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TETRACHLOROETHYLENE CONTAMINATION ASSESSMENT AND CONCEPTUAL
CORRECTIVE ACTION PLAN FOR DRY CLEANING FACILITY SITE 45 WITH TRANSMITTAL
LETTER MCRD PARRIS ISLAND SC
6/16/1994
S&ME INC

**TETRACHLOROETHYLENE CONTAMINATION
ASSESSMENT AND CONCEPTUAL
CORRECTIVE ACTION PLAN
U.S. MARINE CORPS RECRUIT DEPOT
DRY CLEANING FACILITY**

Prepared For:

Morale, Welfare and Recreation
Marine Corps Recruit Depot
Post Office Box 5100
Parris Island, South Carolina

Prepared By:

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June 16, 1994

Morale, Welfare and Recreation
Marine Corps Recruit Depot/ERR
Post Office Box 5100
Parris Island, South Carolina 29905-5001

ATTENTION: Mr. Robert Mullen

Reference: **TETRACHLOROETHYLENE CONTAMINATION ASSESSMENT
AND CONCEPTUAL CORRECTIVE ACTION PLAN**
Marine Corps Depot Dry Cleaning Facility
Parris Island, South Carolina
S&ME, Inc. Project No. 1134-94-202

Dear Mr. Mullen:

S&ME, Inc. (S&ME) is pleased to submit the enclosed assessment report and conceptual corrective action plan for the Tetrachloroethylene (PCE) release that occurred at the above referenced facility.

The enclosed report details the on-site procedures undertaken to complete an initial assessment of the site. Also included in this report are the tabulated analytical results for all samples collected from the site.

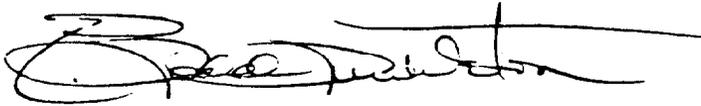
The enclosed conceptual corrective action plan contains our conclusions and recommendations concerning the site based on the information gathered from the site to date.

S&ME, Inc. 840 Low Country Boulevard, Mt. Pleasant, South Carolina 29464, (803) 884-0005, Fax (803) 881-6149

S&ME appreciates the opportunity to submit this information to Morale, Welfare and Recreation. Should you have any comments or questions concerning this information, please do not hesitate to contact us at (803)884-0005.

Sincerely,

S&ME, Inc.



E. Todd Tumbleston
Senior Environmental Specialist



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1.0 PROJECT INFORMATION

The referenced site is the location of the Morale, Welfare and Recreation (MWR) dry cleaning facility which serves the Parris Island Marine Recruit Depot community. Appendix I, figure 1 provides a site location plan of the facility.

This facility maintains four above ground storage tanks in a concrete constructed secondary containment basin. Appendix I, figure 2 provides a site plan of the facility. It is our understanding that these tanks have been in place since 1988 and are used for storage of the dry cleaning solvent Tetrachloroethylene (PCE). It is also our understanding that the above ground system had been constructed to replace an underground storage tank system which contained a petroleum based solvent used prior to the facilities use of PCE.

S&ME understands that a reportable release of PCE occurred on March 11, 1994 when one of the storage tanks was inadvertently overfilled spilling PCE into the concrete containment basin. The PCE was subsequently released when the containment basin was drained following heavy rains.

On March 14 and 19, 1994, Parris Island personnel collected soil samples for laboratory analysis from the area along Panama Road. The laboratory results of these samples indicated light to heavy levels of PCE contamination. Parris Island personnel also excavated the PCE-saturated soil just outside the containment basin drain and placed the contaminated material into seven 55-gallon drums. These drums are currently being stored in the depot hazardous waste yard. Parris Island personnel also collected a water sample from the base of the excavation for laboratory analysis. The locations and analytical results for these samples have been incorporated into this assessment.

S&ME was contracted by MWR in April, 1994 to perform a PCE contamination assessment and create a conceptual remediation plan. The following sections outline the

assessment activities and the analytical results for all collected samples. In addition, the most effective remedial options and a scope of work for the implementation of the chosen conceptual corrective action plan have been determined.

2.0 FIELD ASSESSMENT ACTIVITIES

2.1 Work Plan Permitting

Upon the award of the MWR contract, S&ME prepared a temporary monitoring well installation request letter to Mr. James Peurifoy, G.I.T. of the South Carolina Department of Health and Environmental Control (SCDHEC). The SCDHEC issued an approval letter on May 5, 1994, granting permission to implement our work plan and begin the assessment. The permitting request/approval letters are included in Appendix II.

2.2 Assessment Activities

Upon receipt of verbal authorization from Mr. James Peurifoy, G.I.T. of the SCDHEC, S&ME mobilized to the site and began the initial assessment. S&ME began the assessment by installing three temporary piezometers in a triangle orientation such that groundwater flow direction and groundwater levels could be determined. Each temporary piezometer was installed by utilizing a 3.75-inch stainless steel hand auger to advance boreholes into the groundwater table. Each borehole was then converted to a piezometer by the installation of a five-foot section of 1.75-inch Schedule 40 PVC screen with a 0.010-inch factory machined slot. The screen for each piezometer was set at a point to intersect the ground water table. A five-foot section of Schedule 40 PVC casing was then attached to bring the well above the ground surface. A coarse washed filter sand was used to fill the annulus of the well to approximately one foot above the screened interval. A six-inch to one-foot bentonite pellet seal was placed above the sand to separate the piezometer from possible aboveground sources of contamination. Relative groundwater elevations were measured and calculated for two consecutive days and would indicate that the groundwater currently flows in a southwesterly direction. Water levels obtained showed the groundwater levels across the site to be just over three feet from the ground surface. Piezometer logs are included in Appendix III.

Three borings conducted by McCleskey and Associates, in December, 1993 on an adjacent site and a boring conducted by our drilling department on May 5, 1994 at the site, indicated the existence of a sandy clay stratum at approximately 15 feet below the ground surface which is fairly consistent throughout this area. This stratum may stop or slow the downward migration of PCE in this area. Copies of these boring logs are included in Appendix III.

Based on this information, S&ME began collecting water samples at a depth of approximately four to five feet from the ground surface in an attempt to determine the horizontal extent of the PCE contamination. A 20-foot grid pattern was utilized to mark the locations to be sampled. The grid originated at the original point of release and moved outward in all directions. A KV Rotary Hefty System™ (KV) was utilized to collect groundwater samples for analysis. An electric rotary hammer drill was utilized to advance a 7/8-inch diameter hollow stem steel shaft with a slotted intake screen into the water table. The shaft and screened sections were then purged with a high pressure pulse of compressed nitrogen to clear any obstructions from the slotted intake. Polypropylene tubing was then inserted into the shaft to the bottom of the slotted intake screen and withdrawn approximately four inches. At the surface, the tubing was connected to Norprene™ tubing which was attached and passed through a peristaltic pump. A sample flask was then connected to the opposite side of the Norprene™ tubing for collection of the sample. The pump motor was engaged bringing the water to the surface and depositing it into the sample flask. Whenever possible, the first approximate 500-milliliters are discarded for purging practices. The collected sample is then transferred to 40-milliliter septa-capped vials for analysis by our portable Gas Chromatography (GC) laboratory.

The vertical extent of contamination was estimated by use of KV and hand auger collected samples at selected locations. The KV was driven to different depths, purged at each level and sampled for analysis. The vertical extent sample collection depths selected were five, eight and twelve feet below the ground surface.

In addition, a 3.75-inch stainless steel auger was utilized to collect soil samples at selected locations. Each borehole was advanced to the capillary fringe where a soil sample was collected for analysis. The piezometer designated as PZ-4 was constructed at grid number Z-20 for the purpose of confirming a clean downgradient area. PZ-5 was constructed at grid number D-11 for the purpose of identifying by laboratory analysis the additional compounds detected in this area during the PCE assessment.

All testing and sampling equipment was decontaminated prior to and immediately following each use by standard decontamination procedures including washing with a chemically neutral surfactant and rinsing with alcohol and water. All KV sample points, piezometers and hand augers were abandoned immediately after sample collection by filling the entire length of the location voids to the ground surface with a neat cement slurry. This was performed to prevent surface contamination from rapidly migrating downward through the empty voids. A site plan depicting each sample location and type is included in Appendix I, figure 3. KV and Piezometer construction and abandonment details are attached in Appendix I, figures 4 and 5, respectively.

2.3 Field and Laboratory Analysis

A Photovac 10S50 portable GC was utilized to analyze the samples collected from the site. The GC was calibrated daily using a specially prepared stock solution of 99% pure PCE.

All samples were immediately logged after collection into a daily sample log sheet and analyzed at the earliest possible moment. Due to the required GC startup time, samples collected on the first day were stored in an iced cooler until the second day of the assessment at which time they were removed, allowed to reach ambient temperature and analyzed. Approximately 100 microliters of sample head space from each sample container were injected into the instrument and analyzed for the calibrated compounds including PCE.

The GC generated a strip chart depicting all detectable compound peaks for the time period analyzed. These strip charts were attached to analysis information sheets which provide the project information, the GC setup information and the detected results of the calibrated compound. Copies of the sample logs and G.C. data sheets have been included as Appendix IV.

Additional samples (approximately 25% of total samples collected) were collected at selected locations for laboratory analysis for verification of field results. All additional samples were placed into specially prepared laboratory containers and immediately packaged in an iced cooler for shipment for analysis by a state-certified laboratory.

3.0 ANALYTICAL DATA

The breakdown of the number and types of samples collected by S&ME from the site are as follows:

- o 25 - four to five foot depth KV-collected water samples
- o 2 - eight foot depth KV-collected water samples
- o 5 - twelve foot depth KV-collected water samples
- o 5 - piezometer collected water samples
- o 3 - hand auger-collected soil samples
- o 1 - containment basin rainwater grab water sample

These samples were analyzed for PCE by S&ME personnel at the site utilizing a portable gas chromatograph. Approximately 25% of the samples collected were also analyzed by a state-certified laboratory for PCE by EPA Method 601. Table 1, Appendix V, provides a breakdown of each sample, the results of field GC screening and the laboratory analysis results.

Additional sampling was recommended due to petroleum type constituents detected during the PCE assessment. The sampling was approved and was conducted by installing two additional piezometers (PZ-4 and PZ-5). Both soil and water samples were collected and analyzed for petroleum-based contaminants (by EPA Methods 624, 625, 3550, and 9071). Table 2, Appendix V provides the analytical results of this testing. Actual laboratory data and sample chain of custody are included in Appendix VI.

In addition, 16 soil samples and 1 water sample were collected prior to our assessment by Parris Island personnel and analyzed by Reclamation Services, Inc. in Central City, Kentucky. Table 3 provides a summary of laboratory results for these samples as provided to us by Parris Island personnel. Laboratory results are provided in Appendix VII. Figure 6, Appendix I is provided as a sample location plan for this initial assessment.

4.0 CONCLUSIONS

Based on the information gathered from the site to date, S&ME has concluded that the soils and groundwater in the vicinity of the containment basin have been adversely impacted by the release of PCE which occurred in March of this year. A PCE isoconcentration map has been provided as Figure 7, Appendix I, depicting the analytical results. Based on the size of the contaminant plume and the surrounding soil conditions, S&ME has concluded that additional releases of lesser magnitude may have occurred at this site over a period of time. S&ME believes that these releases may have occurred in the same fashion as the most recent release or from former underground storage tanks.

S&ME conducted interviews with various Parris Island personnel and discovered that underground storage tanks were previously maintained at the site beneath the present location of the containment basin. S&ME was also informed that a petroleum-based solvent had been used in the dry cleaning process prior to the facility's use of PCE. These interviews were prompted by the discovery of various contaminants other than PCE which contained odors similar to that of a petroleum-based compound. S&ME was also informed by Parris Island personnel that the underground storage tanks were removed prior to the construction of the aboveground storage structure. Additional laboratory analysis on samples from this area were performed and did exhibit what appeared to be petroleum-based solvent compounds. Based on this information, S&ME has concluded that a release or spill of petroleum-based solvent has occurred at this site prior to the 1988 aboveground structure completion date. Although the petroleum contamination has not migrated a considerable distance, it may have migrated under the building as this area was not accessible during the time of our initial investigation.

Laboratory analysis of selected groundwater samples exhibited contaminant levels of Tetrachloroethylene (PCE), Trichloroethylene (TCE) and cis-1,2-Dichloroethylene (DCE), above the maximum contaminate level (MCL) as set forth in the U.S. Environmental Protection Agency's Drinking Water Regulations and Health Advisories dated December,

1993. The MCLs for these compounds are as follows:

<u>COMPOUND</u>	<u>MCL</u>
Tetrachloroethylene (PCE)	5.0 ppb
Trichloroethylene (TCE)	5.0 ppb
cis-1,2-Dichloroethylene (DCE)	70.0 ppb

A potentiometric surface map, Figure 8, Appendix 1, has been prepared showing the direction of groundwater flow (southwesterly). An approximate horizontal hydraulic gradient of 2.5×10^{-3} ft has been calculated from this elevation data. The flow of groundwater in the direction of this gradient is impeded by the high content of silts present on site.

The vertical hydraulic gradient is not known at this time as no deep wells were installed. Vertical extent of PCE contamination was investigated by performing selected deeper KV samples. In one location, the PCE concentration decreased rapidly as the depth of sample increased. In another, the concentration increased slightly as depth increased. As PCE is more dense than water, over time most of the contamination would be found at deeper locations. The clay layer identified at this site at approximately 15 feet below grade should stop further migration downward.

An aggressive strategy to quickly address soil and groundwater contamination is recommended in the following sections to remediate the site before the contaminant plume spreads further downgradient.

5.0 CONCEPTUAL CORRECTIVE ACTION PLAN

This section provides a discussion of the technical and economic feasibility of the chosen corrective action plan and why this method was chosen over other remedial options. The discussion includes conceptual details for the design and construction of the chosen remedial system. Also included is a discussion regarding the disposition and expected contamination of the effluents generated by the remedial method.

5.1 TECHNOLOGY SCREENING

To select an appropriate remedial technology for the site, an evaluation of the contaminant properties must be combined with the site geology, mass distribution of the contaminants among phases and site hydrogeologic data. Table 4, Appendix V shows the contaminant characteristics of the major compounds detected at this site.

A Henry's Law value (K_h) of $> 10^{-5}$ -atm-m³/mole indicates a "strippable" volatile constituent. The volatility of a compound is indicated by the vapor pressure of the material, whereas, the partition coefficient (K_{oc}) indicates the ability of the compound to partition from the aqueous phase to the adsorbed phase. K_{oc} levels above 50 indicate contaminants reside principally in the soil matrix. Therefore, all compounds in Table 4, Appendix V are strippable from the soil matrix. These contaminant properties indicate that volatilization based remedial technologies (soil venting and air sparging) are compatible with these contaminants.

A broad feasibility screening was performed to assist in the selection of remedial technologies and the final development of the preferred remedial alternative for the site. Each technology was evaluated according to effectiveness, implementability and cost. Table 5, Appendix V shows the most feasible technologies reviewed and a summary of their advantages and disadvantages.

Based upon screening of remedial alternatives, a combined Air Sparging and Vacuum Extraction (AS/VE) system was considered the most expeditious, most effective and least costly technology for the treatment of adsorbed and dissolved hydrocarbons on-site. This system will remediate the site by stripping the volatile and, to a lesser extent, the semi-volatile constituents from the contaminated area and by enhancing natural microbial activity in the contaminated area through the influx of oxygen.

In addition, activated carbon treatment of vacuum off-gases was selected to provide an economical and effective remedial solution to the removed hydrocarbons if such treatment is required. The Bureau of Air Quality Control (BAQC) requires sources that emit greater than 1,000 pounds per month to have a permit to do so (see Section 7.0). Based on initial emission calculations, this site may not exceed that emission limit (see Appendix X). This Conceptual CAP design includes activated carbon treatment in the event that the treatment is required or desired.

5.2 AIR SPARGING/VAPOR EXTRACTION SYSTEM THEORY

Air Sparging is the injection of pressurized air into saturated soil. The air is injected (via a well point) into the groundwater below the level of significant contamination and is allowed to rise to the surface. The hydrocarbons present in the saturated soil enter the vapor phase upon contact with the injected air stream and are transported to the unsaturated vadose zone. Hydrocarbon vapors in the vadose zone are either (1) collected by a Vacuum Extraction system and transported to a point source discharge or (2) discharged directly to the atmosphere over the site area.

A Vacuum Extraction (VE) system consists of a series of wells that are screened above the free surface of the groundwater and are connected (via a piping network) to a vacuum pump. The vacuum pump is used to develop negative pressure in the well system. This negative pressure pulls the injected (and now hydrocarbon contaminated air) into the well system and transports it to the discharge point. The vapors are

discharged directly to the atmosphere or, if treatment is required, the discharge can be routed through an activated carbon filtration system or catalytic oxidation unit.

5.3 SYSTEM CONSTRUCTION

The Air Sparging/Vacuum Extraction system recommended for this site will utilize twelve (12) Air Sparging wells and twelve (12) Vacuum Extraction wells. The well systems will be paired (one AS well and one VE well) into each of twelve 12-inch diameter boreholes (see Figure 9, Appendix I). The boreholes will be advanced to approximately 15 feet below grade using the hollow stem auger drilling method.

For the Air Sparging wells, a two-inch diameter, schedule 40, flush threaded PVC well casing will be installed down to the base of the borehole. The casing will be screened for five feet using #10 slot PVC well screen (0.01 inch opening). The bottom of the screen will be located one foot above the bottom of the casing and will be plugged. The annulus between the well pipe and borehole wall will be filled with a uniformly graded silica sand filter pack (FX-50) to approximately one foot above the screened portion of the well casing. One foot of bentonite pellets will be used to form a seal on top of the sand and the rest of the annular space will be filled with grout up to the highest recorded level of the groundwater free surface.

The air supply and transmission system for the AS wells will consist of an air compressor connected directly to a piping network which will transport air to the individual injection wells. Near each well head, a valve will be placed in line to regulate flow and pressure of air into the well, and a fitting for installing a pressure gauge will be placed between the valve and the well head. All pipes will be buried with a minimum cover of 18 inches. The air compressor will be a rotary type or other type which needs no lubrication in the compression chamber or air passages so that no contaminants will be injected into the aquifer. The spacing between the injection wells will depend upon the radius of influence of each well within the well field. A pilot study (see Section 6.0) will be performed to

determine the radius of influence for the wells.

For the VE wells, a two-inch diameter, schedule 40, flush threaded PVC well casing will be installed in the same borehole down to one foot above the highest recorded level of the groundwater free surface. The casing will be screened for three feet using #20 slot PVC well screen (0.02 inch opening). The bottom of the casing will be plugged. The annulus between the casing and borehole wall will be filled with a uniformly graded silica sand filter pack (FX-50) to one foot above the screened portion of the well casing. One foot of bentonite pellets will be used to form a seal on top of the sand and the rest of the annular space will be filled with grout to grade.

The vacuum system for the VE wells will consist of a direct drive exhaustor (vacuum) pump. A pressure gauge will be installed on the inlet side of the pump and a flow meter will measure cubic feet per minute of the outlet side of the pump. Actual flow rates will depend on the pilot study. Examples of AS/VE equipment are included in Appendix VIII.

5.3.1 System Well and Manifold Details

The AS/VE manifold piping will be routed below grade in shallow trenches (16 inches by 2.5 feet deep). Manifolding will be constructed with Schedule 40, 3-inch PVC pipe. All subsurface piping will be routed to an equipment shed. The shed will be sized according to need based on the actual equipment purchased to conduct the remediation.

Instrumentation for measuring and controlling positive pressure and air flow as well as air sample collection ports will be installed at each sparge well head. Instrumentation for measuring and controlling vacuum and air flow, as well as, air sample collection ports will be installed at each vacuum well head and on the VE unit (inlet and outlet) after carbon treatment.

5.3.1.1 Air Sparging System

The device recommended to create the positive pressure for Air Sparging will be a 40-Horsepower monoscrew direct drive air compressor. This compressor is recommended over a positive pressure blower due to (a) its capacity to maintain higher air flows and pressures, (b) its reduced voltage starting, (c) low noise, (d) easy maintenance, and (f) affordability. A high air flow at a relatively high pressure is considered necessary to achieve (a) maximum volatilization, (b) an effective radial influence, and (c) supply enough air flow to the proposed sparging wells and possibly additional wells in the future.

The air compressor will be equipped with a main oil coalescing filter, hour meter, discharge and receiver air pressure gauges, line pressure gauge, operating temperature gauge, and service indicators for oil and air filters. The monoscrew compressor will be able to supply forced air of up to 185 cfm at 100 psi, which should be able to handle 7 sparge wells recommended. The 40-Hp compressor will operate on 460 volt, 3- phase power at 60 hertz.

5.3.1.2 Vacuum Extraction System

The recommended vacuum unit size and type is a 15-horsepower direct drive exhaustor. The exhaustor was selected over a regenerative blower due to (a) its capacity to maintain higher air flows over a range of low vacuums, (b) its spark-resistant aluminum housing and impeller, (c) gas-tight construction, (d) easy maintenance, and (f) affordability. A high air flow at low vacuum is considered necessary to achieve (a) maximum volatilization, (b) an effective capture zone, and (c) supply enough air flow to the proposed venting wells and possible additional wells in the future.

Prior to entering the blower unit, well vapors will pass through two, 500-lb., 500 cfm capacity vapor phase carbon units and then through a water trap/demister to remove moisture from the vapor stream. The water trap/demister will contain a liquid level sensor

that will shut down the vacuum unit should the demister tank become full. In as much as industrial blowers are most effectively operated at a constant speed, the concentration of Volatile Organic Compounds (VOCs) in the vapor stream will be controlled through operation of a bleed air valve wherein the influent vapors are diluted with clean ambient air. The inlet valve also allows fine tuning of the vacuum and air flow. Additional fine tuning of the vacuum and air flow will be provided at each vent well head. During vacuum extraction, the highest Volatile Organic Compounds extraction rates occur during initial operation and typically decrease exponentially over time.

The 15-horsepower explosion-proof unit will be operated by three-phase, 230/460 volt, 60 hertz power. Other features of the system include: (1) inlet vacuum control valve, (2) inlet and outlet temperature gauges, (3) sample ports with isolation valves, (4) ambient air control valve, (5) water trap/demister with electrical high-level shutoff and inlet temperature gauge, (6) pressure (psi) gauge, and (7) inlet and outlet flowmeter gauge with pitot tubes.

5.3.2 System Layout and Design

The preliminary layout and design of the AS/VE system is presented in Figure 10, Appendix I. The distance between each well point in the well field shown is based on a predicted radius of influence for a single injection well. The predicted radius of influence is based on (1) the depth of air injection for the well and (2) the local stratigraphy. For this site, the air injection wells will be screened at a depth of approximately 15 feet. The local stratigraphy is composed of fine-grained silts and sands down to 15 feet. For these stratigraphic conditions, the ratio of depth of injection to radius of influence is approximately 1:1. Therefore, the radius of influence of the AS well will be approximately 15 feet. The spacing of the well field grid will vary depending on the results of the pilot test (See Section 6.0).

6.0 PILOT TEST

A pilot study will be necessary to establish the actual field parameters associated with the AS/VE technology. The test will also be necessary to gather the site-specific data required to complete a full Corrective Action Plan for submittal to the SCDHEC. The pilot study can be conducted on-site by installing one AS/VE well unit. The equipment necessary to perform the pilot test includes the following (see Appendix VIII for details regarding this equipment):

- A 7.5-horsepower mobile vacuum extraction unit;
- A 7.5-horsepower air compressor;
- A portable 40 KVA generator (3 phase, 230 V); and
- All necessary drilling equipment and well supplies.

The study will consist of varying the pressure applied to the AS system and the vacuum applied to the VE system. By monitoring the effectiveness of each pressure or vacuum level applied, the area of influence for both the sparging effect and the extraction effect can be determined.

The effectiveness of the AS pilot test will be measured in terms of the radial influence of the various pressures (i.e. 25, 40, 80, 110-psi) and corresponding flow rates applied to the system. The radial influence of the injected air will be measured by recording dissolved oxygen, upwelling of water levels in monitoring wells, positive pressures and the inflatability of plastic bags or balloons attached to the monitoring wells existing on-site, and vapor points. The effectiveness of the VE pilot test will be measured in terms of the radial influence of the various vacuum loads (i.e. 50, 70, 115, 130 and 150-inches of water) and corresponding flow rates applied to the system. The radial influence of the vacuum well will be measured by recording vapor pressure measurements and the upwelling of the water in nearby monitoring wells and vapor points. (Note: It will be important during the operation of the true AS/VE system that the cumulative radial influence for the vacuum system be greater than the AS system, so as to minimize

escaping contaminated air streams.)

7.0 REQUIRED PERMITS

The regulations promulgated by the SCDHEC under Title 48 Chapter 1 of the 1976 South Carolina Code of Laws as amended March 23, 1990 requires that permits be obtained for wells which are used for the purpose of injecting a fluid into underground formations (R.61-87). A "fluid" is defined as "material or substance which flows or moves whether in a semisolid, liquid, sludge, gas or any other form or state." The ambient air which is proposed to be injected into the aquifer is included in this definition. These regulations require that a permit be obtained for Class V.A. corrective action wells as classified under Type "G" experimental technologies wells. The applicable sections of an Underground Injection Control Permit Application for this class and type of well are included in Appendix IX.

The Air Sparging system also vents contaminants into the atmosphere. Therefore, as part of the CAP, air quality information must be submitted to the Bureau of Air Quality Control (BAQC) before the CAP may be implemented. A BAQC application is included in Appendix IX. The total amount of emissions released into the atmosphere from the system is projected to be much less than 1000 pounds of air toxins per month indicating that a permit from the BAQC may not be necessary. Calculations regarding air emissions are included in Appendix X.

A site-specific CAP must be submitted to the SCDHEC for review and approval. This CAP will contain information gathered to date, subsequent assessment, and data gathered during a pilot test. Well permits must be obtained from the SCDHEC before well installation will be allowed. The permits will be granted as part of the SCDHEC CAP approval process.

8.0 AIR SPARGING/VAPOR EXTRACTION SYSTEM STARTUP

Initial system startup will consist of operating the system for a 2-day test period to evaluate capture zones, optimum vacuums, pressures, air flows, upwelling of water table and compliance with any required permits. The 2-day test will entail adjusting air injection pressures, vacuum pressures and air flow rates to realize maximum efficiency of the systems and maximize the radial influence of each of the air sparging and vacuum extraction wells. The efficiency will be measured by calculation of pounds per day of total PCE in the effluent prior to and after off-gas treatment. Time weighted measurements will be taken over the second day trial run, along with the linear velocity of effluent air measured in feet/second to evaluate air emissions in pounds/day. Carbon usage rates will also be recalculated.

9.0 SYSTEM MONITORING, MAINTENANCE AND REPORTING

This Section discusses the monitoring, maintenance and reporting involved with the operation of the AS/VE system. Included is a written schedule for system operation and the necessary methodology to verify remedial goals.

9.1 AIR SPARGING SYSTEM MONITORING AND MAINTENANCE

Monitoring of the AS system will include monitoring and adjustment of compressed air flow to ensure the desired radial influence of the AS system is being achieved. The following parameters should be recorded:

- temperature of influent air;
- air flow rate (cfm) between the compressor and well head;
- pressure in pounds per square inch; and
- Gauge readings at compressor and each sparge well head.

Maintenance of the AS system will include checking the compressor bi-weekly for proper operation, oil level, filter use and proper gauge readings. All monitoring and maintenance readings will be recorded in a log book.

9.2 VACUUM EXTRACTION SYSTEM MONITORING AND MAINTENANCE

Monitoring and maintenance of the VE system will include monitoring of VOC concentrations in the vapor stream, as well as monitoring and adjustment of the vacuum flow to ensure the maximum radial influence without pulling the water table above two feet below ground surface. Most of the vapor monitoring will be completed utilizing carbon tubes. The radial influence of the vapor extraction system will be assessed periodically by recording the same parameters as performed for the pilot test.

9.3 REPORTING

Before start of the AS/VE system, a baseline concentration will be established for the chlorinated hydrocarbons in the vadose and phreatic zone in order that the progress of the remediation can be measured. The baseline for the soil and groundwater contamination will consist of the latest sampling event results performed at the site.

Carbon tube air samples will be collected periodically from the sample ports before and after the two carbon units and at each well head for chlorinated compounds identified on-site as well as for analysis of CO₂ and O₂. These analyses will be used to measure air quality compliance, carbon treatment effectiveness, hydrocarbon removal rates and natural biodegradation from the vacuum and sparging processes.

From the data accumulated during the monitoring of the VE system, the amount of chlorinated hydrocarbons extracted per day by the remediation system will be calculated (using a time weighted measurement of total volatiles per day in parts per million) and listed together with the performance data. The radial influence of the sparging system will be assessed periodically by recording the same parameters as performed for the pilot test. After the first quarter of operation, the contractor will prepare a monitoring report summarizing the remediation system start-up and initial operation status.

The groundwater monitoring wells will be analyzed quarterly for chlorinated hydrocarbons including PCE, TCE, and DCE using appropriate EPA Methods. Baseline measurements for static water levels, dissolved oxygen, and temperature shall also be taken on all existing monitoring wells. All data will be reported using appropriate QA/QC methodology to be determined at a later date.

Parameters to be measured prior to purging of monitoring wells are static water level, Ph, conductivity, temperature, and dissolved oxygen. These parameters will be utilized in spreadsheet and graphical form to monitor changes in plume geometry and flow net

direction to operate the remediation systems efficiently.

9.4 SYSTEM DECOMMISSIONING

It is estimated that the AS/VE system will adequately remediate the MWR Dry Cleaners site in approximately one to two years. Upon completion of the remediation of this site, the AS/VE system will be decommissioned. All decommissioning will be performed in accordance with SCDHEC procedures.

Before decommissioning of the AS/VE system, two test borings will be drilled in the areas where initially the most significant contamination existed. Samples from these borings should be analyzed for PCE, DCE and TCE by EPA Method 601. Additionally, groundwater samples should also be collected and analyzed for chlorinated and petroleum hydrocarbons. If the results indicate that adequate remediation of the site has occurred then a summary report would be prepared together with a request to Parris Island and the SCDHEC for closure of soil and groundwater remediation activities.

10.0 COST ESTIMATE

The cost associated with the final design and implementation of the remedial action are presented in Table 6, Appendix II. This estimate is provided solely for your use for budgetary purposes. This estimate is subject to change with information gained during pilot testing, length of clean-up, other actions required by the SCDHEC, Parris Island, or other regulatory body, and changing site conditions.

APPENDIX I

FIGURES

Panama Street



Aluminum
Shed

PCE Storage Tank
Containment

AC Unit

MWR
Dry
Cleaners

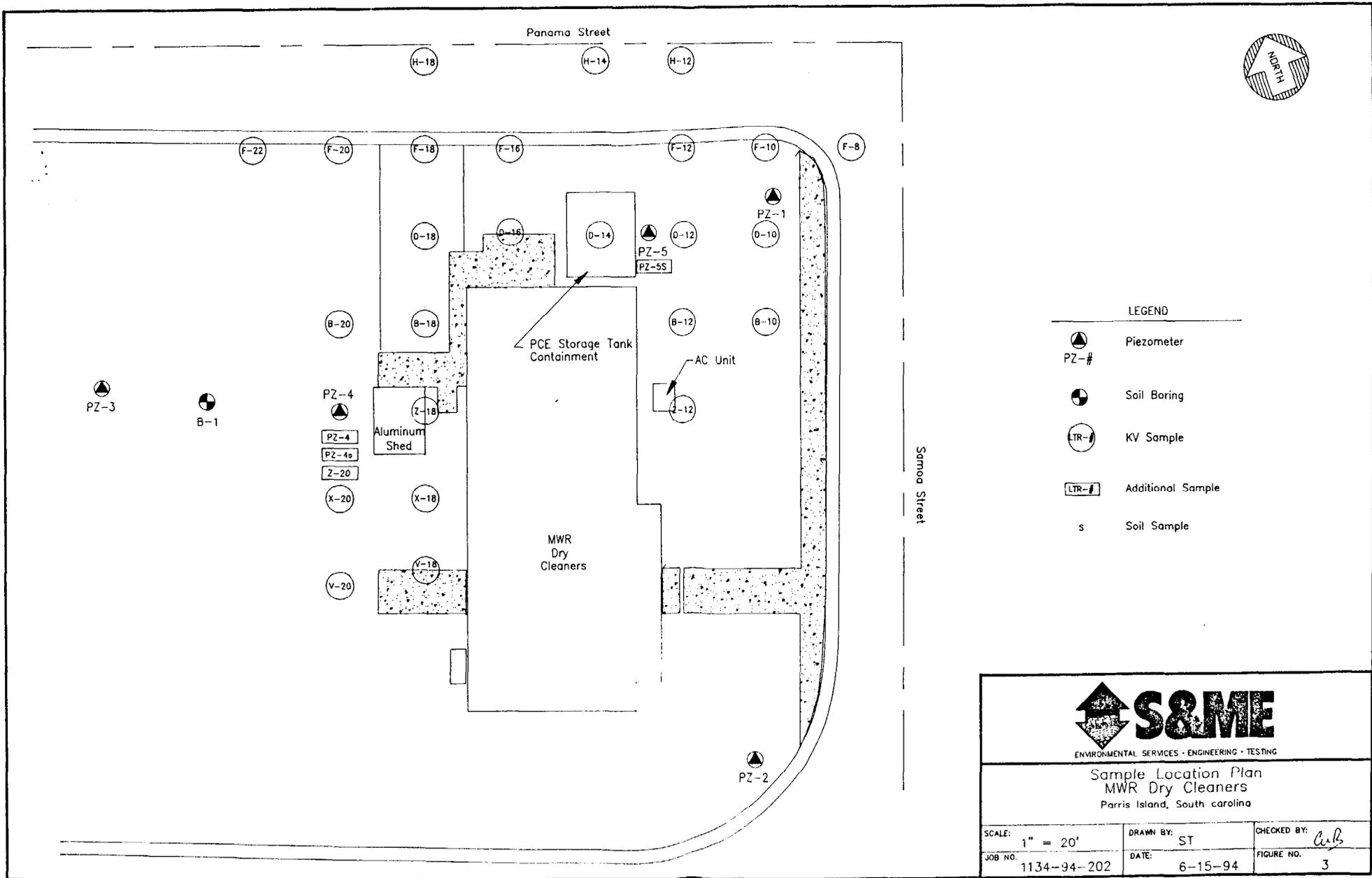
Somoa Street



ENVIRONMENTAL SERVICES • ENGINEERING • TESTING

Site Plan
MWR Dry Cleaners
Parris Island, South Carolina

SCALE: 1" = 20'	DRAWN BY: ST	CHECKED BY: <i>WJ</i>
JOB NO. 1134-94-202	DATE: 6-15-94	FIGURE NO. 2



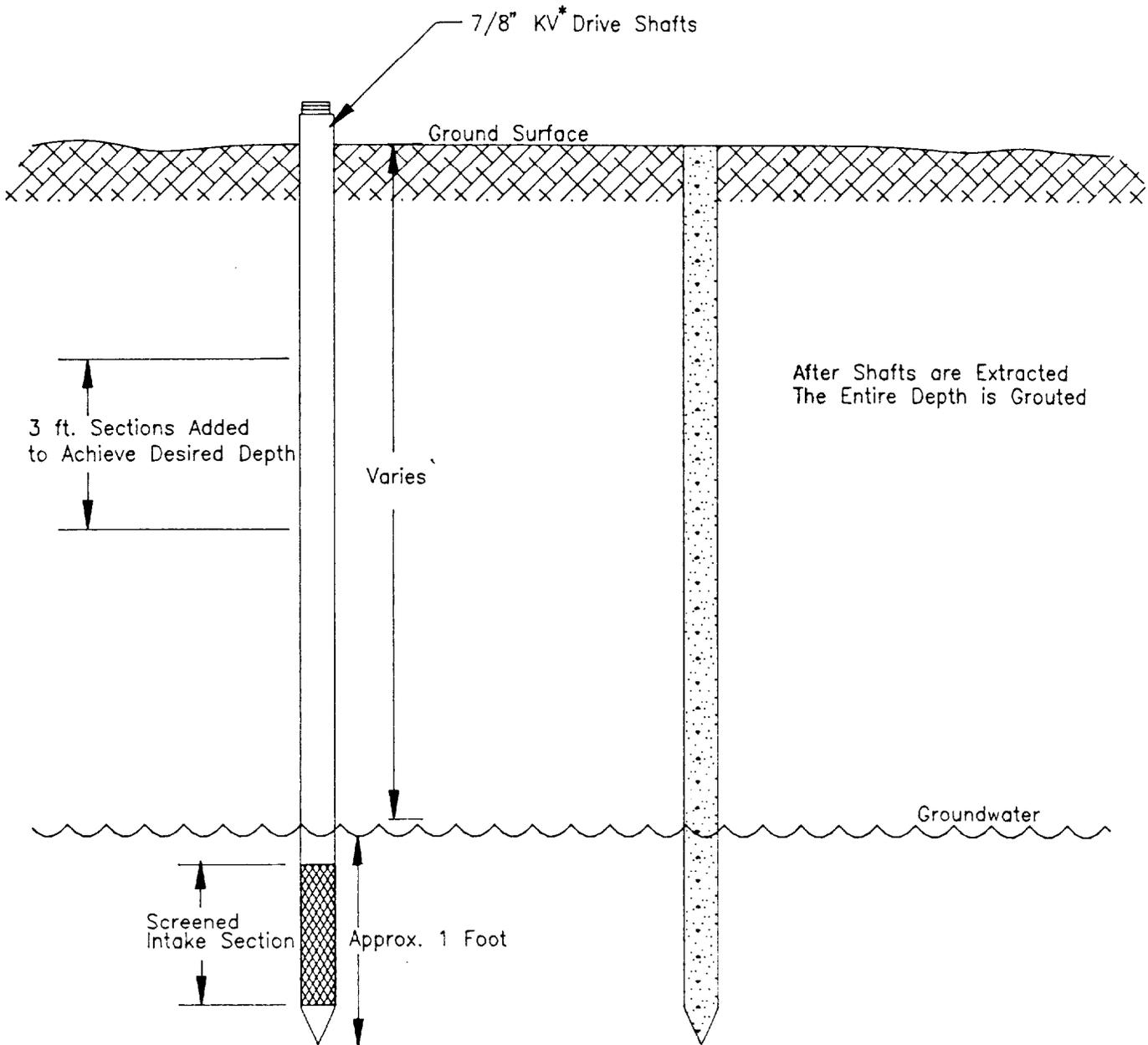
- LEGEND
-  Piezometer
 -  Soil Boring
 -  KV Sample
 -  Additional Sample
 -  Soil Sample



ENVIRONMENTAL SERVICES • ENGINEERING • TESTING

Sample Location Plan
MWR Dry Cleaners
Parris Island, South Carolina

SCALE: 1" = 20'	DRAWN BY: ST	CHECKED BY: <i>CLB</i>
JOB NO. 1134-94-202	DATE: 6-15-94	FIGURE NO. 3



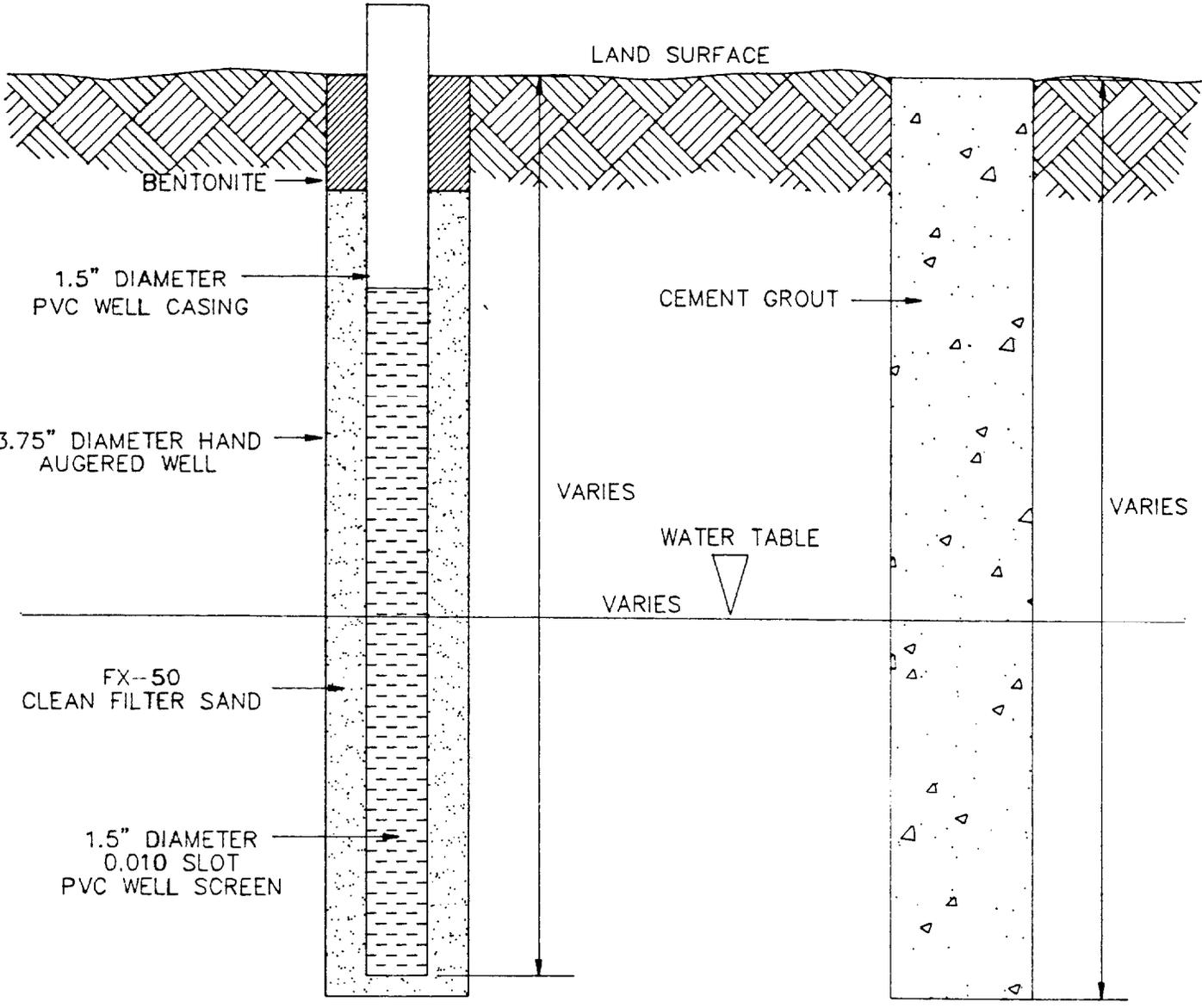
* Note: KV is Manufactured by K-V Associates, Inc.

SCALE:	No Scale
CHECKED BY:	<i>CWB</i>
DRAWN BY:	ST
DATE:	6-15-94



KV Installation Abandonment Detail MWR Cleaners Parris Island, South Carolina	JOB NO:	1134-94-202
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FIGURE NO	4
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CONSTRUCTION DETAILS

ABANDONMENT DETAILS

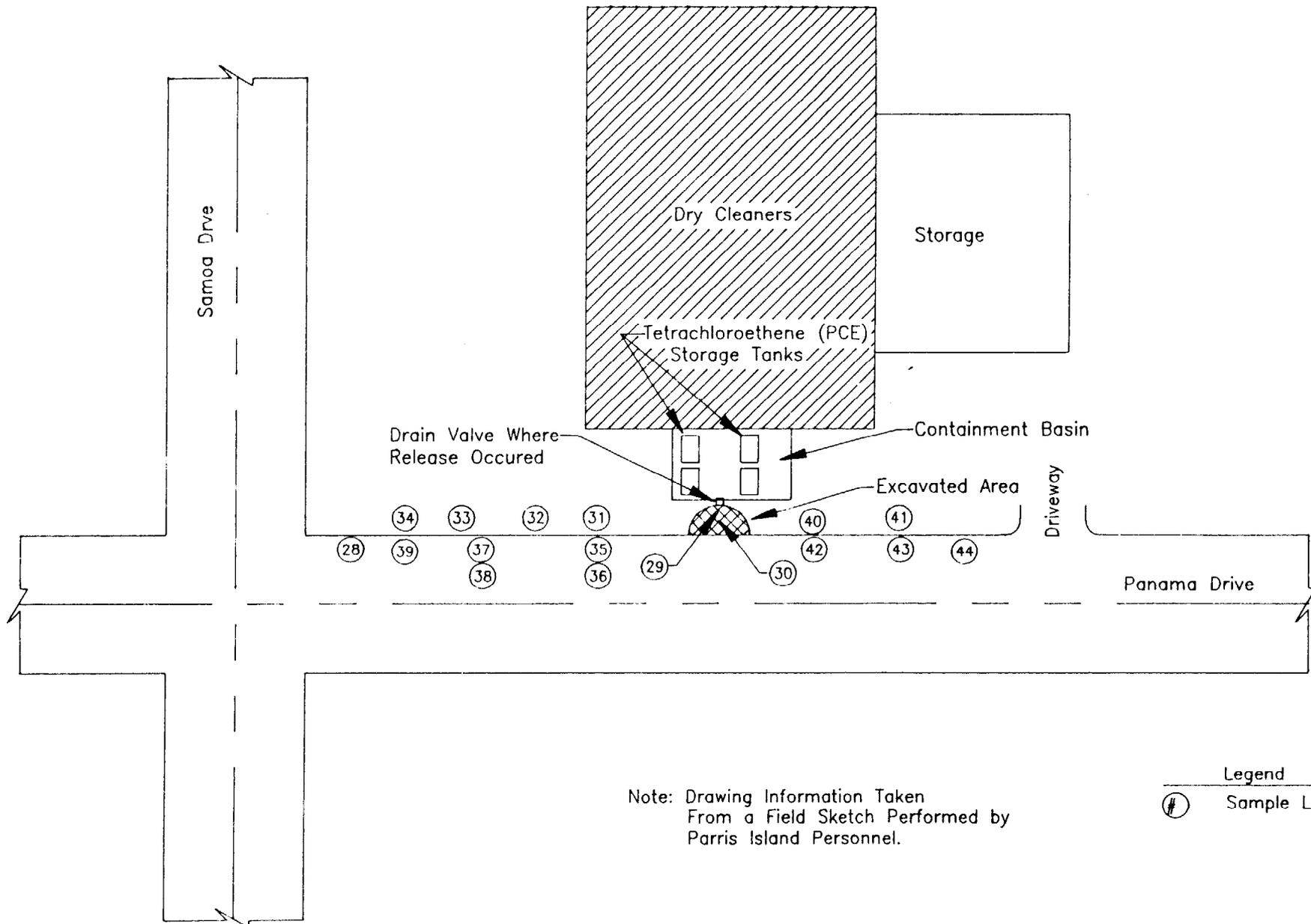
SCALE:	No Scale
CHECKED BY:	<i>cu</i>
DRAWN BY:	ST
DATE:	6-15-94

S&ME
ENVIRONMENTAL SERVICES • ENGINEERING • TESTING

Piezometer Construction Diagram
 MWR Dry Cleaners
 MCRD Parris Island
 Parris Island, South Carolina

JOB NO: 1134-94-202

FIGURE NO
 5



Note: Drawing Information Taken From a Field Sketch Performed by Parris Island Personnel.

Legend
 (28) Sample Location

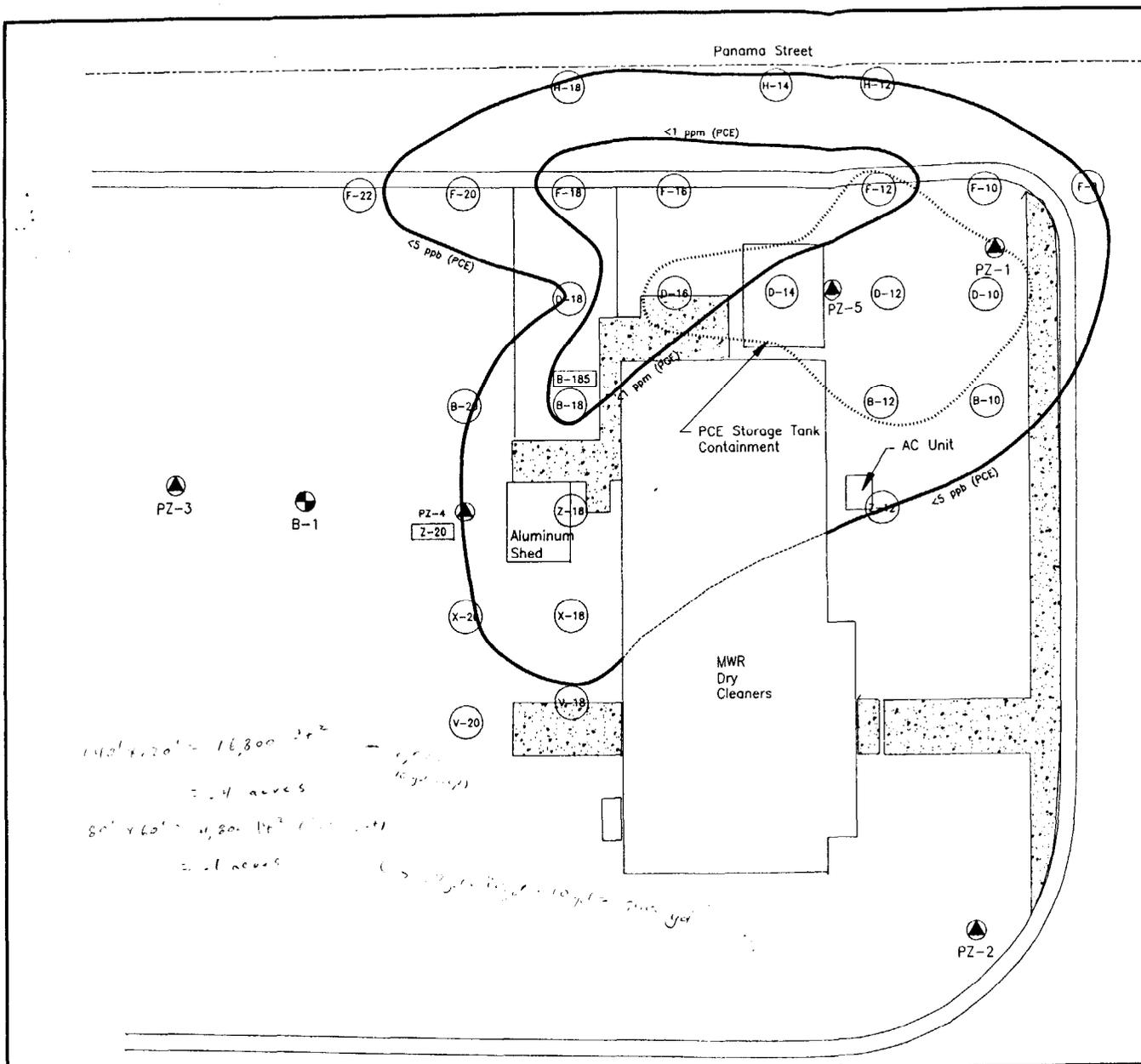
SCALE:	No Scale
CHECKED BY:	<i>CWB</i>
DRAWN BY:	ST
DATE:	6-15-94



Parris Island Sample Locations
 MWR Dry Cleaners
 MCRD Parris Island
 Parris Island, South Carolina

JOB NO. 1134-94-202

FIGURE NO.
 6



Legend

- KV Sample
- Additional Sample
- Boring
- Piezometer
- Piezometer
- Estimated Isoconcentration Contour (PCE)
- Estimated Location of Petroleum Solvents
- PCE Tetrachloroethylene
- ppb Parts Per Billion
- ppm Parts Per Million

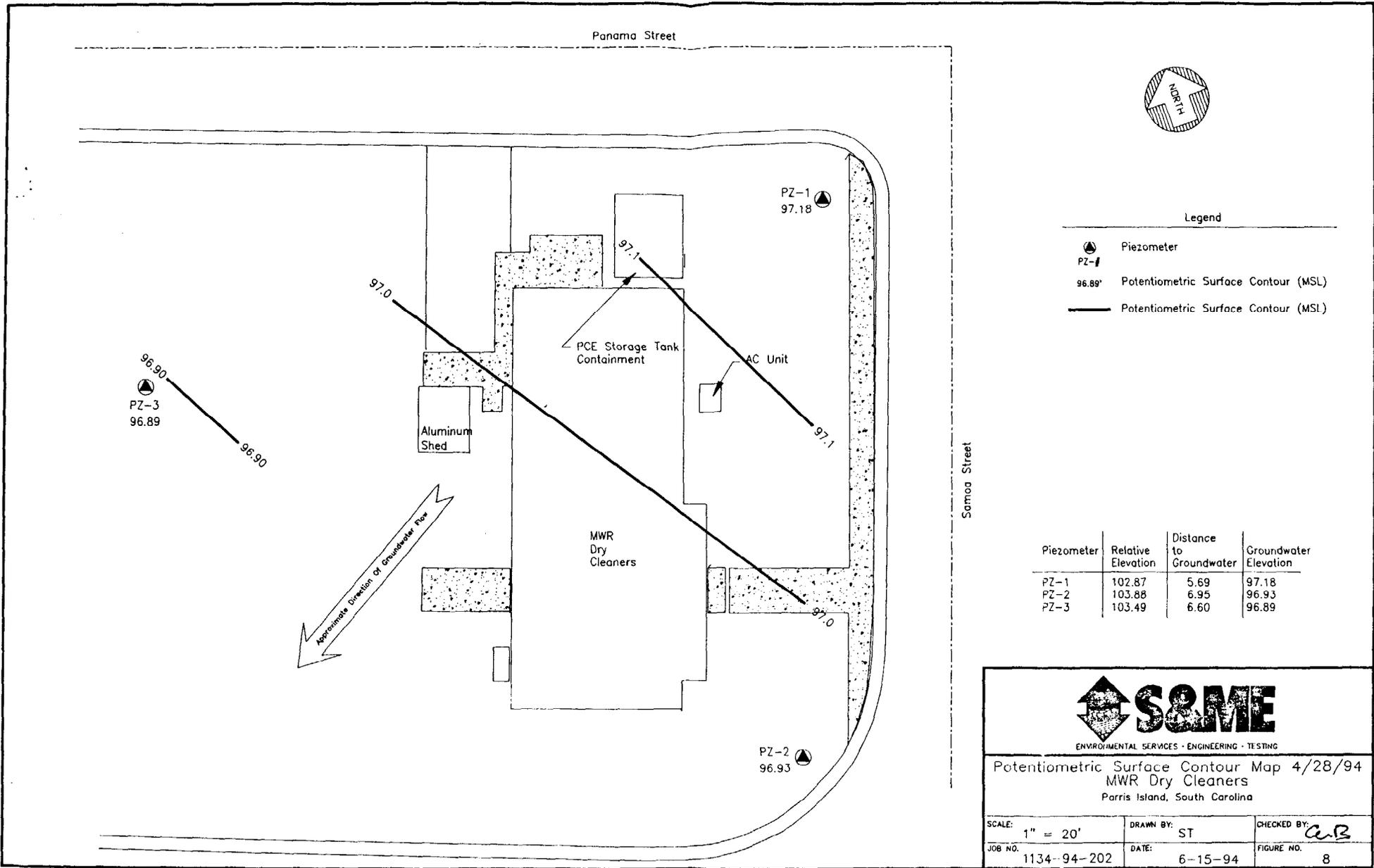
140' x 20' = 16,800 sq ft
 = 3.8 acres
 80' x 60' = 4,800 sq ft
 = 1.1 acres

Somoa Street



Groundwater Isoconcentration Plan
 GC Analysis
 MWR Dry Cleaners
 Parris Island, South Carolina

SCALE: 1" = 20'	DRAWN BY: ST	CHECKED BY: <i>CWB</i>
JOB NO. 1134-94-202	DATE: 6-14-94	FIGURE NO. 7



Legend

- Piezometer
- PZ-# Potentiometric Surface Contour (MSL)
- Potentiometric Surface Contour (MSL)

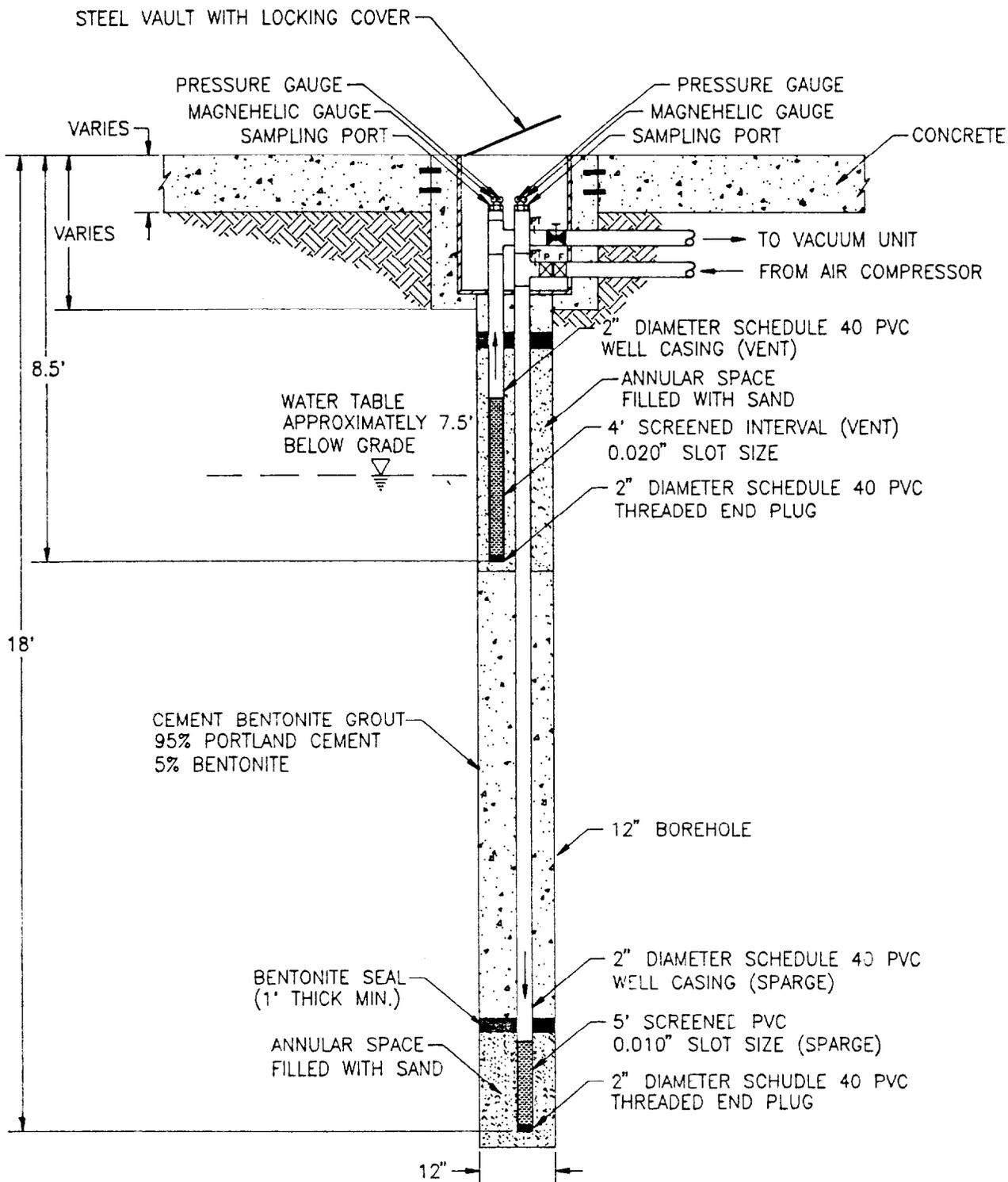
Piezometer	Relative Elevation	Distance to Groundwater	Groundwater Elevation
PZ-1	102.87	5.69	97.18
PZ-2	103.88	6.95	96.93
PZ-3	103.49	6.60	96.89



ENVIRONMENTAL SERVICES • ENGINEERING • TESTING

Potentiometric Surface Contour Map 4/28/94
 MWR Dry Cleaners
 Parris Island, South Carolina

SCALE: 1" = 20'	DRAWN BY: ST	CHECKED BY: <i>a.B.</i>
JOB NO. 1134-94-202	DATE: 6-15-94	FIGURE NO. 8



VAPOR EXTRACTION / AIR SPARGE WELL
TYPICAL CONSTRUCTION DETAILS
(BELOW-GRADE COMPLETION)

NOT TO SCALE

LEGEND

- PT | PITOT TUBE TO MEASURE AIR FLOW
- ⊗ | PRESSURE VALVE
- ⊘ | FLOW VALVE
- ⊠ | 2" BALL VALVE

SCALE:	No Scale
CHECKED BY:	<i>W.B.</i>
DRAWN BY:	
DATE:	6-14-94

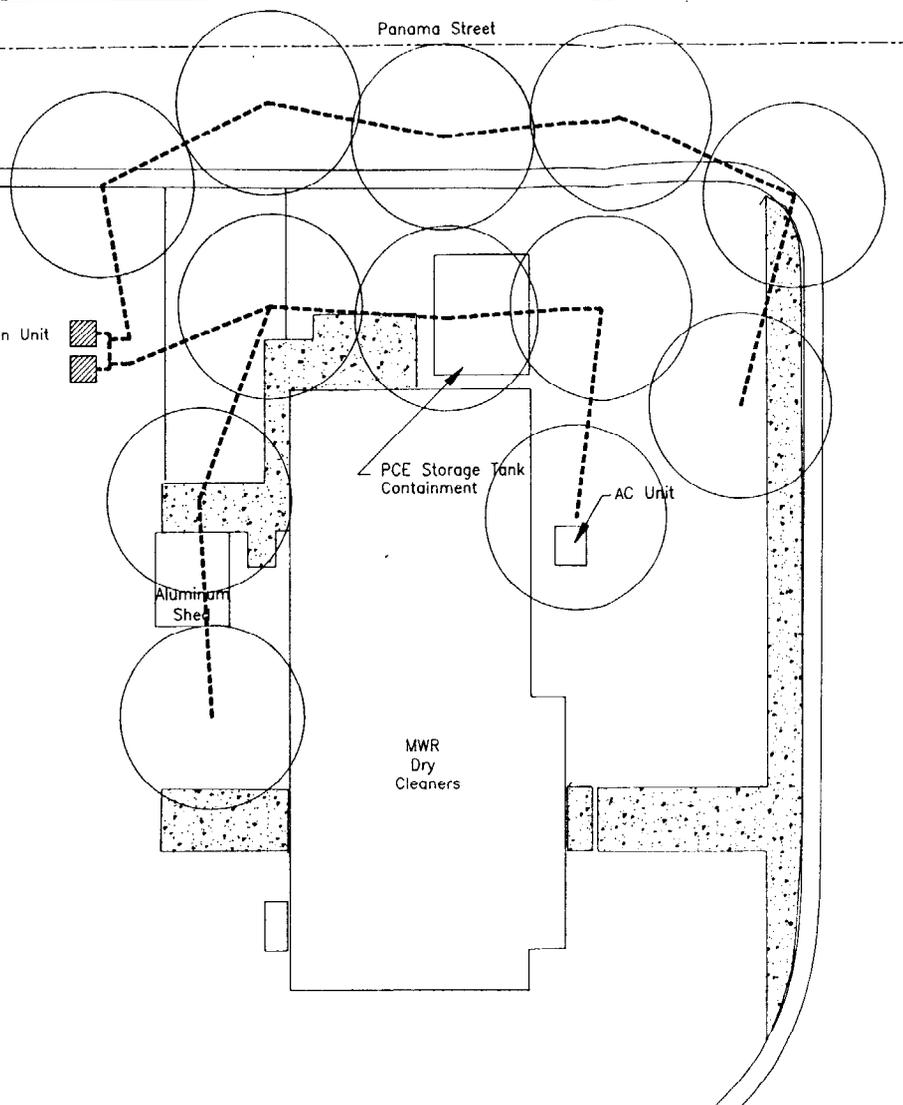
ENVIRONMENTAL SERVICES • ENGINEERING • TESTING

Vacuum Extraction/Sparge Well Conceptual Corrective Action Plan MWR Dry Cleaners Parris Island, South Carolina	FIGURE NO 9
JOB NO: 1134-94-202	

Panama Street



Vacuum Extraction Unit
Air Compressor



PCE Storage Tank Containment

AC Unit

Aluminum Shelf

MWR Dry Cleaners

Samoa Street

LEGEND



Estimated 15' Radius of Influence for AS/VE Point.



System Piping



ENVIRONMENTAL SERVICES • ENGINEERING • TESTING

Proposed AS/VE System Layout
MWR Dry Cleaners
Parris Island, South Carolina

SCALE: 1" = 20'	DRAWN BY: ST	CHECKED BY: <i>awb</i>
JOB NO. 1134-94-202	DATE: 6-15-94	FIGURE NO. 10

APPENDIX II
PERMITTING REQUEST/APPROVAL LETTERS



April 22, 1994

South Carolina Department of
Health and Environmental Control
149 Ribaut Square
Beaufort, South Carolina 29902

ATTENTION: Mr. James Peurifoy, G.I.T.

REFERENCE: TEMPORARY MONITORING WELL/HYDROPUNCH INSTALLATION
MWR Dry Cleaning Facility
MCRD Parris Island
Parris Island, South Carolina
S&ME, Inc. Job No. 1134-94-202

Dear Mr. Peurifoy:

S&ME, Inc. (S&ME), on behalf of the Morale, Welfare and Recreation (MWR) Department on the Marine Corps Recruit Depot (MCRD) Parris Island, requests permission to install piezometers, temporary monitoring wells, Hydropunch™ sample locations and KV™ sample locations at the MWR Dry Cleaning Facility on the MCRD, Parris Island. This request is submitted to enable S&ME to assess the suspected Tetrachloroethylene release at the subject site and presents the details of the sample collection procedures including the maximum number of samples anticipated to be collected, the details of the sampling procedure, the parameters to be analyzed and the abandonment procedures for the sample locations.

The subject site is the MWR Dry Cleaning Facility on the MCRD Parris Island. Figure 1 presents a site location plan of the facility and Figure 2 presents a site plan of the facility. S&ME intends to assess the site beginning on April 25, 1994 by collecting groundwater samples at the site and analyzing the samples on-site utilizing a portable Gas Chromatograph (GC). 25% of the samples would be split for analysis by a State certified laboratory to correlate with the on-site analyses. It is proposed that samples initially be collected in the area of the suspected release and extended radially outward until the

DATE 4/22/94
TYPED BY DT
MAILED BY FAXED BY: SC
HAND DELIVERED BY 4/26/94 TT, CB
AUTHOR/SENIOR AUTHOR SC1
(INITIALS)

FILE COPY

THIS DOCUMENT DOES NOT LEAVE FILE



extent of contamination has been defined. It is proposed that the groundwater samples initially be collected by use of the KV Rotary Hefty System™ (KV). This system will collect a groundwater sample from approximately six inches below the groundwater table. A one inch outside diameter hollow stem stainless steel shaft with a slotted intake screen point will be driven into the water table. The slotted point will be purged with nitrogen gas to free the screen of any obstructions. Polypropylene tubing will be connected to the slotted point and run the length of the KV shaft. On the ground surface, a valve assembly will connect the polypropylene to Norprene™ tubing. The Norprene™ tubing will be passed through a peristaltic pump. A sampling flask will be placed at the valve assembly to collect groundwater.

To minimize the potential for cross-contamination of collected samples, new sections of polypropylene tubing will be used for each KV location. All downhole and sampling equipment will be decontaminated between KV borings by steam cleaning and/or washing with a chemically neutral surfactant and triple rinsing with deionized water.

It is requested that a maximum of 50 KV sampling points be approved for installation. Upon completion of each KV sample point, it will be abandoned by filling the hole created with a neat cement grout.

To assess the vertical extent of contamination a maximum of 10 Hydropunch™ locations are requested for approval. The Hydropunch™ is a hollow cylindrical device which is hydraulically pushed into the ground by a drill rig. Upon reaching the desired depth, a groundwater sample is collected by slightly retrieving the Hydropunch which opens the collection port allowing the sample to be collected utilizing a peristaltic pump. The samples collected would be placed in sample containers provided by the laboratory and the hydropunch equipment would be decontaminated between each sample collected.

In addition to the request to install both KV™ and Hydropunch™ sample locations, S&ME requests permission to install a maximum of five temporary groundwater monitoring wells to gauge groundwater elevations and determine a general direction of groundwater flow.

The temporary wells would be installed by advancing a 3½-inch hand auger to a depth of approximately 3-feet below the groundwater table. A section of 2-inch diameter 10 slot (0.01 inches) well screen would be installed in the borehole and the annulus of the borehole would be filled with a filter sand (FX-50). Upon collecting the groundwater table elevation readings in the wells, the wells would be removed, the auger holes would be bored out and filled with a neat cement grout. Figure 3 provides a temporary well construction and abandonment detail.

All groundwater samples collected for laboratory analysis would be analyzed for Tetrachloroethylene by EPA Method 601. As previously stated, all of the samples collected would be analyzed on site utilizing a portable GC as a screening mechanism with 25% being analyzed by a State certified laboratory to confirm the limits of contamination. As Mr. Sonny Chestnut discussed with you on April 22, 1994, the MWR has requested that S&ME be prepared to initiate site work on the afternoon of April 25th; therefore, we request that you review this request and provide verbal approval if possible on that date. This is requested in an effort for the MWR to assess the site and provide your office with the results as soon as possible.

S&ME appreciates your consideration in this matter and looks forward to hearing from you on April 25th. Should you have any questions concerning our request, please don't hesitate to contact us.

Sincerely,

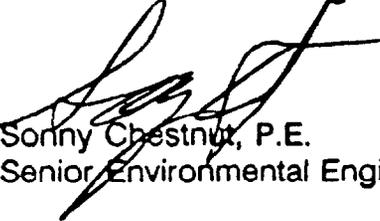
S&ME, Inc.



E. Todd Tumbleston
Senior Environmental Specialist

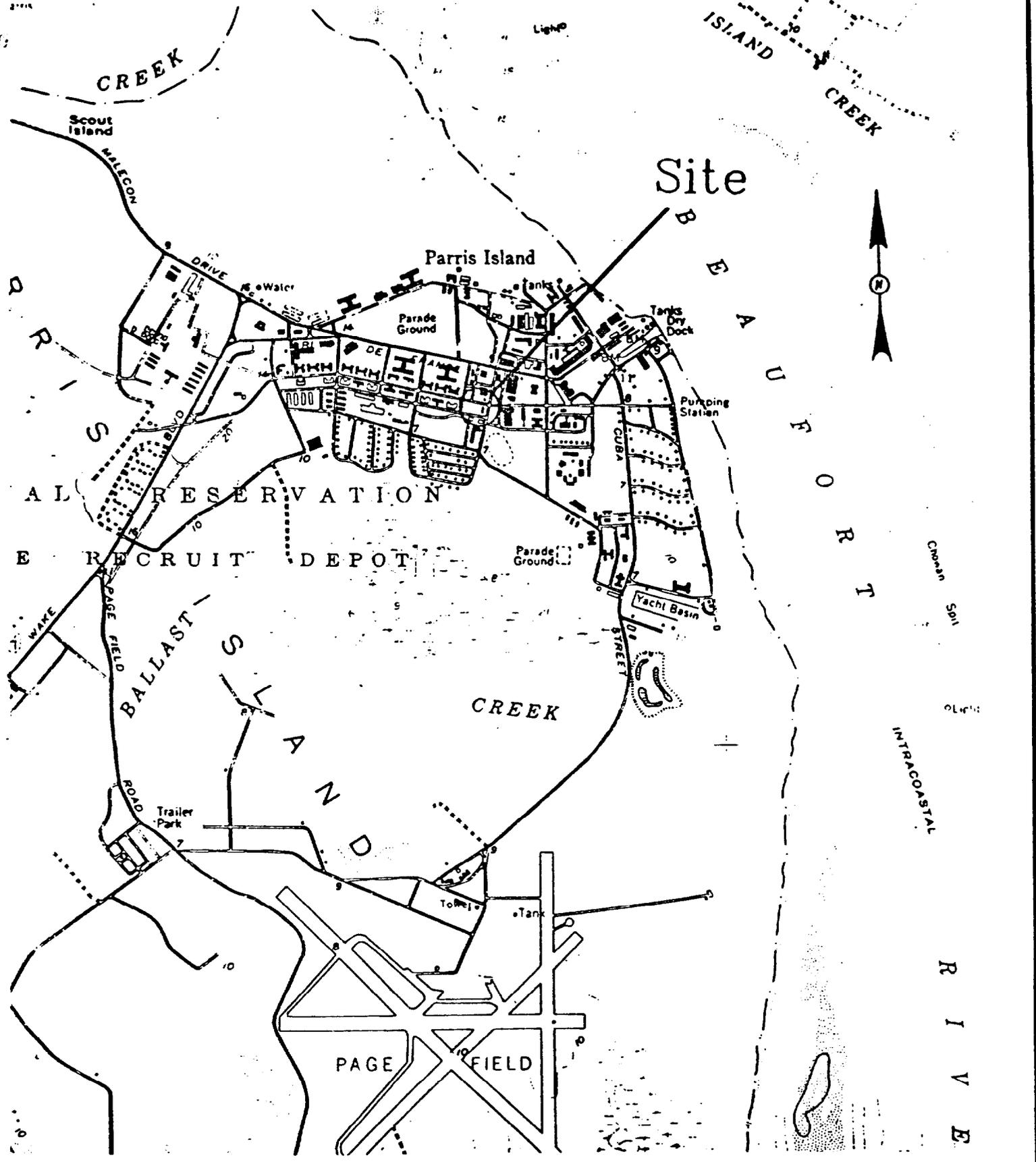


Chuck Black, E.I.T.
Staff Environmental Engineer



Sonny Chestnut, P.E.
Senior Environmental Engineer

TT/CB/SC/dt

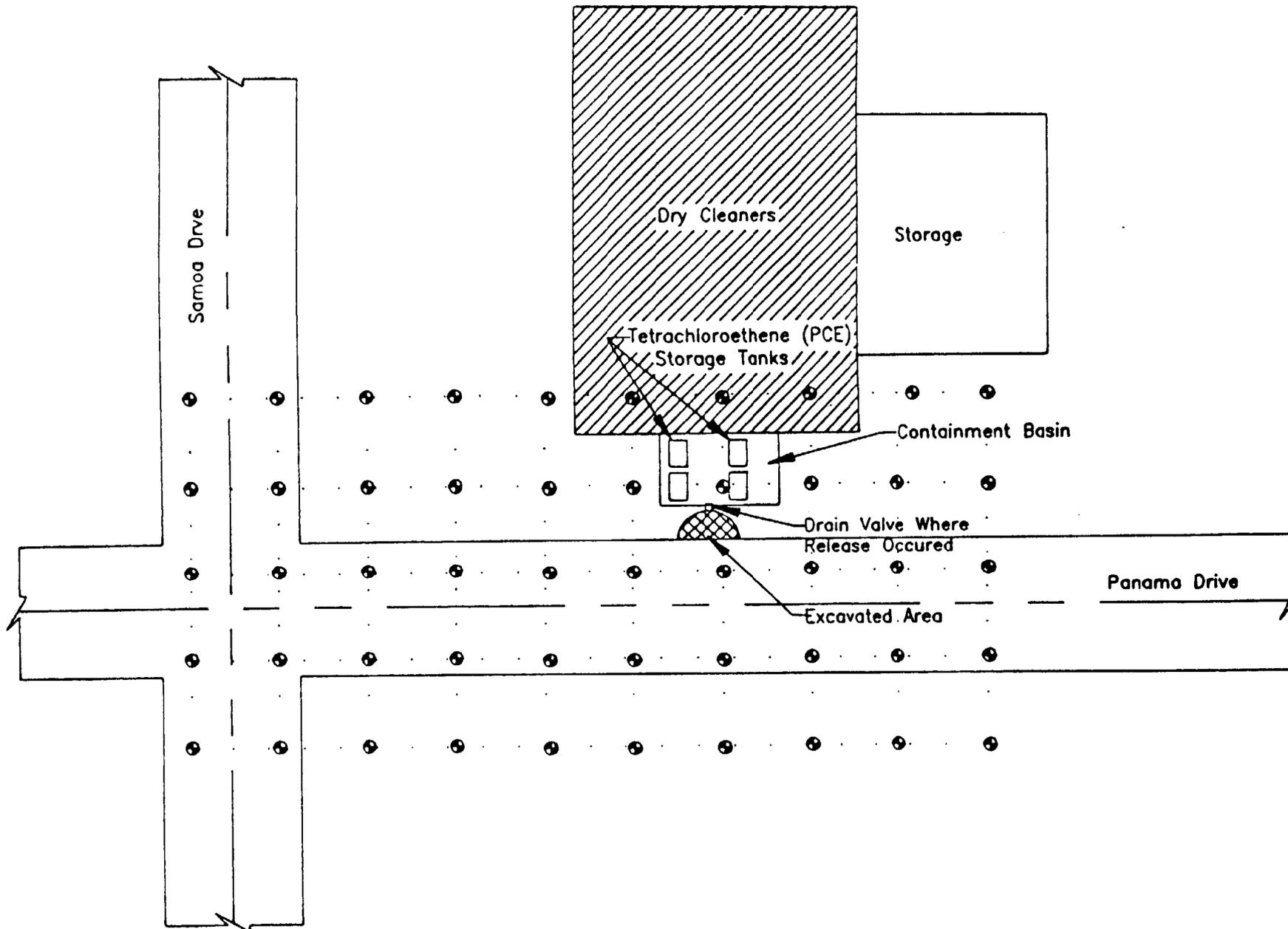


SCALE: 1" = 2000'
 CHECKED BY: *AE*
 DRAWN BY: N/A
 DATE: 4-22-94



Site Location Plan
 MWR Dry Cleaners
 MCRD Parris Island
 Parris Island, South Carolina
 JOB NO: 1134-94-202

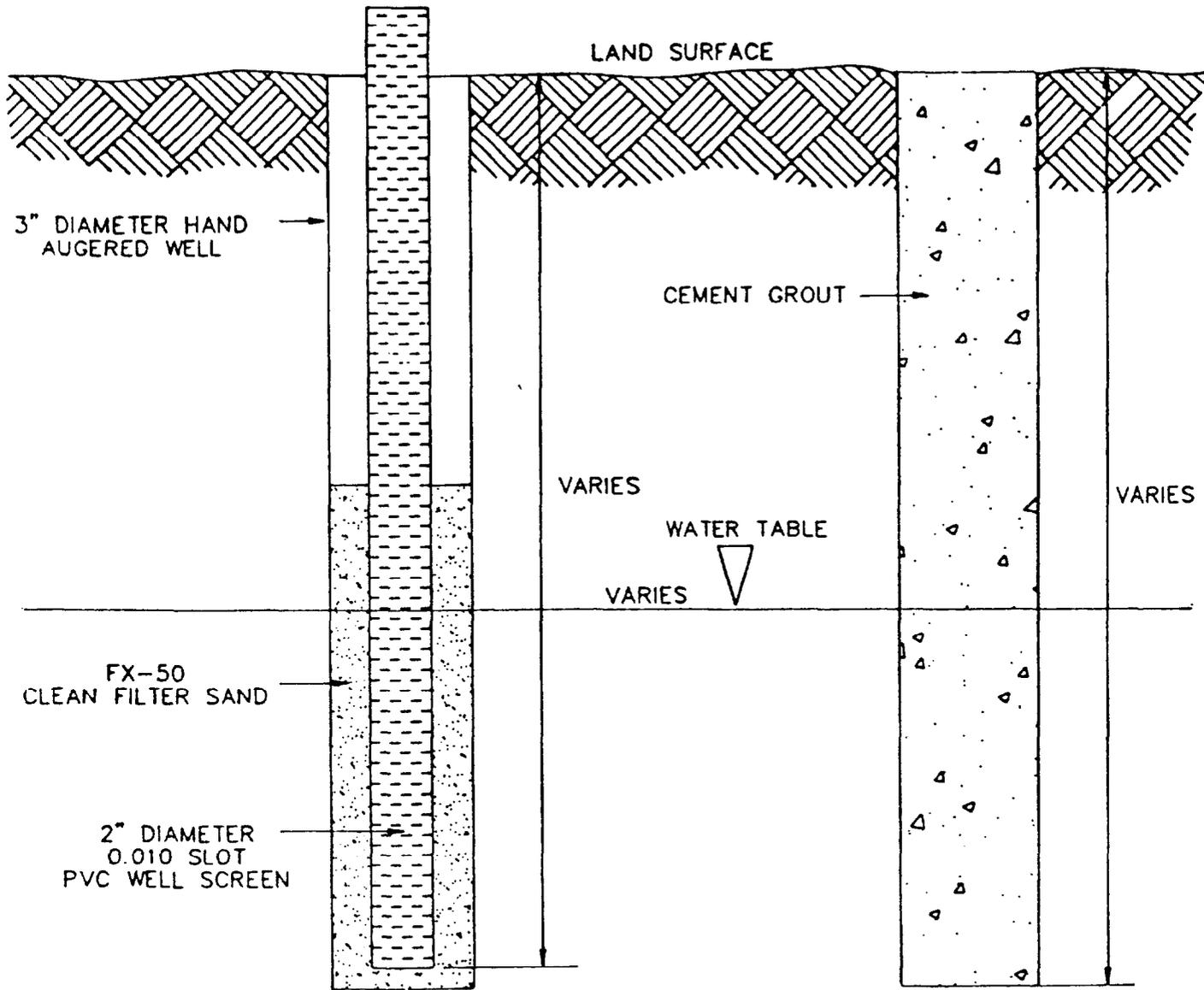
FIGURE NO
 1



SCALE:	No Scale
CHECKED BY:	<i>[Signature]</i>
DRAWN BY:	ST
DATE:	4-22-94



Site Plan MWR Dry Cleaners MCRD Parris Island Parris Island, South Carolina	FIGURE
JOB NO. 1134-94-202	



CONSTRUCTION DETAILS

ABANDONMENT DETAILS

SCALE: No Scale	<p>ENVIRONMENTAL SERVICES • ENGINEERING • TESTING</p>	Temporary Well Construction Diagram MWR Dry Cleaners MCRD Parris Island Parris Island, South Carolina	FIGURE NO
CHECKED BY: <i>ST</i>			3
DRAWN BY: ST			
DATE: 4-22-94				JOB NO: 1134-94-202

Monitoring Well Installation Approval Form

Date of Issue: May 5, 1994

Approval is hereby granted to: S&ME, Inc.
(on behalf of): MCRD, Parris Island

GWPD Site#: MWR Dry Cleaning Facility-Not Assigned
County: Beaufort

This approval is for the construction of a maximum of 50 groundwater monitoring points designated KV 1-50 (temporary ground water sampling points), HP 1-10 (vertical extent temporary groundwater sampling points) and MW 1-5 (temporary groundwater monitoring wells) in accordance with the construction plans and technical specifications submitted to the Department on April 22, 1994. The wells are to be constructed and abandoned in accordance with the submitted plan for the intended purpose of monitoring ground-water quality and/or water levels at the referenced facility. Approval is provided with the following conditions:

1. The latitude and longitude, surveyed elevations, boring and/or geologist logs and actual (as-built) construction details for each well be submitted to Jim Peurifoy of the Lowcountry District EQC office *within 30 days* of completion (of last well(s) installed).
2. Each well, not immediately abandoned after sampling, shall be labeled with an identification plate constructed of a durable material affixed to the casing or surface pad where it is readily visible. The plate shall provide monitoring well I.D.#, date of construction, static water level, and driller name and state certification #.
3. Well construction and sampling derived waste including, but not necessarily limited to, drill cuttings, drilling fluids, development and purge water should be managed properly and in compliance with applicable requirements. If containerized, each vessel should be clearly labeled with regard to contents, source, and date of activity.
4. A minimum of forty-eight (48) hours prior to initiation of drilling activities, provide notice to Jim Peurifoy of the Low Country District EQC office (803 522 9097).
5. Please provide ground-water quality data (chemical analysis and/or water level(s)), associated field measurements (i.e., in-situ field measurements) to Jim Peurifoy within thirty (30) days of receipt from laboratory.

6. Monitoring wells shall be installed by a well driller certified by the State of South Carolina.

This approval is pursuant to the provisions of Section 4-5540 of the 1976 South Carolina Code of Laws and the SC Department of Health and Environmental Control Regulations R.61-71.

Approved by: Jim A. Peurifoy, G.I.T.
District Hydrologist
Lowcountry District EQC
Bureau of District Services

cc Mr. Jim Hess, P.G., Manager
Assessment and Development Section

Mr. Russell Berry, Lowcountry EQC

APPENDIX III
BORING AND PIEZOMETER LOGS

TEST BORING RECORD

FIELD CLASSIFIED

ELEV	DEPTH	DESCRIPTION	PENETRATION - BLOWS PER FOOT																	
			0	10	20	40	60	80	100											
	3'	SM Loose, brown, fine silty sand		(9)																
	5'	SM Firm, tan-gray, fine silty		(8)	(15)															
	8'				(12)															
	10'	SP-SM Very loose, gray, fine sand		(2)																
	13'																			
	15'	CH Soft, gray clay		(4)																
	18'																			
	20'	CH-OH Soft, gray clay with organic matter		(4)																
	22'																			
	25'	CL Very soft gray sandy clay		(2)																
	27'																			
	30'	CH Firm, gray clay		(5)																
	33'																			
	35'	SM Dense, gray silty sand																		(76)
		Cont. on page 2																		

Penetration is number of blows of 140 lb. hammer falling 30 in. required to drive 2.0 in. O.D. sampler one foot.

BORING NO. B-1, Page 1 of 2

WHITAKER LABORATORY, INC.

JOB Multi-Service Center, Parris Island
 DATE 11/10/93

TEST BORING RECORD

FIELD CLASSIFIED

ELEV	DEPTH	DESCRIPTION	PENETRATION - BLOWS PER FOOT														
			0	10	20	40	60	80	100								
	1.5'	SP-SM Loose, brown fine sand		(8)													
	5'	SM Firm to loose, reddish tan to tan, fine silty sand		(10)													
	8'			(15)													
	10'	SM Very loose, gray, silty		(10)													
	12'			(2)													
	15'	SM-SC Very loose, gray, clayey		(2)													
	17'																
	20'	SM Loose, gray, silty		(5)													
	22'																
	25'	SM-SC Loose, gray, fine clayey		(6)													
		Boring Terminated															

Penetration is number of blows of 140 lb. hammer falling 30 in. required to drive 2.0 in. O.D. sampler one foot.

BORING NO. B-2

JOB Multi-Service Center, Parris Island
DATE 11/11/93

WHITAKER LABORATORY, INC.

TEST BORING RECORD

FIELD CLASSIFIED

ELEV.	DEPTH	DESCRIPTION	PENETRATION - BLOWS PER FOOT														
			0	10	20	40	60	80	100								
	1.5'	SP-SM Firm, brown fine sand			(11)												
		SM			(12)												
	5'	Firm to loose, reddish tan fine silty sand			(4)												
	8'				(5)												
	10'	SM Loose, light gray			(5)												
	12'																
	15'	SC Soft, gray, fine sand clay			(3)												
	17'																
	20'	CL Firm, gray, fine sandy clay			(5)												
	25'				(7)												
		Boring Terminated															

Penetration is number of blows of 140 lb. hammer falling 30 in. required to drive 2.0 in. O.D. sampler one foot.

BORING NO. B-3

JOB Multi-Service Center, Parris Island

WHITAKER LABORATORY, INC.

DATE 11/11/93

APPENDIX IV

SAMPLE LOG AND GC DATA SHEETS

INC.
DAILY SAMPLING LOG

Instructions	
Location:	KV Grid Number
Depth:	In Feet (Including Screen and Point)
GC/Lab:	X for Sample Destination
Amount Collected:	List container #'s & sizes
Odor:	V= Very Strong, S= Strong, M= Medium, L= Light, NO= no odor

Project Name: MNR-Cleaners		
Job Number: 113A-94-20Z	Date: 4/27/94	
Weather: Sunny / Warm		
Project Manager: CHUCK BLACK		
Chemist: TODD TUMBLESTON		
Operators: FRANK SLAUGHTER (C) TODD Tumbleston (C)		

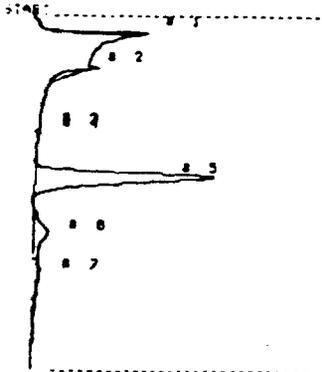
Location	Time Sampled	Depth	GC	Lab	Amount Collected	Odor	Comments	Coll. Init.	G.C. Init.
PZ-1	08:50	7'-3'	X		1-40ml	ND	1.5" Piezo Well	CB/-	PAH
PZ-2	09:05	7'-3'	X		1-40ml	Yes	1.5" Piezo Well	CB/-	PAH
PZ-3	09:20	7'-3'	X		1-40ml	I/D	1.5" Piezo Well	CB/-	PAH
F-12.4	10:52	4'	X		1-40ml	ND	KV Punch	FS/TT	PAH
F-12.8	11:30	8'	X		1-40ml	ND	KV Punch	FS/TT	PAH
D-12.4	12:10	4'	X		1-40ml	STRONG	KV Punch	FS-CB/TT	PAH
F-12.12	13:55	12'	X		1-40ml	YES	KV Punch / Silty	FS/TT	PAH
D-10.5	14:55	5'	X		1-40ml	YES	KV Punch / STRANGE ODOR	FS/TT	PAH
B-12.5	16:05	5'	X		1-40ml	YES	KV Punch / STRANGE ODOR	FS/TT	PAH
Z-12.5	16:55	5'	X		1-40ml	NO	KV Punch / STRANGE ODOR	FS/TT	PAH
B-10.5	17:50	5'	X		1-40ml	NO	KV Punch / No odor	FS/TT	PAH

General Comments: _____

Signature: _____

Page: 1 of 1

PHOTOVAC



STOP @ 550.0
SAMPLE LIBRARY 1 APR 27 1994 9:51
ANALYSIS # 5 63.5 PPB CALIBRA
INTERNAL TEMP 24 MWR CLEANERS
GAIN 200 50UL INJECTION

OFFSET 7.0 uV
CHART SPEED 0.5 cm/min
SLOPE SENS. 10 16 0 uV/Sec
WINDOW 1% 10 Percent
MINIMUM AREA 5 uVSec
TIMER DELAY 0.0 Sec
ANALYSIS TIME 550.0 Sec
CYCLE TIME 8 Min

Table with 4 columns: COMPOUND NAME, PEAK, R.T., AREA/PPM. Rows include UNKNOWN peaks at 1, 4, 5, 6, and 7 minutes.

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:
ON OFF
EVENT 1: 5.5 6.0 ANALYSIS TIME: 550.0 SEC.
EVENT 2: 0 0 CHART SPEED: 1.5 CC/MIN.
EVENT 3: 0 65.0 COLUMN TYPE: CPSIL-5
EVENT 4: 0 0 SOURCE TYPE: 10.6 EV
EVENT 5: 0 0 TYPE CALIBRANT: AQU. PREP.

*** SAMPLE ID Standard Cal MATRIX: Aqueous

Table with 3 columns: COMPOUND NAME, PPM, PPB. Row 1: TETRACHLOROETHENE (PCE) 63.5

PHOTOVAC

APR 27 1994 10:0

FIELD: 31
POWER: 38

Table with 3 columns: SAMPLE, 5.5, 6.0. Rows include CAL, EVENT 3, 4, 5, 6, 7, 8.

PHOTOVAC

SAMPLE LIBRARY 1 APR 27 1994 10:1
ANALYSIS # 5 63.5 PPB CALIBRA
INTERNAL TEMP 24 MWR CLEANERS
GAIN 200 50UL INJECTION

OFFSET 7.0 uV
CHART SPEED 0.5 cm/min
SLOPE SENS. 10 16 0 uV/Sec
WINDOW 1% 10 Percent
MINIMUM AREA 5 uVSec
TIMER DELAY 0.0 Sec
ANALYSIS TIME 550.0 Sec
CYCLE TIME 8 Min

Table with 4 columns: COMPOUND NAME, PEAK, R.T., AREA/PPM. Row 1: TETRACHLOROETHENE 63.50 PPB

SAMPLE TEMP: 25 (C) SAMPLE PH: N/A
SAMPLE CONDUCTIVITY: N/A (PPM)(M/MHOS) ODOR: NA
SAMPLE DESCRIPTION: PREPARED STANDARD
DATE SAMPLED: 4-26+27-94 DATE ANALYZED: 4-27-94

ANALYTICAL NOTES:

SAMPLE ANALYZED BY: [Signature]
Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID

PRE-BLANK/PZ-1

MATRIX: AQUEOUS

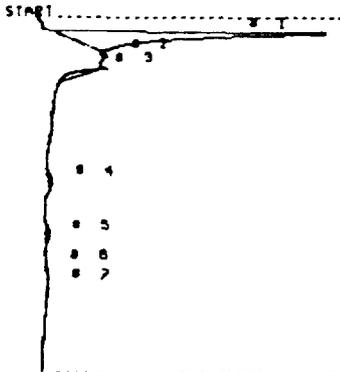
COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		19.60

SAMPLE TEMP: 25 (C) SAMPLE PH: NA
 SAMPLE CONDUCTIVITY: NA (PPM)(M/KHOS) COOR: None
 SAMPLE DESCRIPTION: Bero Collection
 DATE SAMPLED: 4/27/94 DATE ANALYZED: 4/27/94

ANALYTICAL NOTES:

SAMPLE ANALYZED BY:

[Signature]
 Senior Environmental Specialist

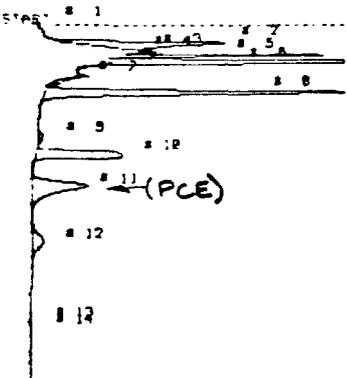


STOP # 550.0
 SAMPLE LIBRARY 1 APR 27 1994 10:12
 ANALYSIS # 0 POST CAL RUN
 INTERNAL TEMP 24 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 7.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 uV/Sec
 WINDOW +/- 10 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 550.0 Sec
 CYCLE TIME 0 min

COMPOUND NAME PEAK R.T. AREA/PPM

UNKNOWN	1	23.1	8.6 US
UNKNOWN	2	40.9	19.2 uS
TETRACHLOROETHENE	3	252.0	19.60 PPB
UNKNOWN	5	244.2	287.2 uS
UNKNOWN	7	412.0	35.4 uS



STOP # 550.0
 SAMPLE LIBRARY 1 APR 27 1994 10:22
 ANALYSIS # 2 PZED-1
 INTERNAL TEMP 24 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 7.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 uV/Sec
 WINDOW +/- 20 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 550.0 Sec
 CYCLE TIME 0 min

COMPOUND NAME PEAK R.T. AREA/PPM

UNKNOWN	1	11.5	11.4 uS
UNKNOWN	2	19.5	19.2 uS
UNKNOWN	3	40.9	19.2 uS
UNKNOWN	4	44.0	42.2 uS
UNKNOWN	5	43.2	1.1 uS
UNKNOWN	6	101.9	8.3 uS
UNKNOWN	7	171.2	8.5 uS
UNKNOWN	8	159.2	150.6 uS
UNKNOWN	10	207.8	3.1 uS
TETRACHLOROETHENE	11	252.0	19.60 PPB
UNKNOWN	12	343.8	222.9 uS
UNKNOWN	13	455.4	8.8 uS
UNKNOWN	14	478.4	6.1 uS

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202

PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>15</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID

BLANK/PZ-2

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		*4.177

SAMPLE TEMP: 25 (C) SAMPLE PH: NA

SAMPLE CONDUCTIVITY: NA (PPM)(M/MHOS) OOR: ND

SAMPLE DESCRIPTION: Handauger Piezo

DATE SAMPLED: 4/27/94 DATE ANALYZED: 4/27/94

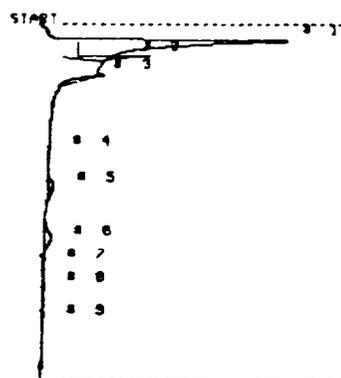
PCE is sticky in GC.

ANALYTICAL NOTES: * Subtract Blank from

Sample results
5.861 - 1.684 =

* Field Check - Sample Contains Slight Ddor.

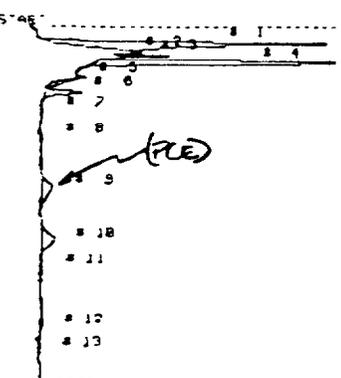
SAMPLE ANALYZED BY: [Signature]
Senior Environmental Specialist



STOP # 550.0
SAMPLE LIBRARY 1 APR 27 1994 10:10
ANALYSIS # 8 PZED-2 BLANK
INTERNAL TEMP 24 MWR CLEANERS
GAIN 200 100UL INJECTION

OFFSET 6.0 uV
CHART SPEED 8.5 uV/min
SLOPE SENS. 16 16 6 uV/Sec
WINDOW 28 Percent
MINIMUM AREA 5 uVSec
TIMER DELAY 8.0 Sec
ANALYSIS TIME 550.0 Sec
CYCLE TIME 8 Min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	25.1	5.2 UG
UNKNOWN	2	55.1	241.9 UG
TETRACHLOROETHEN	5	256.4	664 PPB
UNKNOWN	6	342.1	438.3 UG
UNKNOWN	8	412.4	21.7 UG
UNKNOWN	9	460.9	5.9 UG



STOP # 550.2
SAMPLE LIBRARY 1 APR 27 1994 10:54
ANALYSIS # 3 PZED-2
INTERNAL TEMP 24 MWR CLEANERS
GAIN 200 100UL INJECTION

OFFSET 6.0 uV
CHART SPEED 8.5 uV/min
SLOPE SENS. 16 16 6 uV/Sec
WINDOW 28 Percent
MINIMUM AREA 5 uVSec
TIMER DELAY 8.0 Sec
ANALYSIS TIME 550.0 Sec
CYCLE TIME 8 Min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	46.7	4.1 UG
UNKNOWN	1	47.7	12.9 UG
UNKNOWN	2	48.9	511.4 UG
UNKNOWN	4	32.9	2.2 UG
UNKNOWN	6	127.1	254.6 UG
UNKNOWN	7	132.0	11.2 UG
UNKNOWN	8	173.1	26.8 UG
TETRACHLOROETHEN	9	256.4	5.861 PPB
UNKNOWN	10	242.1	1.1 UG
UNKNOWN	11	287.1	32.0 UG
UNKNOWN	12	426.2	237.8 UG
UNKNOWN	13	512.0	22.9 UG

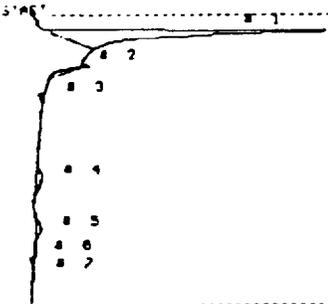
ANALYSIS INFORMATION SHEET: PROTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>



STOP # 150.0
 SAMPLE LIBRARY 1 APR 27 1994 11:2
 ANALYSIS # 10 PRE-ANALYSIS BLK
 INTERNAL TEMP 24 MWR CLEANERS
 INJIN 200 100UL INJECTION

OFFSET 7.0 µV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 µV/Sec
 WINDOW 1 Percent
 MINIMUM AREA 5 µVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 150.0 Sec
 CYCLE TIME 0 min

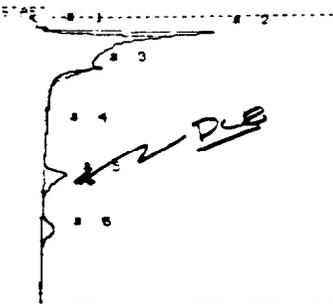
COMPOUND NAME	PEAK	RT.	AREA/PPM
UNKNOWN	1	26.7	8.6 µS
UNKNOWN	2	101.6	21.3 µS
TETRAHYDROETHEN	4	159.2	2.549 PPB
UNKNOWN	5	241.2	228.5 µS
UNKNOWN	6	380.2	13.3 µS
UNKNOWN	7	485.0	44.8 µS

*** SAMPLE ID

BLANK/PZ-3

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
<u>TETRACHLOROETHENE (PCE)</u>		<u>5.426</u>



STOP # 450.0
 SAMPLE LIBRARY 1 APR 27 1994 11:10
 ANALYSIS # 11 PZ20-3
 INTERNAL TEMP 24 MWR CLEANERS
 INJIN 200 100UL INJECTION

OFFSET 6.0 µV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 µV/Sec
 WINDOW 1 Percent
 MINIMUM AREA 5 µVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 450.0 Sec
 CYCLE TIME 0 min

COMPOUND NAME	PEAK	RT.	AREA/PPM
UNKNOWN	1	22.3	52.6 µS
UNKNOWN	2	22.4	1.2 µS
UNKNOWN	3	126.2	6.9 µS
TETRAHYDROETHEN	5	241.2	8.994 PPB
UNKNOWN	6	341.2	657.3 µS

SAMPLE TEMP: 250 (°C) SAMPLE PH: NA

SAMPLE CONDUCTIVITY: NA (PPM)(M/MHOS) COND: _____

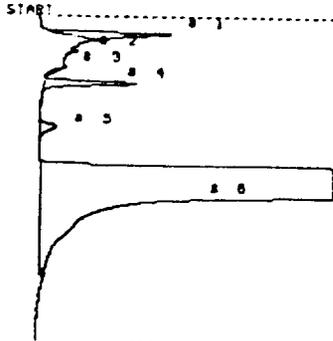
SAMPLE DESCRIPTION: Hudanger Piezo Well

DATE SAMPLED: 4/27/94 DATE ANALYZED: 4/27/94

ANALYTICAL NOTES: Subtract Blank from Sample -

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

PHOTOVAC



FILE # 80212
 SAMPLE LIBRARY : APR 27 1994 11:30
 ANALYSIS # 13 KV F-12347
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 102 100UL INJECTION

OFFSET 6.0 µV
 CHART SPEED 2.5 cm/min
 SLOPE SENS. 16 16 6 µV/Sec
 WINDOW 17- 20 Percent
 MINIMUM AREA 5 µVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 500.0 Sec
 CYCLE TIME 8 Min

COMPOUND NAME	PEAK	RT	AREA	PERCENT
UNKNOWN	1	5.5	21.9	100
UNKNOWN	1	5.5	21.9	100
UNKNOWN	1	5.5	21.9	100
UNKNOWN	1	5.5	21.9	100
TETRACHLOROETHEN	1	5.5	21.9	100

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID



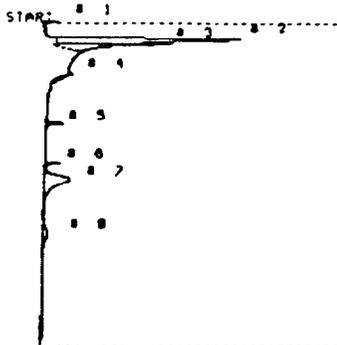
MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
<u>TETRACHLOROETHENE (PCE)</u>	<u>5.147</u>	

SAMPLE TEMP: 25 (C) SAMPLE PH: NA
 SAMPLE CONDUCTIVITY: NA (PPM)(M/MHOS) ODOR: Yes
 SAMPLE DESCRIPTION: KV Extracted @ 4'
 DATE SAMPLED: 4/27/94 DATE ANALYZED: 4/27/94

ANALYTICAL NOTES: Medium Odor-

SAMPLE ANALYZED BY: [Signature]
Senior Environmental Specialist



STOP # 500.2
 SAMPLE LIBRARY 1 APR 27 1994 12:17
 ANALYSIS # 17 BACKGROUND AIR
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 100 100UL INJECTION

COMPOUND NAME	PEAK	RT	AREA
UNKNOWN	1	4.5	25.0
UNKNOWN	2	5.5	25.0
UNKNOWN	3	6.0	25.0
UNKNOWN	4	6.5	25.0
TETRACHLOROETHEN	5	7.0	25.0
TETRACHLOROETHEN	6	7.0	25.0
UNKNOWN	7	7.0	25.0

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE #: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

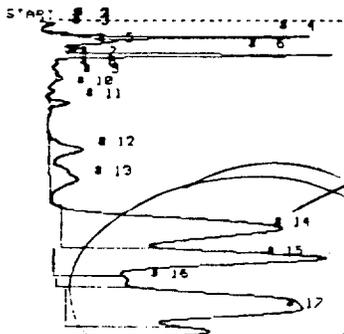
	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID



MATRIX: Aqueous

PHOTOVAC



STOP # 124.2
 SAMPLE LIBRARY 1 APR 27 1994 12:22
 ANALYSIS # 18 K-12441T
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 50 100UL INJECTION

OFFSET 5.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 10 10 6 uV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 5 uV/Sec
 TIMER DELAY 0.8 Sec
 ANALYSIS TIME 500.0 Sec
 CYCLE TIME 8 min

COMPOUND NAME	PEAK	RT	AREA
UNKNOWN	1	8.7	47.0
UNKNOWN	2	12.7	14.2
UNKNOWN	3	13.0	16.6
UNKNOWN	4	16.7	20.0
UNKNOWN	5	17.0	102.0
UNKNOWN	6	17.7	3.2
UNKNOWN	7	18.0	19.0
UNKNOWN	8	14.7	56.6
UNKNOWN	9	20.7	106.6
UNKNOWN	10	116.5	37.2
UNKNOWN	11	125.2	507.4
UNKNOWN	12	126.6	0.1
TETRACHLOROETHEN	13	133.6	69.21
UNKNOWN	14	133.7	20.2
UNKNOWN	15	133.2	22.0
UNKNOWN	16	133.6	10.9
UNKNOWN	17	145.6	14.4

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		43.73
"UNKNOWN COMPOUNDS"		

SAMPLE TEMP: 25 (C) SAMPLE PH: NA
 SAMPLE CONDUCTIVITY: NA (PPM)(M/MHOS) OOR: STRONG
 SAMPLE DESCRIPTION: KV Collection 40ml UOA
 DATE SAMPLED: 4/27/94 DATE ANALYZED: 4/29/94

Subtract Blank PCE
* Strong odor - other heavier compounds present

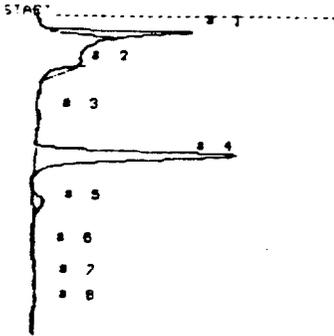
ANALYTICAL NOTES: SEEEN ON SAMPLE *

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

JOB NAME: MWR CLEANERS JOB #: 1134-94-202

PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

PHOTOVAC



STOP # 520.0
 SAMPLE LIBRARY 1 APR 27 1994 13:52
 ANALYSIS # 20 RE-CAL FLOW ADJ.
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 7.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 uV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 500.0 Sec
 CYCLE TIME 0 Min

COMPOUND NAME	PEAK #	RET. TIME
UNKNOWN	1	1.061 1.012 1.5
UNKNOWN	2	1.571 1.543 1.5
TETRACHLOROETHENE	4	1.552 63.50 PPB
UNKNOWN	5	1.929 26.11 1.5
UNKNOWN	7	1.116 1.218 1.5
UNKNOWN	8	1.552 1.012 1.5

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF
EVENT 1:	<u>5.5</u>	<u>6.0</u>
EVENT 2:	<u>0</u>	<u>0</u>
EVENT 3:	<u>0</u>	<u>65.0</u>
EVENT 4:	<u>0</u>	<u>0</u>
EVENT 5:	<u>0</u>	<u>0</u>

ANALYSIS TIME: 550.0 SEC.

CHART SPEED: 1.5 CC/MIN.

COLUMN TYPE: CPSIL-5

SOURCE TYPE: 10.6 EV

TYPE CALIBRANT: AQU. PREP.

*** SAMPLE ID

RE-CALIBRATE

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		63.50

SAMPLE TEMP: 250 (C) SAMPLE PH: /

SAMPLE CONDUCTIVITY: / (PPM)(M/MHOS) OOR: /

SAMPLE DESCRIPTION: Standard Prepared

DATE SAMPLED: 4/27/94 DATE ANALYZED: 4/27/94

ANALYTICAL NOTES: Adjust flow 2-cc increase

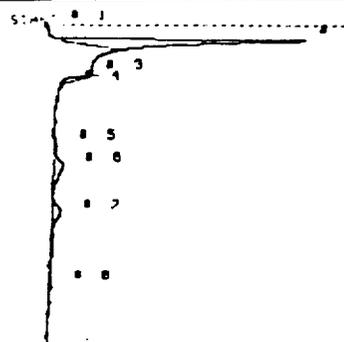
SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>



STOP # 500.0
 SAMPLE LIBRARY 1 APR 27 1994 14:3
 ANALYSIS # 21 RE-CAL FLOW ADJ.
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 2.0 µV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 0 µV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 5 µVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 520.0 Sec
 CYCLE TIME 0 Min

COMPOUND NAME	PEAK	RT	AREA/HT
UNKNOWN	1	5.5	4.0 µE
UNKNOWN	4	8.7	2.3 µE
TETRACHLOROETHENE	5	18.5	13.92 µE
TETRACHLOROETHENE	6	20.4	2.0 µE
UNKNOWN	7	23.9	2.0 µE
UNKNOWN	8	42.0	12.1 µE

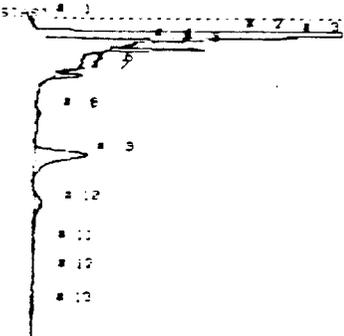
*** SAMPLE ID

BLANK / F12012A

MATRIX: AQUOUS

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		13.92

PHOTOVAC



STOP # 520.0
 SAMPLE LIBRARY 1 APR 27 1994 14:23
 ANALYSIS # 22 KU F-12012FT
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 2.0 µV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 0 µV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 5 µVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 522.0 Sec
 CYCLE TIME 0 Min

COMPOUND NAME	PEAK	RT	AREA/HT
UNKNOWN	1	5.5	16.1 µE
UNKNOWN	2	8.7	12.1 µE
UNKNOWN	3	20.4	27.1 µE
UNKNOWN	4	23.9	12.1 µE
UNKNOWN	5	24.0	12.1 µE
UNKNOWN	6	28.0	12.1 µE
TETRACHLOROETHENE	7	18.5	18.54 µE
UNKNOWN	8	23.9	12.1 µE
UNKNOWN	9	24.0	12.1 µE
UNKNOWN	10	28.0	12.1 µE
UNKNOWN	11	42.0	12.1 µE

SAMPLE TEMP: 25 °C SAMPLE PH: Na
 SAMPLE CONDUCTIVITY: Na (PPM)(M/MHOS) COOR: ND
 SAMPLE DESCRIPTION: KV Collection / 40 ml WOA
 DATE SAMPLED: 4/27/94 DATE ANALYZED: 4/27/94

ANALYTICAL NOTES: - Subtract blank results from sample total -

SAMPLE ANALYZED BY: Justina [Signature]
 Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

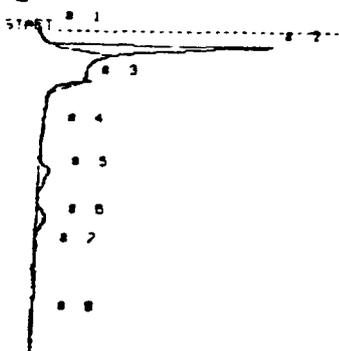
*** SAMPLE ID: D-10@5ft MATRIX: Aqueous

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		1.278
* Very high Concentration * of Heavy Compounds - Strong Kerosene type odor		

SAMPLE TEMP: 25 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) OODR:
 SAMPLE DESCRIPTION: KV Collection
 DATE SAMPLED: 4/27/94 DATE ANALYZED: 4/27/94

ANALYTICAL NOTES: Substandard blank amount.

SAMPLE ANALYZED BY: *Just as real*
 Senior Environmental Specialist



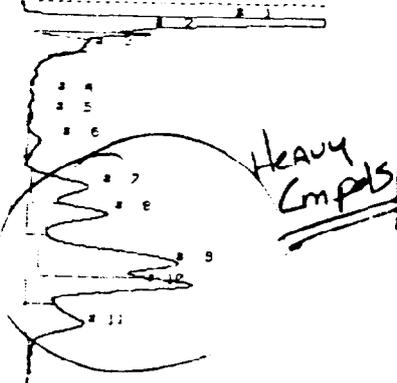
STOP # 500.0
 SAMPLE LIBRARY: APR 27 1994 14:36
 ANALYSIS # 23 BKGRND ATR BLANK
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 2.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 uV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 500.0 Sec
 CYCLE TIME 0 min

DETECTED PEAKS

RETENTION TIME	PEAK	R.T.	AREA
UNKNOWN	1	26.1	27.1 uS
UNKNOWN	2	51.2	2.1 uS
UNKNOWN	4	154.4	6.2 uS
UNKNOWN	5	195.2	0.126 PPB
UNKNOWN	6	205.6	0.124 PPB

PHOTOVAC



STOP # 400.0
 SAMPLE LIBRARY: APR 27 1994 15:1
 ANALYSIS # 24 KV D-10@5FT
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 6.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 uV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 400.2 Sec
 CYCLE TIME 0 min

DETECTED PEAKS

RETENTION TIME	PEAK	R.T.	AREA
UNKNOWN	1	26.1	27.1 uS
UNKNOWN	2	51.2	2.1 uS
UNKNOWN	4	154.4	6.2 uS
TETRACHLOROETHEN	5	195.2	0.126 PPB
TETRACHLOROETHEN	6	205.6	0.124 PPB
UNKNOWN	7	234.3	5.2 uS
UNKNOWN	9	302.5	2.3 uS
UNKNOWN	9	313.7	12.3 uS
UNKNOWN	10	447.1	10.3 uS
UNKNOWN	11	510.7	2.0 uS

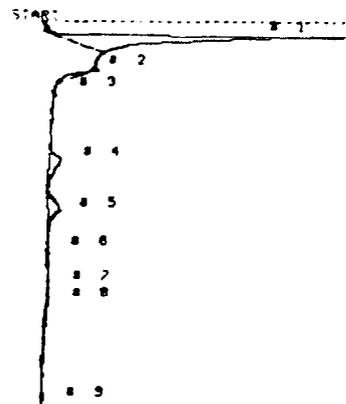
ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>



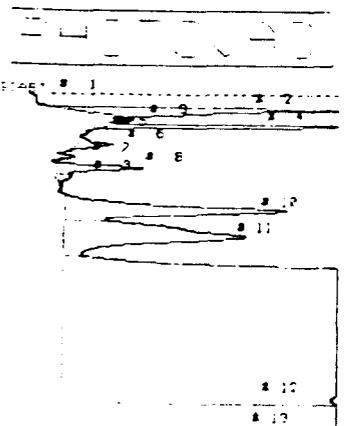
STEP # 4001
 SAMPLE LIBRARY 1 APR 27 1994 15:14
 ANALYSIS # 25 BKGRND AIR BLANK
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION

DETECTED NAME: HEX. 9.1. AREA: 111

UNKNOWN	1	25.7	6.8	1.0
TETRACHLOROETHENE	2	415.6	5.242	PPB
UNKNOWN	3	200.2	263.2	#1
UNKNOWN	6	300.1	15.1	#1
UNKNOWN	7	418.7	66.7	#1
UNKNOWN	8	442.5	15.2	#1

*** SAMPLE ID: B-12 @ 5' MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		94.248
: High levels of Unknown Compounds:		



STEP # 4003
 SAMPLE LIBRARY 1 APR 27 1994 15:45
 ANALYSIS # 26 KV P-12&5FT.
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION

DETECTED NAME: HEX. 9.1. AREA: 111

UNKNOWN	1	25.7	6.8	1.0
UNKNOWN	2	415.6	5.242	PPB
UNKNOWN	3	200.2	263.2	#1
UNKNOWN	4	300.1	15.1	#1
UNKNOWN	5	418.7	66.7	#1
UNKNOWN	6	442.5	15.2	#1
UNKNOWN	7	105.6	171.7	#1
UNKNOWN	8	113.5	15.2	#1
UNKNOWN	9	124.8	47.7	#1
UNKNOWN	10	184.7	11.7	#1
TETRACHLOROETHENE	11	274.1	93.45	PPB
UNKNOWN	12	320.2	15.2	#1

SAMPLE TEMP: 25 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODOR: Yes
 SAMPLE DESCRIPTION: KV Collection 40ML UDA
 DATE SAMPLED: 4/27/94 DATE ANALYZED: 4/27/94

ANALYTICAL NOTES: KV - STRANGE ODOR -

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PROTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

ON	OFF	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 1: <u>5.5</u>	<u>6.0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 2: <u>0</u>	<u>0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 3: <u>0</u>	<u>65.0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 4: <u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>
EVENT 5: <u>0</u>	<u>0</u>	

*** SAMPLE ID

7-12.5

MATRIX: Aqueous

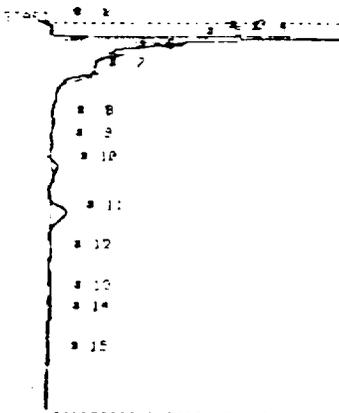
COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PUE)		2A

SAMPLE TEMP: 25 (°C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODOR: No
 SAMPLE DESCRIPTION: KV Collection
 DATE SAMPLED: 4/27/94 DATE ANALYZED: 4/27/94

ANALYTICAL NOTES:

SAMPLE ANALYZED BY:

Just [Signature]
 Senior Environmental Specialist



STOP # 020.0
 SAMPLE LIBRARY: APR 22 1994 12:3
 ANALYSIS # 22 KU 7-125FT
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 282 LABUL INJECTION

IDENTIFIED NAME (I.D.) (P.P.M.) (P.P.B.)

UNKNOWN	1	5.5	20.0	PPB
UNKNOWN	2	11.0	1.8	PPB
UNKNOWN	3	26.5	0.5	PPB
UNKNOWN	4	35.0	0.1	PPB
UNKNOWN	5	55.0	0.0	PPB
UNKNOWN	6	55.0	0.0	PPB
UNKNOWN	7	105.0	0.0	PPB
TETRACHLOROETHEN	8	150.0	0.0	PPB
TETRACHLOROETHEN	9	150.0	0.0	PPB
UNKNOWN	10	200.0	0.0	PPB
UNKNOWN	11	200.0	0.0	PPB
UNKNOWN	12	300.0	0.0	PPB
UNKNOWN	13	300.0	0.0	PPB
UNKNOWN	14	300.0	0.0	PPB
UNKNOWN	15	300.0	0.0	PPB

INC.
DAILY SAMPLING LOG

Instructions	
Location:	KV Grid Number
Depth:	In Feet (Including Screen and Point)
GC/Lab:	X for Sample Destination
Amount Collected:	List container #'s & sizes
Odor:	V= Very Strong, S= Strong, M= Medium, L= Light, NO= no odor

Project Name: MWR CLEANERS	
Job Number: 1134-94-202	Date: 4/28/94
Weather: Sunny/Warm	
Project Manager: Chuck Black	
Chemist: Jodd Shuckleston	
Operators: Frank Slaughter Todd Tumbleston	

Location	Time Sampled	Depth	GC	Lab	Amount Collected	Odor	Comments	Coll. Init.	G.C. Init.
F-8.5	10:15	5'	X		1-40ml VOA	NO	KV/Punch Silty/No odor	FS/TT	JA
H-12.5	12:00	5'	X	X	(1-40)(2-40/1KU)	NO	KV/Punch Very Silty	FS/TT	JA
H-14.5	13:00	5'	X		1-40ml VOA	NO	KV/Punch Very Silty	FS/	JA
F-16.5	14:30	5'	X	X	(1-40)(2-40/1KU)	NO	KV/Punch Clear-	FS/	JA
D-16.5	15:25	5'	X		1-40ml VOA	YES	KV/Punch Clear-	FS/	JA
D-14.5	16:00	5'	X	X	(1-40)(2-40/1KU)	FREE PC	KV/Punch PRODUCT/FLOAT	FS/	JA
F-18.5	17:00	5'	X	X	(1-40)(2-40/1KU)	NO	KV/Punch Silty	FS/	JA

General Comments: _____

Signature: 

Page: 1 of 1

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID



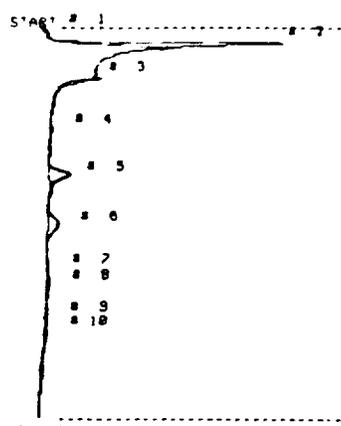
MATRIX: Aqueous

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		< 1

SAMPLE TEMP: 25 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODOR: ND
 SAMPLE DESCRIPTION: 40ml VOA KV Collection
 DATE SAMPLED: 4/28/94 DATE ANALYZED: 4/28/94

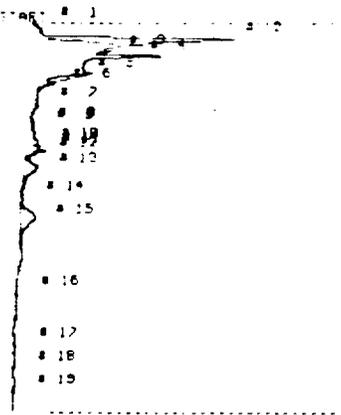
ANALYTICAL NOTES: Subtract blank from
Sample for PCE.

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist



TOP # 600.0
 SAMPLE LIBRARY 1 APR 28 1994 10:42
 ANALYSIS # 33 BLANK BACKGROUND
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION
 OFFSET 2.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 uV/Sec
 WINDOW 28 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 600.0 Sec
 CYCLE TIME 0 Min

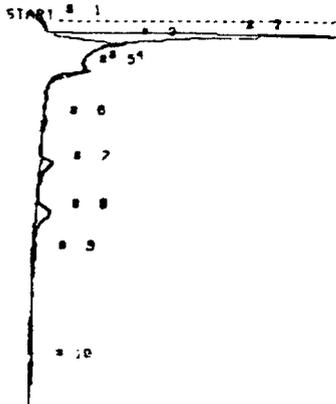
COMPOUND NAME	PEAK	RT	AREA
UNKNOWN	2	26.6	2.1 uV
UNKNOWN	4	160.2	10.2 uV
TETRACHLOROETHEN	5	200.2	5.926 PPB
UNKNOWN	6	312.2	622.8 uV
UNKNOWN	7	418.2	11.1 uV
UNKNOWN	8	420.3	10.9 uV
UNKNOWN	10	440.0	10.1 uV



TOP # 600.0
 SAMPLE LIBRARY 1 APR 28 1994 10:53
 ANALYSIS # 34 KV F-845FT.
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION
 OFFSET 2.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 uV/Sec
 WINDOW 28 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 600.0 Sec
 CYCLE TIME 0 Min

COMPOUND NAME	PEAK	RT	AREA
UNKNOWN	1	4.5	1.9 uV
UNKNOWN	2	22.0	1.1 uV
UNKNOWN	3	45.7	28.0 uV
UNKNOWN	4	54.7	656.2 uV
UNKNOWN	6	37.3	102.3 uV
TETRACHLOROETHEN	12	100.0	1.241 PPB
TETRACHLOROETHEN	13	140.0	2.583 PPB
TETRACHLOROETHEN	14	124.4	1.258 PPB
TETRACHLOROETHEN	15	200.0	4.000 PPB
UNKNOWN	17	140.0	200.0 uV
UNKNOWN	18	120.0	1.4 uV
UNKNOWN	19	100.0	1.4 uV

PHOTOVAC

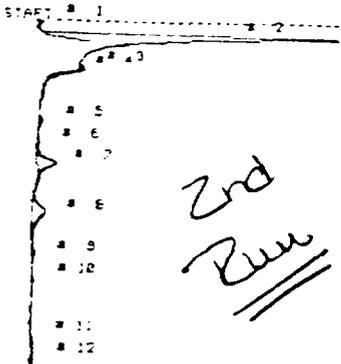


STOP # 622.0
 SAMPLE LIBRARY 1 APR 28 1994 12:22
 ANALYSIS # 35 KV H-12X5F1
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 6.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 uV/Sec
 WINDOW 28 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 600.0 Sec
 CYCLE TIME 0 Min

COMPOUND NAME PEAK RT. AREA/PPB

UNKNOWN	1	5.5	5.0
UNKNOWN	4	21.9	0.0
UNKNOWN	6	24.2	42.0
TETRACHLOROETHENE	7	25.8	4.000
UNKNOWN	8	32.1	0.0
UNKNOWN	9	37.1	34.0
UNKNOWN	12	50.7	0.0



STOP # 542.6
 SAMPLE LIBRARY 1 APR 28 1994 12:59
 ANALYSIS # 36 H-12 RERUN
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 6.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 uV/Sec
 WINDOW 28 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 550.0 Sec
 CYCLE TIME 0 Min

COMPOUND NAME PEAK RT. AREA/PPB

UNKNOWN	2	26.7	2.0
UNKNOWN	3	28.2	0.0
UNKNOWN	5	32.1	20.0
TETRACHLOROETHENE	6	37.1	34.0
TETRACHLOROETHENE	7	50.7	0.0

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>0.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID



MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		45 PPB
"LAB SPLIT"		

SAMPLE TEMP: 25 (°C) SAMPLE PH:

SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODOOR: None

SAMPLE DESCRIPTION: KV Collected 40 ml WPA

DATE SAMPLED: 4/28/94 DATE ANALYZED: 4/28/94

ANALYTICAL NOTES:

* PRIOR SAMPLE - 4.3 PPB -
 RESIDUE READING ~
 RERAN SAMPLE =

SAMPLE ANALYZED BY

[Signature]
 Senior Environmental Specialist

START: 8:32

8 0
8 2
8 3
8 10
8 11
8 12
8 13
8 14
8 15
8 16

STOP @ 550.0
SAMPLE LIBRARY 1 APR 28 1994 13:12
ANALYSIS @ 27 BLANK AIR RUN
INTERNAL TEMP 26 MWR CLEANERS
GAIN 200 100UL INJECTION

OFFSET 6.0 uV
CHART SPEED 0.5 cm/min
SLOPE SENS. 10 10 0 uV/Sec
WINDOW 28 Percent
MINIMUM AREA 5 uVSec
TIMER DELAY 0.0 Sec
ANALYSIS TIME 550.0 Sec
CYCLE TIME 0 Min

COMPOUND NAME PEAK RT. AREA PCT

UNKNOWN 1 11.9 23.0 uS
UNKNOWN 2 26.4 2.3 uS
UNKNOWN 3 30.6 9.3 uS
UNKNOWN 4 42.3 1.0 uS
TETRACHLOROETHENE 1 119.2 3.500 PPM
TETRACHLOROETHENE 3 128.2 2.892 PPM
TETRACHLOROETHENE 2 157.4 4.524 PPM
UNKNOWN 1 161.0 6.500 uS
UNKNOWN 13 170.0 127.0 uS

START: 8:31

8 3
8 4
8 5
8 6
8 7

STOP @ 550.0
SAMPLE LIBRARY 1 APR 28 1994 13:44
ANALYSIS @ 26 KUMH-14 @ 5FT.
INTERNAL TEMP 26 MWR CLEANERS
GAIN 200 100UL INJECTION

OFFSET 6.0 uV
CHART SPEED 0.5 cm/min
SLOPE SENS. 10 10 0 uV/Sec
WINDOW 28 Percent
MINIMUM AREA 5 uVSec
TIMER DELAY 0.0 Sec
ANALYSIS TIME 550.0 Sec
CYCLE TIME 0 Min

COMPOUND NAME PEAK RT. AREA PCT

UNKNOWN 1 121.0 16.4 uS
UNKNOWN 2 137.0 10.8 uS
TETRACHLOROETHENE 3 154.1 0.258 PPM
UNKNOWN 1 162.0 6.100 uS

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

ON OFF
EVENT 1: 5.5 6.0 ANALYSIS TIME: 550.0 SEC.
EVENT 2: 0 0 CHART SPEED: 1.5 CC/MIN.
EVENT 3: 0 65.0 COLUMN TYPE: CPS10-5
EVENT 4: 0 0 SOURCE TYPE: 10.6 EV
EVENT 5: 0 0 TYPE CALIBRANT: AQU. PREP.

*** SAMPLE ID

Blank/HA

MATRIX: Aqueous
@ 5ft

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		< 1 PPB

SAMPLE TEMP: 25 (C°) SAMPLE PH: None

SAMPLE CONDUCTIVITY: None (PPM)(M/MHOS) CONDOR: None

SAMPLE DESCRIPTION: Home KV Collection

DATE SAMPLED: 4/28/94 DATE ANALYZED: 4/28/94

ANALYTICAL NOTES: Subtract Blank Run

SAMPLE ANALYZED BY: [Signature]
Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

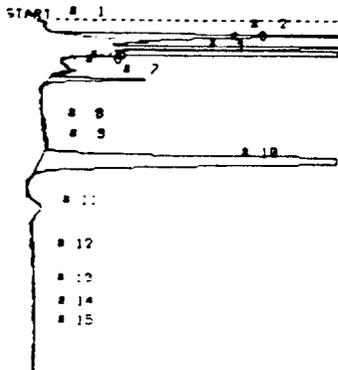
	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID



MATRIX: Aqueous

PHOTOVAC



STEP # 202.2
 SAMPLE LIBRARY 1 APR 28 1994 14:59
 ANALYSIS # 33 KV F-16 & SF7
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 6.8 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 mu/Sec
 WINDOW 28 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 550.0 Sec
 CYCLE TIME 8 min

COMPOUND NAME 147 8.71 254.1

UNKNOWN	1	8.71	254.1
UNKNOWN	2	16.12	1.8
UNKNOWN	3	41.11	4.1
UNKNOWN	4	53.12	8.1
UNKNOWN	5	71.11	8.1
UNKNOWN	6	82.13	70.1
UNKNOWN	7	92.18	1.6
TETRACHLOROETHEN	8	126.11	2.311
TETRACHLOROETHEN	2	201.18	254.1
UNKNOWN	11	122.11	100.1
UNKNOWN	12	124.11	101.1
UNKNOWN	13	126.11	2.311
UNKNOWN	14	128.11	102.1

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		254.1

SAMPLE TEMP: 26 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODOR: None
 SAMPLE DESCRIPTION: 40ml KV Collection
 DATE SAMPLED: 4/28/94 DATE ANALYZED: 4/28/94

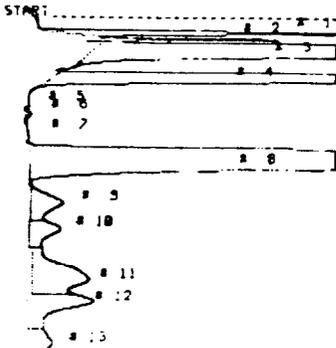
ANALYTICAL NOTES: Hot Sample!

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-9A-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

PHOTOVAC



STEP 0 159.72
 SAMPLE LIBRARY 1 APR 28 1994 15:56
 ANALYSIS # 42 KU D-16 # 5 FT
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 100 100UL INJECTION

OFFSET 5.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 uV/Sec
 WINDOW +/- 20 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 550.0 Sec
 CYCLE TIME 8 Min

COMPOUND NAME	RET.	AREA	AREA/RET.
UNKNOWN	16.5	4.6	0.28
UNKNOWN	36.6	1.1	0.03
UNKNOWN	52.9	62.9	1.19
UNKNOWN	86.3	40.0	0.46
UNKNOWN	156.9	14.1	0.09
TETRACHLOROETHENE	180.7	2,750	15.22
TETRACHLOROETHENE	204.7	2,825	13.81
UNKNOWN	229.7	0.6	0.00
UNKNOWN	293.6	0.9	0.00
UNKNOWN	400.7	6.3	0.02
UNKNOWN	450.1	6.3	0.01

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID



MATRIX: Aqueous

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)	2.8	

SAMPLE TEMP: 26 (°C) SAMPLE PH: ✓
 SAMPLE CONDUCTIVITY: ✓ (PPM)(M/MHOS) COOR: Yes
 SAMPLE DESCRIPTION: 40ml KV Collection
 DATE SAMPLED: 4/28/94 DATE ANALYZED: 4/28/94

ANALYTICAL NOTES: Late Peaks?
REAN AFTER SAMPLE WAS
Allowed to Sit for 1hr.
- 1st Run OK -

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

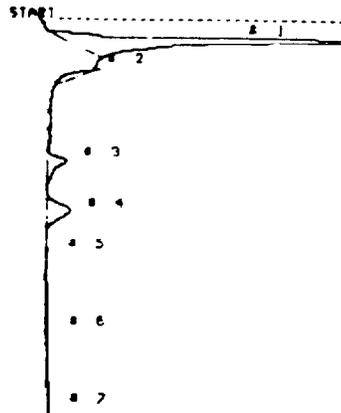
ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>



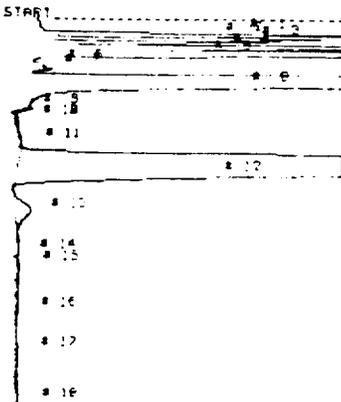
STDP # 652.0
 SAMPLE LIBRARY 1 APR 28 1994 12:52
 ANALYSIS # 46 BACKGROUND AIR
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 200 100UL INJECTION

COMPOUND NAME	PEAK	RT.	AREA	PPM
UNKNOWN	1	1.55	1.1	1.0
TETRACHLOROETHENE	11	1.55	2.853	PPM
UNKNOWN	1	1.55	1.1	1.0
UNKNOWN	6	1.55	1.1	1.0
UNKNOWN	6	1.55	1.1	1.0
UNKNOWN	7	1.55	1.1	1.0

*** SAMPLE ID



MATRIX: Aqueous



STDP # 652.0
 SAMPLE LIBRARY 1 APR 28 1994 10:13
 ANALYSIS # 47 KU F-18 # 5FT
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 6.0 mV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16 6 mV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 5 mVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 650.0 Sec
 CYCLE TIME 0 min

COMPOUND NAME	PEAK	RT.	AREA	PPM
UNKNOWN	1	1.55	1.1	1.0
UNKNOWN	1	1.55	1.1	1.0
UNKNOWN	1	1.55	1.1	1.0
UNKNOWN	6	1.55	1.1	1.0
UNKNOWN	6	1.55	1.1	1.0
UNKNOWN	6	1.55	1.1	1.0
UNKNOWN	7	1.55	1.1	1.0
UNKNOWN	7	1.55	1.1	1.0
UNKNOWN	8	1.55	1.1	1.0
UNKNOWN	8	1.55	1.1	1.0
UNKNOWN	12	1.55	1.1	1.0
TETRACHLOROETHENE	11	1.55	2.346	PPM
TETRACHLOROETHENE	11	1.55	1.55	PPM
UNKNOWN	13	1.55	1.1	1.0
UNKNOWN	14	1.55	1.1	1.0
UNKNOWN	15	1.55	1.1	1.0
UNKNOWN	16	1.55	1.1	1.0
UNKNOWN	17	1.55	1.1	1.0
UNKNOWN	18	1.55	1.1	1.0

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)	1.55	

SAMPLE TEMP: 25 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODOR: No
 SAMPLE DESCRIPTION: 40ml KV Collection
 DATE SAMPLED: 4/28/94 DATE ANALYZED: 4/28/94

ANALYTICAL NOTES: Subtract Background Blank

SAMPLE ANALYZED BY: Chuck Black
 Senior Environmental Specialist

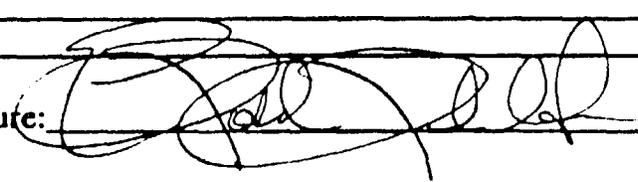
SEME, INC.
DAILY SAMPLING LOG

Instructions	
Location:	KV Grid Number
Depth:	In Feet (Including Screen and Point)
GC/Lab:	X for Sample Destination
Amount Collected:	List container #'s & sizes
Odor:	V= Very Strong, S= Strong, M= Medium, L= Light, NO= no odor

Project Name: MWR CLEANERS	
Job Number: 1134-94-202	Date: 4/29/94
Weather: Sunny WARM	
Project Manager: Chuck Black	
Chemist: Todd Tumbelston	
Operators: Frank Slaughter	

Location	Time Sampled	Depth	GC	Lab	Amount Collected	Odor	Comments	Coll. Init.	G.C. Init.
D-18.5	0820	5'	X		1-40ml	No	KV/Punch/Silty	F.S	Est
B-18.5	0925	5'	X		1-40ml	No	KV/Punch/Silty	F.S	Est
F-20.5	1030	5'	X	X	(1-40ml)(2w/HCl)	No	KV/Punch/Silty	F.S	Est
Z-18.5	11:10	5'	X	X	(1-40ml)(2w/HCl)	Eaten Egg	KU/Punch/Silty	F.S	Est

General Comments: _____

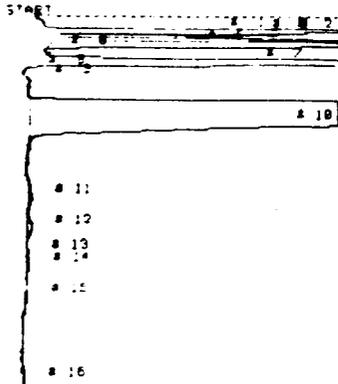
Signature: 

Page: 1 of 1

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-9A-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

PHOTOVAC



ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 50°C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

STDP # 420 0
 SAMPLE LIBRARY 1 APR 29 1994 8:56
 ANALYSIS # 52 KU B-18 # 511.
 INTERNAL TEMP 24 MWR CLEANERS
 GAIN 200 100UL INJECTION

*** SAMPLE ID



MATRIX: AQUEDUS

OFFSET 6.0 mV
 CHART SPEED 8.5 cm/min
 SLOPE SENS. 16 16 6 mV/Sec
 WINDOW +/- 20 Percent
 MINIMUM AREA 5 mV/Sec
 TIMER DELAY 8.0 Sec
 ANALYSIS TIME 620.0 Sec
 CYCLE TIME 0 min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	25.4	18.0
UNKNOWN	2	20.7	1.0
UNKNOWN	3	21.8	1.5
UNKNOWN	4	18.9	1.0
UNKNOWN	5	46.0	10.0
UNKNOWN	6	60.0	10.0
UNKNOWN	7	70.0	10.0
UNKNOWN	8	11.4	10.0
TETRACHLOROETHENE	10	2.631	2.801
UNKNOWN	11	30.0	1.0
UNKNOWN	12	35.0	1.0
UNKNOWN	14	40.0	1.0
UNKNOWN	15	10.0	1.0
UNKNOWN	16	10.0	1.0

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)	2.631	

SAMPLE TEMP: 23 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODOR: NO
 SAMPLE DESCRIPTION: KV collection 40 ml Ura
 DATE SAMPLED: 4/29/94 DATE ANALYZED: 4/29/94

ANALYTICAL NOTES: Good PCE PEAK

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202

PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 50 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU.PREP.</u>

*** SAMPLE ID

F-20

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		20.5

SAMPLE TEMP: 24 (°C) SAMPLE PH: ✓

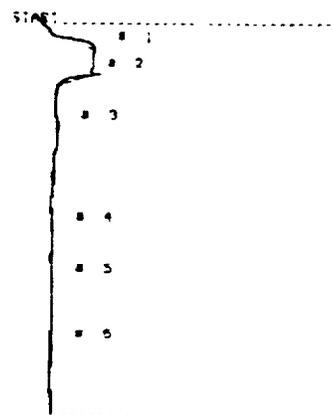
SAMPLE CONDUCTIVITY: ✓ (PPM)(M/MHOS) QOOR: NO

SAMPLE DESCRIPTION: 40ml KV Collection

DATE SAMPLED: 4/29/94 DATE ANALYZED: 4/29/94

ANALYTICAL NOTES: Ran twice (QC)

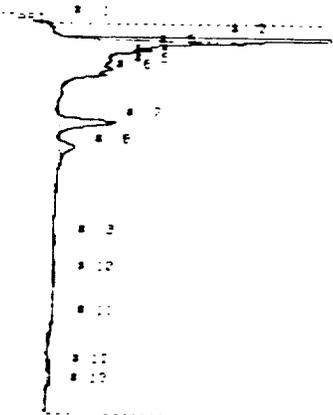
SAMPLE ANALYZED BY: [Signature]
Senior Environmental Specialist



STOP # 500.0
 SAMPLE LIBRARY 1 APR 29 1994 9:30
 ANALYSIS # 53 BACKGROUND AIR
 INTERNAL TEMP 20 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 0.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16.0 uV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.2 Sec
 ANALYSIS TIME 500.0 Sec
 CYCLE TIME 0 min

COMPOUND NAME	PEAK	RT	AREA	PPM
UNKNOWN	1	5.5	12.1	20.5
TETRACHLOROETHENE	1	5.5	12.1	20.5
UNKNOWN	2	12.1	12.1	20.5
UNKNOWN	3	12.1	12.1	20.5



STOP # 400.0
 SAMPLE LIBRARY 1 APR 29 1994 9:51
 ANALYSIS # 54 KV F-20 # 517
 INTERNAL TEMP 20 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 2.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 16.0 uV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 5 uVSec
 TIMER DELAY 0.2 Sec
 ANALYSIS TIME 400.0 Sec
 CYCLE TIME 0 min

COMPOUND NAME	PEAK	RT	AREA	PPM
UNKNOWN	1	5.5	12.1	20.5
UNKNOWN	2	12.1	12.1	20.5
UNKNOWN	3	12.1	12.1	20.5
UNKNOWN	4	12.1	12.1	20.5
UNKNOWN	5	12.1	12.1	20.5
TETRACHLOROETHENE	1	5.5	12.1	20.5
UNKNOWN	2	12.1	12.1	20.5
UNKNOWN	3	12.1	12.1	20.5
UNKNOWN	4	12.1	12.1	20.5

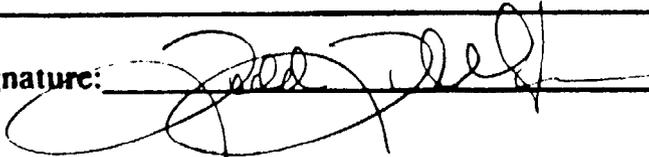
SAFE, INC.
DAILY SAMPLING LOG

Instructions	
Location:	KV Grid Number
Depth:	In Feet (Including Screen and Point)
GC/Lab:	X for Sample Destination
Amount Collected:	List container #'s & sizes
Odor:	V= Very Strong, S= Strong, M= Medium, L= Light, NO= no odor

Project Name: MWR Cleaners	
Job Number: 1134-94-202	Date: 5/2/94
Weather: Cloudy / Cool	
Project Manager: Chuck Black	
Chemist: Good [Signature]	
Operators: Frank Slaughter Chuck Black	

Location	Time Sampled	Depth	GC	Lab	Amount Collected	Odor	Comments	Coll. Init.	G.C. Init.
H-18.5	15:30	5'	X		1-40ml	No		FS/CB	SA
X-18.5	16:30	5'	X		1-40ml	No		FS/CB	SA
B-20.5	17:45	5'	X		1-40ml	No		FS/CB	SA

General Comments: _____

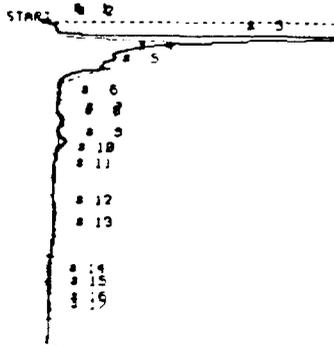
Signature: 

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202

PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

PHOTOVAC



RTDP # 500.0
 SAMPLE LIBRARY 1 MAY 3 1994 8:42
 ANALYSIS # 3 KU H-18 & DIT.
 INTERNAL TEMP 23 MWR CLEANERS
 GAIN 200 100UL INJECTION

COMPOUND NAME	PEAK	RT	AREA	PPM
UNKNOWN	1	11.0	22.1	µS
UNKNOWN	2	15.1	10.8	µS
UNKNOWN	4	57.2	14.9	µS
PERCHLOROETHENE	7	154.2	0.023	PPB
PERCHLOROETHENE	8	190.7	0.058	PPB
UNKNOWN	12	216.6	11.3	µS
UNKNOWN	13	249.9	16.4	µS
UNKNOWN	14	327.9	35.7	µS
UNKNOWN	15	322.5	15.4	µS

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID

H-18

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		<1

SAMPLE TEMP: 24 (C°) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODR: None
 SAMPLE DESCRIPTION: 40ul KV Collection
 DATE SAMPLED: 5/2/94 DATE ANALYZED: 5/3/94

ANALYTICAL NOTES: _____

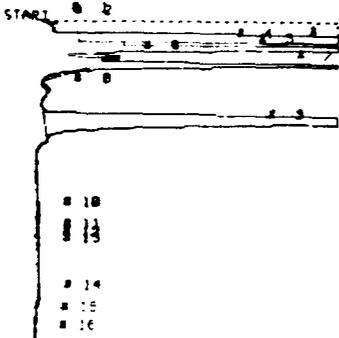
SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202

PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

PHOTOVAC



STD# 0 502.2
 SAMPLE LIBRARY 1 MAY 3 1994 8:52
 ANALYSIS # 18 KU X-18 # 511
 INTERNAL TEMP 23 MWR CLEANERS
 GAIN 200 100UL INJECTION

COMPOUND NAME	PEAK	R.T.	AREA/CPM
UNKNOWN	1	10.5	20.2 US
UNKNOWN	3	27.9	35.3 US
UNKNOWN	4	37.2	4.0 US
UNKNOWN	5	44.0	8.9 US
UNKNOWN	6	56.2	232.0 US
UNKNOWN	7	72.5	8.1 US
UNKNOWN	8	112.5	58.5 US
PERCHLOROETHENE	9	156.1	97.65 PPB
UNKNOWN	10	50.0	13.1 US
UNKNOWN	11	42.0	119.8 US

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID

X-18 @ 5 ft

MATRIX: AQUEOUS

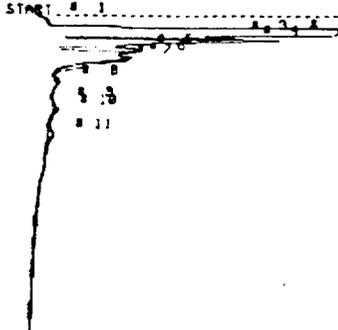
COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		97.63

SAMPLE TEMP: 24 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) DOOR: Slight
 SAMPLE DESCRIPTION: Home KV Collection
 DATE SAMPLED: 5/2/94 DATE ANALYZED: 5/3/94

ANALYTICAL NOTES:

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

PHOTOVAC



STOP # 522.0
 SAMPLE LIBRARY 1 MAY 3 1994 8:26
 ANALYSIS # 8 KV B-20 & 517.
 INTERNAL TEMP 24 MWR CLEANERS
 GAIN 280 100UL INJECTION

COMPOUND NAME	PEAK	RT	AREA	ATTN
UNKNOWN	2	22.7	43.8	US
UNKNOWN	3	32.6	2.1	US
UNKNOWN	4	40.8	5.7	US
UNKNOWN	5	55.7	660.8	MUS
UNKNOWN	6	70.7	134.8	MUS
UNKNOWN	8	110.8	57.8	MUS
PERCHLOROETHENE	9	143.6	0.030	PPB
PERCHLOROETHENE	10	155.6	0.143	PPB
PERCHLOROETHENE	11	195.2	0.506	PPB

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF
EVENT 1:	<u>5.5</u>	<u>6.0</u>
EVENT 2:	<u>0</u>	<u>0</u>
EVENT 3:	<u>0</u>	<u>65.0</u>
EVENT 4:	<u>0</u>	<u>0</u>
EVENT 5:	<u>0</u>	<u>0</u>

ANALYSIS TIME: 550.0 SEC.
 CARRIER SPEED: 1.5 CC/MIN.
 COLUMN TYPE: CPSIL-5
 SOURCE TYPE: 10.6 EV
 TYPE CALIBRANT: AQU. PREP.

*** SAMPLE ID

B-20@5H

MATRIX: Aqueous

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		<1

SAMPLE TEMP: 22 (C) SAMPLE PH: /

SAMPLE CONDUCTIVITY: / (PPM)(M/MHOS) ODOR: None

SAMPLE DESCRIPTION: 100.0 KV Collected

DATE SAMPLED: 5/2/94 DATE ANALYZED: 5/3/94

ANALYTICAL NOTES: Sample collected

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

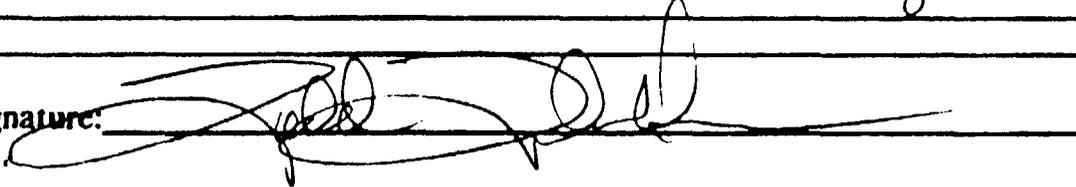
INC.
DAILY SAMPLING LOG

Instructions	
Location:	KV Grid Number
Depth:	In Feet (Including Screen and Point)
GC/Lab:	X for Sample Destination
Amount Collected:	List container #'s & sizes
Odor:	V= Very Strong, S= Strong, M= Medium, L= Light, NO= no odor

Project Name: MWR Cleaners	
Job Number: 1134 94-202	Date: 5/3/94
Weather: Cloudy / Cool / Rain	
Project Manager: Chuck Black	
Chemist: Bob Decker	
Operators: Frank Slaughter Chuck Black	

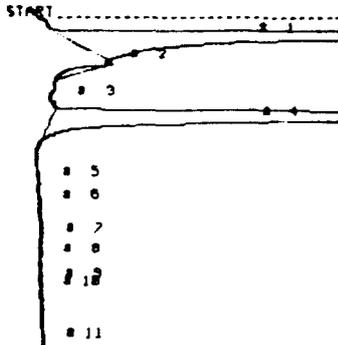
Location	Time Sampled	Depth	GC	Lab	Amount Collected	Odor	Comments	Coll. Init.	G.C. Init.
F22.5	0830	5'	X		1-40ml	No	KV/Punch/Silty	FS/CB	Est
Z-20.5	0940	5'	X		1-40ml	No	KV/Punch/Silty	FS/CB	Est
X-20.5	10:30	5'	X		1-40ml	No	KV/Punch/Silty	FS/CB	Est
V-20.5	11:00	6'	X	X	(1-40ml)(2w/HCl)	No	KV/Punch/Silty	FS/CB	Est
V-18.5	11:50	5'	X		1-40ml	No	KV/Punch/Silty	FS/CB	Est
X-18.8	14:00	8'	X		1-40ml	No	KV/Punch/Silty	FS/CB	Est
X-18.12	14:30	12'	X		1-40ml	No	KV/Punch/Silty	FS/CB	Est
CB-1	15:00	0	X		1-40ml	No	Contaminant Rain W	TT	Est
D-16.12	15:55	12'	X		1-40ml	Yes	KV/Punch/Sulfur odor	FS/TT	Est
V-20.12	17:25	12'	X		1-40ml	No	KV/Punch/Silty	FS/TT	Est
F-22.12	18:05	12'	X		1-40ml	No	KV/Punch/Silty	FS/TT	Est

General Comments: 11 samples collected & analyzed (7:30 AM - 18:30 hrs)

Signature: 

Page: 1 of 1

PHOTOVAC



STOP @ 550.0
 SAMPLE LIBRARY 1 MAY 3 1994 7:52
 ANALYSIS # 5
 INTERNAL TEMP 23 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 7.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 14 6 uV/Sec
 WINDOW +/- 20 Percent
 MINIMUM AREA 10 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 550.0 Sec
 CYCLE TIME 0 min

COMPOUND NAME	PEAK	R.T.	AREA/PPB
UNKNOWN	1	125.5	52.1 US
PERCHLOROETHENE	2	125.5	8,292 PPB
PERCHLOROETHENE	4	152.1	127.0 PPB
UNKNOWN	5	259.9	16.9 uS
UNKNOWN	7	246.5	32.3 uS
UNKNOWN	11	508.6	154.5 uS

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID

Stand. Cal

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		127.000

SAMPLE TEMP: 22 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODOR:
 SAMPLE DESCRIPTION: 40ml Prepared Standard
 DATE SAMPLED: 5/3/94 DATE ANALYZED: 5/3/94

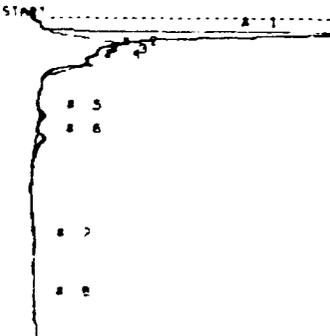
ANALYTICAL NOTES: New prepared standard from stock (PCE) anhydrous 99+%

SAMPLE ANALYZED BY: Chuck Black
 Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

PHOTOVAC



STEP # 300.0
 SAMPLE LIBRARY 1 MAY 3 1994 9:15
 ANALYSIS # 11 KV F-22 & SFT.
 INTERNAL TEMP 24 MWR CLEANERS
 GAIN 200 100UL INJECTION

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	25.3	15.2 US
UNKNOWN	2	37.7	35.6 MUS
UNKNOWN	3	70.7	11.6 MUS
PERCHLOROETHENE	5	55.5	0.442 PPB
PERCHLOROETHENE	6	133.2	0.745 PPB
UNKNOWN		151.5	12.4 MUS

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID

F-22 @ 5'

MATRIX: Aqueous

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		< 1

SAMPLE TEMP: 25 (°C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) COOR: None
 SAMPLE DESCRIPTION: ADME KV Collection
 DATE SAMPLED: 5/3/94 DATE ANALYZED: 5/3/94

ANALYTICAL NOTES: _____

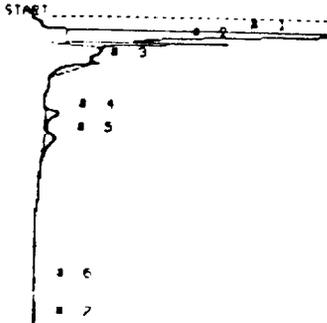
SAMPLE ANALYZED BY:
 Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PHOTONIC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202

PROJECT MANAGER: CHUCK BLACK PHONE #: 884-0005

PHOTOVAC



ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF
EVENT 1:	<u>5.5</u>	<u>6.0</u>
EVENT 2:	<u>0</u>	<u>0</u>
EVENT 3:	<u>0</u>	<u>65.0</u>
EVENT 4:	<u>0</u>	<u>0</u>
EVENT 5:	<u>0</u>	<u>0</u>

ANALYSIS TIME: 550.0 SEC.

CHART SPEED: 1.5 CC/MIN.

COLUMN TYPE: CPSIL-5

SOURCE TYPE: 10.6 EV

TYPE CALIBRANT: AQU. PREP.

STEP # 500.2
 SAMPLE LIBRARY 1 MAT 3 1994 3:52
 ANALYSIS # 13 KV 2-20 & 517
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 200 100UL INJECTION

COMPOUND NAME PEAK RT. AREA/HT

UNKNOWN	1	55.4	121.3	US
UNKNOWN	2	44.9	2.7	US
PERCHLOROETHENE	4	156.0	1.027	PPB
PERCHLOROETHENE	5	120.7	1.126	PPB
UNKNOWN	6	419.0	18.7	MUS
UNKNOWN	7	474.8	43.5	MUS

*** SAMPLE ID

Z-20 @ 5'

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
<u>TETRACHLOROETHENE (PCE)</u>		<u>1 PPB</u>

SAMPLE TEMP: 25 (C) SAMPLE PH:

SAMPLE CONDUCTIVITY: (PPH)(M/MHOS) ODOR: None

SAMPLE DESCRIPTION: ADMC KV Collection

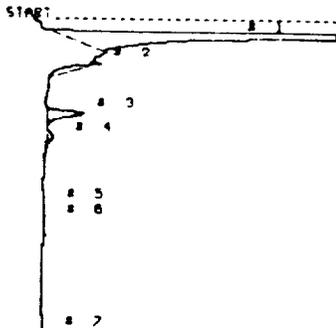
DATE SAMPLED: 5/3/94 DATE ANALYZED: 5/3/94

ANALYTICAL NOTES:

SAMPLE ANALYZED BY:

[Signature]
 Senior Environmental Specialist

PHOTOVAC



STEP # 12277
 SAMPLE LIBRARY: MAY 3 1994 10:39
 ANALYSIS # 15 KU X20 & 51T.
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION

COMPOUND NAME	PEAK	R.T.	AREA	PPM
UNKNOWN	1	26.8	27.8	US
PERCHLOROETHENE	2	154.8	2.387	PPB
PERCHLOROETHENE	4	131.7	2.53	PPB
UNKNOWN	5	295.2	35.9	US

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

ON	OFF	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 1: <u>5.5</u>	<u>6.0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 2: <u>0</u>	<u>0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 3: <u>0</u>	<u>65.0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 4: <u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>
EVENT 5: <u>0</u>	<u>0</u>	

*** SAMPLE ID

X-20@5H

MATRIX: Aqueous

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		2.4

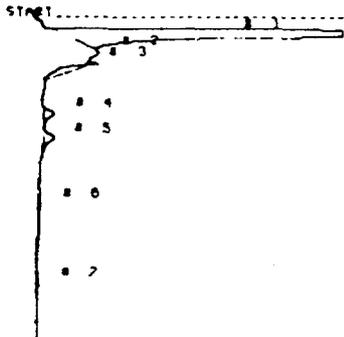
SAMPLE TEMP: 76 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODOR: None
 SAMPLE DESCRIPTION: 40ml KV Collection
 DATE SAMPLED: 5/3/94 DATE ANALYZED: 5/3/94

ANALYTICAL NOTES: _____

SAMPLE ANALYZED BY:

[Signature]
 Senior Environmental Specialist

PHOTOVAC



STOP # 522.2
 SAMPLE LIBRARY 1 MAY 3 1994 11:0
 ANALYSIS # 16 KU 0-20 # 511
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 200 100UL INJECTION

COMPOUND NAME	PEAK	RT	AREA	OFF
UNKNOWN	1	27.0	32.4	MS
UNKNOWN	2	59.1	11.1	MS
PERCHLOROETHENE	4	154.4	0.936	PPB
PERCHLOROETHENE	5	182.2	0.832	PPB
UNKNOWN	6	289.1	25.1	MS
UNKNOWN	7	416.9	102.2	MS

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID

V-20 @ 5'

MATRIX: Aqueous

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		< 1

SAMPLE TEMP: 25 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) OOR: None
 SAMPLE DESCRIPTION: 40me KV Collection
 DATE SAMPLED: 5/3/94 DATE ANALYZED: 5/3/94

ANALYTICAL NOTES: _____

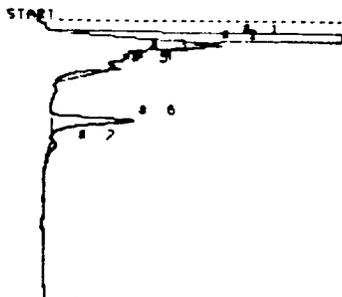
SAMPLE ANALYZED BY:

[Signature]
 Senior Environmental Specialist

JOB NAME: MWR CLEANERS JOB #: 1134-94-202

PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

PHOTOVAC



STOP # 427.5
 SAMPLE LIBRARY 1 MAY 3 1994 11:51
 ANALYSIS # 17 KU J-18 & 511
 INTERNAL TEMP 24 MWR CLEANERS
 GAIN 200 100UL INJECTION

COMPOUND NAME	PEAK	RT	PREP/REP
UNKNOWN	1	22.7	42.1 #US
UNKNOWN	2	43.1	188.7 #US
UNKNOWN	3	58.1	35.5 #US
UNKNOWN	4	71.5	23.8 #US
PERCHLOROETHENE	6	156.8	5.171 PPB
PERCHLOROETHENE	7	134.2	2.425 PPB

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID

V-18 @ 5 ft.

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		5.17

SAMPLE TEMP: 26 (C) SAMPLE PH: /

SAMPLE CONDUCTIVITY: / (PPM)(M/MHOS) OOR: None

SAMPLE DESCRIPTION: 40mc KV Collection

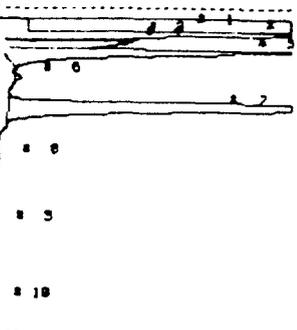
DATE SAMPLED: 5/3/94 DATE ANALYZED: 6/3/94

ANALYTICAL NOTES:

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

PHOTOVAC

START



STOP # 500.0
 SAMPLE LIBRARY 1 MAY 3 1994 15:10
 ANALYSIS # 13 X-18 @ 1211
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 7.0 mV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 10 14 6 mV/Sec
 WINDOW 7% 20 Percent
 MINIMUM AREA 10 mV/Sec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 500.0 Sec
 CYCLE TIME 0 Min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	5.5	55.9 US
UNKNOWN	2	6.0	7.6 US
UNKNOWN	3	65.0	1.6 US
UNKNOWN	4	65.0	3.8 US
UNKNOWN	5	65.0	7.6 US
UNKNOWN	6	65.0	127.1 PPT
TETRACHLOROETHENE	7	65.0	69.22 PPB
UNKNOWN	8	65.0	33.3 MUS
UNKNOWN	9	65.0	42.8 MUS

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID

X-18 @ 1211

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		69.22

SAMPLE TEMP: 26 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) DOOR: No
 SAMPLE DESCRIPTION: 40ml KV Collection
 DATE SAMPLED: 5/3/94 DATE ANALYZED: 5/3/94

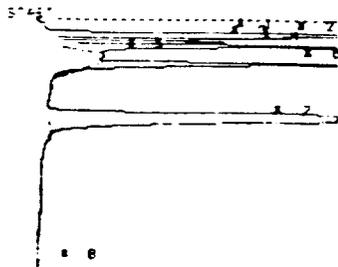
ANALYTICAL NOTES:

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

JOB NAME: MWR CLEANERS JOB #: 1134-94-202

PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

PHOTOVAC



ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

STEP # 500.2
 SAMPLE LIBRARY 1 MAY 3 1994 15:19
 ANALYSIS # 20 X-18 8 BIT
 INTERNAL TEMP 26 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 7.0 AU
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 14 6 AU/Sec
 WINDOW 20 Percent
 MINIMUM AREA 10 AU/Sec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 500.0 Sec
 CYCLE TIME 0 min

RETENTION TIME PEAK NO. AREA PER

UNCALIB	1	24.9	11.0	US
UNCALIB	2	30.2	9.2	US
UNCALIB	3	37.8	1.0	US
UNCALIB	4	43.1	0.2	US
UNCALIB	5	72.1	1.9	1
TETRAHYDROETHENE	7	72.27	22.22	PPB

*** SAMPLE ID

X-18@12'

MATRIX: Aqueous

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		72.27

SAMPLE TEMP: 26 (C) SAMPLE PH: ✓
 SAMPLE CONDUCTIVITY: ✓ (PPM)(M/MHOS) DOOR: None
 SAMPLE DESCRIPTION: 40ml KV Collection
 DATE SAMPLED: 8/3/94 DATE ANALYZED: 5/3/94

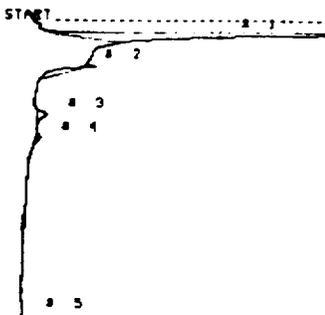
ANALYTICAL NOTES:

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

PHOTOVAC

JOB NAME: MWR CLEANERS JOB #: 1134-94-202

PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005



ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

STOP # 522.2
 SAMPLE LIBRARY 1 MAY 3 1994 14:51
 ANALYSIS # 18 ~~MWR CLEANERS~~
 INTERNAL TEMP 27 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 2.0 mV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 14 0 mV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 10 mVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 500.0 Sec
 CYCLE TIME 0 min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	5.5	5.4 UG
PERCHLOROETHENE	2	132.6	2.703 PPB
PERCHLOROETHENE	4	155.7	2.112 PPB
UNKNOWN	5	462.6	16.3 MUG

*Contaminant Basin
 water*

*** SAMPLE ID Contaminant Basin MATRIX: Aqueous

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		<1

SAMPLE TEMP: 26 (°C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODOR: None
 SAMPLE DESCRIPTION: Ast Contaminant Basin Water
 DATE SAMPLED: 5/3/94 DATE ANALYZED: 5/3/94

ANALYTICAL NOTES:

SAMPLE ANALYZED BY: *Justin [Signature]*
 Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

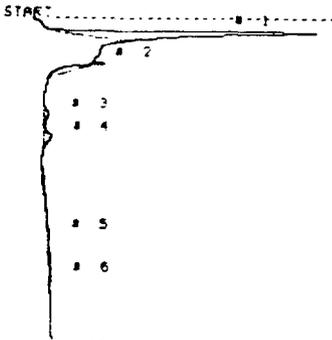
JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME:	<u>550.0</u>	SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED:	<u>5</u>	CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE:	<u>CPSIL-5</u>	
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE:	<u>10.6</u>	EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT:	<u>AQU. PREP.</u>	

PHOTOVAC



STOP # 520.0
 SAMPLE LIBRARY 1 MAY 3 1994 17:38
 ANALYSIS # 22 U-20 3 121T.
 INTERNAL TEMP 22 MWR CLEANERS
 GRIN 200 100UL INJECTION

OFFSET 2.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 14 6 uV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 10 uVSec
 TIMER DELAY 3.0 Sec
 ANALYSIS TIME 500.0 Sec
 CYCLE TIME 0 min

COMPOUND NAME	PEAK	R.T.	AREA	PPM
TETRACHLOROETHENE	1	2.1	1000	1000

*** SAMPLE ID

V-20.12

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		<1

SAMPLE TEMP: 26 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODOR: None
 SAMPLE DESCRIPTION: Home KV Collection
 DATE SAMPLED: 5/3/94 DATE ANALYZED: 5/3/94

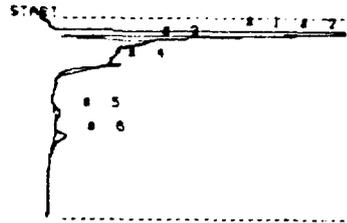
ANALYTICAL NOTES:

SAMPLE ANALYZED BY:

[Signature]
 Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

PHOTOVAC



STOP # 311.6
 SAMPLE LIBRARY 1 MAY 3 1994 10:13
 ANALYSIS # 23 F-22 # 1217
 INTERNAL TEMP 27 MWR CLEANERS
 GAIN 200 100LL INJECTION

OFFSET 7.2 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 14 6 uV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 18 uVSec
 TIMER DELAY 0.2 Sec
 ANALYSIS TIME 502.9 Sec
 CYCLE TIME 8 min

IDENTIFY NAME YEAR UNIT REVISION

UNKNOWN 1 24.5 0.9 US
 UNKNOWN 2 23.6 0.6 US
 PERCHLOROETHENE 5 13.0 0.14 PPB
 PERCHLOROETHENE 6 13.0 0.14 PPB

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID

F-22.18

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
<u>TETRACHLOROETHENE (PCE)</u>		<u><1</u>

SAMPLE TEMP: 76 (C) SAMPLE PH: ✓
 SAMPLE CONDUCTIVITY: ✓ (PPM)(M/MHOS) OODR: None
 SAMPLE DESCRIPTION: 40ml KV Collection
 DATE SAMPLED: 5/3/94 DATE ANALYZED: 5/3/94

ANALYTICAL NOTES: _____

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

INC
DAILY SAMPLING LOG

Instructions	
Location:	KV Grid Number
Depth:	In feet (including Screen and Point)
GC/Lab:	X for Sample Destination
Amount Collected:	List container #'s & sizes
Odor:	V= Very Strong, S= Strong, M= Medium, L= Light, NO= no odor

Project Name:	Parris Island MWR Cleaners		
Job Number:	134-94-202	Date:	5/4/94
Weather:	Raining / Cool		
Project Manager:	Chuck Black		
Chemist:	Bob [Signature]		
Operators:	Bob [Signature] Frank Staughter		

Location	Time Sampled	Depth	GC	Lab	Amount Collected	Odor	Comments	Coll. Init.	G.C. Init.
B-18S	10:15	3'		X	2-4 oz	Yes	LAB Soil / Hand Auger	FS	—
PZ-5S	10:50	3'	X	X	2-4oz / 1-40ml	Yes	LAB Soil / HA / 6L	TT	EA
PZ-4S	10:15	3'	X	X	7-4oz / 1-40ml	No	LAB Soil / HA / 6L	FS	EA
PZ-5	12:00	3-6.5	X	X	(2-40ml) (2-40ml HCl) (3-1 Petco)	YES	LAB / PZ / 6L	FS / TT	EA
PZ-4	12:20	3-10.0	X	X	(2-40ml) HCl (2-1 Petco)	No	LAB / PZ / 6L	FS / TT	EA

General Comments: _____

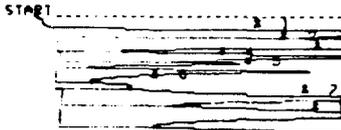
Signature: 

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202

PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

PHOTOVAC



ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> BF
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

SEC # 500.0
 SAMPLE LIBRARY 1 MAY 4 1994 11:40
 ANALYSIS # 26 Z-5 # 317 SOIL
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 7.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 14 0 uV/Sec
 WINDOW +/- 20 Percent
 MINIMUM AREA 10 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 500.0 Sec
 CYCLE TIME 0 Min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	27.5	11.4 US
UNKNOWN	2	42.1	21.6 US
UNKNOWN	3	69.9	11.4 US
UNKNOWN	4	76.1	3.2 US
UNKNOWN	5	98.5	5.9 US
UNKNOWN	6	111.4	1.1 US
UNKNOWN	7	128.1	1.9 US
TETRACHLOROETHENE	8	133	44.06 PPB

*** SAMPLE ID P2-5 Soil MATRIX: Soil

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		44.06
High levels of Contaminates / before & after PCE		
		0.6

SAMPLE TEMP: 25 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) DOOR: Yes
 SAMPLE DESCRIPTION: 40ml / VAPOR HEADSPACE
 DATE SAMPLED: 5/4/94 DATE ANALYZED: 5/4/94

ANALYTICAL NOTES:

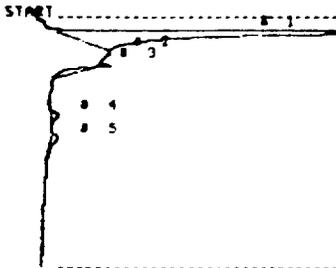
SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PHOTONIC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202

PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

PHOTOVAC



STOP # 285.3
 SAMPLE LIBRARY 1 MAY 4 1994 11:32
 ANALYSIS # 25 PZ-4 & 31T SOIL
 INTERNAL TEMP 25 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 2.0 uV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 10 14 0 uV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 10 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 580.0 Sec
 CYCLE TIME 0 min

COMPOUND NAME	PEAK	R.T.	AREA/PPM
UNKNOWN	1	25.6	14.3 U.S
UNKNOWN	2	52.3	14.6 uS
PERCHLOROETHENE	4	154.0	0.432 PPB
PERCHLOROETHENE	5	121.2	0.633 PPB

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF
EVENT 1:	<u>5.5</u>	<u>6.0</u>
EVENT 2:	<u>0</u>	<u>0</u>
EVENT 3:	<u>0</u>	<u>65.0</u>
EVENT 4:	<u>0</u>	<u>0</u>
EVENT 5:	<u>0</u>	<u>0</u>

ANALYSIS TIME: 550.0 SEC.
 CHART SPEED: 15 CC/MIN.
 COLUMN TYPE: CPSIL-5
 SOURCE TYPE: 10.6 EV
 TYPE CALIBRANT: AQU. PREP.

*** SAMPLE ID

PZ-4 Soil

MATRIX: Soil

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		<1

SAMPLE TEMP: 25 (C°) SAMPLE PH: ✓

SAMPLE CONDUCTIVITY: ✓ (PPM)(M/MHOS) ODOR: No

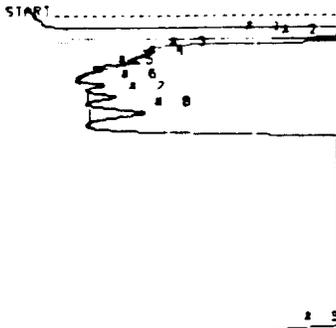
SAMPLE DESCRIPTION: 1/2-40ml VAPOR HEADSPACE

DATE SAMPLED: 5/4/94 DATE ANALYZED: 5/4/94

ANALYTICAL NOTES:

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

PHOTOVAC



STEP # 502.2
 SAMPLE LIBRARY 1 MAY 4 1994 14:50
 ANALYSIS # 31 PZ-5 WATER
 INTERNAL TEMP 24 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 2.0 mV
 CHART SPEED 0.5 cm/min
 SLOPE SENS. 16 14 6 µV/Sec
 WINDOW 2% 28 Percent
 MINIMUM AREA 10 µVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 500.0 Sec
 CYCLE TIME 8 Min

COMPOUND NAME	PEAK	RT	AREA	%
UNKNOWN	1	32.1	70.1	1.0
UNKNOWN	2	47.2	7.0	0.1
UNKNOWN	3	63.2	133.9	1.8
UNKNOWN	4	76.7	30.9	0.4
UNKNOWN	5	98.3	24.7	0.3
UNKNOWN	6	111.7	185.3	2.5
UNKNOWN	7	122.7	839.0	11.4
PERCHLOROETHENE	8	137.1	127.4	1.7

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>1.5</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU.PREP.</u>

*** SAMPLE ID

PZ-5

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
<u>TETRACHLOROETHENE (PCL)</u>		

SAMPLE TEMP: 26 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) ODOR: Yes
 SAMPLE DESCRIPTION: 40ml PZ-5 Collected
 DATE SAMPLED: 5/4/94 DATE ANALYZED: 5/4/94

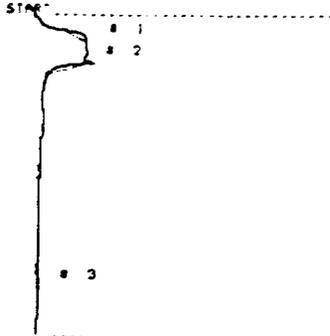
ANALYTICAL NOTES:

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

ANALYSIS INFORMATION SHEET: PHOTOVAC 10550 PORTABLE GAS CHROMATOGRAPH

PHOTOVAC

JOB NAME: MWR CLEANERS JOB #: 1134-94-202
 PROJECT MANAGER: CHUCK BLACK PHONE#: 884-0005



STEP # 500.0
 SAMPLE LIBRARY: MAY 4 1994 14:42
 ANALYSIS # 32 PZ-4 WATER
 INTERNAL TEMP 24 MWR CLEANERS
 GAIN 200 100UL INJECTION

OFFSET 7.0 uV
 CHART SPEED 8.5 cm/min
 SLOPE SENS. 16 14 6 uV/Sec
 WINDOW 20 Percent
 MINIMUM AREA 10 uVSec
 TIMER DELAY 0.0 Sec
 ANALYSIS TIME 500.0 Sec
 CYCLE TIME 0 min

COMPOUND NAME PEAK 5.7 AREA/PPM
 UNKNOWN 1 401.5 262.0 uV

ANALYSIS FLOW RATE: 10-15 CC/MIN. OVEN TEMPERATURE: 40 °C

EVENT SETTINGS:

	ON	OFF	
EVENT 1:	<u>5.5</u>	<u>6.0</u>	ANALYSIS TIME: <u>550.0</u> SEC.
EVENT 2:	<u>0</u>	<u>0</u>	CHART SPEED: <u>15</u> CC/MIN.
EVENT 3:	<u>0</u>	<u>65.0</u>	COLUMN TYPE: <u>CPSIL-5</u>
EVENT 4:	<u>0</u>	<u>0</u>	SOURCE TYPE: <u>10.6</u> EV
EVENT 5:	<u>0</u>	<u>0</u>	TYPE CALIBRANT: <u>AQU. PREP.</u>

*** SAMPLE ID

PZ-4

MATRIX: AQUEOUS

COMPOUND NAME	PPM	PPB
TETRACHLOROETHENE (PCE)		ND

SAMPLE TEMP: 26 (C) SAMPLE PH:
 SAMPLE CONDUCTIVITY: (PPM)(M/MHOS) OOR: None
 SAMPLE DESCRIPTION: 40ml Pico 20 Calibration
 DATE SAMPLED: 5/4/94 DATE ANALYZED: 5/4/94

ANALYTICAL NOTES:

SAMPLE ANALYZED BY: [Signature]
 Senior Environmental Specialist

APPENDIX V

TABLES

TABLE 1
DRY CLEANING FACILITY ANALYTICAL RESULTS
TETRACHLOROETHYLENE ASSESSMENT
PARRIS ISLAND, SOUTH CAROLINA

SAMPLE ID #	TYPE	DATE COLLECTED	DATE ANALYZED	MATRIX	GC ⁽¹⁾ PCE ⁽³⁾	LAB ⁽²⁾ PCE	LAB DCE ⁽⁴⁾	LAB TCE ⁽⁵⁾
PZ-1	WELL	4-27-94	4-27-94	WATER	19.6 ⁽⁶⁾	-	-	-
PZ-2	WELL	4-27-94	4-27-94	WATER	<10.0	-	-	-
PZ-3	WELL	4-27-94	4-27-94	WATER	<10.0	-	-	-
F-12.4	KV	4-27-94	4-27-94	WATER	5,147	-	-	-
F-12.8	KV	4-27-94	4-27-94	WATER	1,678	-	-	-
D-12.4	KV	4-27-94	4-27-94	WATER	43.73 ⁽⁷⁾	-	-	-
F-12.12	KV	4-27-94	4-27-94	WATER	13.92	-	-	-
D-10.5	KV	4-27-94	4-27-94	WATER	<10.0 ⁽⁷⁾	-	-	-
B-12.5	KV	4-27-94	4-27-94	WATER	94.25 ⁽⁷⁾	-	-	-
Z-12.5	KV	4-27-94	4-27-94	WATER	<10.0	-	-	-

- Notes:
- | | |
|------------------------------------|---|
| (1) GC - Gas Chromatograph Results | (5) TCE - Trichloroethylene |
| (2) Lab - laboratory Results | (6) All data in parts per billion |
| (3) PCE - Tetrachloroethylene | (7) High levels of other compounds detected |
| (4) DCE - cis-1,2 Dichloroethylene | |

TABLE 1 (continued)
 DRY CLEANING FACILITY ANALYTICAL RESULTS
 TETRACHLOROETHYLENE ASSESSMENT
 PARRIS ISLAND, SOUTH CAROLINA

SAMPLE ID #	TYPE	DATE COLLECTED	DATE ANALYZED	MATRIX	GC ⁽¹⁾ PCE ⁽³⁾	LAB ⁽²⁾ PCE	LAB DCE ⁽⁴⁾	LAB TCE ⁽⁵⁾
B-10.5	KV	4-27-94	4-27-94	WATER	< 10.0	-	-	-
F-8.5	KV	4-28-94	4-28-94	WATER	< 10.0	-	-	-
H-12.5	KV	4-28-94	4-28-94	WATER	< 10.0	< 1.0	< 1.0	< 1.0
H-14.5	KV	4-28-94	4-28-94	WATER	< 10.0	-	-	-
F-16.5	KV	4-28-94	4-28-94	WATER	254.1	29.4	160.0	7.3
D-16.5	KV	4-28-94	4-28-94	WATER	2,800 ⁽⁷⁾	-	-	-
D-14.5	KV	4-28-94	4-28-94	WATER	231.1 ⁽⁷⁾	< 500	9,250	< 500
F-18.5	KV	4-28-94	4-28-94	WATER	1,550	370	780	840
D-18.5	KV	4-29-94	4-29-94	WATER	< 10.0	-	-	-
B-18.5	KV	4-29-94	4-29-94	WATER	2,631	-	-	-

- Notes:
- | | |
|------------------------------------|---|
| (1) GC - Gas Chromatograph Results | (5) TCE - Trichloroethylene |
| (2) Lab - laboratory Results | (6) All data in parts per billion |
| (3) PCE - Tetrachloroethylene | (7) High levels of other compounds detected |
| (4) DCE - cis-1,2 Dichloroethylene | |

TABLE 1 (continued)
 DRY CLEANING FACILITY ANALYTICAL RESULTS
 TETRACHLOROETHYLENE ASSESSMENT
 PARRIS ISLAND, SOUTH CAROLINA

SAMPLE ID #	TYPE	DATE COLLECTED	DATE ANALYZED	MATRIX	GC ⁽¹⁾ PCE ⁽³⁾	LAB ⁽²⁾ PCE	LAB DCE ⁽⁴⁾	LAB TCE ⁽⁵⁾
F-20.5	KV	4-29-94	4-29-94	WATER	20.5	1.3	2.7	<1.0
Z-18.5	KV	4-29-94	4-29-94	WATER	121.2	<10.0	340.0	20.0
H-18.5	KV	5-2-94	5-2-94	WATER	<10.0	-	-	-
X-18.5	KV	5-2-94	5-2-94	WATER	97.63	-	-	-
B-18.5	KV	5-2-94	5-2-94	WATER	<10.0	-	-	-
F-22.5	KV	5-3-94	5-3-94	WATER	<10.0	-	-	-
Z-20.5	KV	5-3-94	5-3-94	WATER	<10.0	-	-	-
X-20.5	KV	5-3-94	5-3-94	WATER	<10.0	-	-	-
V-20.5	KV	5-3-94	5-3-94	WATER	<10.0	-	-	-
V-18.5	KV	5-3-94	5-3-94	WATER	<10.0	-	-	-
X-18.8	KV	5-3-94	5-3-94	WATER	69.22	-	-	-

Notes:

- | | |
|------------------------------------|---|
| (1) GC - Gas Chromatograph Results | (5) TCE - Trichloroethylene |
| (2) Lab - laboratory Results | (6) All data in parts per billion |
| (3) PCE - Tetrachloroethylene | (7) High levels of other compounds detected |
| (4) DCE - cis-1,2 Dichloroethylene | |

TABLE 1 (continued)
 DRY CLEANING FACILITY ANALYTICAL RESULTS
 TETRACHLOROETHYLENE ASSESSMENT
 PARRIS ISLAND, SOUTH CAROLINA

SAMPLE ID #	TYPE	DATE COLLECTED	DATE ANALYZED	MATRIX	GC ⁽¹⁾ PCE ⁽³⁾	LAB ⁽²⁾ PCE	LAB DCE ⁽⁴⁾	LAB TCE ⁽⁵⁾
X-18.12	KV	5-3-94	5-3-94	WATER	72.27	-	-	-
CB-1	GRAB	5-3-94	5-3-94	WATER	< 10.0	-	-	-
D-16.12	KV	5-3-94	5-3-94	WATER	117.8	-	-	-
V-20.12	KV	5-3-94	5-3-94	WATER	< 10.0	-	-	-
F-22.12	KV	5-3-94	5-3-94	WATER	< 10.0	-	-	-
B-18s	HA	5-4-94	5-4-94	SOIL	-	-	-	4.0
PZ-5s	HA	5-4-94	5-4-94	SOIL	44.1 ⁽⁷⁾	-	-	-
PZ-4s	HA	5-4-94	5-4-94	SOIL	< 10.0	-	-	-
PZ-5	WELL	5/4/94	5/4/94	WATER	< 10.0 ⁽⁷⁾	< 1.0	1,580	< 1.0
PZ-4	WELL	5/4/94	5/4/94	WATER	< 10.0	< 1.0	< 1	< 1.0

Notes:

(1) GC - Gas Chromatograph Results	(5) TCE - Trichloroethylene
(2) Lab - laboratory Results	(6) All data in parts per billion
(3) PCE - Tetrachloroethylene	(7) High levels of other compounds detected
(4) DCE - cis-1,2 Dichloroethylene	

TABLE 2
ANALYTICAL RESULTS
ADDITIONAL PARAMETERS FOR PIEZOMETER PZ-5
DRY CLEANING FACILITY
PARRIS ISLAND, SOUTH CAROLINA

COMPOUND		RESULT
DECANE	(S) ⁽¹⁾	7.7 mg/kg (ppm) ⁽²⁾
2 - PIPERIDINONE	(S)	2.3 mg/kg (ppm)
2,3,6 - TRIMETHYLOCTANE	(S)	1.0 mg/kg (ppm)
2 - METHYL NONANE	(S)	1.1 mg/kg (ppm)
2,3,4 - TRIMETHYL HEPTANE	(S)	1.0 mg/kg (ppm)
2,3,7 - TRIMETHLY OCTANE	(S)	1.0 mg/kg (ppm)
2,5,6 - TRIMETHYL DECANE	(S)	1.3 mg/kg (ppm)
1,1 - DICHLOROETHENE	(W) ⁽³⁾	8.0 ug/l (ppb) ⁽⁴⁾
1,1 - DICHLOROETHENE	(W)	24.0 ug/l (ppb)
TOLUENE	(W)	24.0 ug/l (ppb)
ETHYLBENZENE	(W)	5.6 ug/l (ppb)
CIS - 1,2 - DICHLOROETHENE	(W)	1580.0 ug/l (ppb)
XYLENE	(W)	25.0 ug/l (ppb)
1,3,5 - TRIMETHYLEBENZENE	(W)	31.0 ug/l (ppb)
1,2,4 - TRIMETHYLEBENZENE	(W)	223.0 ug/l (ppb)
1 - ETHYL - 3 METHYLBENZENE	(W)	39.0 ug/l (ppb)
1 - ETHYL - 2 METHYLBENZENE	(W)	31.0 ug/l (ppb)
2 - ETHYL - 1,4 - DIMETHYLBENZENE	(W)	21.0 ug/l (ppb)
NAPHTHLALENE	(W)	18.0 ug/l (ppb)

Notes:

- (1) S - Soil Matrix Sample
- (2) ppm - Parts per million
- (3) W - Water Matrix Sample
- (4) ppb - Parts per billion

TABLE 3
ANALYTICAL RESULTS
SOIL SAMPLES COLLECTED BY PARRIS ISLAND PERSONNEL
DRY CLEANING FACILITY
PARRIS ISLAND, SOUTH CAROLINA

SAMPLE ID	TYPE	DATE COLLECTED	DATE ANALYZED	MATRIX	LAB PCE ⁽¹⁾
Dry Clean Soil	grab	3/14/94	3/15/94	Soil	3000 (PPM) ⁽²⁾
Dry Clean Water	grab	3/14/94	3/15/94	Water	2000 (PPM)
94RS28	hand auger	3/19/94	3/26/94	Soil	< 50.0
94RS29	hand auger	3/19/94	3/26/94	Soil	< 50.0 ⁽³⁾
94RS30	hand auger	3/19/94	3/26/94	Soil	< 50.0 ⁽³⁾
94RS31	hand auger	3/19/94	3/26/94	Soil	88,000.0
94RS32	hand auger	3/19/94	3/26/94	Soil	250,000.0
94RS33	hand auger	3/19/94	3/26/94	Soil	150,000.0
94RS34	hand auger	3/19/94	3/26/94	Soil	95,000.0
94RS35	hand auger	3/19/94	3/26/94	Soil	20,000.0
94RS36	hand auger	3/19/94	3/26/94	Soil	155,000.0
94RS37	hand auger	3/19/94	3/26/94	Soil	35,000.0
94RS38	hand auger	3/19/94	3/26/94	Soil	60,000.0
94RS39	hand auger	3/19/94	3/26/94	Soil	25,000.0
94RS40	hand auger	3/19/94	3/26/94	Soil	150,000.0
94RS41	hand auger	3/19/94	3/26/94	Soil	160,000.0
94RS42	hand auger	3/19/94	3/26/94	Soil	150,000.0
94RS43	hand auger	3/19/94	3/26/94	Soil	No results
94RS44	hand auger	3/19/94	3/26/94	Soil	No results

- Notes:
- (1) All data reported in ppb (parts per billion) except as noted
 - (2) ppm - parts per million
 - (3) Sample container broken during shipping

TABLE 4
SELECTED PHYSICAL PROPERTIES OF IDENTIFIED COMPOUNDS ON-SITE
CONCEPTUAL CORRECTIVE ACTION PLAN
MWR DRY CLEANERS
PARRIS ISLAND, SOUTH CAROLINA

COMPOUND	WATER SOLUBILITY (mg/l 25°C)	VAPOR PRESSURE (mm Hg 30°C)	HENRY'S CONSTANT (atm-m³/mole) Kh	Koc (ml/g)	Potential For Remediation
PCE	150	24	1.5×10^{-2}	303	High
TCE	1100	95	9.9×10^{-3}	152	High
DCE (1,2 cis)	800 (20° c)	200 (25° c)	NA ⁽¹⁾	NA ⁽¹⁾	High

Notes:

(1) Not Available

TABLE 5
EVALUATION OF REMEDIAL OPTIONS
CONCEPTUAL CORRECTIVE ACTION PLAN
MWR DRY CLEANERS
PARRIS ISLAND, SOUTH CAROLINA

REMEDIAL OPTION	ADVANTAGES	DISADVANTAGES
No Action Institutional Controls	Low Cost	Low public acceptance; Does not address liability
Soil Excavation	Rapid response to soil contamination	Does not address groundwater; Requires treatment or disposal of soils; high cost
Pump and Treat	Rapidly addresses groundwater issues; Accepted by regulators and public; Low to moderate capital costs	Does not address soil contamination; Effluent discharge costs high
Air Sparging Vacuum Extraction	Addresses soil and groundwater; Rapid treatment; Source reduction; addresses long term liability; Low to moderate cost over life of project	New technology; Little documentation; Requires extensive pilot testing for design; Capital cost

TABLE 6
COST ESTIMATE FOR DESIGN AND IMPLEMENTATION OF AS/VE SYSTEM
MWR DRY CLEANERS
PARRIS ISLAND, SOUTH CAROLINA

ITEM	QUANTITY	UNIT	UNIT \$ COST	SUBTOTAL \$ COST
Permitting and submittals	1	LS	10,000	10,000
Pilot Test	1	LS	20,000	20,000
Develop Final AS/VE System Design and Technical Specifications (CAP)	1	LS	15,000	15,000
AS/VE Equipment	1	LS	50,000	50,000
Equipment Housing	1	LS	10,000	10,000
AS/VE Well Installation	12	WELLS	1,000	12,000
System Installation	1	LS	15,000	15,000
Miscellaneous Equipment	1	LS	5,000	5,000
Carbon Replacement	1	LS	15,000	15,000
Monitoring (1 year)	1	LS	12,000	12,000
Lab Analyses (1 year)	1	LS	25,000	25,000
Report Preparation	1	LS	5,000	5,000
Decommission of AS/VE System	1	LS	5,000	5,000

TOTAL ESTIMATED COST \$199,000.00

APPENDIX VI

SAMPLE CHAIN OF CUSTODY AND LABORATORY DATA SHEETS



800-476-0913
803-750-0913
FAX 803-750-9505

HydroLogic - Columbia, South Carolina

100 Ashland Park Lane, Suite E • Columbia, SC 29210

CHAIN OF CUSTODY RECORD

SAMPLE ANALYSIS REQUIRED

CLIENT: SIMELONG, Inc. Attn: Pleasant S.C. Parris Island 1134-94-202		COPY CONTAINER NUMBER										PRESERVATION (CODE)		LAB
SAMPLER(S) SIGNATURE: <i>[Signature]</i>		PCE by EPA601										CODE: A - NONE B - H2SO4 C - NaOH D - HNO3 E - HCL		USE ONLY
SAMPLE ID (LOCATION)	DATE	TIME	W	S	C	G					REMARKS	LAB I.D.		
L			X	O	O	A								
L			L	L	N	B								
F-18.5	T	T				X	Z					* Some of these samples are in the PPM Range.		
H-12.0						X	Z							
F-16.0						X	Z							
D-14.5						X	Z							
Z-18.5						X	Z							
F-20	✓	✓				X	Z							
RELINQUISHED BY: (Sig.) <i>[Signature]</i>		DATE/TIME: 5/2/94	RECEIVED BY: (Sig.) <i>[Signature]</i>				RELINQUISHED BY: (Sig.)				DATE/TIME	RECEIVED BY: (Sig.)		
RELINQUISHED BY: (Sig.)		DATE/TIME	RECEIVED BY: (Sig.)				RELINQUISHED BY: (Sig.)				DATE/TIME	RECEIVED BY: (Sig.)		
LAB RECEIPT BY: (Sig.)		DATE/TIME	REMARKS:											



800-476-0913
803-760-0913
FAX 803-760-9505

HydroLogic - Columbia, South Carolina

100 Ashland Park Lane, Suite B • Columbia, SC 29210

CHAIN OF CUSTODY RECORD

SAMPLE ANALYSIS REQUIRED

CLIENT:			SAMPLER(S) SIGNATURE:										PRESERVATION (CODE)	
STME Inc. Mt Pleasant S.C. PARRIS ISLAND MWR 1134-94-202			[Signature]										CODE: A - NONE B - H2SO4 C - H4OH D - HNO3 E - _____	
													REMARKS		LAB I
SAMPLE ID (LOCATION)	DATE	TIME	W	L	B	C	O	P	A	B	REMARKS		LAB I	
PZ-4s	5/4	Am	X	X										94-
PZ-5s	5/4	Am	X	X								"Worst Case"	ON PZ-5 Run	94-
B-18s	5/4	Am	X	X									as many parameters	94-
PZ-4 WATER	5/4	Pm	X	X	X				X	X			on Water 1st. Then	94-
PZ-5 WATER	5/4	Pm	X	X					X	X	X	"Worst Case"	run remainder on soil	
													we could not get	
													a sufficient water	
													sample to run all week	
RELINQUISHED BY: (Sig.)			DATE/TIME		RECEIVED BY: (Sig.)			RELINQUISHED BY: (Sig.)			DATE/TIME		RECEIVED BY: (Sig.)	
[Signature]			5/5/90		Anderson Armor									
RELINQUISHED BY: (Sig.)			DATE/TIME		RECEIVED BY: (Sig.)			RELINQUISHED BY: (Sig.)			DATE/TIME		RECEIVED BY: (Sig.)	
LAB RECEIPT BY: (Sig.)			DATE/TIME		REMARKS:									
[Signature]			5/5/94 4:10p		received on wet ice @ 10c W									

HYDROLOGIC COLUMBIA
 Sample Data Report
 NC Certification No. 400
 SC Certification No. 40101
 Kentucky Certification No. 70002
 EPA M601

Date : 5/11/94
 Project : Parris Island 1134-94-202
 Client : S & ME, Inc.
 Date Collected : None Given
 Date Received : 5/2/94
 Date Analyzed : 5/6/94
 Date Reported : 5/11/94

Sample ID/Client ID
94-2142/F-18.5

ANALYSIS

Bromodichloromethane	<10.0
Bromoform	<10.0
Bromomethane	<10.0
Carbon Tetrachloride	<10.0
Chlorobenzene	<10.0
Chloroethane	<10.0
2-Chloro Ethyl Vinyl Ether	<10.0
Chloroform	<10.0
Chloromethane	<10.0
Dibromochloromethane	<10.0
1,2-Dichlorobenzene	<10.0
1,3-Dichlorobenzene	<10.0
1,4-Dichlorobenzene	<10.0
Dichlorofluoromethane	<10.0
1,1-Dichloroethane	<10.0
1,2-Dichloroethane	<10.0
1,1-Dichloroethene	<10.0
trans-1,2-Dichloroethene	<10.0
1,2-Dichloropropane	<10.0
cis-1,3-Dichloropropene	<10.0
trans-1,3-Dichloropropene	<10.0
Methylene Chloride	<10.0
1,1,2,2-Tetrachloroethane	<10.0
Tetrachloroethene	370
1,1,1-Trichloroethane	<10.0

RECEIVED
 MAY 13 1994

M601 = ug/L (parts per billion) by M601

HYDROLOGIC COLUMBIA
EPA M601 Continued

Date : 5/11/94
Project : Parris Island 1134-94-202
Client : S & ME, Inc.

<u>ANALYSIS</u>	<u>Sample ID/Client ID</u> <u>94-2142/F-18.5</u>
1,1,2-Trichloroethane	<10.0
Trichloroethene	840
Trichlorofluoromethane	<10.0
Vinyl Chloride	<10.0
cis-1,2-Dichloroethylene	780

M601 = ug/L (parts per billion) by M601
Dilution Factor x 10

Data Approved for Release:

Robert D. Downing
Robert D. Downing
Laboratory Manager

HYDROLOGIC COLUMBIA
Sample Data Report
NC Certification No. 400
SC Certification No. 40101
Kentucky Certification No. 70002
EPA M601

Date : 5/11/94
Project : Parris Island 1134-94-202
Client : S & ME, Inc.
Date Collected : None Given
Date Received : 5/2/94
Date Analyzed : 5/6/94
Date Reported : 5/11/94

<u>ANALYSIS</u>	<u>Sample ID/Client ID</u> <u>94-2143/H-12.0</u>
Bromodichloromethane	<1.0
Bromoform	<1.0
Bromomethane	<1.0
Carbon Tetrachloride	<1.0
Chlorobenzene	<1.0
Chloroethane	<1.0
2-Chloro Ethyl Vinyl Ether	<1.0
Chloroform	<1.0
Chloromethane	<1.0
Dibromochloromethane	<1.0
1,2-Dichlorobenzene	<1.0
1,3-Dichlorobenzene	<1.0
1,4-Dichlorobenzene	<1.0
Dichlorofluoromethane	<1.0
1,1-Dichloroethane	<1.0
1,2-Dichloroethane	<1.0
1,1-Dichloroethene	<1.0
trans-1,2-Dichloroethene	<1.0
1,2-Dichloropropane	<1.0
cis-1,3-Dichloropropene	<1.0
trans-1,3-Dichloropropene	<1.0
Methylene Chloride	<1.0
1,1,2,2-Tetrachloroethane	<1.0
Tetrachloroethene	<1.0
1,1,1-Trichloroethane	<1.0

M601 = ug/L (parts per billion) by M601

HYDROLOGIC COLUMBIA
EPA M601 Continued

Date : 5/11/94
Project : Parris Island 1134-94-202
Client : S & ME, Inc.

<u>ANALYSIS</u>	<u>Sample ID/Client ID</u> <u>94-2143/H-12.0</u>
1,1,2-Trichloroethane	<1.0
Trichloroethene	<1.0
Trichlorofluoromethane	<1.0
Vinyl Chloride	<1.0
cis-1,2-Dichloroethylene	<1.0

M601 = ug/L (parts per billion) by M601

Data Approved for Release:

Robert D. Downing
Robert D. Downing
Laboratory Manager

HYDROLOGIC COLUMBIA
 Sample Data Report
 NC Certification No. 400
 SC Certification No. 40101
 Kentucky Certification No. 70002
 EPA M601

Date : 5/11/94
 Project : Parris Island 1134-94-202
 Client : S & ME, Inc.
 Date Collected : None Given
 Date Received : 5/2/94
 Date Analyzed : 5/6/94
 Date Reported : 5/11/94

Sample ID/Client ID
94-2144/F-16.0

ANALYSIS

Bromodichloromethane	<1.0
Bromoform	<1.0
Bromomethane	<1.0
Carbon Tetrachloride	<1.0
Chlorobenzene	<1.0
Chloroethane	<1.0
2-Chloro Ethyl Vinyl Ether	<1.0
Chloroform	<1.0
Chloromethane	<1.0
Dibromochloromethane	<1.0
1,2-Dichlorobenzene	<1.0
1,3-Dichlorobenzene	<1.0
1,4-Dichlorobenzene	<1.0
Dichlorofluoromethane	<1.0
1,1-Dichloroethane	<1.0
1,2-Dichloroethane	<1.0
1,1-Dichloroethene	<1.0
trans-1,2-Dichloroethene	<1.0
1,2-Dichloropropane	<1.0
cis-1,3-Dichloropropene	<1.0
trans-1,3-Dichloropropene	<1.0
Methylene Chloride	<1.0
1,1,2,2-Tetrachloroethane	<1.0
Tetrachloroethene	29.4
1,1,1-Trichloroethane	<1.0

M601 = ug/L (parts per billion) by M601

HYDROLOGIC COLUMBIA
EPA M601 Continued

Date : 5/11/94
Project : Parris Island 1134-94-202
Client : S & ME, Inc.

<u>ANALYSIS</u>	<u>Sample ID/Client ID</u>
	<u>94-2144/F-16.0</u>
1,1,2-Trichloroethane	<1.0
Trichloroethene	7.3
Trichlorofluoromethane	<1.0
Vinyl Chloride	<1.0
cis-1,2-Dichloroethylene	160

M601 = ug/L (parts per billion) by M601

Data Approved for Release:

Robert D. Downing
Robert D. Downing
Laboratory Manager

HYDROLOGIC COLUMBIA
 Sample Data Report
 NC Certification No. 400
 SC Certification No. 40101
 Kentucky Certification No. 70002
 EPA M601

Date : 5/11/94
 Project : Parris Island 1134-94-202
 Client : S & ME, Inc.
 Date Collected : None Given
 Date Received : 5/2/94
 Date Analyzed : 5/10/94
 Date Reported : 5/11/94

<u>ANALYSIS</u>	<u>Sample ID/Client ID</u> <u>94-2145/D-14.5</u>
Bromodichloromethane	<500.0
Bromoform	<500.0
Bromomethane	<500.0
Carbon Tetrachloride	<500.0
Chlorobenzene	<500.0
Chloroethane	<500.0
2-Chloro Ethyl Vinyl Ether	<500.0
Chloroform	<500.0
Chloromethane	<500.0
Dibromochloromethane	<500.0
1,2-Dichlorobenzene	<500.0
1,3-Dichlorobenzene	<500.0
1,4-Dichlorobenzene	<500.0
Dichlorofluoromethane	<500.0
1,1-Dichloroethane	<500.0
1,2-Dichloroethane	<500.0
1,1-Dichloroethene	<500.0
trans-1,2-Dichloroethene	<500.0
1,2-Dichloropropane	<500.0
cis-1,3-Dichloropropene	<500.0
trans-1,3-Dichloropropene	<500.0
Methylene Chloride	<500.0
1,1,2,2-Tetrachloroethane	<500.0
Tetrachloroethene	<500.0
1,1,1-Trichloroethane	<500.0

M601 = ug/L (parts per billion) by M601

HYDROLOGIC COLUMBIA
EPA M601 Continued

Date : 5/11/94
Project : Parris Island 1134-94-202
Client : S & ME, Inc.

<u>ANALYSIS</u>	<u>Sample ID/Client ID</u> <u>94-2145/D-14.5</u>
1,1,2-Trichloroethane	<500.0
Trichloroethene	<500.0
Trichlorofluoromethane	<500.0
Vinyl Chloride	<500.0
cis-1,2-Dichloroethylene	9250

M601 = ug/L (parts per billion) by M601
Dilution Factor x 500

Data Approved for Release:

Robert D. Downing
Robert D. Downing
Laboratory Manager

HYDROLOGIC COLUMBIA
Sample Data Report
NC Certification No. 400
SC Certification No. 40101
Kentucky Certification No. 70002
EPA M601

Date : 5/11/94
Project : Parris Island 1134-94-202
Client : S & ME, Inc.
Date Collected : None Given
Date Received : 5/2/94
Date Analyzed : 5/6/94
Date Reported : 5/11/94

Sample ID/Client ID
94-2146/Z-18.5

ANALYSIS

Bromodichloromethane	<10.0
Bromoform	<10.0
Bromomethane	<10.0
Carbon Tetrachloride	<10.0
Chlorobenzene	<10.0
Chloroethane	<10.0
2-Chloro Ethyl Vinyl Ether	<10.0
Chloroform	<10.0
Chloromethane	<10.0
Dibromochloromethane	<10.0
1,2-Dichlorobenzene	<10.0
1,3-Dichlorobenzene	<10.0
1,4-Dichlorobenzene	<10.0
Dichlorofluoromethane	<10.0
1,1-Dichloroethane	<10.0
1,2-Dichloroethane	<10.0
1,1-Dichloroethene	<10.0
trans-1,2-Dichloroethene	<10.0
1,2-Dichloropropane	<10.0
cis-1,3-Dichloropropene	<10.0
trans-1,3-Dichloropropene	<10.0
Methylene Chloride	<10.0
1,1,2,2-Tetrachloroethane	<10.0
Tetrachloroethene	<10.0
1,1,1-Trichloroethane	<10.0

M601 = ug/L (parts per billion) by M601

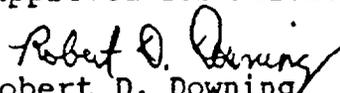
HYDROLOGIC COLUMBIA
EPA M601 Continued

Date : 5/11/94
Project : Parris Island 1134-94-202
Client : S & ME, Inc.

<u>ANALYSIS</u>	<u>Sample ID/Client ID</u> <u>94-2146/Z-18.5</u>
1,1,2-Trichloroethane	<10.0
Trichloroethene	20.0
Trichlorofluoromethane	<10.0
Vinyl Chloride	<10.0
cis-1,2-Dichloroethylene	340

M601 = ug/L (parts per billion) by M601
Dilution Factor x 10

Data Approved for Release:


Robert D. Downing
Laboratory Manager

HYDROLOGIC COLUMBIA
 Sample Data Report
 NC Certification No. 400
 SC Certification No. 40101
 Kentucky Certification No. 70002
 EPA M601

Date : 5/11/94
 Project : Parris Island 1134-94-202
 Client : S & ME, Inc.
 Date Collected : None Given
 Date Received : 5/2/94
 Date Analyzed : 5/6/94
 Date Reported : 5/11/94

Sample ID/Client ID
94-2147/F-20

ANALYSIS

Bromodichloromethane	<1.0
Bromoform	<1.0
Bromomethane	<1.0
Carbon Tetrachloride	<1.0
Chlorobenzene	<1.0
Chloroethane	<1.0
2-Chloro Ethyl Vinyl Ether	<1.0
Chloroform	<1.0
Chloromethane	<1.0
Dibromochloromethane	<1.0
1,2-Dichlorobenzene	<1.0
1,3-Dichlorobenzene	<1.0
1,4-Dichlorobenzene	<1.0
Dichlorofluoromethane	<1.0
1,1-Dichloroethane	<1.0
1,2-Dichloroethane	<1.0
1,1-Dichloroethene	<1.0
trans-1,2-Dichloroethene	<1.0
1,2-Dichloropropane	<1.0
cis-1,3-Dichloropropene	<1.0
trans-1,3-Dichloropropene	<1.0
Methylene Chloride	<1.0
1,1,2,2-Tetrachloroethane	<1.0
Tetrachloroethene	1.3
1,1,1-Trichloroethane	<1.0

M601 = ug/L (parts per billion) by M601

HYDROLOGIC COLUMBIA
EPA M601 Continued

Date : 5/11/94
Project : Parris Island 1134-94-202
Client : S & ME, Inc.

<u>ANALYSIS</u>	<u>Sample ID/Client ID</u>
	<u>94-2147/F-20</u>
1,1,2-Trichloroethane	<1.0
Trichloroethene	<1.0
Trichlorofluoromethane	<1.0
Vinyl Chloride	<1.0
cis-1,2-Dichloroethylene	2.7

M601 = ug/L (parts per billion) by M601

Data Approved for Release:

Robert D. Downing
Robert D. Downing
Laboratory Manager

H Y D R O L O G I C , I N C .

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242

 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5391
 HYDROLOGIC LAB I.D.#: 70002
 SAMPLE IDENTIFICATION: #94-2244 B-185
 DATE SAMPLED: 5/4/94
 DATE EXTRACTED: N/A
 DATE/TIME ANALYZED: 5/16/94

METHOD EPA 8010

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
Benzyl chloride	100-44-7	0.001	BDL
Bromobenzene	108-86-1	0.001	BDL
Bromodichloromethane	75-27-4	0.001	BDL
Bromoform	75-25-2	0.001	BDL
Bromomethane	74-83-9	0.005	BDL
Carbon Tetrachloride	56-23-5	0.001	BDL
Chlorobenzene	108-90-7	0.001	BDL
Chloroethane	75-00-3	0.005	BDL
Chloroform	67-66-3	0.001	BDL
2-Chloroethyl vinyl ether	110-75-8	0.005	BDL
Chloromethane	74-87-3	0.005	BDL
Dibromochloromethane	124-48-1	0.001	BDL
Dibromomethane	74-95-3	0.001	BDL
1,2-Dichlorobenzene	95-50-1	0.001	BDL
1,3-Dichlorobenzene	541-73-1	0.001	BDL
1,4-Dichlorobenzene	106-46-7	0.001	BDL
Dichlorofluoromethane	75-43-4	0.005	BDL
1,1-Dichloroethane	75-34-3	0.001	BDL
1,2-Dichloroethane	107-06-2	0.001	BDL
1,1-Dichloroethene	75-35-4	0.001	BDL
trans-1,2-Dichloroethene	156-60-5	0.001	BDL
Dichloromethane	75-09-2	0.001	BDL
1,2-Dichloropropane	78-87-5	0.001	BDL
cis-1,3-Dichloropropene	10061-01-5	0.001	BDL
trans-1,3-Dichloropropene	10061-02-6	0.001	BDL

Page 2 continued

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242
 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5391
 SAMPLE IDENTIFICATION: #94-2244 B-185
 DATE SAMPLED: 5/4/94

METHOD EPA 8010

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
1,1,2,2-Tetrachloroethane	79-34-5	0.001	BDL
1,1,1,2-Tetrachloroethane	630-20-6	0.001	BDL
Tetrachloroethene	127-18-4	0.001	0.004
1,1,1-Trichloroethane	71-55-6	0.001	BDL
1,1,2-Trichloroethane	79-00-5	0.001	BDL
Trichloroethene	79-01-6	0.001	BDL
Trichlorofluoromethane	75-69-4	0.005	BDL
1,2,3-Trichloropropane	96-18-4	0.001	BDL
Vinyl Chloride	75-01-4	0.005	BDL

BDL = Below Sample Detection Limit
 SDL = Sample Detection Limit

COMMENTS: _____

H Y D R O L O G I C , I N C .

COMPANY NAME: Hydrologic-Columbia, Inc.
COMPANY PROJECT NUMBER: #94-2242

HYDROLOGIC PROJECT NUMBER: FL94-5389
HYDROLOGIC SAMPLE NUMBER: 5392
HYDROLOGIC LAB I.D.#: 70002
SAMPLE IDENTIFICATION: #94-2245 72-A
DATE SAMPLED: 5/4/94
DATE EXTRACTED: N/A
DATE/TIME ANALYZED: 5/9/94

METHOD EPA 601

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (ug/l)	<u>RESULT</u> (ug/l)
Bromodichloromethane	75-27-4	1.0	BDL
Bromoform	75-25-2	1.0	BDL
Bromomethane	74-83-9	1.0	BDL
Carbon Tetrachloride	56-23-5	1.0	BDL
Chlorobenzene	108-90-7	1.0	BDL
Chloroethane	75-00-3	1.0	BDL
2-Chloro Ethyl Vinyl Ether	110-75-8	1.0	BDL
Chloroform	67-66-3	1.0	BDL
Chloromethane	74-87-3	1.0	BDL
Dibromochloromethane	124-48-1	1.0	BDL
1,2-Dichlorobenzene	95-50-1	1.0	BDL
1,3-Dichlorobenzene	541-73-1	1.0	BDL
1,4-Dichlorobenzene	106-46-7	1.0	BDL
Dichlorofluoromethane	75-43-4	1.0	BDL
1,1-Dichloroethane	75-34-3	1.0	BDL
1,2-Dichloroethane	107-06-2	1.0	BDL
1,1-Dichloroethene	75-35-4	1.0	BDL
trans-1,2-Dichloroethene	156-60-5	1.0	BDL
1,2-Dichloropropane	78-87-5	1.0	BDL
cis-1,3-Dichloropropene	10061-01-5	1.0	BDL
trans-1,3-Dichloropropene	10061-02-6	1.0	BDL
Methylene Chloride	75-09-2	1.0	BDL
1,1,2,2-Tetrachloroethane	79-34-5	1.0	BDL
Tetrachloroethene	127-18-4	1.0	BDL
1,1,1-Trichloroethane	71-55-6	1.0	BDL

Page 2 continued

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242
 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5392
 SAMPLE IDENTIFICATION: #94-2245 PZ-4
 DATE SAMPLED: 5/4/94

METHOD EPA 601

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (ug/l)	<u>RESULT</u> (ug/l)
1,1,2-Trichloroethane	79-00-5	1.0	BDL
Trichloroethene	79-01-6	1.0	BDL
Trichlorofluoromethane	75-69-4	1.0	BDL
Vinyl Chloride	75-01-4	1.0	BDL
cis-1,2-Dichloroethylene	541-59-4	1.0	BDL

BDL = Below Sample Detection Limit
 SDL = Sample Detection Limit

COMMENTS: _____

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242

 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5392
 HYDROLOGIC LAB I.D.#: 70002
 SAMPLE IDENTIFICATION: #94-2245 P2-4
 DATE SAMPLED: 5/4/94
 DATE EXTRACTED: 5/6/94
 DATE/TIME ANALYZED: 5/10/94

METHOD TPH 3550

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (ug/l)	<u>RESULT</u> (ug/l)
DIESEL		100	BDL

BDL = Below Sample Detection Limit
 SDL = Sample Detection Limit

COMMENTS: _____

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242
 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5389
 HYDROLOGIC LAB I.D.#: 70002
 SAMPLE IDENTIFICATION: #94-2242 FZ-4<
 DATE SAMPLED: 5/4/94
 DATE EXTRACTED: N/A
 DATE/TIME ANALYZED: 5/16/94

METHOD EPA 8010

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
Benzyl chloride	100-44-7	0.001	BDL
Bromobenzene	108-86-1	0.001	BDL
Bromodichloromethane	75-27-4	0.001	BDL
Bromoform	75-25-2	0.001	BDL
Bromomethane	74-83-9	0.005	BDL
Carbon Tetrachloride	56-23-5	0.001	BDL
Chlorobenzene	108-90-7	0.001	BDL
Chloroethane	75-00-3	0.005	BDL
Chloroform	67-66-3	0.001	BDL
2-Chloroethyl vinyl ether	110-75-8	0.005	BDL
Chloromethane	74-87-3	0.005	BDL
Dibromochloromethane	124-48-1	0.001	BDL
Dibromomethane	74-95-3	0.001	BDL
1,2-Dichlorobenzene	95-50-1	0.001	BDL
1,3-Dichlorobenzene	541-73-1	0.001	BDL
1,4-Dichlorobenzene	106-46-7	0.001	BDL
Dichlorofluoromethane	75-43-4	0.005	BDL
1,1-Dichloroethane	75-34-3	0.001	BDL
1,2-Dichloroethane	107-06-2	0.001	BDL
1,1-Dichloroethene	75-35-4	0.001	BDL
trans-1,2-Dichloroethene	156-60-5	0.001	BDL
Dichloromethane	75-09-2	0.001	BDL
1,2-Dichloropropane	78-87-5	0.001	BDL
cis-1,3-Dichloropropene	10061-01-5	0.001	BDL
trans-1,3-Dichloropropene	10061-02-6	0.001	BDL

Page 2 continued

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242
 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5389
 SAMPLE IDENTIFICATION: #94-2242 PZ-45
 DATE SAMPLED: 5/4/94

METHOD EPA 8010

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
1,1,2,2-Tetrachloroethane	79-34-5	0.001	BDL
1,1,1,2-Tetrachloroethane	630-20-6	0.001	BDL
Tetrachloroethene	127-18-4	0.001	BDL
1,1,1-Trichloroethane	71-55-6	0.001	BDL
1,1,2-Trichloroethane	79-00-5	0.001	BDL
Trichloroethene	79-01-6	0.001	BDL
Trichlorofluoromethane	75-69-4	0.005	BDL
1,2,3-Trichloropropane	96-18-4	0.001	BDL
Vinyl Chloride	75-01-4	0.005	BDL

BDL = Below Sample Detection Limit
 SDL = Sample Detection Limit

COMMENTS: _____

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242
 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5392
 HYDROLOGIC LAB I.D.#: 70002
 SAMPLE IDENTIFICATION: #94-2245 P2-45
 DATE SAMPLED: 5/4/94
 DATE ANALYZED: 5/9/94

<u>ANALYSIS</u>	<u>METHOD</u>	<u>UNITS</u>	<u>SDL</u>	<u>RESULT</u>
Oil and Grease	TPH 9070	mg/l	1.0	BDL

BDL = Below Sample Detection Limit
 SDL = Sample Detection Limit

COMMENTS: _____

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242
 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5390
 HYDROLOGIC LAB I.D.#: 70002
 SAMPLE IDENTIFICATION: #94-2243 PZ 5 - Soil
 DATE SAMPLED: 5/4/94
 DATE EXTRACTED: 5/6/94
 DATE/TIME ANALYZED: 5/12/94

METHOD EPA 8270

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
Acenaphthene	83-32-9	0.6	BDL
Acenaphthylene	208-96-8	0.6	BDL
Aniline	62-53-3	0.6	BDL
Anthracene	120-12-7	0.6	BDL
Benzidine	92-87-5	0.6	BDL
Benzoic Acid	65-85-0	3.3	BDL
Benzo(a)Anthracene	56-55-3	0.6	BDL
Benzo(b)Fluoranthene	205-99-2	0.6	BDL
Benzo(k)Fluoranthene	207-08-9	0.6	BDL
Benzo(g,h,i)Perylene	191-24-2	0.6	BDL
Benzo(a)Pyrene	50-32-8	0.6	BDL
Benzyl Alcohol	100-51-6	1.3	BDL
Bis(2-Chloroethoxy)Methane	111-91-1	0.6	BDL
Bis(2-Chloroethyl)Ether	111-44-4	0.6	BDL
Bis(2-Chloroisopropyl)Ether	39638-32-9	0.6	BDL
Bis(2-Ethylhexyl)Phthalate	117-81-7	0.6	BDL
4-Bromophenyl Phenyl Ether	101-55-3	0.6	BDL
Butyl Benzyl Phthalate	85-68-7	0.6	BDL
4-Chloroaniline	106-47-8	1.3	BDL
1-Chloronaphthalene		0.6	BDL
2-Chloronaphthalene	91-58-7	0.6	BDL
4-Chloro-3-Methyl Phenol	59-50-7	1.3	BDL
2-Chlorophenol	95-57-8	0.6	BDL
4-Chlorophenyl Phenyl Ether	7005-72-3	0.6	BDL
Chrysene	218-01-9	0.6	BDL

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242
 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5390
 SAMPLE IDENTIFICATION: #94-2243 PZ-S Soil
 DATE SAMPLED: 5/4/94

METHOD EPA 8270

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
Dibenz(a,h)Anthracene	53-70-3	0.6	BDL
Dibenzofuran	132-64-9	0.6	BDL
Di-N-Butylphthalate	84-74-2	0.6	BDL
1,3-Dichlorobenzene	541-73-1	0.6	BDL
1,4-Dichlorobenzene	106-46-7	0.6	BDL
1,2-Dichlorobenzene	95-50-1	0.6	BDL
3,3'-Dichlorobenzidine	91-94-1	1.3	BDL
2,4-Dichlorophenol	120-83-2	0.6	BDL
2,6-Dichlorophenol	87-65-0	0.6	BDL
Diethylphthalate	84-66-2	0.6	BDL
A,A-Dimethylphenethylamine	122-09-8	0.6	BDL
2,4-Dimethylphenol	105-67-9	0.6	BDL
Dimethylphthalate	131-11-3	0.6	BDL
4,6-Dinitro-2-Methylphenol	534-52-1	3.3	BDL
2,4-Dinitrophenol	51-28-5	5.3	BDL
2,4-Dinitrotoluene	121-14-2	0.6	BDL
2,6-Dinitrotoluene	606-20-2	0.6	BDL
Diphenylamine	122-39-4	0.6	BDL
Di-N-Octylphthalate	117-84-0	0.6	BDL
Fluoranthene	206-44-0	0.6	BDL
Fluorene	86-73-7	0.6	BDL
Hexachlorobenzene	118-74-1	0.6	BDL
Hexachlorobutadiene	87-68-3	0.6	BDL
Hexachlorocyclopentadiene	77-47-4	0.6	BDL

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242
 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5390
 SAMPLE IDENTIFICATION: #94-2243 PZ-5 Soil
 DATE SAMPLED: 5/4/94

METHOD EPA 8270

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
Hexachloroethane	67-72-1	0.6	BDL
Indeno(1,2,3-cd)Pyrene	193-39-5	0.6	BDL
Isophorone	78-59-1	0.6	BDL
2-Methylnaphthalene	91-57-6	0.6	BDL
2-Methylphenol	95-48-7	0.6	BDL
4-Methylphenol	106-44-5	0.6	BDL
Naphthalene	91-20-3	0.6	BDL
2-Nitroaniline	88-74-4	3.3	BDL
3-Nitroaniline	99-09-2	3.3	BDL
4-Nitroaniline	100-01-6	3.3	BDL
Nitrobenzene	98-95-3	0.6	BDL
2-Nitrophenol	88-75-5	0.6	BDL
4-Nitrophenol	100-02-7	3.3	BDL
N-Nitroso-Di-N-Butylamine	924-16-3	0.6	BDL
N-Nitrosodimethylamine	62-75-9	0.6	BDL
N-Nitrosodiphenylamine	86-30-6	0.6	BDL
N-Nitrosodipropylamine	621-64-7	0.6	BDL
Pentachlorophenol	87-86-5	3.3	BDL
Phenanthrene	85-01-8	0.6	BDL
Phenol	108-95-2	0.6	BDL
Pyrene	129-00-0	0.6	BDL
1,2,4,5-Tetrachlorobenzene	95-94-3	0.6	BDL
2,3,4,6-Tetrachlorophenol	58-90-2	0.6	BDL
1,2,4-Trichlorobenzene	120-82-1	0.6	BDL

Page 4 continued

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242
 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5390
 SAMPLE IDENTIFICATION: #94-2243 PZ - 5 Soil
 DATE SAMPLED: 5/4/94

METHOD EPA 8270

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
2,4,5-Trichlorophenol	95-95-4	0.6	BDL
2,4,6-Trichlorophenol	88-06-2	0.6	BDL
Surrogate Recovery:			
2-Fluorobiphenyl			114%
Nitrobenzene-d5			114%
4-Terphenyl-D14			121%
2-Fluorophenol			108%
Phenol-D5			110%
2,4,6-Tribromophenol			97%

BDL = Below Sample Detection Limit
 SDL = Sample Detection Limit

COMMENTS: _____

H Y D R O L O G I C , I N C .

COMPANY NAME: Hydrologic-Columbia, Inc.
COMPANY PROJECT NUMBER: #94-2242
HYDROLOGIC PROJECT NUMBER: FL94-5389
HYDROLOGIC SAMPLE NUMBER: 5390
HYDROLOGIC LAB I.D.#: 70002
SAMPLE IDENTIFICATION: #94-2243 PZ-S soil
DATE SAMPLED: 5/4/94
DATE EXTRACTED: 5/6/94
DATE/TIME ANALYZED: 5/13/94

TENTATIVELY IDENTIFIED COMPOUNDS
(solid samples)

<u>COMPOUND NAME</u>	<u>ESTIMATED CONCENTRATION</u> (mg/kg)
DECANE	7.7
2-PIPERIDINONE	2.3
OCTANE, 2,3,6-TRIMETHYL	1.0
NONANE, 2-METHYL	1.1
HEPTANE, 2,3,4-TRIMETHYL	1.0
OCTANE, 2,3,7-TRIMETHYL	1.0
DECANE, 2,5,6-TRIMETHYL	1.3

BDL = Below Sample Detection Limit
SDL = Sample Detection Limit

COMMENTS: _____

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242

 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5390
 HYDROLOGIC LAB I.D.#: 70002
 SAMPLE IDENTIFICATION: #94-2243 PZ-5 Soil
 DATE SAMPLED: 5/4/94
 DATE EXTRACTED: 5/6/94
 DATE/TIME ANALYZED: 5/7/94

METHOD TPH 3550

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (mg/kg)	<u>RESULT</u> (mg/kg)
Diesel		1.0	BDL

BDL = Below Sample Detection Limit
 SDL = Sample Detection Limit

COMMENTS: _____

COMPANY NAME: Hydrologic-Columbia, Inc.
COMPANY PROJECT NUMBER: #94-2242

HYDROLOGIC PROJECT NUMBER: FL94-5389
HYDROLOGIC SAMPLE NUMBER: 5390
HYDROLOGIC LAB I.D.#: 70002
SAMPLE IDENTIFICATION: #94-2243 PZ-5 SOIL
DATE SAMPLED: 5/4/94
DATE ANALYZED: 5/9/94

<u>ANALYSIS</u>	<u>METHOD</u>	<u>UNITS</u>	<u>SDL</u>	<u>RESULT</u>
Oil and Grease	TPH 9071	mg/kg	10	BDL

BDL = Below Sample Detection Limit
SDL = Sample Detection Limit

COMMENTS: _____

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242
 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5393
 HYDROLOGIC LAB I.D.#: 70002
 SAMPLE IDENTIFICATION: #94-2246 PZ-5
 DATE SAMPLED: 5/4/94
 DATE EXTRACTED: N/A
 DATE/TIME ANALYZED: 5/13/94

METHOD EPA 624

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (ug/l)	<u>RESULT</u> (ug/l)
Chloromethane	74-87-3	5.0	BDL
Bromomethane	74-83-9	5.0	BDL
Vinyl Chloride	75-01-4	5.0	BDL
Chloroethane	75-00-3	5.0	BDL
Methylene Chloride	75-09-2	5.0	BDL
Trichlorofluoromethane	75-69-4	5.0	BDL
1,1-Dichloroethene	75-35-4	1.0	8.0
1,1-Dichloroethane	75-34-3	1.0	24
trans-1,2-Dichloroethene	156-60-5	2.0	BDL
Chloroform	67-66-3	1.0	BDL
1,2-Dichloroethane	107-06-2	1.0	BDL
1,1,1-Trichloroethane	71-55-6	1.0	BDL
Carbon Tetrachloride	56-23-5	1.0	BDL
Bromodichloromethane	75-27-4	1.0	BDL
1,2-Dichloropropane	78-87-5	1.0	BDL
cis-1,3-Dichloropropene	10061-01-5	5.0	BDL
Trichloroethene	79-01-6	1.0	BDL
Dibromochloromethane	124-48-1	1.0	BDL
1,1,2-Trichloroethane	79-00-5	1.0	BDL
Benzene	71-43-2	1.0	BDL
trans-1,3-Dichloropropene	10061-02-6	5.0	BDL
2-Chloroethyl vinyl ether	110-75-8	5.0	BDL
Bromoform	75-25-2	1.0	BDL
Tetrachloroethene	127-18-4	1.0	BDL
1,1,2,2-Tetrachloroethane	79-34-5	1.0	BDL

Page 2 continued

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242
 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5393
 SAMPLE IDENTIFICATION: #94-2246 PZ-5
 DATE SAMPLED: 5/4/94

METHOD EPA 624

<u>ANALYSIS</u>	<u>CAS NO.</u>	<u>SDL</u> (ug/l)	<u>RESULT</u> (ug/l)
Toluene	108-88-3	1.0	24
Chlorobenzene	108-90-7	1.0	BDL
Ethylbenzene	100-41-4	1.0	5.6
1,2-Dichlorobenzene	95-50-1	5.0	BDL
1,3-Dichlorobenzene	541-73-1	5.0	BDL
1,4-Dichlorobenzene	106-46-7	5.0	BDL

BDL = Below Sample Detection Limit
 SDL = Sample Detection Limit

COMMENTS: _____

COMPANY NAME: Hydrologic-Columbia, Inc.
 COMPANY PROJECT NUMBER: #94-2242
 HYDROLOGIC PROJECT NUMBER: FL94-5389
 HYDROLOGIC SAMPLE NUMBER: 5393
 HYDROLOGIC LAB I.D.#: 70002
 SAMPLE IDENTIFICATION: #94-2246 P2.5
 DATE SAMPLED: 5/4/94
 DATE EXTRACTED: N/A
 DATE/TIME ANALYZED: 5/13/94

TENTATIVELY IDENTIFIED COMPOUNDS
(water samples)

<u>COMPOUND NAME</u>	<u>ESTIMATED CONCENTRATION</u> (ug/l)
cis-1,2-dichloroethene	1580
xylene	25
1,3,5-trimethylbenzene	31
1,2,4-trimethylbenzene	223
1-ethyl-3-methylbenzene	39
1-ethenyl-2-methylbenzene	31
2-ethyl-1,4-dimethylbenzene	21
naphthalene	18

BDL = Below Sample Detection Limit
 SDL = Sample Detection Limit

COMMENTS: _____

APPENDIX VII

LABORATORY RESULTS FROM INITIAL INVESTIGATION

6280
NREAO
31 Mar 94

FACT SHEET

Subject: SPILL 11 MARCH 1994 DRY CLEANING PLANT

On 11 March 1994, a reportable spill of Tetrachloroethylene at the MWR Dry Cleaners was noted by the Environmental Office and reported to SCDHEC.

On 14 March 1994, samples were taken from the water in the containment basin and soil by the discharge line and sent off for analysis. The results were positive. The allowable limits under RCRA is 0.7 ppm (parts per million). Sample 1 (containment basin) indicated 2000 ppm. Sample 2 (berm/road) indicated 3000 ppm, (Encl 1).

On 15 March 1994, the National Response Center was notified. As required by regulation one pound of contaminants discharged into the environment is reportable.

On 18 March 1994, the Environmental Officer, Mr. Clark, surveyed the ground to identify the extent of contamination.

On 19 March 1994, seventeen samples were taken from the ground along the side of the road some of which were taken through holes bored in the road surface to quantify the contamination. Results indicated contamination has leached through the cracks in the road to the subsurface in excess of RCRA limits (Encl 2).

Mr. Russell Berry of the South Carolina Department of Health and Environmental Control Office inspected the site on March 14, 1994. He expressed concerns of clean up to meet the RCRA limits of 0.7 ppm.

Mr. Clark has been advised by the DRMO who administers the HW contract that a roll-off container can be obtained for \$2000. The containerized material would go out at fifty cents per pound.

Johnsie A. Nabors
NREAO Ext. 2779

PAGE 1
RECEIVED: 03/15/94

--RECLAMATION-- REPORT
03/17/94 10:54:00

WORK ORDER # 94-03-019

REPORT DIC.NAVFAC CONTRACTS
TO BUILDING 864, P.O. BOX 5035
PARRIS ISLAND, S.C. 29905

PREPARED RECLAMATION SERVICES INC
BY 701 TEMPLE STREET
CENTRAL CITY, KENTUCKY 42530

Sue P. Cardwell
CERTIFIED BY

ATTEN JAMES CLARK

ATTEN ANALYTICAL LABORATORY
PHONE 502 754 3976

CONTACT SUE CARDELL

CLIENT PARRIS ISLAND SAMPLES 2
COMPANY DIC.NAVFAC CONTRACTS
FACILITY PARRIS ISLAND MCRD

SUE POOLE CARDELL
PRESIDENT

WORK ID DELIVERY ORDER 0038
TAKEN 03/14/94
TRANS RSL
TYPE MISC
P.O. # N62467-92-D-0812
INV. # 9114931

PREVIOUSLY REPORTED ON 03/17/94

SAMPLE IDENTIFICATION
01 94RS026-DRY CLEANING SOIL
02 94RS027-DRY CLEANING WATER

TEST CODES AND NAMES USED ON THIS WORKORDER
TETRA TETRACHLOROETHYLENE

Post-It® brand fax transmittal memo 7671		# of pages »
To: <i>James Clark</i>	From: <i>Sue Cardwell</i>	
Co.	Co.	
Dept.	Phone #	
Fax # <i>803 525 3401</i>	1214	

PAGE 2
RECEIVED: 03/15/94

--RECLAMATION--
RESULTS BY SAMPLE

WORK ORDER # 94-03-019

SAMPLE ID 94RS026-DRY CLEANING SOIL FRACTION D1A TEST CODE 1ETRA NAME TETRACHLOROETHYLENE
DATE & TIME COLLECTED 03/14/94 CATEGORY _____

ANALYTE	ANALYST INITIALS	DATE COMPLETED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLOROETHYLENE	DRP	03/16/94	SV896-8290	50 PPM (PPE)	3000

SAMPLE ID 94RS027-DRY CLEANING WATER FRACTION D2A TEST CODE 1ETRA NAME TETRACHLOROETHYLENE
DATE & TIME COLLECTED 03/14/94 CATEGORY _____

ANALYTE	ANALYST INITIALS	DATE COMPLETED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLOROETHYLENE	DRP	03/16/94	SV896-8290	50 PPM (PPE)	2000

*PPE = parts per billion
PPM = parts per million*

*Inside Room
and out between
door to 4 inches
below space.*

PAGE 1
RECEIVED: 03/22/94

RECLAMATION REPORT
03/28/94 09:35:58

WORK ORDER # 94-03-024

REPORT OIC HAVEAC CONTRACTS
TO BUILDING 804 P.O. BOX 5035
PARRIS ISLAND S.C. 29905

PREPARED RECLAMATION SERVICES INC
BY 201 TEMPLE STREET
CENTRAL CITY, KENTUCKY 42330

Sue P. Cardwell
CERTIFIED BY

ATTEN JAMES CLARK

ATTEN ANALYTICAL LABORATORY
PHONE 502 754 3976

CONTACT SUE CARDWELL

CLIENT PARRIS ISLAND SAMPLES 12
COMPANY OIC HAVEAC CONTRACTS
FACILITY PARRIS ISLAND MORN

SUE POOLE CARDWELL
PRESIDENT

WORK TO DELIVERY ORDER 0039
TAKEN 03/19/94
TRANS RSI
TYPE MISC
P.O. # MS2467-92-D-0812
INVOICE UNDER SEPARATE COVER

SAMPLE IDENTIFICATION

- 01 83027 94RS028
- 02 83028 94RS029
- 03 83029 94RS030
- 04 83030 94RS031
- 05 83031 94RS032
- 06 83032 94RS033
- 07 83033 94RS034
- 08 83034 94RS035
- 09 83035 94RS036
- 10 83036 94RS037
- 11 83037 94RS038
- 12 83038 94RS039
- 13 83039 94RS040
- 14 83040 94RS041
- 15 83041 94RS042
- 16 83042 94RS043
- 17 83043 94RS044

TEST CODES AND NAMES USED ON THIS WORKORDER

1ETRA TETRACHLOROETHYLENE

Post-It® brand fax transmittal memo 7671 # of pages 1

To <i>James Clark</i>	From <i>Sue Cardwell</i>
Co.	Co.
Dept.	Phone #
Fax # <i>803 525 3401</i>	Fax #

LAB I.D. 9803021-01A DATE REPORTED: 03/28/98

SAMPLE DESCRIPTION: ~~XXXXXXXXXX~~
DATE COLLECTED: 03/19/98

Storm Drain

SPC
ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYTE	ANALYST INITIALS	DATE COMPLETED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLOROETHYLENE	DRP	03/26/98	SW846-8020	50 ppb PPB	<0.850

*From boring thru gutter at
3rd or 4th junction from
Excavation near the storm
drain*

LAB I.D. 980302A-02A DATE REPORTED: 03/28/98

1-A

SAMPLE DESCRIPTION 8302A-9805029
DATE COLLECTED: 03/19/98

SAC
ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYTE	ANALYST INITIALS	DATE COMPLETED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLOROETHYLENE	DRP	03/26/98	SW846-8020	50 PPM	<0.050

*Invalid Sample
Broken in transit*

*being thru gutter at 3rd
junction between excavation and
driveway*

LAB I.D. 9303023-03A DATE REPORTED: 03/28/98

SAMPLE DESCRIPTION 
DATE COLLECTED: 03/19/98

SFC
ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYTE	ANALYST INITIALS	DATE COMPLETED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLORDETHYLENE	DRP	03/26/98	S-845-8020	30 PPB	<0.850

*Invalid Sample
Broken in Transit*

LAB I.D. 9903021-04A

DATE REPORTED: 03/28/94

SAMPLE DESCRIPTION

DATE COLLECTED: 03/19/94

SPC

ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYTE	ANALYST INITIALS	DATE COMPLETED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (ppm)
TETRACHLOROETHYLENE	DRP	03/26/94	SW846-8020	50 PPB PPB	88 ppm

LAB I.D. 9903028-05A

DATE REPORTED: 03/28/98

SAMPLE DESCRIPTION

DATE COLLECTED: 03/19/98

SPC

ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYTE	ANALYST INITIALS	DATE COLLECTED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (ppm)
TETRACHLORDETHYLENE	DRP	03/25/98	SW846-8070	50 PFB	250

2nd juncture between the
excavation and storm drain
grass side of curb

LAB I.D. 9403028-06A DATE REPORTED: 03/28/98

SAMPLE DESCRIPTION: 83032 818033
DATE COLLECTED: 03/26/98

SPC
ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYTE	ANALYST INITIALS	DATE COMPLETED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLOROETHYLENE	DRP	03/26/98	SW846-8029	50 PPM	150

LAB I.D. 9903024-02A

DATE REPORTED: 03/28/94

SAMPLE DESCRIPTION

DATE COLLECTED: 03/26/94

SPC

ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYTE	ANALYST INITIALS	DATE COLLECTED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLOROETHYLENE	DRP	03/26/94	SW846-8020	50 PPB	85

*4th juncture from excavation
toward storm drain*

grass side

C-A

LAB I.D. 9403024-D8A DATE REPORTED: 03/28/94

SAMPLE DESCRIPTION ~~_____~~
DATE COLLECTED: 03/19/94

SPC
ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYTE	ANALYST INITIALS	DATE COMPLETED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLOROETHYLENE	DRP	03/26/94	SV846-8028	50 PPM	20

*From boring thru gutter
at juncture*

LAB I.D. 9403024-10A DATE REPORTED: 03/28/98

SAMPLE DESCRIPTION ~~XXXXXXXXXX~~
DATE COLLECTED: 03/19/98

SPC
ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYZE	ANALYST INITIALS	DATE COMPLETED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLOROETHYLENE	DRP	03/26/98	SW846-8020	50 PPM	60

From boring thru gutter at second juncture from excavation toward storm drain

LAB I.D. 9903029-11A DATE REPORTED: 03/28/98

SAMPLE DESCRIPTION: ~~83032 9903029~~
DATE COLLECTED: 03/26/98

SAC
ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYTE	ANALYST INITIALS	DATE COMPLETED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLOROETHYLENE	DRP	03/26/98	SW846-8020	50 PPM	35

*Thru street approx 5'
from curb at 2nd
junction from excavation*

S A

LAB I.D. 980302A-12A DATE REPORTED: 03/28/98

SAMPLE DESCRIPTION ~~XXXXXXXXXX~~
DATE COLLECTED: 03/19/98

SAC
ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYTE	ANALYST INITIALS	DATE COMPLETED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLOROETHYLENE	DRP	03/26/98	SW846-8020	50 PPM	25

*3rd junction from excavation
toward storm drain
grass side of curb*

LAB I.D. 9403028-13A DATE REPORTED: 03/28/98

SAMPLE DESCRIPTION 23039 94RS040
DATE COLLECTED: 03/19/98

SPC
ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

<u>ANALYTE</u>	<u>ANALYST INITIALS</u>	<u>DATE COMPLETED</u>	<u>REFERENCE METHOD</u>	<u>DETECTION LIMIT</u>	<u>CONCENTRATION (PPM)</u>
TETRACHLOROETHYLENE	DRP	03/26/98	SW846-8020	50 PPM	150

*borings thru gutter at 2nd
junction between Excavation and
driveway*

LAB I.D. 9403024-18A DATE REPORTED: 03/28/94

SAMPLE DESCRIPTION ~~ROAD SIDING~~
DATE COLLECTED: 03/19/94

SAC
ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYTE	ANALYST INITIALS	DATE COMPLETED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLOROETHYLENE	DRP	03/26/94	SW845-8020	50 PPM	160

*Soil at 1st juncture in curb
between Excavation and Storm
Drain*

Grass side of curb

LAB I.D. 9A03028-15A DATE REPORTED: 03/28/98

11

SAMPLE DESCRIPTION: 33011 84PS007
DATE COLLECTED: 03/19/98

SFC
ENVIRONMENTAL DIVISION
RECLAMATION SERVICES UNLIMITED

ANALYTE	ANALYST INITIALS	DATE COLLECTED	REFERENCE METHOD	DETECTION LIMIT	CONCENTRATION (PPM)
TETRACHLOROETHYLENE	DRP	03/26/98	SW846-8020	50 PPM	150

*borings thru street approx 5'
from curb at juncture
directly out from plume (excavation)*

APPENDIX VIII

AS/VE EQUIPMENT EXAMPLES

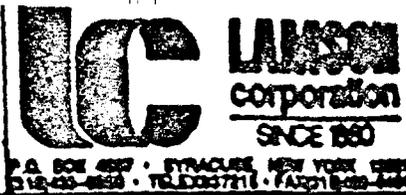
PILOT TEST EQUIPMENT

VE Pilot Unit
(VES-5 Module)

Component List

1. Exhauster - Lanson Corporation Model No. 265
7.5 Hp, 8180 RPM, with 1003 impellers.
Capable of 300 ICFM @ 6" Hg.
2. Electrical Equipment
 - NEC location - Class I , Group D
 - Motor - Toshiba 7.5 Hp 208/230/460 Volt 3 phase
60 Hz. FLA-21.6/19.4/9.7, S.F.-1.15
Xp Locations - Class I, Grp D - Class II,
Grp E, F & G
 - Motor Starter - Allen Bradley - 609U-BHA 3 Phase with 230
volt Low Voltage Protection coil and thermal
overloads - W59.
 - Float Switch - Dwyer Flotech L-6
3. Vacuum Gauge - Dwyer Magnehelic 0 - 150 inches water
4. Pressure Gauge - Dwyer Magnehelic 0 - 5 PSI
5. 2 Flow Gauges - Dwyer Magnehelic 0-2 + 0-1 inches water
Dwyer Pitot Tube - 167-6 CF
6. Water Trap - MRS 2033 with 14" demister and polypropylene
hatch. Demister - SS304 14" OD x 6".
7. Vac Relief
8. Temp Gauges - Inlet 0-250, Outlet 50-500 degrees F

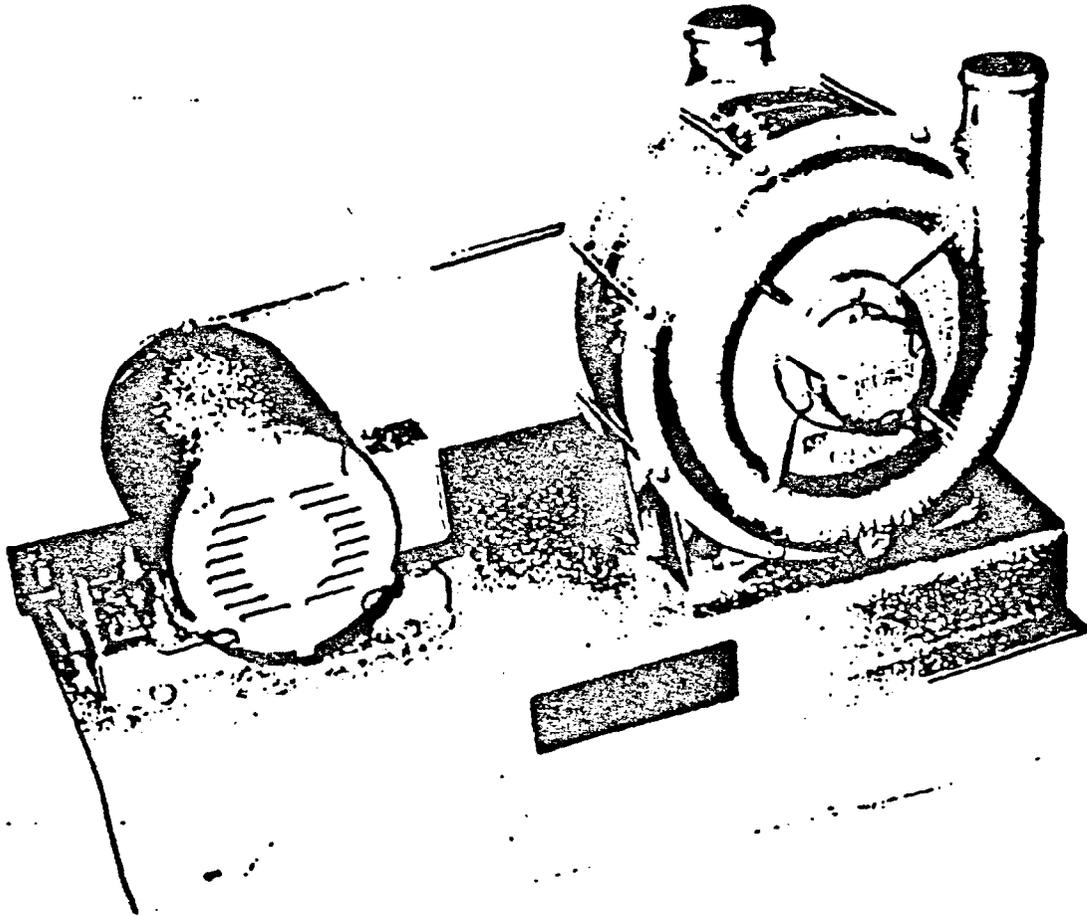
PRODUCT DATA



CENTRAL VACUUM
AIR SYSTEMS

BLOWERS/
EXHAUSTERS

Installation and Operating Instructions "250F" Series



1. HANDLING

Move bare machine by lifting from beneath bearing housings. Move complete assembly by lifting from beneath steel base. DO NOT lift with sling around shaft.

2. LOCATION AND ERECTION

Remove shipping skids. On a firm level surface in a clean dry place, set the unit on the six base pads provided. Locate one under each corner and one under the approximate center of each base flange, toward the heavy end. Do not bolt down. If bolts are used to position machine, omit fastening with nuts.

Remove shipping covers and connect piping. Use extreme caution to prevent foreign material entering blower/exhauster. Use flexible connections between unit and piping system.

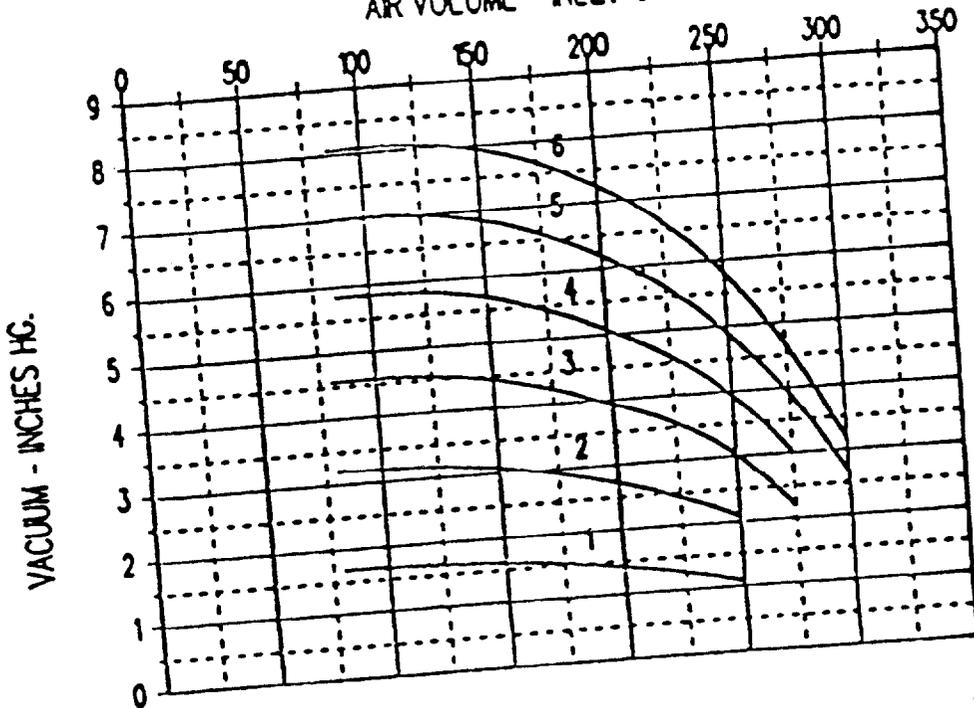
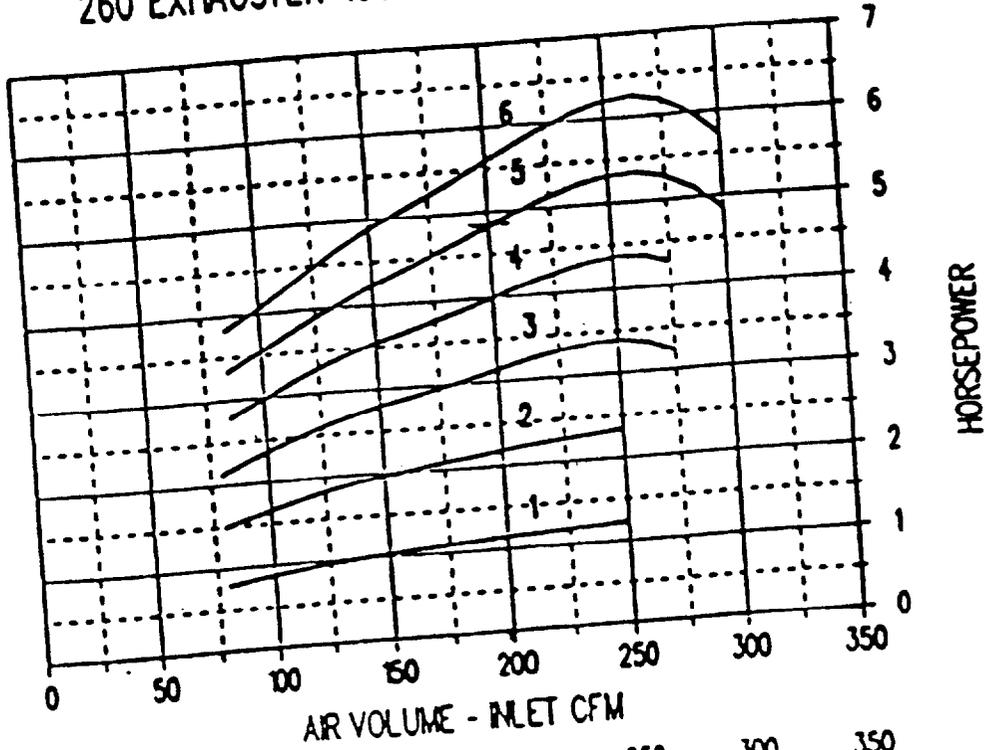
PRODUCT DATA



Over 100 Years of Leadership
LAMSON CORPORATION
P. O. BOX 487, S.W. MAINE ST. W. W. 13221

STANDARD
PERFORMANCE
CURVES

260 EXHAUSTER-1003 IMPELLER-7050 RPM



BAROMETER - 29.92" HG., 68 F

FOR THE BEST PERFORMANCE
PLEASE USE THE FOLLOWING
RECOMMENDED SETTINGS

082-10

25.34.05 R

AIR COMPRESSORS of the Carolinas, Inc.

FAX: 704/398-1888

Telephone: 704/393-3098

800/584-8111

October 12, 1992

Mr. Stewart Hines
S & ME
Post Office Box 7668
Charlotte, NC 28241

*Pilot Unit
Air Compressor*

Dear Mr. Hines:

We are pleased to offer this quotation on the following equipment for your consideration. For our understanding of your requirements, we propose:

CHAMPION AIR COMPRESSOR MODEL VR7-8

Two-stage, 7 1/2 HP, 80 gallon vertical receiver. 400 V, 3 Ø. Includes vibro-isolators, NEMA 4 Pressure Switch, and Magnetic Starter (factory mounted). TEFC Motor, Automatic Tank Drain.

QUOTED UNIT PRICE

OPTIONS

- A. Air-Cooled Aftercooler
- B. Arrow Model R354 Pressure Regulator with Gauge
- C. Arrow Model F502-04 Coalescing Filter

- NOTES: 1. Prices do not include North Carolina sales tax.
2. Freight is prepaid to first destination.
3. Compressor warranty is five years.
4. Prices are subject to change without notice.

Mr. Hines, we appreciate this opportunity to be of service. Should you have any questions or if we may offer additional information, please call us at your convenience. We look forward to hearing from you.

Best regards,

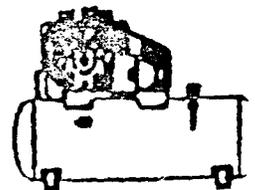
AIR COMPRESSORS OF THE CAROLINAS, INC.

Doug Phillips
Sales Representative

DP/bb



1122 Summerville Road • Charlotte, North Carolina 28214
P.O. Box 949 • Paw Creek, North Carolina 28130



CHAMPION PNEUMATIC MACHINERY CO., INC.
PRINCETON, IL
FAX TRANSMITTAL FORM

Princeton FAX Number---815/872-0421

COMPANY: Air Compressors of the Carolinas FAX: 704-398-1569

TO: Terry Buchanan NO. OF PAGES: 1

FROM: Gene Klocke DATE: 12/17/92

Per your phone request this date, I am sending the flow rates for
a VR7-8 compressor unit running at the 125PSIG speed.

10PSIG-----	34.0CFM
20PSIG-----	33.7CFM
30PSIG-----	33.4CFM
40PSIG-----	33.1CFM
50PSIG-----	32.7CFM
60PSIG-----	32.2CFM
70PSIG-----	31.7CFM
80PSIG-----	31.3CFM
90PSIG-----	31.0CFM
100PSIG-----	30.3CFM
110PSIG-----	30.2CFM
120PSIG-----	30.1CFM
125PSIG-----	30.0CFM

I trust this information is what you require. Please advise if any
further information is required.

Kind regards and Happy Holidays!

Gene Klocke

Gene Klocke

8

AS/VE SYSTEM EQUIPMENT

December 18, 1992
S & ME, INC.
P.O. Box 7668
Charlotte, NC 28241

Terms: 55% On Acceptance
45% On Order
Freight: FOB Coal City, IL
Delivery: 5-6 Weeks
Taxes: Not Included
Price: Valid for 30 Days

Attn: Stewart Hines
Prop. No. 92 MR 0561

Price Proposal
VES7-S Module

One (1) VES7-S Module outfitted with Direct Drive exhauster capable of 540 ICFM @ 7" Hg or 650 ICFM @ 3" Hg.

The VES Module will be outfitted with the following features:

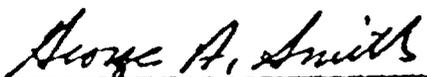
- * One (1) - 15 HP XP, 3 phase, 230/460V, 60 Hz.
- * One (1) - Instrument panel for following monitors:
 - * One (1) - Flowmeter gauge (pressure change).
 - * One (1) - Pressure gauge (PSI).
 - * One (1) - Vacuum gauge (" H₂O).
- * One (1) - Vacuum relief valve - adjustable.
- * One (1) - Outlet temperature gauge.
- * Two (2) - Sample ports with isolation valves.
- * One (1) - Ambient air control valve.
- * One (1) - Water trap/demister w/electrical level shutoff, 1/2" drain valve and SS304 wire mesh demister.
- * Operation & maintenance instructions.
- * Inlet - 4" threaded NPT (male), with 4" butterfly valve.
- * Outlet - 3" threaded NPT (male).
- * All structural components painted white unless you specify company colors.

Module Price:

Options:

- * XP combination magnetic starter mounted on module and wired to level switch.
- * XP Magnetic starter only requires remote circuit breaker.

Submitted by:


George A. Smith, Vice-President
MODULAR REMEDIATION SYSTEMS, INC.

Accepted by:

Authorized Representative
S&ME, INC.



Modular Remediation Systems, Inc.

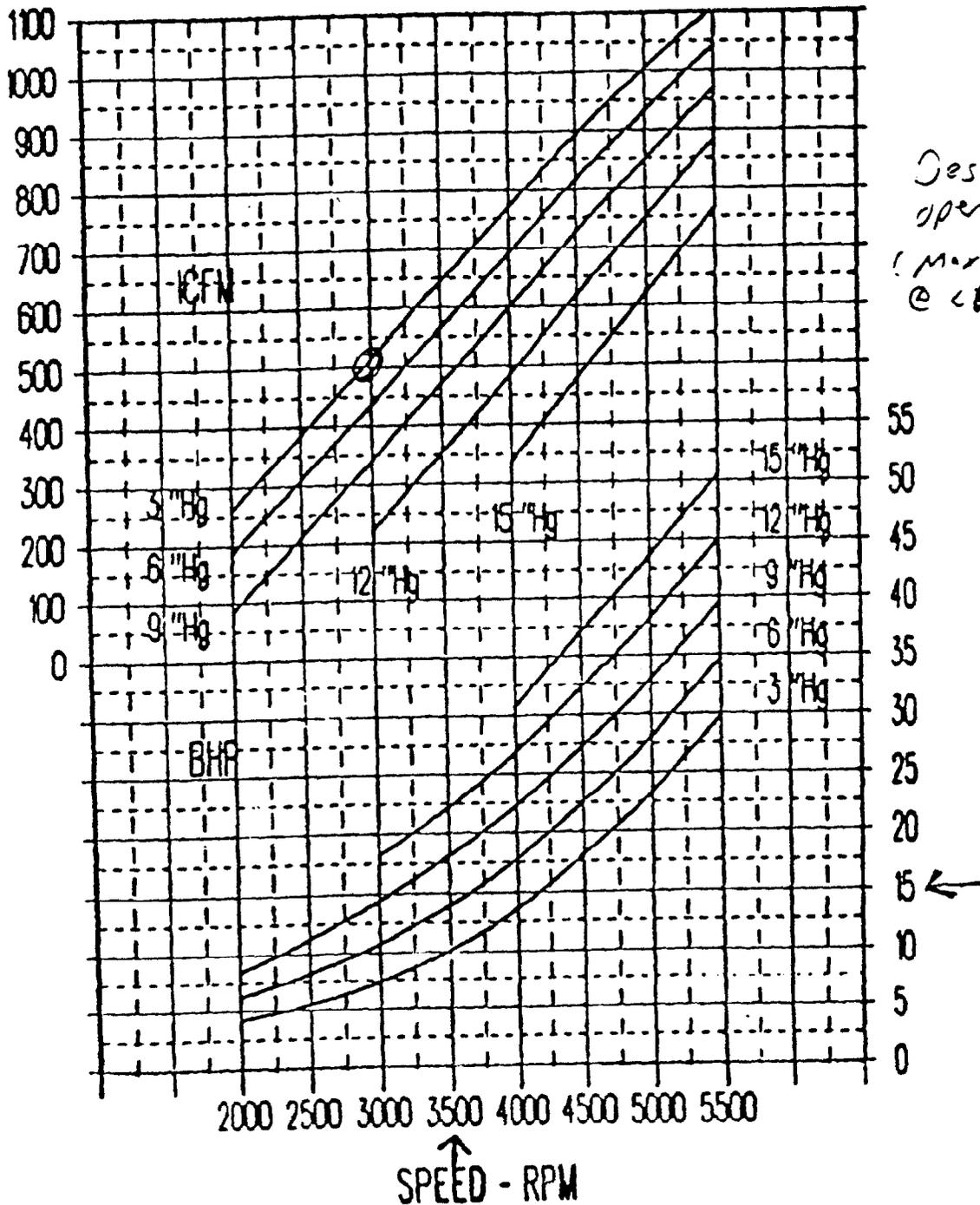
PRODUCT DATA



TURBOTRON

PERFORMANCE CURVES

TURBOTRON EXHAUSTER (ICFM vs. "HG)



Design operating
(Max - 5000 CFM
@ 15" Hg)



December 18, 1992

Mr. Stewart Hines
S&ME
Post Office Box 7668
Charlotte NC 28241

Dear Stewart:

Based on our understanding of your requirements, we are pleased to offer this quotation for your consideration on the following equipment:

- A. GRIMMER SCHMIDT MONOSCREW DIRECT DRIVE AIR COMPRESSOR MODEL DD40
40 HP, 460V, 3 Ø. 185 CFM at 100 PSI. NEMA 4 enclosure for weather protection. Reduced voltage starting (required by Duke Power).

- B. ARROW COALESCING FILTER MODEL F508-08AF
Nominal Flow Rate is 200 CFM. 1" NPT fitting. (Filter for discharge of compressor.)

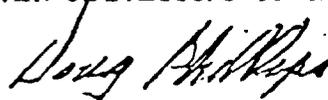
- C. PACKAGE FOR EACH WELLHEAD
consisting of 1 each: 1/2" NPT Coalescer, 1/2" Regulator, Air Flow Control Valve, and Liquid-filled Gauge. NOTE: 5 required.

- NOTES: 1. Freight is to be FOB factory.
2. Prices shown do not include sales/use tax.
3. Prices are subject to change without notice.

Stewart, we appreciate this opportunity to be of service. Should you have any questions or if we may offer additional information, please call us at your convenience. We look forward to hearing from you.

Best regards,

AIR COMPRESSORS OF THE CAROLINAS, INC.



Doug Phillips
Sales Representative

DP/bb



Master Distributor

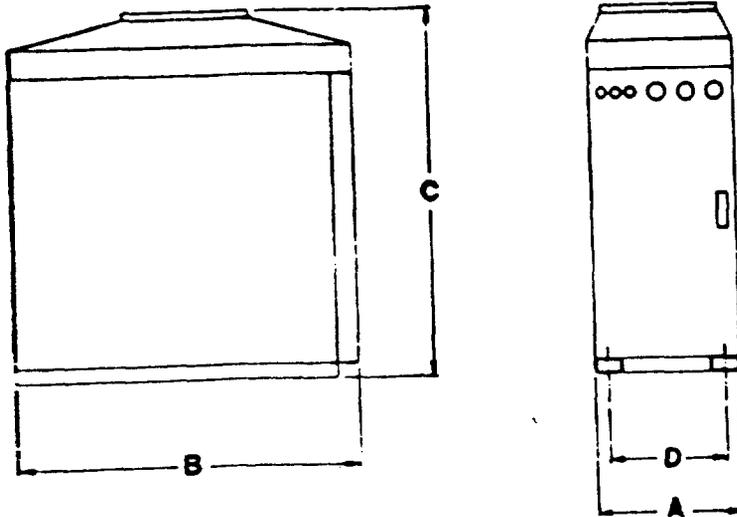
1122 Summerville Road • Charlotte, North Carolina 28214
P.O. Box 949 • Paw Creek, North Carolina 28130





TOLL FREE (800) 428-9703
 (317) 736-8418
 FAX (317) 736-3831

GrimmerSchmidt Compressors



Model	40	50	50X*	60	60X*
Horsepower	40	50	50	60	60
CFM @ 100 psi	185	230	185	250	230
Cu M/min @ 7 Bar	5.2	6.5	5.2	7	6.5
Coolant Cap Gal	5.5	5.5	5.5	5.5	5.5
Liters	21	21	21	21	21
Air Discharge NPT	1.25	1.25	1.25	1.25	1.25
Weight - lbs.	1855	1950	1890	1995	1970
Weight - kg	843	886	859	907	895

Model	40	50	50X*	60	60X*
A inches	30	30	30	30	30
A mm	762	762	762	762	762
B inches	64	64	64	64	64
B mm	1625	1625	1625	1625	1625
C inches	76	76	76	76	76
C mm	1930	1930	1930	1930	1930
D inches	24	24	24	24	24
D mm	610	610	610	610	610

* X denotes High Pressure 150 psi

Other industrial electric compressors available from GrimmerSchmidt include Open MonoScrew Direct Drive series from 40 to 60 hp; Horizontal MonoScrew Direct Drive series from 75 to 250 hp; RatioDrive MonoScrew series from 25 to 40 hp; Oil Free MonoScrew series from 10 to 50 hp; and the Scroll series from 5 to 7.5 hp.

Compressors are electrically driven, single stage MonoScrew compressors completely packaged, wired and piped ready to operate with the following standard equipment:

Motor

230/460 volt, 3-phase, 60 Hz
 Open drip proof NEMA frame

Starter

Magnetic full voltage IEC
 Mounted and wired for 460 V
 Deduct for no starter

Drive Coupling

Flexible direct coupled
 Non-lube type

Air and Oil Cooling

Receiver/Separator ASME
 Oil level indicator
 Oil cooler - air cooled
 Aftercooler - air cooled with automatic condensate trap
 Cooling or ventilating fan motor TEFC
 Oil filter spin-on style
 Heat recovery connection

Frame and Enclosure

Sheet metal enclosure
 NEMA 12

Forklift provision

Instruments and Controls

Hourmeter
 Discharge air pressure gauge
 Receiver air pressure gauge
 Line pressure gauge
 Operating temperature gauge
 Air filter service indicator
 Oil filter service indicator
 110 volt controls
 Start button/power on light
 Reset button/fault indicator
 Compressor "OFF" button

Compressor Controls

High efficiency modulation control
 Energy reduction automatic blowdown valve

Protective Devices

Safety relief valve
 High temperature shutdown valve
 Fan guard
 Motor overload protection

OPTIONAL FEATURES

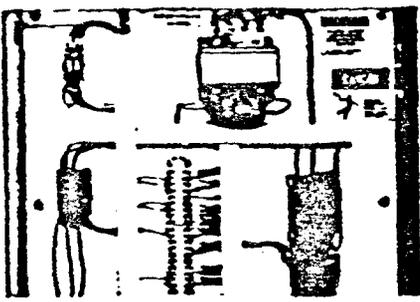
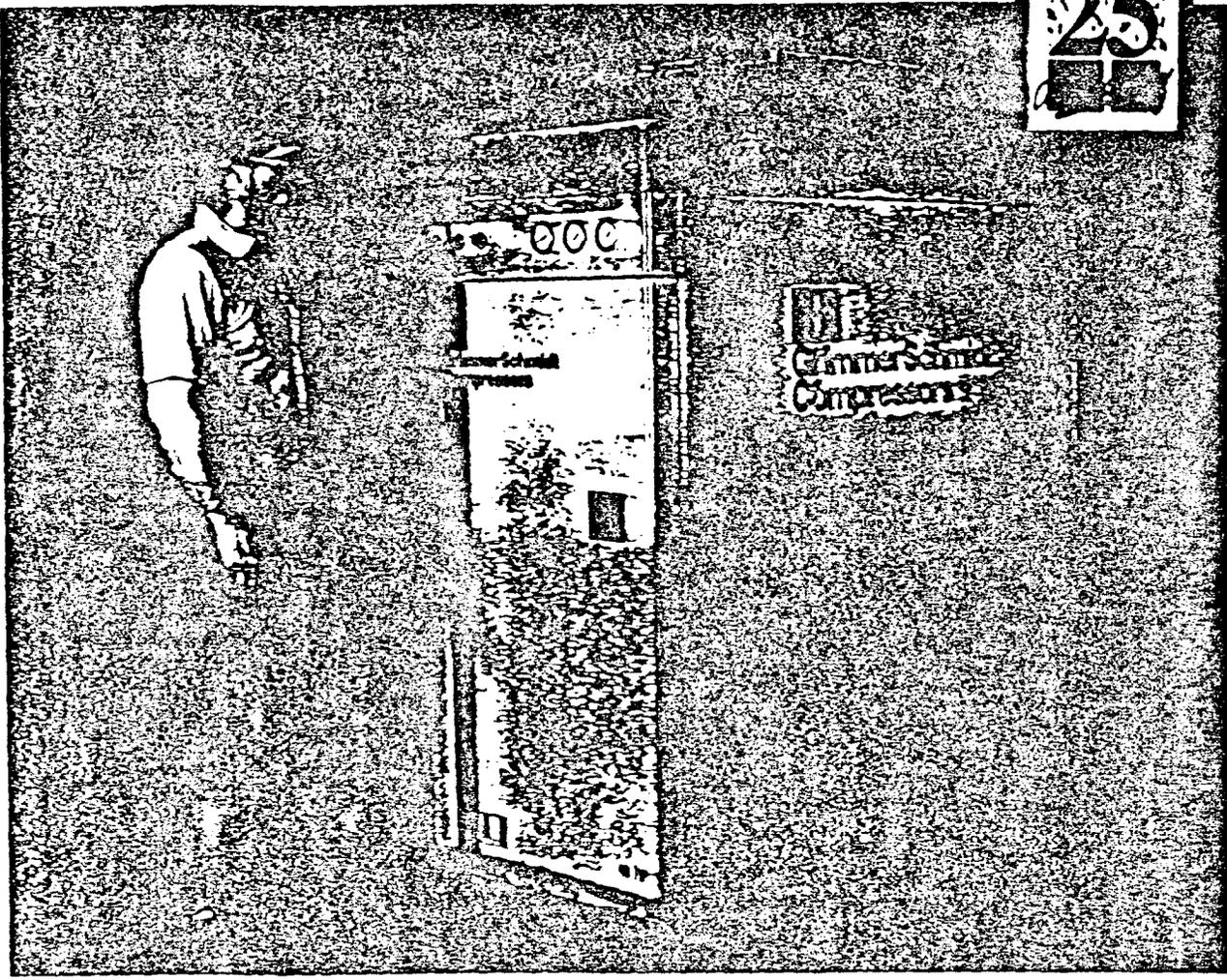
Motor variations:
 200, 208 and 575 volt and TEFC or encapsulated
 On line/off line control
 Auto stop/start control
 Multi-unit sequencer
 Reduced voltage starters
 Special high pressure
 Other NEMA enclosures
 Acoustic enclosure
 Water-cooled compressor
 Deduct for omission of enclosure
 High dust filter
 Consult factory for other required features
 Extended protection plans 5 and 10 years

GrimmerSchmidt Corporation reserves the right to make changes in specifications shown herein, add improvements, or discontinue manufacture without notice or obligation.

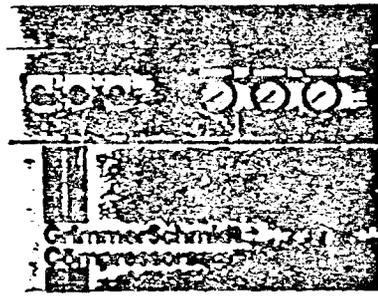


Vertical Monoscrew Direct Drive Compressor
40/50/60 hp

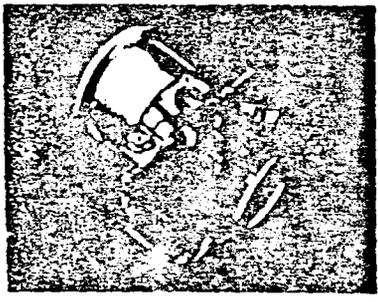
GrimmerSchmidt Compressors



STARTER CONTROL
High reliability and ease of service are possible because the starter control is made from American made "off the shelf" components. There's no need to rely on a computer memory board, which means very limited downtime — another GrimmerSchmidt cost savings advantage.



FULL INSTRUMENTATION
To monitor compressor functions, standard equipment gauges include hourmeter, discharge air pressure gauge, receiver air pressure gauge, line pressure gauge, operating temperature gauge and service indicators for oil and air filters. The 110-volt control circuit uses only readily available components.



MONOSCREW ADVANTAGE
The MonoScrew air end offers several advantages over all rotary compressors. Balanced forces of compression mean longer compressor bearing life. Simple design makes the MonoScrew field rebuildable. The result is less maintenance and lower total cost of operation.

Engineering Data Sheet

21 June 1980

Type		20HP	25HP	30HP	40HP	50HP	70HP	100HP	150HP	200HP
I. General Compressor Data:										
- Capacity (ACFM)	100 PSIG	78	110	125	185	220	300	475	700	900
	● 125 PSIG	74	85	105	-	-	-	-	-	-
	150 PSIG	62	73	100	-	-	-	-	-	-
- Maximum operating pressure		150	150	150	115	115	115	115	110	110
- Minimum operating pressure		80	80	80	80	80	80	80	80	80
- Pressure differential		10	10	10	10	10	10	2	2	2
	● 110 PSIG	10	10	10	10	10	10	2	2	2
- Drive Motor Power (HP)		20	25	30	40	50	70	100	150	200
- Nominal Motor Speed (RPM)		1750	1750	1750	3600	3623	3635	3641	3645	1750
- Motor Speed (RPM)	100 PSIG	2680	3530	4215	3600	3623	3635	3641	3645	1750
	● 125 PSIG	2680	3178	3630	-	-	-	-	-	-
	150 PSIG	2282	2660	3530	-	-	-	-	-	-
- Motor Diameter (inch)		140	140	140	165	190	205	225	255	280
- Motor Tip Speed (M/S)	100 PSIG	19.5	25.8	30.9	30.3	33.2	37.9	41.7	54.7	30.2
	● 125 PSIG	19.5	23.7	25.8	-	-	-	-	-	-
	150 PSIG	17.2	18.5	25.8	-	-	-	-	-	-
- Motor Pulley Diameter (inch)	100 PSIG	7.95	10.55	10.55	-	-	-	-	-	-
	● 125 PSIG	7.85	7.95	10.55	-	-	-	-	-	-
	150 PSIG	6.88	7.95	10.55	-	-	-	-	-	-

02-09-49 WED 01:36

Type		20HP	25HP	30HP	40HP	50HP	70HP	100HP	150HP	200HP
-Compressor Pulley										
Diameter (inch)										
	100 PSIG	6.23	6.23	4.38	.	.	.	.	.	.
	① 125 PSIG	6.23	4.38	6.23	.	.	.	.	.	.
	150 PSIG	6.23	6.23	6.23	.	.	.	.	.	.
-Type of Multi-Groove V-Belts										
		3V	3V	3V	.	.	.	.	.	.
-Minimum Recommended Tank Size (Gal.)										
	100 PSIG	120	120	120	.	.	.	.	.	.
	① 125 PSIG	120	120	120	.	.	.	.	.	.
	150 PSIG	120	120	120	.	.	.	.	.	.

II. Cooling Data

-Cooling System Type	A/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C	A/C
-Max. Ambient Temp. For Continuous Operation (F)	125	125	125	125	125	125	125	125	125	125

A. Air Cooling

-Fan Motor Power (HP)				2HP	2HP	6HP	6HP	7.5HP	10HP	
-Cooling Fan Capacity (CFM)	3780	3780	3780	4730	4730	12888	12888	16700	14043	
-Approach Temperature (F)		13	13	12	10	12	10	21	10	
-Heat Rejected (BTU/HR)	48176	57720	68300	92400	116800	173220	239000	348800	482800	
-Allowable additional pressure drop in outlet ducts. (inch Water)	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	1/16	

B. Water Cooling

-Cooling Water Required @ 85 degree F. (GPM)	6.0	7.5	9.0	12	15	18	21	24	28	
---	-----	-----	-----	----	----	----	----	----	----	--

Type	20HP	25HP	30HP	40HP	60HP	70HP	100HP	150HP	200HP
-Temp. difference between discharge air and cooling inlet water, (F)	9	13	13	12	16	12	19	21	25
-Heat Rejected (BTU/Hr)	46176	57720	68300	92400	118608	173220	231000	348960	462000

III. Air End

	M1405A	M1405A	M1405A	E1405EX	M1805H	M2005H	M2250H	M2500K	M3005A
--	--------	--------	--------	---------	--------	--------	--------	--------	--------

IV. Piping Connections, NPT

-Air Discharge	1 1/4	1 1/4	1 1/4	1 1/4	1 1/4	2	2	2	3
-Cooling Water Connections (NPT)	1 1/4	1	1	1 1/4	1 1/4	1 1/4	1 1/2	2	2 1/2

V. Noise Level Data (db)

(3 feet out. to CAG)

-A/C w/ standard enclosure	75	77	78	81	81	84	86	88	88
-A/C w/ acoustic enclosure and H.D. air cleaner	71	72	74	78	78	78	80	80	81

VI. Dimensions

-Length (inch)	66	66	66	64	64	64	64	800	132
-Width (inch)	34	34	34	30	30	48	48	66	66
-Height (inch)	80	60	60	78	78	48	48	64	66
-Floor Space (Ft ²)	9.8	9.8	9.8	13.3	13.3	26	26	320	66

VII. Net Shipping Weight (Lbs.)

-w/ standard enclosure	675	725	730	1685	1900	2460	2730	3100	3600
------------------------	-----	-----	-----	------	------	------	------	------	------

Type		20HP	25HP	30HP	40HP	50HP	75HP	100HP	150HP	200HP
IX. Start-Up Data										
Recommended Fuse Size (Dual Element Type)	480V	40	60	80	80	100	160	200	280	300
	230V	80	100	125	150	200	300	400	600	-
Overload Relay/Motor Rating	480V	33.1	38.3	42.1	65.8	70	110.8	138.8	234.4	285.7
	230V	62.8	77.3	84.2	131.8	140	228.2	278.2	488.7	-
	208V	68.2	85.4	83	145.8	155.8	244.8	307.8	618.3	-
Start/Stop Frequency of motor (per hour)		8	6	8	3	3	3	2	2	2

32-03-49 MED U 1:30

**The
Warranty**

GrimmerSchmidt products are warranted to be free from defects in workmanship and materials under normal use and service, for the period or hours of operation stated below, whichever shall occur first, from the date of delivery to the first purchaser.

WARRANTY DURATION		
PRODUCT	HOURS	MONTHS
Gasoline and Diesel Portable Compressors	2,000	12
Compressor Valves - Single Stage	4,000	24
Multi-Stage and Booster Compressors	2,000	6
Electric Driven Compressors	Unlimited	12
Air Ends - New	Unlimited	24
Air Ends - Exchange	Unlimited	12
Parts and Air Tools	Unlimited	3
Exchange Valves	Unlimited	6

**GrimmerSchmidt's
Responsibilities**

With respect to a product failure which occurs as the result of a defect in workmanship or materials during the warranty period, which is not otherwise excluded by this warranty, GrimmerSchmidt shall have the following responsibilities:

GASOLINE, DIESEL, and ELECTRIC COMPRESSORS: GrimmerSchmidt will pay for parts and labor during the warranty period.

COMPRESSOR VALVES: Applies to valves supplied in new and Recon single stage MonoBlock compressors (excluding Boosters). During the first half of the warranty period, GrimmerSchmidt will pay parts and labor. During the second one-half of the warranty period, GrimmerSchmidt will pay for valve parts only on a prorated basis. Examples: If failure occurs in the 13th month, GrimmerSchmidt pays 11/12 of the dealer net valve cost and customer pays 1/12. If failure occurs in the 18th month, each pays 1/2.

MULTI-STAGE and BOOSTER COMPRESSORS: GrimmerSchmidt will pay for replacement or repair of parts only.

AIR ENDS - NEW and EXCHANGE: Air end failures will be replaced with exchange air ends. When an air end (either new or exchange) fails under warranty, it must be returned to the factory in its failed state. If the air end is disassembled, the warranty is void. The parts covered by this plan include all components of the air end, with the exception of the drive coupling, air intake housing assembly, and discharge housing assembly which are not included.

PARTS, AIR TOOLS, and EXCHANGE VALVES: GrimmerSchmidt will pay for the replacement or repair of parts or valves only.

**Customer
Responsibilities**

The customer is responsible for the operation and maintenance of the product as required by good industry practice and as specified in any Manual supplied by GrimmerSchmidt.

In order to make a claim for warranty service the customer must:

Notify GrimmerSchmidt or its authorized dealer of the defect within the warranty period;

Return the product or part thereof to GrimmerSchmidt for inspection;

Pay all shipping charges as required.

The customer is responsible for communication expenses, meals, lodging, travel and similar costs incurred.

The customer is responsible for downtime expenses, and all business costs and losses resulting from any warrantable failure.

The warranty period shall be established by the date in service of the first user as reported by the warranty registration card mailed to GrimmerSchmidt Corporation by the owner or distributor. If a registration card is not on file, the invoice date will establish the start of the warranty period.

Limitations

Except as otherwise stated, this warranty is limited to the repair or replacement of parts at distributor net cost if, upon inspection, such parts are found to be defective in material or workmanship. When requested, allegedly defective parts shall be shipped prepaid to the factory for GrimmerSchmidt inspection. Before parts are returned to the factory for warranty, GrimmerSchmidt warranty claim form (FORM #GS-114R) must be filled out and sent to GrimmerSchmidt, within 30 days from date of failure, for consideration and instructions regarding further disposition. Claims filed after this 30-day time period will not be considered.

This warranty does not apply to (1) any compressor unit that shall have been subject to overspeeding, chemical or abrasive action, negligence, accident or other misuse, (2) any compressor or part that shall have been repaired or altered by anyone who is not an authorized GrimmerSchmidt distributor if, in the judgment of GrimmerSchmidt, its performance and reliability are adversely affected, (3) any part of a compressor unit improperly applied or installed, (4) failures in any way resulting from use of parts not manufactured or approved by GrimmerSchmidt or (5) normal maintenance services including, but not limited to, tune-up and repair or replacement of oil, filters and belts.

GrimmerSchmidt shall not be liable for loss of time to the user while the compressor or other equipment is out of commission or for special, incidental or consequential damage arising from any alleged breach of warranty.

Engines, motors, electrical equipment, gauges, valves, clutches, radiators, and other items not manufactured by GrimmerSchmidt which are warranted by their respective manufacturers, are not warranted by GrimmerSchmidt.

Labor charges are paid based on Repair Time Standards and Rates established by GrimmerSchmidt.

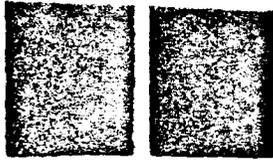
All implied warranties, if any, applicable to consumer products terminate concurrently with the expiration of the express warranties applicable to such product.

There are no other warranties, expressed or implied, including warranties for merchant ability or fitness for a particular purpose by GrimmerSchmidt except the warranty against defects in material and workmanship specified herein. No person is authorized to bind GrimmerSchmidt for any other warranty.

Extended Protection Plans

Extended Protection Plans are available on many GrimmerSchmidt products. Contact GrimmerSchmidt or your dealer for further information.

Post-It brand fax transmittal memo 7671		# of pages = 8	
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Dept.		Phone #	
Fax #		Fax #	



GrimmerSchmidt Compressors



X-L Extended Life Warranty

5 Year and 10 Year

GrimmerSchmidt Industrial MonoScrew Compressors are available with the X-L Extended Life Warranty of 5 years or 10 years with unlimited hours of operation.

The X-L warranty covers the complete air end, from intake flange to discharge flange. The air end is expected to perform continuously, except for routine maintenance as specified. The X-L warranty includes air end exchange during the warranty period.

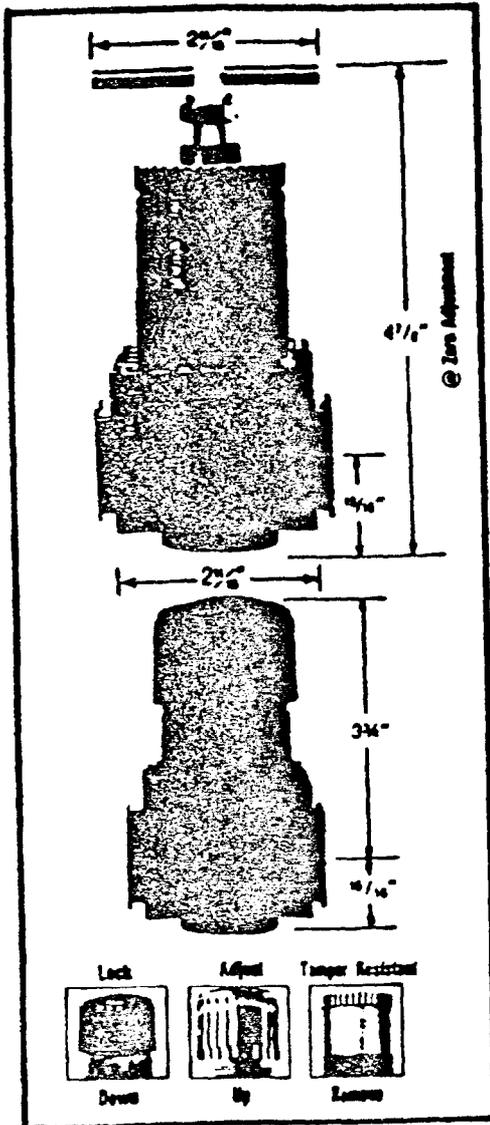
Also included in the X-L Extended Life Warranty is the initial fill of GSL-8 8000 hour compressor coolant/lubricant, GrimmerSchmidt Fluid Analysis for 12,000 hours, and a 2000 hour GrimmerSchmidt service filter kit. The customer is responsible for maintaining the compressor with GSL-8, GrimmerSchmidt Fluid Analysis, and GrimmerSchmidt service filters throughout the warranty period.

The cost of the 5 year program is \$30 per horsepower dealer net.

The 10 year program is \$45 per horsepower dealer net.

x-16-22-90

ARROW TRI-STAR REGULATORS



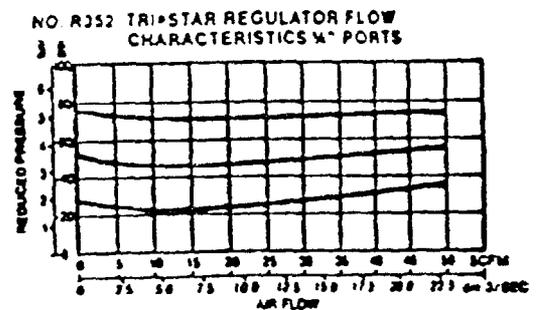
Arrow's TRI-STAR regulators are available in 1/4, 3/8 and 1/2-inch ports for air flows up to 100 SCFM. Engineered as high performance units with compact size, lightweight and cosmetic appeal, they exhibit added benefits for those critical machine tool requirements. Each is enhanced with the sensitivity of diaphragm operation for repeated accuracy, a highly balanced disc assembly to minimize the effect of supply pressure variations, an inserted machined brass seat and molded disc for zero creep and an efficient aspirator for minimal droop. TRI-STAR regulators are ideally suited for high flow industrial requirements as well as those requiring precise pressure control as in pneumatic cylinders and valves.

Features

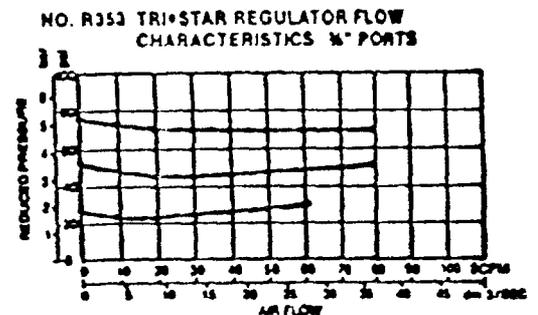
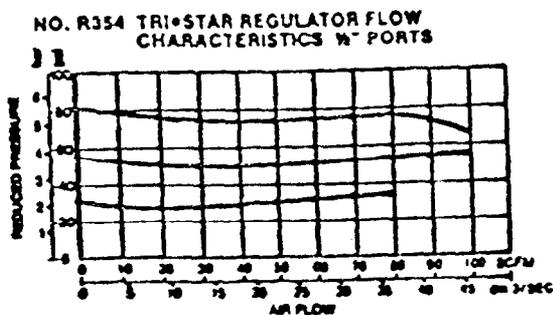
- 1/4, 3/8 and 1/2 inch ports
- 1/4, 3/8, 1/2 and 3/4 inch pipe inserts can be used with each unit
- Three position adjusting knob standard — Lock, adjust and reserve for tamper-resistance
- "T" handle optional
- Efficient aspiration
- 100 SCFM capacity
- Minimal droop
- Diaphragm operation
- Non-rising adjustment
- Machined brass valve seat
- Molded balanced disc
- Easily panel or wall mounted
- Three pressure ranges
- Die cast aluminum

Display Information			
Pipe Size	Model No.	Flow (SCFM)	Approx. Wt. Lbs.
1/4"	R352	50	1.5
3/8"	R353	80	1.5
1/2"	R354	100	1.5

For options, performance specifications and gauges, See Pg 22



Flow Characteristics Inlet Pressure set at 100 PSIG



ARROW COALESCING STYLE FILTERS!

SERIES F4 — Oil Removing

An extremely effective and economical oil removing filter, the Arrow Series F4 was developed to accommodate the variety of compressed air systems and their filtering needs. The white borosilicate style element removes liquid oil and oil aerosols up to a 90% efficiency rating, as well as sub-micron solid contaminants (such as dirt and scale) down to .9 microns in size. Effective filtration coupled with low pressure drop and servicing ease, make it ideally suited for dental equipment, sprayer painters, food processing, instrumentation and pharmaceuticals. It also acts as an excellent after filter for particle removal as required with a twin tower regenerative dryer.

SERIES F5 — Oilscer

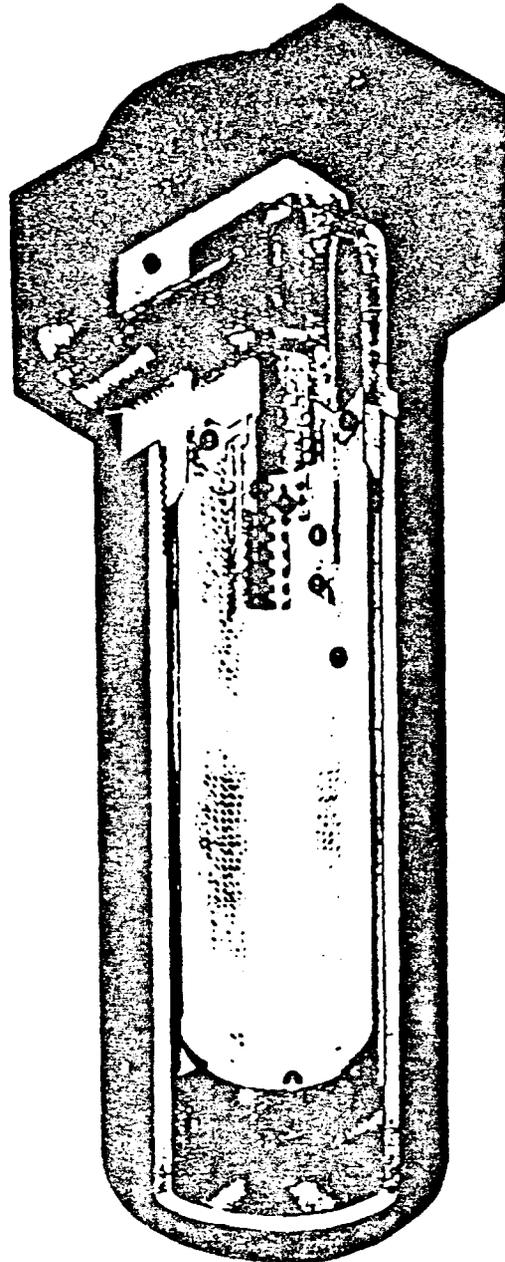
The Arrow Series F5 Oilscer Filter Series, will remove oil aerosols and reduce the air quality index to .015 PPM remaining, by weight, based on an intake of 50 PPM. All sizes utilize a filter element constructed of the finest borosilicate micro glass fibers. These filters are vacuum formed to precisely control the physical parameters of the porous mass microfilament matrix. Graded as a .03 micron, they will eliminate oil aerosols to a D.O.P. efficiency rating of 99.97% and absolute particle retention to 3 microns. The filter element is completed with the addition of a rigid plastic support layer for durability and a non-wicking glass drain layer to insure against re-entrainment. High filtration efficiency and structural integrity make the F5 Oilscer Filters a perfect choice for protecting sophisticated pneumatic systems.

SERIES F6 — Adsorber

The Arrow Series F6 Adsorber filters were engineered for those critical applications that will not tolerate the presence of oil vapors, oil-associated odors and solid particle contaminants. Each unit exhibits the same fine qualities of a borosilicate filter element as its counterpart series F5 Oilscer. However, it is further enhanced with the purification qualities of 40 micron powdered, activated charcoal particles. If the compressed air has been prepared by a suitable refrigerated dryer and F5 Oilscer Filter, the F6 Adsorber will insure oil concentrates of .01 PPM by weight. In all cases, an F5 Oilscer must precede an F6 Adsorber.

At maximum flow rates, 90% efficiency can be expected. At less than maximum flow, the efficiency approaches 95%. If applied at ambient temperatures, a 3 to 6 month service life is normal. The most effective way to determine when to replace the adsorber element is to sniff the effluent air.

Because it can emit virtually contamination-free air, the Arrow F6 Adsorber Filter is an excellent choice for the critical applications found in the food, dairy, pharmaceutical and brewery industries.



- 1 LIGHTWEIGHT CAST ALUMINUM HEAD
- 2 PRESSURE DIFFERENTIAL GAUGE PORTS
- 3 MOLDED, PERMANENTLY BORED URETHANE RUBBER END SEALS ACT AS SEAL BETWEEN ELEMENT AND HOUSING. NO ADDITIONAL SEALS REQUIRED.
- 4 HIGH EFFICIENCY BOROSILICATE GLASS FIBER MEDIA COALESCES AND REMOVES FINEST OIL AEROSOLS. THE DEPTH PENETRATION EXTENDS FILTER LIFE. AN EXTRA LAYER OF POLYESTER PREVENTS MEDIA MIGRATION.
- 5 PLASTIC INNER SUPPORT CONE SUPPORTS ELEMENT AND PREVENTS DAMAGE UNDER REVERSE FLOW.
- 6 PLASTIC OUTER SUPPORT CONE PREVENTS DAMAGE TO ELEMENT UNDER HIGH PRESSURE DIFFERENTIAL CONDITIONS.
- 7 FIBERGLASS DRAIN LAYER PROVIDES DRAINAGE VEHICLE. PREVENTS RE-ENTRAINMENT OF DROPLETS, AND IS NOT AFFECTED BY SYNTHETIC OILS AND HIGH TEMPERATURES.
- 8 LARGE RESERVOIR FOR COLLECTED FLUIDS.
- 9 SPUN ALUMINUM BOWL IS RATED TO 250 PSI
- 10 FLOJAT TYPE AUTOMATIC DRAIN (OPTIONAL) AUTOMATICALLY DRAINS COLLECTED FLUIDS. HAS MANUAL OVERRIDE.

ARROW F4, F5, F6 ORDERING INFORMATION

F4 Oil Removing (.9 micron)

F5 Oilscr (0.03 micron)

F6 Adsorber (activated charcoal)

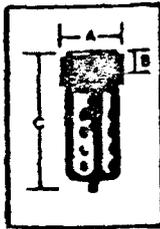
F5 Miniature Series (.03 Micron)



Pipe Size	Model No. Plastic Bowl	Bowl Capacity	Nominal Air Flow (SCFM)	Dimensions			Approx. Wt. Lbs.
				A	B	C	
1/4"	F500-01	1 oz.	15	1 1/2"	1/2"	4 1/2"	.5
1/4"	F500-02	1 oz.	15	1 1/2"	1/2"	4 1/2"	.5

Options: (Specify as Suffix) "Z" — piston drain "M" — metal bowl "J" — overnight drain plastic bowl
"K" — overnight drain metal bowl

STANDARD SERIES

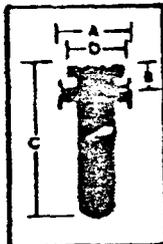


Pipe Size	F4 Metal Bowl	Nominal Air Flow (SCFM)	F5 Metal Bowl	Nominal Air Flow (SCFM)	F6 Metal Bowl	Nominal Air Flow (SCFM)	Dimensions				Approx. Wt. Lbs.
							A	B	C	D	
1/4"	F452	27	F552	24	F652	24	2 1/2"	1/2"	5 1/2"	—	1.0
1/4"	F453	45	F553	37	F653	37	2 1/2"	1/2"	5 1/2"	—	1.0
1/4"	F454	53	F554	37	F654	37	2 1/2"	1/2"	5 1/2"	—	1.0
1/4"	F402-02	30	F502-02	24	F602-02	24	3 1/2"	1/2"	6 1/2"	—	1.6
1/4"	F402-03	55	F502-03	40	F602-03	40	3 1/2"	1/2"	6 1/2"	—	1.6
1/4"	F402-04	72	F502-04	55	F602-04	55	3 1/2"	1/2"	6 1/2"	—	1.6
1/4"	F405-04	125	F505-04	110	F605-04	110	4 1/2"	1 1/2"	8 1/2"	—	3.7
1/4"	F405-06	185	F505-06	150	F605-06	150	4 1/2"	1 1/2"	8 1/2"	—	3.7
1"	F408-08	300	F508-08	200	F608-08	200	4 1/2"	1 1/2"	13 1/2"	—	6.0
1 1/2"	F410-12	475	F510-12	415	F610-12	415	6 1/2"	2"	18 1/2"	—	16.0
1 1/2"	F418-12	590	F518-12	515	F618-12	515	6 1/2"	2"	26 1/2"	—	19.0
2"	F410-16	475	F510-16	415	F610-16	415	6 1/2"	2"	17 1/2"	—	16.0
2"	F418-16	590	F518-16	515	F618-16	515	6 1/2"	2"	26 1/2"	—	19.0
2"	F428-16	840	F528-16	765	F628-16	765	6 1/2"	2"	36 1/2"	—	23.0
3"	F411-24	620	F511-24	560	F611-24	560	7 1/2"	2 1/4"	20 1/2"	—	21.0
3"	F419-24	770	F519-24	800	F619-24	800	7 1/2"	2 1/4"	28 1/2"	—	24.0
3"	F429-24	1100	F529-24	1000	F629-24	1000	7 1/2"	2 1/4"	38 1/2"	—	28.0

Options for Standard Series: (Specify as Suffix)

"F" — auto drain (5200) "W" — metal bowl w/Arrow Sight (except ASME)
"A" — .01 micron element (F5 series only) "K" — overnight drain metal bowl
"D" — heavy duty drain (N/A for F452, 3, 4; F552, 3, 4; F652, 3, 4)

ASME



3"	F4N2-24	1300	F5N2-24	1100	F6N2-24	1100	17"	6 1/4"	42"	13 1/4"	200.0
4"FLG	F4X2-32	1300	F5X2-32	1100	F6X2-32	1100	17"	6 1/4"	42"	13 1/4"	212.0
4"FLG	F4X3-32	2000	F5X3-32	1750	F6X3-32	1750	20"	8 1/4"	46 1/2"	16"	300.0
6"FLG	F4X3-48	2000	F5X3-48	1750	F6X3-48	1750	20"	8 1/4"	46 1/2"	16"	315.0
6"FLG	F4X4-48	2750	F5X4-48	2400	F6X4-48	2400	23"	10 1/4"	50 1/2"	19"	450.0
6"FLG	F4X5-48	3500	F5X5-48	3000	F6X5-48	3000	25"	11"	52 1/2"	21"	540.0
6"FLG	F4X6-48	4300	F5X6-48	3750	F6X6-48	3750	27"	11"	53"	23 1/4"	650.0
6"FLG	F4X8-48	5000	F5X8-48	4500	F6X8-48	4500	30"	11 1/4"	54"	25"	875.0

Options for ASME Series: (Specify as Suffix) "F" — external auto drain (T53-04) "A" — .01 micron element (F5 series only)

Bowl	Max. Pressure	Temp. Rated
Plastic	150 psig	40°F to 120°F
Metal	250 psig	40°F to 200°F
w/sight glass (W)	250 psig	40°F to 160°F
w/auto drain (F)	30 to 175 psig	40°F to 120°F

WARNING: For compressed air service only. Not to be used on life support systems or breathing air systems. Never use polycarbonate plastic bowls on air supplied by a compressor lubricated with synthetic oils or oils containing phosphate esters or chlorinated hydrocarbons. They can carry over into the air distribution systems and chemically attack and possibly rupture the bowls. On these applications use a metal bowl. Also, do not expose these polycarbonate plastic bowls to materials such as trichloroethylene, acetone or paint thinner. Cleaning fluids or other harmful materials will crack and/or rupture the bowl. If materials harmful to polycarbonate are present either outside or inside the bowl, use a metal bowl.



API09, API10H/C, API11H/C, API24H/C DIRT/RUST CARTRIDGES

These cartridges are made by an exclusive process in which pure white cellulose fibers are permanently arranged in the form of a porous rigid cylinder. The spaces between fibers become gradually smaller toward the center cavity in this way larger particles are trapped in the outer layers, while at the inner layers particles as small as 5 microns are trapped. Only clean water flows up through the cavity into the outlet water stream. This method of filter cartridge construction ensures superior cartridge strength, larger dirt load capacity, and extended cartridge life. Cartridges are available with dirt load capacities ranging from 1 to 50 microns.

APS117, APS217 TRIPLE ACTION CARTRIDGE DIRT/RUST, TASTE/ODOR/CHLORINE, SCALE/CORROSION

Water enters the cartridge at the top, passing through a 5 micron prefilter to remove dirt/rust. It is then directed through a depth bed of activated carbon to remove chlorine and the contaminants that cause bad taste/odor. These cartridges also inhibit the build-up of scale, caused when lime, calcium, and other minerals precipitate out of heated water. Special scale-stopping crystals slowly dissolve to inhibit this precipitation. At the same time they form a microscopic coating over internal hot water system surfaces to further protect against scale formation, clogging, and corrosion. A post-filter retains carbon granules so only fresh, clean water flows through the center hole to the point of use.

API17, AP217 DOUBLE ACTION CARTRIDGES DIRT/RUST, TASTE/ODOR/CHLORINE

Water enters the cartridge at the top, passing through a 5 micron prefilter to remove dirt/rust. It is then directed through a depth bed of activated carbon to remove chlorine and contaminants that cause bad taste/odor. The cartridge design ensures that the water is in contact with the most amount of contaminant-adsorbing carbon for the longest possible time. A post-filter retains the carbon granules as the water flows through the center hole to the point of use.

AP420 DOUBLE ACTION CARTRIDGE DIRT/RUST, SCALE/CORROSION

This cartridge uses Aqua-Pure's exclusive scale-stopping crystals to inhibit scale and corrosion in hot water systems. It also contains the dirt/rust capability of a depth bed filter element. The filter must be installed in the cold water line ahead of the water heater.

For more information about Aqua-Pure scalestopping filters, see the bulletin entitled SCALE AND CORROSION INHIBITOR SYSTEMS.



CARTRIDGE SPECIFICATIONS

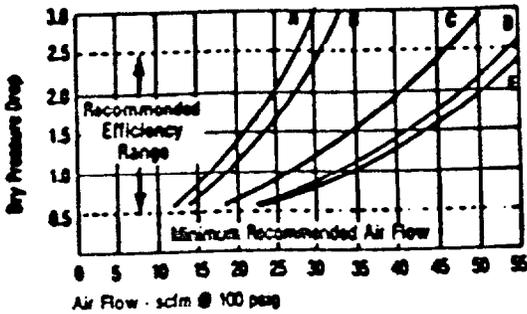
CARTRIDGE	CARTRIDGE MAX. TEMP.	FLOW RATE PER CTG.	DEGREE OF FILTRATION	CLEAN PRESSURE DROP PER CTG.	DIMENSIONS		
					HEIGHT	MAX DIA.	CENTER HOLE
API09	145°F (62.7°C)	6gpm (22.7 lpm)	Extra fine 1 micron	1psi @ 6gpm (0.7 Bar @ 22.7 lpm)	9 1/2" (242.5mm)	2 1/4" (54mm)	1" (25.4mm)
API10H/C	210°F (99°C)	6gpm (22.7 lpm)	Normal contamination 5 microns	1psi @ 6gpm (0.7 Bar @ 22.7 lpm)	9 1/2" (242.5mm)	2 1/4" (54mm)	1" (25.4mm)
API11H/C	210°F (99°C)	6gpm (22.7 lpm)	Medium heavy contamination 25 microns	1psi @ 6gpm (0.7 Bar @ 22.7 lpm)	9 1/2" (242.5mm)	2 1/4" (54mm)	1" (25.4mm)
API24H/C	210°F (99°C)	6gpm (22.7 lpm)	Heavy contamination 50 microns	1psi @ 6gpm (0.7 Bar @ 22.7 lpm)	9 1/2" (242.5mm)	2 1/4" (54mm)	1" (25.4mm)
API17	100°F (38°C)	3gpm (11.4 lpm)	Normal contamination 5 microns	5psi @ 3gpm (.35 Bar @ 11.4 lpm)	9 1/2" (242.5mm)	3" (76.20mm)	1" (25.4mm)
APS17	100°F (38°C)	3gpm (11.4 lpm)	Normal contamination 5 microns	5psi @ 3gpm (.35 Bar @ 11.4 lpm)	9 1/2" (242.5mm)	3" (76.20mm)	1" (25.4mm)
AP420	100°F (38°C)	6gpm (20.4 lpm)	Normal contamination 5 microns	1psi @ 6gpm (.09 Bar @ 22.7 lpm)	9 1/2" (242.5mm)	3" (76.20mm)	1" (25.4mm)
AP217	100°F (38°C)	2gpm (7.6 lpm)	Normal contamination 5 microns	—	6 1/2" (162.56mm)	3 1/4" (80.25mm)	—
APS217	100°F (38°C)	2gpm (7.6 lpm)	Normal contamination 5 microns	—	6 1/2" (162.56mm)	3 1/4" (80.26mm)	—

Cartridge Chlorine Reduction Capacity for API17/APS117 is 10,000 gallons (37,800 liters) per cartridge, for AP217/APS217 2,000 gallons (7,560 liters)

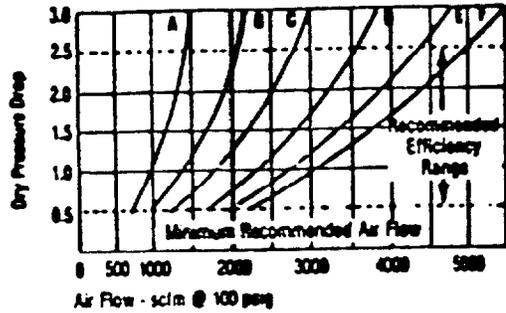


ARROW COALESCING FILTERS FLOW CHARACTERISTICS

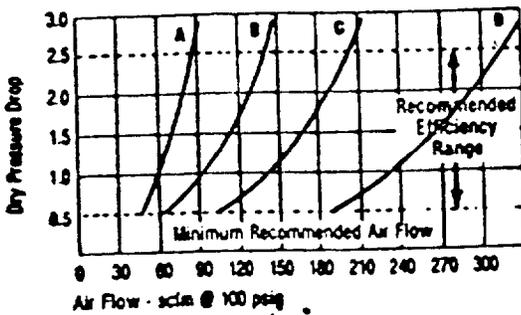
F4 Series Flow Charts



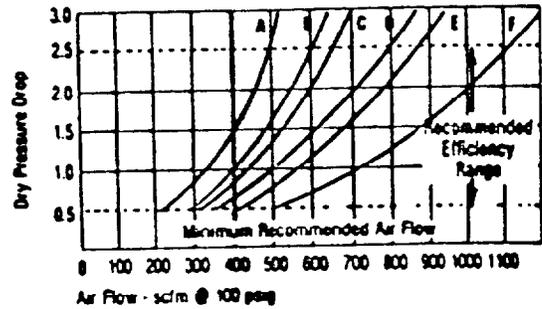
- A. F402
- B. F402-02
- C. F403
- D. F404
- E. F402-03



- A. F402, F403
- B. F404
- C. F405
- D. F406
- E. F407
- F. F408

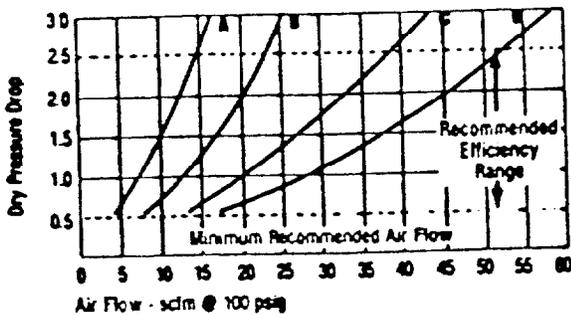


- A. F402-04
- B. F405-04
- C. F405-06
- D. F406-06

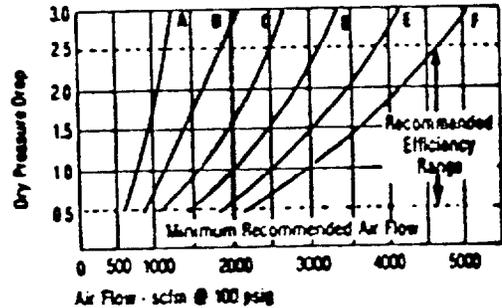


- A. F410-12
- F410-18
- B. F410-24
- C. F411-24
- D. F420-18
- E. F420-24
- F. F420-24

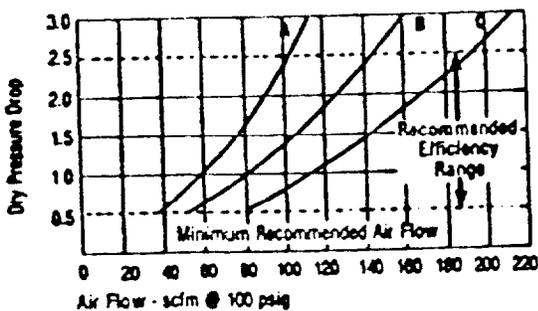
F5 & F6 Series Flow Charts



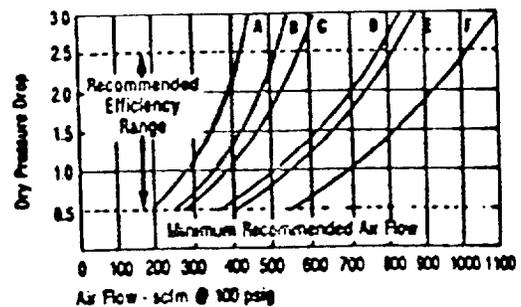
- A. F500-01, F500-02
- B. F502-02, F502-04, F502-06, F502-08, F502-10, F502-12, F502-14, F502-16, F502-18, F502-20, F502-22, F502-24, F502-26, F502-28, F502-30, F502-32, F502-34, F502-36, F502-38, F502-40, F502-42, F502-44, F502-46, F502-48, F502-50, F502-52, F502-54, F502-56, F502-58, F502-60, F502-62, F502-64, F502-66, F502-68, F502-70, F502-72, F502-74, F502-76, F502-78, F502-80, F502-82, F502-84, F502-86, F502-88, F502-90, F502-92, F502-94, F502-96, F502-98, F502-100
- C. F502-03, F503, F502-03, F503, F504
- D. F502-04, F502-04



- A. F502, F503
- F502, F503
- B. F504, F505
- C. F506, F507
- D. F508, F509
- E. F510, F511
- F. F512, F513



- A. F505-04, F505-04
- B. F505-06, F505-08, F505-10, F505-12, F505-14, F505-16, F505-18, F505-20, F505-22, F505-24, F505-26, F505-28, F505-30, F505-32, F505-34, F505-36, F505-38, F505-40, F505-42, F505-44, F505-46, F505-48, F505-50, F505-52, F505-54, F505-56, F505-58, F505-60, F505-62, F505-64, F505-66, F505-68, F505-70, F505-72, F505-74, F505-76, F505-78, F505-80, F505-82, F505-84, F505-86, F505-88, F505-90, F505-92, F505-94, F505-96, F505-98, F505-100
- C. F508-08, F508-08



- A. F510-12, F510-18, F510-24, F511-24
- B. F520-18, F520-24, F520-30, F520-36, F520-42, F520-48, F520-54, F520-60, F520-66, F520-72, F520-78, F520-84, F520-90, F520-96, F520-102
- C. F511-24, F511-24
- D. F520-18, F520-18, F520-24, F520-24, F520-30, F520-30, F520-36, F520-36, F520-42, F520-42, F520-48, F520-48, F520-54, F520-54, F520-60, F520-60, F520-66, F520-66, F520-72, F520-72, F520-78, F520-78, F520-84, F520-84, F520-90, F520-90, F520-96, F520-96, F520-102, F520-102



SPECIFICATIONS

12/18/92

Model: 500DR02V, 500 cfm vapor phase adsorption system using two banks of drums in a series

Inlet/Outlet: 5"

Activated Carbon: 4 x 10 mesh, Iodine #1050
500 pounds /vessel

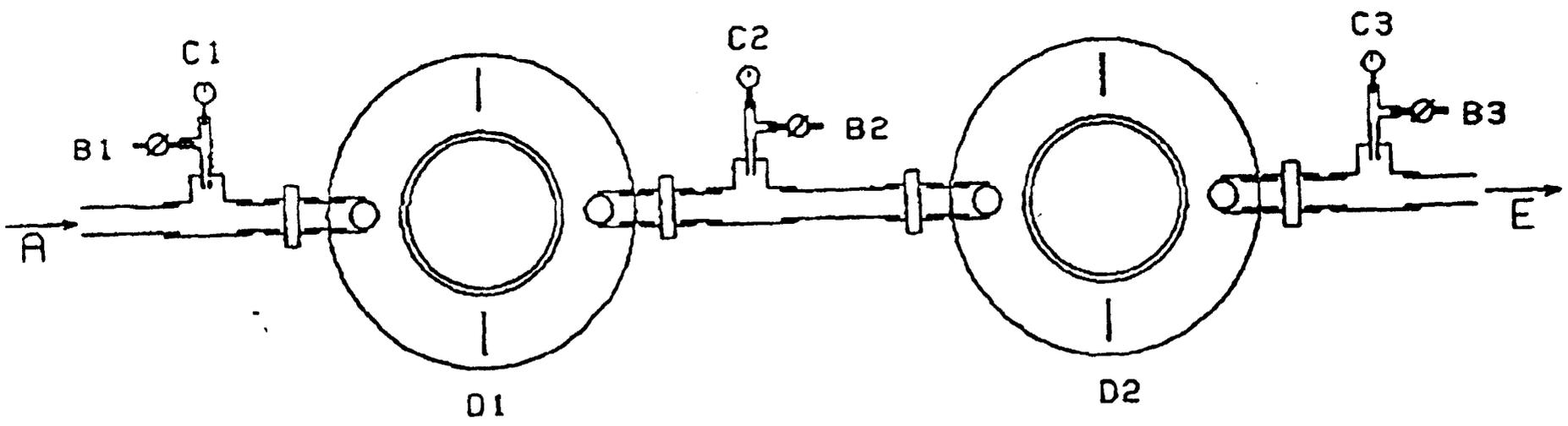
Carbon Filters: 2 - JDV500 Steel Drum Units

Contact Time: 4.32 seconds

Installation Area: 10' x 13'

Specifications subject to change.

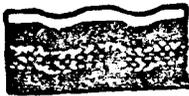
500 CFM SOIL VENTING SYSTEM



LEGEND
 A= INLET AIR
 B= SAMPLE PORTS
 C= V/P GAUGES
 D= JUMBO GAC DRUMS
 E= TREATED AIR

COPYRIGHT © 1983
 CONTINENTAL ENVIRONMENTAL SERVICES,
 ALL RIGHTS RESERVED

DESIGNED BY			
PROJECT			
DESIGNED BY CES	DESIGNED BY HOR	DATE 500JD2 3	CHECKED DALE CANN ENV. ENGR.
CONTINENTAL ENVIRONMENTAL SERVICES		DATE	



CONTINENTAL ENVIRONMENTAL SERVICES

Premium - grade GAC is Especially Suited for Pesticides & Petroleum HydroCarbons

Pesticides, petroleum products, and solvents require a higher grade of carbon for effective adsorption of VOC molecules. CES liquid phase GAC is graded with a minimum iodine number of 950.

The iodine number represents the number of pores in the carbon granule that are available for adsorption. The greater the iodine number, the greater the carbon's capacity for adsorption.

Using carbon with more capacity improves the effectiveness and economics for the remediation and control of pesticides and petroleum hydrocarbons.

Drums & Systems for Carbon Adsorption

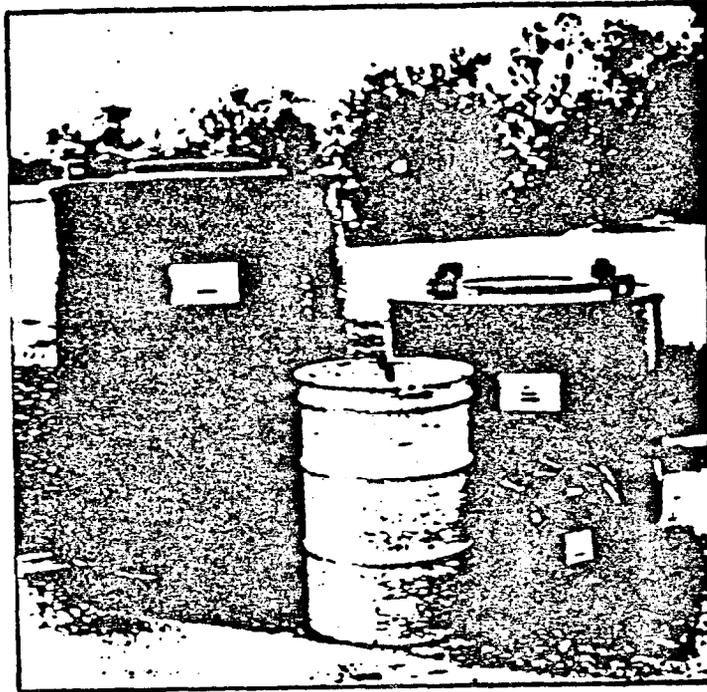
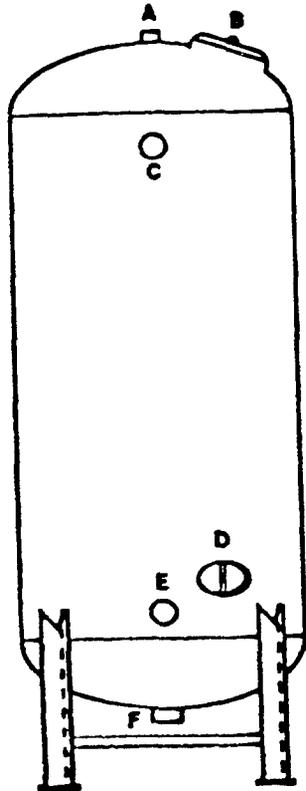


Photo above, shows CES' 1,000- and 500-pound Jumbo drums behind CES' 200-pound drum and 50-pound mini drum. Drawing, left, is of CES' High Pressure steel tank.



A VENT
B MANHOLE
C INLET
D HAND HOLE
E DRAIN
F OUTLET

Applications & Recommended System Types

GENERAL APPLICATIONS	MODEL NUMBERS							DESCRIPTION	
	MDC1L	DR02V	DRC1L	DRC2L	DRB2L	HPB2L	IDB2L		IDC2L
Filtration of water during sampling & well purging	•								of Model Numbers 1 - 3 3 4
Pump Testing				•	•			•	1a - Drum type M - Overure drum DR - 200-lb drum HP - High Pressure tank ID - Jumbo drum
De-aerating			•	•				•	
Tank Cleaning			•	•		•	•	•	
Pump & Treat					•	•	•		2a - Prefiltration type O - No prefiltration
Polishing effluent of Diffused Aerator			•	•	•	•	•		B - Backwashing Assembly C - Disposable Cartridges
Polishing liquid effluent of Air Stripper					•	•	•		3a - # of carbon beds
Removal of vapors		•							4a - Vapor or liquid phase

SPECIFICATIONS FOR VESSEL SIZE AND TYPE ON BACK.

01.03.00.
0007

SPECIFICATIONS

		AMOUNT OF CARBON (lbs.)	MAX FLOW/PRESSURE	DIA" x HT"	APPROX SHIP WT	INLET OUTLET"
C CDV200	Liquid	200	10gpm/10psi	24 x 36	250	1/1
	Vapor	200	100 cfm	24 x 36	250	2/2
HP1000 HP1800	Liquid	1000	50gpm/75psi	42 x 55	1800	3/3
	Liquid	1800	100gpm/75psi	54 x 92	3200	4/4
CDL500 CDV500	Liquid	500	50gpm/10psi	45.5 x 42	900	2/2
	Vapor	500	500cfm	45.5 x 42	900	4/4
CDL800 CDV800	Liquid	800	50gpm/10psi	45.5 x 42	1200	2/2
	Vapor	800	500cfm	45.5 x 42	1200	4/4
CDL1000 CDV1000	Liquid	1000	50gpm/10psi	45.5 x 56	1500	2/2
	Vapor	1000	500cfm	45.5 x 56	1500	4/4
CDL1300 CDV1300	Liquid	1300	50gpm/10psi	45.5 x 62	1800	2/2
	Vapor	1300	500cfm	45.5 x 62	1800	4/4
CDL1500 CDV1500	Liquid	1500	50gpm/10psi	45.5 x 70	2200	2/2
	Vapor	1500	500cfm	45.5 x 70	2200	4/4
CDL1700 CDV1700	Liquid	1700	50gpm/10psi	45.5 x 78	2500	2/2
	Vapor	1700	500cfm	45.5 x 78	2500	4/4
MDL50 MDV50	Liquid	50	3gpm/10psi	15.25 x 19.875	60	.75/1
	Vapor	50	30cfm	15.25 x 19.875	60	1/7.5

Standard 200-pound Drums

- 16-gauge steel • epoxy-lined • channeling reduced with outlet distributor design •

High Pressure Steel Tanks

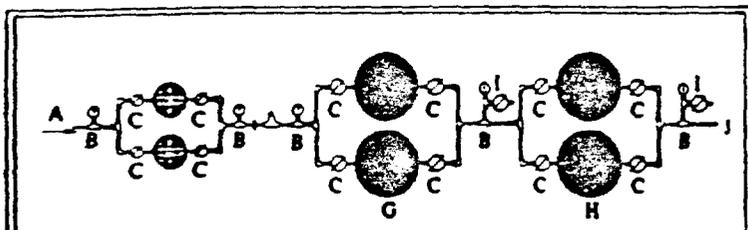
- Carbon-steel • skid mounted • epoxy-lined •

Jumbo Drums

- 10-gauge steel • Four-way Forklift entry • 2-inch Drain Valve •

Mini Drums

- High Density polyethylene • Compact design • Molded-in handle •



LEGEND:

- | | |
|---------------------------------|-----------------------------|
| A = Inlet Water | F = Pressure Reducing Valve |
| B = Pressure Gauges | G = GAC Drum (stage 1) |
| C = Ball Valves | H = GAC Drum (stage 2) |
| D = Cartridge Housing & Filters | I = Sample Ports |
| E = Union | J = Treated Water |

Drawing of the Model 200RC2L, a 20 gpm system with disposable cartridge filtration to protect the drum units. The 200-pound units are plumbed in series to provide a minimum 10 minute contact time at 20 gpm.





December 17, 1992

Stewart Hines
S & ME
9751 Southern Pine Blvd
P.O. Box 7668
Charlotte, NC 28241

PROPOSAL# MA380 TERMS: NET 10 FOB: DELIVERED
PRICE FIRM: 60 DAYS DELIVERY: 6 WEEKS

This proposal was prepared using the following design criteria:

Flow Rate: 500 CFM
TPH-100 mg/m²
MTBE-50 mg/m³

PROPOSED TREATMENT SYSTEM:

- (1) MODEL 500DR02V VAPOR PHASE GAC TREATMENT SYSTEM:
System Includes:
-(2) CDV500 Vapor Phase GAC Drums. (500# GAC/ea.)
-GAC Manifold Assembly.
-Delivery & Installation (1 day on site).

Please feel free to call if you have any questions
or require any further information.

Sincerely,

Brian Strange

Brian Strange
Technical Representative

CONTINENTAL ENVIRONMENTAL SERVICES

CARBON USE RATES

SGME

UNOCAL DERITA

FLOW RATE: 500 CFM

BTX CONCENTRATION: 124.68 PPM

**THIS SYSTEM WILL USE BETWEEN 23.93617 AND 36.26692 POUNDS
OF ACTIVATED CARBON A DAY.**

**THESE RESULTS ASSUME AN ADSORPTION RATE OF 20-30% BY WEIGHT.
THESE RESULTS ARE ESTIMATES AND SHOULD BE VIEWED AS SUCH.**



CONTINENTAL ENVIRONMENTAL SERVICES

CORPORATE OFFICE
TEL: (800) 342-1103
FAX: (904) 373-7660

FOR MORE INFORMATION CONTACT US AT (800) 342-1103

December 3, 1992

RECD DEC 09 1992

S & ME
9751 Southern Pine Blvd.
Charlotte, NC 28241

ATTN: Stewart Hines

Continental Environmental Services uses a coal based carbon, manufactured by US Carbons, in our vapor phase adsorption units. This carbon has a minimum iodine number of 1000, and a carbon tetrachloride minimum of 60%. This carbon will remove 99.999% of petroleum hydrocarbon constituents in an air stream.

Enclosed you will find a specification sheet for this carbon.

Sincerely,

Dale Gann
Environmental Engineer

enclosure

U S Carbons

ACTIVATED CARBON

USC 41V

GRANULAR ACTIVATED CARBON

DESCRIPTION:

The USC 41V is a 4x10 mesh granular, vapor phase, activated carbon. Produced from select grades of coal and thermally activated under carefully controlled conditions to provide a strong, dust free product with a very high surface area. The USC 41V granular activated carbon, because of its production process, is not susceptible to fines or dust generation. This product will provide excellent adsorptive characteristics without increase in pressure drop, even under extended continuous service. The particle size distribution is carefully controlled to offer minimal pressure drop. The high hardness provides a strong filtration media. These features add up to longer service life, therefore fewer bed changes and more economical filtration performance.

SPECIFICATIONS:

- o
- o
- o
- o
- o
- o
- o

U.S. Sieve Series Mesh	4x10
Greater Than 4 Mesh (Maximum)	5%
Less Than 8 Mesh (Maximum)	3%
Iodine Number, mg/gm (Minimum)	1000
Carbon Tetrachloride, weight % (Minimum)	60%
Hardness (Minimum)	95
Moisture (As Packed) (Maximum)	2%

PHYSICAL CHARACTERISTICS:

- o
- o
- o
- o

Total Surface Area, m ² /gm (N ₂ BET Method)	1050-1150	
Apparent Density, Bulk Dense Pack, lbs/ft ³	28-30	
	gms/cc	0.48-0.50
Pore Volume, cc/gm	0.60	

COMMERCIAL INFORMATION:

Packed in 200 net lbs drum or 1,000 net lbs bulk bag.
National Motor Freight #40560, Class #70

Note: Steam activated carbons are excluded from provisions of LATA #395, IMCO Class 4.2 or UN #1362.

CAUTION: Wetted activated carbons preferentially remove oxygen from air. In closed or partially closed containers and/or vessels, oxygen reduction may reach hazardous levels. If workers are to enter a vessel containing carbon, appropriate sampling and work procedures for potentially low oxygen spaces should be followed. These include all applicable Federal and State requirements.

The data included herein are based on test information obtained by U S Carbons. These data are believed to be reliable but do not imply any warranty or performance guarantee. We recommend that the user determine performance by testing on his own processing equipment. We assume no liability or responsibility for patent infringement resulting from the use of this product.

APPENDIX IX

INJECTION WELL PERMIT AND BAQC PERMIT APPLICATION

Form 1 UIC	South Carolina Department of Health and Environmental Control Ground-Water Protection Division UNDERGROUND INJECTION CONTROL PERMIT APPLICATION (Collected under the authority of Title 48 Chapter 11 of the 1976 South Carolina Code of Laws)	I. EPA ID NUMBER		
		U		T/A/C

READ ATTACHED INSTRUCTIONS BEFORE STARTING
FOR OFFICIAL USE ONLY

Application approved to day year	Date Received mo day year	Permit/Well Number
-------------------------------------	------------------------------	--------------------

Comments

II. FACILITY NAME AND ADDRESS			III. OWNER/OPERATOR AND ADDRESS		
Facility Name			Owner/Operator Name		
Street Address			Street Address		
City	State	Zip Code	City	State	Zip Code

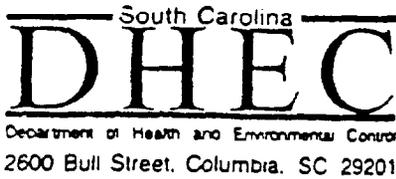
IV. OWNERSHIP STATUS (Mark 'x')	V. SIC CODES
<input type="checkbox"/> A. Federal <input type="checkbox"/> B. State <input type="checkbox"/> C. Private <input type="checkbox"/> D. Public <input type="checkbox"/> E. Other (Explain)	

VI. WELL STATUS (Mark 'x')		
<input type="checkbox"/> A. Operating	Date Started mo day year	<input type="checkbox"/> B. Modification/Conversion <input type="checkbox"/> C. Proposed

50

WELL CLASS AND TYPE CODES

Class I :	Industrial, municipal, and other injection wells for the subsurface disposal of fluids. (Prohibited)
Class II	Oil and gas production and storage related injection wells.
Type "D"	Produced fluid disposal well
"R"	Enhanced recovery well
"H"	Hydrocarbon storage well (excluding natural gas)
"X"	Other Class II wells
Class III	Special process injection wells.
Type "S"	Solution mining well
"U"	Uranium mining well (excluding solution mining of conventional mines)
"X"	Other Class III wells
Class IV	Hazardous or radioactive waste disposal injection wells. (Prohibited)
Class V.A.	Injection wells not included in Class I, II, III, IV, or V.B..
Type "A"	Storm runoff drainage wells
"B"	Aquifer recharge wells
"C"	Salt-water intrusion barrier wells
"D"	Subsidence control wells
"E"	Backfill wells associated with subsurface mining
"F"	Geothermal energy recovery wells
"G"	Experimental technologies wells
"H"	Natural gas storage wells
"I"	Corrective Action Wells
Class V.B.	Non-contact return flow system wells.
Type "A"	Heat pump return flow wells
"B"	Cooling water return flow wells



Commissioner: Michael D. Jarrett

Board: John B. Pate, MD, Chairman
 William E. Applegate, III, Vice Chairman
 John H. Burnss, Secretary

Toney Graham, Jr., MD
 Richard E. Jabbour, DDS
 Henry S. Jordan, MD
 Cume E. Sprvey, Jr.

Promoting Health. Protecting the Environment

BAQC MODELING INFORMATION

PLEASE FILL OUT COMPLETELY

COMPANY NAME: _____

CLEANUP LOCATION: _____ PCAS: _____

TYPE OF OPERATION (i.e. AIR STRIPPER): _____

CONTACT: _____

PHONE NUMBER: _____

SITE MAPS

Please include a scaled plot plan of the site location that clearly shows distances from the stack to the property boundaries. All buildings and/or structures within a radius of 5 stack heights (measured from the stack/vent) shall be incorporated on this plot plan and information on each building and/or structure's height, width, and length shall also be included.

STACK INFORMATION

HEIGHT ABOVE GROUND _____ FEET; DIAMETER _____ FEET

TEMPERATURE _____ F; VELOCITY _____ FEET/SECOND

AIR TOXIC INFORMATION

AIR TOXIC EMITTED (i.e. BENZENE)	CHEMICAL ABSTRACT SERVICE (CAS) NUMBER	EMISSION RATE LB/HR
A) _____	_____	_____
B) _____	_____	_____
C) _____	_____	_____
D) _____	_____	_____
E) _____	_____	_____

Please submit the completed form with maps to the appropriate SCDHEC project manager at the Ground-Water Protection Division. (BAQC-MIF)

APPENDIX X

CALCULATION OF TOTAL PCE

APPENDIX X

Calculation of Total PCE on site.

The following is an estimate for the total air emissions (without carbon absorption) during the air sparging remediation of the PCE contamination existing at the MWR Dry Cleaners at Parris Island, South Carolina.

I. ASSUMPTIONS:

1. The contaminated area is approximately 14,000 square feet.
2. Contamination exists to a depth of 15 feet (clay layer).
3. Worst case PCE concentration detected during S&ME Assessment (5147 ppb @ location F-16) is present throughout entire area.
4. No natural bioremediation is occurring.
5. All PCE is volatilized and emitted over a six-month time frame.

II. CALCULATIONS

1. Total volume of PCE-contaminated soil and water:
 - a. $(15 \text{ feet}) \times (14,000 \text{ feet}^2) = 210,000 \text{ cubic feet.}$
 - b. $(210,000 \text{ ft}^3) \times (28.32 \text{ L/ft}^3) = 5.9472 \times 10^6 \text{ Liters.}$
2. Total PCE on site:
 - a. $5147 \text{ ppb} \times .001 \text{ ppm/ppb} \times .001 \text{ ppt/ppb} = 5.15 \times 10^{-3} \text{ g/L}$
 - b. $(5.15 \times 10^{-3} \text{ g/L}) \times (5.9472 \times 10^6 \text{ L}) = 30,610 \text{ g PCE}$
 - c. $(30,610 \text{ g}) \times (2.21 \times 10^{-3} \text{ lbs/g}) = 67.65 \text{ lbs PCE}$
3. Volatilization of PCE during six months:
 - a. $(30,610 \text{ g PCE}) \div (1.5552 \times 10^7 \text{ seconds}) = 1.97 \times 10^{-3} \text{ g/sec}$