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November 28, 1988

Aero-Dri Corporation
1180 S.W. 10th Street
Delray Beach, Florida 33444

Attention: Mr. Mario D. Bevilacqua,
President

Contamination Assessment Report
Delray Beach, Florida
FOR AERO-DRI CORPORATION

Dear Mr. Bevilacqua:

Enclosed is the Contamination Assessment Report (CAR) for the Aero-Dri site in Delray Beach, Florida. Please review these documents at your convenience. Please do not hesitate to call, if you have any questions.

Very truly yours,

DAMES & MOORE

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CONTAMINATION ASSESSMENT REPORT

Prepared For

AERO-DRI DIVISION OF DAVEY COMPRESSOR COMPANY
&
L & J ENTERPRISES

DELRAY BEACH, PALM BEACH COUNTY, FLORIDA

1.0 INTRODUCTION

The Aero-Dri Division of Davey Compressor Company was requested by the Florida Department of Environmental Regulation (FDER), in their letter of October 13, 1987, to install a two well cluster (screened 25 and 45 feet below ground surface), within an area where perchloroethylene (perc) was alleged to have been discharged. Soil samples were collected on October 22, 1987, during the installation of monitor wells MW-1 and MW-2. Ground water samples were collected on October 30, 1987. The analyses of these samples confirmed the presence of perc in the soil and ground water. The values of perc ranged from a low of 26 ppb (parts per billion) to a high of 585,000 ppb in the soils, and 5,600 ppb to 531,500 ppb in the ground water. On December 21, 1987, the results were submitted to DER, and accepted as meeting the intent of a Preliminary Contamination Assessment Report (PCAR).

The DER requested that a Contamination Assessment Plan (CAP) be prepared to evaluate the extent of the contamination. Dames & Moore prepared the CAP, which was accepted by DER with modifications, as indicated in their letter of March 28, 1988. This Contamination Assessment Report (CAR) details the field investigations performed, the results of the soil and ground water sample analyses, and presents our findings and recommendations.

2.0 SCOPE OF WORK

To meet the objectives of the March 28, 1988 CAP, Dames & Moore implemented the following scope of work:

2.1 TASK I - INFORMATION REVIEW

A review of all available information concerning the site and the spill was conducted, to attempt to estimate the quantity of perc allegedly discharged and to aid in evaluating the degree of soil and ground water contamination. Well inventory surveys, perform-

ed by the Palm Beach County Health Department (PBCHD) were reviewed, to determine the number of public and private wells within one mile of the site.

In addition, surface waters within 1/2 mile of the site, were to be evaluated as to their classification and potential to be either receptors or sources of contamination.

2.2 TASK II - SOIL SAMPLING AND MONITORING WELL INSTALLATION

In order to evaluate soil and ground water contamination, Dames & Moore observed the installation of 19 monitor wells, and 18 soil borings, as part of the CAR; in addition to the two existing wells, MW-1 and MW-2, installed as part of the PCAP. The locations of the monitor wells and soil borings are shown on Figure 1. A listing providing a chronological summary of the field investigation is presented in Table 1.

Initially, two lines of soil borings were planned. The boring locations were reevaluated during the field activities based on the results obtained from the prior borings. The main group of borings extended in a north-south direction, extending from the suspected spill area, toward Monitor Well Cluster MWC1. Additional borings were executed south of the suspected spill area, towards MWC2. At those locations where contamination was confirmed, additional borings were performed to further evaluate the extent of contamination. Appendix A (Volume II) contains the logs of the completed soil borings.

Monitoring Well Cluster 1 (Figure 1) is located near the northwest corner of the property, and consists of three wells (A, B and C). Monitoring Well Cluster 2 is located near the south end of the property, and consists of three wells (A, B and C). Monitoring Well Cluster 3 is located near the southeast corner of the property, within the drum storage area, and consists of two wells (A and B). Monitor Well Cluster 4 is located east of Aero-Dri building, near the loading dock, and consists of three monitor wells (A, B, and C). Monitor Well Cluster 5 is located north-northwest of the site, on the west side of S. W. 13th Avenue, and consists of two monitor wells (A and B). Monitor Well Cluster 6 is located north-northwest of the site, on the west side of S. W. 14th Avenue, and consists of two monitor wells (A and B). Appendix B (Volume II) contains the well construction diagrams for onsite and offsite wells.

During the installation of the monitor wells in MWC-1, perc was not detected until 80 feet below land surface. Consequently, the boring program was revised, so that all borings would extend down to 100 feet below land surface.

Eighteen soil borings were executed upon completion of the onsite monitor well construction program. Two of these borings were performed in the drum storage area, and the remaining borings were performed west of the Aero-Dri building. Soil samples were collected from all soil borings, and sent to laboratories for analyses.

A series of fourteen shallow (10') test borings were executed southwest of the suspected spill area, at a location where possible additional contamination was thought to exist.

2.3 TASK III - GROUND WATER SAMPLING AND LABORATORY ANALYSIS

Two sets of ground water samples were collected. The first set was collected on May 25 and 26, 1988, and included all wells from MWC1, MWC2, MWC3, and MWC4, as well as MW-1, MW-2, and MW-3. The second round of samples were collected on August 2, 3 and 4, 1988, and included all wells from MWC1, MWC2, MWC3, MWC4, MWC5, and MWC6 as well as MW-1, MW-2, MW-3, MW-4, MW-5 and MW-6, in addition to operating municipal wells 22, 23, 25, and 26. Municipal well 24 was sampled on August 9, 1988. The location of the municipal wells in relation to the Aero-Dri site is shown in Figure 2. The results of the laboratory analyses are shown in Appendix C (Volume II).

3.0 SURFACE AND GROUND WATER

The area surrounding the Aero-Dri facility, to a 0.5 mile radius, was inspected for surface water and drainage flows. There are no surface water bodies within this radius. The U. S. G. S. 7.5' Quadrangle map of Delray Beach (revised 1973) shows the presence of a dry drainage channel, located northwest of the property, and oriented northeast to southwest. This channel no longer exists. Likewise, the wetlands noted to the south of Linton Boulevard have been drained, and no longer exist. Consequently, there are no surface water bodies that could have been impacted by the activities at the Aero-Dri site, nor could they have served as pathways for dispersal of contaminants.

The area surrounding the Aero-Dri facility, that is within the City of Delray Beach, receive municipal services. There is a small area of unincorporated Palm Beach County located southwest of Aero-Dri, and is bordered by I-95 to the west, Linton Boulevard to the south, Old Germantown Road to the east, and Royal Palm Drive to the north. Most of the residences in this area have their own potable water wells.

A review of the Water Use Permits for Palm Beach County, provided by the South Florida Water Management District (SFWMD) indicates that there is only one permitted ground water withdrawal in the area:

Permit No. 5000177W
Owner: City of Delray Beach
Facilities: Six production wells (21 through 26)
Use: Potable water supply

The City's Series 20 wellfield is located west and northwest of the site, and consists of six production wells (21 through 26). Production well 21 is located north of S. W. 8th Street, between 13th and 14th Avenue. Production wells 22 through 24 are on the east side of S. W. 15th Avenue, approximately evenly spaced between 7th and 10th Street. Production Well 25 is located south of S. W. 10th Street, west of S. W. 15th Avenue. Production Well 26 is located south of S. W. 10th Street, east of I-95.

On August, 22, 1987, as part of routine procedures, samples were collected from all of the City of Delray Beach's production wells. Perc was detected in the raw water from production wells 21 through 24. These wells were taken out of service. When the remaining wells were later retested, the analyses results indicated that production well 25 also contained perc.

In order to remove the perc from the raw water, the City of Delray Beach installed granular activated charcoal (GAC) filters in the spring of 1988. The GAC filters were installed on production wells 22, 23, 24 and 25. Production well 21 was taken out of service, to reduce the potential for additional contamination. In addition, its production was the least of the wellfield, had the highest drawdown, and its motor required maintenance and repairs.

On December 29, 1987, the PBCHD tested nine selected domestic wells within the unincorporated area including those nearest to the Aero-Dri site. Perc was not detected in any of these wells. These results are presented in Appendix C (Volume II). The addresses and locations of the tested wells are shown in Figure ___. (This information is being provided by Tim Neal, of Palm Beach County Environmental Resources Management Division, and will be forwarded as soon a we receive it.)

4.0 FIELD ACTIVITIES

The field investigation activities were performed from April 18, 1988 to July 28, 1988 and included the collection and analyses of surface and subsurface soil samples, the installation of ground

water monitoring wells (onsite and offsite), completion of soil borings, collection of ground water samples and the measuring of ground water levels to evaluate hydraulic gradient.

All drilling activities onsite and offsite were completed by Ground Water Protection Inc. of Orlando, Florida. Two types of drilling rigs were used: One was a CME 4500 drill rig and the second was a Speedstar Mini-Star drill rig. The CME 4500 completed all onsite and offsite monitoring wells except for MW-4, MW-5 and MW-6. These wells were drilled by the Mini-Star, to accommodate the larger diameter borings necessary to complete the deeper monitoring wells.

All soil borings onsite were drilled with the CME 4500 drill rig, with the exception of SB-13, which was executed using the Speedstar Mini-Star. Soil boring SB-13 was converted into MW-4. No offsite soil borings were completed. The locations are shown on the Monitoring Well and Soil Boring Location Plan, Figure 1.

The drilling rigs and all equipment used during soil sampling were steam cleaned prior to being mobilized onsite. In addition, all flight augers, drill rods, split spoons, and hoses were steam cleaned between each boring and each monitor well.

During the Standard Penetration Test (SPT) soil sampling, all split spoons were washed with Alconox, then double rinsed with city water, between each use.

5.0 MONITORING WELL INSTALLATION AND SOIL BORING INVESTIGATION

Monitoring well clusters were divided into two distinct groups, onsite and offsite.

Four onsite monitoring well clusters were installed within the property boundaries (MWC1, MWC2, MWC3, and MWC4). An additional 4 monitoring wells were installed onsite - two single completion wells (MW-3 and MW-4) and one dual completion (same borehole) monitoring well (MW-5 and MW-6).

Offsite wells are located in two separate clusters. Monitoring well cluster 5 (MWC5) and monitoring well cluster 6 (MWC6). Both well clusters are located northwest of the site. Monitor well cluster 5 (MWC5) is located on S.W. 13th Avenue. Monitoring cluster well 6 (MWC6) is located on S.W. 14th Avenue.

All wells were constructed of 2 inch diameter Triloc Schedule 40 PVC pipe with a 0.010 inch slot screen. All wells were completed with either above or below grade locking well covers. All onsite wells had screened sections that were 10 feet in length, with

the exception of MW-4 and MW-6. Monitor well 4 has 30 feet of PVC wire wrapped 0.010 inch slot screen and is 4 inches in diameter (Triloc). Monitoring well 6 is 2" diameter (Triloc) with 20 feet of PVC 0.010 inch slot screen. All monitoring well pipes, screens and centralizers were steam cleaned before being placed in the borings.

All monitoring well and soil boring samples were obtained in accordance with ASTM D1586-84 "Method for Penetration Test and Split-Barrel Sampling of Soils".

Sample intervals on both monitoring wells and soil borings were continuous from 0-16 feet, then at 5 foot centers unless specific geologic conditions warranted a change in the sampling interval; i.e. denser layers, or harder drilling within a well cluster lithology. Logs of borings are included in Appendix A (Volume II).

Both monitoring wells and soil borings were drilled from the water table down by rotary wash drilling techniques using bentonite mud (Brand names: Quik-Gel and Super Gel-X) as the drilling fluid. No other additives were introduced into the boreholes. In addition, all drilling fluid including mud, cuttings and grout were drummed. All development water was also drummed. The drums were then marked and transported to the "used" drum storage area located on the south eastern corner of the Aero-Dri site. After receiving the laboratory analysis from each particular boring, the drums will be disposed of in an environmentally acceptable manner.

When loss of circulation occurred during drilling operations, the borehole was grouted from the bottom up, using the drill rod. During the execution of SB-7, SB-9 and SB-11, drilling fluid circulation was lost at the bottom of the borings, indicating cavity zones, and high secondary permeability. This loss of circulation is noted on the respective boring logs (Appendix A, Volume II). It should be noted that SB-9 was advanced from 220 feet to 302 feet with no circulation of drilling fluid.

A listing providing a chronological summary of the field investigation is presented in Table 1.

6.0 SITE GEOLOGY

The assessment of the site-specific geology is based upon 32 lithologic logs of borings obtained during the boring and well installation activities. The average boring depth is approximately 100 feet and the maximum boring depth is 302 feet below existing grade (SB-9). The Monitor Well and Soil Boring Location

Plan (Figure 1) shows the locations of all monitor wells and borings. Table 2 shows the depth and land-surface elevation, of all monitor wells, and Appendix A (Volume II) contains the lithologic logs of the borings.

The study area is located on the east slope of a northeast to southwest beach ridge. The topographic elevation of the site is approximately 10 feet above mean sea level (msl) and the crest of the ridge is slightly above 20 feet msl, approximately one-half mile west of the Aero-Dri site.

The upper 300 feet of the site is a sandy marine terrace deposit that primarily contains very fine to medium sand, with broken shells and discontinuous calcareous cemented sandstones and thin, sandy limestones. Generally, the sands encountered in the upper 40 to 50 feet are loose, uncemented and uncompacted.

The most significant features within the surficial sand are the dense, highly compacted, fine sand, calcareous cemented sand or sandy limestone zones and the loose shell and coquina deposits. The compacted, fine sand and calcareous cemented sand/sandy limestones deposits are of relatively low permeability, while the loose shells have relatively high permeability. The dense sand and cemented sand/sandy limestone zones are primarily observed in the lower part of the sand aquifer, at depths below 50 feet.

Below the surficial sands, sandy limestones were encountered in both of the borings that penetrated below 80 feet. The limestone contains solution cavities, (zone of secondary permeability) some of which are large enough to have caused the loss of circulation of drilling fluids. This cavity riddled zone may extend from approximately -80 to -225 feet MSL (Swayze, Miller, 1984). Loss of drilling fluid circulation into these cavities occurred during the construction of MWC5-A (118'), and MWC6-A (103'). Loss of drilling fluid circulation into these cavities also occurred during the execution of soil borings SB-3 (80'), SB-5 (82'), SB-7 (80'), SB-8 (80'), SB-9 (125' and 225'), and SB-17 (80').

No clay was observed within the upper 300 feet of soils, which suggests primarily moderate to high energy depositional environments. According to published literature (Rodis, 1976), a green calcareous, silty, clay, the Hawthorn Formation, forms the base of the surficial sand and is the unit that separates the surficial aquifer (Biscayne aquifer) from the Floridan aquifer system. This material was found in SB-9, at a depth of 302 feet, at the end of the soil sampler. The stratigraphic relationships of the lithologic units are provided in cross sections A - A' (Figure 3), B - B' (Figure 4) and C - C' (Figure 5). The cross sections show a lithologic change at approximately 60 feet below land surface, representing the sharp increase in the relative compactness of the material at this depth.

7.0 SITE HYDROGEOLOGY

To evaluate the potential directions and gradients of the ground water flow system, two sets of water levels were measured in the 18 monitor wells at the Aero-Dri site. The first was on May 25th and May 26th, 1988, which was limited to the available onsite wells, and the second on August 3rd and 4th, 1988, which included all onsite and offsite monitor wells, and the Series 20 Well-field. The locations of the monitor wells are shown in the Monitor Well and Soil Boring Location Plan (Figure 1) and the water-level information is provided in Table 2.

The unconfined, surficial aquifer is the primary concern of this investigation. The surficial aquifer is more than 300 feet thick and is composed primarily of surficial sands and the Anastasia Formation limestone. The permeable sand near the surface (upper 50 feet) grades denser and becomes more calcareous near the top of the Anastasia Formation limestone. The upper portion of this limestone is riddled with cavities, which generally decrease in frequency with depth. The Hawthorn Formation a green silty clay forms the base of the surficial aquifer. It is the main confining unit that separates the surficial aquifer from the Floridan aquifer system. The potentiometric surface changes continuously, as it is directly affected by the pumping schedule of the adjacent Series 20 wellfield. Cross-sections A - A′ and B - B′ (Figures 3 and 4) qualitatively presents the estimated potentiometric levels. Figures 3 & 4 are qualitative and should not be used to calculate gradients. Also, the water table is estimated as the field program only includes one well screened above elevation -10.0 feet MSL. An estimated potentiometric contour map of the aquifer is provided as Figure 6 (map pocket).

7.1 DIRECTION AND GRADIENT OF GROUND WATER FLOW

Water level elevations on August 3rd and 4th, 1988, in the unconfined aquifer range from +3.55 feet msl, in the west well, MWC4-C, to -0.50 feet msl monitor well in MWC6-A, in the northwest. The hydraulic gradients and ground water velocities change frequently, in response to the changing pumping scenarios at the Series 20 wellfield. The horizontal flow potential measured in the deeper wells is to the west-northwest. The regional gradient in the immediate vicinity of the wellfield is 0.003, from MWC2-A, MWC4-A and MWC6-B (August, 1988 water levels). Onsite average gradient is 0.003, from MWC1-C, MWC2-C and MWC4-C (August, 1988 water levels). Offsite average gradient is 0.004, from MWC1-B, MWC5-B and MWC6-B (August, 1988 water level). The gradient in the immediate vicinity of the Series 20 wellfield becomes steeper to the north-northwest direction, due

to pumping from these wells. The hydraulic gradient in the area varies continuously, due to the changing pumping schedules of the production wells.

7.2 HYDRAULIC CONDUCTIVITY

The hydraulic conductivity (permeability) of the upper portion (0'-50') of the surficial aquifer has been evaluated by performing slug tests on the onsite monitor wells. The slug tests were performed by introducing a solid aluminum slug, to displace the water in the casing. The water level information was recorded using an InSitu HERMIT hydrologic data logger. Once the water level had returned to the initial level, the slug was pulled out, and the recovery in the well was recorded. The water level information collected was electronically transferred to a personal computer and analyzed. The results of these procedures are presented in Appendix D. The central portions of these graphs represent the calculated permeability of the soils. Both the beginning and end of the tests are usually affected by air pockets and mounding effects, which result in erratic results at the beginning, and an apparent decrease near the end of the test. The results of the permeability tests range from 0.015 centimeters per second (cm/sec) in MW-3, to 0.0005 cm/sec in MWC4-C. The average permeability (of thirteen test wells) is approximately 0.0025 cm/sec. It is anticipated that the permeability decreases in the surficial sands (0'-50') with depth because the sands become denser, and in some cases, cemented.

The U.S. Geological Survey Water Resources Investigations 76-119 title "Hydraulic Conductivity and Water Quality of the Shallow Aquifer, Palm Beach County," indicates that the shallow sands have a permeability which ranges from about 0.00035 to 0.0035 cm/sec with a median value of about 0.002 cm/sec. The U.S. Geological median value is within approximately 25% of the mean permeability measured for the shallow sands.

For the remaining deeper portion of the aquifer,it is our opinion that the permeability should be higher than the permeability of the surficial sands. A total transmissivity of 160,000 gallons per day per foot of aquifer is indicated in the Palm Beach County Wellfield Protection Zone Study, for this area. Using this value for the total aquifer, and assuming the following:

Total thickness of aquifer = 300 Feet
Depth of surficial sands = 50 Feet
Permeability of surficial sands = 0.0025 cm/sec

Using the above parameters, an average permeability for the deeper portion of the aquifer can be calculated to be 0.025

cm/sec. This indicates that the average permeability in the deeper portion of the aquifer is approximately ten times that of the overlying sands. The water resources investigation 76-119 indicates a similar permeability.

The deep portion of this aquifer typically has a cavity riddled zone, which was encountered during the drilling activities. Based on this information, it is prudent to think of the permeability calculated above (0.025 cm/sec) as a weighted average for the deeper portion (50'-300') of the aquifer, with the understanding that individual strata may be considerably higher (or lower) than this value.

7.3 RATE OF MOVEMENT

The surficial aquifer in this area is stratified in an upper, primarily sand unit, and a lower, shelly, limestone, with cavity riddled zones. The ground water flow will tend to be through the more permeable layers, as this is the path of least resistance.

The regional trend for ground water movement in Delray Beach is towards the east. However, the local direction of ground water flow in the vicinity of the Aero-Dri site is towards the west, and northwest. This is due to localized drawdowns, which have been established by the ground water withdrawals from the Series 20 Wellfield. The Aero-Dri site is located within Zone 3, of the Palm Beach County Wellfield Protection Ordinance. This area is between the calculated 210 day travel time contour and the 500 day travel time contour or the one foot draw down zone whichever is farthest from the wellfield (Note: the one foot drawdown is referenced from the 1984 conditions, used during the preparation of the Palm Beach County Wellfield Protection Ordinance). The travel time contour lines are the theoretical location where particles in the ground water would require the indicated time to reach the wells (Figure 2).

The average gradient across the site was calculated as 0.003, in the northwest direction. Due to the inherent complexity of the microscopic structure of the aquifer (pore space), any movement of ground water will be statistical in nature. The rate of ground water movement was evaluated by using Darcy's law. This empirical formula uses the gradient and soil permeability to estimate the rate of ground water flow.

Using Darcy's Law, the potential rates of horizontal and vertical flow can be estimated. The ground water velocities presented here are only intended to provide an order of magnitude and may not be appropriate for detailed site-specific assessments, with-

out additional data at various time periods under diverse pumping conditions. Generally, the average ground water velocity depends upon the hydraulic conductivity (K), the hydraulic gradient (i), and the effective porosity (p). The specific horizontal discharge velocity (Vh) is expressed as follows:

$$Vh = (K)\ (i)$$

$$Vh_i = Vh / (p)$$

where: K = horizontal hydraulic conductivity

i = hydraulic gradient

p = effective porosity

Vh = average specific horizontal discharge velocity

Vh_i = average interstitial velocity

It should be noted that the average specific discharge velocity is not the speed at which the ground water will move in the horizontal direction. Rather, the average interstitial velocity is the speed at which the ground water will move without mixing. The average interstitial velocity can be calculated by dividing the average specific discharge velocity by the effective porosity. Since the water must flow through the voids within the soil, the interstitial velocity is usually significantly higher than the horizontal velocity.

Based on the permeabilities presented in Section 7.2 (above), and using a average effective porosity of 0.20 (Ground water, Freeze & Cherry, 1979) the average ground water movement would be on the order of 45 to 450 feet per year across of the site. The lower value reflects movements primarily within the shallow sands, while the higher value is for the movement in the deeper strata. However, due to the random nature of the flow, some of the water could flow at rates significantly higher than the interstitial velocities. This would indicate that a significant percentage of the ground water could be expected to move at rates up to 30 percent higher than the average interstitial velocity, or about a range of 60 to 600 feet per year. This rate is presented as an order of magnitude approximation, and does not include the effect of macroscopic features, layers of increased permeability, density dependent movement, or multi-phase flow.

The hydraulic gradient off site increases significantly as the distance from the operating wellfield decreases. Due to the small intake region of the wells, the surrounding ground water flow will be predominantly radial, with gradients on the order of 0.03 within about 100 feet of a individual well. The ground

water velocity will increase as the well is approached and velocities of several thousand feet per year are typical. Therefore, ground water in the production zone, at a radial distance of about 100 feet from a operating well (discharge rate near 800 gpm) would reach the well in approximately 10 days or less.

Summarizing, based on average permeabilities, water in the immediate vicinity of the site can be expected to travel at rates which range between 45-450 feet per year. Ground water found near the northwest property corner (closest to the municipal wells) will flow at velocities near the upper limit. Ground water near the southeast property corner will flow a velocities near the lower limit. However, a significant percentage of the ground water may travel at rates on the order of 60-600 feet per year. Off site the gradient can be expected to increase with the resulting increase in ground water velocity. These velocities will vary, depending on the pumping schedules of the municipal wells. Therefore, measurements taken at different times may produce different rates for ground water velocities in this area.

8.0 SOIL HEADSPACE CONCENTRATION

During the execution of the soil borings, and the installation of the monitor wells, soil samples were collected for field evaluation, and laboratory analyses. The field evaluation was carried out by performing headspace tests on the soil samples. The collected samples were placed in one pint jars, filled halfway to the top and covered with aluminum foil. The sample was allowed to equilibrate for a minimum period of thirty minutes, prior to piercing the aluminum foil with the tip of the organic vapor analyzer (OVA). The OVA was calibrated according to the methods specified in the Quality Assurance Project Plan (QAPP), prepared for this project.

The results of the headspace analyses for each soil boring is shown in Figures B-1 through B-42. This series of graphs show the change in headspace concentration values with depth. The concentrations increase whenever the density in the sands decrease, and a denser layer is found below the sampling point. The denser layer acts to retain the heavy organic compounds, and allows them to collect in the layers above them.

Soil headspace OVA response concentrations for soils below these depths continue to indicate the presence of volatile organic compounds. No additional maps can be developed, as there are only two borings that proceeded beyond 100 feet: SB-9 and SB-13. A review of Figure B-9 (SB-9) shows that additional peaks were detected at -115′ (32 ppm), -155′ (65 ppm), an increase between

-175' to -225' (10 to 15 ppm), followed by an increase to 450 ppm at -240', followed by an increase to 450 ppm between -255' to -275'. A final increase was detected at -285', of 600 ppm. A review of Figure B-13 (SB-13) shows that OVA response concentration began to rise at -125' (98 ppm), and would oscillate down to 20 ppm between -125' and -150' This was followed by a rise to 400 ppm at -180' Two additional OVA response concentration spikes were detected, at -210' (480 ppm) and at -235' (300 ppm).

9.0 LABORATORY ANALYSES OF SOIL SAMPLES

Beginning on April 18th, 1988, soil samples were sent to McGinnes Laboratories (Tech Analyses), for analyses using EPA methodologies 601 and 602. In order to reduce the turnaround time, however, Dames & Moore was requested by Aero-Dri's counsel to use the services of Enviropact Laboratories. Consequently, beginning on May 23rd, 1988, all samples were sent to Enviropact Laboratories for analyses. For quality control, five samples from SB-18 were split and sent to Savannah Laboratories, as well as to Enviropact.

The laboratory reports for the soil samples from the monitor well cluster installations are presented in Appendix E (Volume III). The laboratory reports for the soil samples from the soil borings are presented in Appendix F (Volume III).

A summary of the soil sample analyses results are presented in Table 3. It should be noted that where compounds were detected, it is only for those discrete intervals sampled. Detecting compounds in one sample does not mean that the entire borehole was contaminated.

Perc (also known as tetrachloroethene and tetrachloroethylene) was detected in samples from MWC1-A, MWC1-B, MWC4-A, MWC5-A, MWC6-A, SB-2, SB-4, SB-6, SB-7, SB-9, SB-10, SB-12, SB-14 and SB-18. The highest concentration detected during the Contamination Assessment was 4 and 6 feet below land surface, in SB-18, at a concentration of 94,000 ppb. Figures D-1 through D-14 show the perc concentrations obtained from the samples collected at various depths. Figures D-15, D-16 and D-17 show site cross sections, with the concentrations of perc detected from the samples collected at various depths.

In addition to perc, other compounds were detected. 1,1,1-Trichloroethane was detected in samples from MWC1-A, MWC4-C, MWC5-B, and SB-3. It is extremely unlikely that this contaminant originated at the Aero Dri site. Chloroform was detected in samples from MWC1-A. Methylene Chloride was detected in samples from MWC1-A, MWC4-A, MWC4-C, SB-12, and SB-13. Chloroform and

Methylene Chloride were never used at the Aero Dri site, and unless it is a laboratory contaminant its origin is unclear. Toluene was detected in samples from MWC1-B, MWC6-B, SB-9, and SB-18. Xylenes (ortho-, meta- and para-) were detected in samples from MWC1-B, MWC6-B, SB-9, and SB-18. The presence of toluene and xylenes in the equipment blanks indicate the prevailing winds may have carried these volatiles towards the area under investigation and may have contaminated the samples when they were collected.

After the PCAP activities, and prior to initiating the CAP activities, a surface soil sample collected on December 7, 1987, from the used sandblasting sands near the south side of the property was analyzed for EP toxicity metals. This sample proved to have elevated EP toxicity levels of lead (215 ppm) and chromium (80 ppm). Consequently, DER requested that all surface samples be analyzed for metals. In an attempt to control costs, lead was chosen as an indicator metal. The highest concentration detected was 5.3 ppm in SB-16, west of the vacuum extraction area. As none of the other surface samples collected in this area were as high on the remaining Aero Dri site, then we believe that the initial sample may have been biased by possible solder chips that may have been removed from the metal parts being sandblasted.

10.0 VACUUM EXTRACTION SYSTEM

To reduce the impact to the ground water, Aero-Dri elected to initiate an Interim Remedial Action (IRA). The IRA consisted of the installation of a vacuum extraction system to remove perc from the vadose zone of the suspected spill area. This system was selected, as the immediate proximity of the building precluded any excavation without requiring extensive foundation support. The system consists of six 4" diameter Schedule 40 PVC wells. These wells have a total depths of 14', and have 7.5' of 0.010" slot screen. There is one central well (VE-0) and the other five are placed radially from it (Figure 7). The area is covered with plastic tarpaulin, and weighted down with railroad ties and mulch. The central well, and one of the radial wells, are connected to a vacuum blower. When the system is in operation, the perc containing soil gases surrounding these wells are extracted, and discharged through the system stack. The moisture in the soil gas condenses and is trapped in the knock off pot assembly. This water is filtered through the Carbtrol GAC units, and discharged into the City's sanitary sewers.

The system began part time operation on May 31, 1988, and full time operation on July 29, 1988. It is currently in operation. Boring logs for the system wells (VE-0 through VE-5) are

presented in Appendix A (Volume II), and the well construction diagrams are in Appendix B (Volume II).

11.0 TRENCH AREA

Southwest of the main spill area, is the trench area. The CME 4500 drilling rig was fitted with flight augers, to execute test borings (TB's) in this area. Fourteen soil borings were executed (Figure 8) and samples were collected for headspace analyses only. The results of this investigation are depicted in Figures E-1 through E-5. Concentrations of organic vapors greater than 1000 ppm were detected in the south portion of the suspected trench area, extending from the surface to a depth of 8 feet. Below this depth, perc was found to be located near the northeast corner of the suspected trench area. Boring logs for the test borings (TB-1 through TB-14) are presented in Appendix A (Volume II).

12.0 GROUND WATER QUALITY ANALYSES

Ground water samples were collected on May 25th and 26th, 1988, and August 2nd through 5th, and 9th, 1988. The laboratory analyses results are presented in Appendix C (Volume II). Table 4 presents a summary of the water quality analyses results.

Concentrations of lead in the ground water has ranged between 0.005 ppm to 0.007 ppm for ground water samples collected in August, 1988. These concentrations are below the maximum contamination level (MCL) acceptable for lead (.05 ppm), and therefore, lead in the ground water at the Aero-Dri site does not represent a hazard.

Trichloroethene was detected in samples collected in August, 1988 in MW-1, MW-2, MW-3, MW-6, MWC1-A, MWC1-B, MWC4-B, MWC5-A, MWC5-B, MWC6-A and city wells numbers 23, 24 and 25 ranging from a high of 1,760 ppb in MW-6 to a low of 2.2 ppb in city well #23.

1,2-Dichloropropane was detected in samples collected in August, 1988 in MW-6 only at a concentration of 3.4 ppb.

Trichloroethene was detected in samples collected in August, 1988 in MW-1, MW-2, MWC1-A and MWC1-B ranging from a high of 7.0 ppb in MWC1-A to a low of 5.9 ppb in MW-2.

Trans-1,2,-Dichloroethene was detected in the municipal wells, but not in any of the monitor wells. This compound is a solvent

for fats and phenols, rubber manufacturing, additives to dyes and lacquer solutions, and low temperature solvent for heat sensitive substances. This substance has never been used in any of the Aero-Dri processes.

Methyl-tert-Butyl-Ether was detected initially in MWC4-A, at a concentration of 0.7 ppb. This compound is occasionally used as an additive to gasoline, as an octane booster. Its presence and subsequent disappearance may be related to the occasional test running of rebuilt compressors in this vicinity.

Concentrations of perc have diminished in MW-1 and MW-2, from those observed in November, 1987 (5,600 ppb and 531,500 ppb), but they still remain elevated (2,290 and 3,180 ppb, respectively). Monitor well 3 had no perc, but had 1520 ppb of trichloroethene.

In general, the August, 1988 ground water sample analyses of the shallow wells outside of the suspected spill area (MWC1-C, MWC2-A, B, C, MWC4-A, B, and C) indicate that perc was absent, or present in relatively minor concentrations. However, perc was detected in all wells deeper than 80 feet. This includes MW-4, 5, 6, MWC1-A, B, MWC5-A, B, and MWC6-A, as well as Municipal wells 24 and 25. These results indicate that the perc has been detected in both the shallow and deep zones of the (surficial aquifer). Perc has been detected on the upper portion of the aquifer only in the vicinity of the spill area, as shown in the cross sections A - A', B - B' and C - C' (Figures 9, 10 and 11).

13.0 CONCLUSIONS AND RECOMMENDATIONS

A survey of industries surrounding the Aero Dri site indicates there are several automobile repair shops, lawn care maintenance facilities (with their own vehicle maintenance shops) and automobile paint shops in the immediate vicinity of the Series 20 Wellfield. Table 5 supplies site names and addresses of these facilities and Figure 12 is a location map of such sites in respect to the Aero Dri facilities. It is unknown to what degree these firms have contributed to the existing ground water quality conditions.

These firms may utilize compounds containing some of these contaminants detected in the study. Micronized Fluoropolymer Products (MFP) located west of the Aero Dri site is known to utilize Perc and other solvents, in their manufacturing process.

The perc contamination at the Aero-Dri site has been found to have migrated vertically downward, with little horizontal displacement, to a depth of approximately 80'. At this depth, it has

entered a zone of secondary permeability that has allowed rapid vertical movement of perc, and possible lateral movement of dissolved perc to the north-northwest.

A conceptual remediation plan would require the collection of perc from the affected zones. One way of accomplishing this objective may be the installation of collector wells. A pumping test on MW-4 may be performed to evaluate the hydrogeologic properties of the deeper zone.

The collected ground water will require treatment for the removal of the perc. This may be performed by the use of airstrippers or converted cooling towers. The installation of these systems may require the construction of an infiltration gallery, for disposal of the treated ground water.

TABLE 1

FIELD INVESTIGATIONS
CHRONOLOGICAL SUMMARY

April 18, 1988 - Drilling began with MWC1, believed to be one of less contaminated well clusters onsite. Access problems prohibited MWC4 background wells to be drilled first.

April 21, 1988 - Developed MWC1-A.

April 22, 1988 - Developed MWC1-B.

April 25, 1988 - MWC1 completed.

April 26, 1988 - Began drilling MWC4. Developed MWC1-C.

April 27, 1988 - Left MWC4 for installation of Vacuum Extraction System vent wells on southwest corner of Aero-Dri building.

April 28, 1988 - Completed 6 vent wells (VE-0 to VE-5) in vadose zone for Vacuum Extraction System.

May 2, 1988 - Return to MWC4 to drill remaining wells A and B. Began construction of Vacuum Extraction System. Drumming all knockout pot water until carbon units installed.

May 3, 1988 - MWC4 completed.

May 5, 1988 - MWC3 drilling began (Well A). Access problems because of sands. Four wheel drive rig mobilized for remaining wells on site.

May 6, 1988 - MW-3 drilled and completed while waiting for Four wheel drive rig to be mobilized.

May 9, 1988 - Laid planking down for conventional rig to access remaining Well B in cluster MWC3. Drilled and completed MWC4-B. Finished cluster.

May 10, 1988 - Four wheel drive rig arrives onsite. Drilling began on MWC2.

May 11, 1988 - MWC2 completed. Vacuum extraction unit in final construction phase. Developed MWC3-A, MWC3-B, MW-3, MWC4-A, MWC4-B, and MWC4-C.

May 12, 1988 - Ready to begin offsite MWC5. Permits not authorized. Begin soil boring program with SB-1 in used drum storage area. SB-1 completed.

TABLE 1

FIELD INVESTIGATIONS
CHRONOLOGICAL SUMMARY (CONTINUED)

May 16, 1988 - SB-2 drilled and completed.

May 17, 1988 - SB-3 drilled - first identification of contamination below 50 foot mark on west side of building. Headspace analysis with gas chromatograph indicates perc at 87 feet with a relative response of 175 ppm. Change in boring program, depth of borings increased.

May 18, 1988 - SB-4 drilled and completed.

May 19, 1988 - SB-5, and SB-6 drilled and completed.

May 20, 1988 - Offsite drilling permits authorized SB-8 drilled and completed.

May 23, 1988 - SB-7 drilled, lost circulation at 80 feet. Was unable to regain circulation - grouted boring. Projected soil removal activities from the trench area by Chemical Conservation (ChemCon) started and completed.

May 24, 1988 - SB-12 drilled and completed. SB-11 drilled to 30 feet, continued on May 25, 1988.

May 25, 1988 - SB-11 drilled to 89 feet, lost circulation, was unable to regain circulation - grouted boring. Set up on first offsite well and drilled to 60 feet. Enviropact samples city wells. Dames & Moore (Ed Siersema) sampled site wells for the first time. Samples were split with CH2M Hill (Derek Williams), and Palm Beach County Health Department (Tim Neal). Water level measurements for first time on site.

May 26, 1988 - MWC5-B (off site) continued drilling. Set well and completed.

May 27, 1988 - Sampled surface soils for lab analysis SB3-0, SB4-0, SB5-0, SB6-0, SB7-0, and SB8-0.

May 30, 1988 - Memorial Day - no work.

May 31, 1988 - SB-10 drilled and completed. Carbon units are hooked up to Vacuum Extraction Systems. Knock out pot, electrical and pipe work connected to Carbtrol GAC units and pumps. System pumping about 4000 gals/day of water.

June 1, 1988 - Test borings in trench area with flight augers. Vacuum Extraction System adjustment of packers to

accommodate excessive water production.

June 2, 1988 - MWC5-A (off site) started.

June 3, 1988 - MWC5-A still in progress.

June 6, 1988 - MWC5-A completed.

June 7, 1988 - MWC6-B (off site) started.

June 8, 1988 - MWC6-B completed.

June 9, 1988 - MWC6-A (off site) started.

June 10, 1988 - MWC6-A completed.

June 14, 1988 - Insitu permeability tests started on onsite wells.

June 15, 1988 - Insitu permeability tests completed on all existing onsite wells.

June 16, 1988 - SB-13 started. SB-14 started.

June 17, 1988 - SB-13 continued. SB-14 completed.

June 20, 1988 - SB-13 continued.

June 21, 1988 - SB-13 continued.

June 22, 1988 - SB-13 continued.

June 23, 1988 - SB-13 continued. Bottom of boring at 240 feet.

June 24, 1988 - SB-13 grout boring up to 205 feet to accommodate setting of screen of MW-4.

June 27, 1988 - SB-17 started and completed. Started to ream SB-13 to 205 feet with larger bit.

June 28, 1988 - SB-16 started and completed. SB-13 reaming out. Loss of ground developed under the back of the rig. Hole grouted shut. 10-inch diameter PVC temporary casing installed.

June 29, 1988 - SB-9 started. SB-13 problems with rig (mechanical).

TABLE 1

FIELD INVESTIGATIONS
CHRONOLOGICAL SUMMARY (CONTINUED)

June 30, 1988 - SB-9 continued drilling. SB-13 another hole opens up around base of rig. Placement of steel surface casing attempted. Unsuccessful.

July 1, 1988 - SB-9 loses circulation at 120 feet. Needs casing to continue hole. SB-13 mechanical problems.

July 4, 1988 - Independence Day.

July 5, 1988 - SB-9 new casing arrives and is installed. SB-13 mechanical problems.

July 6, 1988 - SB-9 continued drilling to 190 feet. SB-13 rig leaves site for repairs.

July 7, 1988 - Onsite - rain day.

July 8, 1988 - SB-9 continued drilling to 242 feet.

July 11, 1988 - SB-9 boring reaches 302 feet. Grouting boring up. Second rig returned to site after repairs. SB-13 drilled and converted to well MW-4 well.

July 12, 1988 - SB-9 pulling casing. SB-13/MW-4 completed, well end plug failed during development. MW-5/MW-6 (adjacent to SB-9) drilled to 60 feet to set surface casing.

July 13, 1988 - Repaired bottom of MW-4 well with a cement plug. MW-5 and MW-6 mechanical problems with rig and hole collapse.

July 14, 1988 - MW-5/MW-6 setting of surface casing (welding and grouting).

July 15, 1988 - MW-5 and MW-6 decision to dual complete well (same borehole). MW-5 screened interval 135-145 feet. MW-6 screened interval 100-120 feet.

July 18, 1988 - MW-5 and MW-6 re-drilled and dual completed. Surveying in existing wells and borings onsite and offsite.

July 19, 1988 - MW-5 and MW-6 finished up and grouted.

July 20, 1988 - Developed MW-4, MW-5 and MW-6.

July 28, 1988 - SB-18 drilled and completed.

TABLE 1

FIELD INVESTIGATIONS
CHRONOLOGICAL SUMMARY (CONTINUED)

July 29, 1988 - Finished surveying in existing wells and borings onsite. Full-time operation of vacuum extraction system begins.

August 2, 1988 - Began first complete round of well sampling onsite, offsite and City wells, with Palm Beach County Health Department (Sherry Younger), CH2M Hill (Gregory Ford) and Dames & Moore (Steve Krupa and Bob Taylor). Water levels measured by Dames & Moore (Steve Krupa and Bob Taylor), on site and off site wells (second time).

August 3, 1988 - Continuation of August 2 task.

August 4, 1988 - Completed well sampling rounds. City wells #21 and #24 not operating. Water levels measured for third time including static water levels in city wells and golf course wells.

August 5, 1988 - Final walk through site to check on site restoration after drilling operations.

August 9, 1988 - Sampled City well #24. Insitu permeability test initiated on remaining wells onsite and offsite).

August 18, 1988 - Permeability tests on all onsite wells completed.

TABLE 2

MONITOR WELL SCREENED INTERVALS

WATER LEVEL ELEVATIONS

Water Levels Collected on May 26, 1988

Well #	Setting Screen	Total Depth (feet)	Elev. Ground	Elev. TOC	Water Level Depth	Water Level (MSL)
MW 1	15-25	25	14.65	17.50	17.27	0.23
MW 2	35-45	45	14.79	17.80	16.96	0.84
MW 3	20-30	30	15.14	14.97	14.17	0.80
MW 4	175-205	205	14.80	17.77	Not installed	
MW 5	135-145	145	14.31	17.41	Not installed	
MW 6	100-120	135	14.31	17.77	Not installed	
MWC 1-A	90-100	100	15.24	15.16	15.61	-0.45
MWC 1-B	70-80	80	15.03	14.88	15.32	-0.44
MWC 1-C	50-60	60	14.77	14.60	14.98	-0.38
MWC 2-A	80-90	90	14.20	17.49	17.02	0.47
MWC 2-B	60-70	70	14.40	17.48	16.89	0.59
MWC 2-C	40-50	50	14.46	17.23	16.53	0.70
MWC 3-A	70-80	80	12.30	11.94	10.81	1.13
MWC 3-B	50-60	60	12.83	12.54	11.32	1.22
MWC 4-A	60-70	70	15.23	17.99	15.61	2.38
MWC 4-B	40-50	50	15.32	18.01	15.31	2.70
MWC 4-C	20-30	30	15.22	18.53	14.99	3.54
MWC 5-A	104.5-124.5	125	13.75	13.45	Not installed	
MWC 5-B	70-90	90	13.98	13.69	Not installed	
MWC 6-A	110-120	122	13.81	13.07	Not installed	
MWC 6-B	68.5-88.5	92	13.84	13.76	Not installed	

TABLE 2

MONITOR WELL SCREENED INTERVALS

WATER LEVEL ELEVATIONS (CONTINUED)

Water Levels Collected on August 3, 1988

Well #	Setting Screen	Total Depth (feet)	Elev. Ground	Elev. TOC	Water Level Depth	Water Level (MSL)
MW 1	15-25	25	14.65	17.50	15.00	2.50
MW 2	35-45	45	14.79	17.80	15.29	2.51
MW 3	20-30	30	15.14	14.97	12.15	2.82
MW 4	175-205	205	14.80	17.77	15.89	1.88
MW 5	135-145	145	14.31	17.41	15.21	2.20
MW 6	100-120	135	14.31	17.77	15.56	2.21
MWC 1-A	90-100	100	15.24	15.16	13.45	1.71
MWC 1-B	70-80	80	15.03	14.88	13.15	1.73
MWC 1-C	50-60	60	14.77	14.60	12.82	1.78
MWC 2-A	80-90	90	14.20	17.49	15.00	2.49
MWC 2-B	60-70	70	14.40	17.48	14.85	2.63
MWC 2-C	40-50	50	14.46	17.23	14.53	2.70
MWC 3-A	70-80	80	12.30	11.94	8.79	3.15
MWC 3-B	50-60	60	12.83	12.54	9.18	3.36
MWC 4-A	60-70	70	15.23	17.99	15.11	2.88
MWC 4-B	40-50	50	15.32	18.01	15.18	2.83
MWC 4-C	20-30	30	15.22	18.53	15.62	2.91
MWC 5-A	104.5-124.5	125	13.75	13.45	12.64	0.81
MWC 5-B	70-90	90	13.98	13.69	12.76	0.93
MWC 6-A	110-120	122	13.81	13.07	13.57	-0.50
MWC 6-B	68.5-88.5	92	13.84	13.76	14.09	-0.33

TABLE 2

MONITOR WELL SCREENED INTERVALS

WATER LEVEL ELEVATIONS (CONTINUED)

Water Levels Collected on August 4, 1988

Well #	Setting Screen	Total Depth (feet)	Elev. Ground	Elev. TOC	Water Level Depth	Water Level (MSL)
MW 1	15-25	25	14.65	17.50	15.12	2.38
MW 2	35-45	45	14.79	17.80	15.46	2.34
MW 3	20-30	30	15.14	14.97	12.28	2.69
MW 4	175-205	205	14.80	17.77	16.19	1.58
MW 5	135-145	145	14.31	17.41	15.38	2.03
MW 6	100-120	135	14.31	17.77	15.72	2.05
MWC 1-A	90-100	100	15.24	15.16	13.60	1.56
MWC 1-B	70-80	80	15.03	14.88	13.22	1.66
MWC 1-C	50-60	60	14.77	14.60	12.83	1.77
MWC 2-A	80-90	90	14.20	17.49	15.21	2.28
MWC 2-B	60-70	70	14.40	17.48	15.05	2.43
MWC 2-C	40-50	50	14.46	17.23	14.73	2.50
MWC 3-A	70-80	80	12.30	11.94	8.88	3.06
MWC 3-B	50-60	60	12.83	12.54	9.39	3.15
MWC 4-A	60-70	70	15.23	17.99	15.25	2.74
MWC 4-B	40-50	50	15.32	18.01	15.29	2.72
MWC 4-C	20-30	30	15.22	18.53	15.76	2.77
MWC 5-A	104.5-124.5	125	13.75	13.45	12.89	0.56
MWC 5-B	70-90	90	13.98	13.69	12.94	0.75
MWC 6-A	110-120	122	13.81	13.07	13.76	-0.69
MWC 6-B	68.5-88.5	92	13.84	13.76	14.30	-0.54

TABLE 3

SUMMARY
SOIL SAMPLING LABORATORY ANALYSES

MONITOR WELLS AND SOIL BORINGS

Location	Chemical Detected	Concentration	Sample Depth (feet)
Monitor Wells			
MWC1-A	1,1,1-Trichloroethane	1.38 ppb	2-4
		4.20 ppb	4-6
	Perchloroethylene	43.5 ppb	100-102
	Chloroform	2.25 ppb	2-4
		2.95 ppb	4-6
	Methylene Chloride	2.86 ppb	2-4
		6.24 ppb	4-6
MWC1-B	Toluene	1 ppb	14-16
	o-Xylene	7 ppb	14-16
	m-Xylene	4 ppb	14-16
	p-Xylene	3 ppb	14-16
MCW1-B	Perchloroethylene	43.3 ppb	6-8
MWC2-B	None Detected		
MWC2-C	None Detected		
MWC3-B	None Detected		
MWC4-A	Trichloroethene	4.3 ppb	4-6
		1.6 ppb	10-12
		1.2 ppb	35-37
	Perchloroethylene	50.3 ppb	4-6
	Methylene Chloride	5.5 ppb	4-6
MWC4-C	1,1,1-Trichloroethane	6.4 ppb	30-32
	Methylene Chloride	7.2 ppb	30-32
MWC5-A	Perchloroethylene	22 ppb	120-122
MWC5-B	1,1,1-Trichloroethane	21 ppb	14-16
MWC6-A	Perchloroethylene	52.0 ppb	115-117
MWC6-B	Lead	1.5 ppm	1-3
	Toluene	11 ppb	10-12
	Xylene, total	20 ppb	50-52
Soil Borings			
SB-1	None Detected		
SB-2	Trichloroethene	7.9 ppb	0-1
SB-3	1,1,1-Trichloroethane	2.2 ppb	90-92
		1.1 ppb	100-102
SB-4	Perchloroethylene	69.9 ppb	10-12
		52.1 ppb	20-22
		35.9 ppb	30-32

TABLE 3

SUMMARY
SOIL SAMPLING LABORATORY ANALYSES

MONITOR WELLS AND SOIL BORINGS (CONTINUED)

Location	Chemical Detected	Concentration	Sample Depth (feet)
SB-4	Perchloroethylene	27.9 ppb	40-42
		26.9 ppb	50-52
		18.2 ppb	60-62
		20.8 ppb	70-72
		10.3 ppb	90-92
		3.6 ppb	100-102
SB-5	None Detected		
SB-6	Perchloroethylene	9.96 ppb	0-2
SB-7	Perchloroethylene	30 ppb	80-82
SB-8	None Detected		
SB-9	Lead	4.6 ppm	0-4
	Perchloroethylene	615 ppb	70-72
		21 ppb	115-117
		25 ppb	120-122
		39400 ppb*	130-132
		386 ppb	135-137
	Toluene	450 ppb	130-132
		234 ppb	135-137
		62.0 ppb	140-142
		51 ppb	145-147
		188 ppb	155-157
		193 ppb	185-187
		191 ppb	190-192
	Xylene	30 ppb	135-137
SB-10	Perchloroethylene	16 ppb	14-16
		119 ppb	20-22
		205 ppb	30-32
		18 ppb	50-52
		3970 ppb	60-62
		175 ppb	70-72
SB-11	None Detected		
SB-12	Lead	3.4 ppm	0-2
	Perchloroethylene	28 ppb	90-92
SB-13	Lead	1.4 ppm	0-4
	Methylene Chloride	93 ppb	228-230
		93 ppb	238-240
SB-14	Lead	18 ppm	0-4
	Perchloroethylene	98 ppb	10-12
SB-15	Lead	4.9 ppm	0-4
SB-16	Lead	5.3 ppm	0-4

TABLE 3

SUMMARY
SOIL SAMPLING LABORATORY ANALYSES

MONITOR WELLS AND SOIL BORINGS (CONTINUED)

Location	Chemical Detected	Concentration	Sample Depth (feet)
SB-17	Lead	2.1 ppm	0-4
SB-18	Toluene	17 ppb	4-6
SB-18	Xylene	140 ppb	4-6
	Perchloroethylene	94000 ppb	4-6
		79 ppb	6-8
		2300 ppb	20-22
		160 ppb	40-42
		5100 ppb	100-102

* Spiked sample prepared in the field, to blind test laboratory quality control.

TABLE 4

SUMMARY
WATER QUALITY SAMPLE ANALYSES RESULTS

WELL #	COMPOUND	MAY	AUGUST
MW-1	Perchloroethylene	1,430 ppb	2,290 ppb
	Toluene	0.6 ppb	
	Trichlorethene	1.2 ppb	123 ppb
	1,1,2-Trichloroethane		6.8 ppb
MW-2	Perchloroethylene	55,200 ppb	3,180 ppb
	Toluene	3.2 ppb	
	Trichloethene	279 ppb	202 ppb
	Xylene (total)	2.8 ppb	
	1,1,2-Trichloroethane		5.9 ppb
MW-3	Perchloroethylene	237 ppb	
	Trichlorethene	36.7 ppb	1,520 ppb
MW-4	Perchloroethylene	616 ppb	
MW-5	Perchloroethylene	537 ppb	
MW-6	Trichlorethene		1,760 ppb
	1,2-Dichloropropane		3.4 ppb
MWC1-A	Perchloroethylene	3,660 ppb	1,550 ppb
	Trichlorethene	11.9 ppb	35.5 ppb
	1,1,2-Trichlorethane		7.0 ppb
MWC1-B	Perchloroethylene	1,330 ppb	1,170 ppb
	Trichlorethene	7.2 ppb	12.8 ppb
	1,1,2-Trichlorethane		6.8 ppb
MWC1-C	No compounds detected from either sample.		
MWC2-A	Lead	0.007 ppm	
	Perchloroethylene		2.6 ppb
MWC2-B	Lead	0.005 ppm	
	Perchloroethylene		4.7 ppb
MWC2-C	Lead	0.005 ppm	
MWC3-A	Lead	0.005 ppm	
	Perchloroethylene		9.1 ppb

TABLE 4

SUMMARY (CONTINUED)
WATER QUALITY SAMPLE ANALYSES RESULTS

WELL #	COMPOUND	MAY	AUGUST
MWC3-B	Lead	0.005 ppm	
MWC4-A	Methyl-Tert-Butyl-Ether	0.7 ppb	
	Perchloroethylene		4.0 ppb
MWC4-B	Perchloroethylene		16.5 ppb
	Trichlorethene		1.8 ppb
MWC4-C	Perchloroethylene	3.4 ppb	13.1 ppb
MWC5-A	Perchloroethylene		1,350 ppb
	Trichlorethene		27.3 ppb
MWC5-B	Perchloroethylene		349 ppb
	Trichlorethene		6.9 ppb
MWC6-A	Perchloroethylene		349 ppb
	Trichlorethene		19.1 ppb
MWC6-B	Perchloroethylene		3.8 ppb
City Wells			
22	Trans-1,2-Dichloro-ethene		6.4 ppb
23	Perchloroethylene		12.2 ppb
	Trichlorethene		2.2 ppb
24	Perchloroethylene		537 ppb
	Trans-1,2,-Dichloro-ethene		51.8 ppb
	Trichlorethene		69.0 ppb
25	Perchloroethylene		303 ppb
	Trans-1,2,-Dichloro-ethene		46.4 ppb
	Trichlorethene		38.1 ppb
26	No compounds detected from either sample.		

TABLE 5

Field Survey of Potential Sources of Contamination in the Vicinity of the Aero-Dri Facilities Delray Beach, Florida

1. Ace Auto Repair - 445 N. Federal Highway
   Oil, fuels, degreasers, solvents.

2. Ace Radiator - 445 N. Federal Highway
   Antifreeze, caustic sodas, automatic transmission fluid.

3. Jim Radiator Service - 401 N. Federal Highway
   Antifreeze, caustic sodas

4. Duro Transmissions - 40 N. Federal Highway
   Automatic transmission fluids, oils, solvents

5. Klines Patio & Rattan Shop - 2301 S. Federal Highway
   Adhesives, solvents

6. Nozel Nolan - 375 S. Federal Highway
   Pesticides, defoliants, fertilizers

7. Delray Auto Air & Radiator - 1 West Linton
   Antifreeze, transmission fluids, caustic soda's

8. Auto Painting U.S.A. - 101 S. Congress Avenue
   Solvents, degreasers, paints

9. Top Water Sports - 2885 S. Congress Avenue
   Fiberglass repair, solvents, acetone

10. Hardrives of Delray - 2350 S. Congress Avenue
    Fuels, solvents, degreasers, hydraulic oil and transmission fluids.

11. Slim's Radiator Service - 235 S.E. 2nd Avenue
    Antifreeze, caustic soda and oils.

12. Modern Roofing - 90 N. Congress Avenue
    Asphalt products

13. Speedy Transmission - 330 N. Congress Avenue
    Transmission fluids, antifreeze and degreasers, and solvents.

14. Orkin - 1400 Ponsettia Drive
Pesticides, herbicides, fertilizers

15. Ultimate Auto Body - 1865 S.W. 4th Avenue
Solvents, thinners and paints.

16. B & C Roofing - 85 S.E. 4th Avenue
Solvents, asphalt products.

17. Econo Auto Painting - 65 N.W. 18th Avenue
Solvents, paintings, thinner

18. Gulfstream Roofing - 140 N.W. 18th Avenue
Solvents, asphalt products

19. Auto Groom - 235 S.E. 2nd Avenue
Oils, solvents, degreasers, waxes.

20. ACE exterminators - 135 E. Atlantic
Possible pesticides.

21. Terry's Auto Wax - 384 S.E. 2nd Avenue
Solvents, degreasers and waxes

22. A. Samuel Pest Control - 142 S.E. 5th Avenue
Pesticides

23. Ambiance Kitchen Studies 1085 S.W. 15th Avenue
Solvents, glues and cements

24. Auto Shine - 765 S.W. 15th Avenue
Waxes, degreasers and solvents.

25. Leisure Landscaping - 831 S.W. 17th Avenue
Oils, solvents, greases, degreasers, fuels

26. Dry Clean U.S.A. - 1545 Linton Square
Pesticides, solvents.

27. Florida Metals Recycling - 17th Avenue
Degreasers, oils, solvents

Body Shop by Gary McGee - 17th Avenue
Solvents, paints and degreasers

Quality Car Care: Fuel - 17th Avenue
Oils and solvents

Willey's Sheet Metals - 17th Avenue
Solvents

28. Chevron Station - Congress and 10th Street
Fuel, oils, transmission fluids, degreasers, steam cleaners outside on pad.

29. Sherwood Park Laundry - Congress and 10th Street
Pesticides, solvents and soaps.

30. 10th St. Automotive - 15th Avenue
Fuels, oils and degreasers.

31. Florida Rust Proofing - 15th Avenue
Solvents, undercoating, degreasers.

32. Palm Beach Chrome Plating - Georgia Street
Plating Metals.

AAA Frame & Body - Georgia Street
Oils, fuels and solvents

Delray Chemical Co. - Linton Center Warehouse
Miscellaneous chemical storage

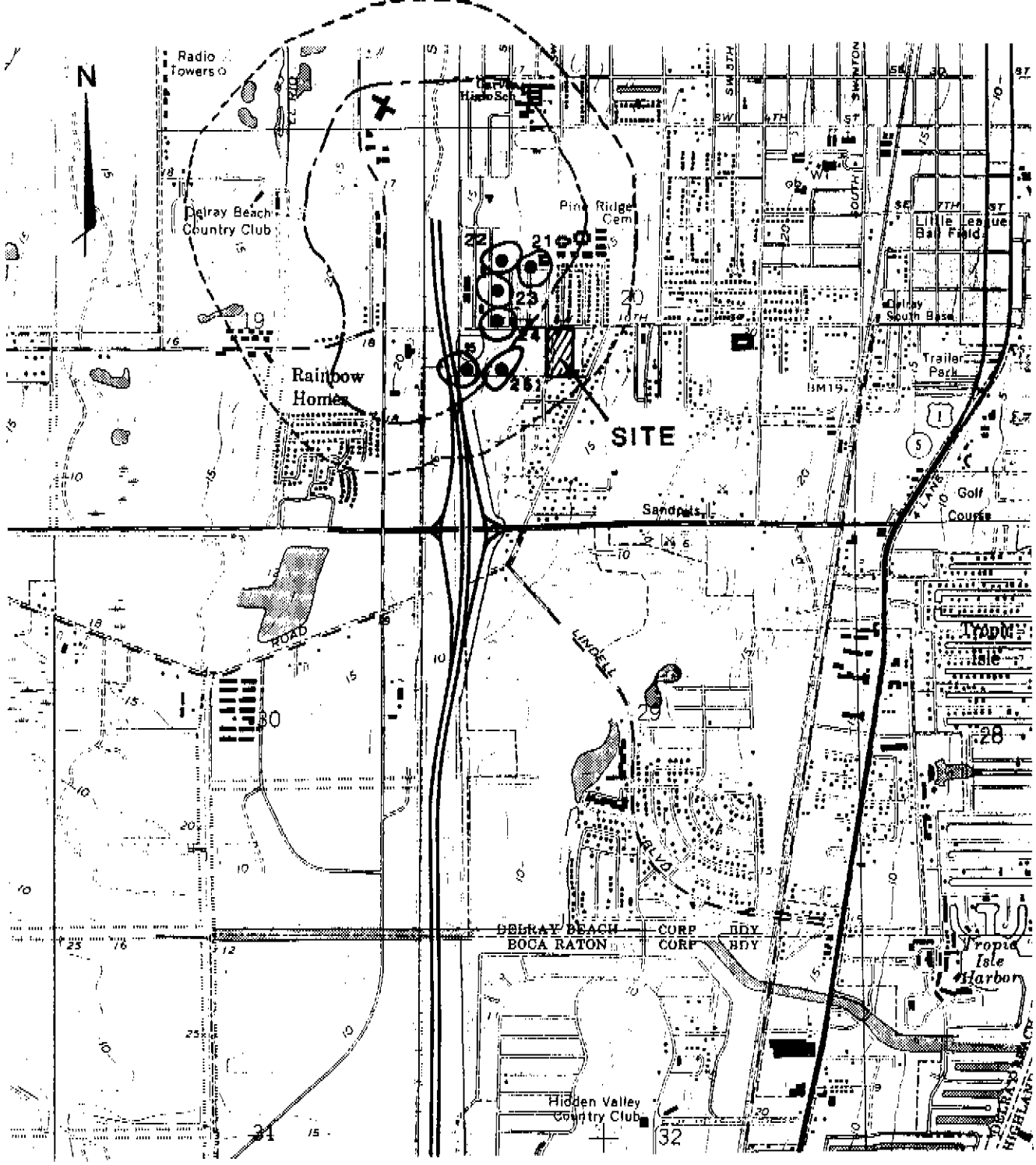
33. Abandoned Gas Station - Germantown Rd. and 10th Street
Possible underground storage tanks

34. County Sanitation - S.W. 4th Avenue
Oils, fuels and degreasers

35. Ziebart Rustproofing - 15874 S.W. 4th Avenue
Solvents, undercoating and oils

36. Graph 4 -Tricounty Litho. Co. - 1055B 10th Street
Solvents, dyes, paints and thinners

37. Micronized Fluoropolymer Products, Inc. -
1055 S.W. 15th Avenue
Perchlorethylene, solvents, dyes, paints and thinners



KEY :

30 DAYS

210 DAYS

500 DAYS

REFERENCE :

U.S.G.S. QUAD. TITLE : DELRAY BEACH, FL. REVISED 1973.

0 2000

FEET

PUBLIC SUPPLY WELLS AND GROUND WATER TRAVEL TIMES IN THE VICINITY OF AERO-DRI CORP. SITE

PROJECT : AERO-DRI CORP.

LOCATION : DELRAY BEACH, FL.

DAMES & MOORE

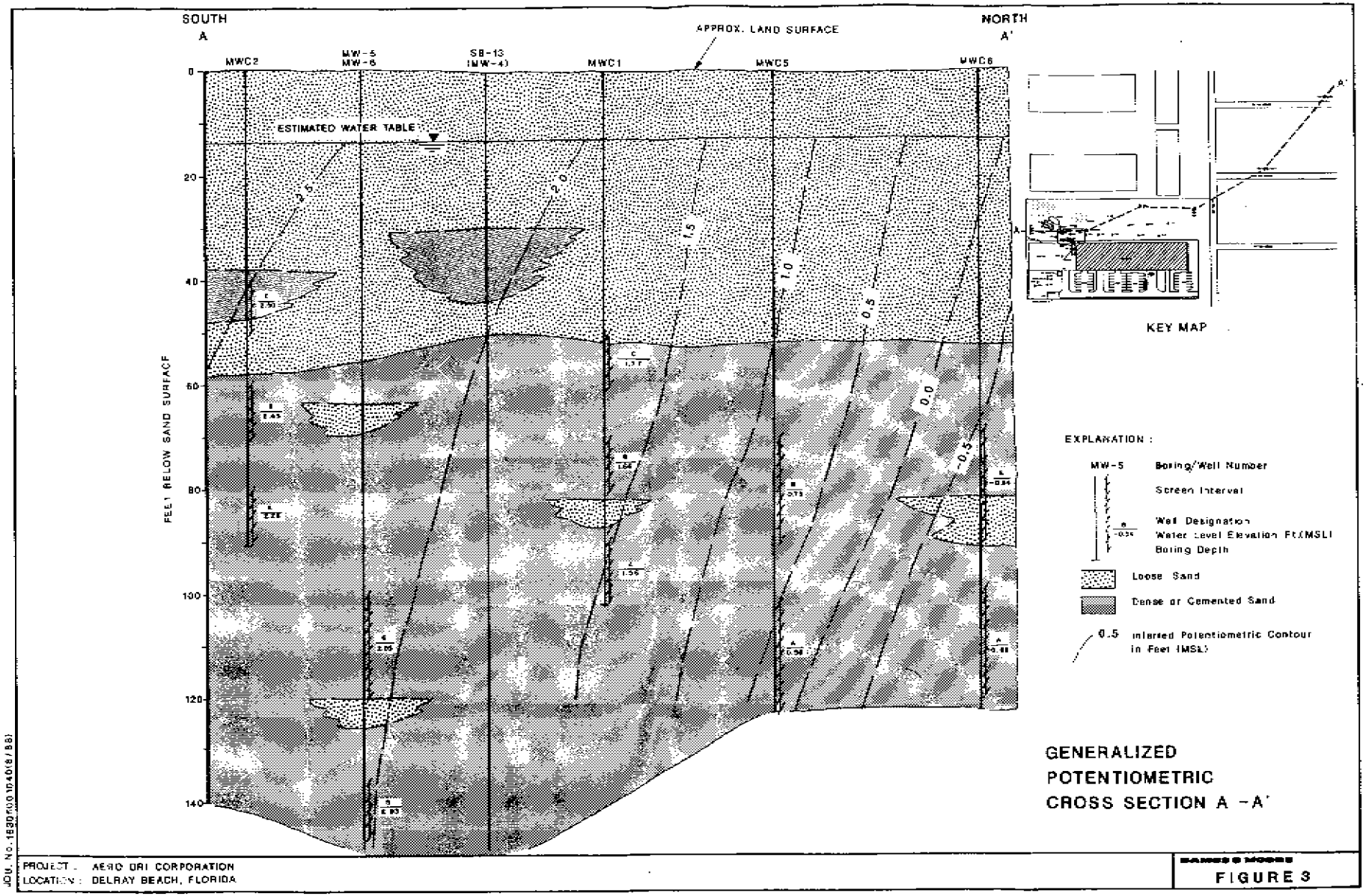
FIGURE 2

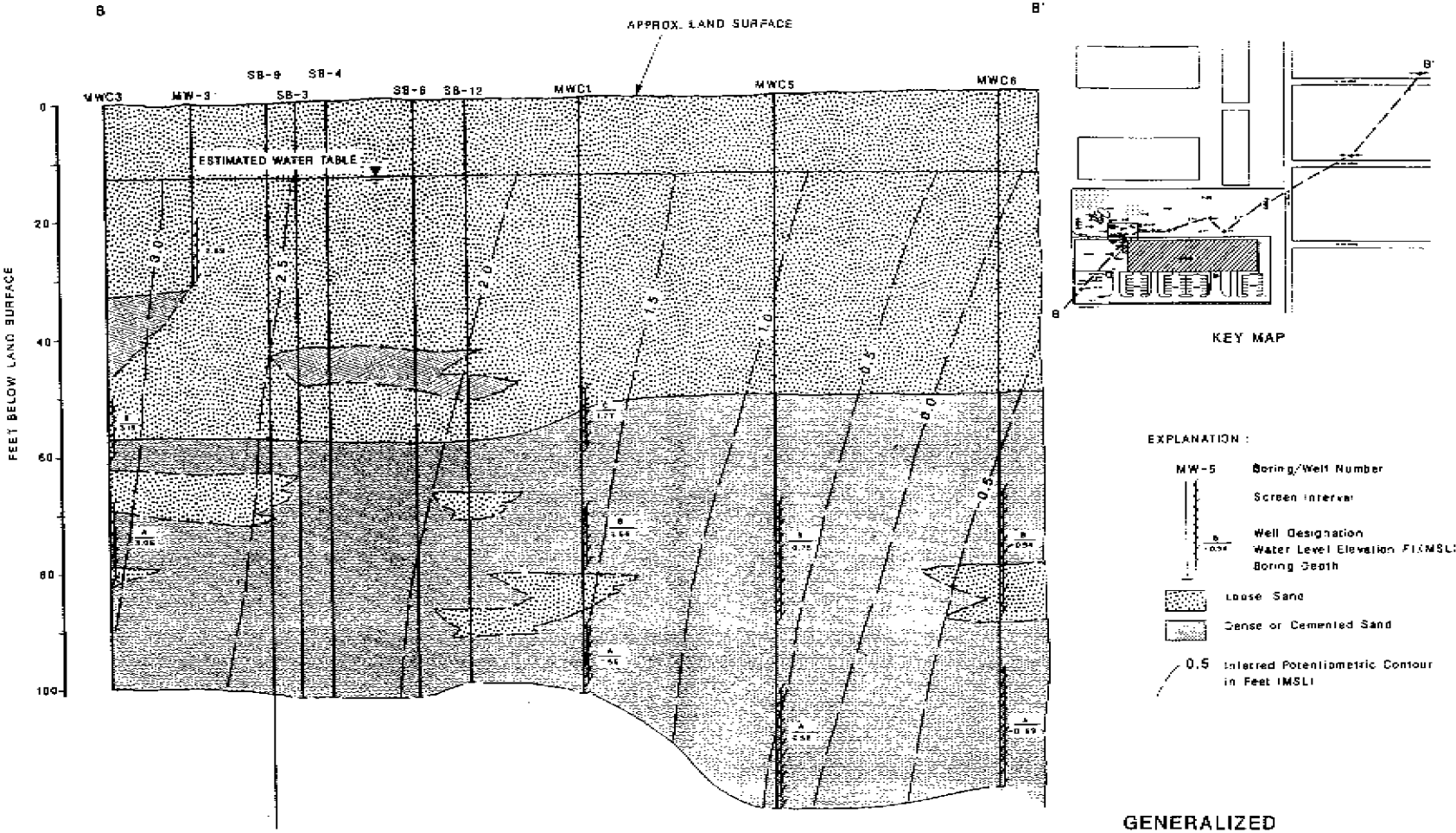
APPROVED ____ DATE ____

CHECKED ____ DATE ____

BY ____ DATE ____

OB No. 16305001024(9/88)


SOUTH
A
NORTH
A'
APPROX. LAND SURFACE
MWC2
MW-5
MW-6
SB-13
(MW-4)
MWC1
MWC5
MWC6
ESTIMATED WATER TABLE
FEET BELOW SAND SURFACE
0
20
40
60
80
100
120
140
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
KEY MAP
EXPLANATION :
MW-5
Boring/Well Number
Screen Interval
Well Designation
Water Level Elevation Ft.(MSL)
Boring Depth
Loose Sand
Dense or Cemented Sand
0.5
Interval Potentiometric Contour in Feet (MSL)
GENERALIZED
POTENTIOMETRIC
CROSS SECTION A -A'
PROJECT : AERO DRI CORPORATION
LOCATION : DELRAY BEACH, FLORIDA
FIGURE 3
REVISION
APPROVED:
CHECKED BY:
BY:
JOB. No. 1890(50.10.40/8/85)



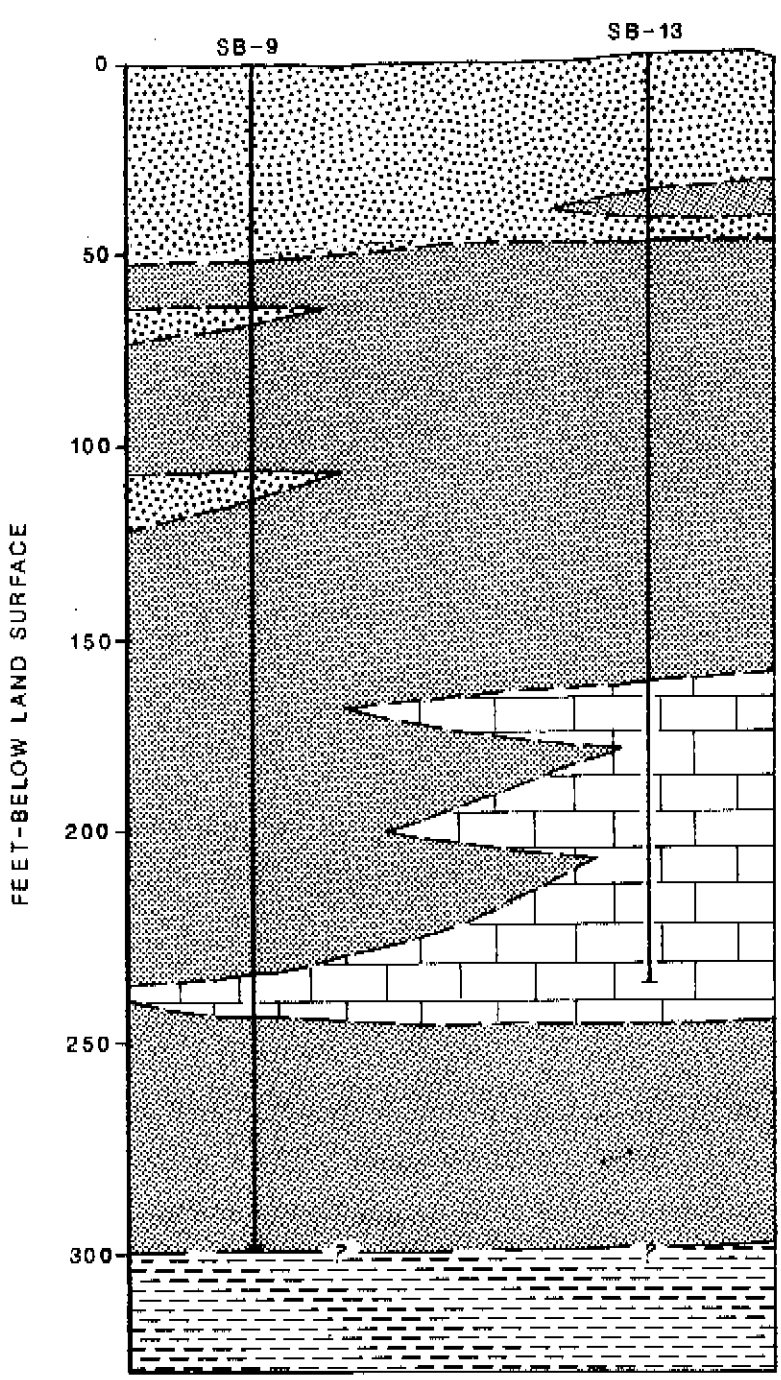
GENERALIZED POTENTIOMETRIC CROSS SECTION B – B'

PROJECT : AERO JET CORPORATION
LOCATION : DELRAY BEACH, FLORIDA

DAMES & MOORE

FIGURE 4

JOB No. 16315001040181881



Explanation :

SB-9 Boring Location, Number -Depth.

Loose Sand

Dense or Cemented Sand

Limestone

Clay

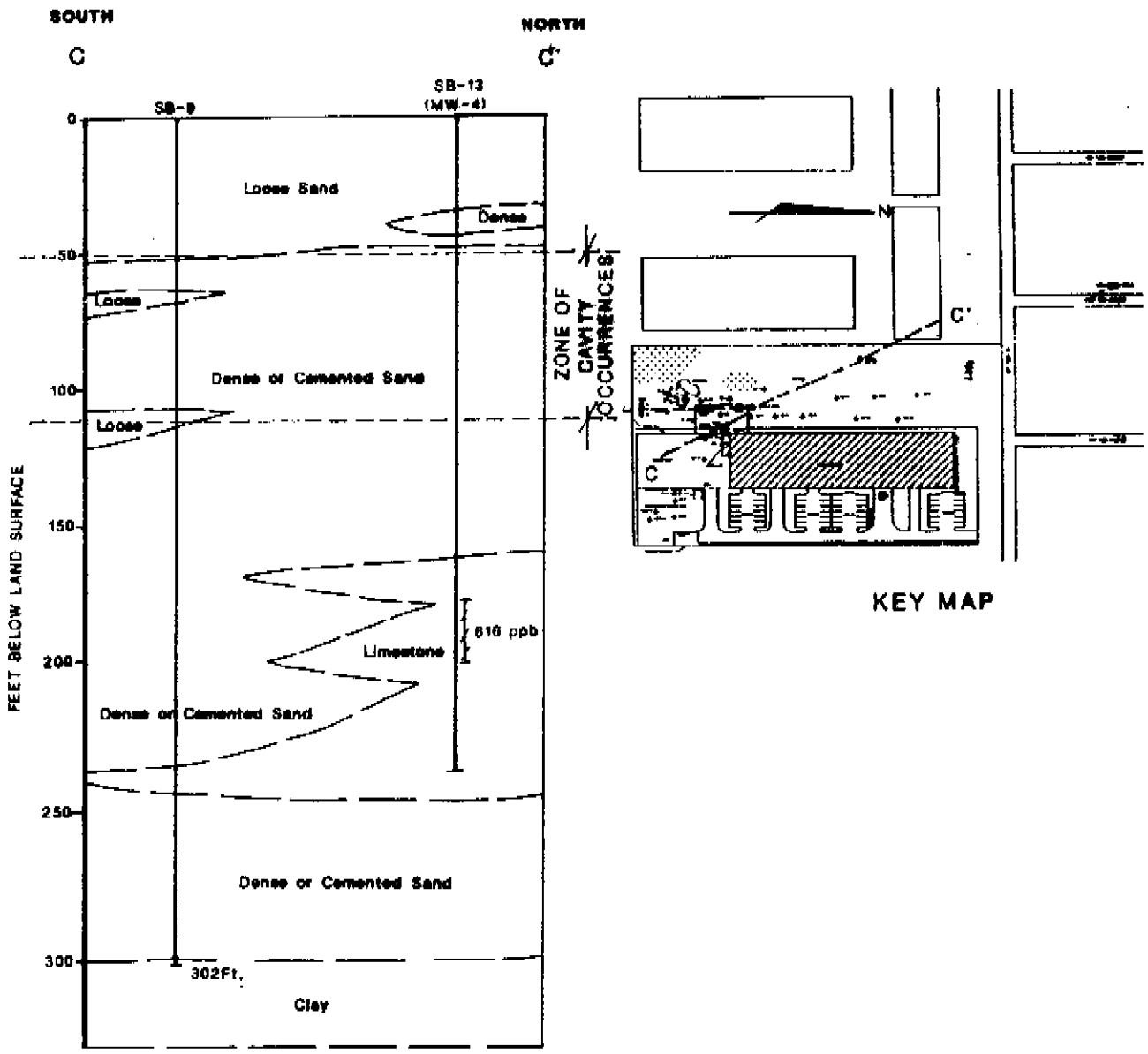
CROSS SECTION C - C'

JOB No. 16305001040(8/88)

PROJECT : AERO DRI
LOCATION : DELRAY BEACH, FLORIDA

DAMES & MOORE
FIGURE 5

BY ____ DATE ____ CHECKED ____ DATE ____ APPROVED ____ DATE ____



Water Quality Data from Laboratory Analysis

Perchloroethylene Concentrations August, 1988

0 120

Horizontal Scale in Ft.

Key :

SB-13 Boring/Well Number

610 ppb(Laboratory Results)

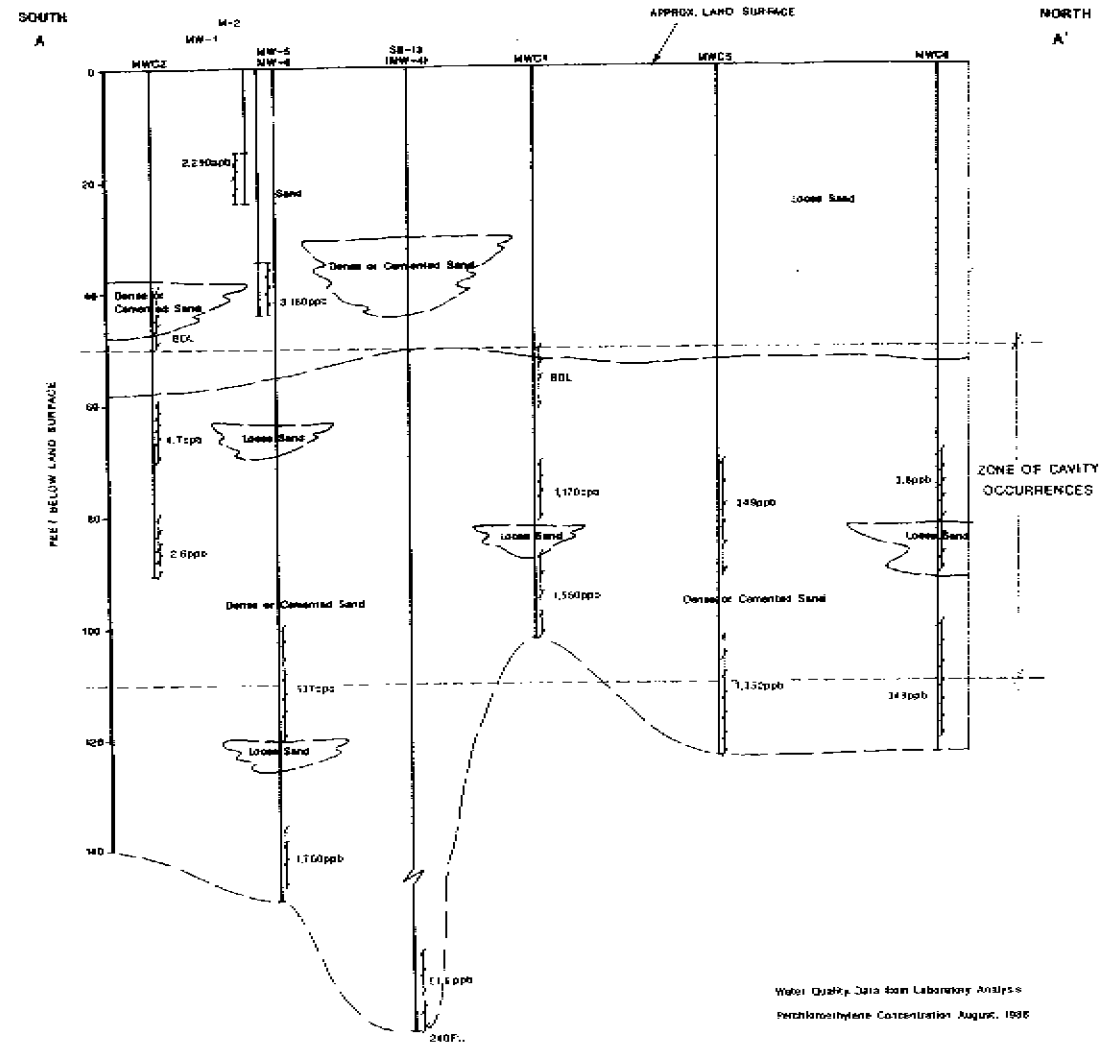
Boring Depth

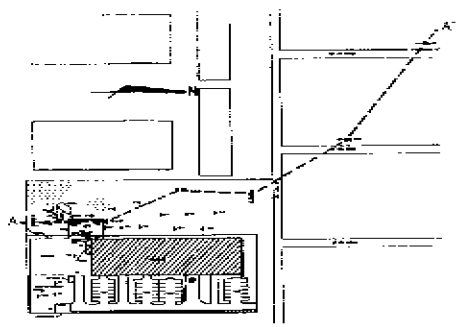
CROSS SECTION C-C'

JOB No. 10305001024(11/88)

PROJECT : AERO DRI
LOCATION : DELRAY BEACH, FLORIDA

DAMES & MOORE
FIGURE 12





KEY MAP

Key :

MWC6 Boring/Well Number

Screen Interval

349ppb(Laboratory Sample Analysis)

Boring Depth

BDL-Below Detection Limits

0 120

Horizontal Scale in Ft.

CROSS SECTION A–A'

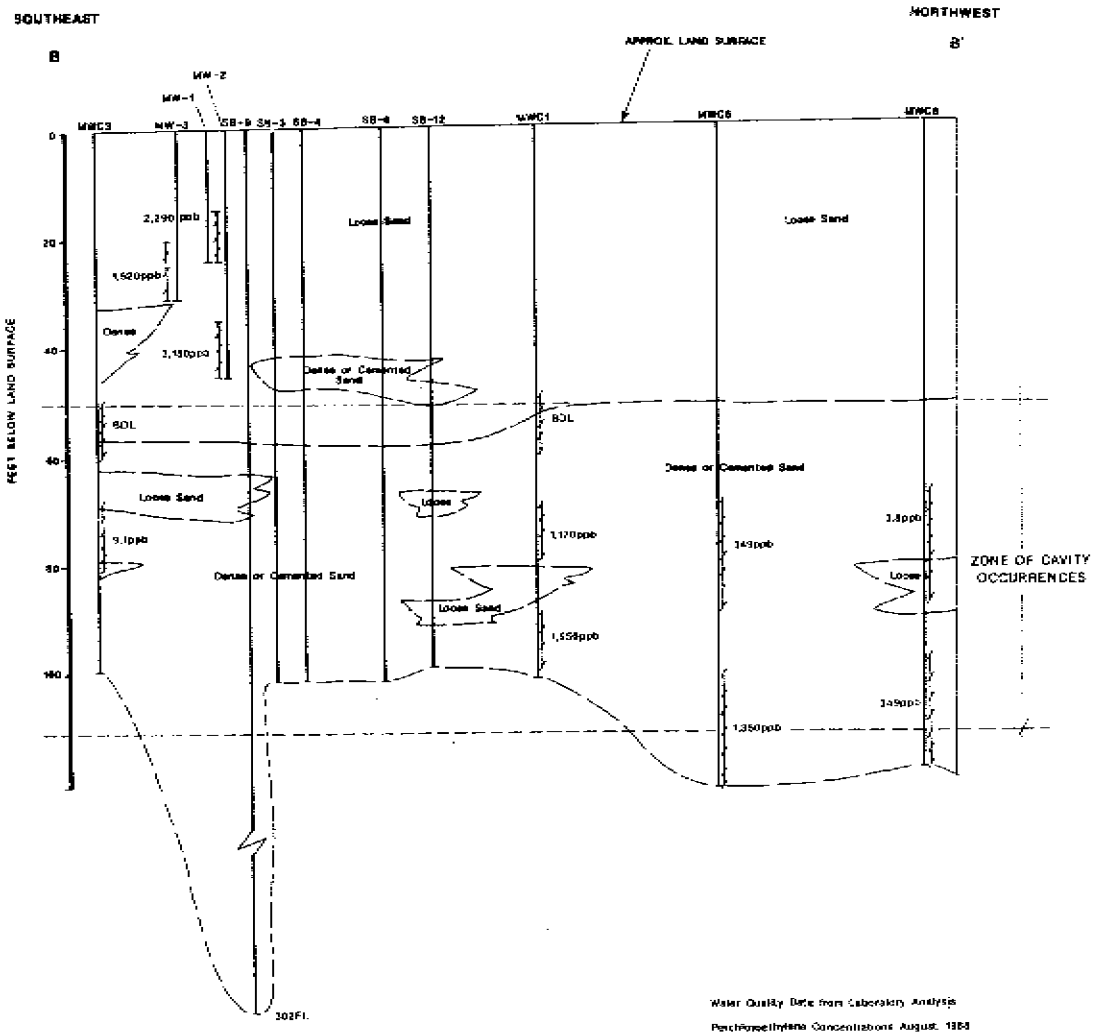
PROJECT : AERO DRI
LOCATION : DELRAY BEACH, FLORIDA

JOB. No. 10304hud102411/88)

BY: _____ CHECKED BY: _____ APPROVED: _____ REVISION : _____

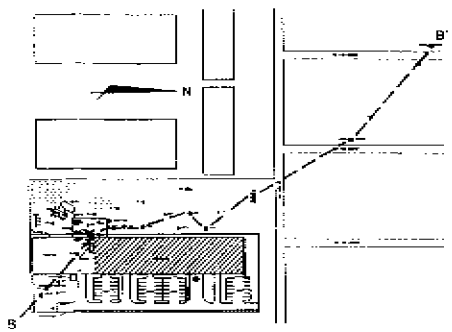
BARNES & MOORE

FIGURE 10



Water Quality Data from Laboratory Analysis

Perchloroethylene Concentrations August, 1988



KEY MAP

Key :

SB-6 Boring/Well Number

Screen Interval

349ppb (Laboratory Analysis Depth)

Boring Depth

BOL=Below Excation Limits

0 12ft

Horizontal Scale in Ft.

CROSS SECTION B-B'

PROJECT : AERO DRI

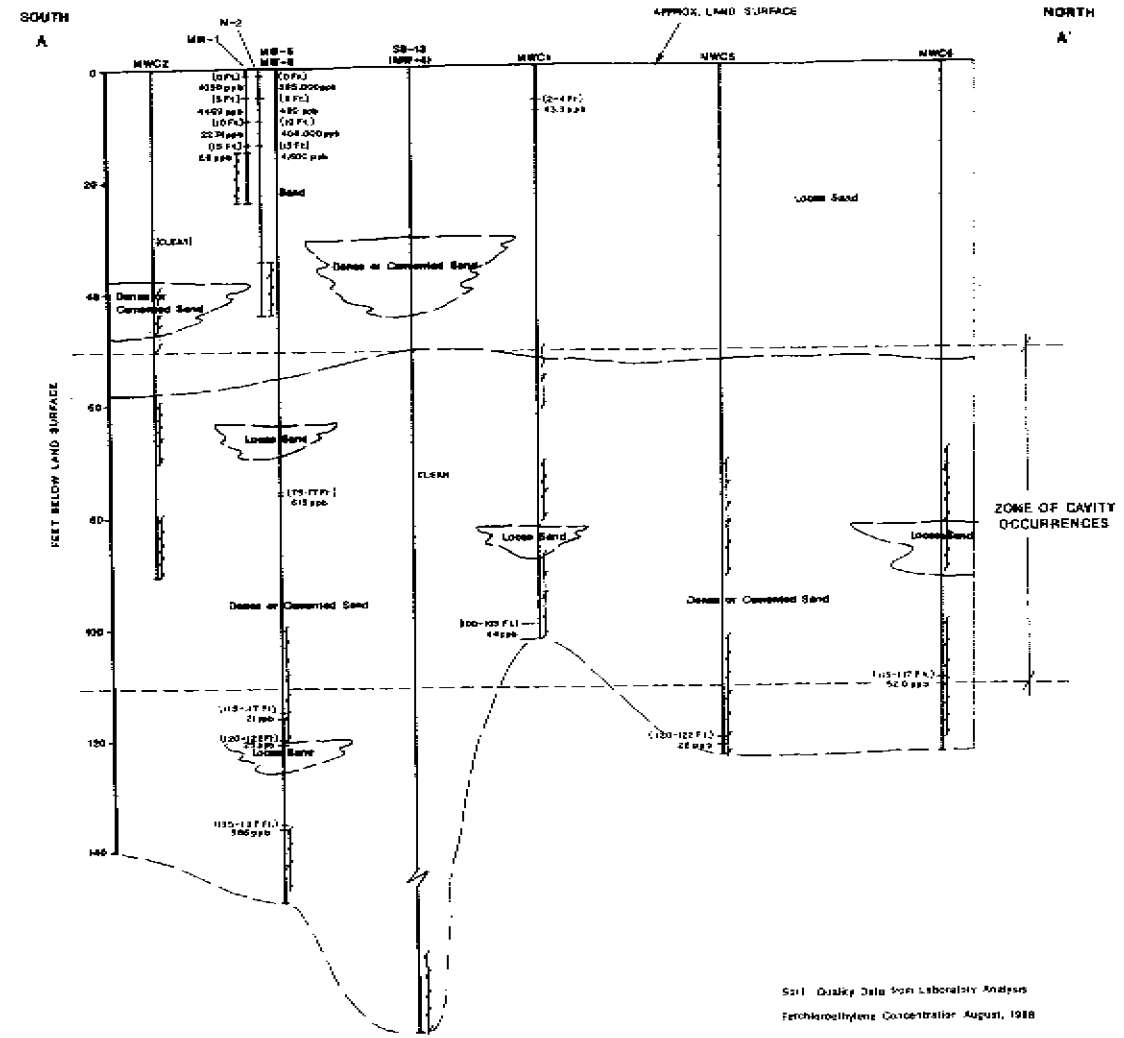
LOCATION : DELRAY BEACH, FLORIDA

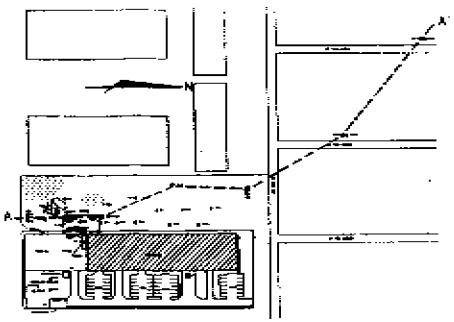
JOB. No. 03051.010241.11/881

BY: CHECKED BY: APPROVED REVISION :

DAMES & MOORE

FIGURE 11





KEY MAP

Key :

MWC5 Boring/Well Number

Screen Interval

318ppb Laboratory Sample Analysis

Boring Depth

0 125

Horizontal Scale in Ft.

Soil Quality Data from Laboratory Analysis

Perchloroethylene Concentration August, 1988

CROSS SECTION A-A'

PROJECT : AERO DRI

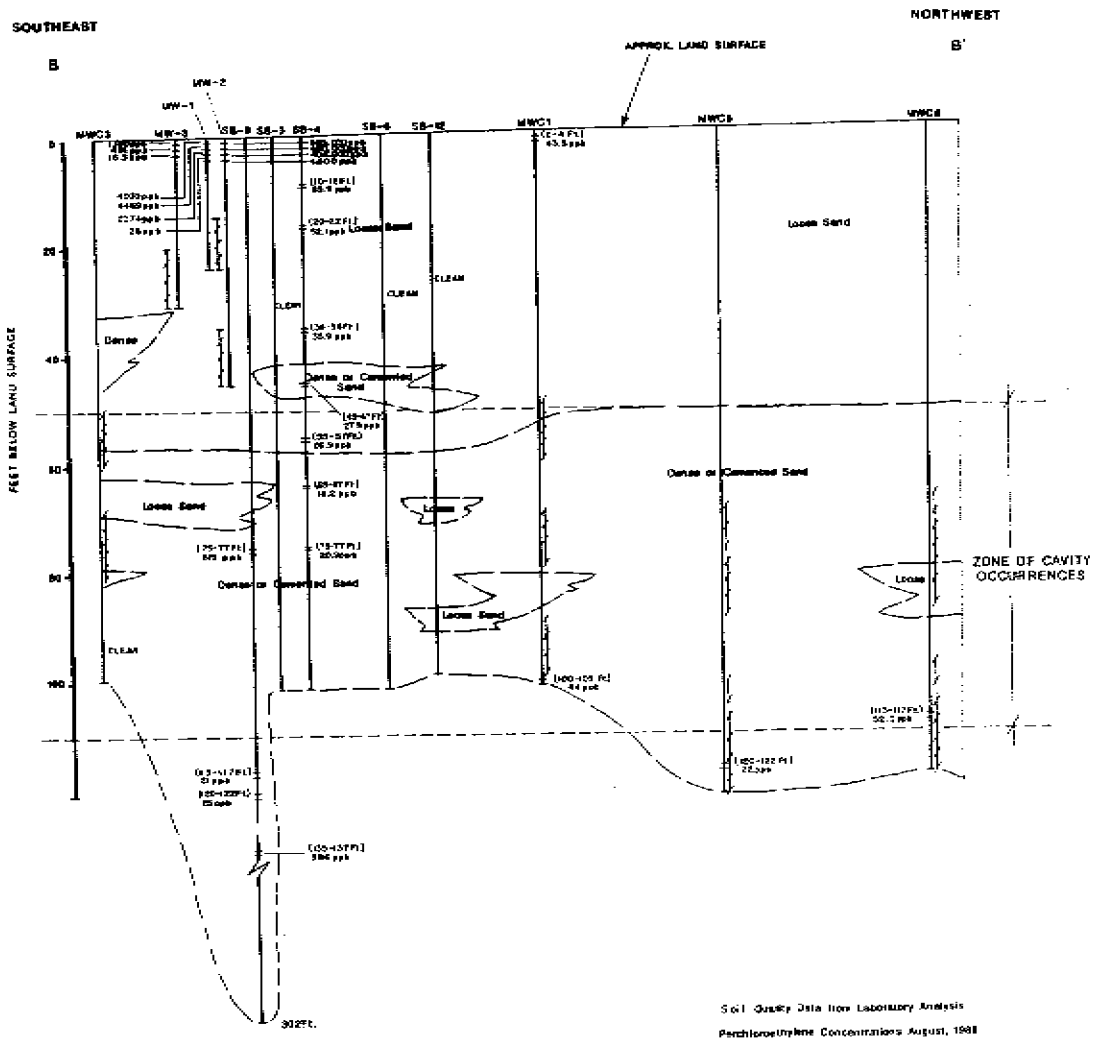
LOCATION : DELRAY BEACH, FLORIDA

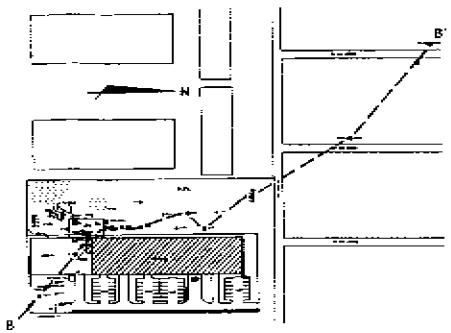
JOB No. 10305001024111/881

BARNES & MOORE

FIGURE D-15

BY: CHECKED BY: APPROVED BY: REVISION





KEY MAP

Key :

SB-6 Boring/Well Number

Screen Interval

349ppb (Laboratory Analysis Depth)

Boring Depth

0 120

Horizontal Scale in Ft

Soil Quality Data from Laboratory Analysis

Perchloroethylene Concentrations August, 1988

CROSS SECTION B-B'

PROJECT : AERO DRI
LOCATION : DELRAY BEACH, FLORIDA

DAMES & MOORE

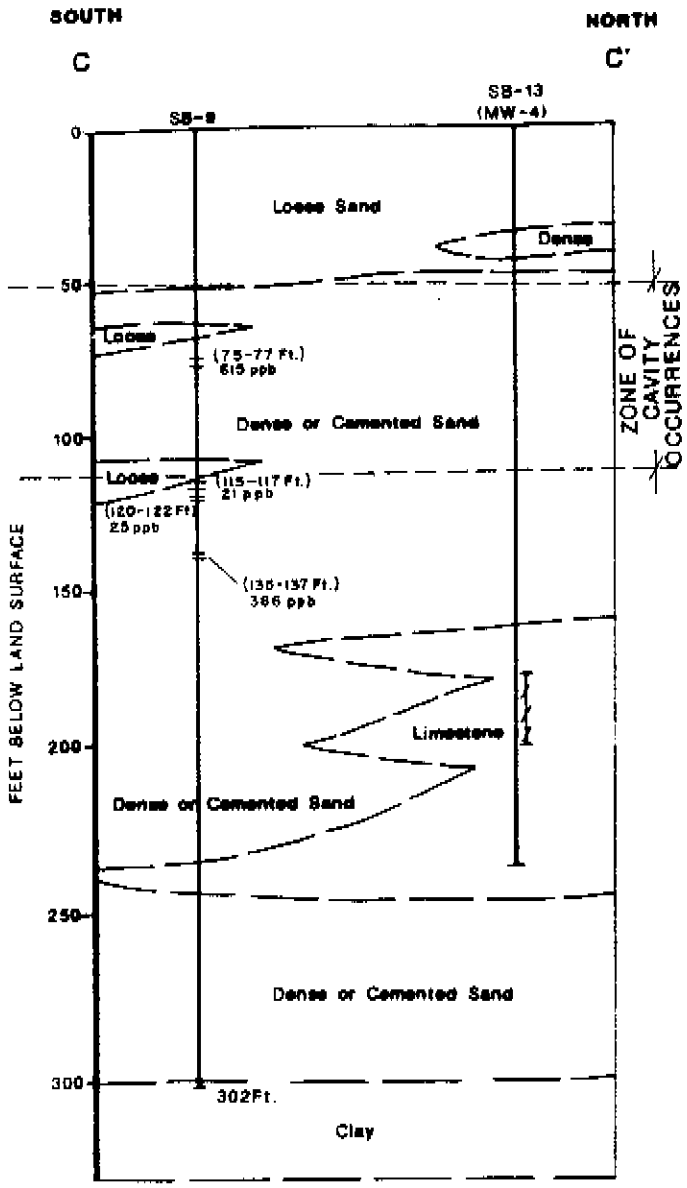
FIGURE D-16

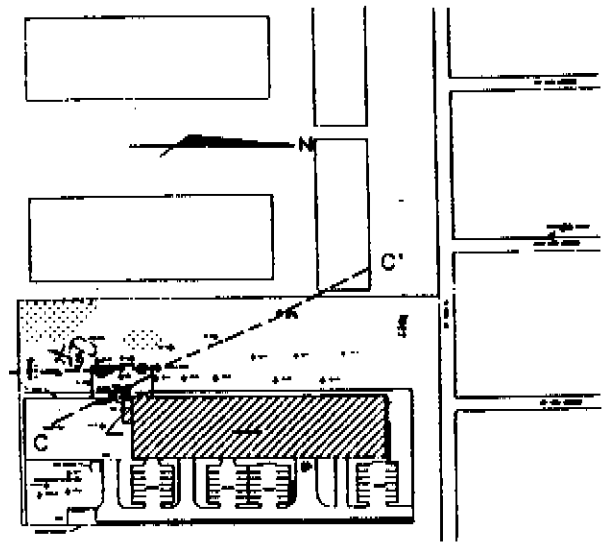
REVISION

APPROVED

DRAWN BY

JOB No. 10305001024(11/88)





KEY MAP

Soil Quality Data from Laboratory Analysis

Perchloroethylene Concentrations August, 1988

0 120

Horizontal Scale in Ft.

Key :

SB-13 Boring/Well Number

616 ppb(Laboratory Results)

Boring Depth

CROSS SECTION C-C'

JOB No 16305001024(11/88)

PROJECT : AERO DRI
LOCATION : DELRAY BEACH, FLORIDA

DAMES & MOORE
FIGURE D-17