WORK PLAN FOR PHASE II SUBSURFACE SOILS INVESTIGATION AT CALMAR INCORPORATED

Prepared for:

Calmar Incorporated
333 South Turnbull Canyon Road
P.O. Box 1203
City of Industry, CA 91749

At the Request of:
Arthur Fine, Attorney at Law
11377 West Olympic Blvd.
Los Angeles, CA 90064

Prepared by:

The Earth Technology Corporation
100 West Broadway, Suite 5000
Long Beach, CA 90802
(213) 595-6611

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1.0 INTRODUCTION

1.1 BACKGROUND AND PURPOSE OF THE WORK PLAN

This Work Plan addresses items in the letter from the California Regional Water Quality Control Board - Los Angeles Region (CRWQCB) dated February 21, 1989 (Appendix A). A meeting on March 15, 1989 among Mr. Phillip Chandler of CRWQCB, Mr. Arthur Fine (Calmar, Inc. legal counsel), Mr. Mike Kammerzelt and Mr. James Severns (Earth Technology) discussed the work carried out to date at the Calmar facility and requirements for further work. A Facility Audit was submitted to CRWQCB on June 12, 1989.

This Work Plan outlines a methodology to perform additional investigations including:

a. A soil investigation to determine lateral and vertical extent of contamination.

b. Soil gas monitoring of drain lines under the main building floor.

c. A determination of the integrity of the clarifier, by external soil and soil gas sampling.

d. A presentation of a laboratory analysis plan for both soil and water which includes all chemicals indicated as having been discharged.

e. The description of onsite containment and offsite disposal plans for both contaminated soil and water.

f. The preparation of a groundwater investigation program to define flow direction, concentrations, aquifer parameters and to provide appropriate monitoring wells relative to onsite sources.

g. The development of a water sampling plan.

1.2 SITE LOCATION

The Calmar Inc. site, which is approximately 13 acres in area, is located in the City of Industry (Los Angeles County), California. It occupies the western corner of Turnbull Canyon Road and Proctor Avenue (see Figure 1). The occupant and address of the subject site is:

Calmar Incorporated Dispensing Systems (Calmar)
333 South Turnbull Canyon Road
City of Industry, CA 91749

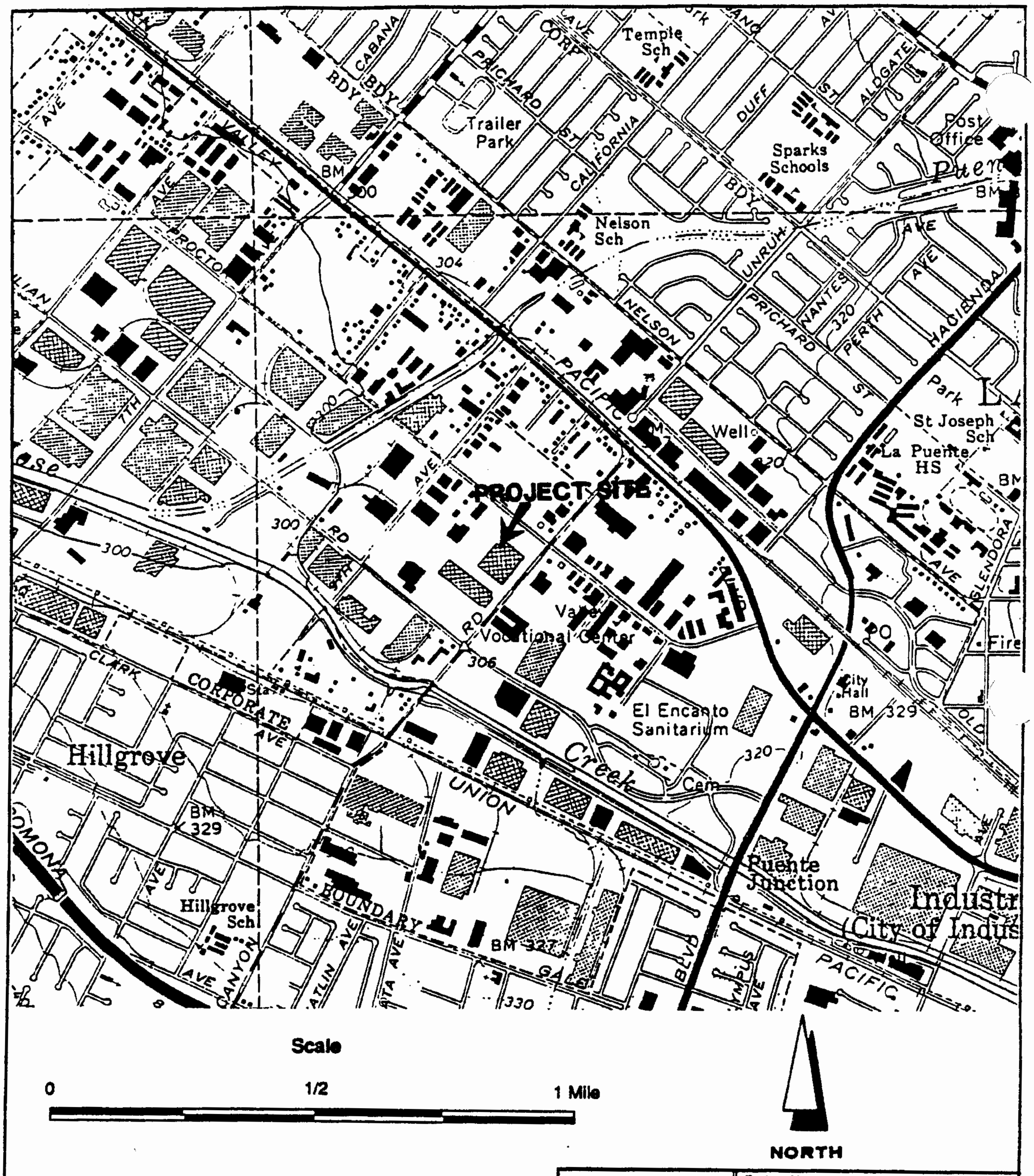
The northwest boundary of Calmar is Proctor Avenue, the southeast boundary is Turnbull Canyon Road. The properties to the northwest and southwest are occupied by industrial buildings.

1.3 AREAS OF CONCERN

Areas of concern have been outlined in previous investigations at the Calmar, Inc. facility. The areas which are the focus of this Work Plan are:

A. Utility trenches
B. Utility trench outlets
C. Clarifier
D. Waste storage area
E. Futura - Calmar fenceline
F. Former waste storage area.

These areas are shown on Figure 2.



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Calmar

Site Location

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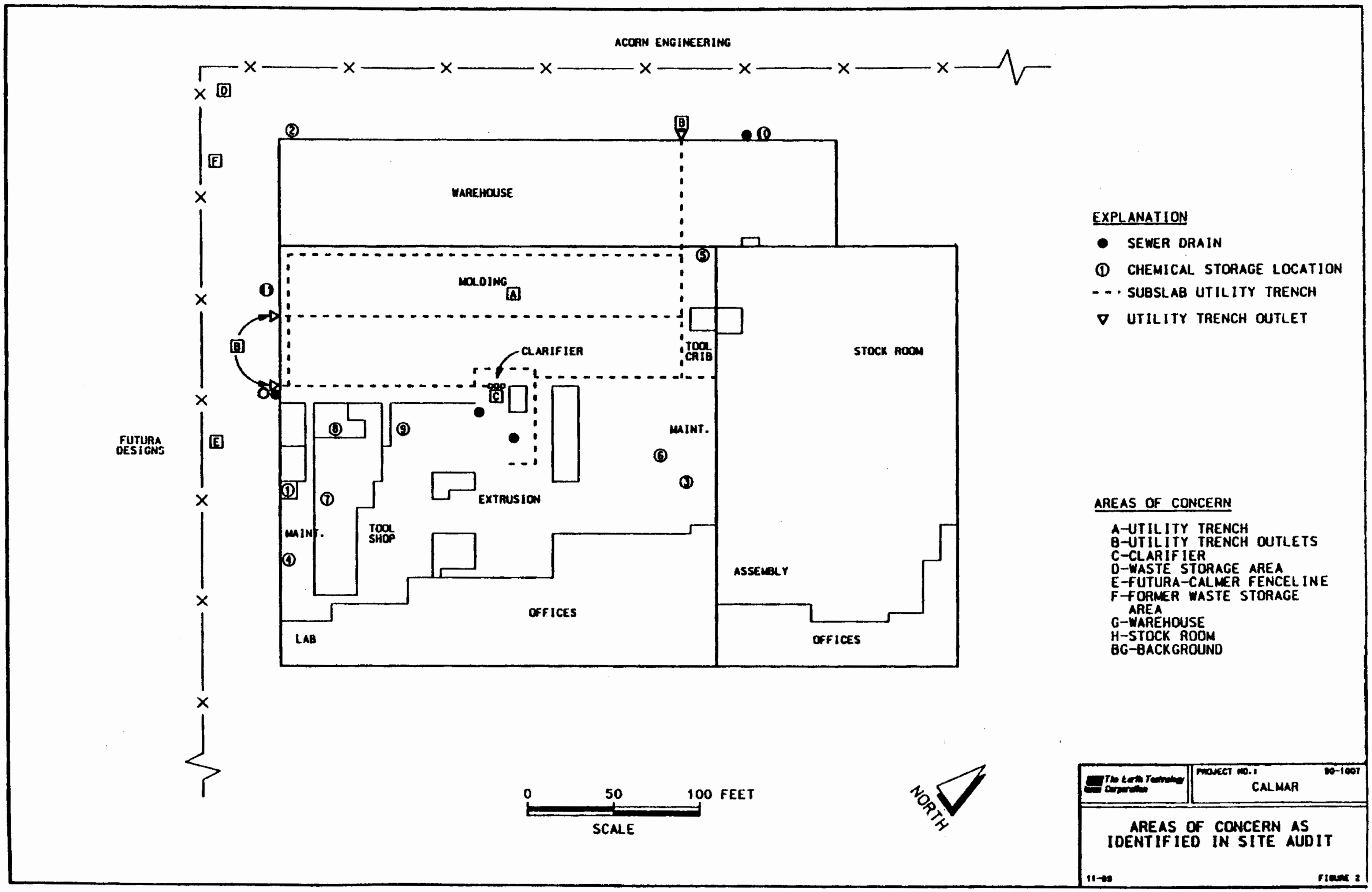
Figure 1



ACORN ENGINEERING
FUTURA DESIGNS
WAREHOUSE
MOLDING
CLARIFIER
TOOL CRIB
STOCK ROOM
MAINT.
EXTRUSION
TOOL SHOP
ASSEMBLY
OFFICES
LAB
OFFICES
EXPLANATION
● SEWER DRAIN
① CHEMICAL STORAGE LOCATION
- - - SUBSLAB UTILITY TRENCH
▽ UTILITY TRENCH OUTLET
AREAS OF CONCERN
A-UTILITY TRENCH
B-UTILITY TRENCH OUTLETS
C-CLARIFIER
D-WASTE STORAGE AREA
E-FUTURA-CALMER FENCELINE
F-FORMER WASTE STORAGE AREA
G-WAREHOUSE
H-STOCK ROOM
BG-BACKGROUND
0 50 100 FEET
SCALE
NORTH
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CALMAR
AREAS OF CONCERN AS IDENTIFIED IN SITE AUDIT
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FIGURE 2

2.0 SUBSURFACE INVESTIGATION DESCRIPTION

2.1 SOIL GAS STUDY

A soil gas survey will be performed using probes installed in an augered borehole, backfilled with a filter pack and sealed with soil and bentonite. The conditions at the Calmar site have several attributes that suggest this type of study:

a. The soils investigation on and around the property indicates the soil to be a silty clay, which would tend to clog driven probe tips.

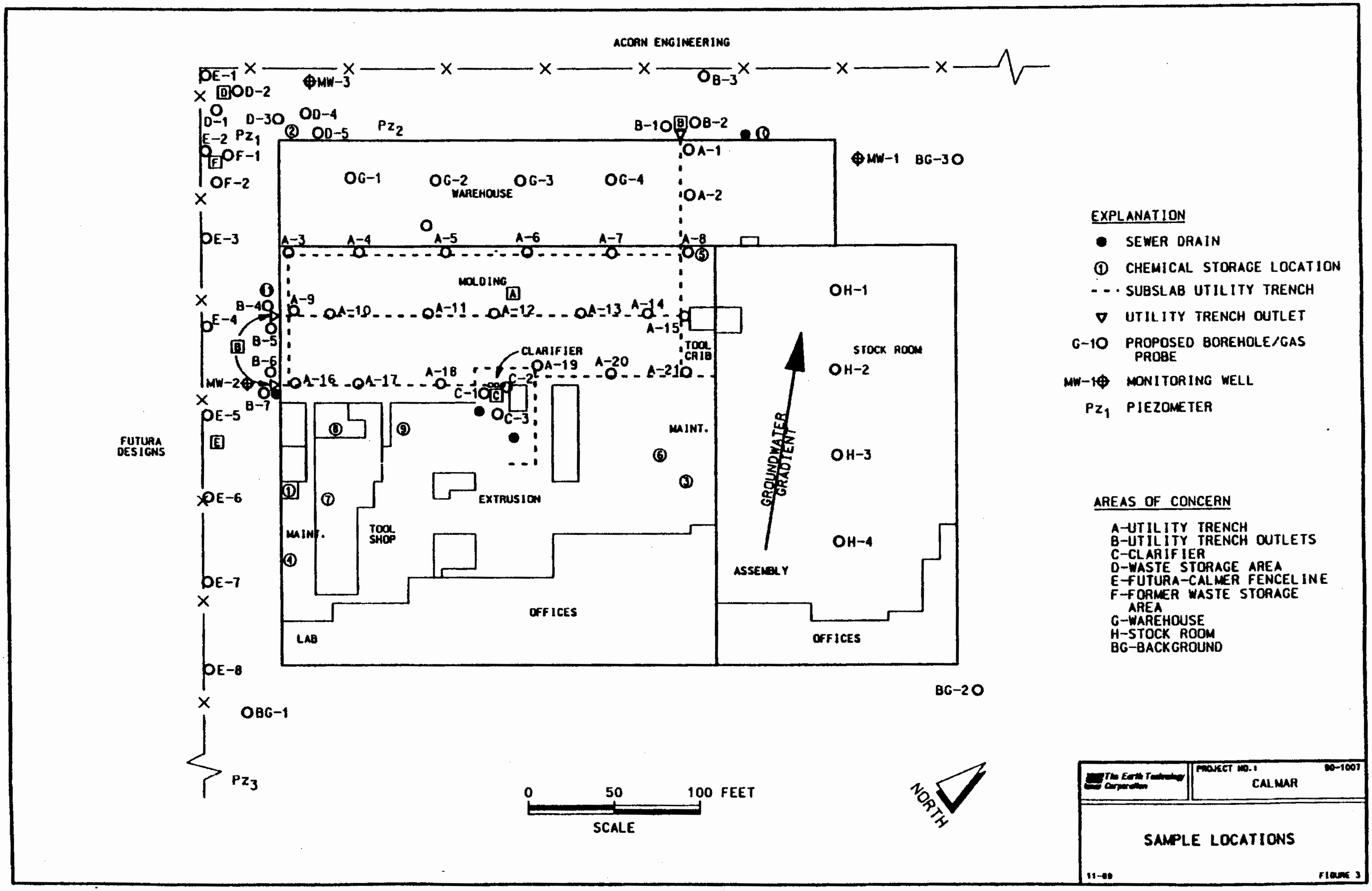
b. It is desirable to obtain soil samples and log soil conditions to confirm contamination sources.

2.1.1 Probe and Sampling Locations

Probe and sampling locations are shown in Figure 3. The locations have been chosen to investigate the areas of concern listed in "Environmental Site Audit of Calmar Incorporated", prepared by BCL Associates in May, 1989, and some additional areas chosen to provide background information. All locations will be bored to a depth of 5 feet. Individual locations are described in the following sections.

Utility Trenches, A1 - A20

Borings will be located at 50 foot intervals along the utility trenches 2 feet from the edge of the trench. Additional borings (not shown) will be located at areas where the concrete walls of the trenches are visibly cracked. The locations of these additional borings will be determined prior to the commencement of drilling.


ACORN ENGINEERING
FUTURA DESIGNS
WAREHOUSE
MOLDING
CLARIFIER
TOOL CRIB
STOCK ROOM
MAINT.
EXTRUSION
TOOL SHOP
ASSEMBLY
OFFICES
LAB
GROUNDWATER GRADIENT
E-1
E-2
E-3
E-4
E-5
E-6
E-7
E-8
D-1
D-2
D-3
D-4
D-5
F-1
F-2
MW-1
MW-2
MW-3
Pz1
Pz2
Pz3
B-1
B-2
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B-4
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A-20
A-21
C-1
C-2
C-3
G-1
G-2
G-3
G-4
H-1
H-2
H-3
H-4
BG-1
BG-2
BG-3
0
50
100 FEET
SCALE
NORTH
EXPLANATION
SEWER DRAIN
CHEMICAL STORAGE LOCATION
SUBSLAB UTILITY TRENCH
UTILITY TRENCH OUTLET
G-10 PROPOSED BOREHOLE/GAS PROBE
MW-1 MONITORING WELL
Pz1 PIEZOMETER
AREAS OF CONCERN
A-UTILITY TRENCH
B-UTILITY TRENCH OUTLETS
C-CLARIFIER
D-WASTE STORAGE AREA
E-FUTURA-CALMER FENCELINE
F-FORMER WASTE STORAGE AREA
G-WAREHOUSE
H-STOCK ROOM
BG-BACKGROUND
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SAMPLE LOCATIONS
11-90
FIGURE 3

Utility Trench Outlets, B1 - B7

Two to three borings will be made at all outlets to the utility trenches.

Clarifier, C1 - C3

Three borings will be made in the vicinity of the clarifier.

Waste Storage Area, D1 - D5

Five borings will be made in the vicinity of the waste storage area.

Future - Calmar Fenceline, E1 - E8

Borings will be made every 50 feet, at the Futura fenceline.

Former Waste Storage Area, F1 - F2

Four borings will be made to determine if soils were contaminated from the former waste storage area. The location of F3 and F4 will be determined at a later time.

Warehouse, G1 - G4

Four borings will be made to determine if the soils under the warehouse were contaminated from wastes generated in other areas.

Stockroom, H1 - H4

Four borings will be made to determine if the soils under the stockroom were contaminated from wastes generated in other areas.

Background, BG1 - BG3

Three borings will be made at the corners of the property, away from known sources of possible contamination.

2.1.2 Boring and Sampling Procedures

The following protocol will be used for drilling boreholes and sampling soils:

2.1.2.1. Asphalt paving material or concrete slabs will be cut with a concrete corer and removed prior to sampling to expose the underlying soils.

2.1.2.2. A drive sampler, equipped with a 2-inch-diameter by 6-inch-long stainless steel liner will be used to collect soil samples. At the beginning and end of the project, and between uses, the sampler will be scrubbed clean with soapy tap water and a brush, followed by a deionized water rinse. The sediments from the tip of the sampler will be placed in a sample jar for field soil gas measurements (see Section 2.1.4). After gas measurements, the soil will be inspected in the field by a qualified geologist, whose observation will be documented in detail on a boring log. The stainless steel liner containing the sample will be removed from the drive sampler, and each end sealed with Teflon™ tape, plastic caps and duct tape. The sample will be labeled, put in a self sealing plastic bag, packed in an ice chest at 4°C, for transportation to Earth Technology's Laboratory for possible future analysis.

2.1.2.3. A 3- or 4-inch diameter power assisted hand auger will be used to bore to a depth of 4 feet. The auger will be decontaminated as per Section 2.1.2.2 before and after the project. The flights of the auger will be brushed clean between bore holes.

2.1.2.4. A second sample will be taken per section 2.1.2.2, and the soil pore gas will be measured.

2.1.2.5. The borehole will be completed to a depth of 5 feet using a 3-inch-diameter (O.D.) hand auger. The auger will be decontaminated as per section 2.1.2.2 prior to use, between uses, and after completion of the project. A gas probe (Section 2.1.3) will be installed in the bore hole immediately after completion.

2.1.3 Probe Installation

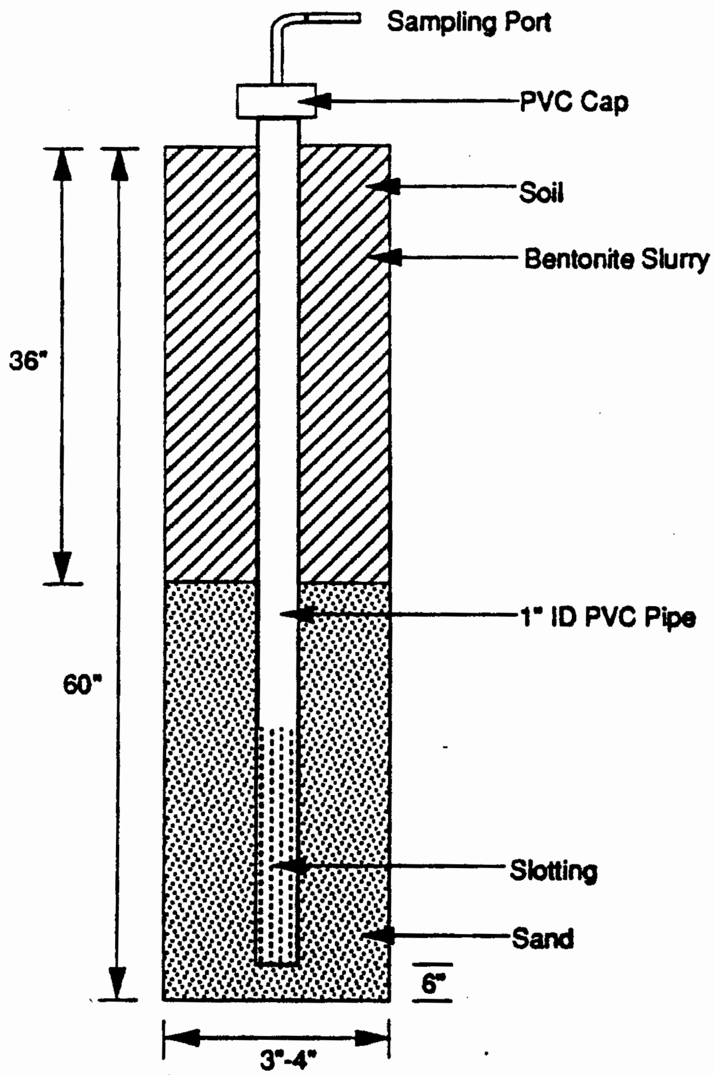
Probes will be installed as shown in Figure 4. The probe casing will be 1" polyvinylchloride (PVC) piping, with the bottom 1.5 feet slotted. New pipe will be used. The bottom 2 feet of the probe bore will be backfilled with a filter pack, and the remainder of the bore backfilled with bentonite slurry. Probe installation will be completed immediately after drilling. The probe will be capped with a PVC cap that has been pressure fitted, not solvent welded on the probe. The cap will be tapped and equipped with a sample port.

2.1.4 Standard Procedures for Field Soil Pore Space Gas Measurements

Soil pore space gas measurements will be performed in a standardized manner to assure that the results are accurate and representative of the area being monitored. Such measurements must be comparable to soil pore space gas measurements made in other areas. Earth Technology has field tested several methods for the measurement of soil pore space gas concentrations. The following methods have been found to provide the most accurate and reliable data. The California Department of Health Services (CDHS) and California Regional Water Quality Control Board (CRWQCB) have observed and evaluated these methods and accept the readings as valid.

It is vital that all of the procedures described in this document be followed in a rigorous manner as measurements made in the field may be influenced by many variables. Prior to performing these measurements the instruments to be used must be calibrated in accordance with Earth Technology procedures.

This soil pore space gas measurement method is designed to be performed on soil samples collected using a barrel-type hand auger. The auger bit is to be scrubbed clean with soapy tap water and a brush followed by a clean water rinse in between each boring. The Earth Technology field supervisor is responsible for inspecting the drill bit, inside of the auger barrel and sample collection tubes to assure that all are clean prior to drilling each hole. No lubricants other than clean water or Teflon™ tape are to be used on the joints between the auger sections.



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Gas Probe Design

11-89

Figure 4

The soil from the tip of the auger barrel is immediately pushed into a clean eight-ounce sample jar with an aluminum foil septum. A cap with a 1/2± inch hole drilled in the center is used to close the jar. The jar should be no more than one half full.

The capped jar is agitated to break up the soil particles and allowed to sit for ten minutes so that the pore space gas will fill the head space of the jar. A portable flame ionization detector (FID) and photoionization detector (PID) are used to monitor this head space gas. The steel probe tip on these instruments is inserted through the opening in the cap, puncturing the aluminum foil septum. The probe is inserted into the hole approximately one half the distance from the cap to the soil. The probe is left in the jar a minimum of 10 seconds or until the instrument readings stabilize. The instrument readings are logged on the geologists lithologic log along with the background readings obtained in ambient air. Once the pore space reading is completed, the cap with a hole is to be removed and replaced with an intact cap with a Teflon™ liner. The jar is to be labeled, sealed, stored and transported to the designated laboratory in accordance with Earth Technology standard operating procedures. This sample is valid for analysis for the base, neutral, acid extractable organics, pesticides, PCB's, inorganics, and pH, but not for the volatile organic compounds.

If a soil sample is not recovered from a given depth, a replacement sample is collected as close as possible to the same depth.

While the soil pore space gases are being monitored, the Earth Technology field crew also processes the soil samples. At all times the sample processing area is kept clean. After removing the samples from the auger barrel, the barrel is cleaned in the following manner. All loose soil is wiped off the barrel using disposable paper towels. The auger barrel tube is immersed in a bucket containing a solution of water and Liquinox™ detergent (or equivalent) cleaning powder. A scrub brush is used to thoroughly clean each part of the sample barrel. A bottle brush is used to clean the interior of the tip of the barrel tube. The wash water must be changed frequently. Following the wash step, the sample barrel is sprayed using a portable hand pressurized sprayer filled with tap water. At least 1/2 quart of water will be used per sample barrel washing. Following the tap water rinse the tube and sleeves are rinsed with at least two cups of deionized water. The washed sample barrel is inspected at each step in this process to assure the effectiveness of the cleaning. Following confirmation of the cleanliness of the sample barrel tube after the final distilled water rinse, the clean sample barrel tube will be re-assembled and a plastic bag will be rubber-banded over the tip of the sample barrel. The tube remains in a clean portion of the work area. All persons involved in touching the sample collection tube during the washing process shall only touch the tube with clean gloves. The sample barrel will remain in the clean area until it is required to collect another sample. At this point, an Earth Technology field crew member will remove the tube using a clean pair of gloves. The plastic bag will remain on the tip of the sample barrel until just before the tube is lowered into the hole. At this point, an Earth Technology crew member will remove the bag.

2.1.5 Standard Procedures for Probe Gas Sampling

Gas sampling will follow procedures indicated by South Coast Air Quality Management District Rule 1150.1 for landfill perimeter probe sampling with modifications as indicated. Probes will be sampled at least 24 hours after installation, to allow for soil gases to enter the filter pack.

An Hnu Model P1 101 Photoionization analyzer equipped with a 10.2 eV lamp, calibrated for direct reading in ppm vol/vol of benzene, will be used to approximate quantities of non-methane hydrocarbons. The Hnu has a linear range of 0.1 to 600 ppm, and a useful range of 0.1 to 2000 ppm. Air is pulled through the sensor with a small, DC operated fan at a flow rate of approximately 0.5 liters per minute. To prevent interference from free liquids or high humidity, the Hnu probe will be fitted with a liquid knock-out consisting of a stainless steel coil, submersed in an ice water bath. To insure evacuation of the sampling train the instrument will be allowed to pump for one minute prior to reading. A Foxboro Century 128 Portable Organic Vapor Analyzer (OVA), equipped with a flame ionization detector (FID) with a sensitivity to 0.1 ppm methane, and a three scale range to 1000 ppm will be used to determine total organic carbon (TOC) as methane. The instrument has a sample flow rate of approximately 2 liters per minute. To insure evacuation of the sample train, the instrument will be allowed to pump for at least 30 seconds prior to recording the reading.

2.1.6 Standard Procedure for Gas Sample Collection

Probe Selection

At least 10 gas samples, plus one field duplicate and one field blank will be collected in the field for detailed laboratory analysis (EPA Method 8240 Modified for gases). Probes will be chosen for sampling according to the following protocol:

1. All probes that contain over 100 ppm TOC as methane by FID or 10 ppm gas as benzene by PID will be sampled.
2. At least one sample will be taken from each area of concern.
3. Remaining samples will be chosen from the probes with the highest readings from field instrumentation.

Equipment Preparation

Samples will be collected through a portable pump into a 2 liter Tedler™ bag. All parts of the pump touching the gas will be either stainless steel, viton rubber, Teflon™ or glass. Prior to use, the pump will be decontaminated by running the pump for one hour in a clean environment, then purging the pump with ultrapurified air or nitrogen. A new Tedler™ bag (SKC West, Inc.) with stainless steel fittings will be used. Bags will be triple purged with ultrapurified air or nitrogen prior to use. Bags will be leaked checked prior to use. Bags that do not remain drum tight when filled with ultrapurified air or nitrogen for 24 hours will be rejected.

Sample Collection

The pump will be set to a flow rate of one liter per minute. The Tedler™ bag will be attached to the pump with its valve in bypass mode. The pump will be attached to the sample port and be allowed to run for one minute prior to sampling. The valve to the Tedler bag will then be opened, and allowed to fill for two minutes. The valve will then be closed, and the sample bag disconnected.

Bags will be stored in a light-tight cardboard box and shipped to the Earth Technology laboratory for analysis. Standard chain-of-custody procedures will be followed. All analysis will be completed within 72 hours of sample collection.

2.2 GROUNDWATER SAMPLE COLLECTION AND LEVEL MONITORING

Samples from the monitoring wells will be collected every 2 months for a 12 month period in order to characterize the groundwater contamination at the site. Groundwater levels will be also taken at this time interval. In order to obtain representative water samples from groundwater wells, the following procedure will be followed. The depth to the water level in the well will be measured in order to calculate the liquid bore volume for purging. This measurement is also important to determine the hydraulic gradient.

The well will be purged of water standing in the casing. During purging activities, the water will be monitored for specific conductance, temperature and pH. Stabilization of the parameters indicates equalization of the water within the well and in the aquifer. At least two well volumes of water will be purged and stored in drums pending analytical results.

If the well goes dry during purging, it will be allowed to recover, emptied, and a sample then taken. In cases where the well is purged dry and recovery is very slow, groundwater samples will be collected as soon as possible after the well has recovered, but within two hours of purging, in any case. In these cases, pH, temperature, and electrical conductivity measurements will be made and recorded at the time of sampling. Sampling equipment will be washed with Alconox™ detergent solution, and rinsed with distilled water between sampling locations to minimize cross-contamination.

Purging will be accomplished using a stainless steel submersible pump to evacuate the water. The discharge rate of the pump will be closely controlled to match the rate of recharge in the well. This will minimize cascading water within the well which would result in non-representative volatile constituent samples. A check valve on the pump discharge will prevent surging.

Upon completion of purging, the pump will be withdrawn from the well and a bailer used to withdraw water for sampling. The bailer will be constructed of teflon and equipped with a bottom-emptying device to minimize volatile constituents disturbance.

VOA jars, with threaded caps and Teflon™-faced silicon septa, will be used to collect water samples. The water sample will be carefully transferred from the bailer bottom valve into the jar to form a tension bubble (convex meniscus) on top of the jar, being careful not to spill the material over the side of the jar. The septum (teflon-faced down) will then be slid over the top of the jar being careful not to allow any air under the septum. The jar will be tightly capped. The jar will be turned over to assure that no air is in the VOA jar. If there is air in the jar, the VOA jar will be emptied and refilled. Each VOA jar will will then be labeled and sealed and immediately stored in an insulated chest with dry ice to chill the sample to 4°C. Samples for volatile organics will be collected in duplicate.

A sample will then be analyzed to determine the level of Total Suspended Solids by using an Imhoff Cone. This value will be reported to the Board.

<u>Water Storage</u>

Water from well development and well purging prior to sampling will be stored in drums marked with well numbers on-site. Disposal methods will be selected after analytical results are received from the laboratory.

2.3 FIELD DATA RECORDS

2.3.1 Lithologic Logs

A detailed lithologic log including the FID, PID, and IR readings will be prepared by a qualified geologist.

Soil Description

In order to standardize soil descriptions each sample shall be described using the following criteria as applicable:

Lithology - Use the Unified Soil Classification System.

Color - Use Munsell Color Chart.

Moisture - Note the moisture as dry ($\leq$ 5%), slightly moist (5-10%), moist(10-20%), or wet (20-30%).

2.3.2 Field Log Book

A permanent bound field log book will be kept for all field operations. The field log book will have consecutively numbered pages. The log book will be used to record at least:

The purpose of sampling.

The name of the project.

The name and address of the company sampled.

The location of the sampling point and measurements necessary to draw a scaled site plan.

The name and address of the field contact.

The number and volume of sample(s) taken.

A description of the sampling point and sampling methodology.
The date and time of collection.

The collector's sample identification number(s).

References such as maps or photographs of the sampling site field observations.

Any field measurements made (e.g., PID, FID, IR)

2.4 QUALITY ASSURANCE QUALITY CONTROL PLAN (QA/QC)

The QA/QC program will assure that the data generated are accurate. Assuring the accuracy of the data is critical since the conclusions regarding the project will be based on these data. The QA/QC program consists of four phases: Prefield Activities, Field Activities, Laboratory Analysis and Post Laboratory Analysis.

2.4.1 Prefield Activities

The QA/QC program begins with the preparation of a work plan which specifies:

1. Sample collection locations
2. Sample collection methods
3. Method for cleaning sampling equipment
4. Type of sample containers to be used
5. The method of preserving the sample
6. Method of labeling the sample
7. Method of transporting the sample to the lab
8. Chain-of-command in the field, including QA/QC
9. Trip blank and other QC samples
10. Field log book procedures
11. Calibration of field equipment
12. Operation of field equipment

The prefield activities, QA/QC procedures have been completed for this project with the preparation of this Work Plan.

2.4.2 Field Activities

The main purpose of the QA/QC program for field activities is to assure that the procedures outlined in the Work Plan are correctly conducted.

The persons assigned to the field work have adequate education, training and experience to complete their tasks.

Handling, Storage and Sample Documentation

All sample containers will have:

1. A waterproof gummed label affixed. The label will contain the following information:

   The name of the collector.

   The name and address of company sampled.

   The sample point location.

   The date and time of collection.

   The collector's sample number.

2. A chain-of-custody record containing the following information:

   The collector's sample number.

   The signature of the collector.

   The date and time of collection.

   The place and address of collection.

   The waste type.

   The signatures of persons involved in the chain of possession inclusive of dates of possession.

3. A sample analysis request sheet containing the following information:

   The name of the lab which will process the sample.

   The name of the person who receives the sample.

   The date of sample receipt.

   The analyses to be performed if known at the time of sample shipment.

Sample Containers

1. Soil Samples

   Soil samples will be collected in laboratory-supplied and cleaned stainless steel sleeves with Teflon™-lined plastic lids, capped and labeled for identification. The caps will be taped closed with duct tape on both ends. A sample identification label will be adhered to the side of the cylinder and a seal adhered across the top of each cap. The sample will be placed in a cooler with ice (4°C) for possible laboratory analysis.

2. Gas Samples

   Gas samples will be collected in triple purged, 2-liter Tedlar™ bags. The bags will be permanently labeled with a log number, and the date of cleaning and leak testing. The bags will be stored at approximately 25°C in light tight cardboard boxes.

Shipment Package

In general, the soil samples will be packed in an ice chest on a suspended rack above blue ice. This will assure that the maximum acceptable temperature of 4°C will not be exceeded. The samples will be packed so that they do not come in direct contact with the dry ice. The samples will be packed to avoid breakage during shipment to the laboratory. The ice chest will be sealed with duct tape and an adhesive seal attached over the latch. The chain of custody will be enclosed in a large envelope which will accompany the chest. Gas samples will be shipped in a light tight cardboard box with the chain-of-custody enclosed in a large envelope which will accompany the box.

Delivery to the Laboratory

All samples will be delivered to the laboratory as soon as possible, preferably the same day they are collected. If a separate transporter is required, the samples must be delivered to the transporter the evening of the collection and overnight delivery must be specified. A specific delivery time must be verified at the time of the drop off. If the transporter will not deliver directly to the laboratory, then arrangements must be made with the laboratory for such a delivery or pickup. The laboratory will be notified of any and all deliveries.

2.4.3 Laboratory Analysis

The laboratory QC program has provisions to track sample movement. These include:

1. Sample Receiving

   The laboratory sample custodian inspects the sample, the label, the seal, the chain-of-custody, and assures the sample and sample container are sound and properly preserved. A job number is assigned and log the sample is logged in the log book. The sample is stored per Earth Technology standard operating procedures. The proper portions of the chain-of-custody form are completed. The laboratory supervisor is notified that the sample was received.

2. Sample Identification Verification

   The sample identification number on the container is verified versus the chain-of-custody, purchase requisition or purchase order, including number of samples, type of sample, client name, adequacy (volume), preservatives (if any) and integrity (leakage). Any discrepancy shall be noted on the requisition or Purchase Order and Sample Control Document.

3. Sample Control Document

The document must be numbered sequentially and show the purchase order number (if any), the receiving date, due date, client name and test description. The laboratory director or supervisor will indicate the fee for test, if known, and will initial the document.

4. Sample Worksheets

These are prepared from the Sample Control Document and are specific for the work station where the analyses are performed. The Worksheets identify the sequence of samples to be analyzed, sample identification numbers, special notes, data to be used in the final calculation, test result and the initials of the testing technician.

2.4.4 Post Laboratory Analysis

The post laboratory QA/QC program will include careful scrutiny of all raw data and final summaries to minimize procedural or typographical errors.

1. Sample Storage

Samples will be retained in the storage area for one month unless otherwise specified. Stored samples are marked with the appropriate date of disposal and filed by accession number.

2. Information Retrieval

Retrieval of information and documents shall occur by use of the sample number and date of analysis.

3. Document Storage

The Sample Control Document is placed in the appropriate file designated for the client.

4. Testing Results

Final results of the testing procedure are entered onto the test report.

5. The test report shall include:

   a) The test result.

   b) The test procedure name or number and revision number.

   c) Any necessary or required evaluating statements of the test data.

   d) Analytical data must meet EPA limits of detection or be justified.

   e) Data when presented must indicate whether chemical was not detected or potentially exists below quantification limits. The actual detection limit for each analyte will be listed.

   f) The signature of the Laboratory Director (or designee) indicates evaluation of the results in accordance with the QA/QC Manual and their acceptability.

   g) An attached copy of Nonconformance Reports (if any).

6. Documentation

   All applicable documentation associated specifically with samples (including, but not limited to: test reports, purchase orders, requisitions, work sheets, data print-outs, nonconformance reports, corrective action reports) is filed with the Sample Control Document according to the unique accession number assigned to the customer specimen. Documentation is retained for five years unless otherwise specified by client contracts.

   Also, the laboratory QA/QC program includes provisions to assure the cleanliness of all equipment and provide for the proper calibration and operation of all equipment.

   The QA program provides for the documentation of the procedures followed to assure data accuracy.

2.5 HEALTH AND SAFETY PLAN

Appendix B contains the site Health and Safety Plan. The plan includes a hazard assessment, monitoring guidelines, and action levels, required safety equipment, decontamination procedures and safety organization and responsibility.

3.0 LABORATORY ANALYSIS

The Sample Plan provides for the following laboratory analyses:

3.1 SOIL AND GROUNDWATER ANALYSIS

Analytical Parameters	EPA Method	Detection Limit
Volatile Organics	601/602 (Water) 8010/8020 (Soil)	0.5 ug/Kg * 1.0 ug/Kg
Total Petroleum Hydrocarbons	Modified 8015 (Soil)	1.0 ug/Kg

* Limits of detection will be provided with each laboratory report for each compound analyzed. PQL limits for each EPA method will be met or justified for not being met.

All samples (both soil and water) subjected to analysis for Halogenated and Aromatic Volatile Organic Compounds will be extracted within 72 hours of collection.

Should a field screening technique indicate contamination in a boring at any interval, all soil samples collected from that boring will be analyzed by EPA Method 8010/8020 and the chain numbers including gasoline and diesel by Method 8015 (modified).

All laboratory work will be performed by Earth Technology Analytical Laboratories, 5702 Bolsa Avenue, Huntington Beach, California, 92649. This laboratory is a California Department of Health Services Certified Laboratory, Certificate #235.

The data package submitted of all analyses will include all QA/QC data performed on each batch of samples. The QA/QC data included blank analyses, matrix spike and matrix spike duplicate analyses. GC/MS tuning data and calibration data will be included upon request.

Water samples will be analyzed for volatile organics by methods 601/602. Detection limits for 601/602 are .05ug/L.

All 8010/8020, 8015 modified, or 601/602 compounds analyzed will be reported as either not detected or detected on each data report. Compounds detected whose concentrations fall below the PQL but above zero will be reported as "Trace." In this instance, no quantitation value will be given.

Modified EPA Method 8015 will be used for analysis routines. The modification contained in Attachment 2 of the February 26, 1987 California Regional Water Quality Control Board's "Guidelines for Removal of Underground Waste Oil Tanks" will be used. A copy of this publication (File No. 1123.64) is enclosed for reference in the Work Plan (see Appendix C). It will be necessary to inform the laboratory before analysis which method will be used: low medium boiling hydrocarbons or high boiling hydrocarbons.

3.2 SOIL GAS ANALYSIS

Soil gases analysis will be performed using a modified EPM Method 8240. EPA Method 8240 is applicable to a wide range of matrices, the most common being water and/or soil. Method 8240 can be used to quantify most volatile organic compounds which have boiling points below 200°C and which are insoluble or slightly soluble in water. Volatile water-soluble compounds can be included in this analytical technique, however, for the more soluble compounds, quantitation limits are approximately ten times higher because of poor purging efficiency. The method is also limited to compounds which elute as sharp peaks from a GC column packed with graphitized carbon lightly coated with a carbowax.

The analytical system is configured as if standard EPA Method 8240 water analysis is to be performed. Once the system is ready for the analysis of samples, (e.g., all tuning and calibration criteria is met), the system blank is run by purging the standard 5 ml of reagent water using the same level of surrogate and internal standard concentration and the same parameters used during initial setup.

Next, the water sample from the purge and trap is replaced with a dry tube. A system air blank is run by drawing 100cc of ambient air using a 100cc gas tight syringe which is equipped with an on/off valve and lure tip. While slowly injecting the sample into the dry tube on the purge and trap, the system is simultaneously switched to purge so that the gas sample reaches the trap quickly. The sample is purged for 5 minutes and prepared to desorb directly onto the GC/MS.

After successfully completing the above step, the sample is desorbed using the same parameters that were set during the initial tuning and calibration steps. The data is processed using the same method used during calibration. Applicable parts of the above steps are repeated to run actual gas samples.

The surrogates are calculated and reported using the standard 8240 format.

The same data interpretation procedure given in the FPA Method 8240 SOP followed for identification of the target and unknown compounds.

Semi-quantitation of the target compounds is reported using the following equation(s) in units of ppm (nv/v). Molar volume is calculated using the Ideal Gas Law (PV=nRT).

$$\text{Concentration (nv/v)} = \frac{(22.4)\ (Ax)\ (Is)\ (D)}{(AIs)\ (RF)\ (V')\ (u\ mol.\ wt.)}$$

nv	= molar volume
Ax	= area of characteristic ion for compound being measured
Is	= Amount of internal standard
AIs	= Area of characteristic ion for internal standard in ug
RF	= Response factor for compound being measured
D	= Dilution factor
u mol. wt.	= molecular wt. of the compound being measured divided by 10E6
V	= volume of sample in liters

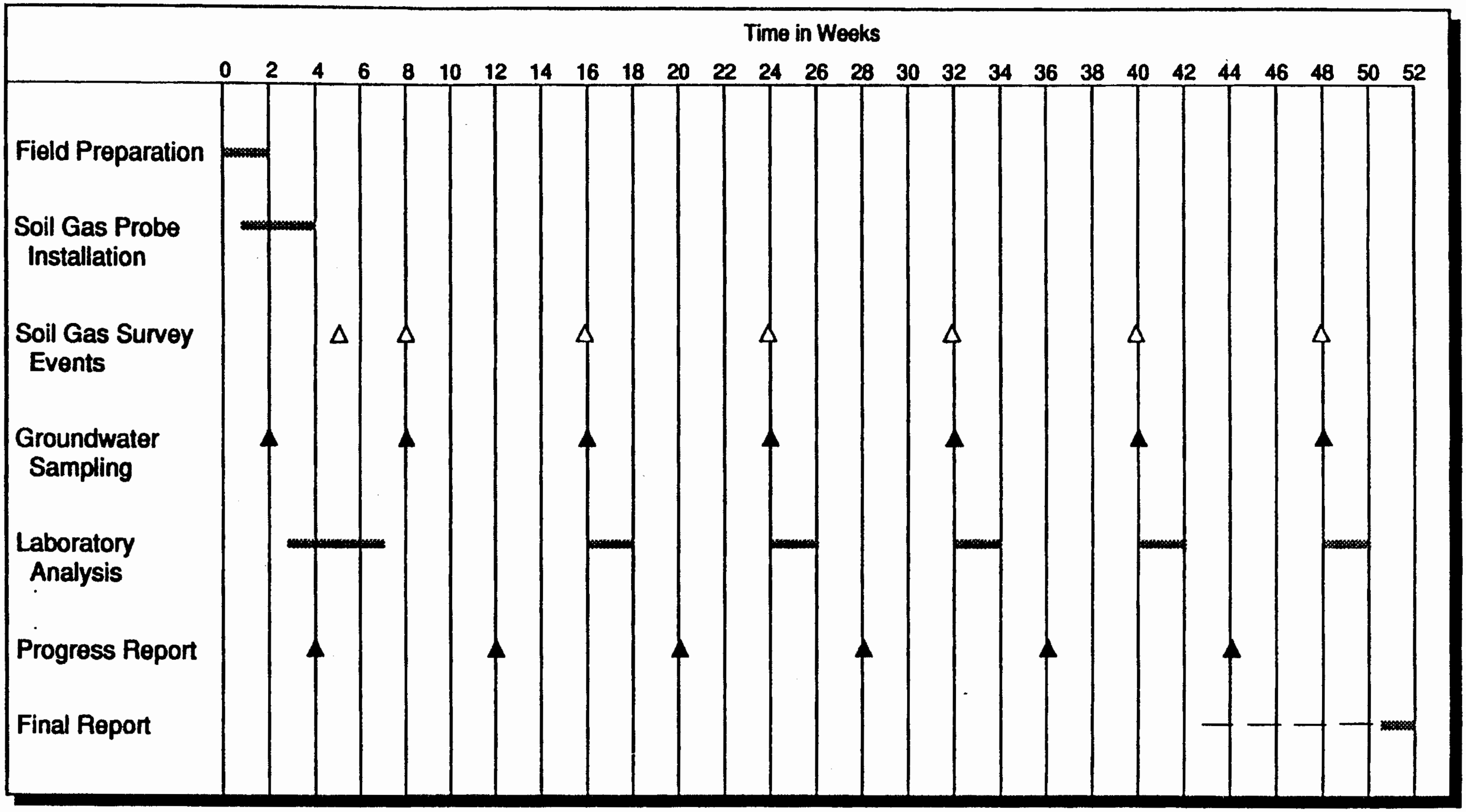
Semi-quantitation of the TIC or unknowns is reported in ug/L using the following equation:

$$\text{Concentration (ug/L)} = \frac{(Ax)\ (Is)\ (D)}{(AIs)\ (RF)\ (V')}$$

4.0 WORK SCHEDULE

The field monitoring/sampling, laboratory analysis and reporting program to be performed in this Work Plan at Calmar is scheduled in a series of concurrent tasks as presented in Figure 5.

Proposed Work Schedule



Note: Week 0 begins upon CRWQCB approval of work plan.

Figure 5

5.0 REPORT AND REMEDIAL ACTION PLAN

A written report will be prepared and will include the following:

a. A log of borings and field data (i.e., FID and PID).

b. All laboratory test results in tabulated and/or graphical form.

c. Map(s) showing areas sampled.

d. An opinion regarding the significance of the findings including an evaluation of soil properties which any affect contaminant mobility. If additional work is required, the report will describe the work.

e. Details of the various practices used in sample collection and analysis.

f. Discussion of any data constraints caused by sample collection or analytical procedures selected in relation to reported results and conclusions derived from these results.

g. A description of any specific assumptions necessary to perform tests, process data, etc.

This report will be signed by a California Registered Civil Engineer or Registered Geologist.

APPENDIX A

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION, LETTER DATED FEBRUARY 21, 1989

RECEIVED FEB 23 1989

STATE OF CALIFORNIA
GEORGE DEUKMEJIAN Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION
107 SOUTH BROADWAY, SUITE 4027
LOS ANGELES, CALIFORNIA 90012-4596
(213) 620-4460

February 21, 1989

Mr. Duane Pegley
Calmar Incorporated
333 Turnbull Canyon Road
City of Industry, CA 91745

SITE ASSESSMENT, CALMAR INCORPORATED - (FILE NO. 102.055)

The subsurface investigation report, received October 28, 1988, has been reviewed. Soil contamination reported from these investigations indicate that discharge(s) have occurred to the surface and subsurface of your company's site which represent a threat to groundwater. This type of unpermitted waste disposal activity is a violation of Section 13260 et seq. of the California Water Code, which requires that before discharging waste to ground, a report of waste discharge must be filed and requirements received from the Board. You are directed to cease discharging of waste to the ground. You must also implement further site assessment according to the general guidelines enclosed and any site specific comments herein. Clarification is also required regarding a few points in the report.

The rationale for requiring additional investigation at your facility is as follows:

1. Local wells, which have provided public drinking water, have been determined to be contaminated by various volatile chlorinated organic compounds above DHS action levels. The Regional Board is involved in a toxics investigation program to determine sources for the contamination.

2. Soil contamination, reported at Calmar Incorporated, includes tetrachlorethylene (PCE), trichloroethylene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethane (1,1,-DCA), 1,1-dichloroethylene (1,1-DCE), dichloromethane, and various petroleum hydrocarbons (C8-C22). The presence of carbon tetrachloride (CTC) in some of the soil samples, although seemingly contradicted in later samples, is of significance until adequately explained. Trace amounts of the following were also reported: chloroform, cis 1,2-dichlorethylene, (cis 1,2-DCE), benzene, chlorobenzene, 1,2-dichlorobenzene, ethylbenzene, toluene, and xylene.

3. Groundwater contamination reported from one round of sampling at three shallow on-site discovery wells included: PCE, TCE, 1,1-DCE, cis 1,2-DCE, 1,1,1-TCA, 1,1-DCA and traces of benzene, ethylbenzene, toluene and xylene.

4. A number of the compounds deteced in the soil and water were present in measurable amounts from surface to near ground-water. These included: PCE, TCE, xylene (Tr), toluene (Tr), ethyl benzene (Tr). The original report also indicated CTC tracking to water.

5. Compounds reported from concurrent analyses of the industrial waste clarifier sludge and supernantant liquid indicate present use of the following chemicals found in soil and groundwater: 1,1,1-TCA, 1,1-DCA, benzene, toluene, xylene and petroleum hydrocarbon compounds (C8-C22).

6. Although it is recognized that the hydrologic data set is limited and there are specifics constraints on the extent to which it may be interpreted (only 3 shallow wells installed without rigorous standards, at positions which may not be completely representative of site conditions), the following conclusions indicate on-site sources for at least some of the contaminants:

   a. Well MW-1, downgradient from the clarifier contained 1,1,1-TCA in relatively higher amounts than either of the other wells. 1,1,1-TCA is present in the industrial waste clarifier. Presence or absence of vertical components of gradient, which might affect concentrations of high specific gravity contaminants in the shallow saturated zone over short distances, has not been determined.

   b. Well MW-3 situated downgradient from the waste storage area(s) and from MW-2 has significantly higher levels of PCE, 1,1-DCE, and 1,1,-DCA than does MW-2.

   c. 1,1-DCA and 1,2-DCA are non-detected in the most upgradient well (MW-2), but are present in the downgradient well MW-3.

7. Soil contamination identified through limited soil investigation, in areas of relatively shallow groundwater, is viewed as symptomatic of possibly more extensive soil and/or groundwater contamination. In this

situation, there is both vertical continuity and an apparent match of some groundwater contaminants to both soil and site operations.

Requirements for Future Work

1. Facility Audit

   a. Determine past and present use, storage, and disposal of chemicals. Cite past owners and operations at the facility. A site usage summary must be developed.

   b. Possible sources and pathways for all chemicals which may have been used or stored on site must be determined. These should include all physical pathways, procedures, past equipment function and locations, and any observable indication of potential source areas through time.

   c. An as-built of the facility, with details on clarifier and utility trench construction must be provided.

2. Additional Subsurface Soil Investigations

   a. Develop soil investigation strategy to ascertain lateral and vetical extent of contamination.

   b. Soil gas techniques should be considered relative to any drain lines under the main building floor.

   c. The integrity of the clarifier, must be checked by external soil sampling and/or soil gas.

   d. Present a laboratory analysis plan for both soil and water which treats all chemicals indicated as having been discharged.

   e. Describe on-site containment and off-site disposal plans for both contaminated soil and water.

3. Groundwater Investigation

   a. Prepare groundwater investigation program to refine flow direction and gradient information, define aquifer parameters and provide appropriate monitoring wells relative to on-site sources.

   b. Develop water sampling plan.

4. Proposed Schedule

   a. A final technical report is to be submitted and must include details of the various practices applied in obtaining and analyzing the soil and water samples.

   b. Progress reports must be included in the schedule. These may correspond to any proposed phasing of the program.

   c. Submit an appropriate schedule showing major milestones.

Questions and incomplete data in the technical report include:

1. The B-1/B-17 sample discrepancies are not fully explained. For instance, although CTC is reported from B-1 and not from B-17, PCE is found in elevated amounts in both. A soil gas survey delineating lateral extent of soil contamination may also help resolve the CTC issue.

2. Survey data for the wells must be provided.

The workplan for site assessment is required by March 14, 1989, which will include a site audit, sampling schedule, provision for tracking source(s) of soil and water contamination. Notification must be provided to staff 1 week in advance of water sampling in order that we may split samples if desired. If you have any questions, please call Philip Chandler at (213) 620-6091.

David A. Bacharowski
for
ROY R. SAKAIDA
Senior Water Resources
Control Engineer

cc: Neil Ziemba, Environmental Protection Agency, Region 9, Toxics and Waste Management Division
Dennis Dickerson, Department of Health Services Region 3, Toxic Substance Control Division
Bill Jones, Los Angeles County, Department of Health Services
Thomas Stetson, Stetson Engineers, Engineer for the Main San Gabriel Basin Water Master
✓BCL Incorporated
Bonnie Wolstoncroft, SWRCB, Office of Chief Counsel

APPENDIX B

SITE SAFETY PLAN FOR INSTALLATION OF GAS PROBES AT THE CALMAR FACILITY

SITE SAFETY PLAN
FOR
INSTALLATION OF GAS PROBES
AT THE CALMAR FACILITY
333 SOUTH TURNBULL CANYON ROAD
CITY OF INDUSTRY, CALIFORNIA

Prepared by:

The Earth Technology Corporation
Health & Safety Office
100 West Broadway, Suite 5000
Long Beach, California 90802-5785
(213) 495-4449

Earth Technology Project No. 90-1007

Effective November, 1989

1.0 INTRODUCTION

This plan presents Health and Safety procedures and practices to be used during vapor probe installation in contaminated soil at the Calmar Incorporated Dispensing Systems Facility located at 333 South Turnbull Canyon Road, City of Industry, California. A total of 59 gas probes will be installed at the site.

All Earth Technology employees involved with on-site work for the subject project will follow this plan which supersedes all interim Health and Safety plans. In the event of a conflict between this plan and another regulatory guideline, the more stringent will be observed.

In addition to this plan, all on-site work will comply with any work plans for the Building Site which have been approved by Earth Technology.

2.0 GENERAL BACKGROUND

The Calmar facility was built on this site in about 1963. Prior to that time, the property was undeveloped. Calmar manufactures dispensing systems for household products (i.e., lotion pumps and spray pumps). These products are fabricated by injection molding of plastics. Raw material in the form of plastic beads is held in outside dispensing silos.

3.0 SCOPE OF WORK

The purpose of this project is to install 59 gas probes at various locations on the site. The areas where the gas probes will be installed will first undergo hand augering techniques to a depth of 5 feet below the ground surface. The probes will be installed into these 5 foot deep holes. The base of the hole will be packed with gravel and probe will be sealed in the ground. At a later date samples will be collected from the gas probes and collected in tedlar bags for analysis of solvent contamination.

4.0 HAZARD ASSESSMENT AND PRECAUTIONS

Based on our previous investigations, 1,1 - dichloroethene, Dichloromethane, 1,1,1 - trichloroethane, Trichloroethylene, and Tetrachloroethene are the contaminates of concern at the Site.

4.1 POTENTIAL CHEMICAL TOXICITY

The chemicals listed above are all solvents and have the same physical effects. These chemicals act as an anesthetic on the human body by depressing the central nervous system and has also shown symptoms of eye irritation, vertigo, tremors, nausea, and dermatitus. Exposures to high levels can sensitize the heart to epinephrine. The target organs are the respiratory system, heart, liver, kidneys, CNS, and skin.

4.2 POTENTIAL PHYSICAL HAZARDS

FLAMMABLE ENVIRONMENTS

Fire potential exists at this site during field operations. Chemical compounds which are flammable may not be identified and, therefore, any vapor or liquid must be treated as if it were flammable. *** Smoking inside designated areas is prohibited.***

Fires involving flammable liquids are considered Class B fires. They require blanketing or smothering to extinguish the fire. This effect keeps oxygen away from the fuel, and can be obtained with Carbon Dioxide (CO_2), dry chemical, foam, loaded stream, or multipurpose dry chemicals. Water Spray, CO_2, and dry chemical extinguishers are marked by a Class "B" on a background of red.

HYPOTHERMIA AND HEAT STRESS

Four factors will influence the interchange of heat between field personnel and hot environments. These are 1) air temperature, 2) air velocity, 3) moisture content of the air, and 4) radiant temperature. The hot environment problem is one in which a combination of these factors produces an imbalance of metabolic heat production and heat loss. When heat loss fails to keep pace with heat gain, certain physiological mechanics come into play: dilation of blood vessels, increased cardiac output, and increased sweat production. Prolonged exposure to excessive heat may cause increased irritability, decreased morale, increased anxiety, and inability to concentrate. The physical disabilities caused by excessive heat exposure are, in order of increasing severity: heat rash, heat cramps, heat exhaustion, and heat stroke.

Symptoms of heat exhaustion usually begin with muscular weakness, dizziness, nausea and a staggering gait. Vomiting is frequent and the bowels may move involuntarily. The victim is very pale, his skin is clammy, he may perspire profusely. The pulse is weak and fast and his breathing is shallow. He may faint unless he lies down. Death can occur.

First aid for the victim is to first remove his from the work area and place him in a cool shady area with good air circulation. Remove all protective gear, call a physician, and give the victim sips of water with salt added or an electrolyte solution. Transport the victim to a medical facility as soon as possible.

Heat stroke is the most serious heat symptom because the core body temperature often raises to 105 to 110 degree F. The skin will be dry, red and hot and the symptoms are pain in the head, dizziness, nausea, and oppression.

First aid for heat stroke is to remove the victim from the work area, remove all protective clothing, and cool the body as fast as possible with ice, water, alcohol, or wet towels. Transport the victim ass soon as possible to the nearest medical facility.

Personnel should be aware of the factors influencing heat stress and of its systems in order to minimize potential hazards in the field.

Some of the following control measures may be used to help control heat stress:

- Provide adequate liquids to replace lost body fluids
- Provide electrolyte replacement fluid
- Establish a work regime to provide adequate rest periods for cooling down
- Provide a cool rest area

Hypothermia is a fall in body temperature to below 95 degrees F. The symptoms are drowsiness, lowers breathing and heart rates, and may lead to unconsciousness or death. Hypothermia can be caused by prolonged exposure to extremely cold weather, swimming in the sea, or wearing damp clothing in cold conditions. A person suffering from hypothermia is usually pale, puffy-faced, and listless. Hypothermia is a medical emergency and anyone suspected of suffering from it requires immediate medical attention.

NOISE EXPOSURE

Working around large equipment often creates excessive noise. The effects of noise can include physical damage to the ear, pain, and temporary and/or permanent hearing loss. Workers can also be startled, annoyed, or distracted by noise during critical activities.

If workers are expected to work where noise levels exceed an 8-hour time-weighted average sound level of 90 dBA (decibels on the A-weighted scale), administrative or engineering controls must be used.

5.0 MONITORING GUIDELINES

This section of the Health and Safety Plan outlines the air monitoring strategies which will be used to determine airborne concentration of contaminates.

5.1 Direct Reading Instruments

The flame ionization detector (FID) will be used on site to determine the airborne concentrations of solvents. This instrument shall be used at all hand augering areas, in the employees breathing zones, and at various locations around the site.

5.2 ACTION LEVELS

Monitoring Zone	Instrument	Response Level	Reading Interval	Response
Breathing Zone	PID	<15 ppm above background	Continuous	Continue working and continue monitoring the work area
Breathing Zone	PID	>15 ppm above background	Continuous	Stop work and Consult the safety officer

6.0 SAFETY AWARENESS

Every safety hazard associated with field operations cannot be anticipated accordingly, rules cannot be developed for every contingency that could arise. Consequently, a practical safety program consists not only of written procedures, but also of the application of a great deal of common sense, judgment, and technical analysis. While all employees are required to adhere to procedures presented in this document, this health and safety plan stresses the importance of maintaining a high level of awareness. This involves constant vigilance for unsafe or potentially hazardous conditions or practices, and immediate corrective action.

Employees are encouraged to ask questions about any field conditions or situations about which they are uncertain or uncomfortable. Field conditions may be discovered which were unknown when the project was planned or implemented.

Safety awareness also includes personal observation of fellow workers. Some indications of possible exposure to hazardous or toxic chemicals are the following symptoms:

- Headaches.
- Dizziness.
- Blurred vision.
- Cramps.
- Irritation of eyes, skin, or respiratory tract.
- Changes in complexion, skin discoloration.
- Changes in coordination.
- Changes in demeanor.
- Excessive salivation, pupillary response.
- Changes in speech pattern.

I one or more of the above symptoms occur; notify the on-site safety officer or team leader, leave the contaminated work zone, decontaminate the individual if possible, and remove the individuals personnel protective equipment.

Have the worker rest in a cool place. Document the extent of contamination and the symptoms the worker is having. If symptoms persist, seek medical attention. Earth Technology's Occupational Physician is:

Dr. Peter Greaney
1103 Aneheim Blvd.
Aneheim, California
(714) 533-2211

7.0 SAFETY PRACTICES, PROCEDURES, AND REQUIREMENTS

7.1 GENERAL SAFETY PRACTICES

The following safety practices will be observed where exposure to potentially hazardous contaminants exists:

1. Eating, chewing gum or tobacco, and taking medication are prohibited in contaminated or potentially contaminated areas or where the possibility of the transfer of contamination exists. Smoking is prohibited throughout the site, except for specifically designated areas.

2. Thorough washing of hands is required before eating.

3. The field crew will avoid contact with potentially contaminated substances. The field crew will also avoid, whenever possible, kneeling on the ground, and leaning or sitting on drums, equipment, or ground. Monitoring equipment will not be placed on potentially contaminated surfaces (i.e., drums, ground, etc.).

4. Personnel will be familiar with and knowledgeable about standard operation safety procedures for both equipment utilization and site considerations.

5. Personnel will be familiar, knowledgeable, and adhere to all instructions in this Site Health and Safety Plan.

6. Supervisors and all personnel will consider fatigue, heat stress, and other environmental factors influencing the health of personnel.

7. All personnel will wear designated, approved protective clothing and devices as instructed by the Health and Safety Manager.

7.2 EDUCATION AND TRAINING

All personnel involved in field operations where close proximity to hazardous materials is expected must receive training in general safety practices, procedures, and equipment use. This includes thorough familiarization with this document and other such safety directives as may be considered appropriate by the On-Site Safety Coordinator (SSC).

The proper care, maintenance, and use of general safety equipment and personnel protective equipment is required.

7.3 EMERGENCY RESPONSE PROCEDURES

Emergency response procedures are to protect the health and safety of personnel working at the site and all persons present in the surrounding community. The Site Safety Plan procedures are designed to take all reasonable precautions to avoid any emergency situation and ensure a continuous work flow. These procedures will remain in effect for the duration of the site project. The objective of these procedures is to minimize the potential risk as much as possible.

Emergency phone numbers including paramedics, local hospitals and fire departments will be posted in the field trucks and are attached to this plan. The OSSC should obtain a site map of the facility showing emergency phone locations. All accidents will be reported to the Site Safety Coordinator immediately and followed with a report.

a. Initiation of Emergency Response - Emergency response procedures will be initiated in response to the following situations:

- o Fire on site
- o Natural disaster
- o Air emissions which pose an immediate danger
- o On-site accident or equivalent failure that poses immediate danger to life or health

b. Responsibilities - The On-Site Safety Coordinator will have overall responsibility for the proper functioning of emergency response procedures. Specific activities will include:

- o Monitor Personnel Protective Equipment
- o Monitor Decontamination Procedures
- o Coordinate Emergency Response Actions
- o Institute a Site Specific Training Program

Response procedures for personnel exposure based problems are outlines in Section 6.0. The primary response to other hazards such as fire and other disasters is to assure an orderly evacuation of the site and notification of emergency personnel listed in Section 9.0.

7.4 SAFETY EQUIPMENT AND PROTECTION

7.4.1 General Safety Equipment

The following safety equipment and information will be provided on-site by the Contractor for use when needed. All equipment must meet Federal and State OSHA requirements and shall be checked on a weekly time interval to ensure that it is in proper condition.

- First-aid kit
- 5 lb fire extinguisher (ABC all purpose dry chemical)
- Hand cleaner and towels
- Clean water for washing or drench shower in case of an accident
- Emergency phone numbers (hospital, police, fire department, etc.)
- Additional equipment as required to provide an adequate safety at the site.

A list of emergency numbers (telephone numbers and radio call numbers, as appropriate) will be posted at the on-site job command post. These emergency numbers include the local police, fire department, medical care, paramedical squad, and the nearest emergency containment service. The names and telephone numbers of Earth Technology's key personnel will be include. All team members will be instructed in how to obtain assistance. In the event of an emergency (accident, illness, explosion, hazardous situation at the site, or intentional acts of harm), emergency assistance will be obtained by the On-Site Safety Coordinator or other member of the team if the OSSC is unable to do so.

7.5 Level of Protection and Personal Protection Equipment

Level D protection will be worn at the site.

Personnel protection equipment required for Level "D" protection includes:

- o Coveralls: Tyvek or Cloth
- o Boots/Shoes: Steel toed
- o Eye Protection
- o Hard Hat (face shield optional)
- o Chemically Resistant Gloves

Level "D" Protection can be worn only under the following circumstances:

- o No indication of airborne health hazards present.
- o No gross indications above background on the Organic Vapor Analyzer.
- o Continuous air monitoring will occur while wearing Level D Protection.

Level C protective gear will be available on-site for all work personnel. Personnel will be prepared to upgrade to this level when the action levels are reached.

Personnel Protective Equipment recommended for Level C protection includes the following:

- o Full-face, air purifying respirator (NIOSH approved) equipped with organic vapor cartridge (color coded yellow)
- o Tyvek coverall with hood taped to respirator
- o Chemically resistant gloves taped to coveralls
- o Hard Hat (face shield optional)
- o Boots (chemically resistant with steel toe and shank)
- o Equipment operators may use half-face respirators and non-vented goggles in place of a full-face respirator

8.0 Decontamination

Field personnel could become contaminated in the course of performing field operations. Personal protective equipment, such as Tyvek, chemically resistant gloves, and well designed work practices help mitigate such contamination. Field investigators, instruments and equipment are at constant risk of contacting hazardous materials.

The extent of decontamination is adapted to site specific conditions. The actual conditions may require more or less intensive effort. The toxicity of contaminants or hazard risk expected govern the degree of decontamination. Highly toxic or skin-destructive materials require full decontamination procedures. Less hazardous substances warrant a lower degree of decontamination complexity.

Field decontamination of personnel and equipment is required when contamination is obvious (visually or by odor). Recommended decontamination procedures follow.

A. Personnel

Solvents should be removed from skin using a mild detergent and water. Hot water is more effective than cold. Liquid dish-washing detergent is more effective than hand soap.

B. Equipment

Gloves, respirators, hard hats, boots, and goggles should be cleaned as described under personnel; however, if boots do not become clean after washing with detergent and water, wash them in a strong solution of trisodium phosphate and hot water.

Sampling equipment, augers, vehicle undercarriages and tires should be steam cleaned. The steam cleaner is a convenient source of hot water for personnel and protective equipment cleaning.

For this project, The Earth Technology field personnel's main concern is with solvent compounds. All decontamination activities will be coordinated with the On-Site Safety Supervisor.

9.0 SAFETY ORGANIZATION AND RESPONSIBILITY

9.1 Project Safety Personnel

Emergency Phone Number Listing:

Dave McElwain	Site Health and Safety Officer	Office:	(213) 495-4449
		Home:	(213) 377-7231
		Beeper:	1(800) 759-8255
		Pin Number:	18528
Mike Kammerzelt	Project Manager	Office:	(213) 495-4449
Joan Siegal	Site Manager	Office:	(213) 495-4449

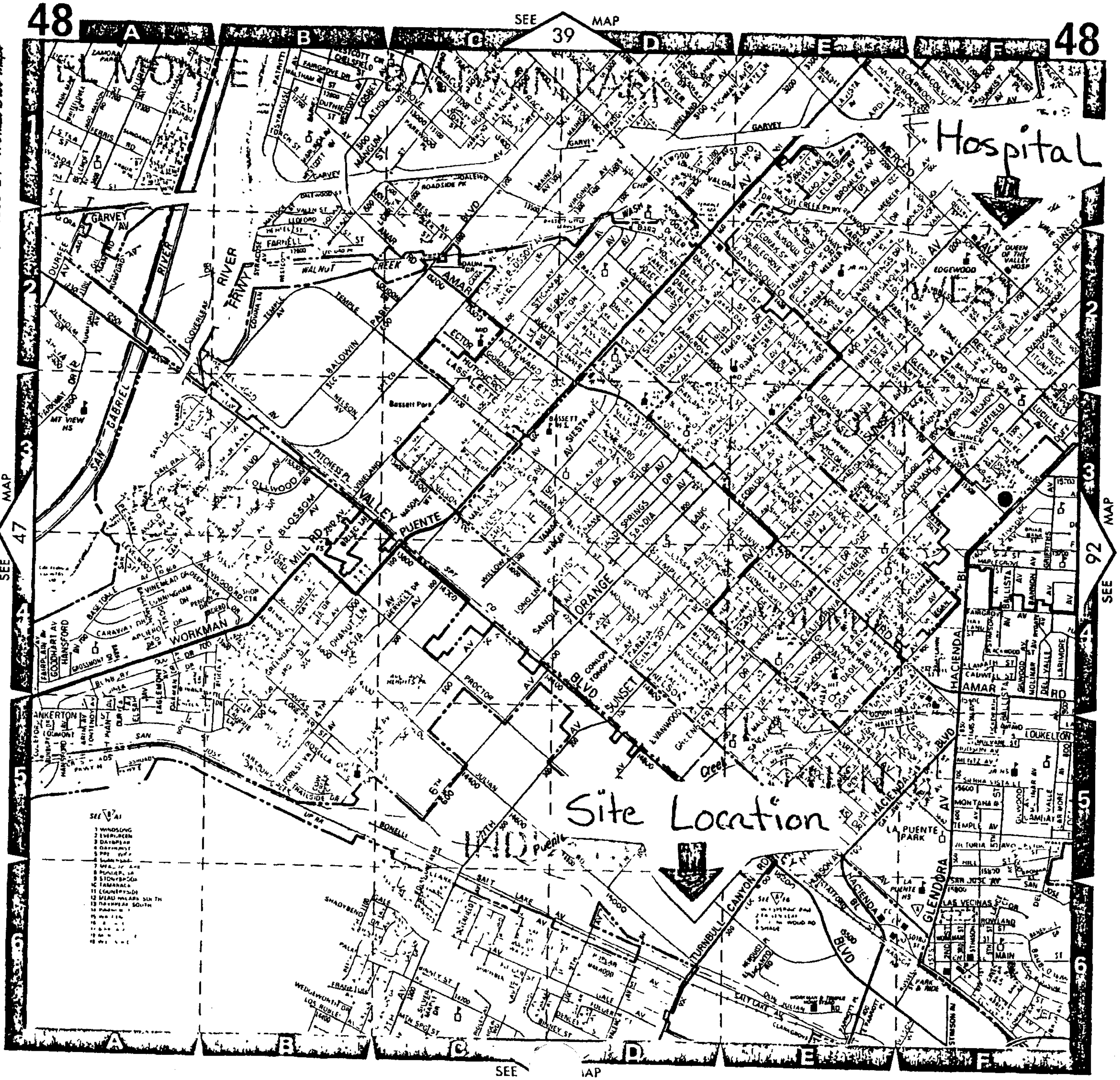
In Emergency:

Hospital	Queen of the Valley Hospital 1115 S. Sunset Avenue West Covina, California	(818) 962-4011
Poison Control		(213) 484-5151
Trauma Center	Presbyterian Inter-community 12401 E. Washington Blvd. Whittier, California	(213) 698-0811

Directions to Hospital

Take Turnbull Ave. North and go east on Valley Blvd. Turn right (north) on Sunset Blvd. The hospital is approximately 1 mile down Sunset and is located on the left hand side of the street. The cross street is Merced Avenue.

Refer to Figure 1 for map containing directions to this site's nearest hospital facility.


48
SEE MAP 39
SEE MAP 92
SEE MAP 47
Hospital
Site Location
SUNSET BLVD
VALLEY
PUENTE
AMAR
GLENDORA
HACIENDA
ORANGE
MERCED
WORKMAN
TURNBULL CANYON RD
RIVER FRWY
SAN GABRIEL RIVER
BALDWIN
BLOSSOM
PROCTOR
GARVEY
LA PUENTE PARK

10.0 INCIDENT REPORT

The OSSC is responsible for submitting an incident report to the Site Health and Safety Officer (SHSO) should an incident occur during the site investigation. An incident is defined as an accident, illness, or case of exposure (suspected or actual). Another field team member may submit the report if the OSSC is unable to do so. The incident report will include the following:

- o Date, time and place of occurrence
- o Person(s) involved.
- o Type of incident.
- o Description of incident and action taken.
- o Recommendations for prevention of a similar occurrence.

The report will be signed and dated by the person completing it. The SHSO will sign and date the report upon receipt. All accident reports and follow-up action on the incidents will be kept on file by the SHSO.

11.0 APPROVALS

The following approvals are provided to this Health & Safety plan dated November, 1989.

11-8-89

Staff Industrial Hygienist

Date

Mike Kammerzelt
Project Manager

Date

12.0 SIGNATURE PAGE

I have read and reviewed the site-specific Health and Safety Plan for the site and understand the information presented. I will comply with the provisions contained therein.

NAME	ORGANIZATION	DATE
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APPENDIX C

GUIDELINES FOR REMOVAL OF UNDERGROUND WASTE OIL TANKS (CRWQCB)

TE OF CALIFORNIA GEORGE DEUKMEJIAN, Governor
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
N FRANCISCO BAY REGION
1 JACKSON STREET, ROOM 6040
KLAND 94607
Phone: Area Code 415
464-1255

February 26, 1987
File No. 1123.64 (TJC)

TO: LOCAL AGENCIES IMPLEMENTING UNDERGROUND TANK PROGRAMS

RE: GUIDELINES FOR REMOVAL OF UNDERGROUND WASTE OIL TANKS

The purpose of this letter is to provide guidance to local agencies regarding the removal of underground waste oil tanks. The following guidelines are in addition to the investigation and cleanup procedures specified in our "Guidelines for Addressing Fuel Leaks", September 1985. Waste oil tanks are used to store a variety of motor oils, however other materials are often discharged to these tanks such as degreasing agents and cleaning solvents. We have discovered instances where chlorinated solvents have been released from waste oil tanks into the surrounding soil and groundwater. We have also found that the heavier oil fractions are more mobile than previously assumed.

A soil sample is required from beneath each waste oil tank that is removed. In general, one soil sample is sufficient for performing analytical tests for a standard size (500 gal.) waste oil tank. However, for larger tanks more samples may be necessary. All samples must be analyzed by a certified analytical laboratory, and should be accompanied by an appropriate chain of custody document. Various field measurements (visual observations, odor, combustible gas readings) may be helpful in evaluating the nature and extent of soil contamination, however, the use of these methods does not obviate the need for the laboratory analyses of soil samples in all cases.

The following analyses should be performed on soil samples taken from waste oil tank excavations.

1. TOTAL PETROLEUM HYDROCARBONS (TPH, high boiling fraction as specified in Attachment 2 of our Guidelines)

2. TOTAL OIL & GREASE (TOG, using solvent extraction (EPA Method 3550), and gravimetric determination by Standard Method 503E)

3. VOLATILE ORGANIC COMPOUNDS (VOC's, using EPA method 8240, or 8010 and 8020)

The results of the above analyses will be used to determine if additional investigation and cleanup is required. One key element

Calibration should be established within the estimated range of contaminant levels within the sample, based on odor or sheen or on prescreening measurements (i.e., combustable gas meter, or I.R. method). Where "non-detectable concentrations" are reported, the level of detection shall not exceed 10 ppm for soil and 50 ppb for water.

III. Quantification of Benzene, Toluene, and Xylene (BTX).

A. Sample Preparation

1. Water

Use EPA Method 602, or EPA method 5020, Headspace or method 5030, Purge and Trap. (EPA manual SW-846, April 1984).

2. Soil

Use EPA method 602 or EPA method 5020, Headspace or method 5030, Purge and Trap. (EPA manual SW-846, April 1984).

B. Analysis

Use EPA method 602 or 8020, (EPA manual SW-846, April 1984).

IV. Quantification of Ethylene Dibromide (1,2 Dibromoethane, EDB).

Use EPA method 601 or appropriate method in Recommended Methods for Analysis of Components in AB 1803, Pg. 301, (a), or any other Department Health Services analysis approved under the 1803 program.

V. Quantification of Tetraethyl Lead.

Use EPA method 7421 Atomic Adsorption/Graphite Furnace (AA/GF).

Results shall be reported as Total Lead.

a. Khalifa, Safy, Ph.D., Tamplin B.R. Ph.D., Spath, David, Ph.D., Recommended Methods Of Analysis For The Organic Components Required For AB 1803. Department of Health Services, State of California. May 1985

II. TOTAL PETROLEUM HYDROCARBONS ANALYSIS

(High boiling point hydrocarbons)
This analysis includes the range of diesel motor fuels and commerical grade jet fuels.

A. Sample Preparation

1. Water

Use EPA method 3510, Separation, (EPA manual SW-846, April 1984). Partitioning with hexane has been found to be an acceptable preparation, however other appropriate solvents may also be used.

2. Soil

Use EPA method 3550, Sonication Extraction. (EPA manual SW-846, April 1984). Acetone extraction with sample partitioning in hexane has been found to be an acceptable sample preparation, however other appropriate solvents may also be used.

B. Analysis

Chromatographic operations for detection of total petroleum fuel hydrocarbons.

Detector: Flame Ionization
Column: 10 Percent SP-2100 on 80.100 8ft x 1/8" glass supelcoport. Capillary columns may also be used as a substitute to improve seprartion.

Typical Operating Conditions:

Carrier Gas: Nitrogen or Helium at 30mL/min.
Injector Temperature: 250°C
Detector Temperature: 300°C
Column Temperature: 40°C hold for 3 minutes, 10°C/min ramp rate to 300°C or until at least 95% of all components are eluted.

C. Quantification

Quantify Total Petroleum Fuel Hydrocarbons by intergrating all major peaks within the time period in which at least 95% of the recoverable hydrocarbons are eluted. Calibration shall be based upon an appropriate fuel standard representative of the suspect fuel.

If an appropriate sample for calibration does not exist, as in the case of an aged fuel, calibration shall be done using a "non-aged" representative fuel standard.

B. Analysis (cont)

Typical Operating Conditions:

Carrier Gas: Nitrogen or Helium at 30mL/min.
Injector Temperature: 250°C
Detector Temperature: 300°C
Column Temperature: 40°C hold for 3 minutes, 10°C/min ramp rate to 300°C or until at least 95% of all components are eluted.

B. Analysis (cont)

2. Chromatograpic operations for detection of total petroleum fuel hydrocarbons with BTX distinction.

Detector: Photo Ionization in series with Flame Ionization.
Column: Carbopack B/3 percent SP-1500

Typical Operating Conditions:

Carrier Gas: Nitrogen or Helium at 10mL/min.
Injector Temperature: 200°C
Detector Temperature: 250°C
Column Temperature: 100°C x 6 min to 225°C at 10°C/min hold 25 min. or until at least 95% of all components are eluted.

C. Quantification

Quantify Total Petroleum Fuel Hydrocarbons by intergrating all major peaks within the time period in which at least 95% of the recoverable hydrocarbons are eluted. Calibration shall be based upon an appropriate fuel standard representative of the suspect fuel.

If an appropriate sample for calibration does not exist, as in the case of an aged fuel, calibration shall be done using a "non-aged" representative fuel standard.

Calibration should be established within the estimated range of contaminant levels within the sample, based on odor or sheen or on prescreening measurements (i.e., combustable gas meter, or I.R. method). Where "non-detectable concentrations" are reported, the level of detection shall not exceed 10 ppm for soil and 50 ppb for water.

ATTACHMENT 2

ANALYTICAL PROCEDURES FOR THE DETECTION AND QUANTIFICATION OF TOTAL PETROLEUM FUEL HYDROCARBONS AND FUEL CONSITUENTS

The following analytical procedures and analysis shall be used for the detection and quantification of petroleum hydrocarbons and fuel consituents. These techniques are to be followed when analysis is required for evaluation of either a suspected or confirmed tank leak as presented in the guidelines. These analytical techniques cover the full range of petroleum fuel hydrocarbons from gasoline (C_4-C_{12}) to jet fuel (C_{10}-C_{16}), to diesel (C_9-C_{22}) in either a liquid or solid matrix. Detection of complex hydrocarbon mixtures are best achieved using a Gas Chromatograph with a Flame Ionization Detector (GC/FID).

I. TOTAL PETROLEUM FUEL HYDROCARBONS ANALYSIS

(Low to medium boiling point hydrocarbons)
This includes the full range of gasoline. This technique may also be appropriate for military grade jet fuels.

A. Sample Preparation

1. Water

   Use EPA method 5020, Headspace or EPA method 5030, Purge and Trap. (EPA manual SW-846, April 1984).

2. Soil

   Use EPA method 5020, Headspace or EPA method 5030, Purge and Trap, (EPA manual SW-846, April 1984). Polyethylene glycol (PEG) or Methanol can be used as extracting solvents. Extractions are applicable for the analyses of both fresh or aged fuels.

B. Analysis

1. Chromatographic operations for detection of total petroleum fuel hydrocarbons without BTX distinction.

   Detector: Flame Ionization
   Column: 10 Percent SP-2100 on 80/100 Supelcort (8ft x 1/8" glass column). Capillary columns may also be used as a substitute to improve separation.

of the investigation requirements, as described in the Guidelines, is the need to determine if groundwater has been impacted.

When soil samples reveal that total oil & grease (TOG), or total petroleum hydrocarbons (TPH) are in excess of 100 ppm, or if volatile organic compounds (VOC) are present in <u>any</u> detectable concentration, a soil boring/monitoring well must be installed. Specifications for the installation of soil borings and monitoring wells are contained in Attachment 1 of our Guidelines.

If you have any questions concerning this matter please contact Tom Callaghan at (415) 464-0787.

Sincerely,

Roger B. James
Executive Officer

cc: Local Agency List
Certified Laboratory List

WORK PLAN FOR PHASE II SUBSURFACE SOILS INVESTIGATION AT CALMAR INCORPORATED

Prepared for:

CALMAR INCORPORATED
333 South Turnbull Canyon Road
P.O. Box 1203
City of Industry, CA 91749

At the Request of:
Arthur Fine, Attorney at Law
11377 West Olympic Blvd.
Los Angeles, CA 90064

Prepared by:

THE EARTH TECHNOLOGY CORPORATION
100 West Broadway, Suite 5000
Long Beach, CA 90802
(213) 595-6611

Earth Technology Project Number 90-1007

November, 1989
Revised February, 1990

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1.0 INTRODUCTION

1.1 BACKGROUND AND PURPOSE OF THE WORK PLAN

This workplan presents a revision of the preliminary workplan previously submitted to the California Regional Water Quality Control Board - Los Angeles Region (CRWQCB) on November 10, 1989. The CRWQCB reviewed the November 10 workplan in a letter to Duane Pefley of Calmar, Inc. dated December 27, 1989 (see Appendix A). Comments from this letter were discussed by Mr. Philip Chandler (CRWQCB), Mr. Arthur Fine (Calmar, Inc. legal counsel), Mr. Mike Kammerzelt and Mr. James Severns (Earth Technology) during a meeting at CRWQCB on January 12, 1990. The clarifications of this meeting were summarized in Mr. Kammerzelt's letter to Arthur Fine dated January 22, 1990 (see Appendix B). This revised workplan is consistent with the agreements reached during the meeting and subsequent correspondence.

This Work Plan outlines a methodology to perform additional investigations including:

a. A high sensitivity soil vapor investigation to determine lateral and vertical extent of contamination at all areas of concern.

b. A determination of the integrity of the clarifier, by external soil and soil vapor sampling.

c. A presentation of a laboratory analysis plan for both soil and water which includes all chemicals indicated as having been discharged.

d. The preparation of a groundwater investigation program to define flow direction, concentrations and aquifer parameters.

e. The development of a groundwater sampling plan.

1.2 SITE LOCATION

The Calmar Inc. site, which is approximately 13 acres in area, is located in the City of Industry (Los Angeles County), California. It occupies the western corner of Turnbull Canyon Road and Proctor Avenue (see Figure 1). The occupant and address of the subject site is:

Calmar Incorporated Dispensing Systems (Calmar)
333 South Turnbull Canyon Road
City of Industry, CA 91749

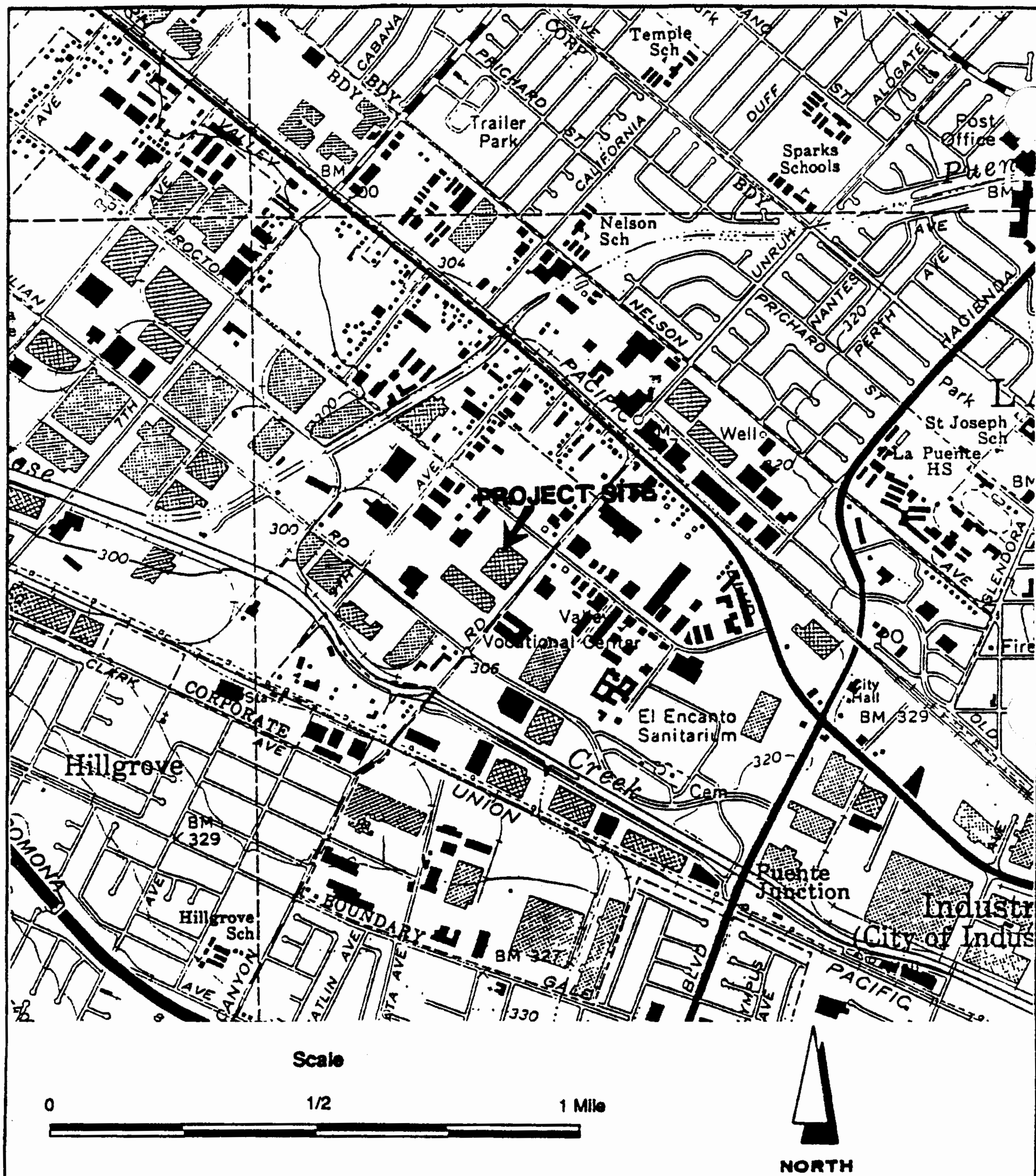
The northwest boundary of Calmar is Proctor Avenue, the southeast boundary is Turnbull Canyon Road. The properties to the northwest and southwest are occupied by industrial buildings.

1.3 AREAS OF CONCERN

Areas of concern have been outlined in previous investigations at the Calmar, Inc. facility. The areas which are the focus of this Work Plan are:

A. Utility trenches
B. Utility trench outlets
C. Clarifier
D. Waste storage area
E. Futura - Calmar fenceline
F. Former waste storage area.

These areas are shown on Figure 2.

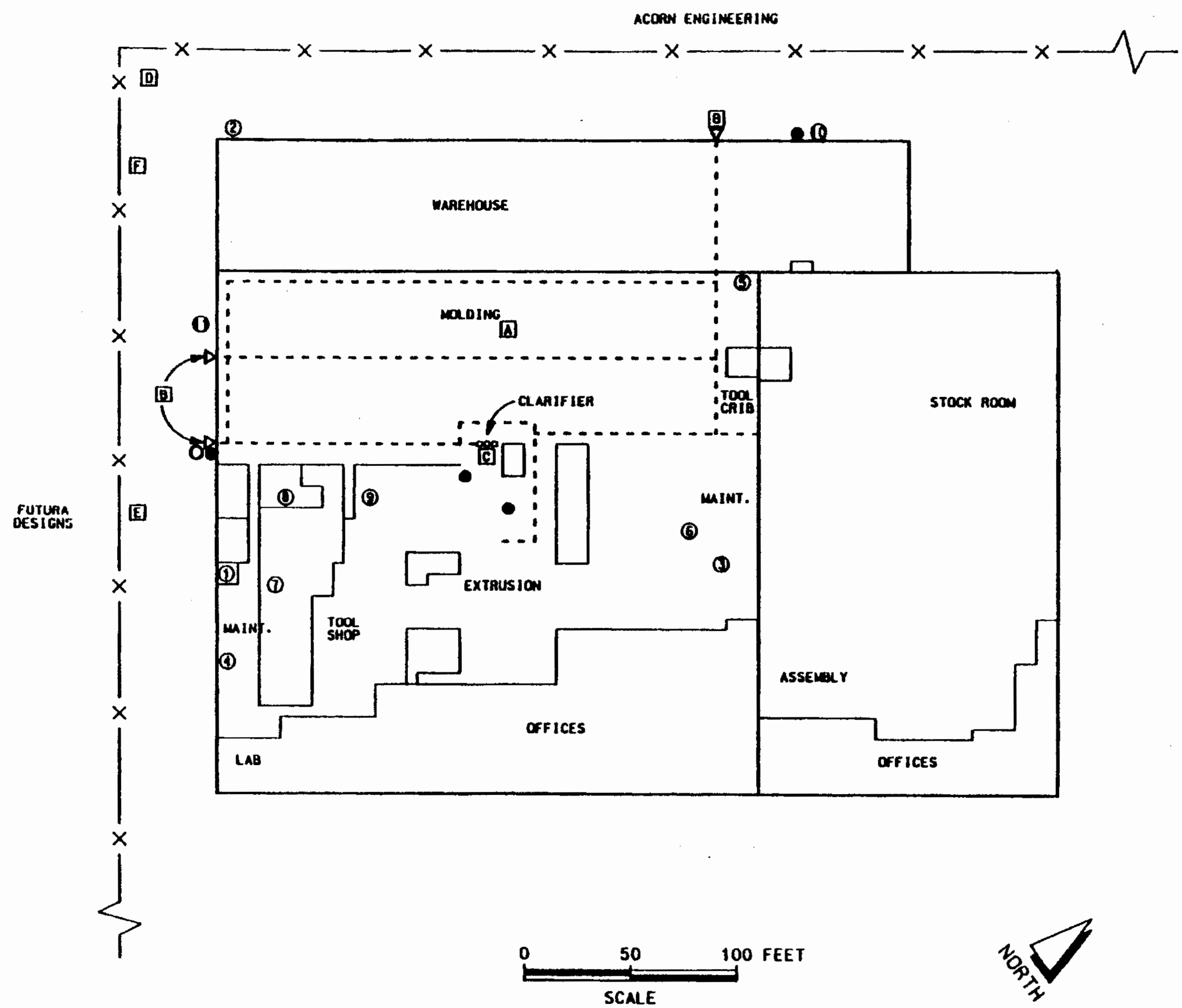


The Earth Technology Corporation	Project No.: 90-1007 Calmar

Site Location

11-89

Figure 1



EXPLANATION

- ● SEWER DRAIN
- ① CHEMICAL STORAGE LOCATION
- - - · SUBSLAB UTILITY TRENCH
- ▽ UTILITY TRENCH OUTLET

AREAS OF CONCERN

A-UTILITY TRENCH
B-UTILITY TRENCH OUTLETS
C-CLARIFIER
D-WASTE STORAGE AREA
E-FUTURA-CALMER FENCELINE
F-FORMER WASTE STORAGE AREA
G-WAREHOUSE
H-STOCK ROOM
BG-BACKGROUND

The Earth Technology Corporation

PROJECT NO. 90-1007

CALMAR

AREAS OF CONCERN AS IDENTIFIED IN SITE AUDIT

11-88

FIGURE 2

2.0 SUBSURFACE INVESTIGATION DESCRIPTION

2.1 SOIL VAPOR STUDY

Soil vapor samples will be collected using an Environmental Instruments Soil Vapor Sampling System™. Points are made of hardened steel with stainless steel screens. The points are attached to three-foot tube sections and driven into the ground with an electric rotary hammer or a slide hammer. The first sample at each location will be drawn from four feet below the ground surface (BGS). Should significant levels of volatile organic compounds (VOCs) be detected at 4 feet BGS, the probe will be driven down and sampled in one meter increments until a clean sample is found or the practical driving limit of 4 meters BGS has been reached. The probe tip will be extracted and decontaminated after the deepest sample has been collected.

Samples will be drawn through the center of the tubes by a pump capable of precisely quantifying flow rate information. The samples will be collected using charcoal media.

The samples will be analyzed onsite by a mobile laboratory using gas chromatography equipped with PID, ECD, and Hall detectors. A discussion of mobile laboratory procedures and detection is presented in Section 3.2.

2.1.1 Soil Vapor and Sampling Locations

The locations for soil vapor sampling have been chosen to investigate the areas of concern listed in "Environmental Site Audit of Calmar Incorporated", prepared by BCL Associates in May, 1989, and some additional areas chosen to provide background information. A total of approximately 120 soil vapor sampling points will be placed in the locations discussed below.

Utility Trench Outlets

At each of the three utility trench outlets, three points will be placed for a subtotal of 9 points.

Utility Trenches

If VOCs are observed in a utility trench's points, additional points will be driven and sampled to assess the lateral extent of contamination. If contamination is observed at a trench outlet, the interior utility trench will be subjected to vapor probe scanning along its entire length.

Clarifier

The clarifier will be physically inspected for leaks. Soil gas points will be placed below the junctions of the inlet and outlet piping. Samples will be collected one foot below the bottom of the joints and 5 feet below the bottom of the clarifier. Soil gas points will be driven in a minimum 10-foot grid around the clarifier. If anomalies are encountered, the inlet and outlet lines will be traced via soil vapor probes.

Waste Storage Area and Former Waste Storage Area

In the vicinity of the Waste Storage area and Former Waste Storage area, the sampling points will be spaced in a 10-foot grid extending from the western corner of the Calmar property to the building. Approximately 60 to 70 points will be sampled in the Waste Storage and Former Waste Storage areas.

Calmar-Futura Fenceline

Along the Calmar-Futura fenceline, points will be placed at 20-foot intervals. At the former waste storage area, the fenceline will be examined at 10-foot intervals.

Calmar-Turnbull Canyon Road Boundary

Along the Calmar-Turnbull Canyon Road boundary, points will be spaced at 50-foot intervals for a subtotal of 10 points.

Warehouse

Four soil vapor points will be screen the soils under the warehouse.

Stockroom

Four soil vapor points will be placed to screen the soils under the stockroom.

Background

Three points will be placed at the corners of the property, away from known sources of possible contamination.

2.1.2 Collection of Verification Soil Samples

Where significant VOCs are found in soil gas samples, boreholes will be drilled and soil samples collected every 5 feet until groundwater is reached. Every sample from these proposed borings will be analyzed in the laboratory to investigate the soil gas anomalies.

Drilling and sampling activities will be supervised by an experienced hydrogeologist, geologist, or engineer, or, if required, by a registered geologist, engineering geologist, or professional engineer certified by the State of California. A detailed log of the drilling activities and materials encountered will be maintained by the site geologist or hydrogeologist. Drilling and sampling methods follow procedures described in the California Department of Health Services Site Mitigation Decision Tree Manual (CDHS, 1986).

2.1.2.1 Site Preparation. Proposed drilling sites will be chosen based on results of the high sensitivity soil vapor survey. Utility companies will be notified and requested to mark locations of underground utilities. Field locations of soil boreholes will be marked prior to the initiation of the field investigation. The Earth Technology Project Manager and a representative of the current site owner will approve final drilling locations before drilling is commenced. Geophysical site clearance will be performed as appropriate, based on available site information.

2.1.2.2 Borehole Drilling. Boreholes will be placed using hollow-stem auger (HSA) techniques. Boreholes will be sampled to total depth following procedures described in Section 2.1.2.5. Using the hollow-stem auger techniques, powered auger flights in 5-foot sections will be advanced into the soil while rotating. The spiral action of the augers forces cuttings to the ground surface. Auger drilling will be performed to document hydrologic conditions, lithologically log the borehole, and allow collection of subsurface samples for chemical analysis.

No drilling fluids will be introduced into the boreholes unless heaving sands are encountered, in which case potable water may be added, which will be analyzed for the compounds of concern.

Boreholes drilled for soil sample analysis will be grouted while the drill stems are removed. The grout slurry will consist of a Portland-type cement mixed with 5-percent powdered bentonite. The slurry will be tremied through the HSA to the bottom of the borehole.

Soil cuttings generated during drilling will be handled as described in Section 2.1.2.5.

Each borehole location will be marked and recorded on a specific site plan.

2.1.2.3 Drilling Records. Drilling records will be kept in a daily field logbook for the program and on logs for each borehole. The information to be recorded on a field borehole log will include the following:

1. Project name and number
2. Borehole location and datum
3. Drilling company
4. Name of driller
5. Drilling equipment
6. Dates drilling started and finished
7. Drilling method and borehole size
8. Types of backfill and seal
9. Name of logger and checker
10. Number and depths of samples
11. Sample descriptions following the Unified Soil Classification System
12. Soil moisture conditions
13. Depths of rock and water
14. Lithology
15. OVA readings in ppm at each sample depth
16. PID readings in ppm at each sample depth
17. IR readings in ppm at each sample depth
18. Blow counts
19. Drilling rate
20. Remarks

2.1.2.4 Air Monitoring During Drilling. Ambient air will be monitored during all drilling and sampling activities. An organic vapor analyzer (OVA) will be used to monitor concentrations of total organic compounds in the breathing space at worker chest level and down the borehole immediately below the ground surface. Air monitoring concentrations will be recorded on the borehole logs. If sustained ambient air concentrations exceed 5 ppm above background levels, drilling will be stopped and action taken according to the Health and Safety Plan (contained in Appendix B).

2.1.2.5 Soil Sampling. Soil samples for laboratory analysis will be collected from soil boreholes. Samples will be obtained at intervals to be determined by the Project Manager using ASTM Method D-1586 with a modified split tube sampler.

Split-Tube Sampling

A split tube sampler will be used to collect soil samples as follows:

1. The augers will be advanced to the desired depth and excess cuttings will be removed.

2. An 18-inch-long by 2.5-inch-diameter split tube sampler will be attached to the sampling rods and lowered into the borehole. The sampler will contain three 6-inch-long by 2-inch-diameter or four 4.5-inch-long by 2-inch-diameter brass or stainless steel liners. The sampler will not be allowed to drop onto the soil being sampled.

3. The hammer will be positioned above and the anvil will be attached to the top of the sampling rods.

4. The dead weight of the sampler, rods, anvil, and drive weight will be rested on the bottom of the boring and a seating blow will be applied. If excessive cuttings are encountered at the bottom of the borehole, the sampler and sampling rods from the borehole cuttings will be removed.

5. The drill rods will be marked in three successive 6-inch increments so that the advance of the sampler under the impact of the hammer can be easily observed for each 6-inch increment.

6. The sampler will be driven with blows from the 140($\pm$)-pound hammer and the number of blows applied in each 6-inch increment will be counted until no visible advancement is made.

7. The number of blows required to effect each 6 inches of penetration will be recorded. The first 6 inches is considered to be a seating drive. If the sampler is driven less than 18 inches, the number of blows for each complete 6-inch increment and for each partial increment will be recorded on the boring log. For partial increments, the depth of penetration will be reported to the nearest inch, in addition to the number of blows. If the sampler advances below the bottom of the boring under the static weight of the drill rods and the static weight of the hammer, this information will be noted on the boring log.

8. The raising and dropping of the 140-pound hammer will be accomplished using either of the following two methods:

   a. By using a trip, automatic, or semi-automatic hammer-drop system that drops the hammer 30 inches.

   b. By using a cathead to pull a rope attached to the hammer. The cathead shall be essentially free of rust, oil, or grease. For each hammer blow, a 30-inch lift and drop will be employed by the operator. The operation of pulling and throwing the rope will be performed rhythmically without holding the rope at the top of the stroke.

9. After driving the sampler to the desired depth, it will be brought to the surface and opened. The percent recovery or the length of sample recovered will be recorded. The soil samples recovered will be described as to composition, color, stratification, and condition following the Unified Soil Classification System.

10. The first liner will be collected for laboratory analysis. The liner will be sealed at both ends using Teflon™ paper and covered with plastic end caps. Labels will be affixed to sample liners bearing job designation, borehole number, sample depth, soil description, sampler signature, and date. The sample will be then be put in a plastic bag and placed in an ice-filled cooler to maintain at 4°C temperature to prevent evaporation of soil moisture.

11. The second liner within the sample barrel will be extruded into a glass sample jar with a Teflon™-lined lid and allowed to volatilize. A headspace measurement will be taken from this sample for total organic compounds using an OVA. The samples in the remaining two liners will be used for lithologic descriptions.

Data obtained for each sample will be recorded in the field and will include the following:

1. Sample depth interval and the sample number.
2. Description of soil and moisture content.
3. Strata changes within sample.
4. Sampler penetration and recovery lengths.
5. Number of blows per 6-inch or partial increment.
6. OVA headspace readings for the sample.

This information will be included on the borehole logs to be filled out by the site geologist.

Decontamination of Soil Sampling Equipment

The split tube samplers and liners will be decontaminated after every sample is collected using the following method:

1. Wash with Alconox™-water solution
2. Rinse with potable water
3. Rinse with deionized water.

Rinse solutions will be disposed of at each borehole in a designated 55-gallon drum.

2.2 GROUNDWATER LEVEL MONITORING, SAMPLE COLLECTION AND AQUIFER TESTING

Samples from existing monitoring wells will be collected every 2 months for a 6-month period in order to characterize the groundwater at the site. Groundwater levels will be recorded prior to each sampling event. At the end of the 6-month period, a follow-up schedule for water sampling will be recommended.

Three monitoring wells (MW-1, MW-2, and MW-3) and three piezometers (Pz1, Pz2, and Pz3) have been placed at Calmar to date. All of these wells and piezometers have been recognized by the CRWQCB as valid sample locations which have been constructed to rigorous design and construction standards. Development data for these wells will be provided in the upcoming water sampling report. Upon completion of the upcoming shallow subsurface vapor investigation and review of the data obtained, requirements for additional monitoring wells will be evaluated.

2.2.1 Well Head Survey

In order to calculate the potentiometric surface, the monitoring wells and the piezometers will be surveyed for elevation and location relative to U.S.G.S., U.S.C. and G.S. or County "precision net" benchmarks. Coordinates will be provided as either UTM or the California State System. The elevation of a notch at the top of each well and piezometer casing will be determined as a reference for subsequent water measurements.

2.2.2 Groundwater Level Measuring Protocol

An electric sounder will be used to measure the depth to water from the notch in the casing. Where floating hydrocarbons are suspected, a dual sounder will be used to record the depth to the air-hydrocarbon interface and to the hydrocarbon-water interface.

Groundwater depths will be measured by sequentially measuring the depths in each of the the wells and piezometers. The measuring sequence will be repeated until three consecutive readings of each well and piezometer are within ± 0.01 feet to assure accurate readings. The sounder will be decontaminated between each measurement by washing with Alconox™-water solution followed by a tap water rinse and then a distilled water rinse. A time interval of at least 10 minutes will elapse between each measurement of a single well.

2.2.3 Sampling Procedure

Prior to purging, water samples will be collected from the wells to analyze for floating constituents. In order to prevent the escape of volatile constituents, each sample will be collected by carefully lowering a clean Teflon™ bailer into the well so that the bailer enters the water smoothly without splashing.

Purging will be accomplished using a stainless steel submersible pump to evacuate the water. Temperature, pH, and specific conductance will be measured every 5 gallons. In order to avoid cascading water in the wells during purging, the wells will initially be pumped at the extremely slow rate of 0.1 gallons per minute (gpm). If the water level in the well continues to drop, the pumping rate will remain at 0.1 gpm until the well has been pumped dry. In this case, the well will be sampled after 80% recovery or within 24 hours, whichever comes first.

If the water level stabilizes at a pumping rate of 0.1 gpm, indicating that the dominant source of the pumped water is the aquifer rather than well bore storage, the pumping rate may be increased slightly. The rate will always be kept low enough to prevent cascading water. In this case, purging will proceed until the well is pumped dry, untill three successive temperature, pH, and specific conductance measurements are within 10%, or until three well volumes are removed, whichever comes first.

Upon completion of purging, the pump will be withdrawn from the well and a Teflon™ bailer used to withdraw water for sampling. The bailer will be lowered carefully into the water without splashing to prevent the loss of volatile constituents.

VOA jars, with threaded caps and Teflon™-faced silicon septa, will be used to collect water samples. The water sample will be carefully transferred from the top of the bailer into the jar to form a tension bubble (convex meniscus) on top of the jar, being careful not to spill the material over the side of the jar. The septum (Teflon™-faced down) will then be slid over the top of the jar being careful not to allow any air under the septum. The jar will be tightly capped. The jar will be turned over to assure that no air is in the VOA jar. If there is air in the jar, the VOA jar will be emptied and refilled. Each VOA jar will will then be labeled and sealed and immediately stored in an insulated chest with dry ice to chill the sample to 4°C. Samples for volatile organics will be collected in duplicate.

A sample will then be observed to determine the amount of Total Settleable Solids by using an Imhoff Cone. This value will be reported to the Board.

2.2.4 Water Storage

Water from well development and well purging prior to sampling will be stored in drums marked with well numbers and dates onsite. Disposal methods will be selected after analytical results are received from the laboratory.

2.2.5 Aquifer Testing

Falling head slug tests will be performed on monitoring wells MW-1, MW-2, MW-3, and piezometer Pz3 to estimate transmissivity and storativity of the aquifer. A Hermit™ data logger manufactured by In-Situ Inc. will be used to measure water levels vs. time from the beginning of the test. The data logger consists of a data acquisition system connected to pressure transducers. The data logger is programmed to record water levels measured by the transducers and converts the measurements from psi to depth to water in feet or meters. The data logger takes measurements according to a pre-set logarithmic schedule which allows for measurements in shorter time intervals and with greater accuracy than an electric sounder. Water level measurements will be periodically measured using an electric sounder as a quality control check of the transducer measurements.

Prior to the test, the water level in the well will be measured using an electric sounder. A pressure transducer connected to the data logger will then be lowered to approximately one foot from the bottom of the well, and the water level will be measured again. The exact depth of the pressure transducer will be recorded.

A slug of potable water will be quickly added to the well until the water level has reached the top of the casing. The data logger will be activated and allowed to run uninterrupted for the duration of the slug test. The test will run until the water level in the casing has dropped at least 90% of the distance from the top of the casing to the original water level.

For the slug test on MW-3, pressure transducers will also be placed into piezometers Pz1 and Pz2. These piezometers are close enough to MW-3 that changes in water levels may be detected as the test proceeds. The other slug test locations are too far from the neighboring wells or piezometers for water level changes to be observed in the neighboring wells or piezometers given the volume of water placed in the tested well.

Upon completion of each test, data will be downloaded from the data logger to a portable computer. Backup copies of the data will be maintained on floppy disks. Data will be computer analyzed to determine values of transmissivity and storativity.

2.3 FIELD DATA RECORDS

2.3.1 Field Log Book

A permanent bound field log book will be kept for all field operations. The field log book will have consecutively numbered pages. The log book will be used to record at least:

The purpose of sampling.

The name of the project.

The name and address of the company sampled.

The location of the sampling point and measurements necessary to draw a scaled site plan.

The name and address of the field contact.

The number and volume of sample(s) taken.

A description of the sampling point and sampling methodology.
The date and time of collection.

The collector's sample identification number(s).

References such as maps or photographs of the sampling site field observations.

Any field measurements made (e.g., PID, FID, IR)

2.4 QUALITY ASSURANCE/QUALITY CONTROL PLAN (QA/QC)

The QA/QC program will assure that the data generated are accurate. Assuring the accuracy of the data is critical since the conclusions regarding the project will be based on these data. The QA/QC program consists of four phases: Prefield Activities, Field Activities, Laboratory Analysis and Post Laboratory Analysis.

2.4.1 Prefield Activities

The QA/QC program begins with the preparation of a work plan which specifies:

1. Sample collection locations
2. Sample collection methods
3. Method for cleaning sampling equipment
4. Type of sample containers to be used
5. The method of preserving the sample
6. Method of labeling the sample
7. Method of transporting the sample to the lab
8. Chain-of-command in the field, including QA/QC
9. Trip blank and other QC samples
10. Field log book procedures
11. Calibration of field equipment
12. Operation of field equipment

The prefield activities, QA/QC procedures have been completed for this project with the preparation of this Work Plan.

2.4.2 Field Activities

The main purpose of the QA/QC program for field activities is to assure that the procedures outlined in the Work Plan are correctly conducted.

The persons assigned to the field work have adequate education, training and experience to complete their tasks.

Handling, Storage and Sample Documentation

All sample containers will have:

1. A waterproof gummed label affixed. The label will contain the following information:

   The name of the collector.

   The name and address of company sampled.

   The sample point location.

   The date and time of collection.

   The collector's sample number.

2. A chain-of-custody record containing the following information:

   The collector's sample number.

   The signature of the collector.

   The date and time of collection.

   The place and address of collection.

   The waste type.

   The signatures of persons involved in the chain of possession inclusive of dates of possession.

3. A sample analysis request sheet containing the following information:

   The name of the lab which will process the sample.

   The name of the person who receives the sample.

   The date of sample receipt.

   The analyses to be performed if known at the time of sample shipment.

Sample Containers

1. Soil Samples

   Soil samples will be collected in laboratory-supplied and cleaned stainless steel sleeves with Teflon™-lined plastic lids, capped and labeled for identification. The caps will be taped closed with duct tape on both ends. A sample identification label will be adhered to the side of the cylinder and a seal adhered across the top of each cap. The sample will be placed in a cooler with ice (4°C) for possible laboratory analysis.

2. Gas Samples

   Gas samples will be collected on charcoal media and immediately analyzed in a mobile laboratory.

Shipment Package

In general, the soil samples will be packed in an ice chest on a suspended rack above blue ice. This will assure that the maximum acceptable temperature of 4°C will not be exceeded. The samples will be packed so that they do not come in direct contact with the dry ice. The samples will be packed to avoid breakage during shipment to the laboratory. The ice chest will be sealed with duct tape and an adhesive seal attached over the latch. The chain of custody will be enclosed in a large envelope which will accompany the chest. Gas samples will be shipped in a light tight cardboard box with the chain-of-custody enclosed in a large envelope which will accompany the box.

Delivery to the Laboratory

All samples will be delivered to the laboratory as soon as possible, preferably the same day they are collected. If a separate transporter is required, the samples must be delivered to the transporter the evening of the collection and overnight delivery must be specified. A specific delivery time must be verified at the time of the drop off. If the transporter will not deliver directly to the laboratory, then arrangements must be made with the laboratory for such a delivery or pickup. The laboratory will be notified of any and all deliveries.

2.4.3 Laboratory Analysis

The laboratory QC program has provisions to track sample movement. These include:

1. Sample Receiving

   The laboratory sample custodian inspects the sample, the label, the seal, the chain-of-custody, and assures the sample and sample container are sound and properly preserved. A job number is assigned and log the sample is logged in the log book. The sample is stored per Earth Technology standard operating procedures. The proper portions of the chain-of-custody form are completed. The laboratory supervisor is notified that the sample was received.

2. Sample Identification Verification

   The sample identification number on the container is verified versus the chain-of-custody, purchase requisition or purchase order, including number of samples, type of sample, client name, adequacy (volume), preservatives (if any) and integrity (leakage). Any discrepancy shall be noted on the requisition or Purchase Order and Sample Control Document.

3. Sample Control Document

   The document must be numbered sequentially and show the purchase order number (if any), the receiving date, due date, client name and test description. The laboratory director or supervisor will indicate the fee for test, if known, and will initial the document.

4. Sample Worksheets

   These are prepared from the Sample Control Document and are specific for the work station where the analyses are performed. The Worksheets identify the sequence of samples to be analyzed, sample identification numbers, special notes, data to be used in the final calculation, test result and the initials of the testing technician.

2.4.4 Post Laboratory Analysis

The post laboratory QA/QC program will include careful scrutiny of all raw data and final summaries to minimize procedural or typographical errors.

1. Sample Storage

Samples will be retained in the storage area for one month unless otherwise specified. Stored samples are marked with the appropriate date of disposal and filed by accession number.

2. Information Retrieval

   Retrieval of information and documents shall occur by use of the sample number and date of analysis.

3. Document Storage

   The Sample Control Document is placed in the appropriate file designated for the client.

4. Testing Results

   Final results of the testing procedure are entered onto the test report.

5. The test report shall include:

   a) The test result.

   b) The test procedure name or number and revision number.

   c) Any necessary or required evaluating statements of the test data.

   d) Analytical data must meet EPA limits of detection or be justified.

   e) Data when presented must indicate whether chemical was not detected or potentially exists below quantification limits. The actual detection limit for each analyte will be listed.

   f) The signature of the Laboratory Director (or designee) indicates evaluation of the results in accordance with the QA/QC Manual and their acceptability.

   g) An attached copy of Nonconformance Reports (if any).

6. Documentation

   All applicable documentation associated specifically with samples (including, but not limited to: test reports, purchase orders, requisitions, work sheets, data print-outs, nonconformance reports, corrective action reports) is filed with the Sample Control Document according to the unique accession number assigned to the customer specimen. Documentation is retained for five years unless otherwise specified by client contracts.

Also, the laboratory QA/QC program includes provisions to assure the cleanliness of all equipment and provide for the proper calibration and operation of all equipment.

The QA program provides for the documentation of the procedures followed to assure data accuracy.

2.5 HEALTH AND SAFETY PLAN

Appendix C contains the site Health and Safety Plan. The plan includes a hazard assessment, monitoring guidelines, and action levels, required safety equipment, decontamination procedures and safety organization and responsibility.

3.0 LABORATORY ANALYSIS

The Sample Plan provides for the following laboratory analyses:

3.1 SOIL AND GROUNDWATER ANALYSIS

Analytical Parameters	EPA Method	Detection Limits
Volatile Organics	601/602 (Water) 8010/8020 (Soil)	0.5 - 5.0 µg/L 5.0 - 10.0 µ/Kg
Total Petroleum Hydrocarbons	Modified 8015 (Soil)	1.0 - 5.0 µg/Kg

Limits of detection will be provided with each laboratory report for each compound analyzed. Practical Quantitative Limits (PQL) limits for each EPA method will be met or justified for not being met.

Should a field screening technique indicate contamination in a boring at any interval, all soil samples collected from that boring will be analyzed for volatile halogenated and aromatic organics by EPA Method 8010/8020 and hydrocarbon analysis with carbon chain speciation including gasoline and diesel by Method 8015 (modified). All samples (both soil and water) will be analyzed within seven days of collection.

All laboratory work will be performed by Earth Technology Analytical Laboratories (ETAL), 5702 Bolsa Avenue, Huntington Beach, California, 92649. This laboratory is a California Department of Health Services Certified Laboratory, Certificate #235.

The data package submitted with all analyses will include all QA/QC data performed on each batch of samples. The QA/QC data will include blank analyses, matrix spike and matrix spike duplicate analyses, and surrogate recoveries.

Water samples will be analyzed for volatile organics by EPA Methods 601/602. Detection limits for 601/602 are 0.5 to 5.0 µg/L.

All 8010/8020, 601/602, or Modified 8015 analytes will be reported as either 'not detected' or 'detected' on each data report. Compounds detected whose concentrations fall below the PQL but above zero will be reported as 'Trace.' In this instance, no quantitative value will be given.

Modified EPA Method 8015 will be used for routine analysis. The modification contained in Attachment 2 of the February 26, 1987 California Regional Water Quality Control Board's "Guidelines for Removal of Underground Waste Oil Tanks" will be used. A copy of this publication (File No. 1123.64) is enclosed for reference in the Work Plan (see Appendix E). It will be necessary to inform the laboratory before analysis which method will be used: low to medium boiling hydrocarbons, or high boiling hydrocarbons.

3.2 SOIL GAS ANALYSIS

Soil gas analysis will be performed in ETAL's mobile laboratory using a gas chromatograph configured with a PID, ECD, and ELCD (HALL). The analytical protocol followed will involve collecting sample on a charcoal tube, desorbing the analytes with isooctane, and then analyzing an aliquot of the extract. All results will be reported within 24 hours. Specifics of the method are included a separate submittal.

Detection limits of 0.1 to 0.01 µg/L are attainable. However, detection limits obtained using this method are influenced by the volume of air sampled, moisture content of the air, and background interferences. Deviations from the reported detection limits will be explained in the data report.

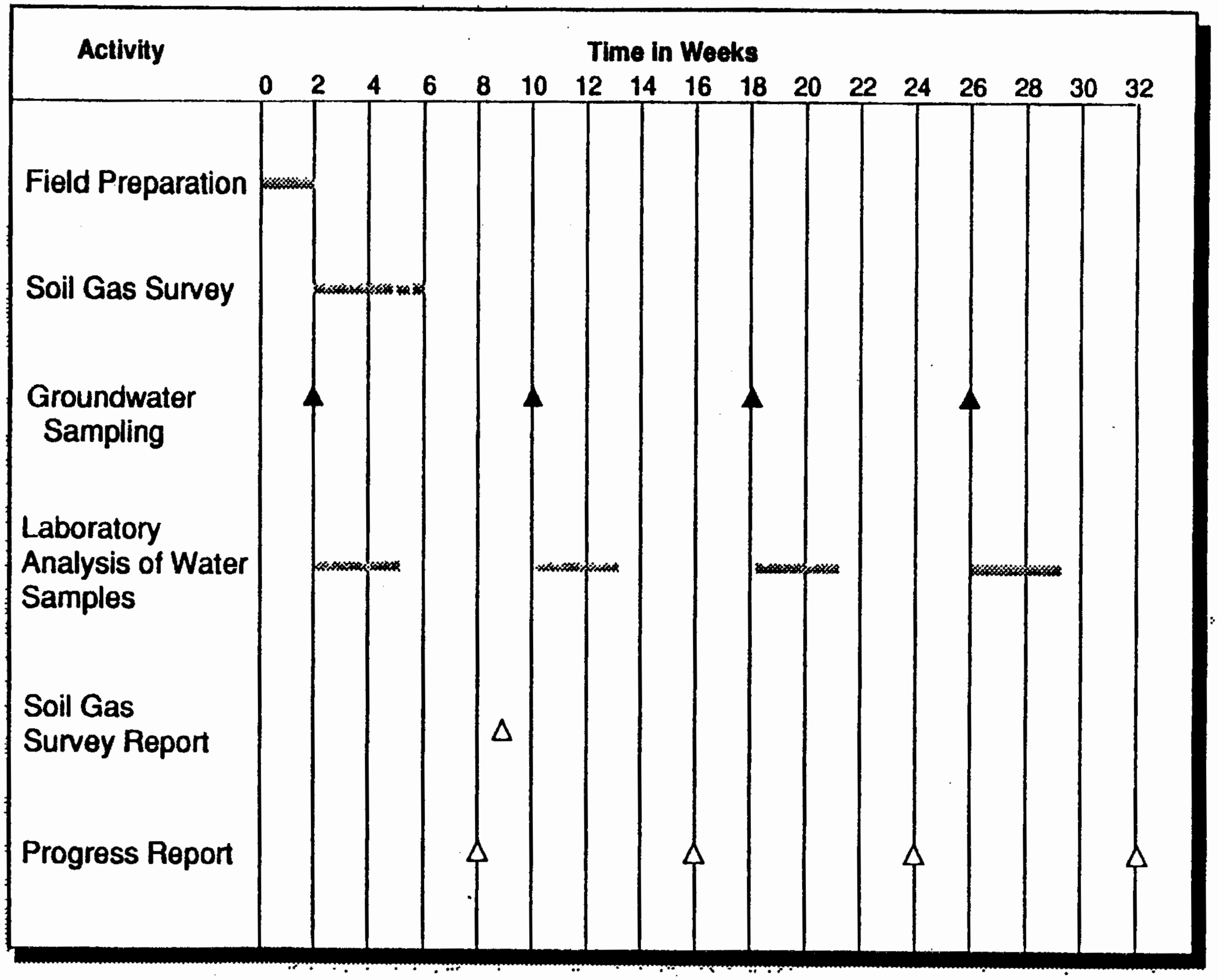
Quality control will consist of one per day duplicate analysis, blank analysis, and spiked blank analysis. Confirmations will be performed at ETAL's main laboratory upon request.

Alternative methods can be made available. These include analysis of Tedlar™ bag, evacuated cylinder and evacuated glass bulb collected samples. These methods are described in a separate submittal.

4.0 WORK SCHEDULE

The field monitoring/sampling, laboratory analysis and reporting program to be performed in this Work Plan at Calmar is scheduled in a series of concurrent tasks as presented in Figure 3.

Proposed Work Schedule



Note: Week 0 begins upon CRWQCB approval of work plan.

Figure 3

5.0 REPORT

A written report will be prepared and will include the following:

a. A map of all soil vapor points, soil borings, groundwater monitoring wells and piezometers.

b. A log of borings and field data (i.e., FID and PID).

c. All laboratory test results in tabulated and/or graphical form.

d. Interpretation of aquifer test results.

e. An opinion regarding the significance of the findings including an evaluation of soil properties which may affect contaminant mobility. If additional work is required, the report will describe the work.

f. Details of the various practices used in sample collection and analysis.

g. Discussion of any data constraints caused by sample collection or analytical procedures selected in relation to reported results and conclusions derived from these results.

h. A description of any specific assumptions necessary to perform tests, process data, etc.

This report will be signed by a California Registered Civil Engineer or Registered Geologist.

APPENDIX A

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LOS ANGELES REGION, LETTER DATED DECEMBER 27, 1989

STATE OF CALIFORNIA GEORGE DEUKMEJIAN, Governor

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD—
LOS ANGELES REGION
101 CENTRE PLAZA DRIVE
MONTEREY PARK, CALIFORNIA 91754-2156
(213) 266-7500

December 27, 1989

Duane Pefley
Calmar, Inc.
333 Turnbull Canyon Road
City of Industry, CA 91745

SITE ASSESSMENT - CALMAR INCORPORATED (FILE NO. 102.055)

The workplan for the subject site assessment, received on November 14, 1989, has been reviewed. Although quite detailed in many respects it does not adequately address the crucial issues of additional subsurface and ground water investigation: (1) The proposed soil gas survey is of low sensitivity, (2) The groundwater investigation does not propose the necessary rigorously designed, constructed and developed monitoring wells, (3) Definition of aquifer parameters is not proposed, (4) Methods to refine flow direction and gradient are not proposed. A revised workplan must be prepared which addresses both the foregoing and the following specific comments:

SOIL GAS SURVEY

1. Any soil gas survey at this stage of investigation must be of high sensitivity. You have proposed a low sensitivity and quasi-quantitative program. The following are minimum conditions for a high sensitivity survey; details must be provided in the revised workplan:

   a. Analyses to be performed by field laboratory using gas chromatography equipped with FID, PID, ECD and/or Hall detectors.

   b. Detection limits of .1 to .01 μg/L must be achieved for soil gas analytes.

   c. Precise volumetric or flow rate information must support the proposed detection limits.

   d. 10 foot sample node grids must be established in areas of known contamination or significant source potential.

   e. 20 foot grids are acceptable in suspect areas and 50 foot grids are acceptable where overall screening is necessary.

f. Multi-depth sampling is required in areas where significant values are reported in shallow surveys.

g. Soil gas anomalies must be confirmed by driven undisturbed samples.

2. Location(s), Number and Depth

a. Utility Trench Outlets - Two to three nodes at all outlets are acceptable to establish presence or absence of contaminant in vadose zone. If volatile organic compounds (VOCs) are observed, then additional nodes must be emplaced to establish lateral extent.

b. Utility Trenches - Trench(es) that are indicated as VOC sources, either through the previous subsurface investigation or by (a) above must be investigated along their entire length.

c. Clarifier - The clarifier must be examined for leaks. This means that in addition to physical inspection borings are required at the junctions of the inlet and outlet piping with clarifier. Samples must be obtained at 1 feet below the bottom of joints and 5 feet below the bottom of the clarifier. Soil gas nodes should be emplaced in a grid out to 10 feet minimum. If anomalies are encountered the inlet and outlet line may need to re-traced.

d. Waste Storage Area - The waste storage area should be examined on a 10 foot grid basis.

e. Futura/Calmar Fenceline - Probe locations in the areas of Calmar discharge (e.g. former waste storage) must not be more than 10 feet apart.

f. Former Waste Storage Area - The former waste storage area must be examined on a 10 foot grid basis.

g. Warehouse - The reconnaissance array in the warehouse is acceptable as proposed.

h. Stockroom - The reconnaissance array in the stockroom is accepted as proposed.

i. Background - Acceptability of background measurements is subject to sufficient assurance that background areas are being sampled .

3. Specific problems with the proposed low sensitivity survey include:

   a. Staff of this Regional Board has not accepted that low sensitivity data proposed by Earth Technology is a substitute for high sensitivity surveys.

   b. Three inch diameter probe holes increase probability of atmospheric influences. Driven or "punched" probes having 1 inch or less bore, adequately sealed with bentonite to prevent atmospheric infiltration, are more appropriate.

   c. Iron or copper probes are more appropriate than PVC.

   d. Dependence on low sensitivity field PID and FID instrumentation, rather than field gas chromatographs having appropriate detectors, limits usefulness of the proposed survey.

   e. Neither the PID or FID proposed to select the ten (10) gas samples for laboratory analyses have sufficient "linear range sensitivity" (e.g. 0.1 ppm bottom end) nor chemical specific response. The PID's 10.2 eV lamp is not appropriate to detect a major site contaminant, 1,1,1-TCA, which has a significantly higher photo-ionization constant. Both instruments are principally designed for air monitoring, not for quantitative analytical work or for analytical screening.

   f. Necessity for proposed 24 hours lag time would be to allow soil gas to "equilibrate" with the filter pack is obviated with an active pumping/purging approach. There is no particular evidence provided that equilibrium is reached in 24 hours.

   g. The 2 liter Tedler bag approach, proposed to collect gas samples for laboratory analyses, is significantly less reliable for high sensitive surveys than methods which either pass a known volume of soil gas past carbon absorbers or collect a precise volume of soil gas.

   h. A promise of all soil gas analyses being completed within 72 hours is considerably less effective than a field laboratory. There are significant concerns about sample losses or possible contamination and possible need for sampling iterations.

i. No confirmation sampling is proposed. This is not acceptable. All anomalous concentrations must be confirmed with standard soil sampling techniques.

j. An argument which is presented regarding need to auger holes conflicts with the high sensitivity soil gas survey recently completed on the adjacent property (Acorn Engineering).

<u>Ground Water</u>

1. Additional monitoring wells must be proposed. Current wells were originally allowed without rigorous design, construction and development in order to obtain "first look" chemistry, to estimate flow direction and to comply with the contingency conversion requirement.

2. A minimum shallow monitoring well array for this site must consist of 2 upgradient wells and sufficient compliance point wells to cover off-site migration of site derived contaminants.

3. Cluster - wells are required to provide adequate compliance point monitoring. Initially a depth of 100-120 feet below ground surface (bgs) is needed.

4. Provide locations, rigorous design, construction and development protocols. Note for example, that this means the use of properly sized stainless steel screen in the saturated horizon with designed filter packs.

5. Provide details of proposed well development. Proper development technique must not have a long term effect on volatile constituents. Wells must be developed to produce non-turbid water, i.e. less than 5 NTU.

6. Propose well head survey and provide information concerning possible benchmark(s). The survey must tie to U.S.G.S., U.S.C. + G.S. or County "precision net" benchmarks. Coordinates must be provided as either UTM or California State System.

7. The proposed sampling protocols require clarification:

   a. Bi-monthly samples are required for a minimum of six (6) months after which a determination will be made as to reducing the sampling interval.

b. Indicate water level measuring protocol.

c. Do not purge the well to dryness. Sampling "soon after recovered" does not compensate for degassing of the water being sampled.

d. Temperature, pH, and specific conductance are to be used to determine when well being purged is in equilibrium with the formation water.

e. Separate samples must be obtained for floating constituents and for turbidity determination at the laboratory.

8. An aquifer testing program must be proposed.

PROPOSED SCHEDULE

1. The proposed schedule must be revised to reflect the full scope of the ground water investigation.

2. The final report is due to this agency at the completion of the soil gas survey and ground water investigation. Monitoring reports are required at the appropriate intervals. A separate final report is not required with the one year monitoring report. Monthly progress reports are required at the completion of each phase.

3. Five copies of the final report and all progress reports must be supplied.

A revised workplan is due to this Regional Board by December 15, 1989. The workplan must indicate the responsible registered individual party for such work. If you have any questions, contact Philip Chandler at (213) 266-7537.

ROY R. SAKAIDA
Senior Water Resource
Control engineer

RRS:PBC:mht

cc: Neil Ziemba, EPA, Region 9, Toxics & Waste Management Division
Dennis Dickerson, Department of Health Services, Toxic Substances Control Division
Bill Jones, Los Angeles County, Department of Health Services, Hazardous Materials Program
Carl Sjoberg, Los Angeles County, Department of Public Works, Underground Tanks Program
Seiichi Saito, Los Angeles County, Department of Health Services, Water and Sewage Unit
Robert Berlien, Counsel for Main San Gabriel Basin Watermaster
Thomas Stetson, Stetson Engineers, Inc.
✓ Mike Kammerzelt, Earth Technology Corporation

APPENDIX B

THE EARTH TECHNOLOGY CORPORATION, LETTER DATED JANUARY 22, 1990

The Earth Technology Corporation

[illegible]

January 22, 1990

Mitchell, Silberberg & Knupp
11377 West Olympic Boulevard
Los Angeles, California 90064

Attention: Mr. Arthur Fine

Subject: California Regional Water Quality Control Board (CRWQCB) Letter to CALMAR, Inc., dated December 27, 1989 and Meeting to Discuss the Points of This Letter at CRWQCB on January 12, 1990
Earth Technology Project No. 90-1007

Dear Mr. Fine:

In response to the CRWQCB's letter, and the items discussed during the January 12, 1990 meeting. Earth Technology's comments are listed below corresponding to items in the CRWQCB's letter.

Soil Gas Survey

1. The high sensitivity soil gas survey for the Phase II CALMAR Site Assessment will incorporate the following clarifications to the December 27, 1989 CRWQCB letter.

   a. The field laboratory specified in this item need not be California Certified.
   b. The field laboratory must be equipped as outlined in 1.a. (letter) to achieve the detection limits on vapor samples of 0.1 to 0.01 ug/L.
   c. An accurate flow rate will be achieved during sample collection using a computerized pump.
   d. Letter should read "potential source areas". This study will be conducted on a grid pattern in these areas. This will be a "one time" sampling per grid node point, with anomalies being sampled for vapors at deeper intervals (see 1.f.). The probe tips will be extracted after the vapor samples have been collected.
   e. No comment.
   f. The first sampling interval will be at four feet below ground surface (BGS) (deeper than one meter). Should significant levels of VOC's be detected in this interval, the probe will be driven deeper and sampled in one meter increments to the practical limit for this method (three to four meters BGS).
   g. No comment.

2. Location(s) Number and Depth

   a. No comment.
   b. The interior utility trenches will be subjected to vapor probe scanning if samples from the outlet areas reveal the detectable presence of VOC's.
   c. through i. No comment.

3. Comments and Clarifications beyond those in the CRWQCB letter may be summarized by the following.

   a. through h. The probes used for vapor collection will be metal (steel or copper) and be driven into place. The vapor samples will be collected using charcoal media or evacuated cylinders and will be analyzed by an onsite mobile laboratory.
   i. Where significant vapor sample concentrations are detected, they will be confirmed by subsequent collection and analysis of soil samples.

Groundwater

1. and 4. All wells placed at CALMAR to date (three monitoring wells and three 4-inch piezometers) have been recognized by the CRWQCB as having been constructed to rigorous design and construction standards. Development data for these wells will be provided in the upcoming water sample report. These wells are recognized as being valid sample points.
2. and 3. The request for deeper wells at this time is felt to be premature. Upon completion of the upcoming shallow subsurface vapor investigation and review of the data obtained, requirements for additional monitoring wells will be evaluated.
7. The wells at CALMAR are low producers of water. The wells will be sampled for floating constituents first, then purged (but at such a rate so as to minimize cascading or well dryness).
   b. through e. The well will then be sampled after 80% or greater recovery or within 24 hours, whichever comes first.
8. An aquifer testing program, to demonstrate overlapping of the radii of influence, will be proposed within the workplan.

Proposed Schedule

Upon submission of this document to the Board, it is requested that a revised due date for the Work Plan be set for February 9, 1990.

Please call me should you have any questions or comments at (213/495-4449).

Very truly yours,

THE EARTH TECHNOLOGY CORPORATION
Commercial Waste Management Division

D. Michael Kammerzelt

D. Michael Kammerzelt.
Senior Project Scientist

DMK:PSK05

APPENDIX C

SITE SAFETY PLAN FOR INSTALLATION OF SOIL VAPOR PROBES AND BOREHOLE DRILLING AT THE CALMAR FACILITY