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From: M Muthig IPGX <mgm.ipgx@gmail.com>
Sent: Tuesday, October 15, 2019 11:40 AM
To: Hornosky, Tim <hornostr@dhec.sc.gov>
Cc: 'Steve Burris' <steve@prsfuel.com>
Subject: RE: Letter - Corrective Action Plan

Tim,

Attached is a copy of the 1993 Corrective Action Plan.

Regards,

Michael

Michael Muthig, President
IPGX, Inc.
803-414-2905
Mgm.ipgx@gmail.com

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CORRECTIVE ACTION PLAN
SOIL AND GROUNDWATER

BURRIS CHEMICAL, INC.
CHARLESTON, S.C.

Prepared For:

Burris Chemical, Inc.
Charleston, SC

And

South Carolina Department of Health
and Environmental Control
Columbia, S.C.

June 18, 1993

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June 18, 1993

Prepared By:

6/18/93
Michael G. Muthig, P.G., Ph.D. Date
South Carolina Professional Geologist No. 803

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1.0 INTRODUCTION

1.1 Background and Purpose

Burris Chemical, Inc. operates a chemical warehouse and distribution facility located in the southern part of North Charleston, South Carolina, near Stark Industrial Park (Figure 1). In response to a March 26, 1990 request from the South Carolina Department of Health and Environmental Control (SCDHEC), a multi-phased assessment has been performed to identify the distribution or inorganic and organic compounds in the soil, groundwater, and surface water in the vicinity of and below the Burris Chemical facility. Data from the assessment has been compiled, processed, and evaluated. The purpose of this report/plan is to summarize the results of assessment activity and to describe plans for site remediation.

1.2 Site Layout and Operational History

Burris Chemical, Inc. operations in the Charleston facility primarily consist of warehousing and distribution of chemicals. Current operations include handling of drummed liquids and bagged solids; and bulk handling and repackaging of flammable and corrosive liquids. The chemicals being handled and fundamental site operations have been similar since early operation of the facility. However, a number of facility improvement projects have taken place. A brief description of the site layout (current and past facilities) is provided below, and a site map is provided in Figure 2.

Map Designation	Description
A	Flammable tank farm consisting of a concrete floored and walled containment area with above-ground tanks and piping. Facility constructed in 1982-1983.
B	Corrosive tank farm consisting of a concrete floored and walled containment area with above-ground tanks and piping. Facility constructed in 1982-1983.

C — Pretreatment facility for water from washing of drums containing caustic material. Water is neutralized before being discharged to a publicly owned treatment works (POTW).

D — Petroleum tank farm consisting of a concrete floored and walled containment area with above-ground tanks and piping. Facility constructed in 1988-1989.

E — Former rail loading and unloading platform.

F — Concrete slab from former warehouse used for drum storage. A covered warehouse is currently being constructed in this area.

OLD HQ

G — Division office building for the Charleston operations. The front portion of this building has been in place since early operation of the facility.

CURRENT HQ

H — Corporate Headquarters constructed in 1986.

I — Tanker containment area consisting of a concrete floored and walled structure for containment of material in the event of a spill during loading/unloading of tankers.

J — Warehouse consisting of a concrete-floored, metal-sided, and covered area for chemical storage. This warehouse was constructed in a portion of the area occupied by the former warehouse.

K — Former warehouses used in the early operation of the facility that reportedly consisted of two former military buildings. These buildings were torn down after a fire in 1975.

L — Former solvent storage area included several above-ground tanks. Little information is available regarding this area; however, it's position is clearly visible on a 1967 aerial photo. Use of this area was discontinued after construction of the flammable tank farm.

Unlabeled	Cement truck unloading took place in the area around and between MW-5 and MW-6. Concrete thickness in this area reportedly range from several inches to several feet.
Unlabeled	Miscellaneous debris was stored in the vicinity of MW-6 and MW-7. Debris reportedly included construction material, cement, and crushed drums.
Unlabeled	Earthen catch basin where rain water collected was reportedly located in the area below the Corporate Headquarters.

During the operational history of the facility, several accidents/spills have been recorded. A summary of known incidents is provided below:

1/1975	A fire in the former warehouse area.
8/31/78	1000 gallon spill of glacial acidic acid in the current location of the Corporate Headquarters.
7/2/79	2700 gallon spill of 40% diethylamine near the former rail loading platform.
7/10/81	2000 gallon spill of sulfuric acid in the area currently occupied by Corporate Headquarters.

1.3 Summary of Assessment Activity

Assessment activity was initiated with submittal of the May 16, 1990 Hydrogeologic Investigation Plan (GEL, 1990). This plan called for installation and sampling of monitoring wells. Four wells were installed and sampled and a Hydrogeologic Investigation Report dated March 11, 1991 (GEL, 1991A) was prepared. This report indicated organic and inorganic compounds were present in groundwater and additional investigation was needed. A June 8, 1991 Phase II Hydrogeologic Investigation Plan (GEL, 1991B) proposed installation of three additional wells, hydrologic (slug) testing, collection of groundwater samples, and determination of groundwater elevations (and flow). The October 31, 1991 Phase II Hydrogeologic Investigation Report (GEL, 1991C) indicated that organics were present in groundwater below the site, organics in groundwater were not resulting in detectable concentrations in Brickyard Creek, additional investigation was needed to define site conditions, and that a feasibility study of remedial options could be developed concurrently with assessment.

A May 12, 1992 Phase III Hydrogeologic Investigation Plan (GEL, 1992) proposed additional sampling of surface water, soils, groundwater, and potable water. Plans for additional groundwater sampling called for using a drive-point sampling device to collect groundwater samples. After completing a portion of the drive-point sampling, it was decided to limit the number of groundwater samples collected by drive point; and, to implement an alternate effort to delineate potential source areas. Revised plans were outlined in a letter to SCDHEC dated October 27, 1992. An interim report of source delineation efforts was submitted in a letter dated January 27, 1993. That report included a discussion of results and a proposal for two source delineation wells.

1.4 Data Collection Activities

1.4.1 Geologic borings/well installations

Nine power auger borings were drilled during three phases of assessment. The first seven borings were drilled during Phase I (1/91) and Phase II (8/91) of the assessment. The last two were drilled in March 1993 to help characterize potential source areas. During drilling, soil samples were collected approximately every five feet and lithologies were recorded. Geologic logs for all borings are provided in Appendix B.

Boreholes were converted to monitoring wells using 2-inch, flush-threaded, PVC casing and screen. Sand packs were installed around screened intervals to help improve well yield and reduce sample turbidity. Bentonite was installed above the sand packs to seal the annular space and reduce the potential for downhole movement of surface water. The upper portion of each well was filled with cement and cement/concrete pads were installed at the surface. Wells were completed at the surface with locking steel casings or water-tight manholes and water-tight locking caps. Construction details for each well are included in Appendix B. The location and elevation of each well is shown on Figure 2. Additional discussion of well drilling and installation protocol is provided in site assessment plans.

Monitoring well MW-2 was abandoned to allow for site construction activity. After construction is completed, approval to install a replacement well will be requested.

1.4.2 Drive-point sampling

During Phase III, groundwater samples were collected from 15 locations utilizing a K-V™ stainless steel groundwater sampling system (drive point). The K-V™ system consists of three-foot long hollow probe shafts, a six-inch slotted well point intake section, and a drive head. Groundwater samples are collected through plastic tubing after the well point has been driven into the ground. A more detailed description of the drive point sampling technique is provided in Phase III Assessment Plan.

Original plans called for sampling up to three (or more) depths at 35 locations across the site. However, difficulties in sample collection were reportedly encountered and discrete depth sampling was typically limited to no more than two samples depths. In addition, after reviewing analytical data from the first round of sampling, it was determined that due to the difficulties associated with sample collection, additional drive-point sampling of groundwater would not be performed.

SCDHEC was notified of plans to discontinue collecting groundwater samples, and a proposal was made to perform a soil gas survey. An AMS Soil Gas Probe System and a Microtip HL-2000 photoionization detector (PID) was used to perform the survey. In performing the survey, the prove was driven to a depth of up to three feet, and soil gas measurements were made as the probe was slowly raised upward. Results of the survey are provided in Figure 7.

1.4.3 Hydrologic testing

Rising head slug tests were performed by General Engineering Laboratories on wells MW-1, MW-2, MW-4 and MW-6 according to the methods describe in Bouwer and Rice (1976) for unconfined aquifers in order to calculate hydraulic conductivity. Prior to performing each slug test, the static-water level was determined in each well by measuring the depth to groundwater with an electronic water-level indicator. The wells were then evacuated using a centrifugal pump. During the recovery of each well, the height of water in the well was measured by an electronic pressure transducer. Water levels were measured and recorded at appropriate time intervals until the water level in each well approximated the static water level measured prior to evacuation. Time-drawdown plots of slug test data are provided in Appendix C.

1.4.4 Water-level monitoring

The site was reportedly surveyed by E.M. Seabrook, Jr., Inc. on September 2, 1991. The survey included determining the location and elevation of monitoring wells MW-1 through MW-7. Prior to installing MW-8 and MW-9, monitoring well locations shown on the site map were field checked and several discrepancies were identified. After installing MW-8 and MW-9, monitoring well locations and elevations and office building locations were resurveyed. Well elevations obtained in the resurvey showed some inconsistencies with previous elevations (possibly attributable to repair/modification of well casings and/or differences in reference point for each well). To minimize the potential for similar problems in the future, a reference point was marked on each casing prior to the resurvey. After reviewing survey data, it was decided to assume the elevation previously provided for MW-5 was correct, and to adjust the other well elevations based on resurveyed data. Measuring point elevations are shown in Table 3.

Water-level elevations were measured once during Phase II Assessment and once during the site-wide well sampling in March 1993. Depth to water, below the reference point marked on each well casing, was measured using an electronic water-level indicator. Water-level elevation data are summarized in Table 3, and water-level elevations on 3/29/93 are shown in Figure 6.

1.4.5 Soil sampling and analyses

Sediment samples were collected from the banks of the creek at two locations to determine if organic compounds in groundwater are attenuating in sediment along the creek. The sampling sites were located downgradient of wells MW-5 and MW-7 where organic compounds had been identified. Sampling personnel approached the sample locations from downstream to avoid disturbing bottom sediments. Three grab samples were collected approximately six feet apart at each of the two sampling locations to minimize bias which could result from localized variations in groundwater discharge pathways to the creek. The three grab samples collected at each location were composited and analyzed for priority pollutant volatile organic compounds.

Prior to installing wells MW-8 and MW-9, a soil vapor survey was performed in an effort to delineate possible source areas for volatile organic compounds. An AMS Soil Gas Probe system and a Microtip HL-2000 portable photoionization detector (PID) were used to perform the survey. In performing the survey, the soil probe was driven to a depth of up to 3 feet and soil gas measurements were made as the probe was raised upward. Results of the soil vapor survey are shown in Figure 7.

During well drilling, soil samples were field screened using a portable photoionization detector (PID). For monitoring wells MW-8 and MW-9, field screening was used to select soil samples for analyses. Samples were collected from MW-8 and MW-9 at 3 and 13 feet. Soil samples were analyzed for purgeable organic compounds following USEPA Method 8240. Results of soil-sample analyses are summarized in Table 5. Certificates of analysis for soil and water samples are provided in Appendix D.

1.4.6 Water sampling and analyses

Surface-water samples were collected on 8/15/91 and 4/24/92 from Brickyard Creek at locations adjacent to the upstream and downstream edges of the Burris facility as shown on Figure 2. These samples were analyzed for priority pollutant volatile organic compounds. Samples were collected on the ebb tide as close to the time of low tide as possible. Sampling personnel approached the sample locations from downstream to avoid disturbing the bottom sediments in the sample locations. To further minimize turbidity in the samples, the downstream sample was collected first. The surface-water samples were collected by slowly lowering the samples bottles into the water to minimize sample aeration.

Surface-water samples were collected at the outfall from the storm-water retention pond and the outfall from the tanker containment area. Procedures for sample collection were in accordance with the Hydrogeologic Investigation Plan. The two outfall samples were collected from depressions in the ground immediately downstream of each outfall. Samples were collected directly from standing water in the depressions using a pre-cleaned polyethylene bailer. At the time samples were collected, there was a small, intermittent flow in the outfall discharge pipes. The source of flow was not determined.

Three samples were collected from the water supply system at the site during the Phase II Assessment. Methods of sample collection and results of that sampling are discussed in the Phase II report. In response to a detection of low levels of two compounds from the spigot in the steam-cleaner boiler room, a second sample was collected from that location. The sample was collected prior to seven-thirty in the morning to ensure that the sample collected had been within the on-site water supply lines and undisturbed for at least eight hours. Prior to collection of the sample, the volume of water contained within this piping was calculated, and the rate of discharge for the line was determined at the spigot using a calibrated container and a stopwatch. A sample was collected after discharging one-half of the calculated volume of water in the line to ensure that the sample was representative of water stored in the on-site underground piping. The potable water sample was analyzed for priority pollutant volatile organic compounds. Results from the steam cleaner boiler room spigot (SG-1) sampling are summarized in Table 4 and the Certificate of Analysis for the second event is provided in Appendix D.

During Phase I, II, and the later part of Phase III, groundwater samples were collected from site monitoring wells. Procedures for groundwater sample collected were based on protocols recommended by the Environmental Protection Agency (EPA) and DHEC. Techniques used for well evacuation, sample collection, and measurement of water-table depth were designed to allow for collection of representative groundwater samples. Prior to the evacuation of a monitoring well, the depth to groundwater in each well was measured with an electronic water-level indicator. The volume of water standing in each well casing was then calculated. Prior to sampling, at least three casing volumes were evacuated from each well using a bailer attached to a new polyethylene line.

Groundwater samples were collected in a manner to minimize sample alteration or contamination during withdrawal from the well and introduction to the sample containers. Sampling personnel wore new, laboratory quality gloves during all evacuation and sample collection activities, and changed gloves between each well. To minimize the potential for altering a sample, the groundwater samples were slowly poured directly from the bailer into the respective sample containers, which were then sealed and placed immediately into a clean sample cooler and covered with ice packs.

During Phase III, groundwater samples were also collected from temporary sampling points using a drive point sampling device. Protocols for drive point sampling are described above in section 2.4.2 and in the Phase III Assessment Plan.

Analyses of groundwater samples included a suite of inorganic parameters and priority pollutant volatile organic compounds. During Phase II, samples from wells MW-1, MW-4, MW-5, MW-6 and MW-7 were also analyzed for base neutral/acid extractable compounds following USEPA Method 8270. Analyses for samples from MW-2 during Phase II also included dimethylamine. Results of volatile organic analyses for drive-point, water-line and stream samples are provided in Table 4. Results of volatile organic analyses from monitoring well samples are included in Table 5. Results of analyses for inorganic compounds are provided in Table 7. Certificates of analysis for samples collected during Phase III are included in Appendix D.

2.0 HYDROGEOLOGY

2.1 Regional/Local Hydrogeology

Park (1985) provides a description of the geology and groundwater resources in Charleston, Berkeley, and Dorchester Counties. The following sections on regional/local geology and hydrology are primary taken from Park (1985).

2.1.1 Geology

Geologic units from the ground surface to a depth of 2500 feet in Charleston County consist of unconsolidated to partially indurated sedimentary deposits ranging in age from Quaternary (recent) to late Cretaceous. A cross section from Reesesville to Mt. Pleasant (Figure 3) is used to illustrate the general stratigraphic framework below the site. A summarized description of the Quaternary through Tertiary units is provided in Table 1, and a general description of deposits in the first 300 feet below ground surface is provided below.

Surficial deposits are generally described as light colored, fine-to medium-grain sand, shelly sand, shell beds, and varicolored clays. Deposition of shallow sediment is generally thought to have occurred during a period of glacially controlled rises and falls of sea level. The Pamlico formation reportedly occurs at elevations between 0 and 25 feet above mean sea level (msl). This formation is described as consisting (from the top down) of green, glauconitic sand, undifferentiated sand, and up to several feet of a basal Pleistocene shell unit. Surficial deposits are underlain by the Cooper Formation, which occurs at approximately 0 to -20 feet below msl in the vicinity of the site.

The Cooper Formation is generally described as a pale-green or yellow-gray, clayey to sandy, fine-grain phosphatic, limestone. The Ashley member is the upper unit of the Cooper Formation and is generally described as a phosphatic, muddy, calcareous, sand. The upper surface of the Cooper Formation has a relief of 15 to more than 50 feet. Overall thickness of the Cooper Formation ranges from 260-280 feet in the vicinity of the site. The Cooper is underlain by the Santee Limestone, which occurs at approximately 250 to 300 feet below mean sea level in the vicinity of the site.

The Santee Limestone is generally described as a gray, fossiliferous, locally phosphatic, limestone. Two stratigraphic Members are recognized within the Santee Limestone: the Cross and Moultrie Members. The Cross Member is the upper unit and is described as a brachiopod-bivalve, muddy limestone. The underlying Moultrie Member is described as a mold and cast limestone (biosparite) and a bryozoan shell hash. The Santee limestone is approximately 40 to 60 feet thick in the vicinity of the site with the base occurring at an elevation between 300 and 350 feet below msl.

2.1.2 Groundwater hydrology

Shallow water-bearing units in Charleston County typically consists of discontinuous layers of sand, clay, and localized shell beds and limestone. Groundwater typically occurs under water-table conditions with recharge primarily supplied by rainfall. Water movement is generally controlled by gravity drainage from topographically high to topographically low areas. Depth to groundwater ranges from 0 - 15 feet below land surface and generally corresponds to variations in topography. Fluctuations in the water table may range from 1 - 6 feet annually and are primarily attributed to rainfall. Transmissivities are typically low due to limited thickness and presence of fine-grain sediment. Specific capacities are low with values commonly less than 4 gpm/ft. Yield from shallow wells may range from less than 1 gallon per minute (gpm) to 200 gpm. Shallow water-bearing units are underlain by the Cooper Formation, which inhibits the downward movement of groundwater. Natural seepage to surface water and evapotransporation are the principal means of shallow groundwater discharge. Water extracted by wells accounts for only a small portion of water loss.

A broad range of water quality is found in shallow groundwater. Predominant cation-anion pairs are sodium-chloride or calcium-bicarbonate. Sodium-chloride type water occurs in nearly all of Charleston County and is most commonly encountered in wells less than 25 feet deep. Higher concentrations of sodium and chloride occur in groundwater in proximity to saline. surface water. Calcium bicarbonate water is commonly found in shallow wells in Charleston County, particularly those screened in shelly beds of the Pamlico Formation. Alkalinities less than 150 milligrams per liter (mg/l) and neutral Ph values are common for shallow groundwater. Hardness varies greatly with sodium-chloride water less than 60 mg/l and calcium-bicarbonate water exceeding 120 mg/l. Total iron concentrations commonly exceed 300 mg/l and locally exceed 30,000 mg/l.

The Cooper Formation is a fine granular, sandy, limestone that produces little or no water and acts as a confining unit that creates artesian conditions in the underlying Santee Limestone. Only a few feet of the material is needed to effectively retard vertical movement of groundwater. The Cooper Formation occurs at approximately 0 to -20 feet msl and is approximately 250 to 300 feet thick in the vicinity of the site.

Water-quality data for the Cooper Formation is limited due to the impermeable nature of the unit. Wells having casings less than 100 feet are generally thought to be open, in part, to the Cooper. Water from those wells have chloride concentrations ranging from 0.4 - 7 mg/l and alkalinities of 80 to 120 mg/l. Total hardness (as calcium carbonate) is greater than 60 mg/l and total dissolved solids are less than 200 mg/l. Total iron concentrations range from 28 to 3,000 mg/l.

2.2 Topography and Drainage

The facility is located in the southern part of North Charleston approximately 1 mile southwest of I-26 and 1 mile northwest of the Ashley River (Figure 1). The topography of the site generally slopes from east to west (or northwest) from approximately 15 feet above mean sea level (msl) along Industrial Avenue to 5 feet above msl along Brickyard Creek. The property is bound to the west by Brickyard Creek, and a small intermittent creek/lowland is present in the northern portion of the property. Brickyard Creek drains southward into the Ashley River. The Ashley River and Cooper River join at the southern tip of Charleston. Brickyard Creek is tidally influenced; and, although the facility is located in the upper reaches of the creek, water level in the creek appears to fluctuate several feet. Water quality samples collected near the end of the falling tide had chloride levels of 25 to 32 parts per million (ppm) and total dissolved solids of 259 - 267 ppm.

2.3 Surface-Water and Groundwater Use Considerations

A search was performed to identify surface water and groundwater users with a 1 mile radius of the site. The search included contacting federal, state and local officials to obtain information regarding permitted uses and availability of public-water supplies. Agencies contacted included the following: SCDHEC, Columbia and Charleston Offices; USGS - Water Resources Division, Columbia; the South Carolina Water Resources Division, Charleston and Columbia; and the Charleston Commissioner of Public Works Office. An inventory, based on information from these agencies, of wells in the site vicinity is included in Appendix A.

No withdrawals from Brickyard Creek were identified. Brickyard Creek is a class SB tidal-saltwater stream. Given the saltwater influence, the potential is low for future use of Brickyard Creek for drinking water.

Sediment above the Cooper Formation in the vicinity of the site is relatively thin and has a limited capacity to product water. Inventories of groundwater use indicate that shallow groundwater in sediment above the Cooper in the vicinity of the site has not been used as a source of drinking water. Records show some limited, past use, of groundwater from below the Cooper Formation within 1 mile of the site. However, publicly supplied water is now available in the area; and, there are no known groundwater users within 1 mile of the site.

2.4 Site Geology

Literature on local/regional geology indicate that near-surface geologic material in the area of the site consist of fine-to medium-grain sand, shelly sand, and varicolored clays. The surficial deposits are underlain by the Cooper Formation, which reportedly occurs at approximately 0 to -20 feet below mean sea level (Park, 1985). As shown in cross-sections A-A' and B-B' (Figures 4 and 5) and described in borings logs in Appendix B, geologic material below the site is consistent with the description provided by Park. The three following geologic units are recognized below the site.

Unit 1: The first geologic unit encountered below the site typically consists of a fine-to medium-grain, moderately sorted clayey, quartz sand. Sand content reportedly ranges from approximately 60% to 80%. Clay is present as interstitial material and as distinct clay laminations and beds. In MW-8 and MW-9, a fossil-rich bed (coquina), with variable amounts of silt and clay, was encountered at the base of Unit 1. The depth to the base of Unit 1 ranges from 8.5 feet in MW-7 to 17.5 feet in MW-2. In the area between and around MW-5 and MW-6, up to 8 feet of fill materials is present at or near the surface. Fill material reportedly includes concrete, construction debris, and crushed drums.

Unit 2: A blue to gray, fossiliferous, silty clay was encountered below the relatively sandy deposits of Unit 1. Clay content of this unit reportedly reaches 80%. In MW-9, the first 6 inches of Unit 2 consisted of a massive, dense, dark gray, clay (the boring was terminated in this clay). In monitoring wells MW-5, 6, and 7, which fully penetrated this unit, Unit 2 ranged in thickness from 3.5 to 8.5 feet.

Unit 3: The Cooper Formation (Unit 3) underlies Unit 2 below the site. Samples from Unit 3 are described as consisting of 70% olive gray clay and 30% very fine-grain sand. Unit 3 was encountered at depths ranging from 15.5 to 23 feet in MW-5, 6 and 7. This corresponds to elevations of approximately 11 to 15 feet below sea level.

2.5 Site Hydrology

2.5.1 Water-level elevations

Water-level elevations were measured on 8/15/91 and 3/29/93. Data for these monitoring events are presented in Table 3. Because their is some uncertainty regarding the 8/15/91 measurements, data from 3/29/93 was used to construct a water-level elevation map (Figure 6). This map shows water-level elevations generally decreasing from above 10 feet msl in the central portion of the site to below 6 feet msl near Brickyard Creek. This configuration is consistent with land surface topography. Water-table gradient, between the 6-and 10-foot contours, is approximately 0.02 ft/ft.

Water-level elevation in MW-5 is lower than expected given the general site topography. During installation of the borehole for MW-5, an extensive thickness of concrete was encountered. A backhoe was reportedly used to dig through the concrete. Drilling resumed after the concrete had been fully penetrated (approximately 7-9 feet below land surface). Because water level in this well is approximately at the depth of backhoe excavation, it is possible that the water level is indicative of conditions within the area that was excavated, and may not be indicative of conditions beyond the excavation.

Less than one foot of difference was measured between depths of water during the 8/15/91 and 3/29/93 monitoring events. This may indicate that wide fluctuation in water table elevations are not common below the site; or, it may simply be a coincidence that water levels were similar during the two events.

2.5.2 Hydrologic Testing

Data from rising-head slug tests performed on wells MW-1, MW-2, MW-3, and MW-4 were reduced and analyzed by General Engineering Labs (GEL, 1991C). AQTESOLV™ software was used for data processing and presentation. Copies of time-drawdown plots are included in Appendix C, and results of data processing are summarized in Table 2. Hydraulic conductivities from the four tested wells ranged from 1.5×10^{-3} centimeters/second (cm/s) to 9.3×10^{-3} cm/s. These values are within the range typical for clean to silty sand. The relatively low value for MW-6 (1.5×10^{-3} cm/s) is expected given the limited thickness of Unit 1 (silty sand) in that well.

3.0 SOIL AND WATER ANALYTICAL RESULTS

3.1 Creek-Sediment and Water Samples

Only methylene chloride was detected in analyses of creek-sediment samples (Table 4). Because methylene chloride was detected in the lab blanks, there is some question to whether methylene chloride was actually present in the samples. Methylene chloride is not a prominent constituent found in groundwater below the site; and, it was reported in the upstream and downstream samples. As such, analytical results are interpreted to indicate that creek sediment do not contain detectable levels of organic compounds characteristically found in groundwater below the site.

As with sediment samples, methylene chloride was the only volatile organic compound detected in samples of creek water. Methylene chloride was only detected in the first set of samples, and it was found in lab blanks during sample analysis. Given results from the two sampling events, data are interpreted to indicate that creek water does not contain detectable levels of volatile organic compounds.

3.2 Rainwater Containment Samples

Analysis of the first round of samples collected from rainwater containment area Number 2 showed 1,1,1 trichloroethane and tetrachloroethylene just above detection limits (14.40 ug/l and 3.72 ug/l, respectively). As follow up to detection of these compounds, an additional sample will be collected. Sampling will be performed following a rainfall event greater than 0.1 inches and at least 72 hours prior to the most recent rainfall. Approximately half of the water in the containment area will be allowed to drain before the sample is collected. Sample analysis will be for purgeable organics following USEPA Method 624.

3.3 Water-Line Samples

The first round of samples collected from water lines at three locations around the facility showed the presence of five volatile organics (chloroform, dichlorobromomethane, methylene chloride, 1,2 dichlorobenzene and tetrachloroethene) at concentrations below drinking-water standards. Two of the compounds (chloroform and dichlorobromomethane) are commonly produced during chlorination of drinking water. Methylene chloride was detected in lab blanks. Therefore, detection of these three compounds was not considered to be associated with compounds present below the site. The two other compounds, tetrachloroethene and 1,2 dichlorobenzene, were not detected in lab blanks and were identified in some groundwater samples. To better characterize quality in water lines at the site, a second round of samples was collected from the sampling point that yielded detections of tetrachloroethene and 1,2 dichlorobenzene. Results of that sampling did not yield detectable levels of either parameter (Table 4).

3.4 Soil Vapor Survey

Results of the soil vapor survey are shown in Figure 7. This map shows the highest values encountered from the maximum depth the probe was driven, and from a depth approximately 0.5 to 1.5 below land surface. At several locations, vapor concentrations were highest at the total depth investigated and deceased upward. For these locations, only the highest value attained is shown in Figure 7. Soil vapor concentrations greater than 100 ppm were encountered in the former solvent storage area and in the area of likely runoff from fire fighting activity. The approximate limits of these areas is illustrated by the 100 ppm contour lines on Figure 7. A values of 45.5 ppm obtained for the vapor point just west of the current solvent storage area, and the highest reading encountered in the area of MW-7 was 13 ppm. Given the elevated soil vapor readings in the former solvent storage and the area of possible fire fighting runoff, two additional monitoring wells (MW-8 and MW-9) were installed to assess soil and groundwater quality in these areas.

3.5 Soil Boring Samples

Monitoring wells MW-8 and MW-9 were installed in areas thought to represent potential sources for organic compounds. During installation, two soil samples were collected from each boring - one from the unsaturated zone and one from the base of Unit 1. Results of soil sample analyses (Table 5) showed detection of compounds similar to those detected in groundwater; however, soil samples contained much lower concentrations than groundwater samples. In addition, soil samples taken above the water table showed lower concentrations than those taken below the water table. Soil analytical results are thought to indicate that volatile organics are not typically present in high concentrations in the unsaturated zone, and that little of the organic compounds are bound in the soil matrix.

3.6 Groundwater Samples

Groundwater analytical results are presented in Tables 3, 4, 6, and 7, and certificates of analyses for Phase III sampling are provided in Appendix D. Generally, compounds identified in groundwater have relatively high Henry's Constants (tend to volatilize) and have low to moderate solubilities in water (Montgomery, 1991). The bulk of the compounds can be characterized as aromatic hydrocarbons (e.g., toluene, ethylbenzene, and xylenes), chlorinated ethenes (e.g., cis-1,2 dichloroethene and trichloroethene), or chlorinated benzenes (e.g., chlorobenzene, and 1,2 dichlorobenzene).

The distribution of total volatile organic compounds in groundwater is shown in Figure 8. This map shows that total volatile concentrations in MW-7 and MW-9 are higher than encountered in other portions of the site. In MW-7, cis-1,2 dichloroethene, vinyl chloride, and 1,1 dichloroethane are the primary compounds present (Table 6). In MW-9, toluene and xylenes were present in the highest concentrations; however, ethylbenzene, chlorobenzene, cis-1,2 dichloroethene, and trichloroethene were also present in concentrations above 100 micrograms per liter (ug/l). There was a notable increase in total volatiles concentration in MW-7. This is primarily because cis-1,2 dichloroethene was included in the 3/93 analyses and not included in the 8/91 analysis. Data from other wells show little change in total concentration of volatile compounds.

4.0 REMEDIAL ACTION PLANS

4.1 Summary of Site Conditions

The site is underlain by a regionally extensive confining layer (Cooper Formation) that is generally recognized as providing a barrier to the downward movement of groundwater. Approximately 4 to 10 feet of a saturated, fine-medium, silty sand is present above the confining bed. Groundwater flow in the silty sand is from east to west below the site with groundwater discharge likely occurring to the creek at the western site boundary. Analyses of creek-sediment and water samples did not show detectable levels of the organic compounds found in groundwater below the site. Generally, organic compounds found in groundwater are relatively volatile and have low water solubilities. No free-phase material was encountered. However, two areas were identified as having higher concentrations than generally encountered below the site.

4.2 Proposed Remedial Actions

Based on site hydrogeologic conditions and analytical data, air sparging combined with soil vapor extraction is the proposed approach for site remediation. Air sparging provides an insitu means of stripping volatile organic compounds from groundwater. Stripping is accomplished by bubbling air into the base of a target zone. Volatile compounds are removed by rising air bubbles and transported to the unsaturated zone. Removal of volatiles from the unsaturated zone is facilitated by use of a vapor extraction system. In addition to physical removal of volatiles, oxygen supplied by sparging enhances biologic degradation of compounds susceptible to aerobic microbes. Air sparging/vapor extraction (ASVE) systems are rapidly developing as technically superior and cost effective methods for remediation of groundwater containing volatile organic compounds (Peterson, et.al, 1993).

Remediation of the Charleston site will be focused around MW-7 and MW-9 to reduce concentrations in areas showing the highest levels of volatile organics in groundwater. A phased approach will be used to implement remediation. Initially, a portable ASVE system will be installed and operated in the vicinity of MW-7 (Area I, Figure 9). After reducing volatile concentrations in Area I, the system will be moved to the vicinity of MW-9 (Area 2). Groundwater quality will be monitored in Area 1 after the system is moved. If concentrations increase in Area 1, the system will be returned after concentrations in Area 2 are reduced.

The phased approach has several advantages. First system operation in Area 1 will serve as a site test of the ASVE technology. After reviewing data from initial operation, modifications can be made, if needed, to improve the system prior to moving to Area 2. Second, preliminary review of data from AS and VE systems indicates that pulsed or intermittent system operation may result in more effective and efficient remediation. Finally, installing a single portable system is a cost effective means of remediation given the site hydrogeology and distribution of volatile organics at this site.

4.3 System Components

4.3.1 Sparge points

Air will be delivered to the base of Unit 1 through use of sparge points. Each sparge point will consist of a ½ to 1-inch bubbling point attached to a ¼ to 1-inch air supply line. Bubbling points will be installed in boreholes with a nominal 1-inch diameter. Sand may be installed around bubbling points, and the annular space around the air supply line will be filled with bentonite. Air flow to each point will be controlled by a valve or air control module. Typical sparge point construction is shown in Figure 10.

The radius of influence for each sparge point is estimated to be 10 feet. Accordingly, sparge points will be installed at a spacing of 15 feet. This should provide 5 feet of overlap between points. Location of proposed sparge points and predicted areas of influence are shown in Figure 9.

4.3.2 Vacuum trench

Due to the shallow water-table depth, vacuum trenches will be used to remove vapors from the unsaturated zone. Trenches will be excavated to approximately 1 to 2 feet above the water table. Gravel (or filter sand) will be placed in the trench, and slotted PVC pipe will be placed on the gravel. The slotted pipe will be covered by gravel, and a fine sand or geotextile fabric will be placed above the gravel. The trench will then be partially filled with excavated soil. A clay-rich layer will be placed near the surface to minimize the potential for infiltration of rainwater. Piping from the trench will be connected to the vapor extraction blower with 2-inch PVC pipe. The extraction trench in Area 1 will be approximately 60-feet long and will be installed between the 2 sparge point rows (Figure 11).

4.3.3 System layout and design

Proposed layout of remediation systems for Area 1 and Area 2 is shown in Figure 11. A single, portable ASVE system will be used for both areas. Area 1 will have two sparge rows, with each row having 4 sparge points installed 10 feet apart. Sparge rows will be approximately 30 feet apart, and the vapor extraction trench will be installed midway between the sparge rows. Design and layout for Area 2 is tentatively based on assumptions used to design the Area 1 remediation program. Data from operation in Area 1 will be evaluated prior to final design of components for Area 2.

The ASVE system will include air sparging and vacuum extraction components. Air sparging equipment typically includes a compressor or positive displacement blower, a prefilter, air bleed and pressure relief valves, pressure and temperature gauges, and a system control unit. The air sparge system will be designed to deliver 10 to 50 cubic feet per minute (cfm) of air at a pressure of 5 - 15 pounds per square inch (psi). Vapor extraction equipment typically includes a demister, air bleed and pressure relief valves, a vacuum extraction blower, sample port, and an air discharge tower. The vapor extraction system will be designed to recover 20 - 70 cfm at a vacuum of 15 - 90 inches of water. A typical ASVE system schematic is shown in Figure 12.

4.4 Mass Removal Calculations

As part of system design, calculations were made to estimate mass removal rates. The first step in the calculation was to estimate the total mass of volatile organic compounds within the system area of influence. This was accomplished by multiplying the area of influence times the saturated thickness of Unit 1 in MW-7 and MW-9 times the estimated porosity times the average concentration of total volatiles for that area (Table 8). The total mass of volatiles was then multiplied by the percent weight of each individual compound for the March 1993 sampling. These values represent the mass of each compound within the system area of influence.

Removal rates are anticipated to change through time with the most rapid removal occurring in the first three months and removal rates decreasing thereafter. For calculation purposes, the following mass removal assumptions were made:

Months from Start Up	**Mass % Removed During Period**
0 - 3	35%
3 - 6	25%
6 - 12	15%

To estimate daily removal rates, the total mass was multiplied by the percent removal for each period, and the resulting mass was divided by the days in that period. Results of removal rate calculations are presented in Table 8.

4.5 System Installation Schedule

Implementation of corrective action will being upon receiving approval of this plan. The first step in implementation will be to submit applications for an underground injection control permit and a variance from air permitting requirements. After receiving the required permits, quotes for system construction and installation will be obtained. The sparge points, vacuum trench, and piping will be installed and prepared for system delivery. Upon receipt, the system will be installed and balanced. Planned start and completion timeframes for system installation are outlined in Table 9. Schedules for monitoring and reporting during the first phase of remediation are discussed below in Section 5.0.

5.0 CORRECTIVE ACTION MONITORING AND REPORTING

5.1 Monitoring

Before the corrective-action system is started, another round of water-quality samples will be collected from monitoring wells MW-1, 6, and 7. After completing installation and balancing of the remediation system, water-level elevations and vacuum pressures will be monitored weekly for the first four weeks, then monthly for the next three months. Subsequently, water levels will be monitored on a quarterly basis. Groundwater samples will be collected from wells MW-1, 6, and 7 quarterly. Samples will also be collected from wells MW-3, 4, 5, 8 and 9 every other quarter. Analyses of monitoring-well samples for the first and third quarters will be for halogenated volatile organic compounds (USEPA Method 8010) and for the second and fourth quarters will be for purgeable volatile organic compounds (USEPA Method 8240). Field measurements will also be made for dissolved oxygen. Air quality from the vapor extraction system will be monitored on a monthly basis. Air samples will be tested for total ionizable volatile organics and for CO^2.

5.2 Reporting

After completing system installation, balancing,and the first month of operation; a start-up report will be submitted. Subsequently, results of monitoring will be submitted each quarter. After completing one year of remediation, a report will be submitted that summarizes the first year of operation and monitoring data, discusses the effectiveness of the remediation program, describes any proposed system modifications, and outlines activity for moving the remediation efforts to Area 2.

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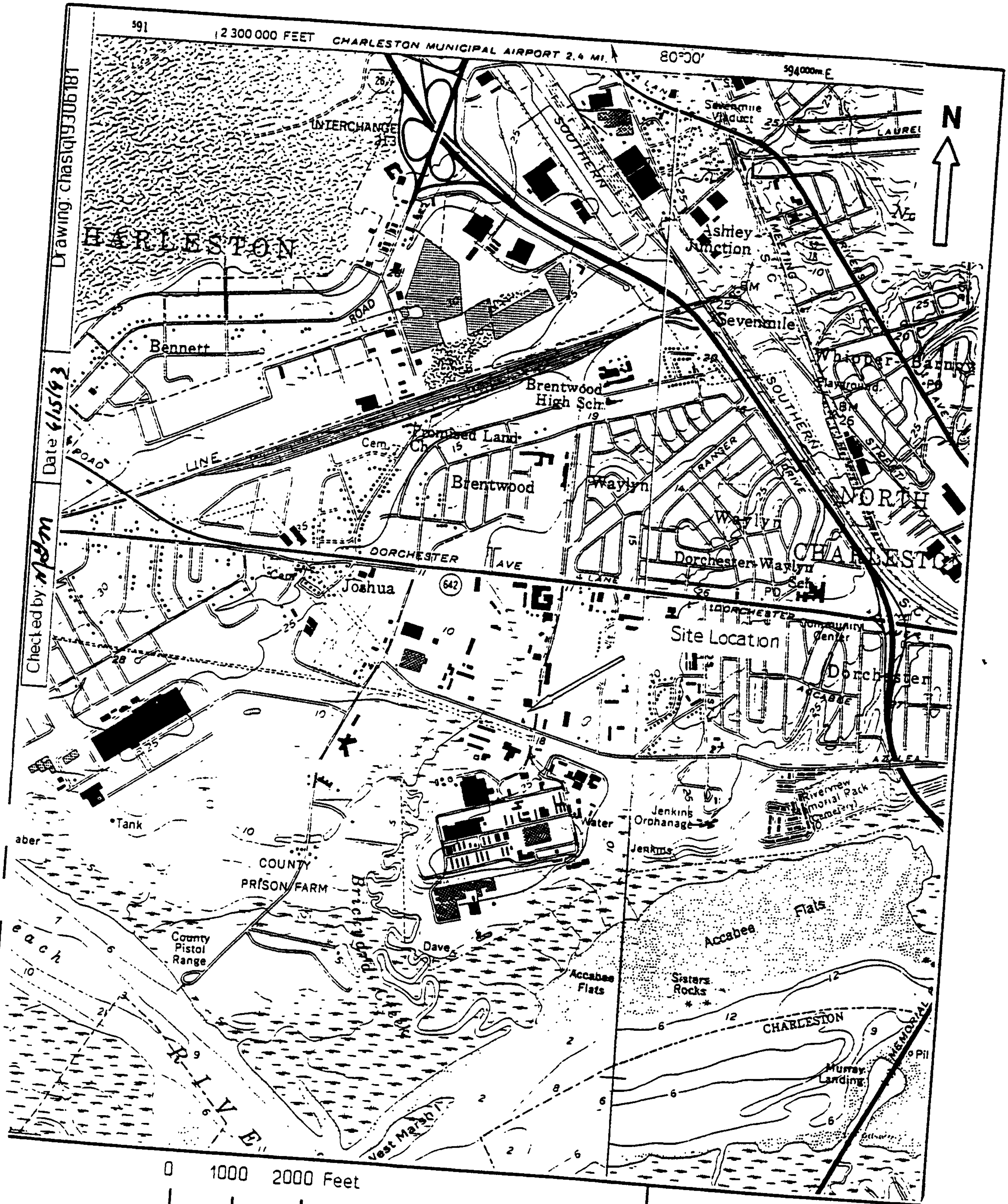
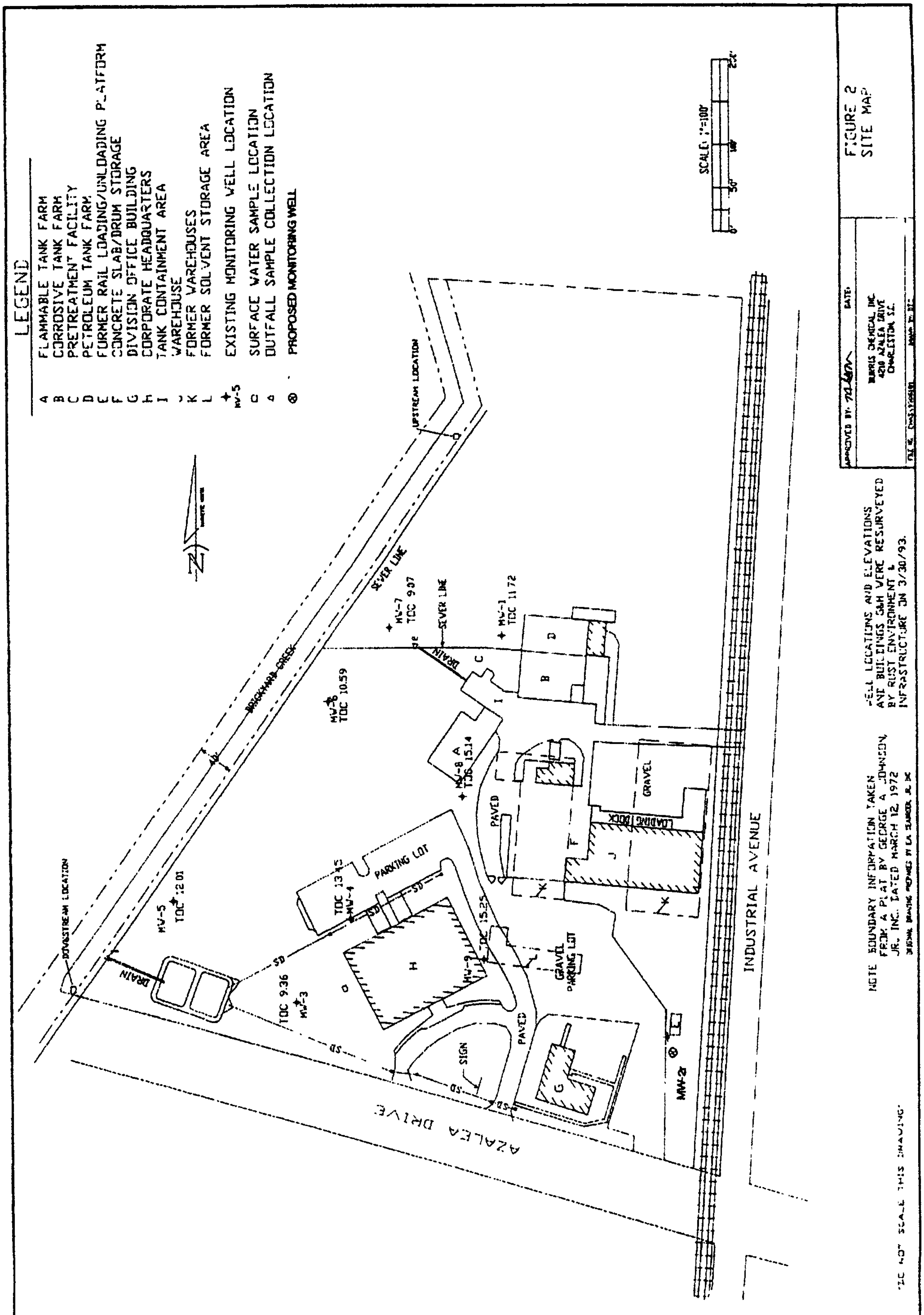


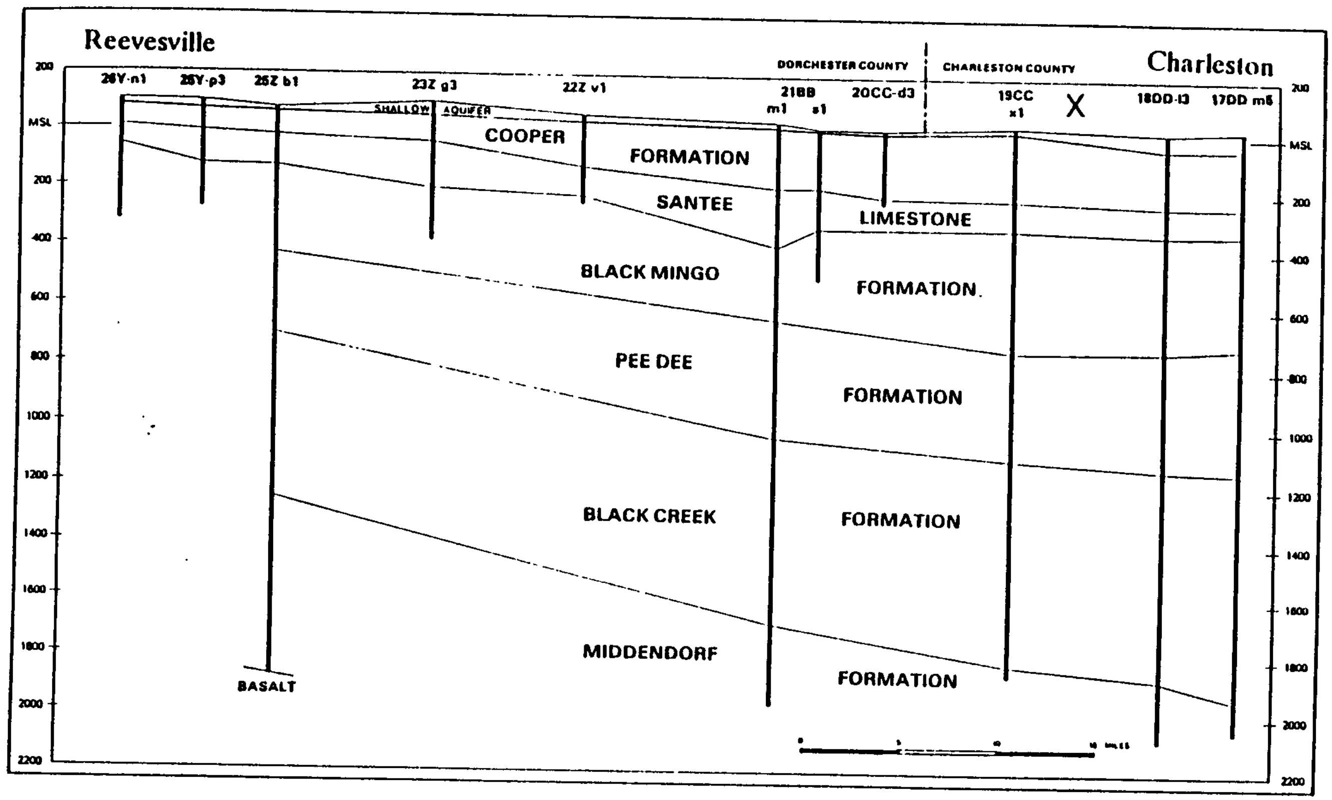
0 1000 2000 Feet

Reference: Charleston & John's Island 7.5 Minute Topographic Maps (1979)

Figure 1
Site Location Map
Burris Chemical, Inc.
Charleston, SC



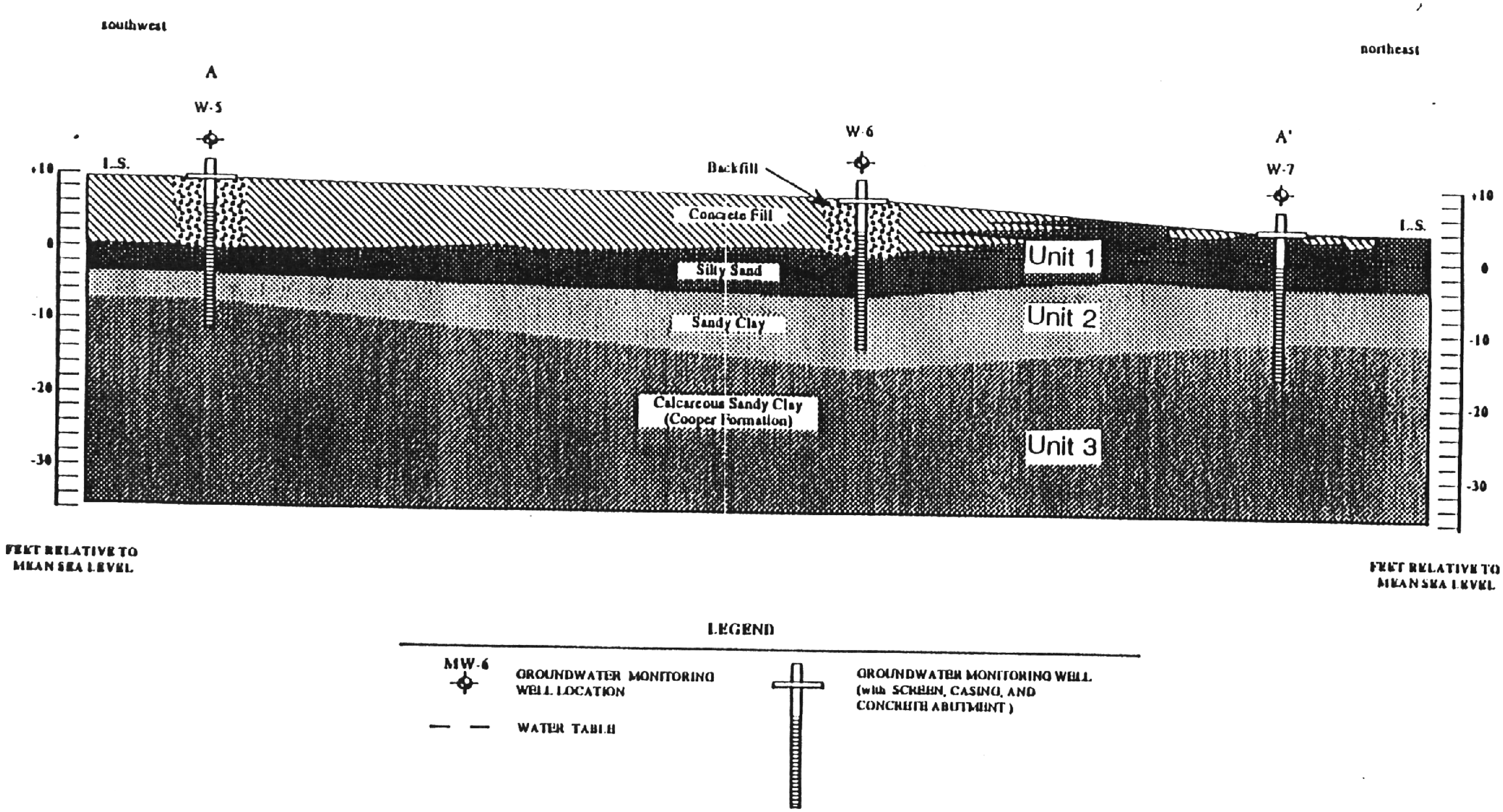
LEGEND
A FLAMMABLE TANK FARM
B CORROSIVE TANK FARM
C PRETREATMENT FACILITY
D PETROLEUM TANK FARM
E FORMER RAIL LOADING/UNLOADING PLATFORM
F CONCRETE SLAB/DRUM STORAGE
G DIVISION OFFICE BUILDING
H CORPORATE HEADQUARTERS
I TANK CONTAINMENT AREA
J WAREHOUSE
K FORMER WAREHOUSES
L FORMER SOLVENT STORAGE AREA
MW-5 EXISTING MONITORING WELL LOCATION
SURFACE WATER SAMPLE LOCATION
OUTFALL SAMPLE COLLECTION LOCATION
PROPOSED MONITORING WELL
SCALE 1"=100'
FIGURE 2
SITE MAP
UPSTREAM LOCATION
DOWNSTREAM LOCATION
BRICKYARD CREEK
SEWER LINE
DRAIN
MW-7 TOC 9.97
MW-1 TOC 11.72
MW-6 TOC 10.59
MW-8 TOC 15.14
MW-5 TOC 12.01
MW-4 TOC 13.45
MW-9 TOC 15.25
MW-3 TOC 9.36
MW-2
PARKING LOT
GRAVEL PARKING LOT
PAVED
GRAVEL
LOADING DOCK
SIGN
AZALEA DRIVE
INDUSTRIAL AVENUE
NOTE BOUNDARY INFORMATION TAKEN FROM A PLAT BY GEORGE A. JOHNSON, JR. INC. DATED MARCH 12, 1972
WELL LOCATIONS AND ELEVATIONS AND BUILDINGS G&H WERE RESURVEYED BY RUST ENVIRONMENT & INFRASTRUCTURE ON 3/30/93.
APPROVED BY: DATE:
BURRIS CHEMICAL INC. 4210 AZALEA DRIVE CHARLESTON S.C.
DO NOT SCALE THIS DRAWING



X – Approximate Site Position

Modified from Park, 1985

chas\930618f3 Appvd By: MGm Date: 4/15/93	Burris Chemical, Inc. 4210 Azalea Dr. Charleston, SC	FIGURE 3. Cross Section from Reevesville to Charleston

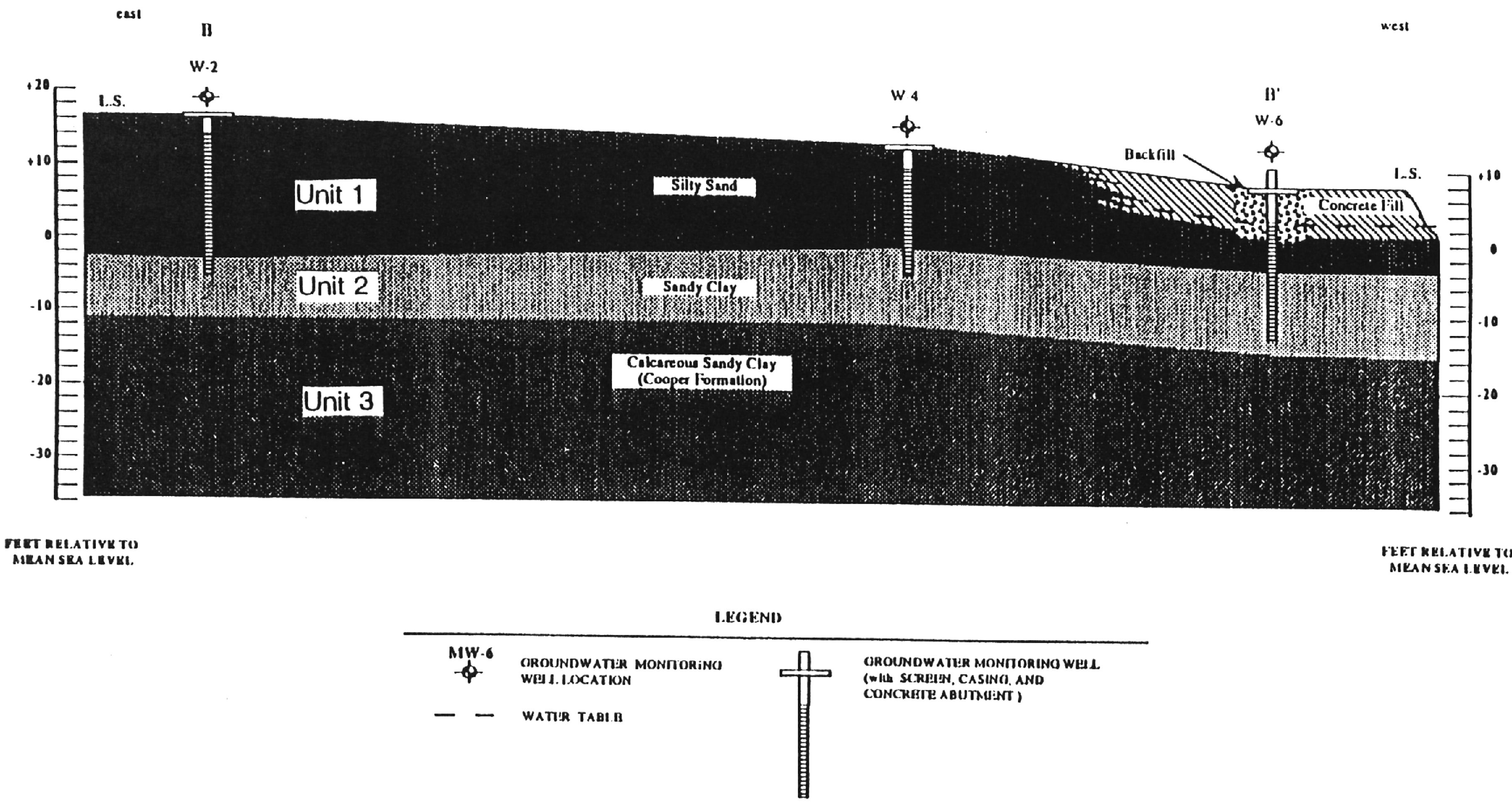


Modified from GEL, 1991 C

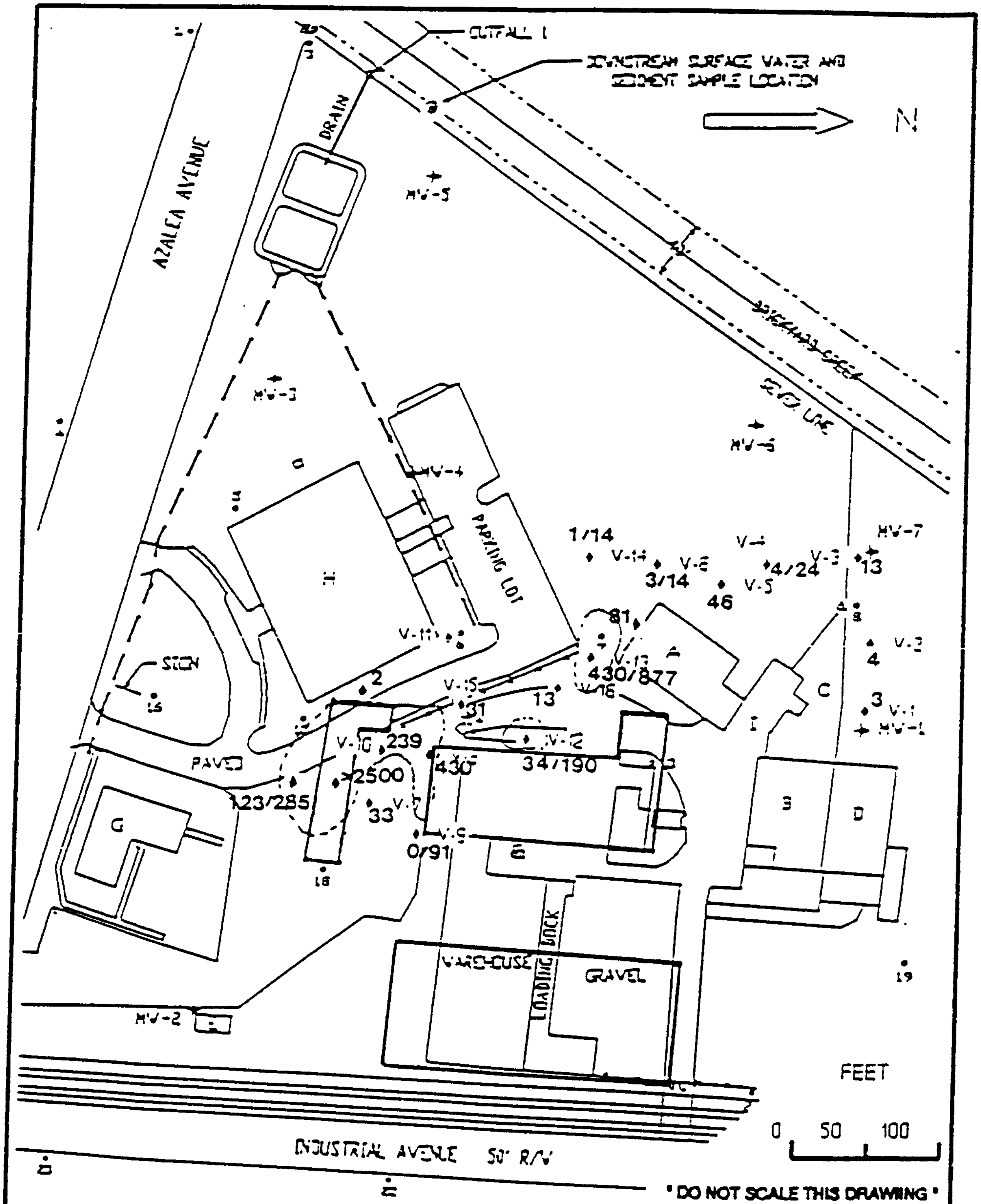
chas\930618f4 | Appvd By: [signature] | Date: 6/15/93

Burris Chemical, Inc.
4210 Azalea Dr.
Charleston, SC

FIGURE 4.
Cross–Section A–A'



Modified from GEL, 1991 C	Burris Chemical, Inc. 4210 Azalea Dr. Charleston, SC	FIGURE 5. Cross–Section B–B'
chas\930618f5 | Appvd By: M-DM Date: 6/15/93		

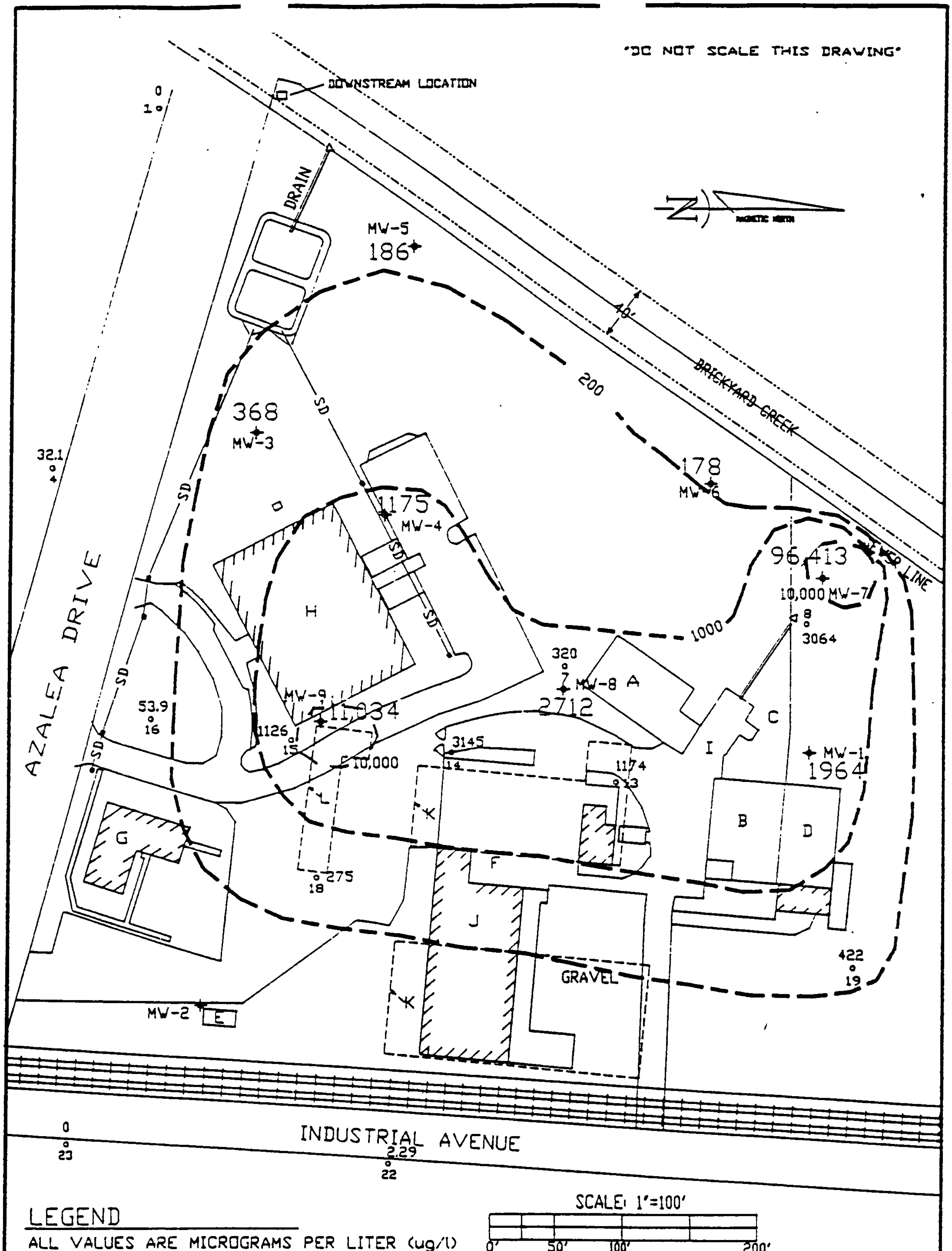


Checked by: [signature]
Date: 1/27/93
chaslq\930121

1/21/93

- ⊗ Prop. Monitor Well
- ⊕ Monitor Well
- ▴ Prop. Boring
- ▲ Boring/Soil Sample
- ◊ Prop. Drive Point
- ♦ Drive Point
- Ⓢ Surface Water Sample
- ♦3/14 OVA Reading (ppm) (deep/shallow reading)

Figure 7. Soil Survey Results
Burris Chemical, Inc.
Charleston, S.C.



LEGEND

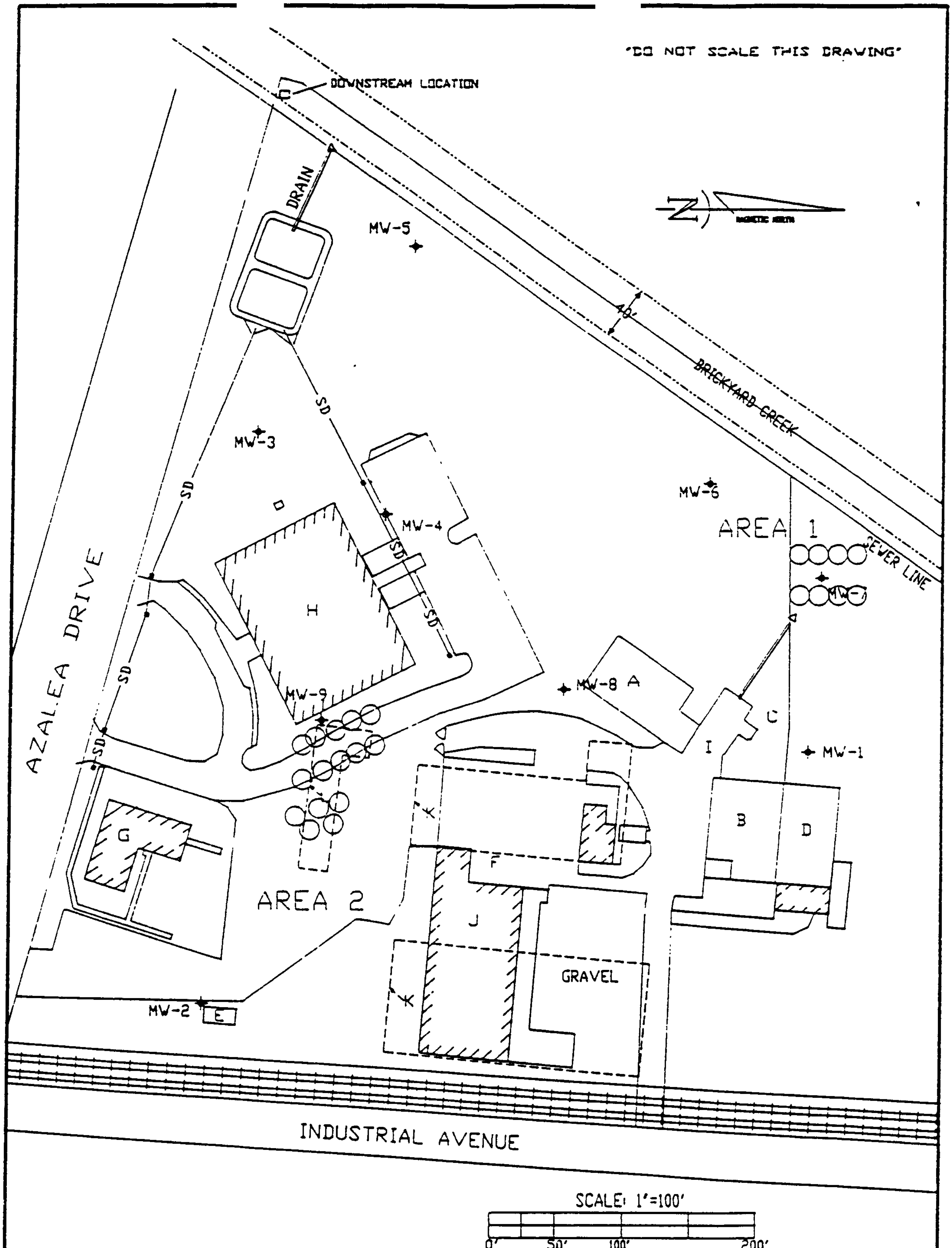
ALL VALUES ARE MICROGRAMS PER LITER (ug/l)
DATA ARE TOTAL VOLATILE ORGANICS
∘ 32.1 DRIVE POINTS
✦186 WELLS

APPROVED BY: MGM DATE: 6/15/93

BURRIS CHEMICAL, INC.
4210 AZALEA DRIVE
CHARLESTON, S.C.

FILE NO. CHAS\9306188 DRAWN BY: DTC

FIGURE 8.
DISTRIBUTION OF VOLATILE ORGANICS IN GROUNDWATER (3/93)



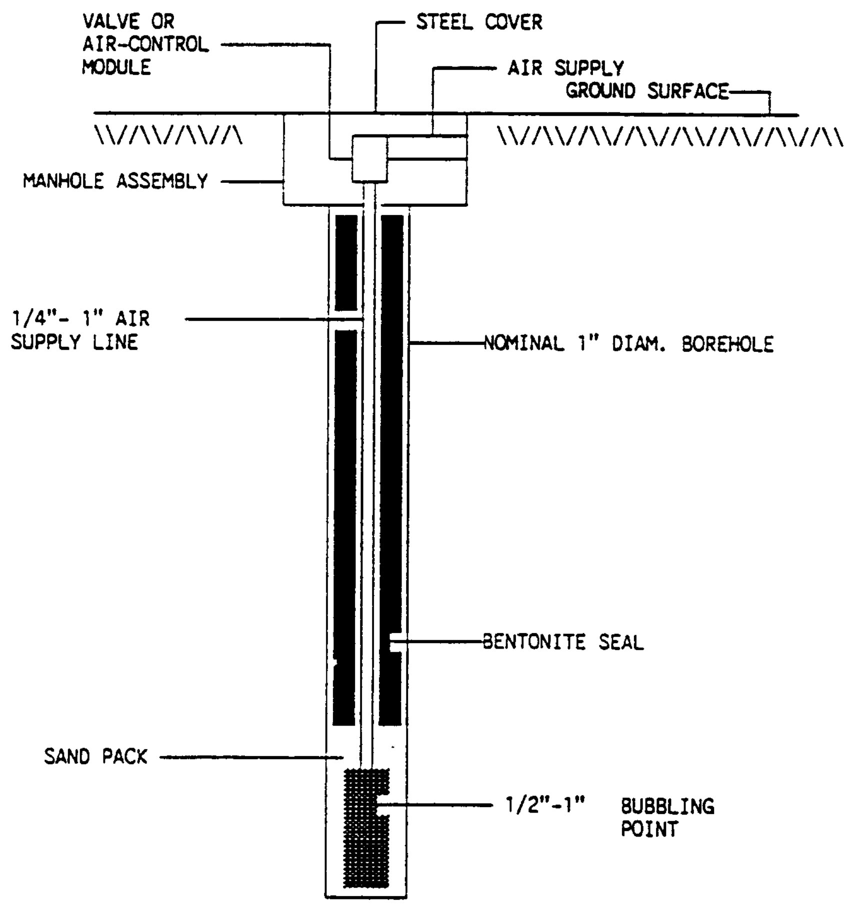
APPROVED BY: MAM DATE: 6/15/93

BURRIS CHEMICAL, INC.
4210 AZALEA DRIVE
CHARLESTON, S.C.

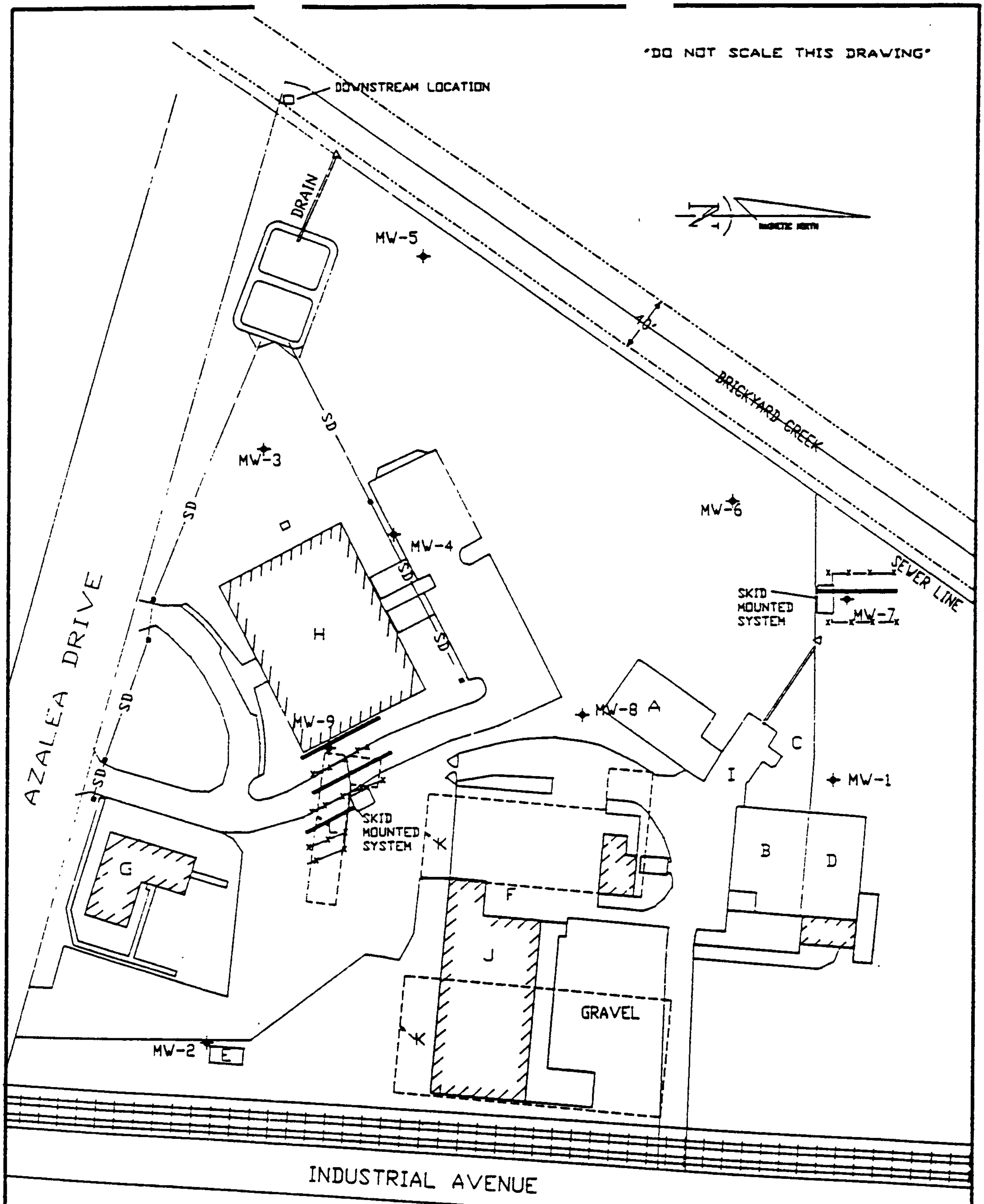
FILE NO. CHAS\9306189

FIGURE 9.
SPARGE POINT PREDICTED AREA OF INFLUENCE

FIGURE 10 . TYPICAL SPARGE-POINT CONSTRUCTION
BURRIS CHEMICAL, INC.
CHARLESTON, SC



chas\q\93061810



LEGEND

- x SPARGE POINT
- ——— AIR SUPPLY LINES
- ▬▬▬ HORIZONTAL VACUUM EXTRACTION TRENCH

SCALE: 1"=100'

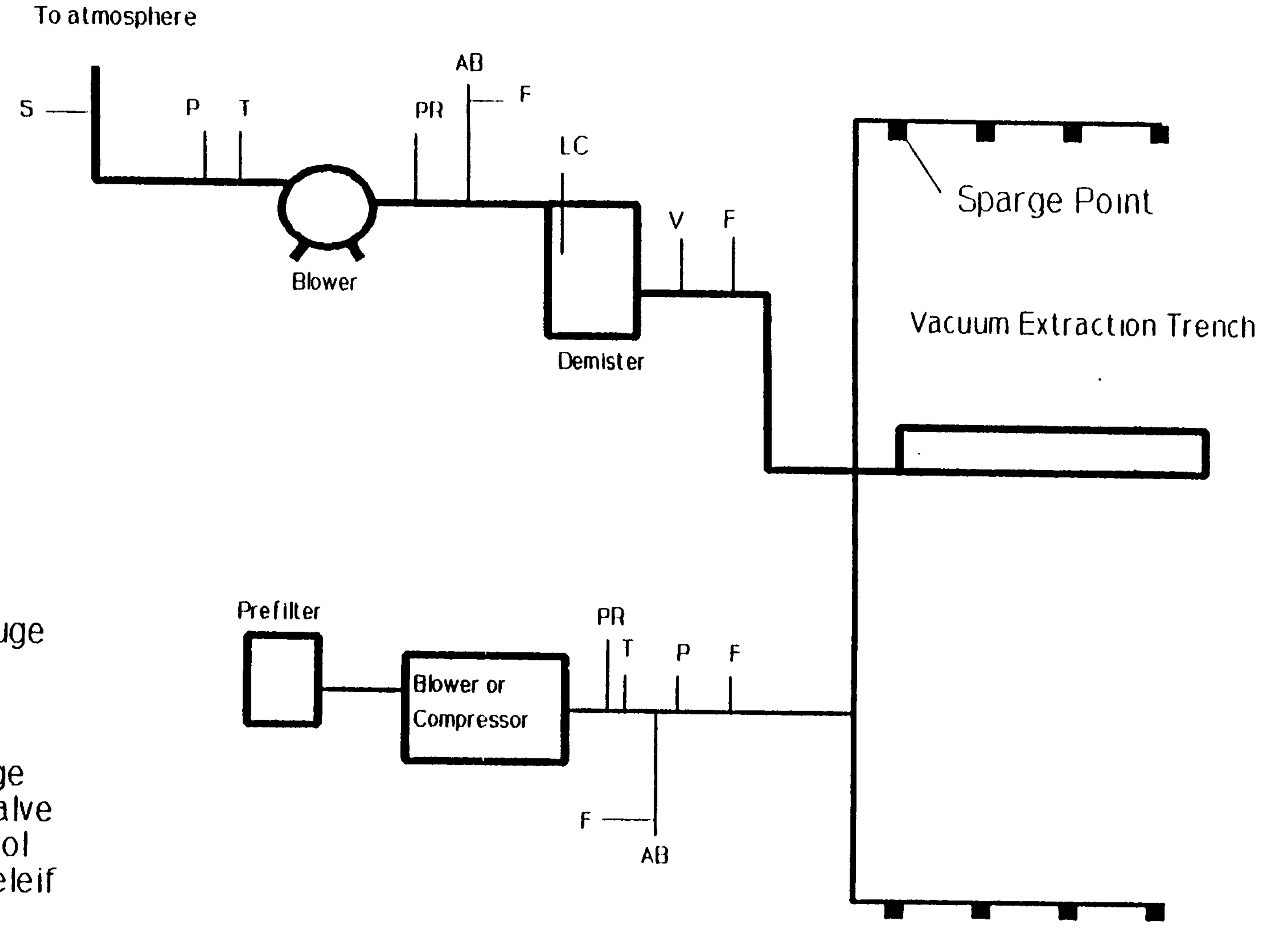
0' 50' 100' 200'

APPROVED BY: MSM DATE: 6/15/93

BURRIS CHEMICAL, INC.
4210 AZALEA DRIVE
CHARLESTON, S.C.

FIGURE 11.
REMEDIATION SYSTEM LAYOUT

FILE NO. CHAS\93061811 DRAWN BY: RTC



F - Flow Gauge
P - Pressure Gauge
S - Sample Port
T - Temperature Gauge
V - Vacuum Gauge
AB - Air Bleed Valve
LC - Level Control
PR - Pressure Releif Valve

Burris Chemical, Inc.
4210 Azalea Drive
Charleston, SC

FIGURE 12
TYPICAL AIR SPARGING/ VACUUM EXTRACION SYSTEM SCHEMATIC

Drawing No. 93061812 **Appvd:** MJM **Date:** 6/15/93

TABLE 1. HYDROGEOLOGIC CHARACTERISTICS – TERTIARY AND QUATERNARY UNITS

SYSTEM	SERIES	FORMATION	LITHOLOGY	WATER-BEARING CHARACTERISTICS
Quaternary	Holocene and Pleistocene	Terrace Deposits	Highly variable. Light-colored fine-to medium-grained sands, shelly sands, and shell beds; varicolored clays. Locally coarse-grained sand or gravel; thin limestone beds.	Ground water occurs under water-table or poorly confined conditions. Transmissivities are generally less than 1,000 ft^2/day. Well yields are variable, ranging from 0 to 200 gpm. Water is commonly acidic at shallow depths and high in iron.
	Miocene	Hawthorn	Fine, sandy, phosphatic limestone, and thin remnents of sand and clay. Generally absent from study area.	
		Edisto	Pale-yellow, sandy, fossiliferous limestone. Present to the northwest along the Edisto River.	
Tertiary	Oligocene	Cooper	Pale-green, or yellowish-gray to olive-brown, sandy, phosphatic limestone. *Harleyville Member:* phosphatic, calcareous clay to clayey, very fine-grained limestone. *Parkers Ferry Member:* glauconitic, clayey, fine-grained, abundantly fossiliferous limestone. *Ashley Member:* phosphatic, muddy, calcareous sands.	Confining unit. Porous bryozoan limestone unit of limited extent will yield up to 300 gpm of freshwater. Yields unknown quantities of brackish water in southern Charleston County.
	Eocene	Santee Limestone	Creamy-white to gray, fossiliferous, locally phosphatic limestone. *Moultrie Member:* biosparrites and bryozoan hash. *Cross Member:* brachiopod-bivalve biomicrite.	Artesian, except in outcrop areas. Typically yields less than 300 gpm. Calcium bicarbonate type water with iron commonly in excess of 0.3 mg/L. Contains brackish water along coast.
Tertiary	Paleocene	Black Mingo	Fossiliferous, white to pale gray limestones, green to gray argillaceous sands, carbonate-and silica-cemented sandstones, and dark-gray to black clays.	Artesian. Transmissivities range from 500 to 8,500 ft^2/day. Will yield 300 to 500 gpm in most areas. Water is soft, alkaline, sodium bicarbonate type. Locally, contains high fluoride and brackish water.

Modified from Park, 1985

TABLE 2. HYDROLOGIC TESTING RESULTS SUMMARY
BURRIS CHEMICAL, INC.
CHARLESTON, SC

WELL NUMBER	HYDRAULIC CONDUCTIVITY		
	(ft/d)	(ft/sec)	(cm/s)
MW-1	2.64E+01	3.06E-04	9.33E-03
MW-2	1.68E+01	1.95E-04	5.95E-03
MW-4	2.34E+01	2.71E-04	8.27E-03
MW-6	4.30E+00	4.98E-05	1.52E-03

Data taken from 10/31/91 Assessment Report by General Engineering Laboratories

TABLE 3. WATER-LEVEL ELEVATIONS
BURRIS CHEMICAL, INC.
CHARLESTON, SC

WELL NO.	MEAS. POINT ELEV.	DATE	DEPTH TO WATER	WATER ELEV.
MW-1	11.96	08/15/91	3.46	8.5
	11.72	03/29/93	2.48	9.24
MW-4	13.79	08/15/91	4.27	9.52
	13.45	03/29/93	3.82	9.63
MW-7	6.53	08/15/91	5.36	1.17
	9.07	03/29/93	5.26	3.81

WELL NUMBER	MEAS. POINT ELEV.	DATE	DEPTH TO WATER	WATER ELEV.
MW-2	16.68	08/15/91	4.6	12.08
MW-5	12.01	08/15/91	11.79	0.22
	12.01	03/29/93	11.75	0.26
MW-8	15.14	03/29/93	4.61	10.53

WELL NUMBER	MEAS. POINT ELEV.	DATE	DEPTH TO WATER	WATER ELEV.
MW-3	9.62	08/15/91	1.06	8.56
	9.36	03/29/93	0.47	8.89
MW-6	10.29	08/15/91	4.98	5.31
	10.59	03/29/93	4.01	6.58
MW-9	15.25	03/29/93	4.71	10.54

Depth to groundwater in feet below measuring point.
Measuring point elevations for 8/15/91 is reportedly relative to mean sea level. Data from 10/31/91 Assessment Report by GEL.
Measuring point elevations were resurveyed on 3/30/93. Elevations were calculated from that survey assuming the elevation for MW-5 was correctly given as 12.01 feet above mean sea level.

TABLE 4. ANALYTICAL RESULTS
DRIVE-POINT, CREEK, AND WATER-LINE SAMPLES
BURRIS CHEMICAL, INC.
CHARLESTON, S.C.

	GS-1	GS-4	GS-6	GS-7	GS-8	GS-13	GS-14
TRICHLOROETHANE 1,1,1-	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	2.02	<200 U
TETRACHLOROETHANE 1,1,2,2-	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
TRICHLOROETHANE 1,1,2-	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
DICHLOROETHANE 1,1-	<2.0 U	<10.0 U	<50.0 U	19.5	56.0	40.2	<200 U
DICHLOROETHENE 1,1-	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	2.47	<200 U
DICHLOROBENZENE 1,2	<2.0 U	<10.0 U	293.0	65.8	1,070.0	<2.00 U	<200 U
DICHLOROETHANE 1,2-	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
DICHLOROPROPANE 1,2	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
DICHLOROETHENE, 1,2-TRANS-	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
DICHLOROBENZENE 1,3	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
DICHLOROBENZENE 1,4	<2.0 U	<10.0 U	56.3	45.1	138.0	<2.00 U	<200 U
CHLOROETHYLVINYL ETHER, 2-	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
ACROLEIN	<20.0 U	<100 U	<500 U	<100 U	<500 U	<20.0 U	<2000 U
ACRYLONITRILE	<20.0 U	<100 U	<500 U	<100 U	<500 U	<20.0 U	<2000 U
BENZENE	<2.0 U	<10.0 U	382.0	26.1	<50.0 U	27.4	<200 U
BROMOFORM	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
CARBON TETRACHLORIDE	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
CHLOROBENZENE	<2.0 U	<10.0 U	<50.0 U	61.8	1,050.0	<2.00 U	<200 U
CHLORODIBROMOMETHANE	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
CHLOROETHANE	<2.0 U	<10.0 U	<50.0 U	<10.0 U	504.0	<2.00 U	<200 U
CHLOROFORM	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
DICHLOROBROMOMETHANE	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
DICHLORODIFLUOROMETHANE	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
ETHYLBENZENE	<2.0 U	<10.0 U	934.0	<10.0 U	<50.0 U	<2.00 U	2,180.0
METHYL BROMIDE	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
METHYL CHLORIDE	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
METHYLENE CHLORIDE	<2.0 U	21.0 B	127.0	18.3	89.0	<2.00 U	594.0 B
TETRACHLOROETHENE	<2.0 U	<10.0 U	137.0	<10.0 U	<50.0 U	54.1	<200 U
TOLUENE	<2.0 U	<10.0 U	73.5	<10.0 U	<50.0 U	<2.00 U	371.0
TRICHLOROETHENE	<2.0 U	<10.0 U	766.0	83.2	<50.0 U	76.5	<200 U
TRICHLOROFLUOROMETHANE	<2.0 U	11.1	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
VINYL CHLORIDE	<2.0 U	<10.0 U	165.0	<10.0 U	157.0	941.0	<200 U
DICHLOROPROPENE CIS-1,3-	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
DICHLOROPROPENE TRANS-1,3-	<2.0 U	<10.0 U	<50.0 U	<10.0 U	<50.0 U	<2.00 U	<200 U
TOTAL VOLATILES	0	32.1	2933.8	319.8	3064	1173.69	3145

All values are ug/l (ppb).
U - Compound not detected.
NA - Compound not analyzed.
B - Compound detected in analytical blank.

TABLE 4. ANALYTICAL RESULTS
DRIVE-POINT, CREEK, AND WATER-LINE SAMPLES
BURRIS CHEMICAL, INC.
CHARLESTON, S.C.

	GS-15	GS-16	GS-17	GS-18.8	GS-18.12	GS-18.22	GS-19
TRICHLOROETHANE 1,1,1-	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
TETRACHLOROETHANE 1,1,2,2-	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
TRICHLOROETHANE 1,1,2-	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
DICHLOROETHANE 1,1-	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
DICHLOROETHENE 1,1-	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
DICHLOROBENZENE 1,2	<50.0 U	<20.0 U	<2.00 U	<1.00 U	<1.00 U	<1.00 U	<50.0 U
DICHLOROETHANE 1,2-	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
DICHLOROPROPANE 1,2	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
DICHLOROETHENE, 1,2-TRANS-	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
DICHLOROBENZENE 1,3	<50.0 U	<20.0 U	<2.00 U	<1.00 U	<1.00 U	<1.00 U	<50.0 U
DICHLOROBENZENE 1,4	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
CHLOROETHYLVINYL ETHER, 2-	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
ACROLEIN	<500 U	<200 U	<20.0 U	NA	NA	NA	<500 U
ACRYLONITRILE	<500 U	<200 U	<20.0 U	NA	NA	NA	<500 U
BENZENE	<50.0 U	<20.0 U	<2.00 U	<1.00 U	<1.00 U	<1.00 U	<50.0 U
BROMOFORM	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
CARBON TETRACHLORIDE	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
CHLOROBENZENE	<50.0 U	<20.0 U	<2.00 U	<1.00 U	<1.00 U	<1.00 U	<50.0 U
CHLORODIBROMOMETHANE	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
CHLOROETHANE	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
CHLOROFORM	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
DICHLOROBROMOMETHANE	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
DICHLORODIFLUOROMETHANE	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
ETHYLBENZENE	942.0	<20.0 U	<2.00 U	258.0	275.0	<1.00 U	<50.0 U
METHYL BROMIDE	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
METHYL CHLORIDE	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
METHYLENE CHLORIDE	110.0 B	53.9	207.0 B	NA	NA	NA	126.0 B
TETRACHLOROETHENE	<50.0 U	<20.0 U	<2.00 U	<1.00 U	<1.00 U	<1.00 U	<50.0 U
TOLUENE	<50.0 U	<20.0 U	<2.00 U	<1.00 U	<1.00 U	<1.00 U	<50.0 U
TRICHLOROETHENE	74.3	<20.0 U	<2.00 U	NA	NA	NA	296.0
TRICHLOROFLUOROMETHANE	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
VINYL CHLORIDE	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
DICHLOROPROPENE CIS-1,3-	<50.0 U	<20.0 U	<2.00 U	<1.00 U	<1.00 U	<1.00 U	<50.0 U
DICHLOROPROPENE TRANS-1,3-	<50.0 U	<20.0 U	<2.00 U	NA	NA	NA	<50.0 U
TOTAL VOLATILES	1126.3	53.9	207	258	275	0	422

All values are ug/l (ppb).
U - Compound not detected.
NA - Compound not analyzed.
B - Compound detected in analytical blank.

TABLE 4. ANALYTICAL RESULTS
DRIVE-POINT, CREEK, AND WATER-LINE SAMPLES
BURRIS CHEMICAL, INC.
CHARLESTON, S.C.

	GS-20	GS-22	GS-23
TRICHLOROETHANE 1,1,1-	<2.00 U	<2.00 U	<2.00 U
TETRACHLOROETHANE 1,1,2,2-	<2.00 U	<2.00 U	<2.00 U
TRICHLOROETHANE 1,1,2-	<2.00 U	<2.00 U	<2.00 U
DICHLOROETHANE 1,1-	<2.00 U	<2.00 U	<2.00 U
DICHLOROETHENE 1,1-	<2.00 U	<2.00 U	<2.00 U
DICHLOROBENZENE 1,2	<2.00 U	<2.00 U	<2.00 U
DICHLOROETHANE 1,2-	<2.00 U	<2.00 U	<2.00 U
DICHLOROPROPANE 1,2	<2.00 U	<2.00 U	<2.00 U
DICHLOROETHENE, 1,2-TRANS-	<2.00 U	<2.00 U	<2.00 U
DICHLOROBENZENE 1,3	<2.00 U	<2.00 U	<2.00 U
DICHLOROBENZENE 1,4	<2.00 U	<2.00 U	<2.00 U
CHLOROETHYLVINYL ETHER, 2-	<2.00 U	<2.00 U	<2.00 U
ACROLEIN	<20.0 U	<20.0 U	<20.0 U
ACRYLONITRILE	<20.0 U	<20.0 U	<20.0 U
BENZENE	<2.00 U	<2.00 U	<2.00 U
BROMOFORM	<2.00 U	<2.00 U	<2.00 U
CARBON TETRACHLORIDE	<2.00 U	<2.00 U	<2.00 U
CHLOROBENZENE	<2.00 U	<2.00 U	<2.00 U
CHLORODIBROMOMETHANE	<2.00 U	<2.00 U	<2.00 U
CHLOROETHANE	<2.00 U	<2.00 U	<2.00 U
CHLOROFORM	<2.00 U	<2.00 U	<2.00 U
DICHLOROBROMOMETHANE	<2.00 U	<2.00 U	<2.00 U
DICHLORODIFLUOROMETHANE	<2.00 U	<2.00 U	<2.00 U
ETHYLBENZENE	<2.00 U	<2.00 U	<2.00 U
METHYL BROMIDE	<2.00 U	<2.00 U	<2.00 U
METHYL CHLORIDE	<2.00 U	<2.00 U	<2.00 U
METHYLENE CHLORIDE	<2.00 U	2.29 B	<2.00 U
TETRACHLOROETHENE	<2.00 U	<2.00 U	<2.00 U
TOLUENE	<2.00 U	<2.00 U	<2.00 U
TRICHLOROETHENE	<2.00 U	<2.00 U	<2.00 U
TRICHLOROFLUOROMETHANE	<2.00 U	<2.00 U	<2.00 U
VINYL CHLORIDE	<2.00 U	<2.00 U	<2.00 U
DICHLOROPROPENE CIS-1,3-	<2.00 U	<2.00 U	<2.00 U
DICHLOROPROPENE TRANS-1,3-	<2.00 U	<2.00 U	<2.00 U
TOTAL VOLATILES	0	2.29	0

All values are ug/l (ppb).
U – Compound not detected.
NA – Compound not analyzed.
B – Compound detected in analytical blank.

TABLE 4. ANALYTICAL RESULTS
DRIVE-POINT, CREEK, AND WATER-LINE SAMPLES
BURRIS CHEMICAL, INC.
CHARLESTON, S.C.

	Upstream Soil	Down-stream Soil	Upstream Water		Downstream Water		Water Line (SG-1)	
			8/15/91	4/24/92	8/15/91	4/24/92	6/7/91	4/24/92
TRICHLOROETHANE 1,1,1-	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
TETRACHLOROETHANE 1,1,2,2-	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
TRICHLOROETHANE 1,1,2-	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
DICHLOROETHANE 1,1-	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
DICHLOROETHENE 1,1-	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
DICHLOROBENZENE 1,2	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	0.873 U	<2.00 U
DICHLOROETHANE 1,2-	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
DICHLOROPROPANE 1,2	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
DICHLOROETHENE, 1,2-TRANS-	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
DICHLOROBENZENE 1,3	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
DICHLOROBENZENE 1,4	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
CHLOROETHYLVINYL ETHER, 2-	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<10 U	<2.00 U
ACROLEIN	NA	U	<20 U	NA	<20 U	NA	<20 U	NA
ACRYLONITRILE	NA	U	<20 U	NA	<20 U	NA	<20 U	NA
BENZENE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
BROMOFORM	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
CARBON TETRACHLORIDE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
CHLOROBENZENE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
CHLORODIBROMOMETHANE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
CHLOROETHANE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
CHLOROFORM	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
DICHLOROBROMOMETHANE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	18.8	13.00
DICHLORODIFLUOROMETHANE	<4.00 U	<4.08 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	1.64	<2.00 U
ETHYLBENZENE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
METHYL BROMIDE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
METHYL CHLORIDE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
METHYLENE CHLORIDE	26.0 B	33.7 B	21.5 B	<2.00 U	7.17 B	<2.00 U	1.51	<2.00 U
TETRACHLOROETHENE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	1.29	<2.00 U
TOLUENE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
TRICHLOROETHENE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
TRICHLOROFLUOROMETHANE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
VINYL CHLORIDE	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
DICHLOROPROPENE CIS-1,3-	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
DICHLOROPROPENE TRANS-1,3-	<20.0 U	<20.4 U	<2.00 U	<2.00 U	<2.00 U	<2.00 U	<0.5 U	<2.00 U
TOTAL VOLATILES	26	33.7	21.5	0	7.17	0	24.113	13

All values are ug/l (ppb).
U – Compound not detected.
NA – Compound not analyzed.
B – Compound detected in analytical blank.

TABLE 5. ANALYTICAL RESULTS –
SOIL SAMPLES
BURRIS CHEMICAL, INC.
CHARLESTON, SC

SAMPLE NUMBER	MW8(3)	MW8(13)	MW9(3)	MW9(13)
ACETONE	<100	<100	<100	<100
BENZENE	<5	19	<5	5
BROMODICHLOROMETHANE	<5	<5	<5	<5
BROMOFORM	<5	<5	<5	<5
BROMOMETHANE	<10	<10	<10	<10
BUTANONE 2–	<100	<100	<100	<100
CARBON DISULFIDE	<5	<5	<5	12
CARBON TETRACHLORIDE	<5	<5	<5	<5
CHLOROBENZENE	<5	3 J	9	<5
CHLOROETHANE	<10	<10	<10	<10
CHLOROFORM	<5	<5	<5	<5
CHLOROMETHANE	<10	<10	<10	<10
DIBROMOCHLOROMETHANE	<5	<5	<5	<5
DICHLOROETHANE 1,1–	<5	6	<5	<5
DICHLOROETHANE 1,2–	<5	<5	<5	<5
DICHLOROETHENE, TRANS–1,2	<5	<5	<5	12
DICHLOROETHENE 1,1–	<5	<5	<5	<5
DICHLOROPROPANE 1,2	<5	<5	<5	<5
DICHLOROPROPENE CIS–1,3–	<5	<5	<5	<5
DICHLOROPROPENE TRANS–1,3–	<5	<5	<5	<5
ETHYLBENZENE	<5	<5	<5	<5
HEXANONE 2–	<50	<50	<50	<50
METHYLENE CHLORIDE	<5	<5	<5	<5
METHYL–2–PENTANONE 4–	<50	<50	<50	<50
STYRENE	<5	<5	<5	<5
TETRACHLOROETHANE 1,1,2,2–	<5	<5	<5	<5
TETRACHLOROETHENE	<5	<5	<5	<5
TOLUENE	<5	2 J	<5	<5
TRICHLOROETHANE 1,1,1–	<5	<5	<5	<5
TRICHLOROETHANE 1,1,2–	<5	<5	<5	<5
TRICHLOROETHENE	5	8	<5	<5
VINYL ACETATE	<50	<50	<50	<50
VINYL CHLORIDE	<10	<10	<10	13
XYLENES TOTAL	<5	4 J	<5	10
TOTAL VOLATILES	5	42	9	52

Values for soil samples are micrograms per kilogram (ppb).
< Compound not detected at or above the detection limit.
J – Concentration estimated below detection limit.
MW9(3) – Well number and sample depth.

TABLE 6. ANALYTICAL RESULTS – GROUNDWATER SAMPLES
BURRIS CHEMICAL, INC.
CHARLESTON, SC

	DATE	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9
ACETONE	06-Feb-91									
	15-Aug-91									
	30-Mar-93	208		<100	<200	<100	<100	<2000	<1000	<2000
BENZENE	06-Feb-91	233		52	<50					
	15-Aug-91	525.0	<10.0	140.0	<50.0	4.36	22.70	<1000		
	30-Mar-93	47		42	8 J	2 J	32	41 J	<50	402
BUTANONE, 2-										
	30-Mar-93	50 J		<100	<200	<100	<100	<2000	<1000	<2000
CHLOROBENZENE	06-Feb-91	<20.0		51	221					
	15-Aug-91	<20.0	<10.0	85.0	240.0	51.10	44.50	<1000		
	30-Mar-93	<5		60	105	3 J	63	35 J	12 J	326
CHLOROETHANE										
	30-Mar-93	46		<10	<20	<10	<10	<200	<100	<200
CHLOROFORM	06-Feb-91	<20		<10	<50					
	15-Aug-91	<20.0	<10.0	<10.0	<50.0	<2.00	<2.00	<1000		
	30-Mar-93	2 J		<5	<10	<5	<5	<100	<50	<100
DICHLOROBENZENE 1,2	06-Feb-91	<20		13	1175					
	15-Aug-91	32.1	<10.0	80.0	1,140.0	18.60	<2.00	<1000		
	30-Mar-93	3 J		34	649	4 J	2 J	<100	8 J	35 J
DICHLOROBENZENE 1,3	06-Feb-91	<20		<10	94					
	15-Aug-91	<20.0	<10.0	<10.0	80.0	<2.00	<2.00	<1000		
	30-Mar-93	<5		3 J	40	<5	<5	<100	<50	<100
DICHLOROBENZENE 1,4	06-Feb-91	<20		48	322					
	15-Aug-91	<20.0	<10.0	20.0	255.0	3.72	<2.00	<1000		
	30-Mar-93	<5		13	148	<5	<5	<100	6 J	<100

	DATE	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9
DICHLOROETHANE 1,1-	06-Feb-91	98		17	63					
	15-Aug-91	165.0	<10.0	25.0	52.5	<2.00	<2.00	3,300		
	30-Mar-93	61		12	13	<5	<5	3080	10 J	<100
DICHLOROETHANE 1,2-	06-Feb-91	<20		<10	<50					
	15-Aug-91	<20.0	<10.0	25.0	<50.0	<2.00	<2.00	<1000		
	30-Mar-93	<5		10	<10	<5	<5	<100	<50	<100
DICHLOROETHENE 1,1-	06-Feb-91	64		22	<50					
	15-Aug-91	121.0	<10.0	70.0	<50.0	<2.00	<2.00	1,550		
	30-Mar-93	20		14	4 J	<5	<5	673	<50	<100
DICHLOROETHENE, 1,2-CIS										
	30-Mar-93	1390		81	11	96	44	81000	172	290
DICHLOROETHENE, 1,2-TRANS	06-Feb-91	87		<10	<50					
	15-Aug-91	127.0	<10.0	10.0	<50.0	2.26	<2.00	<1000		
	30-Mar-93	16		5	<10	2 J	<5	194	<50	<100
ETHYLBENZENE	06-Feb-91	<20		<10	448					
	15-Aug-91	<20.0	<10.0	15.0	300.0	<2.00	2.37	<1000		
	30-Mar-93	<5		5	133	<5	3 J	96 J	<50	867
METHYLENE CHLORIDE	06-Feb-91	143		52	256					
	15-Aug-91	<20.0	<10.0	<10.0	<50.0	<2.00	<2.00	<1000		
	30-Mar-93	<5		<5	<10	<5	<5	281	<50	<100
TETRACHLOROETHENE	06-Feb-91	54		<10	<50					
	15-Aug-91	53.0	<10.0	10.0	60.0	<2.00	<2.00	<1000		
	30-Mar-93	<5		<5	<10	<5	<5	32 J	34 J	<100
TOLUENE	06-Feb-91	68		64	216					
	15-Aug-91	40.0	<10.0	15.0	<50.0	2.86	3.78	1,500		
	30-Mar-93	6		11	12	<5	4 J	805	<50	3830

	DATE	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9
TRICHLOROETHANE 1,1,1-	06-Feb-91	<20		11	179					
	15-Aug-91	<20.0	<10.0	30.0	<50.0	<2.00	<2.00	<1000		
	30-Mar-93	14		13	31	<5	<5	604	<50	<100
TRICHLOROETHENE	06-Feb-91	316		29	76					
	15-Aug-91	286.0	192.0	45.0	67.5	<2.00	<2.00	10,500		
	30-Mar-93	7		25	16	<5	<5	1910	2470	124
VINYL CHLORIDE	06-Feb-91	638		58	<50					
	15-Aug-91	971.0	<10.0	85.0	<50.0	88.70	47.10	1,500		
	30-Mar-93	94		20	<20	79	27	7610	<100	<200
XYLENES (TOTAL)										
	30-Mar-93	<5		20	5 J	<5	3 J	52 J	<50	5160
TOTAL VOLATILES	06-Feb-91	1701	0	417	3050					
	15-Aug-91	2320.1	192	655	2195	171.6	120.45	18350		
		1964		368	1175	186	178	96413	2712	11034

All values are micrograms per liter ug/l.
8/91 Sampling took place on 8/15-16/91.
MW-2 abandonded on
J - Concentration estimated below detection limit.

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TABLE 7. ANAYTICAL RESULTS – INORGANIC CONSTITUENTS
BURRIS CHEMICAL, INC
CHARLESTON, SC

Parameters	Outfall 1	Outfall 2	Upstream	Downstream
Arsenic	<0.005	<0.005	<0.005	<0.005
Sodium	24.20	17.50	43.30	3.80
Chlorides	35.20	24.00	25.00	32.20
Sulfate	20.60	63.00	36.60	38.80
Solids, Total Dissolved	322.00	226.00	259.00	267.00
pH, SU **	8.07	7.95	7.44	7.15
Conductivity, umhos/cm ***	499.00	372.00	404.00	431.00

Parameters	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7
Arsenic	0.09	0.06	0.22	0.32	<0.005	0.006	0.07
Sodium	1.88	3.51	1.85	0.93	10.18	2.46	3.05
Chlorides	176.00	26.30	276.00	78.00	705.00	178.00	500.00
Sulfate	544.00	16.30	596.00	120.00	143.00	27.50	190.00
Solids, Total Dissolved	1,240.00	1,200.00	1,190.00	791.00	1,910.00	1,100.00	1,560.00
pH, SU **	6.25	10.4	6.47	6.43	7.14	11.9	6.83
Conductivity, umhos/cm ***	1,610.00	1,410.00	21,800.00	11,800.00	324.00	268.00	225.00

Values are milligrams per liter unless otherwise indicated.
** – Standard Units
*** – Units in micro–ohms/centimeter

Modified from GEL (1991)

TABLE 8. MASS REMOVAL CALCULATIONS – AREA 1
BURRIS CHEMICAL, INC.
CHARLESTON, SC

Contour Interval – Total Volatiles (ug/l)	Average Value (ug/l)	Area (sq. ft.)	Volume of Water *1 (l)	Mass of Volatiles *2 (ug)	Mass of Volatiles (lb)
10,000–96,500	53,250	1400	23,789	1.27E+09	2.793191
1,000–10,000	5,500	7600	129,139	7.10E+08	1.566135
Total		9,000	152,928	1.98E+09	4.359327

*1 – Area x Saturated Thickness of Unit 1 (3) x Porosity (.20)
*2 – Average concentration x Volume

Parameter	% by weight – total volatiles 3/93 samplig	Mass below ground surface *3 (lb)	Estimated Removal Rate (lb/day) 0–3	3–6	6–12	Months from start
			35%	25%	15%	% removed during period
BENZENE	0.0	0.00	0.00000	0.00000	0.00000	
CHLOROBENZENE	0.0	0.00	0.00000	0.00000	0.00000	
DICHLOROBENZENE 1,2	0.0	0.00	0.00000	0.00000	0.00000	
DICHLOROETHANE 1,1	3.2	0.14	0.00054	0.00039	0.00011	
DICHLOROETHENE 1,1	0.7	0.03	0.00012	0.00008	0.00003	
DICHLOROETHENE 1,2–CIS	84.0	3.66	0.01424	0.01017	0.00302	
DICHLOROETHENE 1,2–TRANS	0.2	0.01	0.00003	0.00002	0.00001	
ETHYLBENZENE	0.1	0.00	0.00002	0.00001	0.00000	
METHYLENE CHLORIDE	0.3	0.01	0.00005	0.00004	0.00001	
TOLUENE	0.8	0.03	0.00014	0.00010	0.00003	
TRICHLOROETHANE 1,1,1–	0.6	0.03	0.00010	0.00007	0.00002	
TRICHLOROETHENE	2.0	0.09	0.00034	0.00024	0.00007	
VINYL CHLORIDE	7.9	0.34	0.00134	0.00096	0.00028	
XYLENES (TOTAL)	0.1	0.00	0.00002	0.00001	0.00000	

*3 – Total mass x % by weight

ug/l – Micrograms per liter
l/m – Liters per minute
ug/m – Micrograms per minute
lb/day – Pounds per day

TABLE 8. MASS REMOVAL CALCULATIONS – AREA 2
BURRIS CHEMICAL, INC.
CHARLESTON, SC

Contour Interval – Total Volatiles (ug/l)	Average Value (ug/l)	Area (sq. ft.)	Volume of Water *1 (l)	Mass of Volatiles *2 (ug)	Mass of Volatiles (lb)
10,000–11,000	10,500	2900	164,256	1.72E+09	3.802937
1,000–10,000	5,500	8100	458,784	2.52E+09	5.563902
200–1,000	600	4100	232,224	1.39E+08	0.307232
Total		15,100	855,264	4.39E+09	9.674072

*1 – Area x Unit 1 Saturated Thickness in MW–9 (10) x Porosity (.20)
*2 – Average concentration x Volume

Parameter	% by weight – total volatiles 3/93 samplig	Mass below ground surface *3 (lb)	Estimated Removal Rate (lb/day) 0–3	3–6	6–12	
			0–3	3–6	6–12	Months from start
			35%	25%	15%	% removed during period
BENZENE	3.6	0.16	0.00061	0.00044	0.00013	
CHLOROBENZENE	3.0	0.13	0.00051	0.00036	0.00011	
DICHLOROBENZENE 1,2	0.3	0.01	0.00005	0.00004	0.00001	
DICHLRORETHANE 1,1	0.0	0.00	0.00000	0.00000	0.00000	
DICHLOROETHENE 1,1	0.0	0.00	0.00000	0.00000	0.00000	
DICHLOROETHENE 1,2-CIS	2.6	0.11	0.00044	0.00031	0.00009	
DICHLOROETHENE 1,2–TRANS	0.0	0.00	0.00000	0.00000	0.00000	
ETHYLBENZENE	7.9	0.34	0.00134	0.00096	0.00028	
METHYLENE CHLORIDE	0.0	0.00	0.00000	0.00000	0.00000	
TOLUENE	34.7	1.51	0.00588	0.00420	0.00125	
TRICHLOROETHANE 1,1,1–	0.0	0.00	0.00000	0.00000	0.00000	
TRICHLOROETHENE	1.1	0.05	0.00019	0.00013	0.00004	
VINYL CHLORIDE	0.0	0.00	0.00000	0.00000	0.00000	
XYLENES (TOTAL)	46.8	2.04	0.00793	0.00567	0.00168	

*3 – Total mass x % by weight

ug/l – Micrograms per liter
l/m – Liters per minute
ug/m – Micrograms per minute
lb/day – Pounds per day

TABLE 9. REMEDIATION IMPLEMENTAION SCHEDULE
BURRIS CHEMICAL, INC.
CHARLESTON, SOUTH CAROLINA

Time is in weeks from receiving approval of the Corrective Action Plan.

Activity	Planned Start	Planned Completion
Preparation and submittal of a UIC Permit Application	1	3
Preparation and submittal of an air discharge variance request	1	3
Prepare bid packages for system construction	2	4

Time is in weeks from receiving a UIC permit, well approval, and Air Variance.

Activity	Planned Start	Planned Completion
Prepare bid packages for drilling	1	2
Receive and review bids, contract drilling	3	4
Review bid packages, contract system design construction	3	5
Receive and review system design specifications	7	9
Order remediation system	10	11
Request quotes/qualifications for installation of system (as needed)	4	5
Review bid packages, contract system installation	7	9
Install sparge points and ASVE piping	10	12
Sample monitoring wells	11	12
Install ASVE system	21	22
Start and balance system	21	23

Schedule assumes there are no permitting, inspection or other similar requirements/delays after week 1.

APPENDIX A

SUMMARY OF WELL INVENTORY INFORMATION

APPENDIX 1
SUMMARY OF WELL INVENTORY INFORMATION

SCWRC NO.	USGS NO.	LATITUDE	LONGITUDE	ELEVATION	TOTAL DEPTH	CASING DEPTH	OWNER
18CC-d1	CHN- 639	325450	795855	35	381		US AIR FORCE
18CC-e1	CHN- 294	325413	795915	40	361	198	WESTVACO
18CC-g1	CHN- 49	325308	795838	30	440	308	RAYBESTOS-MANHATTEN
18CC-g2	CHN- 540	325354	795813	15	450		WESTVACO
18CC-i1	BRK- 297	325321	795604	25	341		GEORGE DEYTEN
18CC-k1	BRK- 273	325226	795556	5			M. BURNS
18CC-k2	BRK- 296	325208	795517	5			
18CC-o1	CHN- 460	325254	795919	30	325	126	V. BUNN
18CC-q1	CHN- 476	325143	795811	20	315		US NAVAL SHIPYARD
18CC-r1	CHN- 17	325121	795741	12	2026	1736	US NAVAL SHIPYARD(CHN-2)
18CC-v1	CHN- 607	325015	795651	12	402		MACALLOY CORP
18CC-w1	CHN- 610	325009	795713	10	440		MACALLOY CORP
18CC-y1	CHN- 150	325044	795948	25	398	55	JENKINS ORPHANAGE (CHN-169)
19CC-d1	CHN- 456	325424	800350	45	1002	1002	VPI
19CC-f1	CHN- 118	325320	800411	25	353	116	S. BELL
19CC-n1	CHN- 503	325219	800350	-1	380		M. CROMBIE
19CC-u1	CHN- 107	325023	800021	8	450	120	BIRD & SON
19CC-u2	CHN- 108	325025	800017	13	452	140	BIRD & SON
19CC-x1	CHN- 172	325049	800353	13	1852	1840	SHADOWMOSS CORP
19CC-y1	CHN- 169	325020	800445	10	421	82	SHADOWMOSS CTRY CLUB

Search area: 325230 800230 325230 795900
325000 800230 325000 795900
(Values in degrees, minutes, and seconds)

Sources of data: SC Water Resources Commission Well Record Files
SC Water Resources Commission Well Tabulations as of 6/10/93
USGS Well Records Invetory

APPENDIX B

BORING LOGS/WELL RECORDS

TABLE 1

MONITORING WELL CONSTRUCTION DETAILS

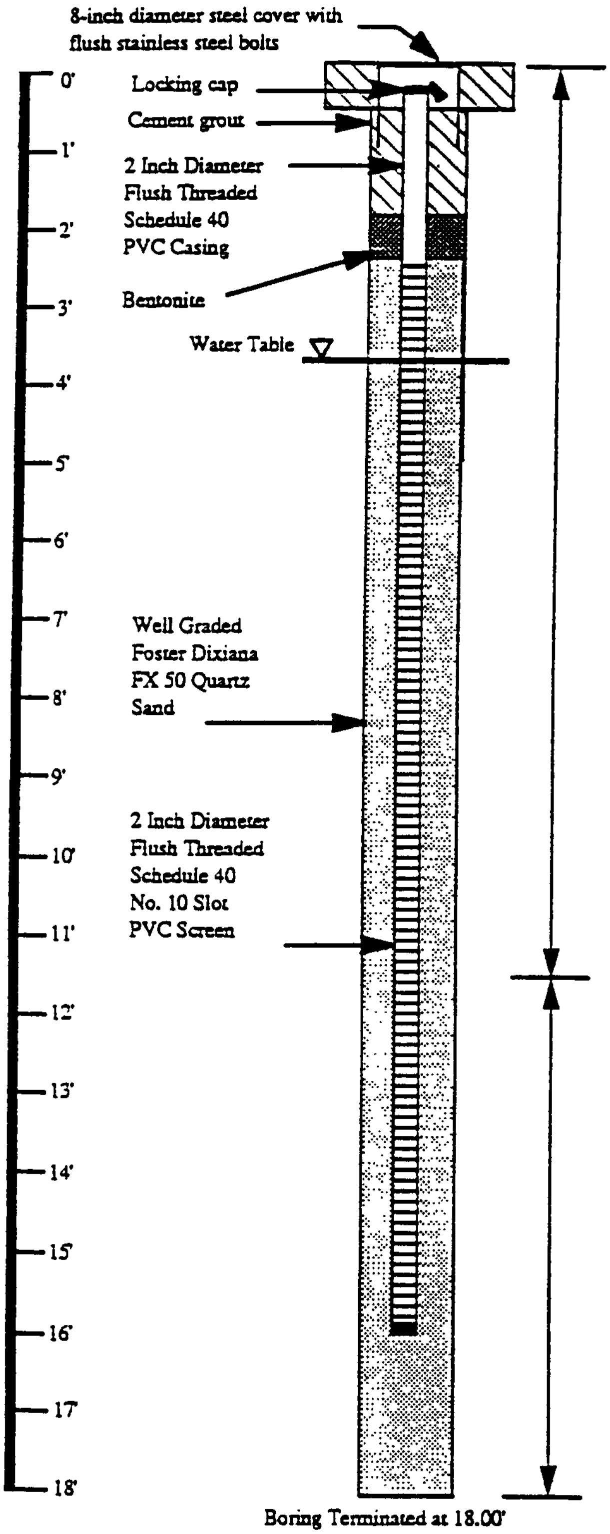
Burris Chemical Company
4210 Azalea Drive
North Charleston, South Carolina

Well Number	Date Installed	Casing Material	Casing Diameter (inches)	Screen Slot Size (inches)	Land Surface Elevation* (Ft-MSL)	Top of Well Elevation* (Ft-MSL)	Total Well Depth** (feet)	Screened Depth** (feet)	Depth to Groundwater 02/06/91** (feet)	Water Table Elevation* (Ft-MSL)
MW-1	02/04/91	PVC	2.0	0.010	9.89	9.89	16.00	2.5-16.0	3.74	6.15
MW-2	01/31/91	PVC	2.0	0.010	13.09	13.09	20.44	2.5-20.5	4.70	8.39
MW-3	02/05/91	PVC	2.0	0.010	10.00	10.00	13.20	3.2-13.2	0.87	9.13
MW-4	02/01/91	PVC	2.0	0.010	14.27	14.27	16.49	2.5-16.5	4.41	9.86

* Elevation of well MW-3 referenced to a 10' temporary bench mark extrapolated from Warren T. Player, Topographic Survey, 07/17/86, DWG. P1 and other wells surveyed relative to well MW-3.

** Depth referenced to measuring point (well cover rim)

Date Installed: February 1, 1991
Drilling Method: 10" Hollow Stem Auger
Latitude: N32°50'56.43" Longitude: W80°00'20.67"

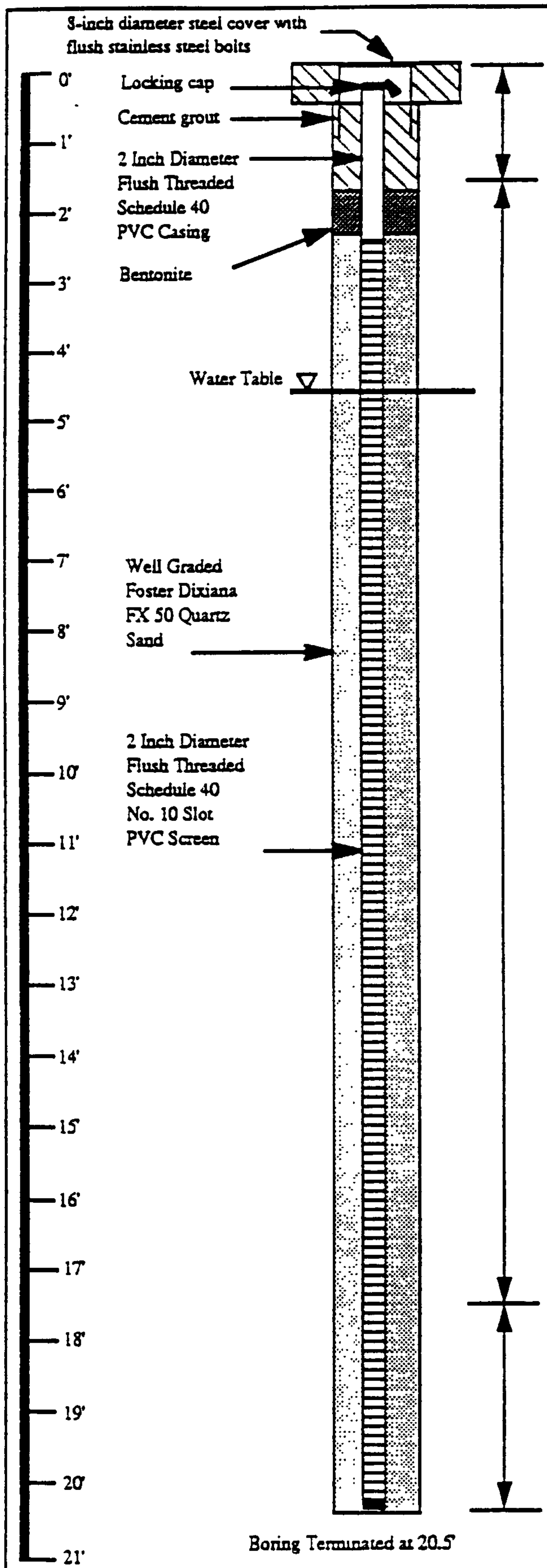


Clayey Sandy Fill: Sand (~60%) fine to medium grained moderately sorted, subangular quartz; Clay (~30%), mottled orange to tan;concrete (~10%).

Silty Clay: Clay (~80%); Silt (~20%), blue to gray, fossiliferous, contains erosional clasts of underlying Cooper Formation.

GENERAL ENGINEERING LABORATORIES engineering consulting • chemical analysis P.O. BOX 30712 CHARLESTON, SC 29417 (803) 556-8171	PROJECT burs00191 HYDROGEOLOGIC INVESTIGATION REPORT BURRIS CHEMICAL COMPANY 4210 AZALEA DRIVE CHARLESTON, SOUTH CAROLINA	MONITORING WELL LITHOLOGIC LOG & SCHEMATIC	APPENDIX I MW-1
	DATE March 2, 1991	DRAWN BY LEH APPRV. BY TH	

Date Installed: January 31, 1991
Drilling Method: 10" Hollow Stem Auger
Latitude: N32°50'52.63" Longitude: W80°00'52.63"



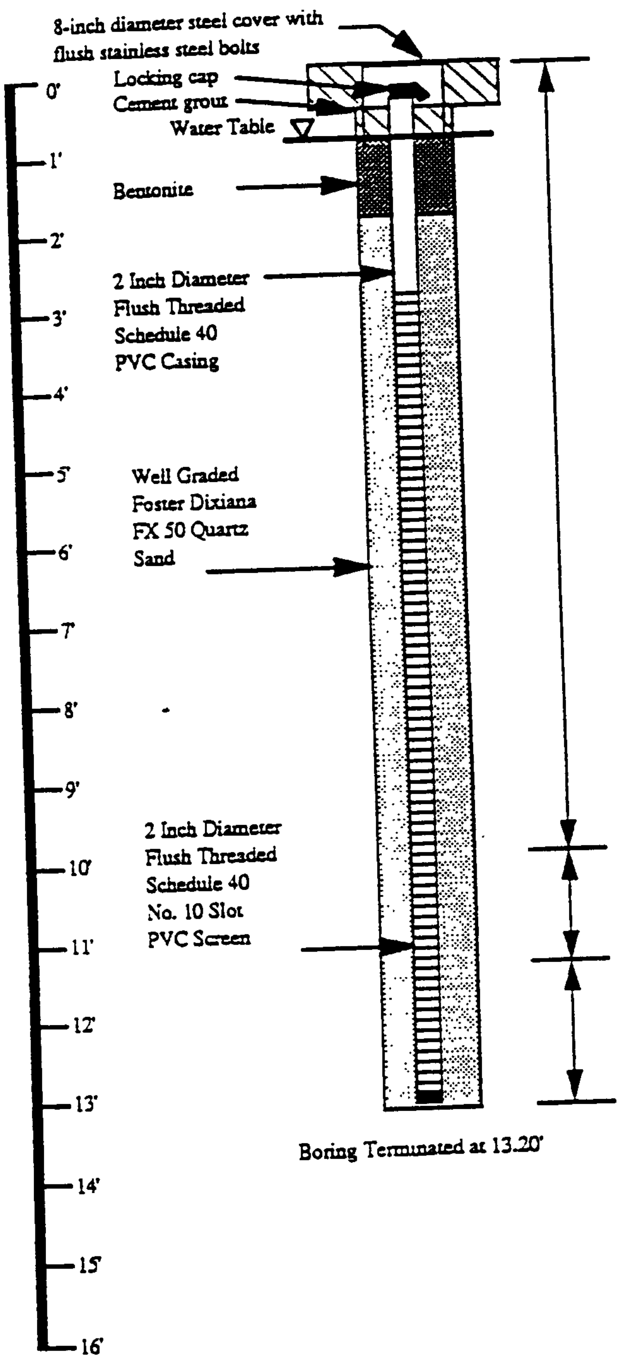
Silty Sand: Sand (~75%) fine to medium grained well sorted, subangular quartz; Silt (~25%), dark brown to black, interstitial to sand.

Clayey Sand: Sand (~60%) fine to medium grained moderately sorted, subangular quartz; Clay (~40%), mottled green-gray and orange, interstitial to sand.

Silty Clay: Clay (~80%); Silt (~20%), blue to gray, fossiliferous, contains erosional clasts of underlying Cooper Formation.

GENERAL ENGINEERING LABORATORIES engineering consulting • chemical analysis P.O. BOX 30712 CHARLESTON, SC 29417 (803) 556-8171	PROJECT burs00191		APPENDIX I
	HYDROGEOLOGIC INVESTIGATION REPORT BURRIS CHEMICAL COMPANY 4210 AZALEA DRIVE CHARLESTON, SOUTH CAROLINA	MONITORING WELL LITHOLOGIC LOG & SCHEMATIC	MW-2
	DATE March 2, 1991	DRAWN BY LEH / APPRV. BY TH	

Date Installed: February 5, 1991
Drilling Method: 10" Hollow Stem Auger
Latitude: N32°50'52.14" Longitude: W80°00'22.23"



Clayey Sandy Fill: Sand (~70%) fine to medium grained moderately sorted, subangular quartz; Clay (~30%), tan to dark gray.

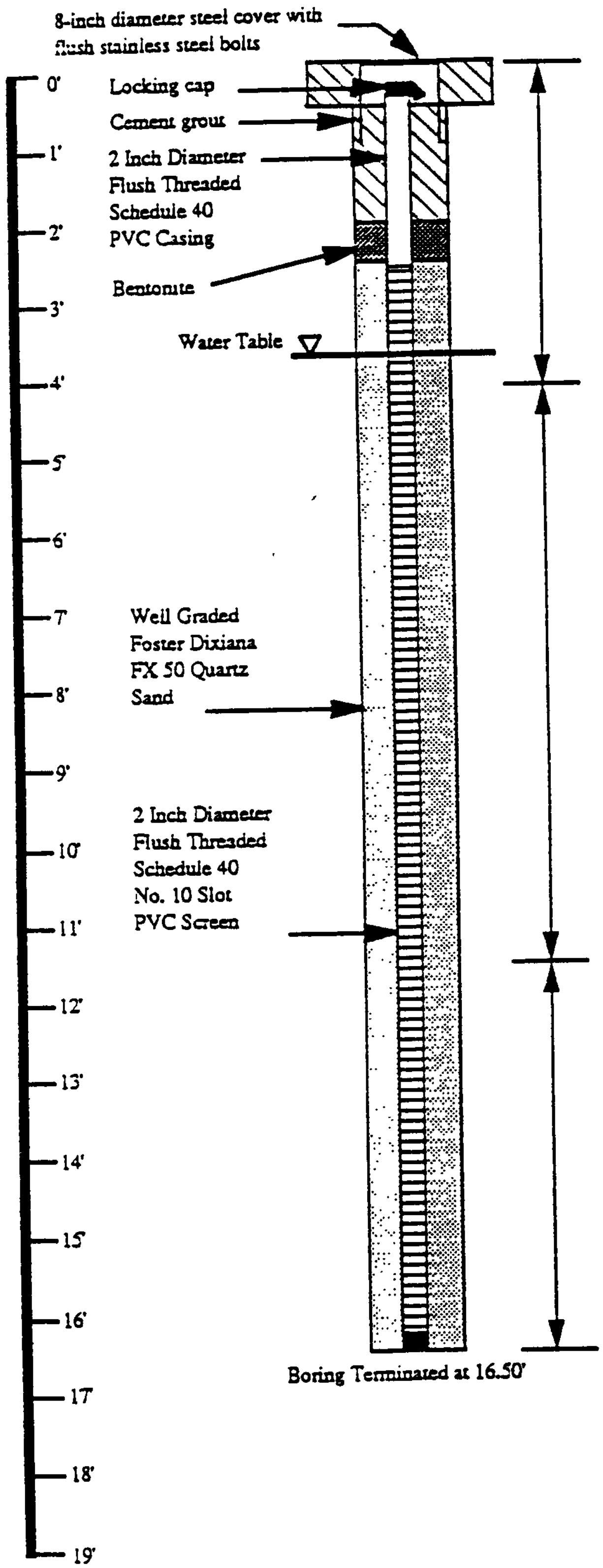
Clayey Sand: Sand (~60%) fine grained moderately sorted, subanuglar quartz; Clay (~40%), dark gray to black.

Silty Clay: Clay (~80%); Silt (~20%), blue to gray, fossiliferous, contains erosional clasts of underlying Cooper Formation.

GENERAL ENGINEERING LABORATORIES
engineering consulting • chemical analysis
P.O. BOX 30712
CHARLESTON, SC 29417
(803) 556-8171

PROJECT [illegible]00191		APPENDIX I
HYDROGEOLOGIC INVESTIGATION REPORT BURRIS CHEMICAL COMPANY [illegible] AZALEA DRIVE CHARLESTON, SOUTH CAROLINA	MONITORING WELL LITHOLOGIC LOG & SCHEMATIC	MW-3
DATE March 2, 1991	DRAWN BY LEH / APPRV. BY TH	

Date Installed: February 4, 1991
Drilling Method: 10" Hollow Stem Auger
Latitude: N32°50'53.46" Longitude: W80°00'22.81"



Clayey Sandy Fill: Sand (~70%) fine to medium grained moderately sorted, subangular quartz; Clay (~30%), grey to orange.

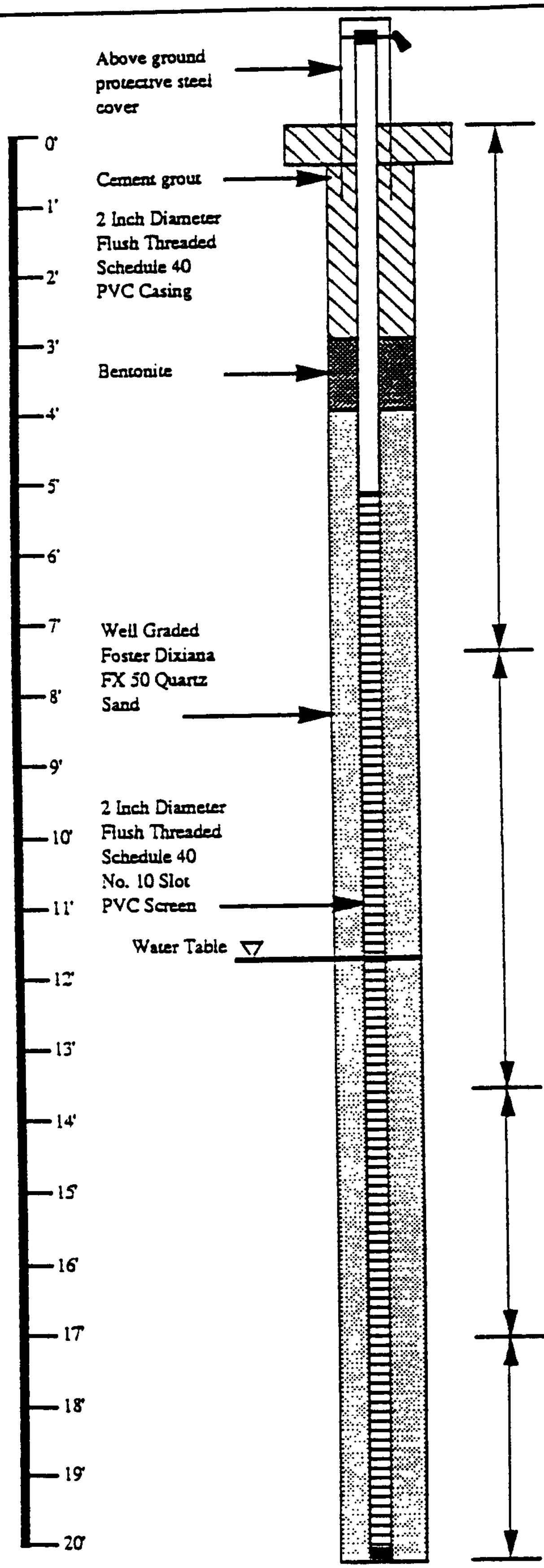
Silty Sandy Fill: Sand (~80%) fine grained well sorted, subangular quartz; Silt (~20%), brown; wood fragments.

Silty Clay: Clay (~80%); Silt (~20%), blue to gray, fossiliferous, contains erosional clasts of underlying Cooper Formation.

GENERAL ENGINEERING LABORATORIES engineering consulting • chemical analysis P.O. BOX 30712 CHARLESTON, SC 29417 (803) 556-8171	PROJECT burr00191 HYDROGEOLOGIC INVESTIGATION REPORT BURRIS CHEMICAL COMPANY 4210 AZALEA DRIVE CHARLESTON, SOUTH CAROLINA DATE March 2, 1991	MONITORING WELL LITHOLOGIC LOG & SCHEMATIC DRAWN BY LEH | APPRV. BY TH	APPENDIX I MW-4

104

Date Installed: August 14, 1991
Drilling Method: 10" Hollow Stem Auger
Latitude: N32°50'52" Longitude: W80°00'23"



Concrete Fill containing crushed drums, drum liners, and construction debris.

Silty Sand: Sand (~70%) fine to medium grained moderately sorted, subangular quartz; Silt (~30%), grey to black.

Sandy Clay: Sand (~30%), fine to medium grained moderately sorted, subangular quartz; Clay (~70%); blue to gray, fossiliferous.

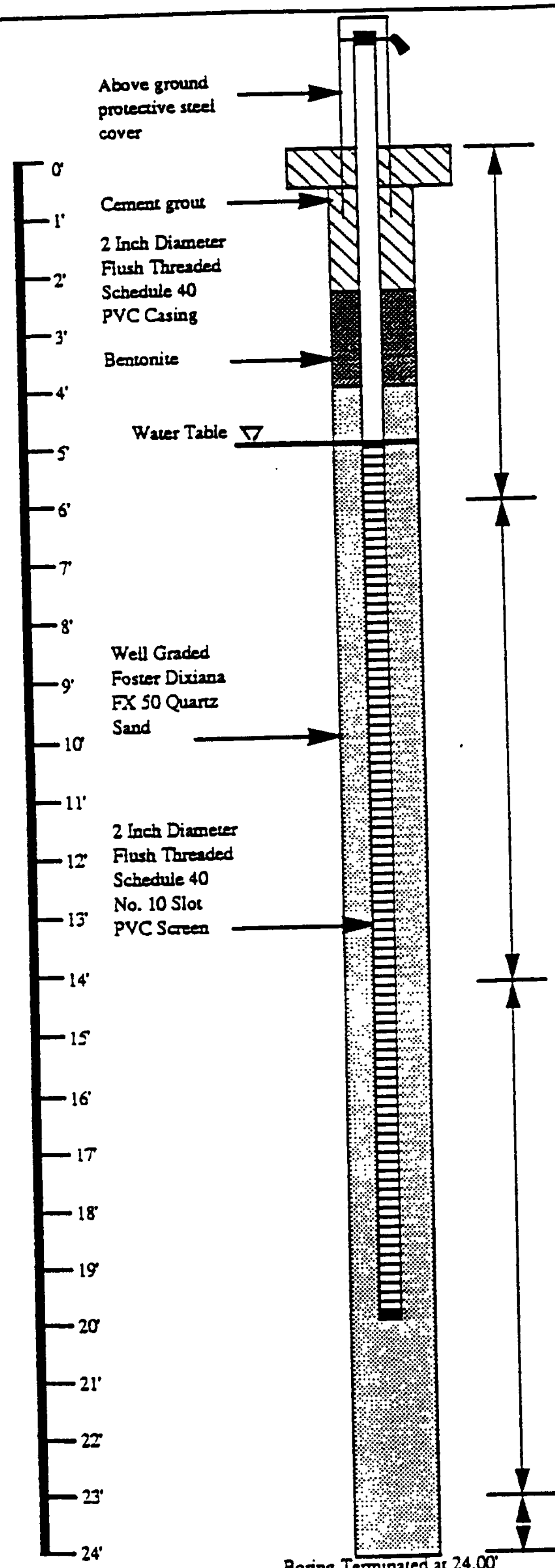
Cooper Formation: Sand (30%), very fine grained, well sorted, subangular quartz; Clay (70%), olive gray in color.

Boring Terminated at 20.30'

GENERAL ENGINEERING LABORATORIES engineering consulting • chemical analysis P.O. BOX 30712 CHARLESTON, SC 29417 (803) 556-8171	PROJECT burr00591 PHASE II HYDROGEOLOGIC INVESTIGATION REPORT BURRIS CHEMICAL COMPANY 4210 AZALEA DRIVE CHARLESTON, SOUTH CAROLINA	MONITORING WELL LITHOLOGIC LOG & SCHEMATIC	APPENDIX I MW-5
	DATE August 29, 1991	DRAWN BY LEH	APPRV. BY TH

105

Date Installed: August 15, 1991
Drilling Method: 10" Hollow Stem Auger
Latitude: N32°50'55" Longitude: W80°00'22"



Concrete Fill containing crushed drums, drum liners, and construction debris.

Silty Sand: Sand (~70%) fine to medium grained moderately sorted, subangular quartz; Silt (~30%), grey to black.

Sandy Clay: Sand (~30%), fine to medium grained moderately sorted, subangular quartz; Clay (~70%); blue to gray, fossiliferous.

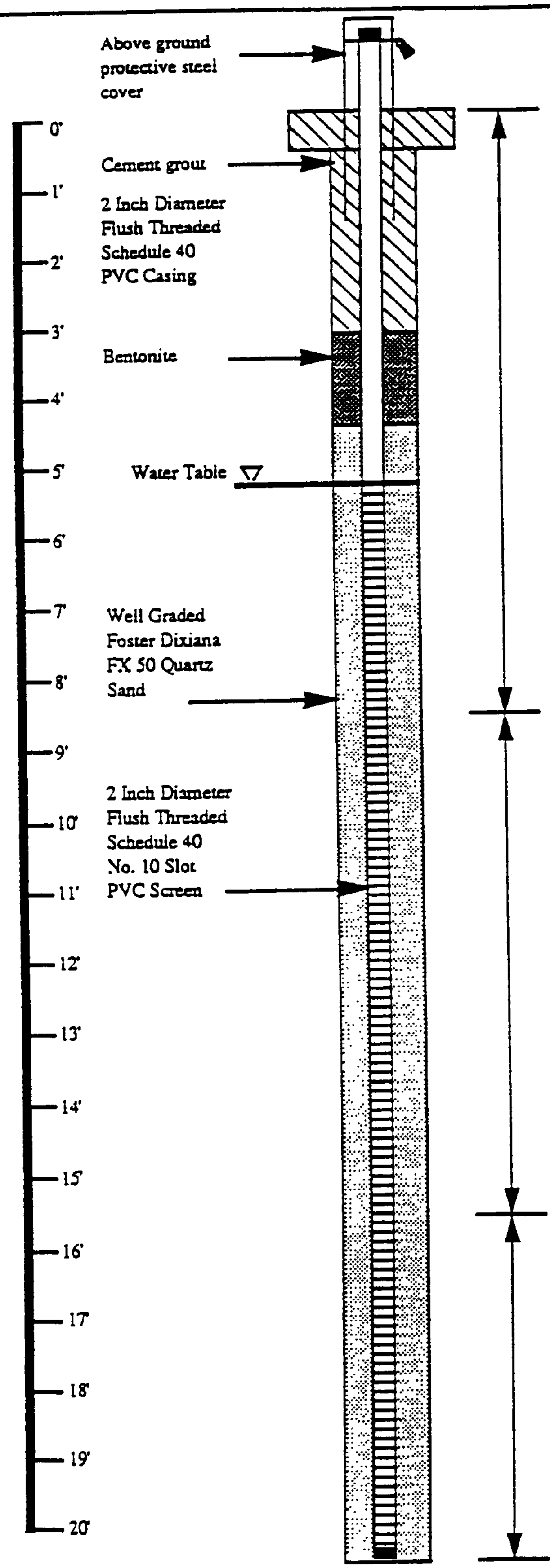
Cooper Formation: Sand (30%), very fine grained, well sorted, subangular quartz; Clay (70%), olive gray in color.

Boring Terminated at 24.00'

GENERAL ENGINEERING LABORATORIES engineering consulting • chemical analyses P.O. BOX 30712 CHARLESTON, SC 29417 (803) 556-8171	PROJECT bum00591 PHASE II HYDROGEOLOGIC INVESTIGATION REPORT BURRIS CHEMICAL COMPANY 4210 AZALEA DRIVE CHARLESTON, SOUTH CAROLINA DATE August 29, 1991	MONITORING WELL LITHOLOGIC LOG & SCHEMATIC DRAWN BY LEH APPRV BY TH	APPENDIX I MW-6

106

Date Installed: August 14, 1991
Drilling Method: 10" Hollow Stem Auger
Latitude: N32°50'57" Longitude: W80°00'22"



Silty Sand: Sand (~70%) fine to medium grained moderately sorted, subangular quartz; Silt (~30%), tan to black; contains crushed drums and construction debris.

Sandy Clay: Sand (~30%), fine to medium grained moderately sorted, subangular quartz; Clay (~70%); blue to gray, fossiliferous.

Cooper Formation: Sand (30%), very fine grained, well sorted, subangular quartz; Clay (70%), olive gray in color.

Boring Terminated at 20.61'

GENERAL ENGINEERING LABORATORIES engineering consulting • chemical analysis P.O. BOX 30712 CHARLESTON, SC 29417 (803) 556-8171	PROJECT bux00591		APPENDIX I
	PHASE II HYDROGEOLOGIC INVESTIGATION REPORT BURRIS CHEMICAL COMPANY 4210 AZALEA DRIVE CHARLESTON, SOUTH CAROLINA	MONITORING WELL LITHOLOGIC LOG & SCHEMATIC	MW-7
	DATE August 29, 1991	DRAWN BY LEH | APPRV. BY TH	

BORING/MONITORING WELL RECORD

Project Name: BURRIS CHEMICAL, CHARLESTON

Boring No: B-8 | Well No: MW-8

Geologist: M. MUTHIG

Driller: | Drilling Co: VIROTECH

Drilling Method: 4" I.D. HOLLOW STEM AUGER

Date/Time Started 3/20/93 10:20 | Date/Time Completed 3/20/93 11:30

Depth	Moisture	Geologic Description	Photo No.	OVA Reading	Blow Counts	Recovery	Sample No.
0		GRAVEL DRIVE		8.7/5			0
		SAND, MED		9.8/1			
	SI	SILT, CLAY, AND SAND					
	SI	SAND, MED., WELL SORTED, ORG-BRN	6	15.4/2		6"	MW8(3)
5		SAND, MED.					5
	SAT						
	SAT						
	SAT	SAND, MEDIUM, WELL SORTED, SOME HORIZONTAL LAMINATION & LAYERING	7		11-12	2'	
	SAT		8	5.1/2	14-14		
10		SAND, F-M, BLACK					10
		SAND, MED					
	SAT						
		SAND, FINE, CLAYEY	9	5.1/25	6-6		MW8(13)
	SAT	COQUINA, W/ SILT & CLAY MATRIX	10		7-7		
15							15
20							20
25							25

RISER: 0-3', 2" PVC, FLUSH THREAD

SCREEN: 3-13, 2" PVC, 10 SLOT, CONTIN. WRAP

SAND PACK: 2-13, FX 50 FILTER SAND

BENTONITE SEAL: 1.5-2

CEMENT/BENT: 0-1.5

FLUSH MOUNT COMPLETION

BORING/MONITORING WELL RECORD

Project Name: BURRIS CHEMICAL, CHARLESTON

Boring No: B-9 | Well No: MW-9

Geologist: M. MUTHIG

Driller: | Drilling Co: VIROTECH

Drilling Method: 4 IN ID HOLLOW STEM AUGER

Date/Time Started: 3/20/93 11:50 | Date/Time Completed: 3/20/93 12:50

Depth	Moisture	Geologic Description	Photo No.	OVA Reading	Blow Counts	Recovery	Sample No.
0		SAND, MED, W/ SOME CLAY & ROOTS					
	SI	SAND, FINE, SILT & CLAY, SOME CARBON GRAY-GRN	11	5.6/4		6"	MW 9(3)
5	SAT	SAND, FINE, CLAYEY					
	SAT						
		SAND, F-M, SOME CLAY	12	7/4	3-3 4-6	6"	
10	SAT	SAND, F-M, CLAY LAYER AT TOP, LAM. @ BOT		11.7/4	1-1	2'	
	SAT	SAND, M, MOD. SORT, HORIZ BED, ?BUR?, BRN-ORG	13	11.3/4	3-4		
		SAND, M CHANGING TO SHELLS					MW9(13)
	SAT	COQUINA, SILT & CLAY MATRIX	14	8.7/3.7	3-5		
		INCR. SILT & CLAY, DECREASE SHELL		7/4			
15		CLAY, MASSIVE, DENSE, GRAY	15	7/4	6-6		

RISER: 0-' 2", PVC, FLUSH THREAD

SCREEN: 4'-14', 2", PVC, 10 SLOT, CONTINUOUS WRAP

20 SAND PACK: 2.75'-14.25', FX 50 FILTER

BENTONITE SEAL: 2'-2.75'

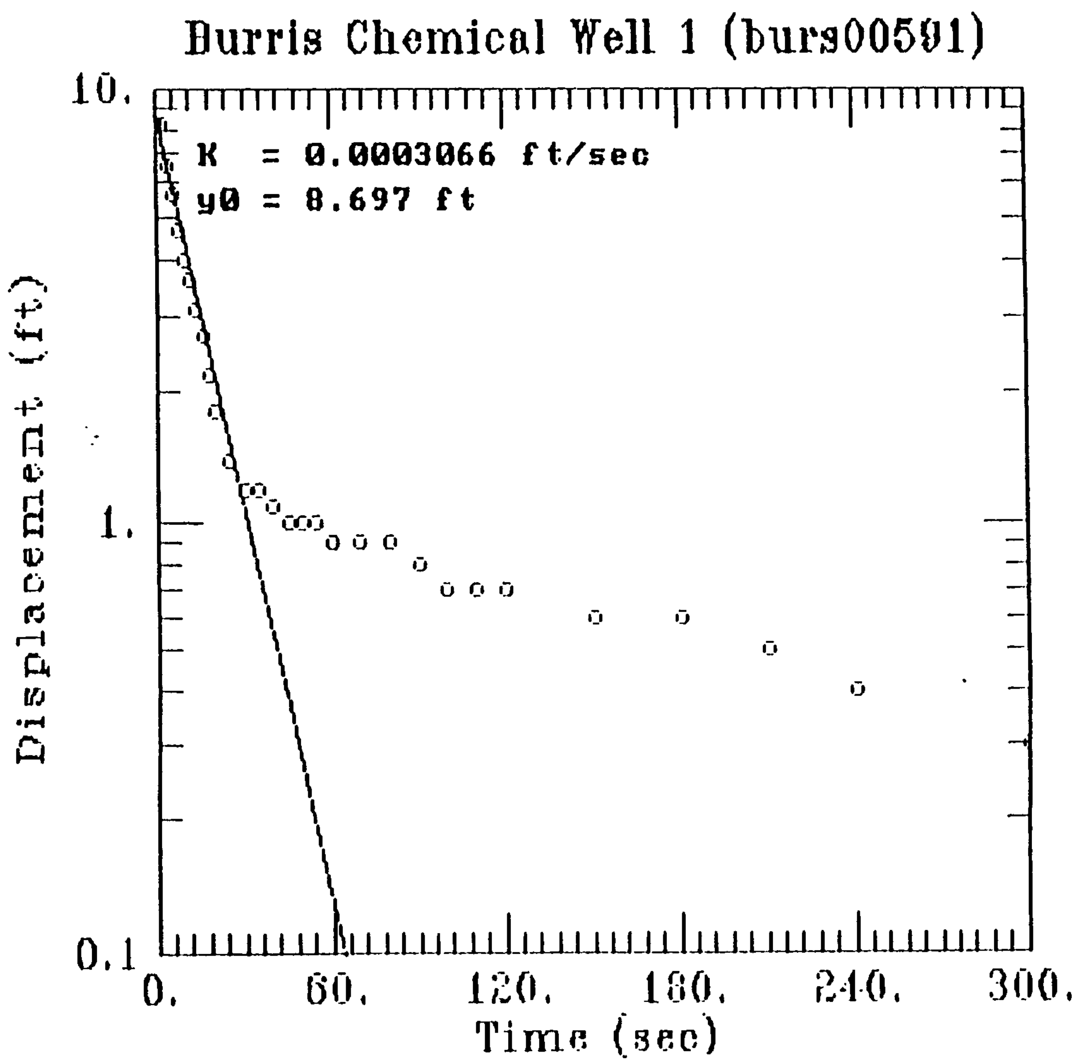
CEMENT/BENTONITE: 0-2'

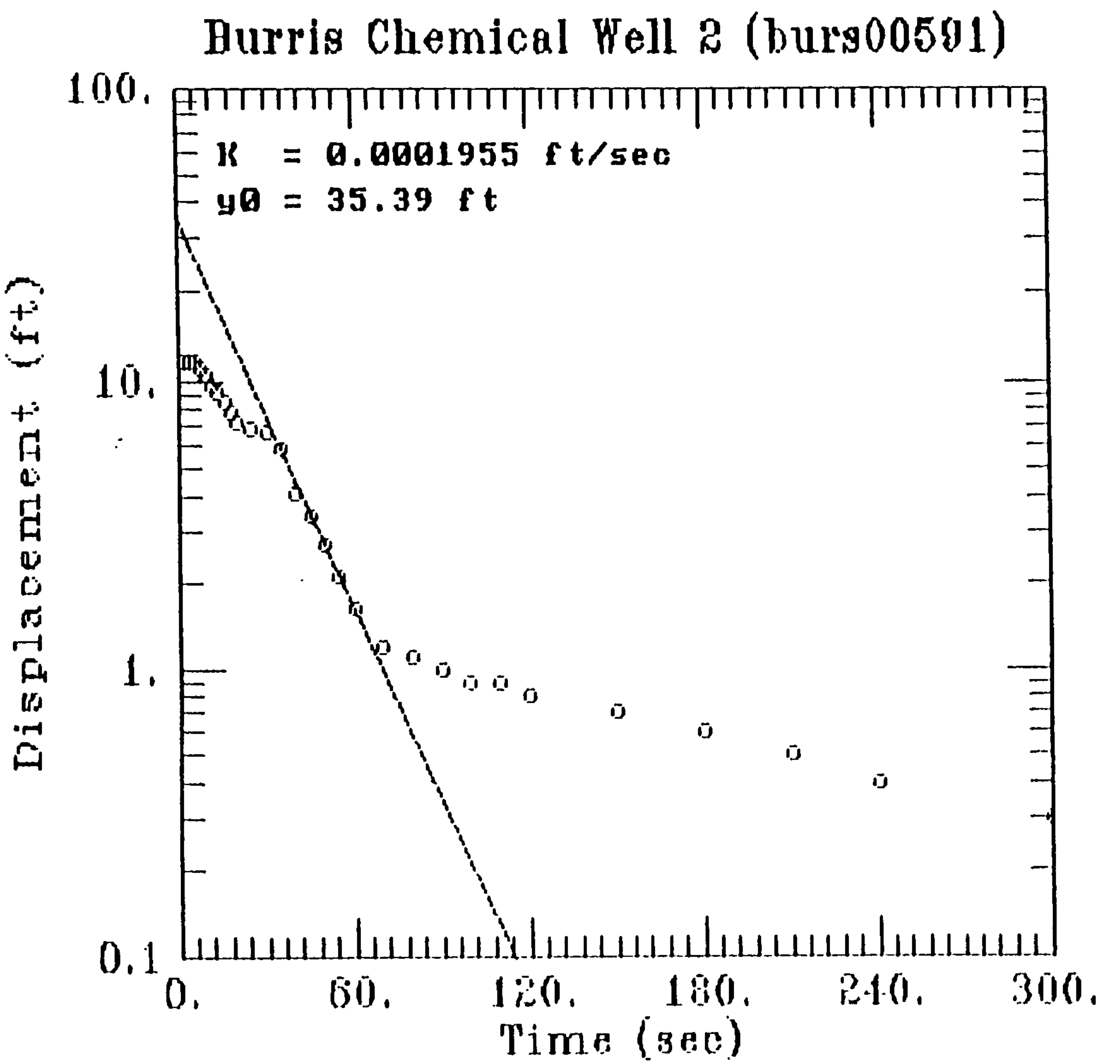
FLUSH MOUNT CONSTRUCTION

25

APPENDIX C

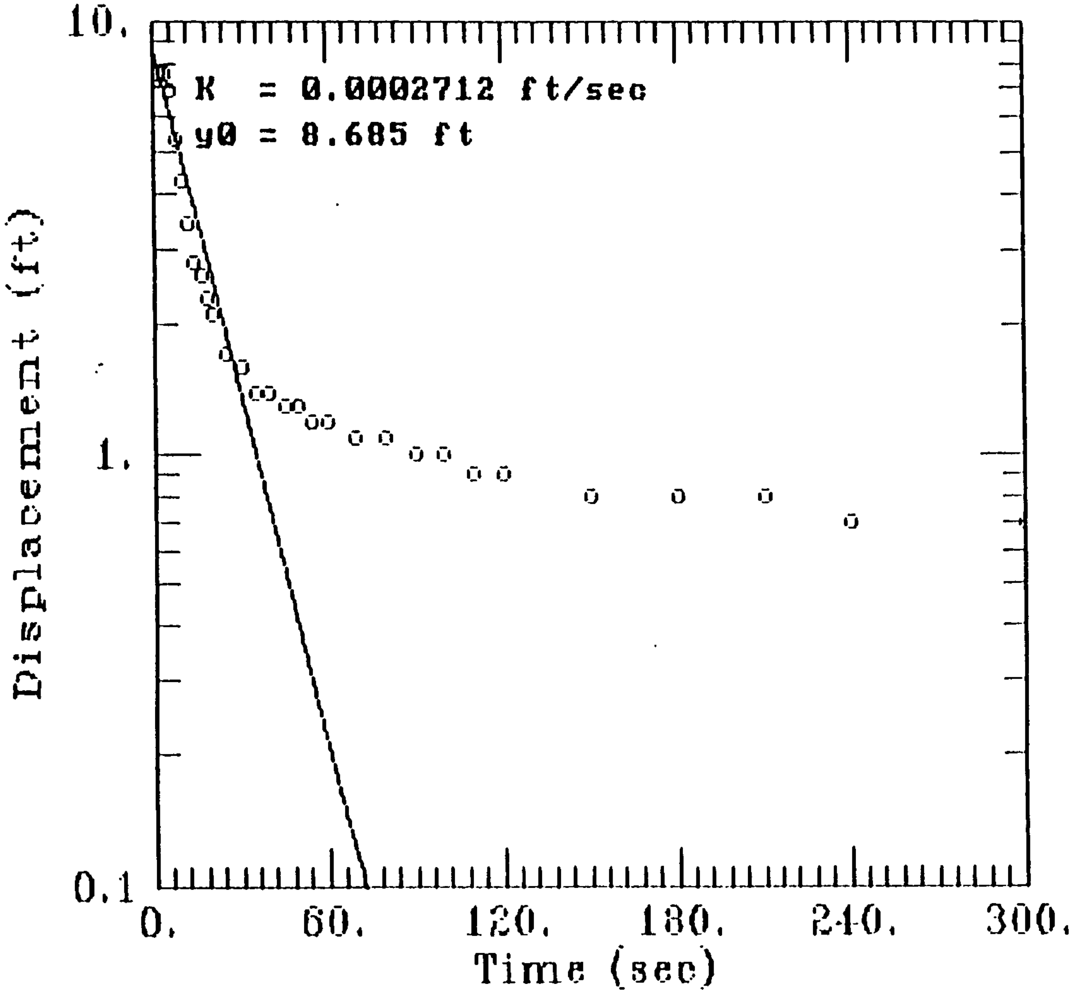
HYDROLOGIC TEST DATA

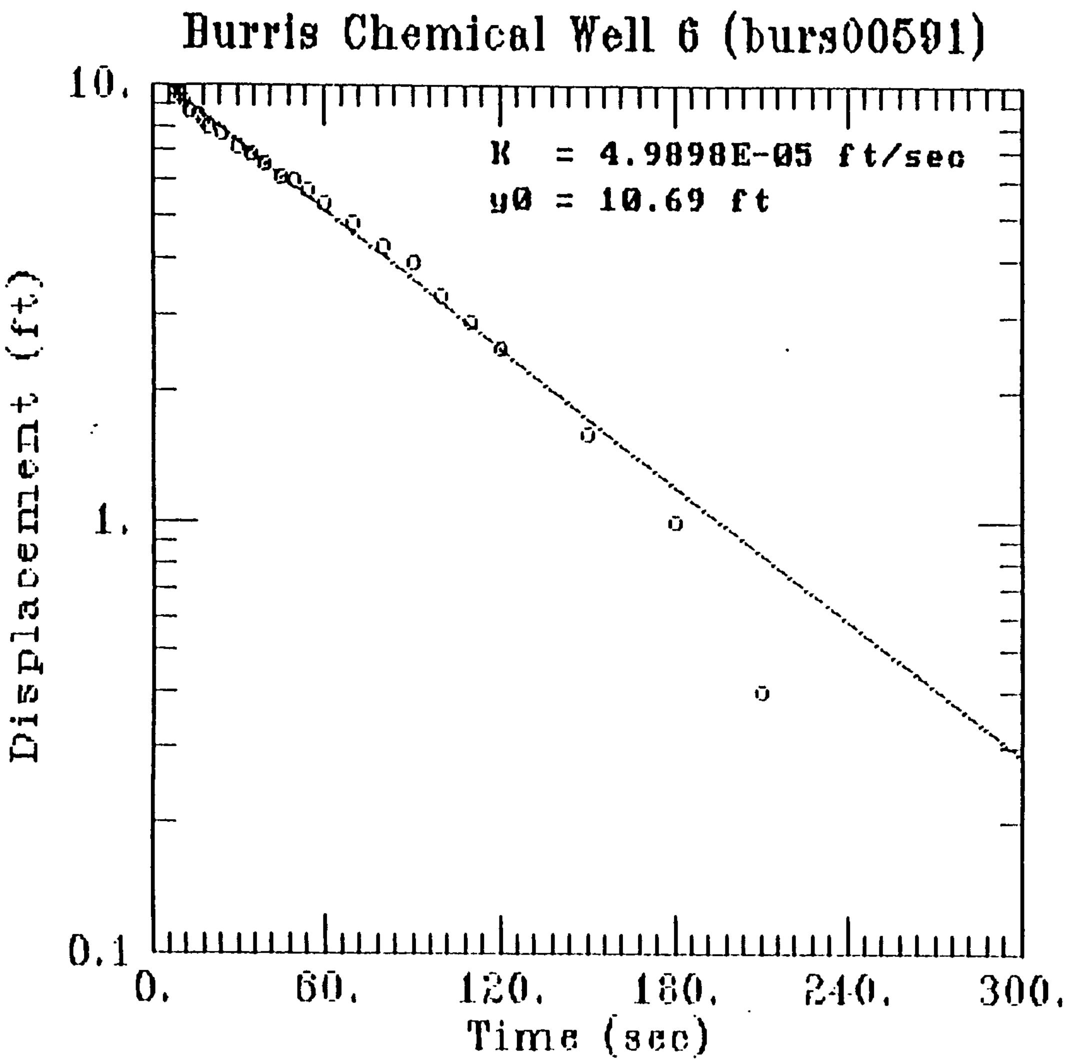

Burris Chemical Well 1 (burs00591)
K = 0.0003066 ft/sec
y0 = 8.697 ft
10.
1.
0.1
Displacement (ft)
0.
60.
120.
180.
240.
300.
Time (sec)



Burris Chemical Well 2 (burs00591)
K = 0.0001955 ft/sec
y0 = 35.39 ft
Displacement (ft)
100.
10.
1.
0.1
0.
60.
120.
180.
240.
300.
Time (sec)

Burris Chemical Well 4 (burs00591)




Burris Chemical Well 6 (burs00591)
K = 4.9898E-05 ft/sec
y0 = 10.69 ft
Displacement (ft)
10.
1.
0.1
0.
60.
120.
180.
240.
300.
Time (sec)

APPENDIX D

CERTIFICATES OF ANALYSIS

CHAIN OF CUSTODY RECORD

General Engineering Laboratories
2040 Savage Road
Charleston, South Carolina 29414
PO Box 30712
Charleston, South Carolina 29417
803-556-8171

Page ____ of ____

Client Name / Facility Name: BUPS0059 Burris Chemicals

Collected By / Company: D.L. Paxton/M. Hill General Eng. Labs.

SAMPLE ANALYSIS REQUIRED(x) - use remarks area to specify specific compounds or methods

← *Use F or P in the boxes to indicate whether sample was filtered and/or preserved*

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# of containers	pH, conductivity	TOC / DOC	TOX	Chloride, Fluoride, Sulfate	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type			Remarks
GS-16-8	7/10/92	1030				X	4						4												SCREEN
GS 16-12	7/10/92	1110				X	4						4												"

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
[signature]	7/10/92	1245					

Relinquished by:	Date	Time	Received by lab by:	Date	Time	Remarks
			[signature]	7-10-92	1715	

White • sample collector Yellow • file Pink • with report

CHAIN OF CUSTODY RECORD

General Engineering Laboratories
2040 Savage Road
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Charleston, South Carolina 29417
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Page ____ of ____

Client Name / Facility Name: Burris Chemical BURS00591

Collected By / Company: J.E. Burton/B. Hill General Eng. Labs

SAMPLE ANALYSIS REQUIRED(x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# of containers	pH, conductivity	TOC / DOC	TOX	Chloride, Fluoride, Sulfate	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type			Remarks
GS-13-8	7/13/92	1233	X				4						4												PP VOC

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
[signature]	7/13/92	1520					
Relinquished by:	Date	Time	Received by lab by: [signature]	Date 7/13/92	Time 1520	Remarks	

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CHAIN OF CUSTODY RECORD

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Page ____ of ____

Client Name / Facility Name: [illegible]

Collected By / Company:

SAMPLE ANALYSIS REQUIRED(x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# of containers	pH, conductivity	TOC / DOC	TOX	Chloride, Fluoride, Sulfate	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	GC-FID SCAN		Remarks
GS-20-7	7-14-92	1145	✓				4																✓		PPVOC
GS-16-8	"	1420	✓				4																✓		PPVOC
GS-14-8	"	1655	✓				4																✓		PPVOC

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Louis E Hill	7/14/92	1730					

Relinquished by:	Date	Time	Received by lab by:	Date	Time	Remarks
			[illegible]	[illegible]	17[illegible]	

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CHAIN OF CUSTODY RECORD

Client Name / Facility Name: Burris / Chas'N. Facility

Collected By / Company: Bucky Hill / GEL

SAMPLE ANALYSIS REQUIRED(x) - use remarks area to specify specific compounds or methods

← Use F or P in the boxes to indicate whether sample was filtered and/or preserved

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# of containers	pH, conductivity	TOC / DOC	TOX	Chloride, Fluoride, Sulfate	Nitrite/Nitrate	VOC - Specify Method required	METALS -specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type	GC-FID SCAN		Remarks LEH
GS-18-22	7-15-92		✓				4																✓		G#3065 Screen
GS-15-10	"		✓				4																✓		PPVOC *
GS-22-10	"		✓				4																✓		"
GS-23-10	"		✓				4																✓		"
GS-6-10	"		✓				4																✓		Odor "

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
Bucky E Hill	7/15/92	800					

Relinquished by:	Date	Time	Received by lab by:	Date	Time	Remarks
			Donna Ward	7/15/92	8:00	

White • sample collector Yellow • file Pink • with report

CHAIN OF CUSTODY RECORD

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Page ____ of ____ BURS C0492

Client Name / Facility Name: BURRIS CHEMICAL

Collected By / Company: Greene / Buxton

SAMPLE ANALYSIS REQUIRED(x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# of containers	pH, conductivity	TOC / DOC	TOX	Chloride, Fluoride, Sulfate	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type		Remarks (LEH)
GS-17-9	7/16/92	1720	X				4						4											PPVOC
GS-5-9	7/16/92	1007	X				4						4											"
GS-4-9	7/16/92	1530	X				4						4											"
GS-7-10	7/16/92	1620	X				4						4											"
GS-M-7	7/16/92	1512					4						4											"
GS-1-9	7/16/92	1905					4						4											"

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
George Greene IV	7/16/92	1930					
Relinquished by:	Date	Time	Received by lab by: [signature]	Date 7/16/92	Time [illegible]	Remarks	

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CHAIN OF CUSTODY RECORD

Page ____ of ____ BURS 00591

Client Name / Facility Name: Burris Chemical Co.

Collected By / Company: [illegible], Burton, [illegible] / [illegible]

SAMPLE ANALYSIS REQUIRED(x) - use remarks area to specify specific compounds or methods

Use F or P in the boxes to indicate whether sample was filtered and/or preserved ←

SAMPLE ID	DATE	TIME	WELL	SOIL	COMP	GRAB	# of containers	pH, conductivity	TOC / DOC	TOX	Chloride, Fluoride, Sulfate	Nitrite/Nitrate	VOC - Specify Method required	METALS - specify	Pesticide	Herbicide	Total Phenol	Acid Extractables	B/N Extractables	PCB's	Cyanide	Coliform - specify type			Remarks
													b												pH #7065
G5-3-7	7/17/92	1100	X				4						4												H_2O - VOC

Relinquished by:	Date	Time	Received by:	Relinquished by:	Date	Time	Received by:
[illegible] IV	7/17/92	1635					

Relinquished by:	Date	Time	Received by lab by:	Date	Time	Remarks
			[illegible]	7-17-92	1635	

White • sample collector Yellow • file Pink • with report

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Molly F. Greene
President

George C. Greene, P.E., Ph.D.
Vice President
SC Registration No. 9103

Laboratory	Certifications:
FL	E87156/87294
NC	233
SC	10120
VA	00151
TN	02934
WI	99988779

CERTIFICATE OF ANALYSIS

Client: Burris Chemical, Inc.
P.O. Box 70788
Charleston, South Carolina 29415

Date: 08/06/92

Contact:
cc: BURS00591 Project Manager: Buddy Hill

Sample ID	: GS-8-7
Lab ID	: 9207378-01
Matrix	: GroundH2O
Date Collected	: 07/17/92
Date Received	: 07/20/92
Priority	: Routine
Collector	: GEL

Methyl Chloride	< 50.0 ppb
Methylene Chloride	39.0 ppb
Tetrachloroethylene	< 50.0 ppb
Toluene	< 50.0 ppb
Trichloroethylene	< 50.0 ppb
Trichlorofluoromethane	< 50.0 ppb
Vinyl chloride	157 ppb
cis-1,3-Dichloropropylene	< 50.0 ppb
trans-1,3-Dichloropropylene	< 50.0 ppb

Comments:

A dilution was required of this sample due to high concentration of target compound(s). As a result, the detection limits are elevated.

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CERTIFICATE OF ANALYSIS

Client: Burris Chemical, Inc.
P.O. Box 70788
Charleston, South Carolina 29415

Date: 08/06/92

Contact:

Released by: [signature] QA/QC Officer

cc: BURS00591   Project Manager: Buddy Hill   Page No.: 1

Sample ID	: GS-8-7
Lab ID	: 9207378-01
Matrix	: GroundH2O
Date Collected	: 07/17/92
Date Received	: 07/20/92
Priority	: Routine
Collector	: GEL

Volatile Organics

Priority Pollutant Volatiles

1,1,1-Trichloroethane	< 50.0 ppb
1,1,2,2-Tetrachloroethane	< 50.0 ppb
1,1,2-Trichloroethane	< 50.0 ppb
1,1-Dichloroethane	56.0 ppb
1,1-Dichloroethylene	< 50.0 ppb
1,2-Dichlorobenzene	1070 ppb
1,2-Dichloroethane	< 50.0 ppb
1,2-Dichloropropane	< 50.0 ppb
1,2-trans-Dichloroethylene	< 50.0 ppb
1,3-Dichlorobenzene	< 50.0 ppb
1,4-Dichlorobenzene	138 ppb
2-Chloroethylvinyl ether	< 50.0 ppb
Acrolein	< 500 ppb
Acrylonitrile	< 500 ppb
Benzene	< 50.0 ppb
Bromoform	< 50.0 ppb
Carbon Tetrachloride	< 50.0 ppb
Chlorobenzene	1050 ppb
Chlorodibromomethane	< 50.0 ppb
Chloroethane	504 ppb
Chloroform	< 50.0 ppb
Dichlorobromomethane	< 50.0 ppb
Dichlorodifluoromethane	< 50.0 ppb
Ethylbenzene	< 50.0 ppb
Methyl Bromide	< 50.0 ppb

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CERTIFICATE OF ANALYSIS

Client: Burris Chemical, Inc.
P.O. Box 70788
Charleston, South Carolina 29415

Date: 07/28/92

Contact:
cc: BURS00591   Project Manager: Buddy Hill   Page No.: 2

Sample ID	: GS-14-8
Lab ID	: 9207286-06
Matrix	: GroundH2O
Date Collected	: 07/14/92
Date Received	: 07/15/92
Priority	: Routine
Collector	: GEL

Methyl Chloride	< 200 ppb
Methylene Chloride	594 ppb
Tetrachloroethylene	< 200 ppb
Toluene	371 ppb
Trichloroethylene	< 200 ppb
Trichlorofluoromethane	< 200 ppb
Vinyl chloride	< 200 ppb
cis-1,3-Dichloropropylene	< 200 ppb
trans-1,3-Dichloropropylene	< 200 ppb

Comments:

A dilution was required of this sample due to high concentration of non-target compounds. As a result, the detection limits are elevated.

Methylene Chloride was detected in the analytical blank.

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CERTIFICATE OF ANALYSIS

Client: Burris Chemical, Inc.
P.O. Box 70788
Charleston, South Carolina 29415

Date: 07/29/92

Contact:
cc: BURS00591 Project Manager: Buddy Hill

Page No.: 2

Sample ID	: GS-13-8
Lab ID	: 9207286-03
Matrix	: GroundH2O
Date Collected	: 07/13/92
Date Received	: 07/15/92
Priority	: Routine
Collector	: GEL

Methyl Chloride	< 2.00 ppb
Methylene Chloride	< 2.00 ppb
Tetrachloroethylene	84.1 ppb
Toluene	< 2.00 ppb
Trichloroethylene	76.5 ppb
Trichlorofluoromethane	< 2.00 ppb
Vinyl chloride	941 ppb
cis-1,3-Dichloropropylene	< 2.00 ppb
trans-1,3-Dichloropropylene	< 2.00 ppb

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CERTIFICATE OF ANALYSIS

Client: Burris Chemical, Inc.
P.O. Box 70788
Charleston, South Carolina 29415

Date: 07/29/92

Contact:

Released by: QA/QC Officer

cc: BURS00591 Project Manager: Buddy Hill Page No.: 1

Sample ID	: GS-15-10
Lab ID	: 9207325-02
Matrix	: GroundH2O
Date Collected	: 07/15/92
Date Received	: 07/16/92
Priority	: Routine
Collector	: GEL

Volatile Organics
Priority Pollutant Volatiles

1,1,1-Trichloroethane	< 50.0 ppb
1,1,2,2-Tetrachloroethane	< 50.0 ppb
1,1,2-Trichloroethane	< 50.0 ppb
1,1-Dichloroethane	< 50.0 ppb
1,1-Dichloroethylene	< 50.0 ppb
1,2-Dichlorobenzene	< 50.0 ppb
1,2-Dichloroethane	< 50.0 ppb
1,2-Dichloropropane	< 50.0 ppb
1,2-trans-Dichloroethylene	< 50.0 ppb
1,3-Dichlorobenzene	< 50.0 ppb
1,4-Dichlorobenzene	< 50.0 ppb
2-Chloroethylvinyl ether	< 50.0 ppb
Acrolein	< 500 ppb
Acrylonitrile	< 500 ppb
Benzene	< 50.0 ppb
Bromoform	< 50.0 ppb
Carbon Tetrachloride	< 50.0 ppb
Chlorobenzene	< 50.0 ppb
Chlorodibromomethane	< 50.0 ppb
Chloroethane	< 50.0 ppb
Chloroform	< 50.0 ppb
Dichlorobromomethane	< 50.0 ppb
Dichlorodifluoromethane	< 50.0 ppb
Ethylbenzene	942 ppb
Methyl Bromide	< 50.0 ppb

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Client: Burris Chemical, Inc.
P.O. Box 70788
Charleston, South Carolina 29415

Date: 07/29/92

Contact:
cc: BURS00591   Project Manager: Buddy Hill   Page No.: 2

Sample ID	: GS-15-10
Lab ID	: 9207325-02
Matrix	: GroundH2O
Date Collected	: 07/15/92
Date Received	: 07/16/92
Priority	: Routine
Collector	: GEL

Methyl Chloride	< 50.0 ppb
Methylene Chloride	110 ppb
Tetrachloroethylene	< 50.0 ppb
Toluene	< 50.0 ppb
Trichloroethylene	74.3 ppb
Trichlorofluoromethane	< 50.0 ppb
Vinyl chloride	< 50.0 ppb
cis-1,3-Dichloropropylene	< 50.0 ppb
trans-1,3-Dichloropropylene	< 50.0 ppb

Comments:

A dilution was required for volatile organics due to high concentration of target compounds. As a result, the detection limits are elevated.

Methylene Chloride was detected in the analytical blank.

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CERTIFICATE OF ANALYSIS

Client: Burris Chemical, Inc.
P.O. Box 70788
Charleston, South Carolina 29415

Date: 07/27/92

Contact:

Released by: [signature]
QA/QC Officer

cc: BURS00591 Project Manager: Buddy Hill Page No.: 1

Sample ID	:	GS-16-8
Lab ID	:	9207286-05
Matrix	:	GroundH2O
Date Collected	:	07/14/92
Date Received	:	07/15/92
Priority	:	Routine
Collector	:	GEL

Volatile Organics

Priority Pollutant Volatiles

1,1,1-Trichloroethane	< 20.0 ppb
1,1,2,2-Tetrachloroethane	< 20.0 ppb
1,1,2-Trichloroethane	< 20.0 ppb
1,1-Dichloroethane	< 20.0 ppb
1,1-Dichloroethylene	< 20.0 ppb
1,2-Dichlorobenzene	< 20.0 ppb
1,2-Dichloroethane	< 20.0 ppb
1,2-Dichloropropane	< 20.0 ppb
1,2-trans-Dichloroethylene	< 20.0 ppb
1,3-Dichlorobenzene	< 20.0 ppb
1,4-Dichlorobenzene	< 20.0 ppb
2-Chloroethylvinyl ether	< 20.0 ppb
Acrolein	< 200 ppb
Acrylonitrile	< 200 ppb
Benzene	< 20.0 ppb
Bromoform	< 20.0 ppb
Carbon Tetrachloride	< 20.0 ppb
Chlorobenzene	< 20.0 ppb
Chlorodibromomethane	< 20.0 ppb
Chloroethane	< 20.0 ppb
Chloroform	< 20.0 ppb
Dichlorobromomethane	< 20.0 ppb
Dichlorodifluoromethane	< 20.0 ppb
Ethylbenzene	< 20.0 ppb
Methyl Bromide	< 20.0 ppb

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CERTIFICATE OF ANALYSIS

Client: Burris Chemical, Inc.
P.O. Box 70788
Charleston, South Carolina 29415

Date: 07/27/92

Contact:

Released by: [signature]
QA/QC Officer

cc: BURS00591 Project Manager: Buddy Hill Page No.: 1

Sample ID	:	GS-16-8
Lab ID	:	9207286-05
Matrix	:	GroundH2O
Date Collected	:	07/14/92
Date Received	:	07/15/92
Priority	:	Routine
Collector	:	GEL

Volatile Organics
Priority Pollutant Volatiles

1,1,1-Trichloroethane	< 20.0 ppb
1,1,2,2-Tetrachloroethane	< 20.0 ppb
1,1,2-Trichloroethane	< 20.0 ppb
1,1-Dichloroethane	< 20.0 ppb
1,1-Dichloroethylene	< 20.0 ppb
1,2-Dichlorobenzene	< 20.0 ppb
1,2-Dichloroethane	< 20.0 ppb
1,2-Dichloropropane	< 20.0 ppb
1,2-trans-Dichloroethylene	< 20.0 ppb
1,3-Dichlorobenzene	< 20.0 ppb
1,4-Dichlorobenzene	< 20.0 ppb
2-Chloroethylvinyl ether	< 20.0 ppb
Acrolein	< 200 ppb
Acrylonitrile	< 200 ppb
Benzene	< 20.0 ppb
Bromoform	< 20.0 ppb
Carbon Tetrachloride	< 20.0 ppb
Chlorobenzene	< 20.0 ppb
Chlorodibromomethane	< 20.0 ppb
Chloroethane	< 20.0 ppb
Chloroform	< 20.0 ppb
Dichlorobromomethane	< 20.0 ppb
Dichlorodifluoromethane	< 20.0 ppb
Ethylbenzene	< 20.0 ppb
Methyl Bromide	< 20.0 ppb

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VA	00151
TN	02934
WI	99988779

CERTIFICATE OF ANALYSIS

Client: Burris Chemical, Inc.
P.O. Box 70788
Charleston, South Carolina 29415

Date: 07/30/92

Contact:

Released by: QA/QC Officer

cc: BURS00591   Project Manager: Buddy Hill   Page No.: 1

Sample ID	: GS-17-9
Lab ID	: 9207339-01
Matrix	: GroundH2O
Date Collected	: 07/16/92
Date Received	: 07/17/92
Priority	: Routine
Collector	: GEL

Volatile Organics

Priority Pollutant Volatiles

1,1,1-Trichloroethane	< 2.00 ppb
1,1,2,2-Tetrachloroethane	< 2.00 ppb
1,1,2-Trichloroethane	< 2.00 ppb
1,1-Dichloroethane	< 2.00 ppb
1,1-Dichloroethylene	< 2.00 ppb
1,2-Dichlorobenzene	< 2.00 ppb
1,2-Dichloroethane	< 2.00 ppb
1,2-Dichloropropane	< 2.00 ppb
1,2-trans-Dichloroethylene	< 2.00 ppb
1,3-Dichlorobenzene	< 2.00 ppb
1,4-Dichlorobenzene	< 2.00 ppb
2-Chloroethylvinyl ether	< 2.00 ppb
Acrolein	< 20.0 ppb
Acrylonitrile	< 20.0 ppb
Benzene	< 2.00 ppb
Bromoform	< 2.00 ppb
Carbon Tetrachloride	< 2.00 ppb
Chlorobenzene	< 2.00 ppb
Chlorodibromomethane	< 2.00 ppb
Chloroethane	< 2.00 ppb
Chloroform	< 2.00 ppb
Dichlorobromomethane	< 2.00 ppb
Dichlorodifluoromethane	< 2.00 ppb
Ethylbenzene	< 2.00 ppb
Methyl Bromide	< 2.00 ppb

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Molly F. Greene
President

George C. Greene, P.E., Ph.D.
Vice President
SC Registration No. 9103

Laboratory	Certifications:
FL	E87156/87294
NC	233
SC	10120
VA	00151
TN	02934
WI	99988779

CERTIFICATE OF ANALYSIS

Client: Burris Chemical, Inc.
P.O. Box 70788
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Date: 07/30/92

Contact:
cc: BURS00591 Project Manager: Buddy Hill Page No.: 2

Sample ID	:	GS-17-9
Lab ID	:	9207339-01
Matrix	:	GroundH2O
Date Collected	:	07/16/92
Date Received	:	07/17/92
Priority	:	Routine
Collector	:	GEL

Methyl Chloride	< 2.00 ppb
Methylene Chloride	2.07 ppb
Tetrachloroethylene	< 2.00 ppb
Toluene	< 2.00 ppb
Trichloroethylene	< 2.00 ppb
Trichlorofluoromethane	< 2.00 ppb
Vinyl chloride	< 2.00 ppb
cis-1,3-Dichloropropylene	< 2.00 ppb
trans-1,3-Dichloropropylene	< 2.00 ppb

Comments:
Methylene Chloride was detected in the analytical blank.

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CERTIFICATE OF ANALYSIS

Client: Burris Chemical, Inc.
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Charleston, South Carolina 29415

Date: 07/29/92

Contact:

Released by: QA/QC Officer

cc: BURS00591   Project Manager: Buddy Hill   Page No.: 1

Sample ID	:	GS-18-12
Lab ID	:	9207286-02
Matrix	:	GroundH2O
Date Collected	:	07/10/92
Date Received	:	07/15/92
Priority	:	Routine
Collector	:	GEL

Volatile Organics
Headspace Screen

1,2-Dichlorobenzene	< 1.00 ppm
1,3-Dichlorobenzene	< 1.00 ppm
Benzene	< 1.00 ppm
Chlorobenzene	< 1.00 ppm
Ethylbenzene	275 ppm
Tetrachloroethylene	< 1.00 ppm
Toluene	< 1.00 ppm
cis-1,3-Dichloropropylene	< 1.00 ppm

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Sample ID	:	GS-18-8
Lab ID	:	9207286-01
Matrix	:	GroundH2O
Date Collected	:	07/10/92
Date Received	:	07/15/92
Priority	:	Routine
Collector	:	GEL

Volatile Organics
Headspace Screen

1,2-Dichlorobenzene	< 1.00 ppm
1,3-Dichlorobenzene	< 1.00 ppm
Benzene	< 1.00 ppm
Chlorobenzene	< 1.00 ppm
Ethylbenzene	258 ppm
Tetrachloroethylene	< 1.00 ppm
Toluene	< 1.00 ppm
cis-1,3-Dichloropropylene	< 1.00 ppm

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Contact:

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Sample ID	: GS-18-22
Lab ID	: 9207325-01
Matrix	: GroundH2O
Date Collected	: 07/15/92
Date Received	: 07/16/92
Priority	: Routine
Collector	: GEL

Volatile Organics
Headspace Screen

1,2-Dichlorobenzene	< 1.00 ppm
1,3-Dichlorobenzene	< 1.00 ppm
Benzene	< 1.00 ppm
Chlorobenzene	< 1.00 ppm
Ethylbenzene	< 1.00 ppm
Tetrachloroethylene	< 1.00 ppm
Toluene	< 1.00 ppm
cis-1,3-Dichloropropylene	< 1.00 ppm

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Sample ID	:	GS-19-7
Lab ID	:	9207339-05
Matrix	:	GroundH2O
Date Collected	:	07/16/92
Date Received	:	07/17/92
Priority	:	Routine
Collector	:	GEL

Volatile Organics
Priority Pollutant Volatiles

1,1,1-Trichloroethane	< 50.0 ppb
1,1,2,2-Tetrachloroethane	< 50.0 ppb
1,1,2-Trichloroethane	< 50.0 ppb
1,1-Dichloroethane	< 50.0 ppb
1,1-Dichloroethylene	< 50.0 ppb
1,2-Dichlorobenzene	< 50.0 ppb
1,2-Dichloroethane	< 50.0 ppb
1,2-Dichloropropane	< 50.0 ppb
1,2-trans-Dichloroethylene	< 50.0 ppb
1,3-Dichlorobenzene	< 50.0 ppb
1,4-Dichlorobenzene	< 50.0 ppb
2-Chloroethylvinyl ether	< 50.0 ppb
Acrolein	< 500 ppb
Acrylonitrile	< 500 ppb
Benzene	< 50.0 ppb
Bromoform	< 50.0 ppb
Carbon Tetrachloride	< 50.0 ppb
Chlorobenzene	< 50.0 ppb
Chlorodibromomethane	< 50.0 ppb
Chloroethane	< 50.0 ppb
Chloroform	< 50.0 ppb
Dichlorobromomethane	< 50.0 ppb
Dichlorodifluoromethane	< 50.0 ppb
Ethylbenzene	< 50.0 ppb
Methyl Bromide	< 50.0 ppb

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Date: 07/30/92

Contact:
cc: BURS00591 Project Manager: Buddy Hill

Page No.: 2

Sample ID	:	GS-19-7
Lab ID	:	9207339-05
Matrix	:	GroundH2O
Date Collected	:	07/16/92
Date Received	:	07/17/92
Priority	:	Routine
Collector	:	GEL

Methyl Chloride	< 50.0 ppb
Methylene Chloride	126 ppb
Tetrachloroethylene	< 50.0 ppb
Toluene	< 50.0 ppb
Trichloroethylene	296 ppb
Trichlorofluoromethane	< 50.0 ppb
Vinyl chloride	< 50.0 ppb
cis-1,3-Dichloropropylene	< 50.0 ppb
trans-1,3-Dichloropropylene	< 50.0 ppb

Comments:

A dilution was required for volatile organics due to high concentration of target compounds. As a result, the detection limits are elevated.

Methylene Chloride was detected in the analytical blank.

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Date: 07/28/92

Contact:

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cc: BURS00591 Project Manager: Buddy Hill Page No.: 1

Sample ID	: GS-20-7
Lab ID	: 9207236-04
Matrix	: GroundH2O
Date Collected	: 07/14/92
Date Received	: 07/15/92
Priority	: Routine
Collector	: GEL

Volatile Organics
Priority Pollutant Volatiles

1,1,1-Trichloroethane	< 2.00 ppb
1,1,2,2-Tetrachloroethane	< 2.00 ppb
1,1,2-Trichloroethane	< 2.00 ppb
1,1-Dichloroethane	< 2.00 ppb
1,1-Dichloroethylene	< 2.00 ppb
1,2-Dichlorobenzene	< 2.00 ppb
1,2-Dichloroethane	< 2.00 ppb
1,2-Dichloropropane	< 2.00 ppb
1,2-trans-Dichloroethylene	< 2.00 ppb
1,3-Dichlorobenzene	< 2.00 ppb
1,4-Dichlorobenzene	< 2.00 ppb
2-Chloroethylvinyl ether	< 2.00 ppb
Acrolein	< 20.0 ppb
Acrylonitrile	< 20.0 ppb
Benzene	< 2.00 ppb
Bromoform	< 2.00 ppb
Carbon Tetrachloride	< 2.00 ppb
Chlorobenzene	< 2.00 ppb
Chlorodibromomethane	< 2.00 ppb
Chloroethane	< 2.00 ppb
Chloroform	< 2.00 ppb
Dichlorobromomethane	< 2.00 ppb
Dichlorodifluoromethane	< 2.00 ppb
Ethylbenzene	< 2.00 ppb
Methyl Bromide	< 2.00 ppb

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Client: Burris Chemical, Inc.
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Date: 07/30/92

Contact:

Released by: [signature]
QA/QC Officer

cc: BURS00591 Project Manager: Buddy Hill Page No.: 1

Sample ID	: GS-4-9
Lab ID	: 9207339-03
Matrix	: GroundH2O
Date Collected	: 07/16/92
Date Received	: 07/17/92
Priority	: Routine
Collector	: GEL

Volatile Organics
Priority Pollutant Volatiles

1,1,1-Trichloroethane	< 10.0 ppb
1,1,2,2-Tetrachloroethane	< 10.0 ppb
1,1,2-Trichloroethane	< 10.0 ppb
1,1-Dichloroethane	< 10.0 ppb
1,1-Dichloroethylene	< 10.0 ppb
1,2-Dichlorobenzene	< 10.0 ppb
1,2-Dichloroethane	< 10.0 ppb
1,2-Dichloropropane	< 10.0 ppb
1,2-trans-Dichloroethylene	< 10.0 ppb
1,3-Dichlorobenzene	< 10.0 ppb
1,4-Dichlorobenzene	< 10.0 ppb
2-Chloroethylvinyl ether	< 10.0 ppb
Acrolein	< 100 ppb
Acrylonitrile	< 100 ppb
Benzene	< 10.0 ppb
Bromoform	< 10.0 ppb
Carbon Tetrachloride	< 10.0 ppb
Chlorobenzene	< 10.0 ppb
Chlorodibromomethane	< 10.0 ppb
Chloroethane	< 10.0 ppb
Chloroform	< 10.0 ppb
Dichlorobromomethane	< 10.0 ppb
Dichlorodifluoromethane	< 10.0 ppb
Ethylbenzene	< 10.0 ppb
Methyl Bromide	< 10.0 ppb

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Contact:
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Page No.: 2

Sample ID	: GS-4-9
Lab ID	: 9207339-03
Matrix	: GroundH2O
Date Collected	: 07/16/92
Date Received	: 07/17/92
Priority	: Routine
Collector	: GEL

Methyl Chloride	< 10.0 ppb
Methylene Chloride	21.0 ppb
Tetrachloroethylene	< 10.0 ppb
Toluene	< 10.0 ppb
Trichloroethylene	< 10.0 ppb
Trichlorofluoromethane	11.1 ppb
Vinyl chloride	< 10.0 ppb
cis-1,3-Dichloropropylene	< 10.0 ppb
trans-1,3-Dichloropropylene	< 10.0 ppb

Comments:

A dilution was required for volatile organics due to high concentration of target compounds. As a result, the detection limits are elevated.

Methylene Chloride was detected in the analytical blank.

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Contact:

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Sample ID	: GS-1-9
Lab ID	: 9207339-06
Matrix	: GroundH2O
Date Collected	: 07/16/92
Date Received	: 07/17/92
Priority	: Routine
Collector	: GEL

Volatile Organics
Priority Pollutant Volatiles

1,1,1-Trichloroethane	< 2.00 ppb
1,1,2,2-Tetrachloroethane	< 2.00 ppb
1,1,2-Trichloroethane	< 2.00 ppb
1,1-Dichloroethane	< 2.00 ppb
1,1-Dichloroethylene	< 2.00 ppb
1,2-Dichlorobenzene	< 2.00 ppb
1,2-Dichloroethane	< 2.00 ppb
1,2-Dichloropropane	< 2.00 ppb
1,2-trans-Dichloroethylene	< 2.00 ppb
1,3-Dichlorobenzene	< 2.00 ppb
1,4-Dichlorobenzene	< 2.00 ppb
2-Chloroethylvinyl ether	< 2.00 ppb
Acrolein	< 20.0 ppb
Acrylonitrile	< 20.0 ppb
Benzene	< 2.00 ppb
Bromoform	< 2.00 ppb
Carbon Tetrachloride	< 2.00 ppb
Chlorobenzene	< 2.00 ppb
Chlorodibromomethane	< 2.00 ppb
Chloroethane	< 2.00 ppb
Chloroform	< 2.00 ppb
Dichlorobromomethane	< 2.00 ppb
Dichlorodifluoromethane	< 2.00 ppb
Ethylbenzene	< 2.00 ppb
Methyl Bromide	< 2.00 ppb

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Date: 07/30/92

Contact:
cc: BURS00531 Project Manager: Buddy Hill

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Sample ID	:	GS-1-9
Lab ID	:	9207339-06
Matrix	:	GroundH2O
Date Collected	:	07/16/92
Date Received	:	07/17/92
Priority	:	Routine
Collector	:	GEL

Methyl Chloride	< 2.00 ppb
Methylene Chloride	< 2.00 ppb
Tetrachloroethylene	< 2.00 ppb
Toluene	< 2.00 ppb
Trichloroethylene	< 2.00 ppb
Trichlorofluoromethane	< 2.00 ppb
Vinyl chloride	< 2.00 ppb
cis-1,3-Dichloropropylene	< 2.00 ppb
trans-1,3-Dichloropropylene	< 2.00 ppb