H2O 12" 0.3

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ENGINEERS, HYDROGEOLOGISTS & APPLIED SCIENTISTS

January 6, 1995 LF 3186.94-10

Ms. Eva Chu
Alameda County Health Care Services Agency
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Subject: Work Plan for Further Soil and Ground-Water Investigations at 6085 Scarlett Court, Dublin, California

Dear Ms. Chu:

Levine•Fricke is pleased to provide you with the enclosed work plan for soil and ground-water investigations at 6085 Scarlett Court in Dublin, California. Further investigative activities proposed in this work plan are based on telephone conversations between you and James Lutton, P.E.

If you have any questions, please feel free to call me or James Lutton, P.E.

Sincerely,

Michael J. Bombard, R.E.A.
Senior Project Geologist

Enclosure

cc: Mr. James McKeehan
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Work Plan for Further Soil and Ground-Water Investigation 6085 Scarlett Court Dublin, California

January 6, 1995
LF 3186.94-10

Prepared for
Executive Personnel Defined Benefit Plan
c/o Jim McKeehan, Trustee
6612 Owens Drive
Pleasanton, California 94588

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January 6, 1995 LF 3186.94-10

WORK PLAN FOR FURTHER SOIL AND GROUND-WATER INVESTIGATION 6085 SCARLETT COURT DUBLIN, CALIFORNIA

1.0 INTRODUCTION

Levine•Fricke has prepared this work plan to present the scope of services, schedule, and estimated budget to conduct further soil and ground-water investigations at 6085 Scarlett Court in Dublin, California ("the Site"; Figures 1 and 2). The overall objective of the investigation is to further define the extent of petroleum hydrocarbons in soil and ground water beneath the Site. Hydrocarbons believed to be present apparently are the result of a release(s) from underground storage tanks (USTs) that were excavated and removed from the Site in 1990. The data collected will be used to address regulatory concerns regarding soil and ground-water quality at the Site. The proposed investigation focuses on assessing the lateral and vertical extent of petroleum-affected soil in the immediate vicinity of the UST excavation and on assessing shallow ground-water quality (less than 20 feet below ground surface [bgs]) at the Site.

2.0 BACKGROUND

The Site is located in a light industrial/commercial neighborhood and is bordered to the north by Dublin Boulevard, to the south by industrial property, to the east by a trailer park, and to the west by Chabot Canal.

According to a previous consultant's report, the facility previously located at the Site operated three 500- to 1,000-gallon USTs and one dispenser island. The USTs reportedly were removed in June 1990. During removal activities, petroleum hydrocarbons were observed in soil at the bottom of the UST excavation. Analytical results of soil samples and one grab ground-water sample collected from within the tank excavation indicated that total petroleum hydrocarbons as gasoline (TPHg) and benzene, toluene, ethylbenzene, and total xylenes (BTEX compounds) were present in the subsurface. Specifically, the analytical results for soil samples indicated that TPHg was present at concentrations up to 220 parts per million (ppm) and BTEX compounds were present at concentrations up to 20 ppm (for toluene). Analytical results of the grab ground-water

sample indicated that TPHg (120 ppm) and BTEX compounds (up to 20 ppm total xylenes) were also present in shallow ground water.

Based on local ground-water data obtained from regulatory agency files, ground water is present at a depth of 16.5 feet bgs, with an assumed flow direction toward the southwest.

During March 1993, a ground-water monitoring well was installed in an area presumed to be downgradient (relative to ground-water flow) from the UST excavation. Analytical results for the analysis of soil samples collected during drilling of the soil boring for the monitoring well indicated that TPHg (17 ppm) and BTEX compounds (up to 0.210 ppm ethylbenzene) were present in soil samples collected at a depth of 10 to 10.5 feet below ground surface (bgs). Concentrations of TPHg (64 ppm) and BTEX compounds (up to 25 ppm benzene) were also present in a ground-water sample collected from the monitoring well.

In May 1994, Levine•Fricke conducted an investigation of petroleum-affected soil and ground water at the Site that consisted of the following activities:

- a limited soil-gas/ground-water survey
- installation of 5 hand-auger borings and collection of soil samples for laboratory analysis

The results of the soil-gas/ground-water survey, and soil sampling are presented in Figures 3, 4, 5, and 6. Based on these results, Levine•Fricke recommended excavation of petroleum-affected soil in the vicinity of the former UST locations.

In July 1994, Levine•Fricke performed the following activities to remove petroleum hydrocarbons from soil and ground water from beneath the former UST locations:

- excavation of approximately 1,100 cubic yards of petroleum hydrocarbon-affected soil in the vicinity of the former USTs
- laboratory analysis of soil samples collected from the sidewalls of the excavation
- on-site aeration of excavated petroleum hydrocarbon-affected soil
- removal and disposal of approximately 150,000 gallons of water from the excavation

Soil excavation to the south and west of the former UST locations was limited by the presence of a building (south) and Chabot Canal (west). The excavated petroleum-affected soil was aerated on site, south of the building. The overburden soil excavated from the ground surface to approximately 5 feet bgs was segregated from the petroleum-affected soil and stockpiled on site. Four soil samples were collected from the overburden pile and analyzed for BTEX and TPHg. Analytical results of the overburden soil samples indicated that targeted compounds were not present at detectable concentrations.

Prior to purging the water from the excavation, a limited discharge permit was obtained from the Dublin/San Ramon Services district for discharge into the sanitary sewer. Prior to and during purging activities, water samples were collected from the excavation and analyzed for BTEX and TPHg. The excavation water discharge schedule and analytical results are presented in Table 1.

3.0 PROPOSED SCOPE OF WORK

The proposed scope of work consists of the following tasks:

Task 1: Prepare a Health and Safety Plan Addendum
Task 2: Obtain Permits and Utility Clearances
Task 3: Collect Soil Samples from Stockpiled Soils
Task 4: Install Geoprobe/Soil Borings and Collect Soil Samples
Task 5: Drill and Install One Ground-Water Monitoring Well
Task 6: Develop and Sample Newly-Installed Monitoring Well
Task 7: Survey Newly-Installed Monitoring Well and Excavation Boundaries
Task 8: Conduct Chemical Analysis
Task 9: Perform Limited Risk Assessment
Task 10 Data Evaluation and Presentation
Task 11: Project Management

Task 1: Prepare a Health and Safety Plan

An addendum to the existing site Health and Safety Plan (HSP) will be prepared to address the specific health and safety issues for the field work proposed in this work plan. The HSP and addendum will be reviewed by Levine•Fricke personnel and subcontractors before work at the Site begins.

Task 2: Obtain Permits and Utility Clearances

Monitoring well construction permits will be obtained, as required, from the Alameda County Flood Control and Water Conservation District, Zone 7 for the drilling and installation of the proposed monitoring well. For budgetary purposes, we have assumed that one ground-water monitoring well will be installed at the Site, as discussed in Task 5. Before drilling activities begin, locations of underground utilities at the Site (e.g., underground pipelines, etc.) will be identified by contacting Underground Service Alert (USA) and by using the services of an underground utility locating subcontractor.

Task 3: Collect Soil Samples from Stockpiled Soils

Soil samples will be collected from 22 sampling locations within the stockpiled soils for possible laboratory analysis. Calculations used in determining the number of samples to be collected are included in Appendix A. These calculations were completed in accordance with the guidelines outlined in Chapter 9 of EPA SW-846, Test Methods for Evaluating Solid Wastes, November 1986. A random number generator will be used to select the sampling locations within a 5 x 10 sampling grid.

Soil samples will be collected using a slide-hammer drive sampler containing clean, brass 2-inch-diameter by 6-inch-long sample liners. After collection, the ends of each liner will be covered with Teflon tape and capped with plastic caps; the liners will then be labeled and placed in an ice-chilled cooler for transportation to the analytical laboratory under strict chain-of-custody protocol. All sampling equipment will be cleaned with Alconox (a laboratory-grade detergent) and rinsed with distilled, deionized water before each use.

Analytical data collected will be evaluated in accordance with EPA SW-846 and in conjunction with completing Task 9 of this work plan, to determine if any statistically significant populations of chemicals of concern exist within the stockpile. If data indicate statistically significant populations are present, we will prepare a work plan describing a proposed option(s) to further address chemical-affected soils within the stockpile.

Task 4: Install Geoprobe/Soil Borings and Collect Soil Samples

Three to six shallow soil borings (approximately 20 feet deep) will be drilled at the Site to better define the lateral and vertical extent of petroleum-affected soil in the vicinity of the former UST locations. These data will be used to assess the volume of petroleum-affected soil left in place in the immediate vicinity of the former USTs.

The soil borings will be advanced using the Geoprobe-driven soil sampling system or hollow-stem auger drilling method with 8-inch-outside-diameter augers, whichever proves more cost effective. Soil samples will be collected during drilling for lithologic description and possible laboratory analysis from depths of 5 feet bgs, 10 feet bgs, and at 15 feet bgs and 20 feet bgs using the Geoprobe or a modified California sampler. An organic vapor analyzer (OVA) will be used to qualitatively measure concentrations of petroleum hydrocarbons in soil samples during drilling, and to assist in selecting soil samples to be submitted to the laboratory for analysis. Soil samples for possible laboratory analysis will be collected in clean brass tubes and prepared for transportation as described in Task 3. also collect grab GW samples from borings 5

Task 5: Drill and Install One Ground-Water Monitoring Well

Previous work conducted at the Site indicated that shallow ground water was present at approximately 16.5 feet bgs. Based on these data, we anticipate that the proposed shallow monitoring well will be installed to a depth of approximately 20 feet bgs. This depth may be modified in the field based on the depths, thicknesses, and types of sediments encountered.

The proposed shallow ground-water monitoring well will be installed at the location shown in Figure 7. This well will be installed to provide data to help assess whether ground water beneath the Site has been significantly affected by petroleum hydrocarbon-affected soils beneath the Site.

The soil boring for the monitoring well will be drilled using the hollow-stem auger drilling method with 8-inch-outside-diameter augers. Soil samples will be collected during drilling for lithologic description and possible laboratory analysis at a minimum of 5-foot intervals using a modified California sampler. An OVA will be used to qualitatively measure concentrations of petroleum hydrocarbons in soil samples during drilling, and to assist in selecting soil samples to be submitted to the laboratory for analysis. Soil samples for possible laboratory analysis will be collected in clean brass sample liners and prepared for transportation to the laboratory as outlined in Task 3. Analyze all S.S. w/ OVA hits

The proposed well will be constructed of 2-inch-diameter polyvinyl chloride (PVC) well casing. The perforated interval will be selected to sample ground water from the more permeable shallow sediments. After the well casing has been placed in the completed borehole, the well annulus opposite the perforated interval will be backfilled with an appropriately sized sand pack material to approximately 1 or 2 feet above the perforations. Bentonite pellets will be emplaced above the sand pack to isolate the perforated interval from material above and prevent the entrance of grout into the sand pack. A cement-bentonite grout will then be placed above the bentonite seal to the

ground surface, sealing the remainder of the borehole interval from surface water. A weather-proof, tamper-proof, flush-mounted traffic vault or locking aboveground monument will then be cemented in place.

All drilling equipment and sampling tools will be steam cleaned before each use.

Task 6: Develop and Sample Newly Installed Monitoring Well

The newly installed monitoring well will be developed by overpumping using a centrifugal pump with a steam-cleaned suction hose. The wells will be developed to remove finer-grained materials from the vicinity of the wellbore. Water clarity, pH, temperature, specific conductance, and volume extracted will be monitored during development. Development will be terminated when, based on visual observations, the well produces little or no sediment and when water-quality indicators stabilize.

Before sampling the well, water levels will be measured to determine the local horizontal ground-water gradient at the time of sampling. If the presence of free floating product is observed in any of the wells, its thickness will be measured using an oil/water interface probe or clear product bailer.

Water samples will be collected from the new monitoring well after purging a minimum of three well casing volumes. If water levels recover slowly, samples will be collected after the water level has recovered to 80 percent of its original level. Samples will be collected using a Teflon bailer. The bailer will be cleaned with a laboratory-grade detergent, steam cleaned, and rinsed with distilled water before use in each well.

Ground-water samples will be collected in 40-milliliter VOA vials with Teflon septa and 1-liter amber-colored glass bottles. After collection, each sample container will be labeled and placed in a chilled cooler for transportation to the analytical laboratory. One field blank sample will be collected for QA/QC purposes.

Waste water generated during well development and sampling will be stored in 55-gallon drums on site in a location directed by a representative of the Executive Personnel Defined Benefit Plan ("the Client"). Waste soils will be temporarily stockpiled (placed on and covered with visquine) at the Site; waste water from well development and sampling will be temporarily placed in 55-gallon drums. The Client will be responsible for the cost of waste storage and disposal, although Levine•Fricke will help coordinate these activities with a licensed subcontractor. Samples of waste soils and waste water will be collected and submitted to the laboratory for appropriate analysis. After receiving analytical results, Levine•Fricke will assist the Client in identifying disposal options.

The cost for waste disposal will depend on the amounts, types, and concentrations of chemicals contained in the waste and are not included in the estimated budget.

Task 7: Survey Newly Installed Monitoring Well and Excavation Boundaries

Following construction of the monitoring well, the top of casing elevation will be surveyed by a licensed surveying subcontractor to a nearby datum. The survey point on the well casing will be permanently marked, and all ground-water levels will be measured from that point. Also tie in w/ wells at Scotsman (if not yet abandoned) to verify GW flow direction + gradient

During surveying activities, the horizontal boundaries of the excavation and location of soil borings will be surveyed. Data collected during the horizontal survey will be used to fix the boundaries of the excavation for future reference. It is our understanding that the Site will be developed and existing surface features may be altered.

Task 8: Conduct Chemical Analysis

For the purposes of this work plan, we are assuming that approximately 22 stockpile soil samples and two soil samples from each soil and monitoring well boring will be submitted to a state-certified analytical laboratory for chemical analysis. The samples collected from the soil borings will be selected for analysis based on the results of the OVA field screening and field observations. The selected soil samples will be analyzed for TPHg using EPA Method 8015/5030, TPH as diesel (TPHd) using EPA Method 8015/3550, and for BTEX compounds using EPA Method 5030/8020.

One ground-water sample will be collected from the newly installed monitoring well. Collected ground-water samples will be analyzed for TPHg using EPA Method 8015/5030, TPHd using EPA Method 8015/3510, and for BTEX compounds using EPA Method 5030/8020.

Task 9: Perform Limited Risk Assessment

A risk assessment will be performed to qualitatively assess the risk associated with petroleum-affected soil left in place beneath the Site. The limited assessment will be performed in accordance with ASTM standards and will be based on soil data collected during this investigation. For the risk assessment, three soil samples will be collected and analyzed for the following parameters: bulk density, total organic carbon, moisture content, and intrinsic permeability.

Task 10: Data Evaluation and Presentation

Upon receipt of the analytical results, Levine•Fricke will prepare a report summarizing the data, including recommendations for additional work at the Site, if necessary.

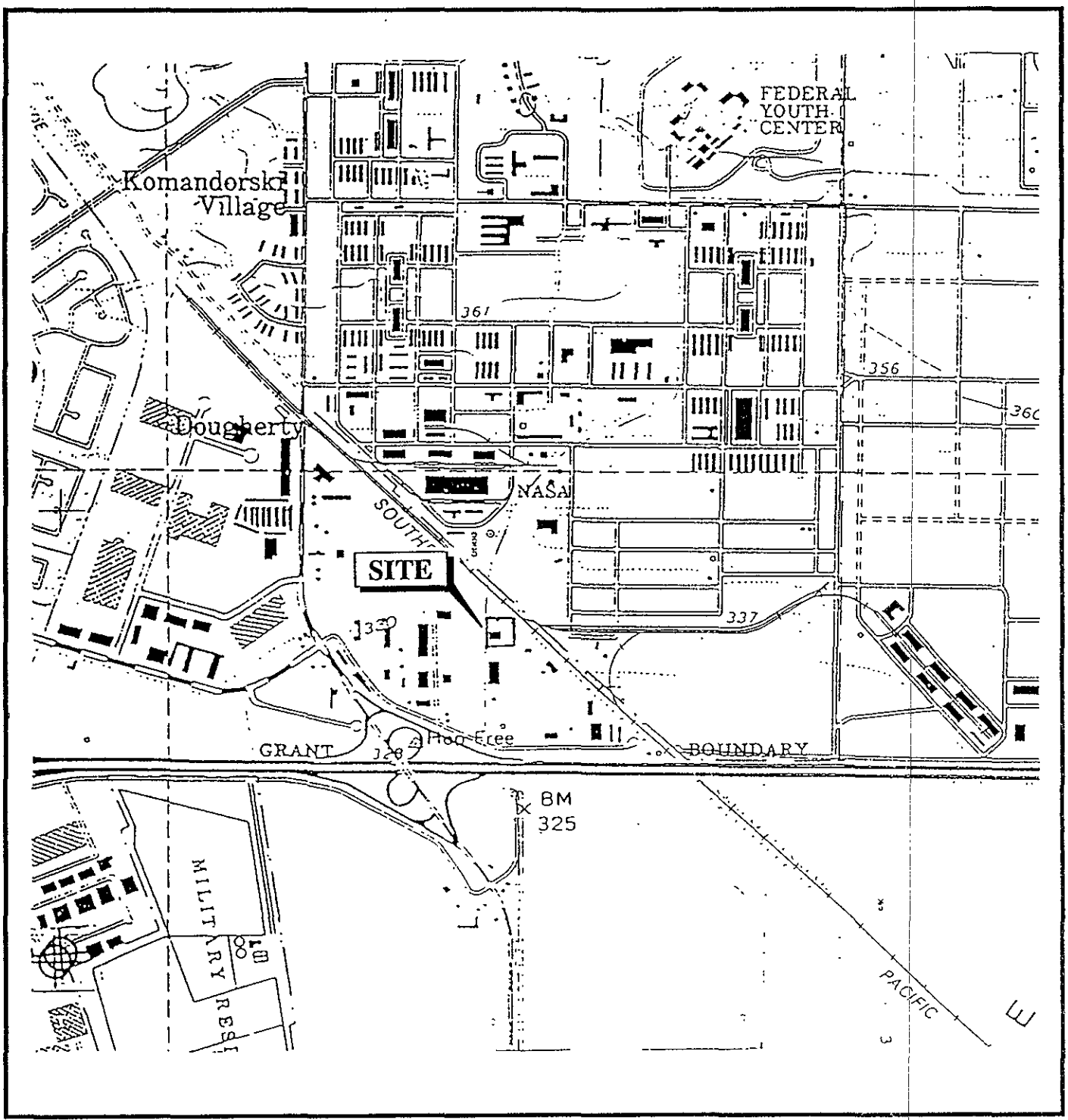
Figures will be prepared describing the type(s) of geologic materials encountered and the occurrence, concentration, and distribution of petroleum hydrocarbons or related compounds in the subsurface. The results of the evaluation will be presented to the Client at a meeting in Dublin, California.

Task 11: Project Management

Mr. Michael J. Bombard, Project Geologist, will be the overall project manager. As such, he will be the primary contact for the Client and will be responsible for the technical and administrative aspects of the project. Engineering support will be provided by James A. Lutton, P.E., Senior Project Engineer. Mr. Bradley D. Cross, R.G., Senior Hydrogeologist, will provide final review for the project.

5.0 SCHEDULE

It is anticipated that the scope of work can be completed within five to six weeks of written authorization to proceed from the Executive Personnel Defined Benefit Plan. This anticipated schedule precludes conditions beyond the control of Levine•Fricke that would affect the schedule (e.g., barriers to site access, subcontractor availability).



MAP SOURCE:
H_2OGEOL
Base from U.S.G.S. Dublin, California
7.5' Quadrangle

Figure 1 : SITE LOCATION

Project No. 3186
6085 Scarlett Court, Dublin, California

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021894 MJB JSC

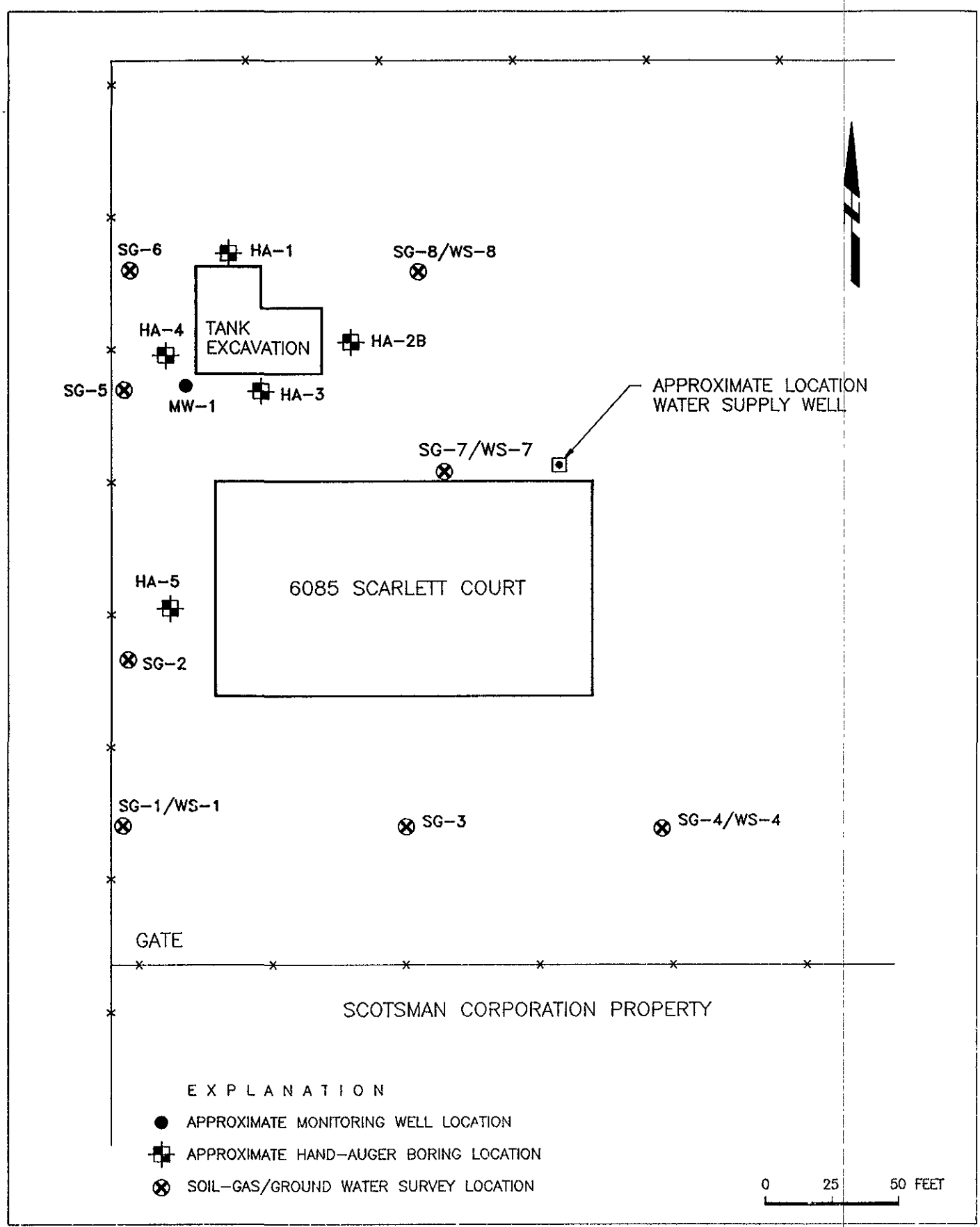

Figure 2 : SITE PLAN SHOWING HAND-AUGER BORING AND SOIL-GAS/ GROUND WATER SURVEY LOCATION

Project No. 3186
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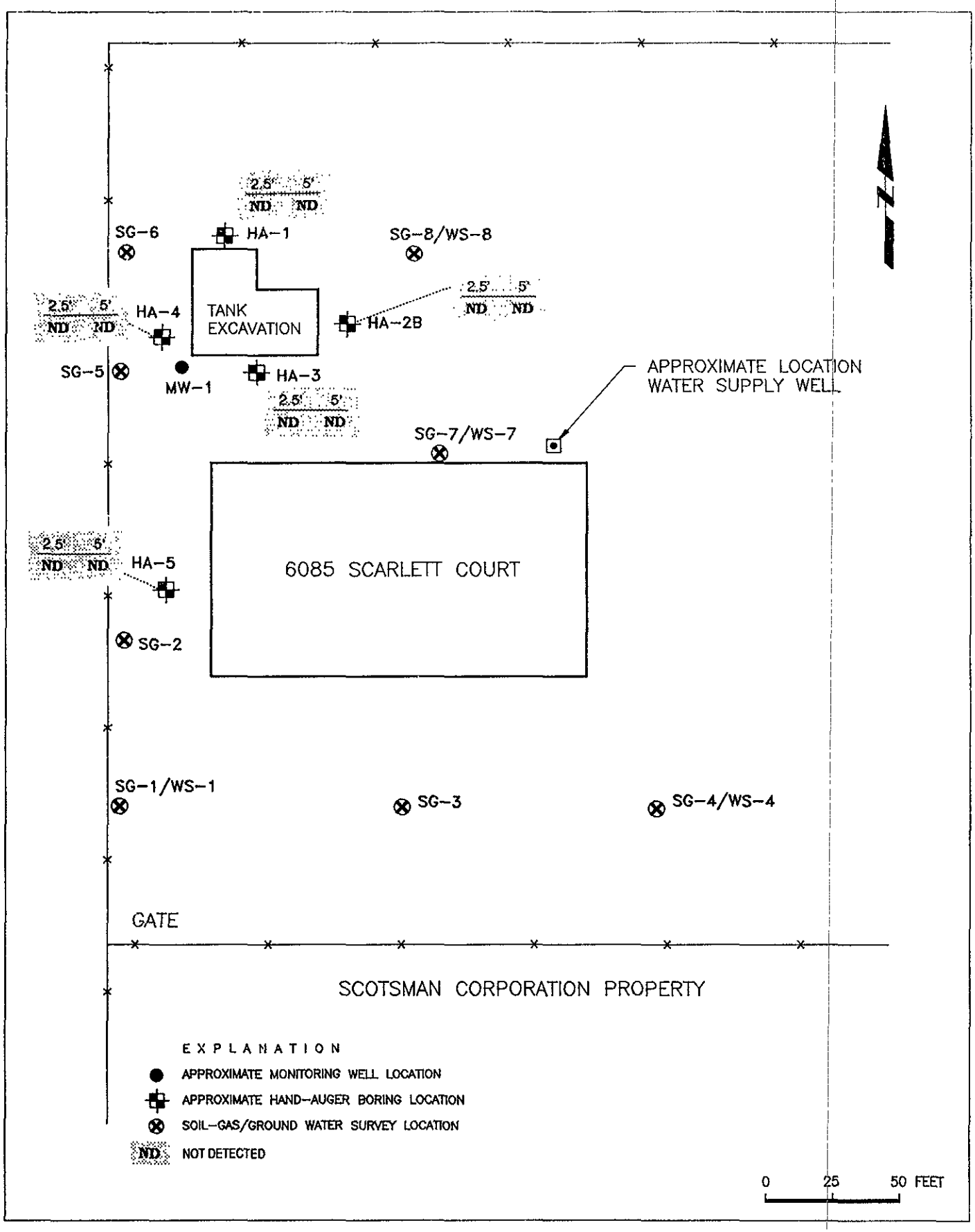

Figure 3 : FORMER SOIL SAMPLE LOCATIONS

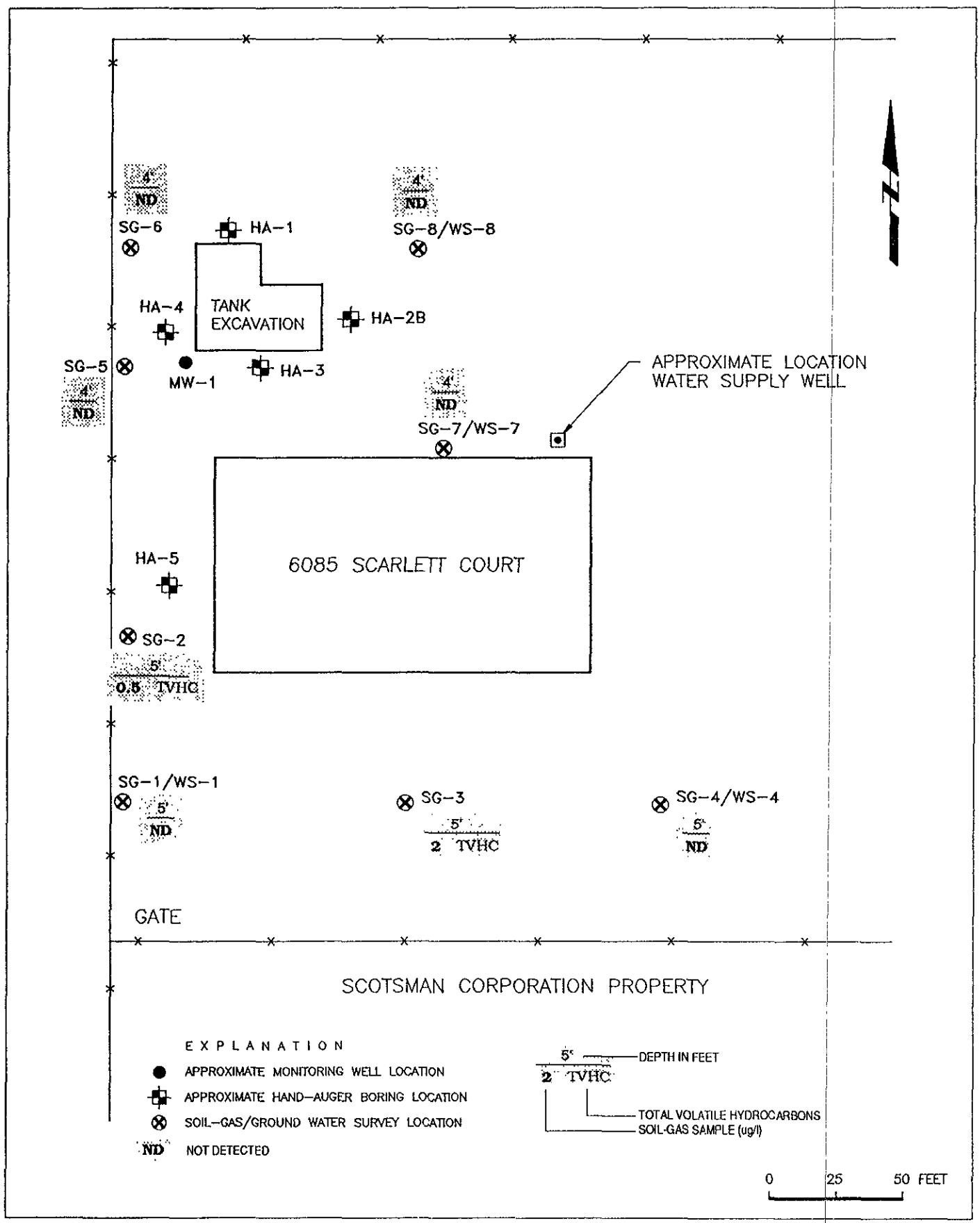

Figure 4 : SOIL-GAS SAMPLE (ug/l) LOCATIONS

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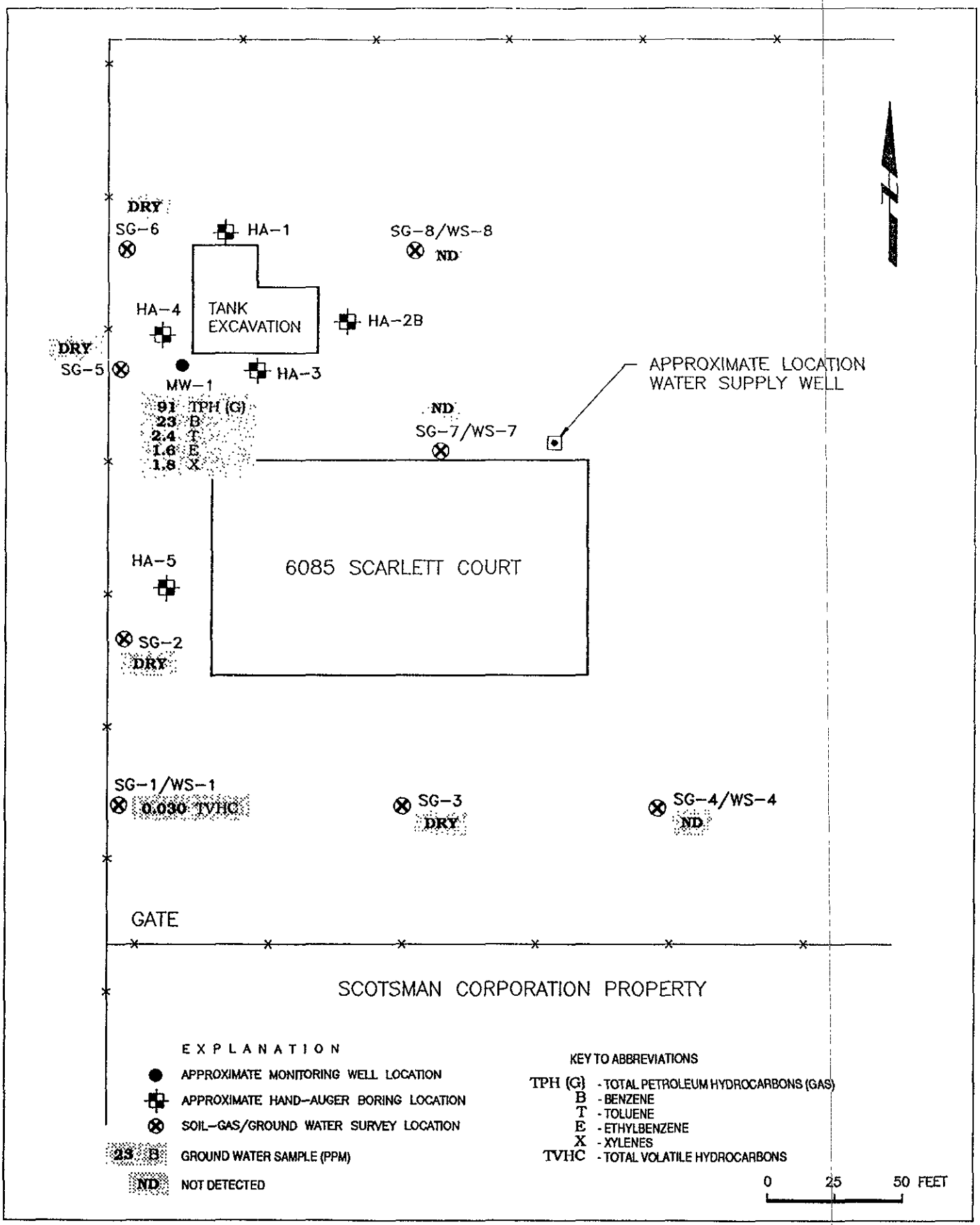

Figure 5 : GROUND WATER SAMPLE (ppm) LOCATIONS

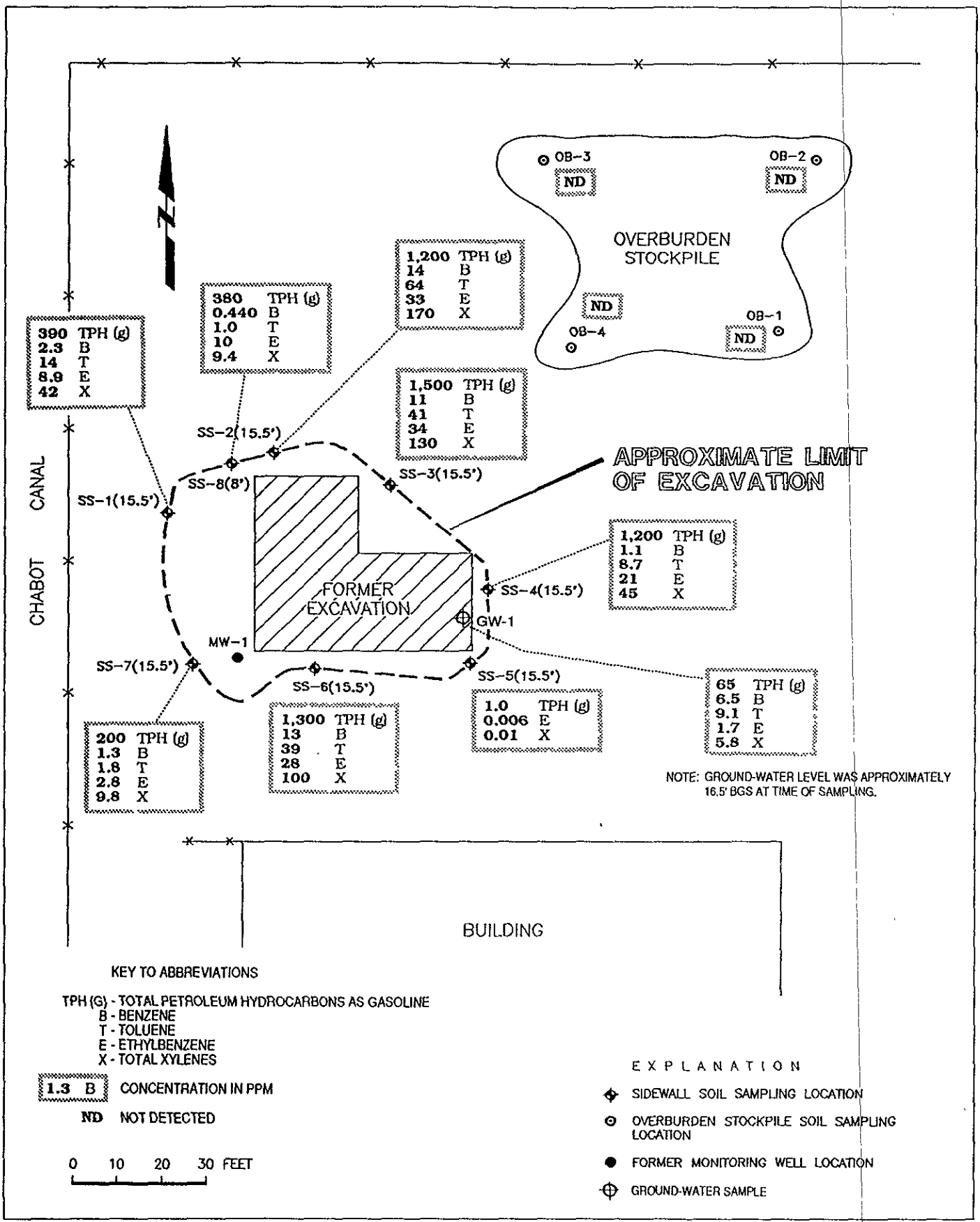

Figure 6 : SOIL AND GROUND-WATER SAMPLE CHEMICAL ANALYSES

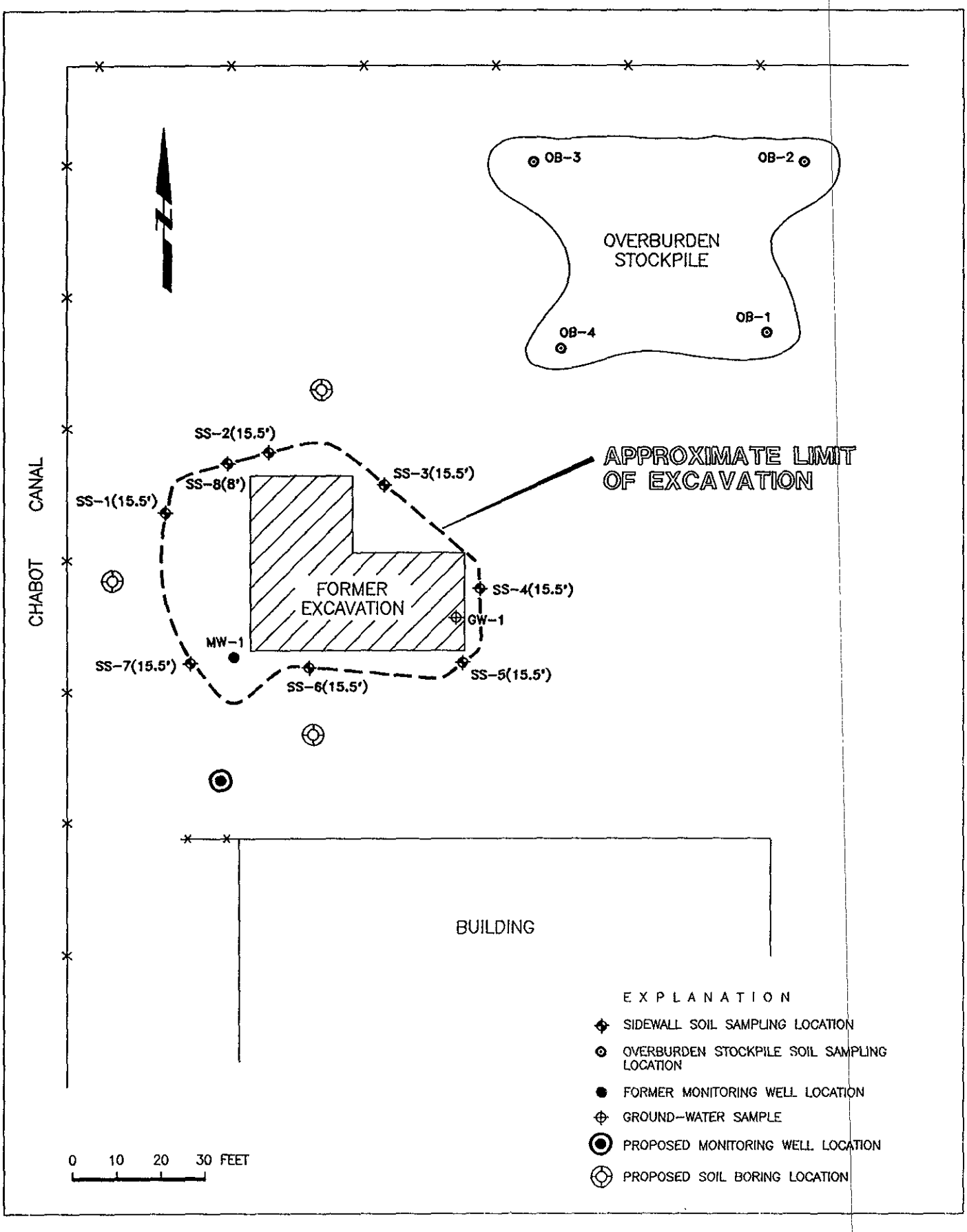

Figure 7 : PROPOSED SOIL BORING AND MONITORING WELL LOCATIONS

Project No. 3186
6085 Scarlett Court, Dublin

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3186S003.MJB:JSC 122394

APPENDIX A

STATISTICAL CALCULATIONS

Appendix A

Equations Used in Statistical Calculations

Mean of measurements generated by previously collected sample ($\bar{x}$)

$$\bar{x} = \frac{\sum_{i=1}^{n}}{n}$$

Variance of sample population (s^2)

$$s^2 = \frac{\sum_{i=1}^{n} x_i^2 - (\sum_{i=1}^{n} x_i)^2/n}{n-1}$$

Appropriate number of samples to collect from the soil stockpile (n)

$$n = \frac{t_{.20}{}^2 s^2}{\Delta^2} \qquad With \Delta = RT - \bar{x}$$

Source: USEPA SW-846 Volume II, Table 9-1

Assumptions:

1) Samples collected above a depth of 8 feet bgs are from soils that were segregated into the "clean" stockpile and are not included in the statistical analysis for the soil stockpile.

2) Concentrations reported as being below analytical detection limits are taken as having a concentration of 1/2 the detection limit.

3) The regulatory threshold (RT) for benzene in the soil stockpile is 2.5 ppm. This level represents approximately 5 times the RCRA regulatory level for a leachate from TCLP extraction and thus represents a conservative assumption.

Statistical Analysis of Soil Sample Data
6085 Scarlett Court, Dublin, California
LF 3186.94

Sample Number	Date	Benzene Concentration (ppb)
East Tank	Jun-90	4000
South Middle Tank	Jun-90	800
North West Tank	Jun-90	3200
West Tank	Jun-90	600
MW-1 (10'-10.5')	Mar-93	37
SS-1	Jul-94	2300
SS-2	Jul-94	14000
SS-3	Jul-94	11000
SS-4	Jul-94	1100
SS-5	Jul-94	2.5
SS-6	Jul-94	13000
SS-7	Jul-94	1300
SS-8	Jul-94	440
sum of concentrations		51779.5
number of samples		13
average of values ($\bar{x}$)		3983.04
variance of values (s^2)		26282102.94
t.20 (12 degrees of freedom)		1.356
regulatory threshold (RT)		2500
standard deviation (s)		5126.61
Number of samples to be collected (n)		22

TABLE 9-2. TABULATED VALUES OF STUDENT'S "t" FOR EVALUATING SOLID WASTES

Degrees of freedom (n-1)[a]	Tabulated "t" value[b]
1	3.078
2	1.886
3	1.638
4	1.533
5	1.476
6	1.440
7	1.415
8	1.397
9	1.393
10	1.372
11	1.363
12	1.356
13	1.350
14	1.345
15	1.341
16	1.337
17	1.333
18	1.330
19	1.328
20	1.325
21	1.323
22	1.321
23	1.319
24	1.318
25	1.316
26	1.315
27	1.314
28	1.313
29	1.311
30	1.310
40	1.303
60	1.296
120	1.289
	1.282

[a]Degrees of freedom (df) are equal to the number of samples (n) collected from a solid waste less one.

[b]Tabulated "t" values are for a two-tailed confidence interval and a probability of 0.20 (the same values are applicable to a one-tailed confidence interval and a probability of 0.10).