

Results by Sample

Continued From Above

SAMPLE ID DM-8 (008) FRACTION 04A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected 07/20/88 Category

SURROGATE RECOVERIES

SCAN	COMPOUND	RECOVERY
	2-fluorophenol	32 %
	d5-phenol	44 %
	d5-nitrobenzene	42 %
	2-fluorobiphenyl	54 %
	2,4,6-tribromophenol	74 %
	d14-terphenyl	44 %

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

SAMPLE ID Matrix Spike SAMPLE # 05 FRACTIONS: A
Date & Time Collected not specified Category

EXT L 07/22/88
date completed

Received: 07/21/88

Results by Sample

SAMPLE ID Matrix Spike FRACTION 05A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected not specified Category

ORGANICS ANALYSIS DATA SHEET
SEMIVOLATILE COMPOUNDS by METHOD 625

ANALYST CARLETON EXTRCTD 07/22/88 FILE # F881439 VERIFIED RP
INSTRMT 4500H INJECTD 07727788 UNITS % recov

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	62-75-9	n-nitrosodimethylamine	NR	10
	108-95-2	phenol	53	1.5
	111-44-4	bis(2-chloroethyl) ether	NR	5.7
	95-57-8	2-chlorophenol	64	3.3
	541-73-1	1,3-dichlorobenzene	NR	1.9
	106-46-7	1,4-dichlorobenzene	12	4.4
	95-50-1	1,2-dichlorobenzene	NR	1.9
	108-60-1	bis(2-chloroisopropyl)ether	NR	5.7
	621-64-7	n-nitroso-di-n-propylamine	53	12
	67-72-1	hexachloroethane	NR	1.6
	98-95-3	nitrobenzene	NR	1.9
	78-59-1	isophorone	NR	2.2
	88-75-5	2-nitrophenol	NR	3.6
	105-67-9	2,4-dimethylphenol	NR	2.7
	111-91-1	bis(2-chloroethoxy)methane	NR	5.3
	120-83-2	2,4-dichlorophenol	NR	2.7
	120-82-1	1,2,4-trichlorobenzene	15	1.9
	91-20-3	naphthalene	NR	1.6
	87-68-3	hexachlorobutadiene	NR	0.90
	59-50-7	4-chloro-3-methylphenol	76	3.0
	77-47-4	hexachlorocyclopentadiene	NR	6.0
	88-06-2	2,4,6-trichlorophenol	NR	2.7
	91-58-7	2-chloronaphthalene	NR	1.9
	131-11-3	dimethyl phthalate	NR	1.6
	208-96-8	acenaphthylene	NR	3.5
	83-32-9	acenaphthene	39	1.9
	51-28-5	2,4-dinitrophenol	NR	42

RAS Perimeter REPORT

Work Order # P8-07-048

Received: 07/21/88

Results by Sample

Continued From Above

SAMPLE ID Matrix Spike FRACTION 05A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected not specified Category

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	100-02-7	4-nitrophenol	73	2.4
	606-20-2	2,6-dinitrotoluene	NR	1.9
	121-14-2	2,4-dinitrotoluene	73	5.7
	84-66-2	diethylphthalate	NR	1.9
	7005-72-3	4-chlorophenyl-phenylether	NR	4.2
	86-73-7	fluorene	NR	1.9
	534-52-1	4,6-dinitro-2-methylphenol	NR	24
	86-30-6	n-nitrosodiphenylamine	NR	1.9
	101-55-3	4-bromophenyl-phenylether	NR	1.9
	118-74-1	hexachlorobenzene	NR	1.9
	87-86-5	pentachlorophenol	77	3.6
	85-01-8	phenanthrene	NR	5.4
	120-12-7	anthracene	NR	1.9
	84-74-2	di-n-butylphthalate	NR	2.5
	206-44-0	fluoranthene	NR	2.2
	92-87-5	benzidine	NR	44
	129-00-0	pyrene	73	1.9
	85-68-7	butylbenzylphthalate	NR	2.5
	91-94-1	3,3'-dichlorobenzidine	NR	17
	56-55-3	benzo(a)anthracene	NR	7.8
	117-81-7	bis(2-ethylhexyl)phthalate	NR	2.5
	218-01-9	chrysene	NR	2.5
	117-84-0	di-n-octyl phthalate	NR	2.5
	205-99-2	benzo(b)fluoranthene	NR	4.8
	207-08-9	benzo(k)fluoranthene	NR	2.5
	50-32-8	benzo(a)pyrene	NR	2.5
	193-39-5	indeno(1,2,3-cd)pyrene	NR	3.7
	53-70-3	dibenz(a,h)anthracene	NR	2.5
	191-24-2	benzo(ghi)perylene	NR	4.1

SAMPLE ID Matrix Spike FRACTION Q5A TEST CODE 625 NAME Semivolatile Organics
Date & Time Collected not specified Category

SURROGATE RECOVERIES

SCAN	COMPOUND	RECOVERY
	2-fluorophenol	38 %
	d5-phenol	53 %
	d5-nitrobenzene	51 %
	2-fluorobiphenyl	56 %
	2,4,6-tribromophenol	89 %
	d14-terphenyl	53 %

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

Received: 07/21/88 Results by Sample

SAMPLE ID Method Blank SAMPLE # 06 FRACTIONS: A
Date & Time Collected not specified Category

EXT L 07/22/88
date completed

Received: 07/21/88

Results by Sample

SAMPLE ID Method Blank FRACTION 06A TEST CODE 625 NAME Semivolatile Organics

Date & Time Collected not specified Category

ORGANICS ANALYSIS DATA SHEET
SEMIVOLATILE COMPOUNDS by METHOD 625

ANALYST CARLETON EXTRCTD 07/22/88 FILE # F881433 VERIFIED RP
INSTRMT 4500B INJECTD 07/27/88 UNITS ug/L

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	62-75-9	n-nitrosodimethylamine	ND	10
	108-95-2	phenol	ND	1.5
	111-44-4	bis(2-chloroethyl) ether	ND	5.7
	95-57-8	2-chlorophenol	ND	3.3
	541-73-1	1,3-dichlorobenzene	ND	1.9
	106-46-7	1,4-dichlorobenzene	ND	4.4
	95-50-1	1,2-dichlorobenzene	ND	1.9
	108-60-1	bis(2-chloroisopropyl)ether	ND	5.7
	621-64-7	n-nitroso-di-n-propylamine	ND	12
	67-72-1	hexachloroethane	ND	1.6
	98-95-3	nitrobenzene	ND	1.9
	78-59-1	isophorone	ND	2.2
	88-75-5	2-nitrophenol	ND	3.6
	105-67-9	2,4-dimethylphenol	ND	2.7
	111-91-1	bis(2-chloroethoxy)methane	ND	5.3
	120-83-2	2,4-dichlorophenol	ND	2.7
	120-82-1	1,2,4-trichlorobenzene	ND	1.9
	91-20-3	naphthalene	ND	1.6
	87-68-3	hexachlorobutadiene	ND	0.90
	59-50-7	4-chloro-3-methylphenol	ND	3.0
	77-47-4	hexachlorocyclopentadiene	ND	6.0
	88-06-2	2,4,6-trichlorophenol	ND	2.7
	91-58-7	2-chloronaphthalene	ND	1.9
	131-11-3	dimethyl phthalate	ND	1.6
	208-96-8	acenaphthylene	ND	3.5
	83-32-9	acenaphthene	ND	1.9
	51-28-5	2,4-dinitrophenol	ND	42

SAMPLE ID Method Blank FRACTION 06A TEST CODE 625 NAME Semivolatile Organics
Date & Time Collected not specified Category

SCAN	CAS #	COMPOUND	RESULT	DET LIMIT
	100-02-7	4-nitrophenol	ND	2.4
	606-20-2	2,6-dinitrotoluene	ND	1.9
	121-14-2	2,4-dinitrotoluene	ND	5.7
	84-66-2	diethylphthalate	ND	1.9
	7005-72-3	4-chlorophenyl-phenylether	ND	4.2
	86-73-7	fluorene	ND	1.9
	534-52-1	4,6-dinitro-2-methylphenol	ND	24
	86-30-6	n-nitrosodiphenylamine	2 J	1.9
	101-55-3	4-bromophenyl-phenylether	ND	1.9
	118-74-1	hexachlorobenzene	ND	1.9
	87-86-5	pentachlorophenol	ND	3.6
	85-01-8	phenanthrene	ND	5.4
	120-12-7	anthracene	ND	1.9
	84-74-2	di-n-butylphthalate	ND	2.5
	206-44-0	fluoranthene	ND	2.2
	92-87-5	benzidine	ND	44
	129-00-0	pyrene	ND	1.9
	85-68-7	butylbenzylphthalate	ND	2.5
	91-94-1	3,3'-dichlorobenzidine	ND	17
	56-55-3	benzo(a)anthracene	ND	7.8
	117-81-7	bis(2-ethylhexyl)phthalate	ND	2.5
	218-01-9	chrysene	ND	2.5
	117-84-0	di-n-octyl phthalate	ND	2.5
	205-99-2	benzo(b)fluoranthene	ND	4.8
	207-08-9	benzo(k)fluoranthene	ND	2.5
	50-32-8	benzo(a)pyrene	ND	2.5
	193-39-5	indeno(1,2,3-cd)pyrene	ND	3.7
	53-70-3	dibenz(a,h)anthracene	ND	2.5
	191-24-2	benzo(ghi)perylene	ND	4.1

SAMPLE ID Method Blank FRACTION 06A TEST CODE 625 NAME Semivolatile Organics
Date & Time Collected not specified Category

SURROGATE RECOVERIES

SCAN	COMPOUND	RECOVERY
	2-fluorophenol	04 %
	d5-phenol	06 %
	d5-nitrobenzene	07 %
	2-fluorobiphenyl	06 %
	2,4,6-tribromophenol	28 %
	d14-terphenyl	71 %

NOTES AND DEFINITIONS FOR THIS REPORT.
DET LIMIT = detection limit.
ND = not detected at specified detection limit.
NR = not required for analysis.
S = compound peak saturated.
J = estimated value less than 3 x minimum detection limit.

Dames & Moore

Ground Water Sampling Record

Project Springs-Uniglass Plant Sample No 001

Location Statesville N.C. Sampler DSW/CHK

Date 7.21.88 Time: Start 8:30 End 900

Sampling Location Designation DM-1

Sampling Method 1" PVC bailer (dedicated)

Sample Parameters VOA (602 & xylenes)

Water Level Observations:

Reference Point TOC (PVC)

Casing Stick-Up 1.36 (Feet above) below ground surface Note: Sampled before manhole complete

Well Diameter 2" Depth to Water 23.85' Depth to Bottom 35.84'

Meter Calibration:

Conductivity Meter - Make and Model # Cole Parmer 1484-10

Date 7.21.88 Time 730 Solution 1000 µmhos/cm

Reading 1000 µmhos/cm Temperature 24.2 Deg C

pH Meter - Make and Model # Cole Parmer 5985-80

Date 7.21.88 Time 735 Solutions 7.00/10.00

Reading 7.00/10.00 Temperature 24.2 Deg C

Sample Readings:

Date 7.21.88 Time 830

Conductivity 156 µmhos/cm

pH 4.86

Temperature 18.4 Deg C

Notes and Observations: 1 well volume = 1.95 gals. Purge 6.0 gals. w/ PVC bailer (dry the well) * Definite hydrocarbon odors no response on HNU or CGI ~ 1/8" layer of floating product

Sampler's Signature: David S. Woodward

Dames & Moore

Ground Water Sampling Record

Project Springs - Uniglass Plant Sample No 003

Location Statesville N.C. Sampler DSW/CHK

Date 7·21·88 Time: Start 925 End 945

Sampling Location Designation DM-3

Sampling Method 1" PVC Bailer (dedicated)

Sample Parameters VOA (602 & xylenes)

Water Level Observations:

Reference Point TOC

Casing Stick-Up 0.64' Feet above/below ground surface Note: Sampled before Manhole completion

Well Diameter 2" Depth to Water 7.68' Depth to Bottom 12.77'

Meter Calibration:

Conductivity Meter - Make and Model # Cole-Parmer 1484-10

Date 7·21·88 Time 730 Solution 1000 umhos/cm

Reading 1000 umhos/cm Temperature 24.2 Deg C

pH Meter - Make and Model # Cole-Parmer 5985-80

Date 7·21·88 Time 730 Solutions 7.00/10.00

Reading 7.00/10.00 Temperature 24.2 Deg C

Sample Readings:

Date 7·21·88 Time 925

Conductivity 560 umhos/cm

pH 6.28

Temperature 21.3 Deg C

Notes and Observations: 1 well volume = 0.83 gals. Purge 3.0 gals w/ PVC bailer (dry the well) - Very cloudy H_2O - silty No response on HNU or CGI No fuel odors or visible floating product!

Sampler's Signature: David S. Woodward

Dames & Moore

Ground Water Sampling Record

Project Springs-Owglass Plant Sample No 004

Location Statesville, N.C. Sampler DSW/CHK

Date 7.21.88 Time: Start 10^30 End 10^50

Sampling Location Designation DM-4

Sampling Method 1" PVC Bailer (dedicated)

Sample Parameters VOA (602 + xylenes)

Water Level Observations:

Reference Point TOC

Casing Stick-Up 0.38' (Feet above/below ground surface) Note: Sampled before Manhole Completion!

Well Diameter 2" Depth to Water 2.56' Depth to Bottom 14.93'

Meter Calibration:

Conductivity Meter - Make and Model # Cole Parmer 1484-10

Date 7.21.88 Time 730 Solution 1000 umhos/cm

Reading 1000 umhos/cm Temperature 24.2 Deg C

pH Meter - Make and Model # Cole Parmer 5985-10

Date 7.21.88 Time 730 Solutions 7.00/10.00

Reading 7.00/10.00 Temperature 24.2 Deg C

Sample Readings:

Date 7.21.88 Time 10^30

Conductivity 749 umhos/cm

pH 6.64

Temperature 19.5 Deg C

Notes and Observations: 1 well volume = 1.2 gals. Purge 4.0 gals w/ PVC bailer dry the well! No response on CGI or HNU Meters - No fuel odors or visible floating product

Sampler's Signature: David S. Woodward

Dames & Moore

Ground Water Sampling Record

Project Springs-Uniglass Plant Sample No 005

Location DM-5 (statesville NC) Sampler DSW/CHK

Date 7·20·88 Time: Start ~~14:15~~ 13:40 DSW End

Sampling Location Designation DM-5

Sampling Method 1" PVC Bailer (dedicated)

Sample Parameters VOA (624), BNA, p.p. metals w/o Hg, Ammonia, total phenols

Water Level Observations:

Reference Point TOC (All meas.)

Casing Stick-Up 1.16' Feet above/below ground surface

Well Diameter 2" Depth to Water 18.52' Depth to Bottom 28.9'

Meter Calibration:

Conductivity Meter - Make and Model # cole-Parmer 1484-10

Date 7·20·88 Time 10^00 Solution 1000 umhos/cm

Reading 1000 umhos/cm Temperature 26.9 Deg C

pH Meter - Make and Model # cole-Parmer 5985-80

Date 7·20·88 Time Solutions 7.00/10.00

Reading 7.00/10.00 Temperature 26.9 Deg C

Sample Readings:

Date 7·20·88 Time 13^40

Conductivity 360

pH 5.53

Temperature 19.2 Deg C

Notes and Observations: 1 well volume = 1.7 gals.
Purged 3 well vols. = 5.1 gals. w/ PVC bailer in 20 mins final H_2O level = 22.05'
No response on HNU or GGI Meters

Samplers Signature: David A. Woodward

Dames & Moore

Ground Water Sampling Record

Project Springs - Uniglass Plant Sample No 006

Location Statesville, N.C. Sampler DSW/CHK

Date 7·20·88 Time: Start 14:15 End

Sampling Location Designation DM-6

Sampling Method 1" PVC Bailer (dedicated

Sample Parameters VOA (624), BNA, p.p. metals w/o Hg, Ammonia, total phenols.

Water Level Observations:

Reference Point TOC

Casing Stick-Up 2.35' Feet (above) below ground surface

Well Diameter 2" Depth to Water 19.43 Depth to Bottom 32.73'

Meter Calibration:

Conductivity Meter - Make and Model # cole-Parmer 1484-10

Date 7·20·88 Time 1000 Solution 1000 umhos/cm

Reading 1000 umhos/cm Temperature 26.9 Deg C

pH Meter - Make and Model # cole-Parmer 5985-80

Date 7·20·88 Time 1005 Solutions 7.00/10.00

Reading 7.00/10.00 Temperature 26.9 Deg C

Sample Readings:

Date 7·20·88 Time 1415

Conductivity 240 umhos/cm

pH 5.42

Temperature 15.6 Deg C

Notes and Observations: 1 well volume = 2.2 gals. Dry the well after purging 6.0 gals. w/ 1" PVC bailer (dedicated) No response on HNU or CGI meters.

Sampler's Signature: David S. Woodward

Dames & Moore

Ground Water Sampling Record

Project Springs-Uniglass Plant Sample No 007

Location Statesville, N.C. Sampler DSW/CHK

Date 7.20.88 Time: Start 14:40 End

Sampling Location Designation DM-7

Sampling Method 1" PVC Bailer (dedicated)

Sample Parameters VOA (624), BNA, p.p metals w/o Hg, Ammonia, total phenols,

Water Level Observations:

Reference Point TOC

Casing Stick-Up 2.51 Feet above/below ground surface

Well Diameter 2" Depth to Water 6.38' Depth to Bottom 32.51'

Meter Calibration:

Conductivity Meter - Make and Model # Cole Parmer 1484-10

Date 7.20.88 Time 1000 Solution 1000 umhos/cm

Reading 1000 umhos/cm Temperature 26.9 Deg C

pH Meter - Make and Model # Cole Parmer 5985-80

Date 7.20.88 Time 1005 Solutions 7.00/10.00

Reading 7.00/10.00 Temperature 26.9 Deg C

Sample Readings:

Date 7.20.88 Time 1440

Conductivity 410

pH 5.07

Temperature 15.9 Deg C

Notes and Observations: 1 well volume = 2.63 gals. Purged 8.0 gals. w/dedicated PVC bailer - No response on HNU or CGI meters!

Sampler's Signature: David S. Woodward

Dames & Moore

Ground Water Sampling Record

Project Springs - Uniglass Plant Sample No. 008

Location Statesville, N.C. Sampler DSW/CHK

Date 7.20.88 Time: Start 15:30 End

Sampling Location Designation DM-8

Sampling Method 1" PVC Bailer (dedicated)

Sample Parameters VOA (624), BNA, p.p. metals w/o Hg, Ammonia, total phenols

Water Level Observations:

Reference Point TOC

Casing Stick-Up 2.3 (Feet) above/below ground surface

Well Diameter 2" Depth to Water 16.78' Depth to Bottom 32.71'

Meter Calibration:

Conductivity Meter - Make and Model # Cole Parmer 1484-10

Date 7.20.88 Time 10^00 Solution 1000 µmhos/cm

Reading 1000 µmhos/cm Temperature 26.9 Deg C

pH Meter - Make and Model # cole Parmer 5985-80

Date 7.20.88 Time 10^05 Solutions 7.00/10.00

Reading 7.00/10.00 Temperature 26.9 Deg C

Sample Readings:

Date 7.20.88 Time 15^30

Conductivity 360

pH 5.23

Temperature 18.9 Deg C

Notes and Observations: 1 well volume = 2.60 gals. Purge 8.5 gals. w/dedicated PVC bailer - dry the well - return purge 2.5 gals. more because of dirty H_2O! No response on HNU or CGI Meters

Sampler's Signature: David S Woodward

RADIAN CORPORATION

0122

Chain of Custody Record

Page _____ of _____

PROJECT: SPRINGS INDUSTRIES - 14631-013

SITE: UNIGLASS PLANT - STATESVILLE, N.C.

COLLECTED BY (Signature): David S. Woodward

FIELD SAMPLE I.D.	SAMPLE MATRIX	DATE/TIME	NO. OF CONTAINERS	BNA's (SEMI-VOA)	Priority Poll. Metals w/o Hg (w/Arsenic)	Ammonia	Total Phenolics					REMARKS	SAM ID NO. (for lab use only)
DM-5 (005)	GRD. H_2O	7-20-88/13:40	4	1	1	1	1						
DM-7 (007)	GRD. H_2O	7-20-88/14:40	2			1	1						

REMARKS

RELINQUISHED BY: David S. Woodward DATE: 7-20-88 TIME:

RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME
[illegible]	7/20	1946									

LAB USE ONLY

RECEIVED FOR LABORATORY BY:	DATE	TIME	AIRBILL NO.	OPENED BY:	DATE	TIME	TEMP°C	SEAL #	CONDITION

REMARKS:

4-88-300337

RADIAN CORPORATION

0123

Chain of Custody Record

Page 1 of ____

PROJECT: SPRINGS INDUSTRIES - 14631-013

SITE: UNIGLASS PLANT - STATESVILLE, N.C.

COLLECTED BY (Signature): David S. Woodward

FIELD SAMPLE I.D.	SAMPLE MATRIX	DATE/TIME	NO. OF CONTAINERS	VOA's (Method 624)	BNA's (SEMI-VOA)	Priority Pollutant Metals w/o Hg. (w/ Arsenic)	Ammonia	Total Phenols					REMARKS	SAM ID NO. (for lab use only)
DM-6 (006)	GRD. H_2O	7-20-88/14:15	7	2	2	1	1	1						
DM-5 (005)	GRD. H_2O	7-20-88/13:40	3	2	1									
DM-7 (007)	GRD. H_2O	7-20-88/14:40	1			1								
TRIP BLANK #1	LAB. H_2O		1											

REMARKS

RELINQUISHED BY: David S. Woodward — DATE — TIME

RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME
[illegible]	7/20	1700									

LAB USE ONLY

RECEIVED FOR LABORATORY BY:	DATE	TIME	AIRBILL NO.	OPENED BY:	DATE	TIME	TEMP°C	SEAL #	CONDITION

REMARKS:

4-88-300337

RADIAN CORPORATION

0124

Chain of Custody Record

Page 1 of 1

PROJECT: SPRINGS INDUSTRIES - 14631-013

SITE: UNIGLASS PLANT - STATESVILLE, N.C.

COLLECTED BY (Signature): David S. Woodward

FIELD SAMPLE I.D.	SAMPLE MATRIX	DATE/TIME	NO. OF CONTAINERS	VOA's (METHOD 624)	BNA's (SEM. VOA)	PRIORITY POLL. METALS W/o Hg (W/ Arsenic)	AMMONIA	Total Phenols					REMARKS	SAM ID NO. (for lab use only)
DM-7 (007)	GRD. H2O	7-20-88 / 14:40	4	2	2									
DM-8 (008)	GRD. H2O	7-20-88 / 15:30	7	2	2	1	1	1						

REMARKS

RELINQUISHED BY: David S. Woodward DATE: 7/20/88 TIME:

RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME
D. Fricker	7/20	2:16									

LAB USE ONLY

RECEIVED FOR LABORATORY BY:	DATE	TIME	AIRBILL NO.	OPENED BY:	DATE	TIME	TEMP°C	SEAL #	CONDITION

REMARKS:

4-88-300337

RADIAN CORPORATION

0127

Chain of Custody Record

Page 1 of 1

PROJECT: Springs Industries 14631-013

SITE: Unglass Plant, Statesville NC

COLLECTED BY (Signature): David S. Woodward

ANALYSES: VOA (602 + Xylene)

FIELD SAMPLE I.D.	SAMPLE MATRIX	DATE/TIME	NO. OF CONTAINERS	VOA (602 + Xylene)	REMARKS	SAM ID NO. (for lab use only)
DM-1	H2O	7.21.88 / 8:30	2	✓	pres. w/ HCl	
DM-3	H2O	7.21.88 / 9:15	2	✓	pres w/ HCl	
DM-4	H2O	7.21.88 / 10:00	2	✓	pres w/ HCl	
Trip Blank #2	H2O		1			

REMARKS

RELINQUISHED BY: David S. Woodward DATE TIME

RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME	RECEIVED BY:	DATE	TIME	RELINQUISHED BY:	DATE	TIME
[illegible]	7.21	1335									

LAB USE ONLY

RECEIVED FOR LABORATORY BY:	DATE	TIME	AIRBILL NO.	OPENED BY:	DATE	TIME	TEMP °C	SEAL #	CONDITION

REMARKS:

4-89-303337

APPENDIX D

Cost Estimates

EXPANDED INVESTIGATION
SUMMARY COST TABLE

		COSTS
I.	LABOR	25,382
II.	EXPENSES	
	A. TRAVEL	5,115
	B. ODC's	5,625
	C. SUBTOTAL	10,740
	D. HANDLING CHARGE (10%)	1,074
	E. TOTAL EXPENSES	11,814
III.	SUBCONTRACTORS	
	A. DRILLER	13,864
	B. LABORATORY	15,125
	C. SOIL GAS SURVEY	6,600
	D. SURVEYOR	600
	E. SUBTOTAL	36,189
	F. HANDLING CHARGE (15%)	5,428
	G. TOTAL SUBCONTRACTOR COST	41,617
IV.	SUBTOTAL	78,813
V.	CONTINGENCY (10%)	7,881
VI.	COMPUTER JOB COST CONTROL (2.5%)	1,810
VII.	TOTAL	88,504

Dames & Moore
Manhour Summary

Labor Category	Planning/ Coordination	Field Investigation	Data Evaluation	Final Report	Total Hours	Hourly Rate	Cost
Principal	3			3	6	150	900
Project Manager	36	8	20	10	74	85	6,290
Hydrogeologist	60		30	12	102	48	4,896
Field Geologist		186	6		192	48	9,216
Field Technician		68			68	32	2,176
Health & Safety Officer	4				4	102	408
Regulatory Analyst			4	4	8	65	520
Technical Illustrator				20	20	32	640
Clerical	2			10	12	28	336
TOTAL LABOR COST ESTIMATE							25,382

*Note: The field investigation contains hour estimates for soil gas, drilling, sampling, slug tests and travel time

Dames & Moore
Equipment and other direct costs, Estimate

	Rate ($)	Anticipated Units	Cost ($)
Field Investigation			
Measuring Equipment (pH meter, conductivity meter, steel tape)	20/day	4	80
Bailers	5/ea	9	45
Peristaltic Pump	25/day	4	100
Disposable Filters	14/sample	15	210
Miscellaneous field equipment (log book, plastic sheeting, soil color chart, etc.)	20/week	3	60
Slug Test Equipment			
-Data Logger	40/day	2	80
Pressure transducers	30/day	2	60
Safety Detection Equipment			
PID Meter	325/week	3	975
Detector Tube Sampling Pump	15/week	3	45
Real Time Particulate Monitor	30/day	15	450
Explosimeter	20/day	15	300
Protective Equipment			
Respirator	30/person-week	4	120
Expendable supplies (Tyvek suits, gloves, respirator cartridges)	60/person-week	4	240
Copies	0.10/copy	2,000	200
Computer	10/hr	35	350
Telephone	------	---	200
Sample Shipping	------	---	400
Postage & Delivery	------	---	90
Subtotal			5,625

Dames & Moore
Travel Cost Estimate

	Rate	Unit	Cost
Coordination Meeting			
Bethesda, MD to Statesville, NC			
(Project Manager)			
(1 person, 1 trip)			
Air Fare	380/trip	1	380
Car Rental	50/day	1	50
Per Diem	85/day	1	85
Home to Airport Transfer	25/person	1	25
SUBTOTAL			540
Field Investigation			
Bethesda, MD to Statesville, NC			
(Soil Gas Sampling)			
(1 person, 1 trip)			
Air Fare	380/trip	1	380
Car Rental	50/day	3	150
Per Diem	85/day	3	255
Home to Airport Transfer	25/person	1	25
SUBTOTAL			810
(Well Installation)			
(1 person, 1 trip)			
Air Fare	380/trip	1	380
Car Rental	50/day	12	600
Per Diem	85/day	12	1,020
Home to Airport Transfer	25/person	1	25
SUBTOTAL			2,025
Bethesda, MD to Statesville, NC			
(Groundwater Sampling & Slug Test)			
(2 persons, 1 trip)			
Air Fare	380/trip	2	760
Car Rental	50/day	4	200
Per Diem	85/day/person	8	680
Home to Airport Transfer	25/person	4	100
SUBTOTAL			1,740
TOTAL COST			5,115

Subcontractor Cost Estimate
Monitoring Well Installation

	Unit Rate ($)	Estimated Quantity	Total Cost ($)
Drilling Operation			
Mobilization/Demobilization (3 man crew)	1450/rig	1	1450
Drilling (4 1/4-inch ID HSA, split spoon sampling)	9.00/ft	250	2250
Well Installation			
2-inch PVC Riser (Schedule 40)	5.5/ft	160	880
2-inch PVC Screen (Schedule 40, 0.010 slot size)	8/ft	90	720
Subgrade Manhole Completion (with locking cap)	250/well	9	2250
Protective Casings	150/well	1	150
Sand Pack	6/ft	99	594
Bentonite seal (1 ft thick)	30/ft	9	270
Grout	5/ft	142	710
Steam Cleaning	180/well	9	1620
Well Development	90/hr	9	810
Standby	90/hr	8	720
Per diem (3 Man crew)	60/day/man	24	1440
Subtotal			13,864

COST ESTIMATE

SOIL GAS SURVEY

	Rate	Units	Cost ($)
Soil Gas Sampling			
Sampling (includes collection of samples)	150/sample	35	5250
Per diem (2-man crew) (includes travel, equipment interpretation, reports)	450/day	3	1350
SUBTOTAL			6,600

COST ESTIMATE

SURVEYOR

Survey Monitoring Wells (includes vertical and horizontal placement)	Rate	Units	Cost ($)
Labor (3-man crew)	60/hr	8	480
Travel	60/hr	2	120
SUBTOTAL			600

Laboratory Cost Estimate

Sample Analyses (2 week turn around time)		Rate($)	Units	Cost($)
EPA 602 (VOC's)	(groundwater)	100/ea	15(a)	1,500
EPA 610 (PAH's)	(groundwater)	200/ea	15(a)	3,000
EPA 8020 (VOC's)	(groundwater)	375/ea	9	3,375
EPA 8270 (BNA's)	(groundwater)	750/ea	9	6,750
EPA 200.7 (PP Metals)	(surface water)	145/ea	3	435
EPA 420.2 (T. Phenolics)	(surface water)	25/ea	3	75
EPA 350.1 (Ammonia)	(surface water)	15/ea	3	45
SM 314A (Hardness)	(surface water)	10/ea	3	30
Sample Savers		50/ea	11	550
Subtotal				15,760

(a) Trip blank, duplicate, equipment blank, 12 samples

COST ESTIMATE

UNDERGROUND STORAGE TANK REMOVAL
(assumed maximum scenario)

	Rate	Units	Cost ($)
Tank Removal (includes removal of 4-30,000 gallon tanks, 1-10,000 gallon tank, backfill material and associated labor)	---	---	42,000
Waste Product Removal (1)	0.25/gallon	17,500	4,375
Removal of Contaminated Soil (2)	250/load (3)	545	136,250
Extra Fill Material (4)	70/load	545	38,150
Asphalt	---	---	5,000
Chemical Samples (5) (analyzed for TPHC's, gasoline, diesel, kerosene modified 8020 method)	375/ea	10	3,750
SUBTOTAL			229,525

(1) Assumes 3000 gallons of product in each 30,000 gallon tank and 5,500 gallons of waste product in 10,000 gallon tank
(2) Assumes soil contaminated to >100ppm (total hydrocarbons) at a distance of 15 feet from each tank
(3) Assumes one truck load equals 10 cubic yards
(4) Extra fill needed to replace contaminated soil removed
(5) Two samples per tank

DAMES & MOORE COSTS

LABOR	Planning	Field Work	Report	Total Hours	Hourly Rate	Cost
Project Manager	4		2	6	85	510
Field Geologist	12	50	4	66	48	3,168
Clerical	1		1	2	20	40
SUBTOTAL						3,718

TRAVEL

1 person, 1 trip	Units	Rate	
Airfare			380
Car rental	1	50/day	250
Per Diem	5	85/day	425
Home to airport transfer	1	25/person	25
SUBTOTAL			1,080

EQUIPMENT			
Health & Safety	1	390/wk	390
Office Direct charges (incl. copies, phone, etc.)			200
SUBTOTAL			590
HANDLING FEES (10%)			167
SUBCONTRACTOR HANDLING FEES (15%)			34,430
SUBTOTAL			39,985
CONTINGENCY FEE (10% subcontractor + Dames & Moore Costs)			26,950
COMPUTER JOB COST CONTROL (Computed on Dames & Moore labor, equipment & Services)			134
TOTAL DAMES & MOORE CHARGES			67,070

Cost Estimate (Order-of-Magnitude) for
Extraction, Free Product Recovery and Treatment System
Uniglass Industries, Statesville, North Carolina
(Assumed Maximum Scenario)

Construction Costs

Item	Rate ($)	Unit	Cost (1988 $)
o Extraction			
Site preparation and cleanup	--	--	2,000
Well drilling/installation (6" diam.)	3,000/well	7	21,000
Pumps, fittings, caps, sensors, connections	1,500/well	7	10,500
Piping, plumbing, wiring[b]	3.25/LF[a]	3,000	9,750
Extraction Subtotal			43,250
o Air stripping/activated carbon			
Packed tower (includes blower, starter, pump)[c]	--	--	25,000
Granular Activated Carbon (GAC) unit[c]	--	--	90,000
Instrumentation and process control	--	--	8,700
Startup and calibration[d]	--	--	52,800
Treatment housing (100 SF prefab with lighting and insulation)[b]	--	--	6,000
Air Stripping/Activated Carbon Subtotal			182,500
o Waste water disposal to surface water			
Piping to sewer line	14.50/LF	2,000	29,000
Pump (2-HP)	3,000/ea	2	6,000
Trench excavation and fill	1.5/LF	2,000	3,000
NPEDS Permitting[f]	--	--	45,000
Waste Water Disposal to Surface Water Subtotal			83,000
o Free Product Recovery			
Gravity oil/water separator (100 gpm unit)[e]	--	--	8,000
1000-gal product storage tank (includes tank, installation, and containment berm)[b]	--	--	1,200
Pump to product storage tank (1-HP)[b]	--	--	500
Piping, connections, plumbing	--	--	600
Treatment housing (100 SF prefab with lighting and insulation)[b]	--	--	6,000
Effluent sampling during startup (BTX's, TPHC's)	300/sample	28	8,400
Free Product Recovery Subtotal			24,700
CONSTRUCTION SUBTOTAL			333,450

CONSTRUCTION CONTINGENCIES AND MISCELLANEOUS (15%)			50,020
TOTAL ESTIMATED CONSTRUCTION COST			383,470
DESIGN, ENGINEERING, AND CONSTRUCTION MANAGEMENT (25%)			95,900
TOTAL CAPITAL COST			479,370
Annual O&M Costs			
Extraction and air stripping/activated carbon pumping systems (includes labor, equipment, and utilities)			5,000
Gravity oil/water separator and housing (includes labor, equipment, and utilities)	--	--	500
Sludge handling and disposalg			500
Maintenance and repairs of treatment units	--	--	1,250
Carbon replacement for activated carbon system[a]	1.00/lb	31,500	31,500
Quarterly sampling and analysis of extraction wells and treatment units effluents (BTX's, naphthalene, TPHC's)	350/sample	40	14,000
Total Annual O&M Cost			52,750
NET PRESENT VALUE (5 year, assuming a 10% discount rate)			679,345
NET PRESENT VALUE (10 year, assuming a 10% discount rate)			803,519
NET PRESENT VALUE (20 year, assuming a 10% discount rate)			928,484

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[a]LF = linear feet.
[b]R.S. Means, 1987.
[c]Vendor quote (Calgon, 1988).
[d]Includes sampling and analysis for BTX's (benzene, toluene, xylenes), napthalene and TPHC's.
[e]Includes high-level alarm; Model HTC-1000 vendor quote (Belcor, Inc., 1988).
[f]Includes permit fees, laboratory samples and environmental impact studies.
[g]Assumes non-hazardous sludge