ESSO TUTU CAR CARE CENTER
Investigation Plan
Quality Assurance/Quality Control Plan

Submitted to
U.S. EPA REGION II
U.S.V.I. D.P.N.R.

Carlos M. Belgodere, Belgodere & Associates
Project Officer

Ana Gloria Ramos, ESSO Standard Oil Co. S.A. Ltd.
Project Manager

1. Project Name: Esso Tutu Car Care Center, Investigation Plan
   St. Thomas, U.S.V.I.

2. Project Requested By: Department of Planning and Natural Resources, U.S.V.I./EPA Region II

3. Date of Request: September 17, 1987

4. Date of Project Initiation: 30 days after EPA/DPNR approval of the Investigation Plan

5. Project Officer: Carlos M. Belgodere
   Belgodere & Associates

6. Quality Assurance Officer: Omar Muñiz
   Sharetech

7. Project Description

   A. Objective and Scope Statement: The proposed soil gas and soil sampling investigations are directed at determining the presence, if any, of hydrocarbon

463 PADRE BERRIOS ST. HATO REY, P.R. 00919 • (809) 754-0348

contamination in the soil matrix underneath the ESSO Tutu Car Care Center. If as a result of the soil gas soil sampling investigation, it is determined that the Esso Car Care Center is not the source or has not contributed to the contamination of local aquifer, adequate releases will be sought from EPA/DPNR. In the event that it is found that product releases, if any, from the Esso Car Care Center have significantly contributed to or is the source of the local aquifer contamination, volatile organic compound recovery wells will be installed, if adequate and necessary, above and below the ground water table.

B. Data Usage: The data collected during this investigation will be used to determine the impact, if any, of the Car Care Center operation on local soils. The analytical results from the soil investigation will be used to determine if underground tanks and pipelines at the facility have contributed to the local aquifer contamination or if any contamination found on site immigrated from another source outside the Car Care Center. If needed, soil gas data and soil physical properties descriptions could be used to support a feasibility study for the site.

C. Sampling Network Design and Rationale: Ten soil profile sampling locations will be used to determine the presence and concentration of hydrocarbon contamination. See Figure 1. Due to the natural slope of the area, sampling locations 1 through 5 are located around and down-stream from the underground tanks and pipelines at the facility. Sampling locations 6 through 10 provide coverage upstream from other sources. Validated hydrocarbon concentration data from soil gas analysis will be compared with hydrocarbon concentration levels found in the local groundwater in order to establish background hydrocarbon levels.

D. Monitoring Parameters and their Frequency of Collection: Ten continuous (every two feet) soil sampling profiles will be obtained to describe local soil physical characteristics. A continuous (every two feet) soil gas analysis will be conducted until the soil/ground water interface is reached. Soil gas analysis will be based on gas chromatograph.

E. Parameter Table:

Parameter	Number of Samples	Sample Matrix	Sample Preservation
Benzene, toluene, ethyl-benzene, xylene	100 (approx.)	Soil Vapor	Dry ice

TUT 003 0824

8. Project Fiscal Information: Not applicable

9. Schedule of Tasks and Products: A schedule of tasks and products is presented in Figure 2.

10. Project Organization and Responsibility: The following is a list of key project personnel and their corresponding responsibilities:

Morales, Alvaro	Sampling Operations
Belgodere, Carlos	Sampling QC
EQ Laboratory	Laboratory Analysis
Ruiz, Jose	Laboratory QC
N/A	Data Processing Activities
N/A	Data Processing QC
Muñiz, Omar	Data Quality Review
N/A	Performance Auditing
N/A	System Auditing
Belgodere, Carlos	Overall QA
Roman, Angel	Field Coordinator
Belgodere, Carlos	Project Officer
Ramos, Ana Gloria	Project Manager

Organization chart is presented in Figure 3.

Data Representativeness: The distribution of sampling locations is sufficiently dense to provide valid sampling. The ten sampling profile network coverage gives a reasonable assurance that any hydrocarbon contamination moving into or out of the site will be detected.

Data Comparability: Three soil gas samples will be obtained every two feet at each sampling location. One sample will be field tested for BTEX using a HNU Gas Chromatograph. One out of five soil gas samples will be sent to E.Q. Laboratory in P.R. for results comparability. The third sample will be preserved for the duration of the study in case of discrepancies between field analysis results and E.Q. Laboratory results.

Data Completeness: The data to be collected will be acquired using standard techniques and methods. The soil gas analysis will determine the presence, if any, of hydrocarbon contamination in the soil matrix underneath the Car Care Service Center. The soil sampling will provide information on soil physical conditions underneath and around the Car Care Center. The results of the soil sampling analyses will be examined for interpreting soil gas data in order to avoid misinterpretation of site condition and the development of erroneous conclusions.

11. Sampling Procedures: The soil gas depth profile sampling procedures will be done as follows: 10 soil gas sampling continuous profiles will be achieved by driving a KV-14 probe 24" into the ground. Tubing made of tygon or similar material will be lowered and sealed with bentonite at the surface to prevent ambient air from entering the sampling point. A low suction pump (peristaltic) will be used to extract soil gases from the probe tip depth.

Soil samples for moisture and size determination will be obtained using split spoon driven cores (ASTM D-1586). Soil samples will be stored in wide mouth 16 oz. clear glass jars.

12. Sample custody procedures: All samples will be logged on chain-of-custody forms following collection. These forms acknowledge the acquisition, possession and analysis of each sample. Figure 4 shows copy of Belgodere & Associates Chain-of Custody Form to be used on this project.

13. Calibration Procedures and Preventive Maintenance:

Field Sampling Equipment

Item	Task	Frequency
KV-14 Probe	Scrub, steam clean	After each sample
Pump tubing	Soak, scrub, rinse	After each sample
Split spoon	Soak, scrub, rinse	After each sample
Core barrel	Scrub, steam clean	After each sample

Program for On Site Volatile Organic Analysis

Scope and Application

The procedures presented here will be used to measure volatile organics on site in a variety of locations. This method is recommended for use by, or under the direct supervision of analysts experienced in the operation of Gas Chromatography (GC) and in the interpretation of chromatograms.

This method provides chromatographic conditions for the detection of volatile organic compounds. Samples are collected using gas tight syringes and are introduced into the gas chromatograph by direct injection through an injection port.

Separation of compounds is achieved by using a chromatographic column selected for the compounds of interest. A temperature program is used in the gas chromatograph to optimize separation of the organic compounds. Detection is achieved by a Flame Ionization Detector (FID).

If interferences are encountered, the method provides an optional second gas chromatographic column that may be helpful in resolving the compounds of interest from the interferences.

Interferences

Before processing any samples, the analyst should demonstrate daily through the analysis of an organic-free water or injection of zero grade nitrogen or air, that the entire system is interference free. Standard quality assurance practices should be used with this method. Field replicates are collected to validate the precision of the sampling technique. Laboratory replicates will be analyzed to validate the precision of the analysis. Where doubt exists over the identification of a peak on the gas chromatogram, known

standards will be utilized to confirm results and to compare retention times of compounds in two different columns.

Apparatus and Material

Gas Chromatograph

HNU Model 301 complete with a programmable gas chromatograph suitable for on-column injection of samples is used with all required accessories, including FID, column supplies, recorder, standards, and a data system for measuring peak areas.

Gas Chromatograph Column

3 m x 1/8" SS packed with 30% OV-275 on Chromosorb Paw, 80-100 mesh.

Detector

Dual Flame Ionization

Syringes

A 1 ml gas tight glass syringe with Teflon plunger and sample preservation valve for sample injection.

A 1.0 ul glass syringe for preparation of standards.

Reagents

Organic Free Water

Distilled Water

Stock Standards

Reagent grade Benzene, Toluene, Ethyl benzene, Xylene.

Zero Grade Air, Hydrogen and Nitrogen.

G. C. Calibration — External Standardization

Calibration standards are prepared by adding a 1.0 ul concentration of a compound into a glass container sealed with teflon septums and allowing to completely volatilize at room temperature. A sample of the gas is withdrawn using a 1.0 ml gas tight syringe and injected into the gas chromatograph for analysis. The concentration of the vapor standard is determined from the specific gravity of the liquid injected and the volume of the glass container. These standards must be prepared fresh daily.

Analyze each calibration standard according to the procedure being used and tabulate peak area responses against the concentration in the standard. The result can be used to prepare calibration curves for each compound. In addition, if the ratio of responses to concentration is constant over the working range, linearity through the origin can be assumed and a calibration factor can be used instead of a calibration curve. The calibration concentration and respective peak areas will then be input into the recorder/data collection system so that subsequent sample concentrations will be calculated automatically.

The working calibration curve or calibration factor must be verified each working day by the measurement of calibration standards.

Concentration Calculations

Ambient air concentrations will be made automatically in the recorder by comparison of the calibration standards to the peak area response of the injected air samples.

Soil vapor samples are analyzed as above. The concentration of the volatile components in the soil vapor will be measured based on the external calibration standards as described in this section.

G. C. Quality Control

Before processing any samples, the analyst should demonstrate through the analysis of a distilled water blank or Zero Grade air sample that all glassware and reagents are interference-free. Each time a set of samples is extracted or there is a change in reagents, a method blank should be processed as a safeguard against laboratory contamination.

14. Documentation, Data Reduction, and Reporting

A. Documentation: Field daily logs, records of sample locations and depth intervals will be maintained for all samples tested. All records and calculations regarding measurements or testing will become a permanent record of this investigation and shall be done neatly, dated, and signed by the preparer. Field Activities Log, Site Base Map, Boring Logs, and Chain-of-Custody Record Form to be used in this project are presented in Appendix A.

B. Data Reduction and Reporting: Quality control for data reduction and reporting will be carried out by checking all calculations, reductions or transfers. Work sheets presented in Appendix A are designed to organize the data in a clear and logical manner.

15. Data Validation: Following completion of the analyses and before the final data is provided, the results of the laboratory verification program will be compared with the field results. If results are outside the accepted control limits, analytical results will be held until the data validation problem is resolved.

All field and laboratory data will be entered into Belgodere & Associates Computer System. After completion of the analyses, a Preliminary Laboratory Results Report will be printed and returned to the Data Quality Review Officer for review and validation. A Final Report will be printed after the certification by Data Quality Review Officer. This report will be signed and approved by the Laboratory Manager before being forwarded to Esso for submittal to EPA and DPNR.

16. Reports: At the end of all field and laboratory work and pursuant to the Investigation Plan Schedule included in Figure 2, a certification of field activities and Final Report will be submitted to EPA and DPNR. Final Report will contain the results of the investigation as well as discussion of the findings.

FIGURES

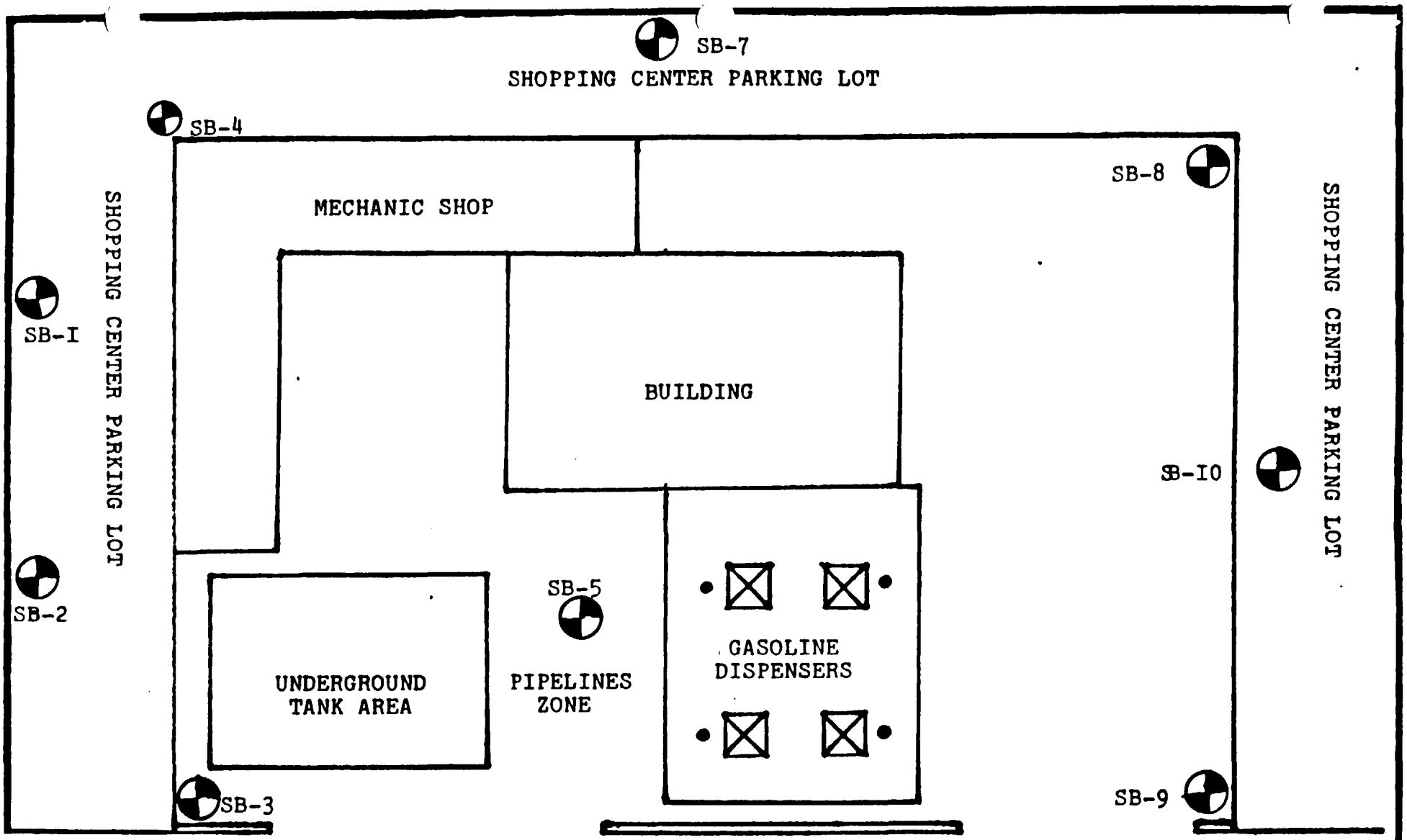


FIGURE I

GENERAL SOIL SAMPLING LOCATIONS

BELGODERE & ASSOCIATES
ENVIRONMENTAL-GEO CONSULTANTS

TUT 003 0837

ESSO TUTU CAR CENTER
SITE INVESTIGATION PLAN SCHEDULE

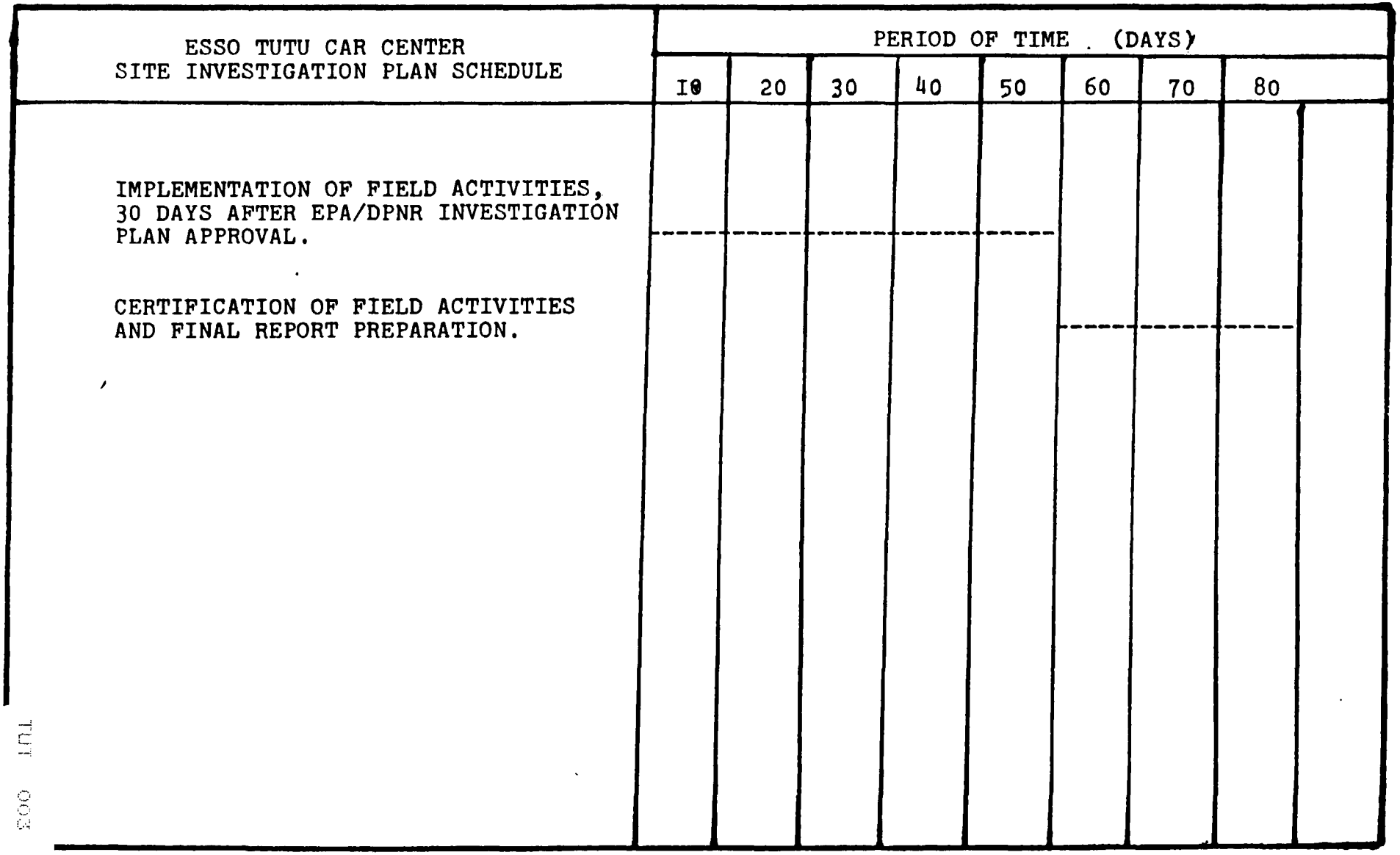


FIGURE 2

ORGANIZATION CHART

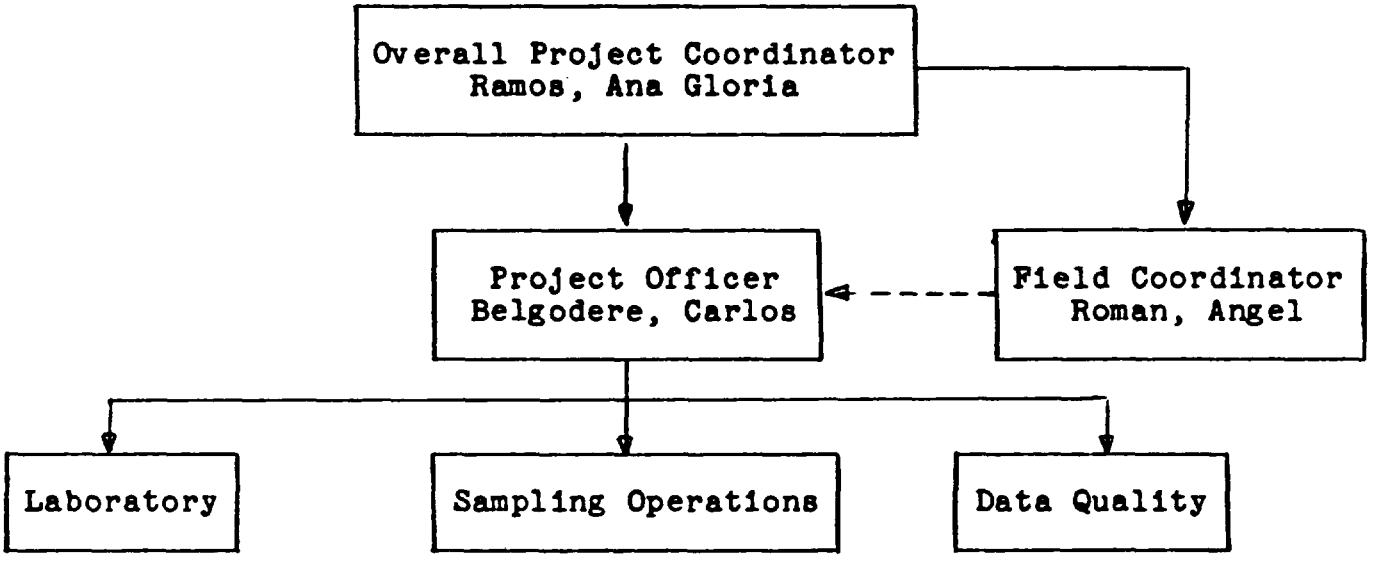


Figure 3

BELGODERE & ASSOCIATES

ENVIRONMENTAL—GEO CONSULTANTS

CHAIN OF CUSTODY RECORD

Name of Unit and Address		
Sample Number	Number of Containers	Description of Samples

Person Assuming Responsibility for Samples	Time	Date

Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody

FIGURE 4

TUT 003 0840

APPENDIX A

BELGODERE & ASSOCIATES

ENVIRONMENTAL—GEO CONSULTANTS

FIELD OPERATIONS RECORD

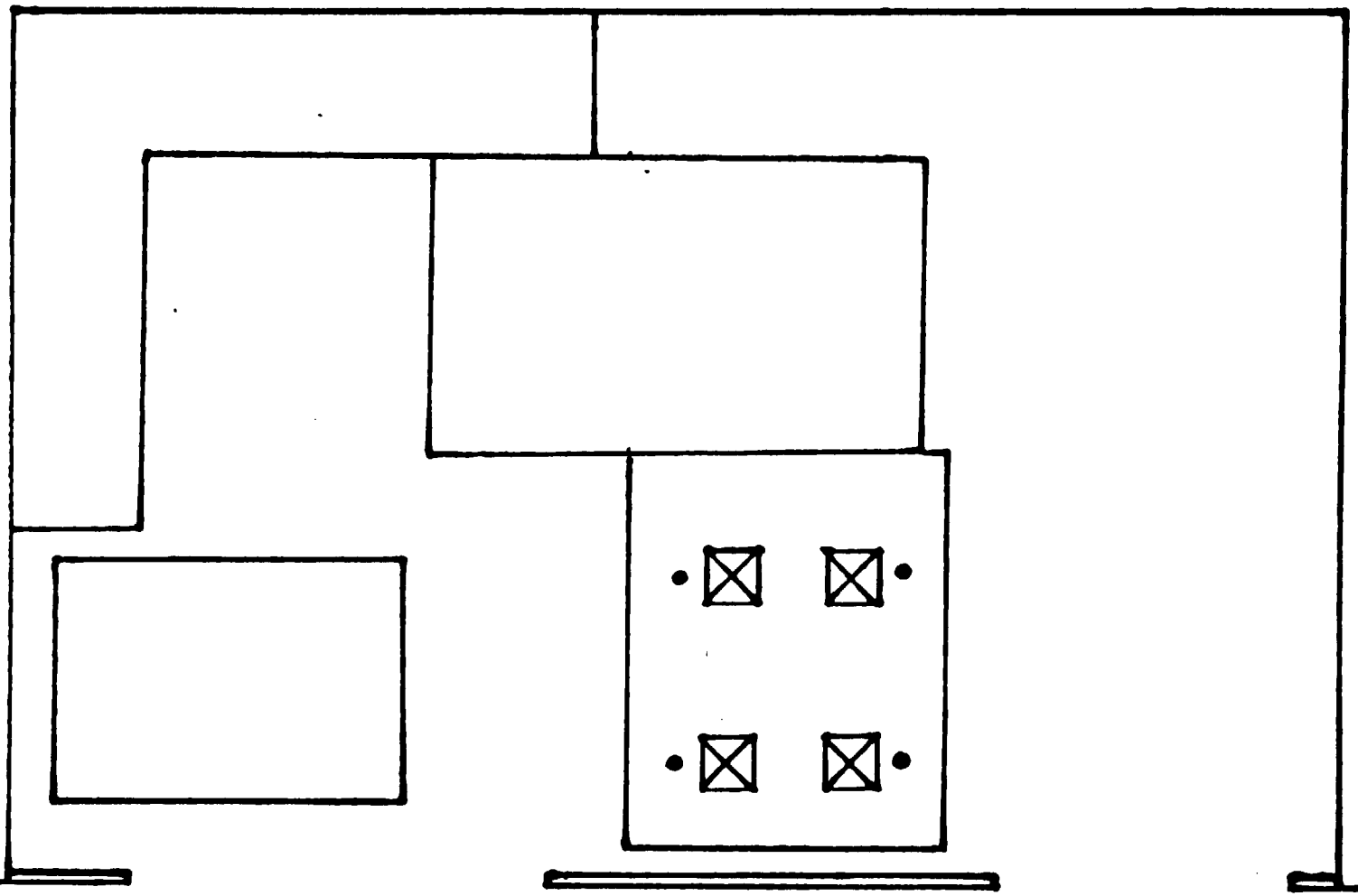
PROJECT:_____ DATE_____
PROJECT#:_____ REQUESTED BY_____
LOCATION:_____ FIELD CREW_____
TIME OF ARRIVAL_____ _____
TIME OF DEPARTURE_____ _____

OBJECTIVES OF FIELD WORK_____

TASK TO BE COMPLETED_____

MATERIALS, TOOLS, EQUIPMENT, PERMITS, PERSONNEL REQUIRED TO COMPLETE TASK:

COMMENTS: (SITE CONDITIONS, REASONS FOR ANY TASKS MODIFIED OR INCOMPLETE, OTHER SUPPLIES REQUIRED, COMMUNICATIONS DURING FIELD WORK:



BELGODERE & ASSOCIATES
ENVIRONMENTAL—GEO CONSULTANTS

BELGODERE & ASSOCIATES

ENVIRONMENTAL—GEO CONSULTANTS

PROJECT _____ JOB NO _____

_____ DATE _____ BY _____

DEPTH ft.	SAMPLE #	SOILS DESCRIPTIONS AND CLASSIFICATIONS	CONCENTRATIONS (ppm)			
			B	T	E	X
5						
10						
15						
20						

BELGODERE & ASSOCIATES

ENVIRONMENTAL—GEO CONSULTANTS

CHAIN OF CUSTODY RECORD

Name of Unit and Address

Sample Number	Number of Containers	Description of Samples

Person Assuming Responsibility for Samples | Time | Date

Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody
Sample Number	Relinquished By:	Received By:	Time	Date	Reason for Change of Custody