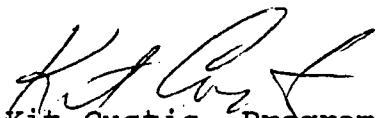


**Memorandum**

Date : AUG 28 1983

To : Hank Yacoub  
Supervising Water Resource  
Control Engineer  
Los Angeles Regional Water  
Quality Control Board



Kit Custis, Program Manager  
AB 1803 Follow-Up Program  
Division of Water Quality

From : STATE WATER RESOURCES CONTROL BOARD

Subject: REVIEW OF WORKPLAN FOR BENCHMARK  
TECHNOLOGY IN CITY OF INDUSTRY

Ms. Charlene Herbst and I have reviewed the proposed workplan for Benchmark Technology. The report proposes to use soil pore gas sampling in place of soil sampling to determine whether a leak of volatile organic solvents has occurred at seven specific areas. It is assumed that these are the only areas of possible solvent discharge since the workplan does not discuss in detail the historic uses at the site.

The following are comments and suggestions about the workplan:

- ✓ 1. What level of contamination in the soil gas will be considered "evidence of leakage"? Will any level of solvent be considered as good evidence of leakage or is there a background level?
- ✓ 2. How will concentrations of solvents in the air be used in calculating soil gas concentrations?
- ✓ 3. What "specific species" of "various volatile chemicals" will the study analyze? Are all chemicals used going to be analyzed?
- ✓ 4. Report on soil gas sampling should discuss what the detection limits for each chemical are for both the GC and the overall sampling system and discuss how they were calculated. Does the vacuum extraction cause a dilution in soil gas concentration? If so, by what amount and how was this calculated?
5. How does the field technician determine the proper time to take a sample? Are multiple samples taken? Is the sampling interval related to the rate of soil pore gas migration?

6. What is the effective radius of the soil gas extraction? Does this vary with soil type and moisture content?
7. What is the nature of the soil beneath the site? Are there any soil engineering reports which describe the subsurface? What effect will soil type have on the concentrations measured? Can a comparison between concentrations at different sampling points be made without soils data? Literature suggests that clayey soils and moist soils inhibit soil pore gas movement. Might this create problems in evaluating results? How will the study evaluate these factors without soil samples?
8. The workplan implies that the seven areas are the only potential sources of discharge. However, details about the site's processing and waste disposal practices are sketchy. The final report should describe the site's waste and solvent handling practices in detail. Are there any "waste tanks" which might have mistakenly received solvents? Experience in Santa Clara shows that acid waste or acid neutralization tanks mistakenly received solvents that eventually leak to ground water. Regional Board staff should determine whether this site is subject to any other ground water regulatory program and determine if this sampling workplan will satisfy those regulations.
9. The final report should contain a better map. One that is readable.
10. The direction of ground water flow should be determined based on available data. Some consideration should be given to sampling soil gas downgradient from the potential sources. Because solvent use at the site has substantially decreased over the last 3 to 4 years, plume may have migrated sufficiently downgradient to be out of the proposed sampling area. The proposed method of sampling only measures chemicals in the pore gases and not chemical adsorbed to soil particles. Therefore, the presence of chemicals in the soil will not be thoroughly evaluated. Since the purpose of the investigation is to determine if a discharge to ground water has occurred, some sampling of the ground water downgradient of the site is recommended.
11. The report should present the analytical calibration curves with the samples plotted on the curves. Photocopies of the chromatograms with labels of chemicals identified should also be included in the report's appendix.

If you have any questions or would like to discuss this further, I can be reached at (916) 322-9858 or ATSS 492-9858.

12. Interior sampling not conducted. To soil gas / 1 e. 7401

SENT TO STATE  
BOARD ON  
8/2/86 FOR REVIEW

203 North Golden Circle Drive  
Santa Ana, CA 92705  
(714) 835-6886  
(213) 581-7164  
Telex 68-3420

RAH  
**Woodward-Clyde Consultants**

RECEIVED

1986 AUG 1 AM 10:48

31 July 1986

QUALITY CONTROL BOARD  
L.A. REGION

California Regional Water Quality  
Control Board - Los Angeles Region  
107 South Broadway, Suite 4027  
Los Angeles, California 90012-4596

Attention: Mr. Raymond K. Delacourt

**SUBJECT: WORKPLAN FOR CONDUCTING SUBSURFACE INVESTIGATION,  
BENCHMARK TECHNOLOGY FACILITY, 200 SOUTH TURNBULL  
CANYON ROAD, CITY OF INDUSTRY  
(LARWQCB FILE NO. 86-22)**

Dear Mr. Delacourt:

This workplan is submitted on behalf of Benchmark Technology in response to your letter dated 13 June 1986. We understand that the purpose of the investigation described in this workplan is to evaluate the past integrity of solvent storage, reclamation, and process use areas. We are submitting this workplan at this time in order to conform to the submittal deadline specified to Mr. Ed Nelson of Benchmark by Mr. Jonathan Bishop of your office (telephone conversation, 14 July 1986).

#### **SOLVENTS AND SOLVENT USE AREAS**

We have reviewed the operations at the Benchmark facility with Mr. Ed Nelson, who is Facilities Manager for Benchmark Technology. According to Mr. Nelson, the use of solvents has decreased significantly over the last few years, and the volume used annually is now approximately 5 percent of that



used three or four years ago. Because of the recent change in procedures, we reviewed the historical use of solvents at the facility in order to identify the areas where solvents were used previously, as well as those where solvents are currently used or handled.

As a result of this review, we have identified the following locations at the Benchmark facility that we propose to investigate:

1. Above ground storage tanks (Area No. 1, Figure 1)  
This storage area, which is located adjacent to the chemical storage shed, has been in use since the mid-1960s. The solvents stored and handled in this area are 1,1,1-trichloroethane and methylene chloride.
2. Drum storage/dispensing area (Area No. 2, Figure 1)  
This metal storage shed was constructed in 1983 and has been used for dispensing isopropyl alcohol, methyl ethyl ketone (MEK), and acetone from drums since that time.
3. Interior drum storage area (Area No. 3, Figure 1)  
This area is inside a warehouse, known as the "chemical storage shed", located behind the main manufacturing building. The area has been used since the mid-1960s for the storage of acetone, MEK, and isopropyl alcohol. Chemical dispensing was discontinued in this area in 1983 when the outside dispensing facility (Area No. 2) was constructed.
4. Former solvent stripper area (Area No. 5, Figure 1)  
This area was formerly the site of the solvent strippers that are now located inside the manufacturing building (Area 6, Figure 1). Methylene chloride was used in this area from the mid-1960s until early 1983.
5. Developer and still (Area No. 5, Figure 1)  
This area is located in the photo process room, inside the manufacturing building. 1,1,1-Trichloroethane has been used in this area since the early 1970s.
6. Solvent strippers (Area No. 6, Figure 1)  
This area has been used for stripping methylene chloride since early 1983, when the strippers in the chemical

storage shed were moved to this location. The strippers are located inside the manufacturing building, in an area known as the "outer layer etch room."

7. Piping runs (Area No. 7, Figure 1)

Two pipes, one carrying fresh solvent from the above ground storage tanks (Area No. 1), and one carrying spent solvent back to the storage area, are enclosed in a 5-foot diameter concrete-lined utility tunnel. These pipes carry methylene chloride and 1,1,1-trichloroethane.

According to Mr. Nelson, the Benchmark facility in the City of Industry has never had underground tanks; all chemical storage has been in drums (Areas No. 2 and 3) or in the above ground tanks in Area No. 1 (Figure 1).

**PLAN OF INVESTIGATION**

The map of the facility, including the locations of known solvent use, handling, and storage areas, past and present, is presented as Figure 1. As indicated above, and as can be seen on the map, several of the areas identified for investigation are located inside structures. This makes a study based on soil borings difficult, and from a logistical perspective, impractical.

The soils at the site are alluvial in nature. Although details regarding the stratigraphy are not available, our experience in the area suggests that one can expect an interbedded sequence of sands, silts, and clays, with occasional gravelly zones. Where coarse grained soils are present, liquids commonly move vertically downward with little lateral spreading. Therefore, if leakage has taken place in the past, the horizontal zones through which the liquids moved may be very restricted. This suggests that

the chances of encountering such zones with a limited program of soil borings may be low.

In contrast to liquid movement, vapors from volatile organic chemicals spread broadly through the vadose zone by molecular diffusion; movement is away from source areas toward regions of lower concentrations. The solvents of interest at the Benchmark facility all are significantly volatile. In that the solvent use and storage areas to be investigated are all paved, if leakage has taken place, vapors from the solvents are likely to be trapped beneath the concrete or asphalt.

In view of the logistical problems associated with drilling soil borings inside the buildings, where most of the solvent use/storage areas are located, and given the volatile nature of the solvents, Woodward-Clyde proposes to conduct the subsurface investigation using soil gas techniques rather than soil borings. It is our opinion that this approach will allow better areal coverage, and will likely be more informative than an investigation based on soil borings.

In conducting the soil gas survey, Woodward-Clyde will insert 3/4-inch diameter hollow metal probes, perforated at the tip, approximately four to five feet below the surface. Small diameter holes will be bored through the concrete or asphalt, and the probes will be driven to depth with a hydraulic device. A vacuum will be applied, and the soil gas will be drawn through a tube. Samples will be withdrawn with a syringe through a membrane (septum) in the sampling line, and will then be injected directly into a gas chromatograph (GC) for analysis.

Woodward-Clyde plans to use its field-operable Varian 3400 gas chromatograph equipped with electron capture and flame ionization detectors. This will allow the identification of the specific organic species that may be present. Ambient air and nitrogen blanks will be run before each sample is analyzed. At least four calibration standards will be used to derive calibration curves, from which the concentrations of the various volatile chemicals will be estimated.

We plan to conduct the investigation by inserting and sampling 26 probes at the approximate locations shown on Figure 1. The probes will be distributed as follows:

Area No. 1	Above Ground Tanks	6 probes
Area No. 2	Dispensing Area	2 probes
Area No. 3	Drum Storage	2 probes
Area No. 4	Former Solvent Strippers	3 probes
Area No. 5	Developer/Still	3 probes
Area No. 6	Solvent Strippers	4 probes
Area No. 7	Piping Runs	<u>6 probes</u>
	Total	26 probes

If the soil gas survey indicates the presence of volatile organic chemicals in the subsurface, soil borings will be used to confirm the presence of such chemicals. If this step proves necessary, soil samples will be collected and chemically analyzed in a laboratory certified by the Department of Health Services.

#### REPORT

Upon completion of the field investigation, Woodward-Clyde will prepare a report to be submitted to the Regional Water

Quality Control Board. The report will include the details of the sampling rationale, the sampling and testing procedures, and our conclusions regarding possible contamination of the subsurface due to organic solvents having leaked from the Benchmark facility. If evidence of leakage is discovered, the report will also include recommendations for additional investigations that may be needed to delineate the three-dimensional extent of contamination, and for remedial action, if such appears to be required. The report will be prepared and signed by a registered geologist.

#### **REQUEST FOR APPROVAL OF THE WORKPLAN**

On behalf of Benchmark Technology, we request that you review this work plan and provide your approval. Woodward-Clyde recognizes that the recommended approach differs from that suggested in your letter dated 13 June 1986. It is our opinion that this plan has several distinct advantages over a soil boring program. These include:

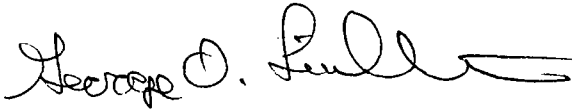
1. The soil gas sampling can be conducted within the structures in which the solvent use/storage areas are largely located, and will thus allow investigation of the subsurface immediately beneath the areas of potential leakage.
2. In that organic vapors are likely to be far more widespread than will soils affected by liquid contaminant migration, evidence of leakage, if such has occurred, is more likely to be discovered using soil gas than using soil borings.
3. Due to the economy of the soil gas survey approach, and to its relatively non-disruptive nature, many more locations can be sampled using the soil gas approach than would be possible with soil borings.

4. The field-operable GC will allow the identification of specific organic compounds while in the field; this will facilitate the timely reporting of the results.
5. Soil gas survey techniques are now well proven, and previous work has demonstrated the ability of this approach to detect and delineate subsurface volatile organic contamination.

We appreciate your consideration of this workplan and will be pleased to discuss the plan with you. If you have questions, or wish more detail, we are prepared to meet with you at your convenience.

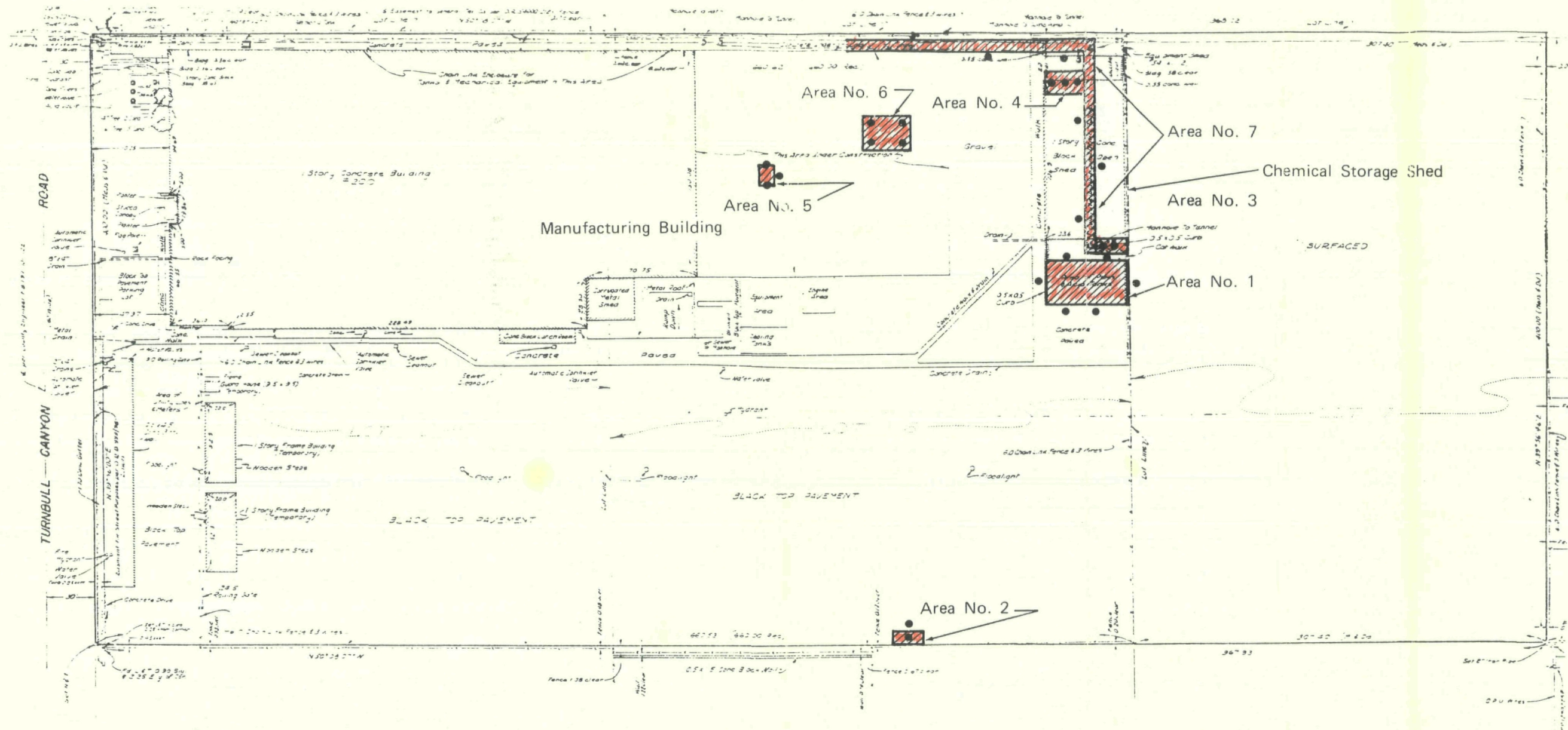
Very truly yours,

WOODWARD-CLYDE CONSULTANTS



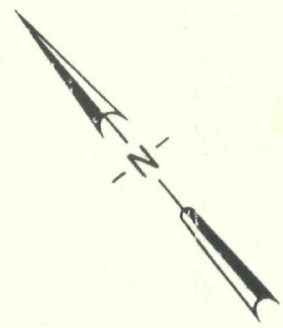
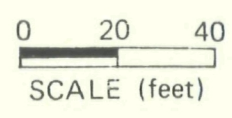
George O. Linkletter, Ph.D.  
Manager, Waste Management/  
Water Resources  
California Registered Geologist  
No. 003728


GOL:pk



**LEGEND**

- Proposed Soil and Gas Probe Location



<b>Woodward-Clyde Consultants</b> 	
BENCHMARK TECHNOLOGY FACILITY MAP SAMPLING LOCATIONS	
Project No. 42202A	Fig.
BENCHMARK SOILS	1